

日本小児整形外科学会雑誌

Journal of Japanese
Paediatric Orthopaedic
Association

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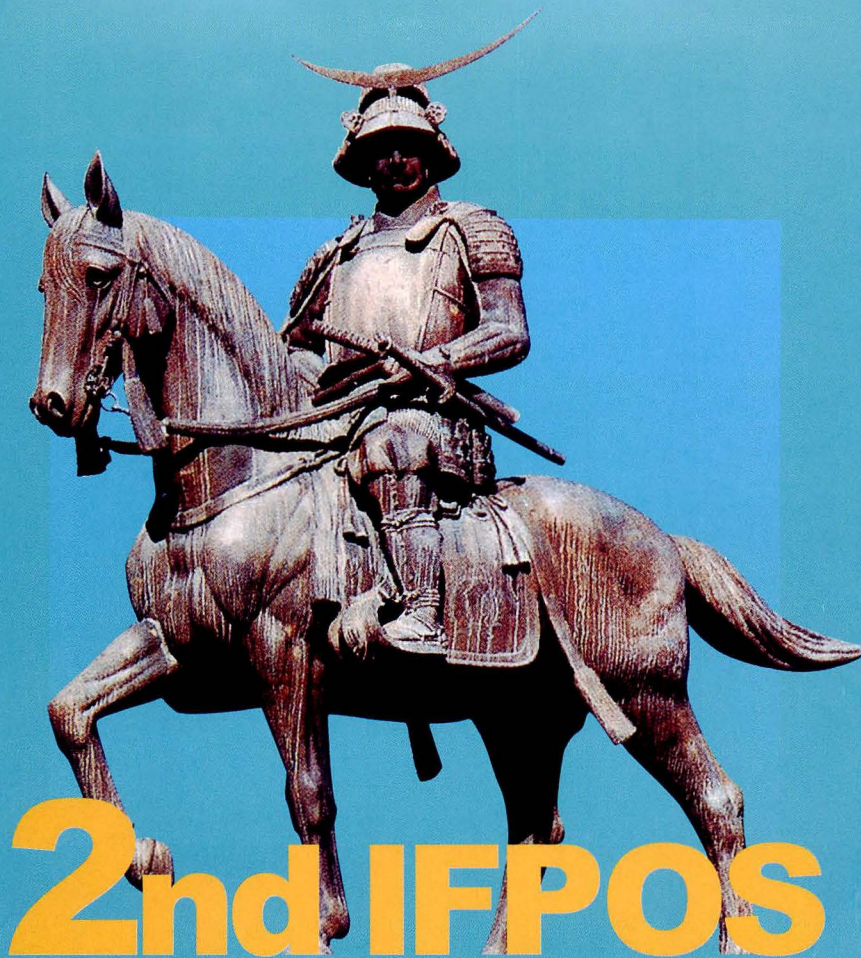
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The 2nd Congress of International Federation of
Paediatric Orthopaedic Societies
combined with the 12th Annual Meeting of
the Japanese Paediatric Orthopaedic Association

November 1st-3rd, 2001
Sendai International Center,
Sendai, JAPAN

CONGRESS BOOK



The 2nd Congress of
the International Federation of Paediatric
Orthopaedic Societies

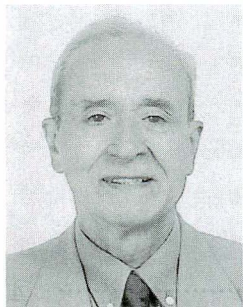
Combined with
The 12th Annual Meeting of
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November 1st to 3rd
Sendai International Center
Sendai
JAPAN

Congress Book

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Message from IFPOS President

Dear Colleagues,

The 2nd Congress of the International Federation of Paediatric Orthopaedic Societies (IFPOS) will soon be held. The Local Organizing Committee and the Scientific and Educational Committee of IFPOS have worked hard to prepare for this triennial Congress.

A great number of abstracts were submitted from different parts of the world. The main fields of paediatric orthopaedics will be covered in the final program, which will certainly be interest to you.

Being combined with the 12th Annual Meeting of the Japanese Paediatric Orthopaedic Association, this Congress will afford you a broad view of various topics. Evident also will be the fellowship among paediatric orthopaedists that has grown since the foundation of IFPOS. Simultaneous translation will be provided for presentations given in Japanese.

This Congress is held with the support of the Paediatric Section of the Asia Pacific Orthopaedic Association (APOA), the Japanese Orthopaedic Association (JOA) and the SICOT. Moreover, UNICEF, with its concern for the protection of children that is devoted to the alleviation of musculoskeletal disorders, supports the Congress.

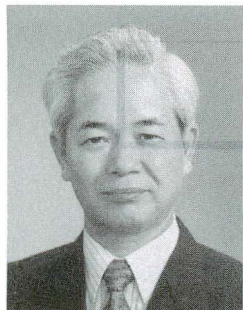
A sightseeing program has been organized for the accompanying persons. But you will also have the opportunity to visit some of the nicest places in Sendai and its surrounding areas.

I am eager to meet you soon in Sendai.

Welcome to all of you

A handwritten signature in black ink, consisting of a stylized 'H' followed by a series of loops and a long horizontal stroke.

Prof. Henri BENSÄHEL
President of IFPOS



Message from President of the 2nd IFPOS Congress

Dear Colleagues,

Sadly enough, unprecedented terrorists' attacks in New York and Washington D.C. killed more than 5000 innocent people in the first year of the 21st century that should have begun with great hopes. These atrocities implanted terror and apprehension about the future into the minds of children throughout the world, those on whom our hopes are based. The success of the 2nd Congress of the International Federation of Paediatric Orthopaedic Societies (IFPOS) in Sendai, therefore, becomes all the more important.

This Congress is held to promote the aim of the IFPOS, which is the unification of paediatric orthopaedic societies throughout the world. We, as professionals, should be willing to exchange our knowledge and strengthen our solidarity without regard for differences in religion and culture towards the ultimate goal of relieving children from musculoskeletal disorders and injuries. This is a declaration of paediatric orthopaedists who love peace and children.

The JPOA has devoted much time to preparing for this Congress since the first IFPOS Congress held at Madrid in 1998. Then, it finally received the honor of hosting the Congress in combination with its 12th Annual Meeting under the sponsorship of UNICEF and the Paediatric Section of the Asia Pacific Orthopaedic Association (Formerly the Western Pacific Orthopaedic Association). As President of the 2nd IFPOS Congress and President of the JPOA, I hope that every participant enjoys his or her stay in Sendai and makes many lifelong friends during the Congress.

A handwritten signature in black ink that reads "Shoichi Kokubun". The signature is fluid and cursive, with the first name "Shoichi" and last name "Kokubun" clearly distinguishable.

Shoichi Kokubun, MD
President of the 2nd IFPOS Congress
President of JPOA

Committees

2nd IFPOS Organizing Committee

<i>President</i>	Henri Bensahel, France
<i>President Elect</i>	Morris Duhaime, Canada
<i>Vice-President</i>	Shoichi Kokubun, Japan
<i>Secretary</i>	Carlo Milani, Brazil
<i>Associate Secretary</i>	J. Andy Sullivan, USA
<i>Treasurer</i>	Seok-Hyun Lee, Korea
<i>Councillors</i>	Gregorio M. Arendar, Argentina
	Jack C.Y. Cheng, Hong Kong
	Federico Fernandez-Palazzi, Venezuela
	Andre Kaelin, Switzerland
	F. W. Marsden, Australia
	Jan W. van der Eijken, The Netherlands
<i>Ex-Officio</i>	Nando de Sanctis, Italy

2nd IFPOS Reading Committee

<i>Chairman</i>	Michael J. Goldberg		
<i>Members</i>	Anthony Catterall	Klaus Parsch	Shlomo Weintraub
	Paulo Bertol	Jorge Groiso	Chiaki Hamanishi
	Kwang Jin Rhee	Alfred D. Grant	Wallace Lehman
	Ian P. Torode	Haruhito Aoki	

Board of JPOA

<i>President</i>	Shoichi Kokubun		
<i>Board of Directors</i>	Haruhito Aoki	Toshio Fujii	Chiaki Hamanishi
	Seiichi Ishii	Yoshiaki Ishii	Yukihide Iwamoto
	Kikuo Kameshita	Tomihisa Koshino	Torao Kusakabe
	Takashi Matsuo	Hirotsugu Oda	Susumu Saito
	Toyonori Sakamaki	Masato Sato	Katsuro Tomita
	Hidezo Yoshizawa		

Local Organizing Committee

<i>Honorary Advisors</i>	Shigeo Matsuno, Sapporo
	Yoichi Sugioka, Fukuoka
	Takao Yamamuro, Kyoto
<i>Chairman</i>	Shoichi Kokubun, Sendai
<i>Vice-Chairman</i>	Chiaki Hamanishi, Osaka
<i>Secretary-General</i>	Tetsuro Sato, Sendai

General Information

Dates & Venue

Nov. 1-3, 2001

Sendai International Center

Aobayama, Aoba-Ku, Sendai 980-0856, JAPAN

TEL : 022-217-4771 FAX : 022-217-4772 (opening hour : as same as the secretariat desk)

Secretariat (Registration) Desk

The desk will be located at the Lobby of Hotel Metropolitan Sendai on Oct. 31st and at the 2nd Floor of Sendai International Center from Nov. 1st to the 3rd.

The desk will be open:

Oct. 31st	13:00-20:00	at Hotel Metropolitan Sendai
Nov. 1st	8:00-18:00	at Sendai International Center
Nov. 2nd	8:00-13:00	at Sendai International Center
Nov. 3rd	8:00-16:00	at Sendai International Center

Main Meeting Rooms

2nd IFPOS Oral Presentations	ROOM 1	(2F Sakura)
12th JPOA Oral Presentations	ROOM 2 & 3	(3F Shirakashi)
2nd IFPOS Poster Exhibits	POSTER ROOM	(2F Hagi & Tachibana)
12th JPOA Poster Exhibits	LOBBY of 3rd Floor	

* Coffee and light meal will be served at the Poster Room through Nov. 1st to the 3rd.

Namecards

Participants must wear their namecards at all times during the Meeting.

Delegates: Blue

Accompanying Persons: Pink

Organizing Committee and Staff: White

Official Language

The official language of the Congress is English. Simultaneous interpretation between English and Japanese will be available in ROOM 1.

Certificates

Certification of presenters and attendances will be issued at the Secretariat Desk upon request.

Cloak

The cloak will be located at the 1st Floor of Sendai International Center from Nov. 1st to the 3rd. It will be open during the meeting.

Internet Service

There will be several computers with free internet service available at the 2nd Floor of the congress site from Nov. 1st to the 3rd.

Scientific & Business Information

Main Topics

Adults Consequences of Paediatric Orthopaedic Conditions

Symposia

IFPOS Symposium 1 (Nov. 1st)

Chairperson: Ken N. KUO

"Late Consequences of Children's Bone and Joint Infections"

IFPOS Symposium 2 (Nov. 3rd)

Chairperson: Takashi MATSUO, Dale R. BLASIER

"Cerebral Palsy"

JPOA Symposium 1 (Nov. 1st)

Chairpersons: Morris DUHAIME, Toshio FUJII

"Developmental Dysplasia of the Hip"

JPOA Symposium 2 (Nov. 3rd)

Chairperson: Carlo MILANI, Makoto KAMEGAYA

"Legg-Calvé-Perthes Disease"

Presidents' Lecture

1. Introduction to the Pathophysiology of the Foot in Children : From Normality to Deformities
Henri BENSACHEL
2. Tissue Engineering Approaches in the Management of Growth Defects in Children
Eng Hin LEE
3. Vascular Malformation of the Lower Extremity and Their Management
James R. KASSER
4. Long-Term Outcomes in DDH
Michael K. D. BENSON
5. The Hip in Cerebral Palsy
Patricia M. de Moraes Barros FUCS
6. Shortening Spinal Osteotomy and its Application
Shoichi KOKUBUN

History of Paediatric Orthopaedics in Japan (POSTER)

- | | |
|--|---|
| 1. Outline of History including that of JPOA
Kikuo KAMESHITA, Chiaki HAMANISHI | 4. Legg-Calvé-Perthes Disease
Kazuo HIROSHIMA, Wook-Cheol KIM |
| 2. Developmental Dysplasia of the Hip ;
Screening & Prevention
Toshio FUJII, Genji FUJII | 5. Slipped Capital Femoral Epiphysis
Masato SATO, Atsushi KITA |
| 3. Developmental Dysplasia of the Hip ; Treatment
Megumi HONDA, Toyonori SAKAMAKI | 6. Wryneck
Kou ODA |

7. Clubfoot

Haruhito AOKI, Haruyasu YAMAMOTO

8. Cerebral Palsy

Takashi MATSUO, Ryoichi SHIBA

9. Spinal Deformity

Sadaaki NAKAI, Yutaka NOHARA

10. Muscular Contracture

Shoichi KOKUBUN

For IFPOS Oral Presenters (ROOM 1)

Each Presenter has a 5-minute to present followed by a 4-minute discussion. It will be strictly controlled by the session's presider.

35 mm Kodak single slide projector and Computer projector are available. Computer presenters must bring their own Personal Computer and connector. Please download materials of your presentation on the Hard Disk of your PC. Please remember not to bring CD-R, Floppy Disk and Zip only. We strongly suggest you bring slides for back-up.

For Symposia

Presentation and Discussion time: Please follow the chairperson's instructions.

Projector: same as Oral Presenters

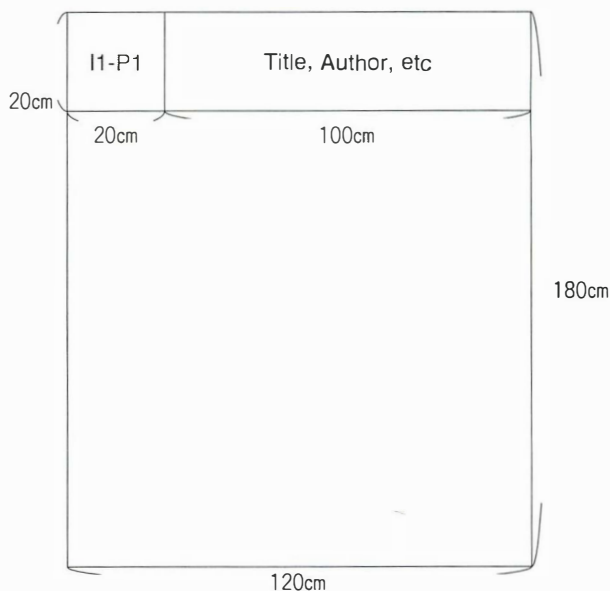
For Poster Presenters

Poster size is 120cm wide x 180cm high. Please put your poster onto the designated board. The session number of the presentation and thumbtacks will be prepared by the secretariat. (The size of the session number is 20cm square.) Title, Author's name, Institute, City and Country should be prepared by the presenter on a different piece of paper of under 100cm width.

Posters will be discussed by the participants at the breaks from November 1st to the 3rd.

Poster mounting: Nov. 1st, 8:00-10:00

Poster removal: Nov. 3rd, 14:00-16:00



Preview Room

Oral Presenters must preview their materials prior to presentation.

It is best for all who are scheduled to present before 10:30am on Nov. 1st, to preview their materials on Oct. 31st, the day before.

Opening hours:	Oct. 31st	13:00-	Hotel Metropolitan Sendai 5F Matsu-no-ma
	Nov. 1st	8:00- 18:00	Sendai International Center 2F ROOM4
	Nov. 2nd	8:00- 13:00	Sendai International Center 2F ROOM4
	Nov. 3rd	8:00- 17:00	Sendai International Center 2F ROOM4

Advance Meeting with your Interpreter

There will be simultaneous interpretation in English and Japanese in Room1.

All presenters in Room1 must have briefing with their interpreters before their presentations.

Date & time have been sent to all presenters, so please come to the "Briefing Room" at the informed time.

Briefing will be held at Hotel Metropolitan Sendai on Oct. 31st and at the Congress Site through Nov. 1st to the 3rd.

Opening hours:	Oct. 31st	13:00-	Hotel Metropolitan Sendai 5F Matsu-no-ma
	Nov. 1st	8:00- 18:00	Sendai International Center 2F anteroom
	Nov. 2nd	8:00- 13:00	Sendai International Center 2F anteroom
	Nov. 3rd	8:00- 16:00	Sendai International Center 2F anteroom

Business Meetings

IFPOS

Oct. 30th, Tuesday

IFPOS Board Meeting	Hotel Metropolitan Sendai 3F Fuji-no-ma	18:00-20:00
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Nov. 1st, Thursday

President's Meeting	Sendai International Center Room 8	12:30-13:30
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JPOA

10月31日(水)

国際委員会	ホテルメトロポリタン仙台 4階 萩の間	12:00-14:30
理事会	ホテルメトロポリタン仙台 3階 藤の間	15:00-16:30
評議員会	ホテルメトロポリタン仙台 3階 曙の間	17:00-18:00

11月1日(木)

編集委員会	仙台国際センター 第6会議室	12:30-13:30
総会	仙台国際センター 第1会場	17:25-17:40

Instructions to Authors

The Journal of The Japanese Paediatric Orthopaedic Association welcomes original articles in English that contribute to paediatric orthopaedic problems and advances in patient care. Original manuscripts (those not published elsewhere except in abstract form) will be accepted from all countries, subject to peer review by the Editors and Editorial Board.

Submissions.

Submit four complete sets of each manuscript (one original and 3 duplicates) with tables, illustrations, and photos, in English. Manuscripts and accompanying illustrations that have not been accepted will be returned when possible. Submitted manuscripts may be revised by the editors without any notice prior to publication.

Form of manuscripts.

* *The first title page* of each manuscript should include the article title, authors' names and affiliations, name, address, telephone and fax numbers, e-mail address of the person to whom proofs and reprints should be addressed, and up to five key words. Indicate specific affiliations of each author.

* *The page following the title page* should include a brief abstract of up to 200 words describing the purpose, study design, results, conclusions and clinical relevance of the study.

* *The text* of the manuscript should follow this sequence: Introduction, Methods, Results, Discussion, Acknowledgements, References, Tables, and Figure Legends. The text must be in double-spaced, typewritten form with a 2.5-cm (1 inch) left margin. The average length for articles (includes abstract, text and references) should not exceed 10 double-spaced pages.

* *Tables* should be typed neatly, each on a separate sheet, with title above and any notes below. Explain all abbreviations.

* *Illustrations* can be graphs, drawings, and photos. The number of figures and tables together should be limited to 6. They should be numbered in the order they appear in the text, unmounted, identified on the back with the manuscript title and their tops plainly marked, and cited in text by number. All illustrations should be glossy prints of professional quality. Color illustrations will not be accepted.

* *Figure legends* should appear on a single page at the back of the manuscript. Each figure should have a separate, fully explicit legend; all sections of the figure and all abbreviations and symbols should be clearly defined.

* *References* are to be numbered alphabetically and cited in text by superscript number. The reference section should be typed double-spaced, following the sample formats given below. Abbreviate journal titles according to the abbreviations approved by Index Medicus. Give complete information for each reference, including titles of journal articles, names of all authors when there are three or fewer (when four or more, list the first three authors followed by "et al"), and inclusive pagination. The first and last pages of each reference should be submitted.

Examples

1. Aronson DD, Zak PJ, Lee CL et al: Posterior transfer of the adductors in children who have cerebral palsy. A long term study. J Bone Joint Surg 73-A: 59-65, 1991.
2. Kruse RW, Bowen JR, Heinhoff S: Oblique tibial osteotomy in the correction of tibial deformity in children. J Pediatr Orthop 9: 476-482, 1989.
3. Tachdjian MO: Pediatric Orthopedics, Saunders. Philadelphia, 769-856, 1972.
4. Ogden JA: The uniqueness of growing bone. In Fractures in Children (Rockwood CA et al ed), Lippincott, Philadelphia, 1-86, 1972.

Address for Contributions

Send each entire manuscript by mail to:

The Japanese Paediatric Orthopaedic Association office, Department of Orthopaedic Surgery, The National Children's Hospital, 3-35-31 Taishi-do, Setegaya-ku, Tokyo (154-0004);tel (fax) +81-3-3424-8383.

For Japanese Attendance (日本人参加者の方へ)

1. 口演発表者へのお知らせ

第2および第3会場(3F)が第12回日本小児整形外科学会口演会場です。
発表形式が第1会場(2nd IFPOS)と異なりますので、ご注意ください。
発表は日本語ですが、スライドは英語でご作成ください。

発表形式および口演時間について

1. 発表はスライド・単写です。35mm標準マウントをご使用ください。コンピュータープレゼンテーションは出来ませんので予めご了承ください。
2. スライドは発表の30分前までにスライド受付にて試写確認の上、ご提出ください。また、ご発表後に直ちにお受け取りください。
3. 口演時間 5分、討論時間 3分です。定められた時間を厳守してください。
4. 次演者は、前演者が登壇されたら次演者席におつきください。

2. ポスター発表者へのお知らせ

ポスターはすべて英文で作成ください。

展示期間および設営・撤去時間について

設営：11月1日(木) 8:00~10:00

展示：11月1日(木) 10:00より3日(土) 14:00まで

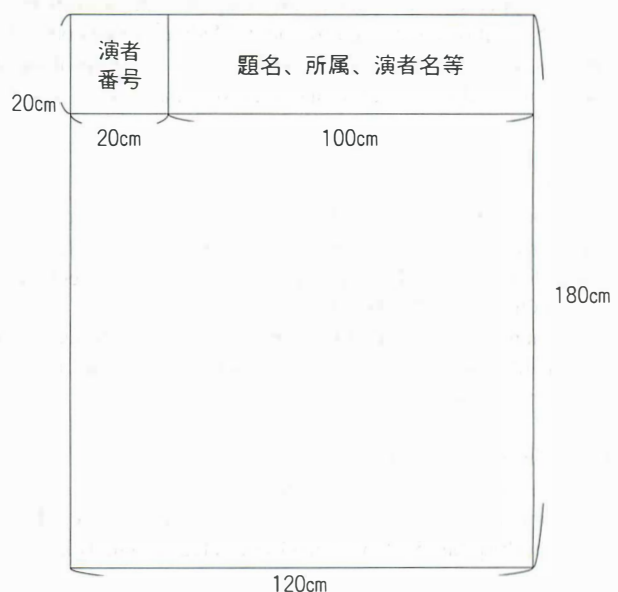
撤去：11月3日(土) 14:00~16:00

質疑応答について

会期中の休憩時間に質疑応答を行います。

展示方法について

1. パネルの大きさは180cm(縦)×120cm(横)です。
2. 演題番号は事務局で準備しますが、題名、所属、演者名等の表示は各自で準備の上、所定のパネルに掲示してください。



3. 年会費及び新入会受付

11月1日(木) 9:00~17:00

11月2日(金) 9:00~12:00

11月3日(土) 9:00~16:00

いずれも Registration Desk 横(仙台国際センター 2階)にて行います。

なお、第12回日本小児整形外科学会の演者、共同演者はともに会員に限ります。

未入会の方は日本小児整形外科学会事務局(国立小児病院整形外科内)宛に必要書をご請求の上、入会手続きをお取りください。

入会手続きがお済みでない方は学会誌に氏名が掲載されませんので、ご注意ください。

4. 原稿の提出について

学術集会における発表内容は日本小児整形外科学会雑誌に掲載することを原則とします。掲載用原稿は平成14年1月31日までに、簡易書留にて日本小児整形外科学会事務局(国立小児病院整形外科内)宛にご送付ください。原稿は投稿規定に従い作成してください。

5. 教育研修講演について

1. 第12回日本小児整形外科学会 ランチョンセミナーの2講演はいずれも日本整形外科学会教育研修会として認定されております。(1講演1単位)
2. 受講ご希望の方は、教育研修講演受付にて申込書をご記入の上、受講料(1講演1,000円)を添えて、お申込ください。
3. 講演終了後、「日整会保存用」の受講証明書に、必要事項をご記入の上、会場出口にて係員にご提出ください。
4. 講演途中で入退場した場合には、受講証明書は交付いたしません。
5. 日整会研修手帳をお持ちで教育研修講演の受講証明を希望される方は、講演終了後、教育研修講演受付にて捺印しますので、必要事項を所定欄にご記入の上、受講料領収書とともに提出してください。
6. 平成7年度以降に日本整形外科学会に入会された方は、研修手帳を必ずご持参ください。研修手帳を提出されない場合は、受講証明はいたしません。
※ 受講証明書または証明印を必要としない方は受講料不要です。

日本小児整形外科学会雑誌投稿規定

(平成 3 年 6 月 28 日制定)

(平成 11 年 4 月 10 日改訂)

1. 主著者および共著者は日本小児整形外科学会会員であること。
2. 論文は和文もしくは英文で、未発表あるいは他誌に発表予定のないもの。

3. 論文は

- 1) タイトルページ (1 枚)
- 2) 和文要旨 (400 字以内)
- 3) 英文要旨 (200 語以内)
- 4) 本文および文献 (和文 15 枚以内, 英文 12 枚以内)
- 5) 図表 (10 個以内)

4. 和文論文は B 5 判 400 字詰原稿用紙を用いる。ワードプロセッサ使用の場合も同様に B 5 判に 20 字×20 行=400 字にて印字し 1 枚とする。

用語は医学用語辞典、整形外科用語集に準拠する。数量を示す文字は m, cm, mm, μ l, g, mg, を用い、また図 1, 表 1, 症例 1 などとする。

英文論文は A 4 判タイプ用紙にダブルスペースで、周辺に十分な余白を置く。

5. タイトルページには以下のものを記す。

- 1) 論文の題名, 2) 著者名, 3) 所属機関名 (番号をもって各著者の所属を示す), 4) キーワード (英語と日本語を併記) 5 個以内, 5) 連絡先住所, 電話番号。

和文論文については 1) - 3) の英文を記す。

英文論文については 1) - 3) の和文を記す。

6. 図, 表は別紙に記入または添付し, 本文中に挿入箇所を指定する。図表には標題, 図には説明を付ける。図はそのまま製版できるような正確, 鮮明なものとする。カラー写真は実費負担とする。

7. 文献は原則として必要なもの 10 個程度とし, 末尾にアルファベット順に並べ, 本文中に右上肩に片括弧にて文献番号を示す。

著者名は 3 名までは全著者を, 4 名以上は「著者 3 名ほか (et al)」とする。

誌名の省略は正式のものとし, 英文誌では Index Medicus にしたがう。

引用文献については, 最初の頁と最後の頁のコピーを必ず添付すること。

記載例を下記に示す。

(例)

- 1) Aronson DD, Zak PJ, Lee CL et al: Posterior transfer of the adductors in children who have cerebral palsy. A long term study, J Bone Joint Surg 73-A: 59-65, 1991
- 2) Kruse RW, Bowen JR, Heinhoff S: Oblique tibial osteotomy in the correction of tibial deformity in children. J Pediatr Orthop 9: 476-482, 1989.
- 3) Schuler P, Rossak K: Sonographische Verlaufskontrollen von Hüfttreifungsstörungen. Z Orthop 122: 136-141, 1984.
- 4) 安竹重幸, 腰野富久, 斎藤知行ほか: 小児 O 脚, X 脚の短下肢矯正装具による治療. 臨整外 25: 17-22 1990.
- 5) Tachdjian MO: Pediatric Orthopedics, Saunders. Philadelphia, 769-856, 1972.
- 6) Ogden JA: The uniqueness of growing bone. In Fractures in Children (Rockwood CA et al ed), Lippincott, Philadelphia, 1-86, 1972.
- 7) 吉川晴三: 先天性内反足, 臨床整形外科学 (大野藤吾ほか編) 7 巻, 中外医学社, 東京, 837-859, 1988.
8. 論文は十分に推敲を重ねて提出すること。英文論文については, 本学会と契約している校正者を紹介する。料金は投稿者が負担するものとする。
9. 原稿 (図表および引用文献の最初・最終頁を含む) はそのコピー 3 部を添えて提出する。但し図の内, X 線像, 組織所見などは, 原図と同じものを付すること。
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13. 原稿は (簡易) 郵便書留にて下記に添付する。

〒154-8509

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国立小児病院 整形外科内

日本小児整形外科学会事務局

Tel (Fax) (03) 3424-8383

Registration

Fees

	Until August 31st, 2001	After September 1st, 2001
Delegate	¥25,000	¥30,000
Accompanying Person	¥10,000	¥10,000
Congress Banquet	¥10,000	¥10,000

For Registered Person

The secretariat will send a registration slip to persons who have already registered in advance. They will receive their namecards in exchange with the registration slip at the secretariat (registration) desk. Please do not forget to bring it.

On-site Registration

Please proceed to the secretariat (registration) desk. Only cash will be accepted as payment for on-site registration.

Optional Events Applicants

The tickets for Optional Events are inside the envelope handed to you at the Secretariat (Registration) Desk. Pre / Post Congress Tour will be handled at the Tour Desk (JTB).

Accommodation

Hotel Metropolitan Sendai
1-1-1, Chuo Aoba-ku, Sendai
Tel: 022-268-2525 Fax: 022-268-2521

Sendai Plaza Hotel
2-20-2, Honcho, Aoba-ku, Sendai
Tel: 022-262-7111 Fax: 022-262-8169

Sendai Hotel
1-10-15, Chuo Aoba-ku, Sendai
Tel: 022-225-5171 Fax: 022-268-9325

Sendai Washington Hotel
2-2-10, Omachi, Aoba-ku, Sendai
Tel: 022-222-2111 Fax: 022-222-2797

Sendai Tokyu Hotel
2-9-25, Ichiban-cho, Aoba-ku, Sendai
Tel: 022-262-2411 Fax: 022-262-4109

Hotel Richfield Sendai
2-2-2, Kokubuncho, Aoba-ku, Sendai
Tel: 022-262-7755 Fax: 022-222-7611

Hotel Metropolitan Sendai is the official hotel of this congress. Several social events are planned there. Shuttle bus services are available between Hotel Metropolitan Sendai and the congress site (Sendai International Center) and between Sendai Plaza Hotel and the congress site from November 1st to the 3rd at 7:30am.

More Information

Climate

Autumn (September to November) is one of the best seasons of Sendai for a visit. Average temperatures are 14 degrees Celsius in October and 9 degrees Celsius in November.

Clothing

In autumn, one should be necessary for a sweater and / or jacket.

Currency Exchange

Only Japanese yen is accepted at regular stores and restaurants. Banks and several hotels are at your disposal for exchanging currency. Banks open Monday to Friday from 9:00 to 15:00.

Tipping

Tips are not necessary anywhere, even at hotels and restaurants in Japan.

Consumption Tax

A 5% consumption tax is added to all purchases in Japan. Some places will have tags of tax included amount. (for example train ticket and so on.)

Electrical Appliance

Japan operates on 100 volts for electrical appliances. The frequency is 50 Hz in eastern Japan including Sendai and Tokyo (60 Hz in western Japan including Osaka, Kyoto and Nagoya).

Shopping

Many shops are open from 10:00 to 19:00, Monday to Sunday.

Messages

Messages Board will be available at the Secretariat (Registration) Desk at the congress site for your convenience.

English Hotline

There is an English hotline service of Sendai City for foreign visitors in Sendai seeking to obtain information regarding travel, city administration and assistance in helping to overcome communication problems. Ticket reservations cannot be made through these services.

Tel: 022-224-1919 (10:00 to 20:00 daily except on national holidays)

Tour Desk (JTB)

The staff will help participants with tour registrations and ticket reservations. The Desk will be open at Hotel Metropolitan Sendai on Oct. 31st and at the Congress Site through Nov. 1st to the 3rd.

Opening hours:	Oct. 31st	15:30-18:30	Hotel Metropolitan Sendai 1F
	Nov. 1st	10:00-17:00	Sendai International Center 2F
	Nov. 2nd	10:00-12:30	Sendai International Center 2F
	Nov. 3rd	10:00-16:00	Sendai International Center 2F

Loople Sendai

The Loople Sendai bus will take you to the famous places in central Sendai with ease. Find out for yourself how fun and convenient a bus trip can be! With a one-day ticket that allows you to use the bus as much as you like within a day, it offers a great way to enjoy Sendai.

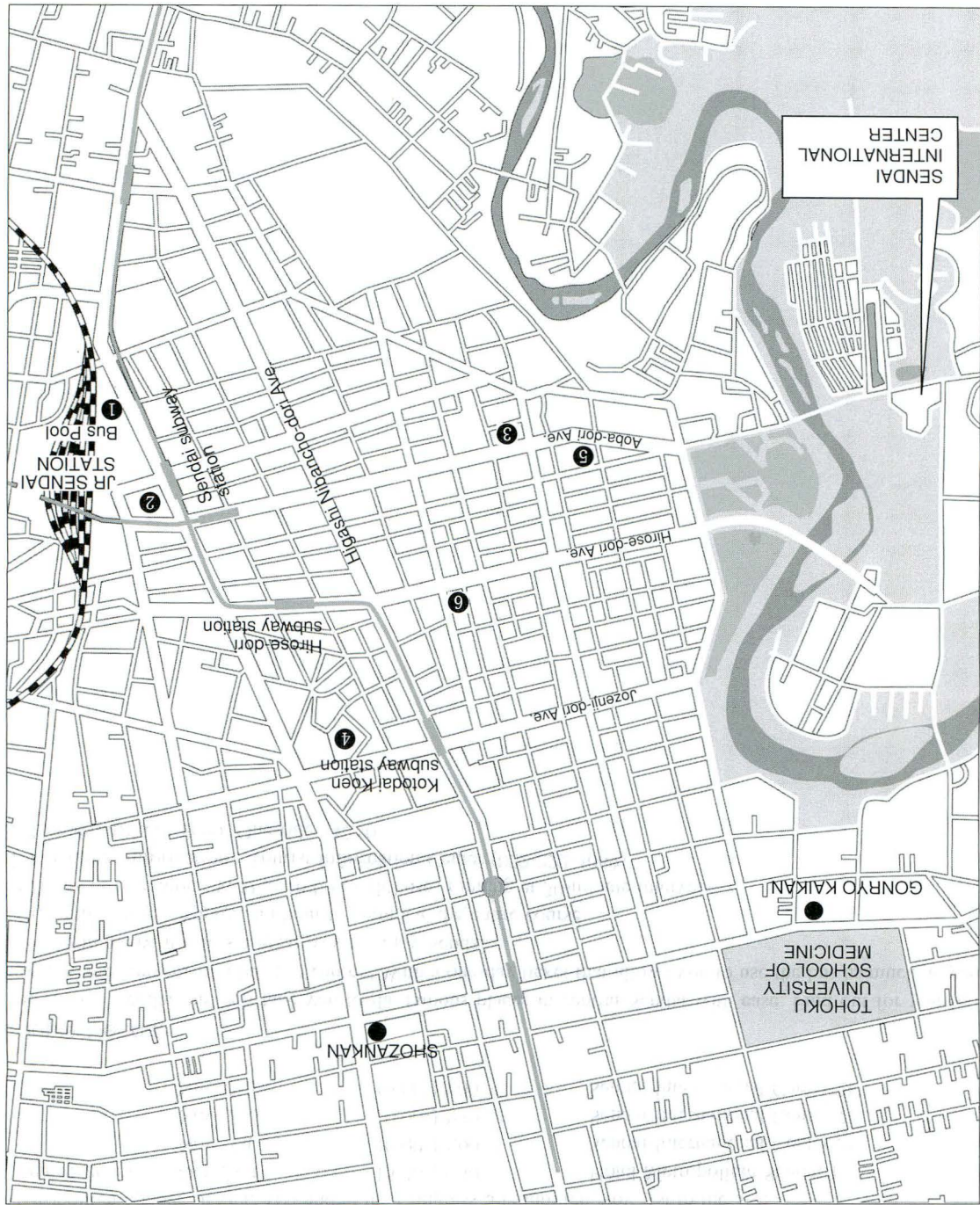
※ Length of ride : Approx. an hour to complete the entire course

※ Hours of operation : 9:00 to 16:00 (with buses running at 30-minute intervals)

※ For further information : Tourist Information Center (022-222-4069)

※ One-day ticket : ¥600 One-ride : ¥250

SENDAI CITY



Accommodation

- ① Hotel Metropolitan Sendai
- ② Sendai Hotel
- ③ Sendai Tokyu Hotel
- ④ Sendai Plaza Hotel
- ⑤ Sendai Washington Hotel
- ⑥ Hotel Richfield Sendai

Access to the congress site (Sendai International Center) from JR Sendai Station

- Bus : 10 minutes from JR Sendai Station
- Taxi : 7 minutes from JR Sendai Station (about ¥1,000)
- On Foot : 30 minutes from JR Sendai Station (Straight along Aoba-dori Ave.)

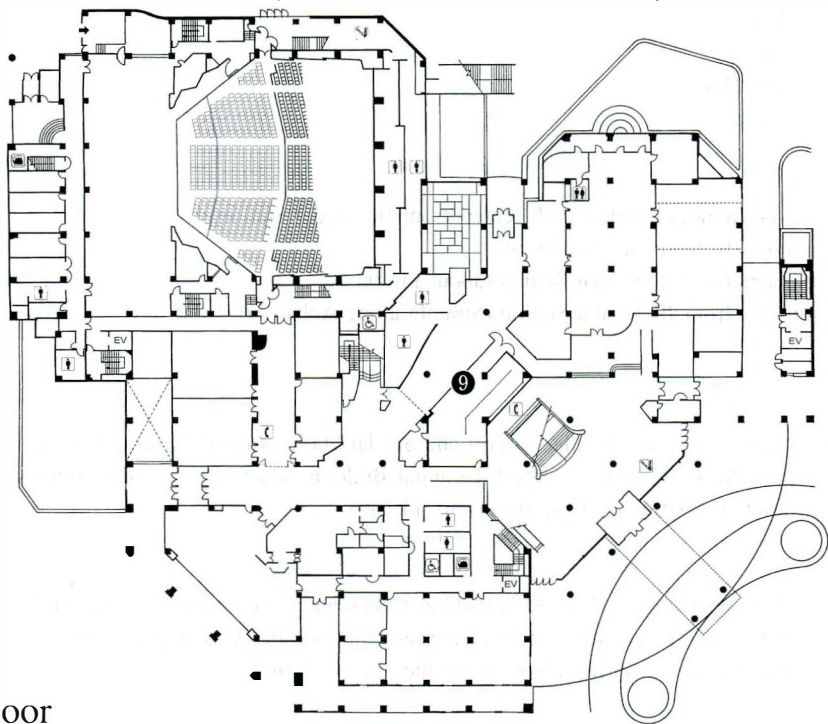
Airport Shuttle Bus

A shuttle bus is in service between Sendai Airport and Sendai Station (about 40 min one-way) on a daily basis. The bus departs from the Sendai Airport Terminal Building at approximately 10-minute intervals. One-way fare for adults is ¥910 (round-trip tickets are ¥1,640)

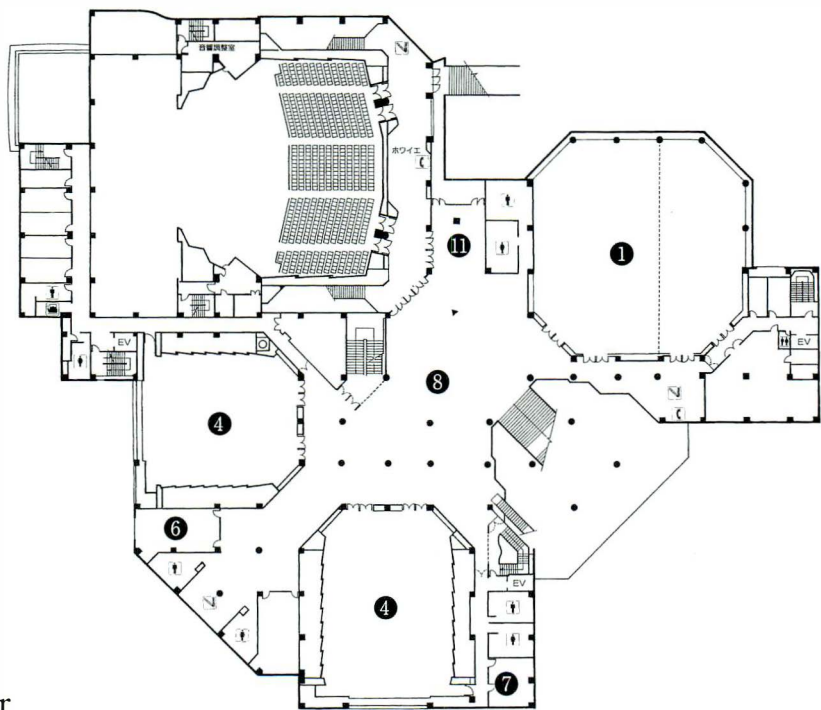
Shuttle Bus Service

There will be shuttle buses between Hotel Metropolitan Sendai and the congress site (Sendai International Center), and between Sendai Plaza Hotel and the congress site (one bus will stop at 'Gon-ryo Kaikan', the aluminus of Tohoku University) from Nov. 1st to the 3rd at 7:30am.

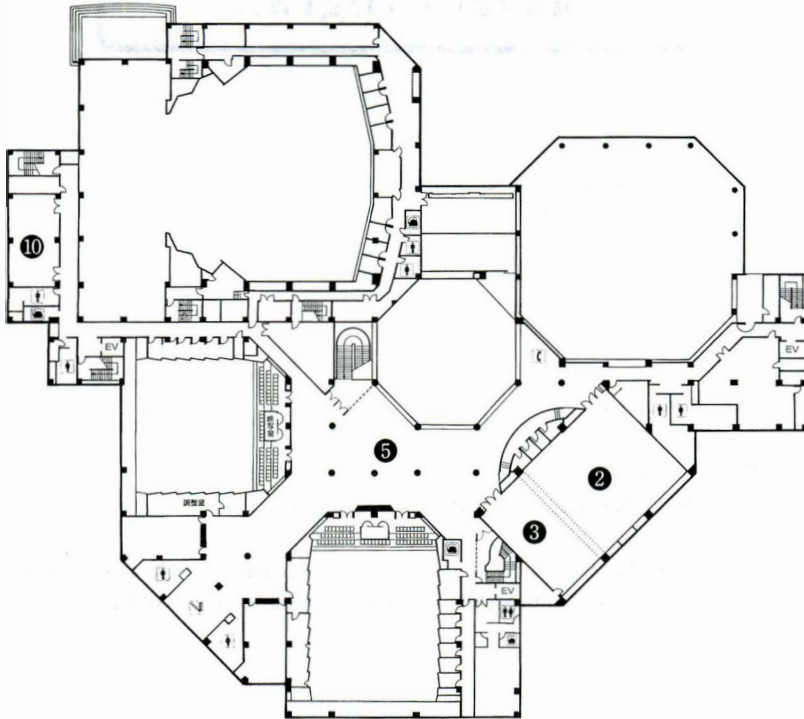
Congress Site
(Sendai International Center)



1st Floor



2nd Floor



3rd Floor

- ① ROOM 1 (Sakura) IFPOS Oral
- ② ROOM 2 (Shirakashi) JPOA Oral (Only Japanese)
- ③ ROOM 3 (Shirakashi) JPOA Oral (Only Japanese)
- ④ IFPOS POSTER, Exhibition & Coffee Break (Hagi&Tachibana)
- ⑤ JPOA POSTER
- ⑥ Preview Room (ROOM4)
- ⑦ Briefing Room with Interpreter (anteroom)
- ⑧ Secretariat (Registration) Desk & Tour Desk (JTB)
- ⑨ Cloak
- ⑩ Room 8 (presidents' meeting room)
- ⑪ Internet Service

Social Program

Get-together

Date & Time: Oct. 31st, 18:30-20:00

Venue: Hotel Metropolitan Sendai 4th Floor "Sendai-no-ma"

1-1-1, Chuo Aoba-ku, Sendai

Tel: 022-268-2525 Fax: 022-268-2521

Price: Included in registration fee

Welcome Reception

Date & Time: Nov. 1st, 18:30-20:30

Venue: Shozankan 4th Floor "Saiun-no ma"

2-1-50, Kamisugi Aoba-ku, Sendai

Tel: 022-213-9188 Fax: 022-213-9546

Price: Included in registration fee

* Shuttle Bus Services are available from the Congress site to Shozankan at 17:30 and from Hotel Metropolitan Sendai to Shozankan at 17:45. Buses from Shozankan to Hotel Metropolitan Sendai will be available after the reception.

Congress Banquet

Date & Time: Nov. 2nd, 18:30-20:30

Venue: Hotel Metropolitan Sendai 4th Floor "Sendai-no-ma"

Price: ¥10,000 per person

Appropriate dress: Business suit for gentlemen

* If you have not purchased tickets for the congress banquet, stop by at the secretariat (registration) desk before 16:00 on Thursday, Nov. 1st, as spaces are limited.

Optional Events

If you have not purchased tickets for these exciting events, stop by at the Tour (JTB) Desk next to the Secretariat (Registration) Desk in the Pre-Function. Also, please visit there if you need further information. Accompanying Persons can choose one half-day tour among Tour 1-B, 2-C and 3-B for free.

※ These tours will be closed out as soon as we have full booking.

Nov. 1st (Thu.)

Half-day tour

1-A "Bathing in a Hot Spring and Tour of the Nikka Whiskey Distillery"

This tour offers the experience of a Japanese hot spring. Relishing the delicacies of the region is a part of the "Hot Springs" experience. This tour will take participants to a well-known spa one hour by bus from Sendai. The tour will make a stop at the Nikka Whiskey Distillery, where the participants will be able to sample the fine whiskey that is made at this distillery. The tour departs at 12:00 noon from Sendai International Center and returns to Hotel Metropolitan Sendai at about 17:00.

Adult: ¥8,000

Child (under 12): ¥7,500

Minimum number of participants: 30

Meals: Snack

1-B "Sendai City Tour: Zuihoden Mausoleum and the Site of Sendai Castle"

Sendai's history began some 400 years ago with the construction of the castle by "Date Masamune", a feudal lord, who commanded great power in the region during the period of civil strife in Japan. The Zuihoden Mausoleum is the final resting-place of the members of the "Date" clan. The site of Sendai Castle is a favorite spot to visit for many who come to Sendai. Situated on high ground, this historical site provides a panoramic view of Sendai. The tour departs at 13:00 from Sendai International Center and returns to Hotel Metropolitan Sendai at 16:30.

Adult: ¥5,000

Child (under 12): ¥4,500

Minimum number of participants: 30

Meals: None

Nov. 2nd (Fri.)

One-day tour

2-A "Matsushima and Shiogama"

Matsushima is renowned as one of the three most beautiful spots in Japan. There are over 260 islands scattered all over Matsushima Bay. Participants will cruise Matsushima Bay on a ferry and visit Bodaiji-Zuiganji Temple (the most famous Zen temple in the Tohoku District) and Godaido (a prayer hall). The tour will also make a stop at Shiogama Shrine, a shrine with a history of 1,200 years. Lunch will be served at a hotel that overlooks Matsushima Bay. The tour departs at 9:00 from Hotel Metropolitan Sendai and returns to the hotel around 16:00pm.

Adult: ¥ 10,000

Child (under 12): ¥ 9,000

Minimum number of participants: 30

Meals: Lunch

2-B "Tour of the Togatta Hot Spring"

The theme of this tour is "The Japanese Fall". Fall is a beautiful season in Japan with the leaves changing into golden and crimson hues. The tour will begin with a stop at a spa located in Togatta at the foothills of the Zao Mountains. A traditional Japanese lunch will be served. Participants will then visit the most famous Kokeshi doll (simple figures made of wood) workshop in Japan where all participants can paint the eyes, nose, and mouth on Kokeshi dolls. The tour departs at 9:30 from Hotel Metropolitan Sendai and returns to the hotel around 15:30pm.

Adult: ¥ 10,000

Child (under 12): ¥ 9,000

Minimum number of participants: 30

Meals: Lunch

Half-day tour

2-C "Akiu Gorge: Autumn Colors and Traditional Japanese Craftwork"

The beginning of November is a very beautiful time in Sendai. This tour will head to the Aiku Gorge, located about one hour by bus from Sendai, where participants will be able to enjoy viewing the brilliant fall colors. The tour will then visit the site where 9 workshops that produce traditional craftworks (cabinets, lacquer ware, Japanese tea ceremony implements etc.) of Sendai are located. The tour departs at 13:00 from Sendai International Center and returns to Hotel Metropolitan Sendai around 17:00.

Adult: ¥ 5,000

Child (under 12): ¥ 4,500

Minimum number of participants: 30

Meals: None

Nov. 3rd (Sat.)

One-day tour

3-A "Hiraizumi: The Golden Age of the Fujiwara Clan"

This tour will visit Hiraizumi, once the major political and cultural center of Japan. There are still some 3,000 national treasures situated across the two main compounds of Chusonji and Motsuji. The Buddhist monk Daishi Jikaku founded Chusonji Temple. At present, only two original structures, the Konjikido (Golden Hall) and Sankozo (Fujiwara Memorial Hall), remain. Although not much remains of the original Motsuji compound, the serene Oizumi Pond and the beautiful Japanese gardens enable visitors to imagine how splendid this site must have been. Lunch will be various Omochi (rice cake) dishes that are served in this region to celebrate joyous occasions. The tour departs at 9:00 from Hotel Metropolitan Sendai and returns to the hotel around 16:00.

Adult: ¥ 10,000

Child (under 12): ¥ 9,000

Minimum number of participants: 30

Meals: Lunch

Half-day tour

3-B "Sendai City Tour: Zuihoden Mausoleum and the Site of Sendai Castle"

Sendai's history began some 400 years ago with the construction of the castle by "Date Masamune", a feudal lord, who commanded great power in the region during the period of civil strife in Japan. The Zuihoden mausoleum is the final resting-place of the members of the "Date" clan. The site of Sendai Castle is a favorite spot to visit for many who come to Sendai. Situated on high ground, this historical site provides a panoramic view of Sendai. The tour departs at 13:00 from Sendai International Center and returns to Hotel Metropolitan Sendai at 16:30.

Adult: ¥ 5,000

Child (under 12): ¥ 4,500

Minimum number of participants: 30

Meals: None

GOLF Nov. 2nd (Fri.), 2001

Sendai Golf and Country Club is a semi-private golf course located 10 minutes by car from Sendai International Center. Playing golf, you can enjoy the beautiful autumn scenery. The tournament will start at 9:45. Please bring your golf shoes. Rental golf clubs are available.

Green fee: ¥ 15,000 Golf club rental fee: ¥ 2,500

Pre and Post Congress Tours

Oct. 30th-31st (Tue.~Wed.)

PRE-1 *Tokyo Sightseeing*

After arriving at Narita Airport on Tuesday, Oct. 30th, participants are requested to go to the Yaesu Fujiya Hotel in Tokyo. A direct shuttle bus service is available from Narita Airport to the hotel (the bus fare is not included in the price of this tour). The tour on Tuesday, Oct. 31st will make stops at major sightseeing locations in Tokyo. An English-speaking guide, of course, will accompany the participants throughout the tour. The Yaesu Fujiya Hotel is located very close to Tokyo Station and the tour bus will depart from and return to this hotel. After the tour, participants will board the Tohoku Shinkansen (Bullet train) bound for Sendai. The arrival time at Sendai is 20:43. The tour is officially over after your arrival at Sendai. Please arrange for your accommodations in Sendai separately. Only breakfast is included with your hotel accommodation.

Price: For 2 persons in a twin room ¥ 38,000 per person
For 1 persons in a single room ¥ 41,000 per person

Including: Travel expenses from Tokyo to Sendai, one-night accommodation and sightseeing tour in Tokyo

PRE-2 *Kyoto Sightseeing*

After arriving at Kansai Airport on Tuesday, Oct. 30th, participants are requested to go to the Kyoto Shin-Miyako Hotel. A direct shuttle bus service is available from Kansai International Airport to the hotel (the bus fare is not included in the tour price). The tour will start in the morning of Wednesday, Oct. 31st with visits to the famous Nijo Castle, Kinkakuji Temple, the Kyoto Imperial Palace, and the Handcrafts Center. The tour bus will return to the Kyoto Shin-Miyako Hotel after completion of the tour. A shuttle bus will take the participants to Osaka Airport for their flight bound for Sendai. The tour will be officially over once you arrive at Sendai Airport. A shuttle bus that will take you from Sendai Airport to downtown Sendai is available (the bus fare is not included in the tour price). An English-speaking guide will accompany the participants during the tour in Kyoto. Only breakfast is included with your hotel accommodation.

Price: For 2 persons in a twin room ¥ 48,000 per person
For 1 persons in a single room ¥ 53,000 per person

Including: Travel expenses from Osaka to Sendai Airport, one-night accommodation and sightseeing tour in Kyoto

Nov. 3rd-4th (Sat.~Sun)

POST-1 *Tokyo Sightseeing*

Participants will head for Tokyo after the end of the Congress on Saturday, Nov. 3rd. The hotel in Tokyo is the Yaesu Fujiya Hotel, which is a 5-minute walk from Tokyo Station. The tour on November 4th will take the participants to the most popular sightseeing spots in Tokyo beginning with a visit to the famous Tokyo Tower (333 meters tall). Although the tour will be officially over upon returning to the Yaesu Fujiya Hotel around 13:30, another night may be arranged for those who wish to stay longer in Tokyo. An English-speaking guide will accompany the participants during the tour. Only breakfast is included with your hotel accommodation.

Price: For 2 persons in a twin room ¥31,000 per person
For 1 person in a single room ¥34,000 per person

Including: Travel expenses from Sendai to Tokyo, one-night accommodation and sightseeing tour in Tokyo

Additional night stay (Nov. 4th)

Price: For 2 persons in a twin room ¥14,000 per person
For 1 person in a single room ¥16,000 per person

POST-2 *Kyoto and Nara Sightseeing*

A post-congress tour of the major cultural attractions of historical Kyoto and Nara has been organized. Participants are requested to gather at Sendai Airport on Saturday, Nov. 3rd. Everyone will then board the plane bound for Osaka Airport. The flight time is 1 hour 10mins. After arrival at Osaka Airport, participants will board a regular service bus bound for Kyoto and the hotel where you will be staying. On Sunday, the tour will begin with stops at famous Kyoto castles and temples, including Nijo Castle, Kinkakuji Temple, and Higashi-Honganji Temple. After sightseeing in Kyoto, the tour will then head for Nara. The one-way travel time by bus from Kyoto to Nara is approximately 2 hours. The bus is expected to go back to the hotel around 18:30. The tour is officially over when everyone checks out of the hotel on Nov. 5th. An English-speaking guide will accompany the participants of the tour. Breakfast is included with your hotel accommodation but dinner is not.

Price: For 2 persons in a twin room ¥68,000 per person
For 1 person in a single room ¥78,000 per person

Including: Travel expenses from Sendai to Kyoto, two-nights accommodation in Kyoto and sightseeing tours in Kyoto and Nara

SCIENTIFIC PROGRAM in Brief

Thursday, Nov. 1st

Friday, Nov. 2nd

Saturday, Nov. 3rd

Room1 (Sakura)
8:10 Opening Ceremony
8:30 IFPOS Oral 1 Musculoskeletal Sepsis
9:10 IFPOS Symposium 1 Bone & Joint Infection
10:30 Break
11:00 IFPOS Oral 2 Legg-Calvé- Perthes Disease
12:30 LUNCH
13:30 Presidents' Lecture 1
14:00 Presidents' Lecture 2
14:30 Presidents' Lecture 3
15:00 Presidents' Lecture 4
15:30 Break
15:55 JPOA Symposium 1 DDH
16:35 JPOA Business Meeting

Room2
(Shirakashi)

Room3
(Shirakashi)

JPOA Oral 1 Legg-Calvé- Perthes Disease	JPOA Oral 3 Congenital Disorder
JPOA Oral 2 Foot	JPOA Oral 4 Joint Infection/ Limb Lengthening

Room1 (Sakura)
8:30 IFPOS Oral 3 Neuromuscular
9:00 IFPOS Oral 4 Foot
9:30 IFPOS Oral 5 Neck/Spine
10:20 Break
10:50 IFPOS Oral 6 DDH
12:10 IFPOS Oral 7 JPOA Multicenter study

Room1
(Sakura)

Room2
(Shirakashi)

Room3
(Shirakashi)

8:30 IFPOS Oral 8 Syndrome
9:10 IFPOS Symposium 2 Cerebral Palsy
10:30 Break
11:00 IFPOS Oral 9 Leg Lengthening Biology
11:30 IFPOS Oral 10 Potpourri
12:00 IFPOS Oral 11 Trauma
12:30 LUNCH
13:30 Presidents' Lecture 5
14:00 Presidents' Lecture 6
14:30 JPOA Symposium 2 Legg-Calvé-Perthes Disease
15:00 Closing Ceremony

JPOA Oral 5 Developmental Dysplasia of the Hip	JPOA Oral 7 Cerebral Palsy/Knee
JPOA Oral 6 Slipped Capital Femoral Epiphysis/Miscellaneous	JPOA Oral 8 Spine/Fracture

**Nov. 1st
Welcome Reception**
Venue: Shozankan
Time: 18:30- 20:00
Price: Included in Registration Fee

* Posters will be discussed at the breaks from Nov.1st to 3rd
* There is "Get-together" on October 31st from 18:30 at Metropolitan Sendai
Price is included in Registration Fee

**Nov. 2nd
Congress Banquet**
Venue: Hotel Metropolitan Sendai
Time: 18:30- 20:30
Price: ¥10,000 per person

SCIENTIFIC PROGRAM

Thursday, November 1st, 2001

Room 1

8 : 10~ 8 : 30 Opening Ceremony

IFPOS Oral 1

8 : 30~ 9 : 10 Musculoskeletal Sepsis

Presider : Toyonori SAKAMAKI

Chairperson : Kálmán SZEPESI

- I-1-1 Prognostic Factors in Septic Arthritis of the Hip in Children: A Twelve Years Review
Pornchai MULPRUEK, Somchai PRICHASUK, Patarawan WORATANARAT
- I-1-2 Total Septic Arthritis in Children at Our Hospital
Kazuya MOROHOSHI, Susumu SAITO, Hirofumi OHGUYA, Atsushi KUSABA, Ken YAMAZAKI
- I-1-3 Utilization of Ultrasonograph in the Detection of Septic Arthritis in Children
Chih-Wei WANG, Yin-Chun TIEN
- I-1-4 The Treatment of Bone Defects Following Chronic Pyogenic Osteomyelitis in Children
Mahomed N. RASOOL

IFPOS Symposium 1

9 : 10~10 : 30 Late Consequences of
Children's Bone and Joint
Infection

Chairperson : Ken N. KUO

- IS-1-1 Late Deformities of Septic Arthritis of the Hip in Children
Ken N. KUO
- IS-1-2 Adult Consequence of the New Born Septic Osteoarthritis
Giovanni PERETTI
- IS-1-3 Femoral Lengthening After Septic Arthritis of the Hip in Children
Jack C. Y. CHENG, T. P. LAM, KW NG
- IS-1-4 Tuberculosis of the Spine
Keith DK LUK

10 : 30~11 : 00 Break

IFPOS Oral 2

11 : 00~12 : 30 Legg-Calvé-Perthes Disease

Presider : Masato SATO

Chairperson : Michael J. GOLDBERG

- I-1-5 Outcomes of Legg-Calvé-Perthes Disease in Japan — Multi Center Study Organized by JPOA —
Wook-Cheol KIM, Kazuo HIROSHIMA
- I-1-6 Quantitative Analysis of Lateral Pillar can Enhance Prediction of Adult Consequences
in Perthes Disease
Tohru FUTAMI, Shigeo SUZUKI, Yoichi SETO, Naoya KASHIWAGI

- I-1-7 Comparison between Operative and Non-Operative Treatments for Legg-Calvé-Perthes Disease
Toshio KITANO, Kennji HIROHASHI, Toshiyuki SAKAI, Yuuki IMAI, Tatsuya KOIKE,
Hirosugu OOHASHI, Yoshiki YAMANO
- I-1-8 Comparison between Salter Osteotomy and Augmented Acetabuloplasty in the Treatment
of Patients with Severe Legg-Calvé-Perthes Disease
Sérgio S. KUWAJIMA, Alvin H. CRAWFORD, Akira ISHIDA, Dennis R. ROY,
José LARED FILHO, Carlo MILANI
- I-1-9* Is the Salter Osteotomy Combined with Proximal Femoral Osteotomy (PFO) a Preferable
Surgical Containment than PFO Only - A Mid Term Follow Up
Dietmar M. MÜLLER, Hannes M. MANNER, N.David ROTHSCILD,
Johanes ALTENHUMER, Franz GRILL
- I-1-10 Eleven Years Follow-Up of Transtrochanteric Rotational Osteotomy of Femoral Head for
Severe Legg-Calvé-Perthes Disease
Yasuharu NAKASHIMA, Yasuo NOGUCHI, Hideaki KUBOTA, Seiya JINGUSHI,
Toshihide SHUTO, Eiji SUENAGA, Yukihide IWAMOTO
- I-1-11 Chiari Osteotomy in Perthes Disease
Masaru KUMAGAI, Takahiro OKAWA, Koichi KOYAMA, Takahiko SANNOMIYA,
Akio INOUE, Fujio HIGUCHI, Kensei NAGATA
- I-1-12 Four Cases of Severe Forms of Perthes Disease Associated with APC Resistance Due to
Homozygosity for Mutant Factor V (Leiden)
Kálmán SZEPESI, Emőke PÓSÁN, Gabriella SZÜCS, Jolán HÁRSFALVI,
Zoltán CSERNÁTONY
- I-1-13 The Influence of Initial Treatments in Transient Synovitis of the Hip
Hiroshi KUSAKABE, Toyonori SAKAMAKI, Satoshi SHIMOMURA, Mitsuru IKEDA

12 : 30~13 : 30 Lunch

Presidents' Lecture I
13 : 30~14 : 00
Chairperson: Shigeo MATSUNO

- IP-1-1 Introduction to the Pathophysiology of the Foot in Children : From Normality to Deformities
Henri BENSAHEL

Presidents' Lecture 2
14 : 00~14 : 30
Chairperson: Seiichi ISHII

- IP-1-2 Tissue Engineering Approaches in the Management of Growth Defects in Children
Eng Hin LEE

Presidents' Lecture 3
14 : 30~15 : 00
Chairperson: Haruhito AOKI

- IP-1-3 Vascular Malformation of the Lower Extremity and Their Management
James R. KASSER

*IFPOS Fellowship Recipient

Presidents' Lecture 4

15 : 00~15 : 30

Chairperson: Takao YAMAMURO

IP-1-4 Long-Term Outcomes in DDH

Michael K. D. BENSON

15 : 30~15 : 55 Break

JPOA Symposium I

15 : 55~17 : 25 Developmental Dysplasia of
Hip

Chairperson: Morris DUHAIME

Toshio FUJII

JS-1-1 Early Detection in Von Rosen Splintage Gives the Best Long-Term Results in DDH

Terry McGUIRE

JS-1-2 The Long-Term Results of Treatment of DDH by Pavlik Method

Viktor BIALIK

JS-1-3 Long-Term Results After Open Reduction for Developmental Dislocation of the Hip

Hideaki KUBOTA, Mayuki TAKETA, Shinji FUKUOKA, Yukio NOGUCHI, Yasuharu NAKASHIMA,
Eiji SUENAGA, Yukihide IWAMOTO

JS-1-4 Long-Term Follow-Up Study of Extensive Anterolateral Approach for DDH

Kou ODA, Yoshimasa MIYAKE, Shigeru MITANI, Kiyoshi AOKI, Ayumi MIYAKE

JS-1-5 Longterm Results of Treatment of Developmental Dislocation of the Hip Joint

Seok Hyun LEE

JS-1-6 Early Childhood Dysplasia of the Hip? Identification and Treatment

James KASSER

17 : 25~17 : 40 JPOA Business Meeting

Room 2 (Japanese Presentation)

JPOA Oral 1

15 : 55 ~ 16 : 35 Legg-Calvé-Perthes Disease

Chairperson : Wook-Cheol KIM

- J-1-1 Multi Center Study for Legg-Calvé-Perthes Disease in Japan — First Report Organized by JPOA —
Wook-Cheol KIM, Kazuo HIROSHIMA
- J-1-2 Late Diagnosis of Perthes Disease
Takahiko KITAKOJI, Hiroshi KITO, Kazuhiro KURITA, Mitsuyasu KATO, Yuji TAKAMINE
- J-1-3 Risk Factor in the Occurrence of Bilateral Perthes Disease
Takanori KUROI, Seiji KAMEI, Tsutana FUKUNAGA, Takayuki SATAKE, Keisuke MATSUO
- J-1-4 Reliability of Stulberg's Classification in Perthes Disease
Makoto KAMEGAYA, Takashi SAISU, Hideo DOUYA, Hideshige MORIYA
- J-1-5 Long-Term Results of Femoral Osteotomy and Combined Osteotomy in the treatment of Perthes Disease
Tomomi MATSUOKA, Yoshitaka NAGATSURU, Hiroshi KAWASOE, Katsumi SAKATA

JPOA Oral 2

16 : 35 ~ 17 : 15 Foot

Chairperson : Haruyasu YAMAMOTO

- J-1-6 Radiographic Evaluation in Congenital Club Foot (The Subluxation of the Cuboid on the Calcaneus)
Masayuki SUGIYAMA, Kikuo KAMESHITA, Shigeharu OKUZUMI, Jiro MACHIDA, Kouji NOYORI, Akiko NAGAOKA
- J-1-7 Post Operative Ankle Motion After Complete Subtalar Release in Congenital Clubfoot
Hideo DOUYA, Makoto KAMEGAYA, Takashi SAISU, Yuuji SHINOHARA, Hideshige MORIYA
- J-1-8 Undergoing Operations of Congenital Vertical Tali with Using Cincinnati Incision
Kazuya KAWAMURA, Wook-Cheol KIM, Yuichi TSUCHIDA, Motoo HOSOKAWA, Kouei KAWAMOTO, Yasusuke HIRASAWA, Torao KUSAKABE
- J-1-9 Operative Treatment of Metatarsus Adductus
Toshitomi MORISHIMA, Mitsugu IWASAKI, Kenji TSUBO
- J-1-10 Clinical Results of Calcaneocuboid Joint Fusion Combined with Soft Tissue Procedures for the Paralytic Cavovarus Foot
Ikuo WADA, Ikuo SUGIMURA, Takashi TERAZAWA, Osamu HORIUCHI, Takashi OGAWA, Nobuo MATSUI, Daiji TSUCHIYA, Hiroshi TOMITA

Room 3 (Japanese Presentation)

JPOA Oral 3

15 : 55 ~ 16 : 35 Congenital Disorder

Chairperson : Mamori KIMIZUKA

- J-1-11 Two Cases of Sprengel's Deformity
Takashi YOSHIDA, Wook-Cheol KIM, Motoyuki HORII, Masao KUROKAWA, Yasusuke HIRASAWA, Torao KUSAKABE
- J-1-12 Woodward Procedure in the Treatment of Congenital Elevation of the Scapula
Mitsuyasu KATOH, Takahiko KITAKOJI, Hiroshi KITOHI, Kazuhiro KURITA, Yuji TAKAMINE, Kunio IDA
- J-1-13 Conservative Treatment for Trigger Thumb in Children
Wataru HATANAKA, Hiroshi YAJIMA, Yasunori KOBATA, Yoshinori TAKAKURA
- J-1-14 The New Bone Lengthening System for Congenital Anomalies
Kazuyuki TAKAMURA, Toshio FUJII, Haruhisa YANAGIDA, Akifusa WADA, Mayuki TAKETA, Aiji MATUURA
- J-1-15 Case of Mirror Foot
Jiro MACHIDA, Kikuo KAMESHITA, Shigeharu OKUZUMI, Kouji NOYORI, Masayuki SUGIYAMA, Akiko NAGAOKA, Masayuki TORIGAI

JPOA Oral 4

16 : 35 ~ 17 : 15 Joint Infection
Limb Lengthening

Chairperson : Shigeharu OKUZUMI

- J-1-16 Six Cases of Subacute Hematogenous Osteomyelitis of the Femur in Children
Osamu HORIUCHI, Ikuo WADA, Ikuo SUGIMURA, Takasi TERAZAWA, Takasi OGAWA
- J-1-17 Treatment for the Disorders in Post Septic Arthritis of the Hip by "Ilizarov-Hip Method"
— A Report of Two Cases —
Takanobu NAKASE, Natsuo YASUI, Shinji HIRABAYASHI, Nobuyuki SHIMIZU, Hideki YOSHAWA
- J-1-18 Surgical Treatment of the Residual Deformity After Septic Arthritis of the Hip
Takehiko MIKAMI, Masaru HIGO, Masahiro NAKAMURA, Natsuko OKANO, Seturou KOMIYA, Yoshihiro RYOUKI
- J-1-19 Humeral Callotasis for Epiphysial Arrest Caused by Neonatal Osteomyelitis : A Report of Two Cases
Noriaki YAMAMOTO, Tosihiro SUZUKI, Seisi YAMAMOTO, Koji YAMANE, Makoto ENOKIDA
- J-1-20 Limb Lengthening for Limb Length Discrepancy with Femur and Tibia
Keisuke SAKURAKICHI, Hiroyuki TSUCHIYA, Kenji UEHARA, Teruhisa YAMASHIRO, Katsuro TOMITA

Friday, November 2nd, 2001

Room 1

IFPOS Oral 3

8 : 30~ 9 : 00 Neuromuscular

Presider : Susumu SAITO

Chairperson : Giovanni PERETTI

- I-2-1 Evaluation of Effects of Orthopaedic Surgery on Patients with Cerebral Palsy: 10 Years Post Surgery Using Gait Analysis

John V. BANTA, Sylvia OUNPUU, Peter A. DELUCA, Cathy BELL, Mark J. ROMNESS

- I-2-2 Rectus Femoris Transfer for Cerebral Palsy Patients - Outcome Evaluation

Aik SAW, Peter SMITH, Ken N. KUO, Shande CHEN

- I-2-3 Botulinum Toxin Injections for Cerebral Palsy in the Second Decade of Life

Ashok N. JOHARI, Asha CHITNIS, Tushar F. AGRAWAL

IFPOS Oral 4

9 : 00~ 9 : 30 Foot

Presider : Susumu SAITO

Chairperson : Giovanni PERETTI

- I-2-4 Calcaneal Lengthening for Flatfoot in Spastic Conditions: Radiographic, Kinematic, and Kinetic Analysis

Chin Youb CHUNG, Dong Han KIM, In Ho CHOI, Tae-Joon CHO

- I-2-5 The C-Sign of Talocalcaneal Coalition. Is it Useful for Diagnosis?

Akira TANIGUCHI, Yasuhito TANAKA, Kunihiro KADONO, Yoshinori TAKAKURA,
Norio KURUMATANI

- I-2-6 Gait Evaluation Following Correction of Idiopathic Relapsed and Neglected Clubfoot Deformity Using Ilizarov's Soft Tissue Distraction Technique in Older Children

Vrisha MADHURI, Thomas PALOCARAN, Ashish MCADEN, Suranjan BHATTACHARJI

IFPOS Oral 5

9 : 30~ 10 : 20 Neck / Spine

Presider : Kozo NAKAMURA

Chairperson : Wun-Jer SHEN

- I-2-7* Sternocleidomastoid Pseudotumor (SCMPOI) and Congenital Muscular Torticollis (CMT) in Infants: The Relation between Spontaneous Regression and Apoptosis

Shengping TANG, Jack C.Y. CHENG, Zhengquan LIU, Xumu QUAN, Juncang QIN, Dewen ZHANG

- I-2-8 Outcome of Surgical Treatment of Congenital Muscular Torticollis

Jack Chun-yui CHENG, BKW NG, S. P. TANG

- I-2-9 Long-Term Impact of Atlantoaxial Arthrodesis on the Pediatric Cervical Spine

Masayuki ISHIKAWA, Morio MATSUMOTO, Masaya NAKAMURA, Kazuhiro CHIBA,
Yoshikazu FUJIMURA, Yoshiaki TOYAMA

- I-2-10 Adult Consequences of Spinal Deformity Due to Neurofibromatosis

Koki UNO, Norihide SHA, Hidenori SHIRAISHI, Ryoichi SHIBA, Hiroshi KUMON

*IFPOS Fellowship Recipient

I-2-11 Lumbar Discectomy in the Teenagers - Comparison of Arthro & Microscopic

Jae-Yoon CHUNG, Hyung-Yeon SEO, Eun-Sun MOON, Taek-Rim YOON

10:20~10:50 Break

IFPOS Oral 6

10:50~12:10 Developmental Dysplasia
of the Hip

Presider: Megumi HONDA

Chairperson: Takeo MATSUNO

I-2-12 Acoustical Technique for Early Screening of Developmental Dysplasia of the Hip

Kevin S.C. KWONG, Jack C.Y. CHENG, Xiao-lin HUANG, John H. EVANS

I-2-13 Treatment Strategy and Results of Pavlik Harness Treatment for Developmental Dislocation of the Hip (DDH) in Japan

Susumu SAITO, Megumi HONDA, Torao KUSAKABE

I-2-14 Arthroscopy of Irreducible DDH

Kenji KIDO, Shinya KAWAI, Hiroshi TANAKA, Atsuhiko WAKISAKA

I-2-15 Avascular Necrosis of the Femoral Head After Open Reduction in the Inveterate DDH: Comparison between Two Methods of Treatment

Carlo MILANI, José LAREDO FILHO, Akira ISHIDA, Sérgio Satoshi KUWAJIMA, Eiffel T. DOBASHI

I-2-16 Trochanteric Distal Advancement for Premature Arrest of the Femoral Head Growth Plate

In-Young OK, Chang Hoon JEONG, Han-Young LEE, Jun-Seok KIM, Nan-Kyong HA

I-2-17 Long Term Follow Up of Ludloff's Medial Approach for Open Reduction of Congenital Dislocation of the Hip

Wataru KOIZUMI, Makoto KAMEGAYA, Keiichi TUCHIYA, Takashi TAKEUCHI, Hideshige MORIYA

I-2-18* Long Term Follow-Up After Colonna's Hip Arthroplasty

Milan KOKAVEC, Vilctor BIALIK, Fvantisek MAKAI, Miroslav BDZOCH

I-2-19 Osteoarthritic Change After Salter Innominate Osteotomy for CDH (Over 20 Years Follow-Up Cases)

Shigeru YANAGIMOTO, Toyonori SAKAMAKI, Takayuki HONMA, Takanari FUJITA

IFPOS Oral 7

12:10~12:20 JPOA Multicenter Study

Presider: Megumi HONDA

Chairperson: Chiaki HAMANISHI

I-2-20 Epidemiology of Slipped Capital Femoral Epiphysis in Japan: A Multicenter Study by the Japanese Paediatric Orthopaedic Association

Yasuo NOGUCHI, Toyonori SAKAMAKI

*IFPOS Fellowship Recipient

Saturday, November 3rd, 2001

Room 1

IFPOS Oral 8

8 : 30 ~ 9 : 10 Syndrome

Presider : Kazuo HIROSHIMA

Chairperson : Viktor BIALIK

- I-3-1 Extreme Forms of True Congenital Hand Gigantism in Children — New Method of Treatment
Olga SOSNENKO, Sabina GASHIMOVA, Elena G. SOSNENKO, Yuri I. POZDNIKIN
- I-3-2 Bisphosphonate Treatment for Osteogenesis Imperfecta Patients
Tae-Joon CHO, In Ho CHOI, Chin Youb CHUNG, Moon Seok PARK
- I-3-3 The Effectiveness of Cyclic Intravenous Pamidronate Therapy in Osteogenesis Imperfecta
Toshikatsu MATSUYAMA, Hitoshi SAINO, Fumio TOKITA, Tetuto SASAKI
- I-3-4 Deformity Correction of the Knee and Leg Lengthening by the Ilizarov Method in Children with Vitamin D Resistant Rickets
In Ho CHOI, Chin Youb CHUNG, Kuhn Sung WHANG, Hui Wan PARK, Kwang Soon SONG, Jae Kwang KIM, Tae-Joon CHO

IFPOS Symposium 2

9 : 10 ~ 10 : 30 Cerebral Palsy

Chairpersons: Takashi MATSUO

Dale R. BLASIER

- IS-3-1 The Adult Consequences of Cerebral Palsy
Michael J. GOLDBERG
- IS-3-2 The "Spastic Hip" — A Model for the Prevention of Osteoarthritis
Ashok N. JOHARI
- IS-3-3 Cervical Spondylosis in Patients with Athetoid Type of Cerebral Palsy
Kazuo YONENOBU
- IS-3-4 Major Orthopaedic Problems in Adults with Cerebral Palsy and Their Treatment
Takashi MATSUO

10 : 30 ~ 11 : 00 Break

IFPOS Oral 9

11 : 00 ~ 11 : 30 Leg Lengthening Biology

Presider : Hirotsugu ODA

Chairperson : James BEATY

- I-3-5* The Response of the Muscle to Limb Lengthening
George SZÖKE, Soon-Hyuck LEE, John BRADLEY, Hamish SIMPSON
- I-3-6* Effect of Soft Tissue Release on the Growth Plate During Limb Lengthening
Sanjeev SABHARWAL, Robert HARTEN, Jean YUN, Chris SABATINO
- I-3-7 Change of Articular Cartilage After Femoral Lengthening
Hae-Ryong SONG, Rakesh MATTOO, Sun Chul HWANG

*IFPOS Fellowship Recipient

IFPOS Oral 10

11 : 30 ~ 12 : 00 Potpourri

Presider : Hirotosugu ODA

Chairperson : James BEATY

- I-3-8 Enhanced Osteoclastogenesis in Congenital Pseudarthrosis of the Tibia
Ichiro NAKAMURA, Nobuhiko HAGA, Sakae TANAKA, Minoru HAMAZAKI, Kazuhiro AOKI,
Keiichi OHYA, Ryouji SHIRO, Kimizuka MAMORI, Hiromi ODA, Kozo NAKAMURA
- I-3-9 Comparison of the Course of Juvenile Chronic Mono-, Oligoarthritis After Conservative
Treatment and After Synovectomy
Yuri A. LAPKIN
- I-3-10* Unicameral Bone Cysts Treated with Bone Marrow Injection or Methylprednisolone Injection
Chia H. CHANG, Robert P. STANTON

IFPOS Oral 11

12 : 00 ~ 12 : 30 Trauma

Presider : Hirotosugu ODA

Chairperson : Kuhn-Sung WHANG

- I-3-11 The Fracture-Separation of the Distal Humeral Epiphysis
Iswar M. SHAKYA, Kenso KOZUKI
- I-3-12 Chronic Radial Head Dislocation (CRHD) in Children: Results of Open Treatment
HT KIM, BG PARK, CI YOO
- I-3-13 Internal Fixation of Ankle Fracture with Bioabsorbable Implants
Dale BLASIER, Rosalind R. WHITE

12 : 30 ~ 13 : 30 Lunch

Presidents' Lecture 5

13 : 30 ~ 14 : 00

Chairperson : Susumu SAITO

- IP-3-5 The Hip in Cerebral Palsy
Patricia M. de Moraes Barros FUCS

Presidents' Lecture 6

14 : 00 ~ 14 : 30

Chairperson : Takashi MATSUO

- IP-3-6 Shortening Spinal Osteotomy and Its Application
Shoichi KOKUBUN

*IFPOS Fellowship Recipient

JPOA Symposium 2

14 : 30 ~ 16 : 00 Legg-Calvé-Perthes Disease

Chairpersons: Carlo MILANI

Makoto KAMEGAYA

- JS-3-1 Legg-Calvé-Perthes Disease: General Considerations, Diagnosis and Treatment Protocol of the Orthopaedic Pediatric Department of the Universidade Federal de São Paulo (UNIFESP) — BRAZIL

Carlo MILANI

- JS-3-2 A Paired Study of LCPD Patients Comparing Conservative and Surgical Treatment

Makoto KAMEGAYA

- JS-3-3 Long Term Follow Up of Legg-Calvé-Perthes Disease

Henri BENSACHEL

- JS-3-4 Bony Changes of the Proximal Femur in Legg-Calvé-Perthes Disease — Comparison between Disease Healing Stage and Skeletal Maturity —

Sung Man ROWE

- JS-3-5 Pathophysiological Basis of Deformation of the Femoral Head and Neck in LCPD from Clinical and Experimental Results

Kenji HIROHASHI, Masaki HAYASHI, Toshio KITANO

- JS-3-6 Prognostic Evaluation of Legg-calvé-Perthes Disease by MRI — The Role of Physeal Involvement

Nando de SANCTIS

16 : 00 ~ 16 : 10 Closing Ceremony

Room 2 (Japanese Presentation)

JPOA Oral 5

14 : 30~ 15 : 20 Developmental Dysplasia
of the Hip

Chairperson : Hideo MIYAOKA

- J-3-1 Ultrasound Screening in 2 Months Babies for the Diagnosis of Developmental Dysplasia of the Hip: A New Method in Our Hospital
Masako GOTO, Takashi SUZUKI
- J-3-2 Ultrasonography and Magnetic Resonance Imaging in Developmental Dysplasia of the Hip
Mototsugu SUGI, Itsuro KAIKHI, Kenzou FUJII, Takanori KOJIMA
- J-3-3 Indications of the Pavlik Harness for Congenital Dislocation of the Hip
Yoshiyuki SHINADA, Mitsuyoshi FUJITSUKA, Toshiharu YAJIMA, Takaaki TANNO, Satoshi IIDA,
Toru HAYAKAWA, Hiroshi HOZUMI, Takayuki FUJIYOSHI, Hiroyasu SHINOHARA
- J-3-4 Long Follow-Up of DDH
Humihiko HARA, Chiaki HAMANISHI
- J-3-5 Epidemiological Study of Orthopaedic Medical Check in New Born
Tomoko MUKAI, Masuo SASA, Syouji ISHII, Gen MOROKAWA, Kenichirou ARAI, Haruhito AOKI

JPOA Oral 6

15 : 20~ 16 : 00 Slipped Capital Femoral
Epiphysis / Miscellaneous

Chairperson : Atsushi KITA

- J-3-6 Why Has Slipped Femoral Capital Epiphysis been Overlooked?
Fumio FUJIOKA, Jun NAKASONE
- J-3-7 A Study of the Contralateral Side of Slipped Capital Femoral Epiphysis
Masahiko TANAKA, Atsushi KITA, Masamizu OYAMA, Yasuhiro NAKAMURA, Koushi HATTORI
- J-3-8 Physeal Closure After Corrective Osteotomy in Slipped Capital Femoral Epiphysis
Kazuhiro KURITA, Takahiko KITAKOJI, Hiroshi KITO, Mitsuyasu KATO, Yuji TAKAMINE
- J-3-9 Risk Factors of Osteonecrosis of the Femoral Head in Childhood
Masaaki SAKAMOTO, Akira HIROSE, Akira HOSHIOKA
- J-3-10 Magnetic Resonance Imaging of Elbow Disorders in Young Baseball Players
Takashi SAISU, Makoto KAMEGAYA, Hideo DOUYA, Hideshige MORIYA, Yukio MATSUSHITA,
Hidehiro MIYAZAWA, Kiyoshi SHONO, Satoru NISHIKAWA

Room 3 (Japanese Presentation)

JPOA Oral 7

14 : 30 ~ 15 : 20 Cerebral Palsy / Knee

Chairperson : Torao KUSAKABE

- J-3-11 Adductor Muscle Release for the Hip Joint Disorder in Cerebral Palsy Children
Satoru TSUBOTA, Keiko YAMAMOTO
- J-3-12 The Effects of Hip Spastic Control Surgery on Gross Motor Function in Cerebral Palsy
Tadao NOMURA, Koji MINEMATSU, Hitoshi NISHIMURA, Katsuro TOMITA
- J-3-13 Long-Term Results of Reconstruction for Spastic Palsy of Upper Extremity : Brief Report
Ken HIRAGAMI, Daisuke SATO, Toshihiko OGINO
- J-3-14 Results of Dislocation or Subluxation of Patella
Ikumasa NAKAJIMA, Kazuhiro BANDO, Yoshiaki HAMADA
- J-3-15 Results of Semitendinosus Transfer for Habitual Dislocation of the Patella in Children with Basic Disease
Yoshitake MASUDA, Toshio FUJII, Kazuyuki TAKAMURA, Haruhisa YANAGIDA
- J-3-16 Brace Treatment for Infantile Blount's Disease
Tsuyoshi TOKUYAMA, Syuuichirou TAKAMI, Kazuhiko IWASA

JPOA Oral 8

15 : 20 ~ 16 : 00 Spine / Fracture

Chairperson : Yoshihiro SEMOTO

- J-3-17 Utilization of MRI for Diagnosis of Intervertebral Discitis in Child
Yoshiaki SATOMI, Toshihiro SUGIHARA, Hiroyuki SHIMIZU, Haruhito AOKI
- J-3-18 Surgical Treatment for Spondylometaphysial Dysplasia with Thoracic Kyphosis and Lumbar Canal Stenosis — A Case Report —
Tsuyoshi SORIMACHI, Satoshi ASANO, Tetsuro KIIYA, Tomohiro TAKEMOTO, Takahiro IIDA, Masataka KAKIHANA, Yutaka NOHARA
- J-3-19 The Evaluation of the Postoperative Local Cervical Kyphosis After the Posterior Procedures in Children and Adolescents
Akira OFUJI, Toshihiko TAGUCHI, Kazuo KANEKO, Kouichiro TOYODA, Hirotsugu ODA, Shinya KAWAI
- J-3-20 A Case of Bilateral Femoral Subtrochanteric Fractures and Tibial Proximal End Fractures in a Child
Hiroshi SUZUKI, Kenso KOZUKI
- J-3-21 Percutaneous Pinning for Supracondylar Fracture of Humerus in Children
Takeshi SUGIMOTO, Hideki SAKANAKA, Yosinori YASUHARA, Hidetosi TERAURA, Yuusuke KINOSITA

IFPOS POSTER 1

Spine

- 11-P1 Surgical Treatment of Spinal Deformity in Marfan Syndrome
Takuya KIMURA, Koki UNO, Ryoichi SHIBA, Shoji FUJII, Shinichiro KANAZAWA, Masaki TOMATSURI, Norihide SHA
- 11-P2 Comparison of Young and Adult Rat Spine on Vertebral Deformities Following Posterior Destabilizing Surgery. A Radiological and Histological Study
Tadanori SAKAMAKI, Shinsuke KATOH, Koichi SAIRYO, Natsuo YASUI
- 11-P3 Three-Dimensional Deformity of Apical Vertebra of Scoliosis Analyzed with Helical Computed Tomography
Masaaki UESUGI, Yutaka INABA, Junichiro NAKAMURA, Tomihisa KOSHINO, Tomoyuki SAITO
- 11-P4 Developmental Change of Social Maturity Scale for Children with Spina Bifida
Kazunari YOSHIDA, Tsutomu IWAYA, Naoko SATO, Kengo KUMAMOTO
- 11-P5 Correlation between Progression of Spinal Deformity and Pulmonary Function in Duchenne Muscular Dystrophy
Toshihiko YAMASHITA, Kohei KANAYA, Tsuneo TAKEBAYASHI, Satoshi KAWAGUCHI, Kazutoshi YOKOGUSHI, Seiichi ISHII
- 11-P6 Eosinophilic Granuloma of the Thoracic Spine with Neural Deficit
Eduardo B. PUERTAS, Marcelo WAJCHENBERG, Valdecir M. OLIVEIRA, Luciano R. MILLER, Paulo S. SOUZA, Reynaldo JESUS-GARCIA, Jose C.M. CHAGAS, Carlo MILANI, Francisco E. P. SANTOS

Congenital Disorder

- 11-P7 Result on Sofield-Miller Operation in Osteogenesis Imperfecta and the Description of a Modified Technique
Wang CHOW, YH LI, John CY LEONG
- 11-P8 Elbow Deformities in Achondroplasia
Hiroshi KITO, Takahiko KITAKOJI, Kazuhiro KURITA, Yuji TAKAMINE
- 11-P9 Twenty Five Years of Experience in Sprengel's Deformity
Daniel E. VAINERAS, Oscar VARAONA, Luciano A. DELLA ROSA, Mario SCHNITMAN, Juan A. PARODI

Limb Correction

- 11P-10 Effectiveness of Short Leg Corrective Bracing for Severe Bowlegs
Yutaka INABA, Tomihisa KOSHINO, Tomoyuki SAITO, Kikuo KAMESHITA, Shigeharu OKUZUMI
- 11-P11 O'Donoghue's Rotation Osteotomy of the Tibia for Medial Torsion of the Lower Leg
Yuko TAKAHASHI, Tatsuhiro OCHIAI, Kazumi SATOH, Akira MORONE
- 11-P12 Use of Ilizarov External Fixator to Treat Popliteal Pterygium Syndrome - A Case Report-
Chang Hoon JEONG, Hyung Min KIM, In-Young OK
- 11-P13 Clinical Results of Humeral Lengthening Using the Callotasis Method
Hiroshi OKAZAKI, Kozo NAKAMURA, Ichiro NAKAMURA, Wakyo SATO, Isao OHNISHI, Takashi MATSUSHITA, Yoshio TAKATORI, Takahiro GOTO, Yasuhito TAJIRI

Trauma

- 11-P14 Epidemiology of Epiphyseal Injuries in Paediatric Fractures
Koei KAWAMOTO, Wook-Cheol KIM, Yuichi TSUCHIDA, Torao KUSAKABE
- 11-P15 A Comparative Study of Open Tibial Fracture and the Closed in Children Cerebral Palsy
Tarou ASAI, Yoshiaki ISHII

Cerebral Palsy

- 11-P16 Orthopaedic Selective Spasticity-Control Surgery for Control of Spasticity in Cerebral Palsy
Takashi MATSUO, Shinnji FUKUOKA, Aiji MATSUURA

Gait Analysis

- 11-P17 Gait Analysis of Toe-in Gait Children with and without Inner Wedge Insole to Prevent Easily Falling Down
Hisashi MOURI, Wook-Cheol KIM, Hidenori URADE, Torao KUSAKABE

Hip

- 11-P18 Proposed New Grading of Findings by Axial Magnetic Resonance Imaging of Dislocated Hips in Patients with Spastic Diplegia
Tatsuhiko OCHIAI, Kazumi SATOH, Akira MORONE, Yuko TAKAHASHI
- 11-19 Outcome Prediction in Legg-Calvé-Perthes Disease Using Magnetic Resonance Image
Motoo HOSOKAWA, Wook-Cheol KIM, Kyung CHANG, Torao KUSAKABE
- 11-20 An Almost Percutaneous Triple Pelvic Osteotomy to Obtain Femoral Head Coverage in Children 6-14 Years of Age
Wallace B. LEHMAN, Dan ATAR, David S. FELDMAN, David M. SCHER, Jamal BAZZI, Ahamed MOHAIDEEN

Tumor

- 11-21 Surgical Treatment of Benign Bone Tumors and Tumor-Like Lesions in Long Bones Using Artificial Bone Substitutes in Children and Adolescent
Yoji KAWAGUCHI, Shiro OKA, Hiromichi NORIMATSU

IFPOS Fellowship Poster

- IF-P1 Correlation of Synovitis with Range of Motion in Perthes Disease
Amod S. KALE, Nandkishore S. LAUD, Sudhir S. WARRIER
- IF-P2 Plasty with Flap on the Base of the Latissimus Dorsi in Lost Function of the Flexor Digitorum
Anatoly B. ORESHKOV, Igor V. SHVEDOVCHENKO, Alexander Y. KOCHISH
- IF-P3 Bone and Joint Tuberculosis in Childhood : The Permanent Problem in Yugoslavia
Zoran S. VUKASINOVIC
- IF-P4 Comparison between Closed Reduction with Percutaneous Pinning and Open Reduction with Pinning in Children with Closed Totally Displaced Supracondylar Humeral Fractures : Randomized Controlled Trial
Kamolporn KAEWPORNSAWAN

IFPOS POSTER 2

Hip

- 12-P1 Irradiation of the Extracorporeal Shock Wave Causes Acetabular Augmentation in Rabbits
Takashi SAISU, Makoto KAMEGAYA, Kenji TAKAHASHI, Shigeru MITSUHASHI, Yuichi WADA, Hideo DOYA, Hideshige MORIYA
- 12-P2 Soft Tissue Interposition After Closed Reduction in Developmental Dislocation of the Hip - The Long-Term Effect on Acetabular Development and Avascular necrosis
Tadashi HATTORI, Takahiko KITAKOJI, Hiroshi KITO, Kazuhiro KURITA
- 12-P3 Evaluation of the Developmental Dysplasia of the Hip - Severin Combined with Kalamchi Classification-
Mayuki TAKETA, Toshio FUJII
- 12-P4 Long-Term Results of Salter Innominate Osteotomy for Residual Subluxation After Congenital Dislocation of the Hip
Shinichi SATSUMA, Daisuke KOBAYASHI, Ryoichi SHIBA

- 12-P5 Reduction of DDH by Flexion-Abduction Continuous Traction
Shigeo SUZUKI, Tohru FUTAMI, Naoya KASHIWAGI, Yoichi SETO, Hideto KANEKO
- 12-P6 A Modified Colonna Capsular Arthroplasty for Old Unreduced DDH in Late Childhood and Adolescence
Duk Yong LEE, In Ho CHOI, Chin Youb CHUNG, Tae-Joon CHO
- 12-P7 A Study of the Physiological Hip Joint Instability by Ultrasonography
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- JF-P1 Intramedullary K-Wiring of Open, Unstable or Malunited Forearm Fractures in Children
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- J-P19 Redosurgery of Clubfoot: Results and Strategy
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- J-P20 Vertical Astragalus
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- J-P21 Medium-Term Results of Vulpius Lengthening of Gastrocnemius Combined with Heel Cord Advancement for Spastic Pes Equinus Deformity
Hideji KURA, Mitsunori YOSHIMOTO, Tetsuto SASAKI, Fumio TOKITA, Tishikatsu MATSUYAMA,
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Presidents' Lectures

IP-1-1

Introduction to the Pathophysiology of the Foot in Children : From Normality to Deformities

Henri BENSACHEL(PARIS)

The embryologic evolution of the foot is well known with the different stages of its buds. The physiologic schema needs not to be impeded by any obstacle in order that the result can be a normal foot. Then, on the biomechanic field, the function of the foot implies a full balance in musculature for keeping a good range of its whole movements.

The foot is a puzzle of bones anlagen, but for its functional activity, it can be considered as made of 2 complexes: the tibio-fibulo-talar complex (TFT) and the calcaneo-forefoot block (CFF). Both of these complexes are moving as true functional anatomic entities. They need to have an accurate function in order to keep an adequate alignment. However, the plasticity of the foot in embryo allows these entities to be disturbed by some anomalies of mobility of the lower limb during the intra-uterine life. This is due to the shape of the 2 main joints which have a function at that stage, it is the tibio-talar joint and the talo-navicular one. Both joints are enarthroses and have a wide mobility.

As long as the global functional axis of the leg and foot is not disturbed, as long as the rotational plane is not affected, the deformity of the foot in neonate will be easily corrected by the self-movements of the baby as the deformity affects only one spatial plane. This is the case of a first group of deformities which are developed in a linear plane. It is the case of the pes varus and the pes valgus of which deviation is located in the subtalar joint. Are also included in this group the postural calcaneus foot (deviation in the tibio-talar joint) and the metatarsus adductus (deviation in the tarso-metatarsal joint).

The second group of deformities includes the flat foot and the metatarsus varus. This kind of flat foot doesn't affect the direct flat foot which is a variant of the normal foot. A well balanced growth will correct it and, finally, the foot will have a nice shape. On the opposite, a valgus flat foot can open the way to several deformities according to its capacities of reducibility. If the valgus flat foot is completely reducible, it will become a normal foot during the course of the growth. If it is not, if the valgus is not reducible and if it has not a full range of movements, then the deformities will affect 2 plans and different kinds of deformities can occur, from the short triceps to the vertical talus, via the Z foot or, even, some aspects of the tarsal coalition.

As for the Metatarsus Varus, it differs from the metatarsus adductus as its adduction-which starts in the Lisfranc joint- is combined to a supination of the forefoot. It affects also 2 plans and, for this reason, it needs a conservative treatment in order to be corrected. We know that some severe cases of metatarsus varus can be mistaken with the talipes equinovarus. But, the metatarsus varus doesn't involve the hindfoot. Besides, the supination deformity of the clubfoot starts more posteriorly, in the Chopart joint.

The third group of deformities is made of the 2 major deformities: vertical talus and clubfoot. They are the most complex ones as the balance between the different complexes of the foot are broken off. Both deformities affect the main joints, the tibio-talar and the talo-navicular ones. In both situations, the Chopart joint plays a major role as it is the avantgard, the leading part of the deformity. It is the most active part of the process. The idiopathic vertical talus and the talipes equinovarus present similarities: in both deformities, the Chopart joint is more or less dislocated. It is the place where the deformity starts, due to the imbalance of the muscles in the frontal plane.

In the clubfoot, for an unknown reason, the tibialis posterior deviates the calcaneo-forefoot block in varus. The tibialis anterior contributes to keep up this deformity by controlling the supination of the midfoot and fore foot. These muscles, together with the adductor hallucis, keep tightly the medial aspect of the foot in varus. This varus deviates also the triceps surae of which axis becomes medial. As this muscle is in a shortening position, it brings progressively the os calcis in equinus. All these deformities release the talus, thus it can move toward an equinus position too. At this point of the process, a vicious circle is created. It is a self-keeping up of all the deformities. In the idiopathic vertical talus, the schema is exactly the reverse as concerning the Chopart joint. The imbalance of the muscles is in favour of the peronei, and at a lesser degree the extensor digitorum. This muscle, which is inserted only dorsally on the foot, contributes to displace the navicular dorsally. The talus is then no more held and it can move in equinus together with the os calcis as the triceps is in a shortening position. And, here also, the fixed deformities of the hindfoot will keep up the deformity of the forefoot. The treatment of these major deformities-as well conservative as surgical one-needs to retrieve the functional anatomy so that the result be stable.

The outcome evaluation of the deformities of the foot needs currently to be made of lone objective datas. In such a way, the different series can be easily compared.

For the Clubfoot, together with K.Kuo, M.Duhaime and the International Clubfoot Study Group (ICFSG), I've set up a rating system of which parameters are morphologic, functional and radiographic ones. It is detailed downward.

This rating system could also be applied to the other deformities of the foot in children for an objective evaluation of their treatment.

RATING SYSTEM LISTING

			SCORE
I .	Morphology:		
	A. Hindfoot:		
	1) Varus or Valgus	0	1(10°) 2(> 10°)
	2) Equinus or Calcaneus	0	1(10°) 2(> 10°)
	B. Midfoot:		
	1) Supination or Pronation	0	1(10°) 2(> 10°)
	2) Adduction or Abduction	0	1(10°) 2(> 10°)
	C. Global Alignment of the Foot:		
	1) Rotation: Medial or Lateral (Thigh-Knee foot angle)	0	1(10°) 2(> 10°)
	2) Pes cavus or Flat Foot	0	1(10°) 2(> 10°)
		Maximum	12
II .	Functional Evaluation:		
	A. Passive Motion:		
	1) Ankle		
	a) dorsiflexion (in degrees)	0	1(0°) 2(negative)
	b) plantar flexion (in degrees)	0	1(10°) 2(0° or negative)

2)	Subtalar Varus - Valgus:	flexible	0		
		stiff	1		
3)	Midtarsal joint motion:				
	pronation-supination:	flexible	0		
		stiff	1		
B.	Muscle Function:		Normal	Moderate	Severe
	Jones' classification		(5,4)	(3)	(2,1,0)
1)	Triceps surae		0	1	2
2)	Toe flexors		0	1	2
3)	Extensors		0	1	2
4)	Anterior tibia tendon		0	1	2
5)	EHL		0	1	2
6)	Posterior tibia tendon		0	1	2
7)	Peroneal tendon		0	1	2
8)	FHL		0	1	2
C.	Dynamic Function:				
1)	Gait		None	Positive	
a)	Intoeing (medial rotation)		0	1(10°)2(>10°)	
b)	calcaneus or c) equinus		0	1(10°)2(>10°)	
d)	dynamic supination		0	1(10°)2(>10°)	
e)	limping		0	1	
f)	ability to run		1	0	
g)	ability to jump		1	0	
2)	Shoe wear		Normal 0	Abnormal 1	
3)	Heel walking <u>OR</u> Toe walking		Yes 0	No 1	
D.	Pain:				
1)	No pain		0		
2)	Pain with Activity		1		
3)	Pain with Sports		2		
4)	Constant		3		
			Maximum	36	

III . Radiologic Evaluation

A.	Standing AP Views (foot in weight bearing position)	Normal	Abnormal
1)	Talo-calcaneal angle	0	1
2)	Cuboid-calcaneo alignment	0	1
3)	Cubo-M5 axis	0	1
4)	Talo-M1 angle	0	1
5)	Talo-navicular position	0	1
B.	Standing Lateral Views (foot in weight bearing position)	Normal	Abnormal
1)	Talo-calcaneal angle	0	1
2)	Tibio-calcaneal angle	0	1
3)	Talo-navicular position	0	1

4)	Talo-MI axis	0	1
5)	Calcaneo-M5 angle	0	1
6)	Flat top talus	0	1
C.	Ankle AP Standing	Normal	Abnormal
	(Posterior border of medial and lateral malleoli lined up at same plane when taking x-ray.)	0	1

Maximum	12
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Score from 0 = Perfect Result
To 60 = Worst Result

IP-1-2

Tissue Engineering Approaches in the Management of Growth Defects in Children

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(APOA)

When dealing with problems with growth in a child it is useful to think in terms of whether the problem is congenital or acquired and whether the problem is generalized as in a case short stature or localized as in a limb length discrepancy or an angular deformity as a result of a physeal injury. The management of the child will obviously depend on the cause of the growth retardation.

In our Tissue Engineering Laboratory we have been studying various approaches to the management of growth defects. Expertise has been developed in the culture and expansion of mesenchymal stem cells and chondrocytes, the use of growth factors such as IGF1 and TGF Beta and the development of biodegradable scaffolds. Experiments on the stimulation of physeal growth with IGF1 and the repair of physeal arrest with mesenchymal stem cells have yielded results that can have therapeutic applications. In vivo experiments on recruitment of mesenchymal stem cells using a biodegradable polymer and TGF Beta have yielded positive results. This composite may have application in situations where cartilage and/or bone may be required such as in a filling of large defects. The presentation will describe our experimental work and its clinical applications.

IP-1-3

Vascular Malformations of the Lower Extremity and Their Management

James R. KASSER

The president of POSNA

This presentation is a summary of my work in this area over the past twenty years as a member of the Vascular Malformation Program at Children's Hospital in Boston. I will present our classification system including hemangiomas, venous malformations, lymphatic malformations and combined malformations including Trippel Trenaunay and Parks-Weber as two of the most common combined malformations. The former (KTW) is a low flow venous lymphatic lesion while the latter (PW) is a high flow arteriovenous malformation. Orthopaedic problems in this group include 1) overgrowth, 2) undergrowth, 3) deformity, 4) intraarticular lesions with cartilage degeneration and 5) focal pain from thrombosis and mass effect.

Treatment with amputation, epiphysiodesis and resection has been highly beneficial in selected cases. I will present a series of such cases concentrating on intraarticular resections of vascular malformation of the knee, as well as selective amputation in lower extremity lesions including cross bone, disarticulation, and ray amputation. Future use of interferon and metalloprotease inhibitors will be mentioned, as will their present role in the management of such problems in our clinic.

IP-1-4

Long-Term Outcomes in DDH

Michael K. D. BENSON

The president of EPOS

Despite clinical and ultrasound screening children still present late with hip dysplasia and displacement. Ultrasound reveals a wide spectrum of dysplasia. Splintage does not control all dysplasia. About 20 per cent of those who need operation for DDH have failed splintage therapy.

Treatment for DDH still varies widely and is not always evidence based. In the UK 17 different types of splint are still in use. When should we operate on a child with irreducible DDH? Should we use traction? Should the reduction be closed or open and if open by which approach? How can we modify the risks of avascular necrosis? How long should post-operative immobilisation continue?

In assessing outcomes of our treatment long-term review is necessary. We know that in childhood the clinical results are better than the radiological results. There are many reviews of 5 to 10 years but this is not adequate for long-term prediction. There are few follow-up studies of over 30 years. It is clear from these, however, that the results deteriorate with time. Subluxation leads inevitably to arthritis by the mid thirties. Our own studies show that the probability of needing joint replacement is directly proportional to residual dysplasia and subluxation and we must balance the risks of surgical failure against the known natural history.

IP-3-5

The Hip in Cerebral Palsy

Patricia M. de Moraes Barros FUCS

The Latin-America Pediatric Orthopaedic Society and Brazilian Pediatric Orthopaedic Society

The hip deformities are very common in the cerebral palsied patients due to muscular imbalance, the immature bone alignment and the severity of the neurological involvement. The non-surgical treatment usually ends in unsatisfactory results. The surgical indications are: prevention of the progression of the deformity, prevent or relieve the pain, preserve or improve the function, provide better positioning of the patient and prevent the pelvic obliquity and the scoliosis. We are going to present our experience in the treatment of the more common hip deformities which are: the flexion-adduction deformity, the hip "at risk", the subluxation and the dislocation. The protocol surgical treatment is based on the necessity of the correction. Started with the soft tissue releases when spasticity and contractures are present, but whenever the bone deformity is establish bony procedures aiming the proximal femur were employed. If there is acetabular dysplasia we use the periacetabular osteotomy described by Dega. We addressed also the painful hip in theses patients with alternative procedures like the proximal femoral resection, valgus osteotomy and hip arthrodesis.

IP-3-6

Shortening Spinal Osteotomy and its Application

Shoichi KOKUBUN

Department of Orthopaedic Surgery, Tohoku University School of Medicine, Sendai,
JAPAN (President of the 2nd IFPOS Congress and JPOA)

Modern techniques and instruments of spinal surgery have made it easier to osteotomize and shorten the spine. Shortening spinal osteotomy is classified into closing wedge osteotomy and axial shortening osteotomy. Each type of osteotomy is applicable to a variety of spinal conditions and each has its own advantages. In this lecture, our methods of osteotomy and its applications and results are described.

Closing wedge osteotomy is best applied to acute angular scoliosis or kyphoscoliosis such as congenital scoliosis due to hemivertebra at the thoracolumbar to lumbosacral spine. The anterior longitudinal ligament is kept intact as a soft tissue hinge for correction on the concave side of the deformity. In contrast to correction by means of elongation or rotation, a much higher rate of correction is obtained with very few or no neurological complications. A shorter extent of fusion with smaller instruments is sufficient to maintain the correction because of the rapid union between the osteotomized vertebral bodies. A combined anterior and posterior approach is chosen for corrections of scoliosis of more than 50 degrees and a posterior approach alone for corrections of scoliosis of less than 50 degrees.

Closing wedge osteotomy is also applied to kyphotic deformities of various etiologies such as congenital, post-traumatic, and post-radiation kyphosis. An approximately 30-degree correction is obtainable at one level by transpedicular wedge osteotomy of a body through a posterior approach. The compression hook and pedicle screw systems are used for gap closure and for rigid fixation, respectively.

Axial shortening osteotomy, that comprises segmental resection of the spine and closing the gap created through a posterior approach, is an alternative procedure to untethering the spinal cord at its bottom. It is best applied to tethered cord syndrome in adolescents or adults. The spinal cord and lipoma are both kept untouched during the operation. A 15 to 20 mm shortening should be long enough for relaxation of the spinal cord. For losing all the bony and soft tissue stabilizers of the spinal column, constructs of pedicle screws and a straight rod employed bilaterally as holders of the spine during the osteotomy and as guides during the shortening of the spine are required. This axial shortening osteotomy is applicable to spine tumor removal and fresh spine fractures.

Symposia

IS-1-1

Late Deformities of Septic Arthritis of the Hip in Children

Ken N. KUO

Rush Presbyterian-St. Luke's Medical Center, Rush University, USA

PURPOSE: To outline the various deformities of the hip that can result from childhood septic arthritis of the hip and proximal femoral osteomyelitis. **METHODS:** 25 cases of residual hip deformity due to septic hip arthritis and osteomyelitis of the proximal femur from early life at our institution were reviewed. There is a minimum of 10 years follow-up with the longest follow-up of 58 years. The residual deformities are classified as follows: Type I: Preserved Capital Femoral Epiphysis: a) capital femoral epiphysis has remained in the acetabulum with intact femoral neck; b) capital femoral epiphysis remained in acetabulum with destruction of the physis and fibrous union; and c) dislocated femoral head. Type II: Absent Capital Femoral Epiphysis: a) femoral neck remained in the acetabular level, and b) high dislocation. **RESULTS:** The problems with this deformity are: 1) persistent dislocation; 2) overgrowth of greater trochanter; 3) premature closure of triradiate cartilage; 4) leg length discrepancy; and 5) fibrous union of the femoral neck. Residual osteomyelitis is rare. Management is aimed at construction of the hip joint or maintaining stability of the hip. We explored the fibrous union and stabilized with internal fixation and valgus osteotomy if necessary. Varus osteotomy often is used to reduce the proximal femur to the joint. In younger patients with no femoral head, a trochanteric arthroplasty is a reasonable choice. Arthrodesis is an additional armamentarium for an unstable hip joint. **CONCLUSION:** The key to manage a late deformity of septic hip joint is stability and preservation of anatomical integrity.

IS-1-2

Adult Consequence of the New Born Septic Osteoarthritis

Giovanni PERETTI

Director of the Institute of Clinical Orthopaedics, Milan University, ITALY

New born infection of the skeleton are rare, but particularly severe because of the involving of the metaphyseal bone and the progress into the nearest joint. During the years 1965 ? 1975 we could examine a very high number of new borne septic osteoarthritis in consequence of the fact that in those years the progress of the intensive therapy increased very much the possibility of surviving for a very immature new born and the invasive techniques used for somministration of aliments through parenteral way could be cause of infection; no many paediatricians knew this kind of infections and no prevention was performed with antibiotic prophylaxis. During those years we had the opportunity to follow the therapy of more than 80 patients, with more than 130 localisations, most of whom where chronic cases and very few acute. We could also observe that only a very early therapy with drainage of the joint secretion and antibiotic therapy, could have reason of the disease. Many have been the consequence of the disease, especially for hip and knee joint, but also for shoulder, ankle and other, consisting in joint luxation, axial deviation, growth anomalies and shortening of the interested leg and later in osteoarthritis, as consequence of the deformity. The paper presentation will show the most frequent deformities, its clinical and radiological evolution and very shortly the therapy that we suggest whether in acute forms or in growing children to prevent adult deformities. Particular attention is paid to illustrate adult consequence and the possibility of recovering with a therapy that goes from physical therapy, to the bone osteotomies, to the lengthening of the short bone and finally to the performance of joint prosthesis, also in very young men.

IS-1-3

Femoral Lengthening After Septic Arthritis of the Hip in Children

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ABSTRACT

Septic arthritis of the hip in newborn baby can result in severe long term sequelae in the form of dislocation of the hip, lost of movement and growth disturbance with leg length discrepancy. For more severe discrepancies often with concomitant hip dislocation, no good solutions are readily available. This series comprised of patients with sequelae of septic arthritis of the hip with associated multiple joint sepsis and resultant major leg length discrepancies ranging from 6.9 to 14 cm. All underwent distraction lengthening with simultaneous correction of angulation and other deformities of the femur, with Ilizarov or Orthofix system. The age of operation ranged from 9 to 13 with an average follow up of 8 years. The overall lengthening achieved ranged from 5 to 14 cm with lengthening index from 24 to 51 days per cm in the first lengthening. One patient had an overall gain 28 cm achieved through two consecutive lengthening procedures. All hips remained stable and the lost of range of hip and knee motion was not significant. Other complications included 1 deep pin tract infection and one fracture of the callus.

IS-1-4

Tuberculosis of the Spine

Keith DK LUK

Chair Professor & Chief, Division of Spine Surgery, Dept. of Orthopedic Surgery,
The University of HONG KONG

Tuberculosis of the spine is still a common disease in some edemic regions and is returning to developed countries. The development of the polymerase chain reaction (PCR) technique and MRI in the past decade has greatly improved the diagnostic accuracy. From the 15-year follow up report of the Medical Research Council, it appears that conservative treatment is as effective as surgical intervention for earlier and milder diseases, there are still reservations on the effect of such treatment at much longer follow ups and for more severe diseases. Radical debridement and anterior strut fusion has proved effective in achieving earlier fusion and less late deformity.

Selective destruction of the anterior column of the spine poses a special problem in children. The lost of the anterior ring apophysis and the continuing growth of the posterior column after anterior fusion would theoretically lead to deterioration of the kyphosis with growth. In a longitudinal follow-up in Hong Kong of 33 children who had anterior spinal fusion done before the age of 10 years, no disproportionate posterior spinal growth was found. In another series of 117 children with an average age at surgery of 7.5 years, the combined anterior and posterior fusion group had an average improvement of the kyphosis of 7o compared with an increase of 12o in the anterior fusion alone group after 10 years. The current opinion is therefore that one should consider fusing the spine circumferentially only in the very young patients.

Suggested readings:

- 1.Upadhyay SS, Saji MJ, Sell P et al.: The effect of age on the change in deformity after radical resection and anterior arthrodesis for tuberculosis of the spine. *J Bone Joint Surg Am* 1994, 76:701--708.
- 2.Schulitz KP, Kothe R, Leong JCY et al.: Growth changes of solidly fused kyphotic bloc after surgery for tuberculosis. Comparison of four procedures. *Spine* 1997, 22:1150--1155.
- 3.Medical Research Council Working Party on Tuberculosis of the Spine. A 15-year assessment of controlled trials of the management of tuberculosis of the spine in Korea and Hong Kong. *J Bone Joint Surg Br* 1998, 80:456--462.
- 4.Luk KDK: Tuberculosis of the spine in the new millennium. *Eur Spine J* 1999, 8:338--345. *
- 5.Luk KDK: Spinal Tuberculosis. Current opinion in orthopedics, Vol.11, No.3 June 2000. Lippincott Williams & Wilkins.

IS-3-1

The Adult Consequences of Cerebral Palsy

Michael J. GOLDBERG

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Little is known about the health status of adults with cerebral palsy. Basic epidemiological statistics are difficult to ascertain. Life expectancy of children with cerebral palsy is longer than had been suggested previously. Birth weight and gestational age are not good predictors of life expectancy. Functional ability (ambulation, manual dexterity, mental ability) is the best predictor of life expectancy. The mentally retarded have a risk of dying before age 50 that is 60 times higher than the general population. Cardiovascular and pulmonary failures are major causes of fatal disease. However, breast cancer is 3 times greater than the general population and brain cancer 24 times higher. There is a high incidence of death from accidents. Adults with cerebral palsy decline in mobility and physical function. A quarter of adults with CP who previously walked, stop. Chronic joint pain, chronic neck and back pain, especially in wheelchair sitters, are common. Contractions and difficulty with spasticity are frequent complaints. A common theme of adults with CP is lack of access to knowledgeable physicians. Important research questions are: do adults with cerebral palsy age prematurely? What benefits do adults with cerebral palsy derive from our pediatric interventions?

IS-3-2

The "Spastic Hip" - A Model for the Prevention of Osteoarthritis

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Awareness and early recognition of spastic hip disease prevents disabling sequelae. Prompt management avoids problems of perineal hygiene, loss of sitting balance, pelvic obliquity, pain and osteoarthritis in later life.

Spastic hip instability is created and perpetuated by unbalanced muscle forces on the upper femur. This causes the femoral head to increasingly slide out from a gradually enlarging acetabulum. Early recognition of spastic hip dislocation is the key to avoiding long term problems and painful sequelae. The incidence of end stage spastic hip disease (ESSHD) varies from 5% to 60% in severely affected spastic quadriplegic cerebral palsy.

This lecture discusses the recognition and management of spastic hip disease. Early measures like positioning, splinting and modified seating are eventually replaced by injection of Botulinum toxin, adductor tenotomy and/or a varus femoral osteotomy. Management of severe degrees of subluxation and dislocation, as generally encountered in the developing countries, will be highlighted by my personal experience. This requires comprehensive surgery including an adductor and hamstring release, iliopsoas release, a varus femoral osteotomy with or without an open reduction and a periacetabular osteotomy. Long standing neglected hip dislocation may not respond to reduction and requires excision of the upper femur to alleviate disabling pain.

IS-3-3

Cervical Spondylosis in Patients with Athetoid Type of Cerebral Palsy

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In the athetoid type of cerebral palsy (CP), involuntary neck movement accelerates the development of spondylotic changes in the young, which sometimes causes cervical myelopathy and/or radiculopathy. Association of cervical myelopathy to CP. makes disabled patients bear further disability. Even if degree of symptoms is mild, disability of the patients becomes more serious. Therefore, treatment of the cervical disorders is important for management of patients with the athetoid type of CP. The aims of this paper are to describe roentgenographical features of the cervical spine in patients with the athetoid type of CP and to report surgical result of treatment for cervical myelo(radiculo)pathy. Roentgenographical features of 180 patients with the athetoid type of CP were high incidence of anterior osteophyte formation and narrowing of the disc space (disc degeneration) (51%), cervical canal narrowing and malalignment. Disc degeneration started at the C5/6 disc level and progressed to other levels including C2/3 and C7/T1. Instability was identified at C4/5 and C3/4 in 27% of the patients and 17% respectively and, the incidence was almost eight times compared to normal. In short, most of pathology exists in the upper subaxial cervical spine. To solve complex pathology as mentioned above, we chose laminoplasty and posterior fusion. Two third of 52 patients who had this procedure had significant benefit from surgery, although accurate assessment of surgical results was difficult because of preexisting disability. The longer the duration of symptoms was, the worse the surgical results.

IS-3-4

Major Orthopaedic Problems in Adults with Cerebral Palsy and Their Treatment

Takashi MATSUO

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Major orthopaedic problems observed in adults with cerebral palsy are documented, and benefits obtained from our surgical intervention based on the concept of OSSCS is discussed. Of 1468 operations in 527 patients with cerebral palsy for whom this orthopaedic surgery was conducted between 1982 and 1998, 329 operations in 125 adult patients were reviewed, and problems requiring the surgery were analyzed. Orthopaedic Surgery called Orthopaedic Selective Spasticity-Control surgery(OSSCS) was scheduled to reduce spasticity by selectively releasing the hypertonic multiarticular muscles having less antigravity activity. The operations carried out were: 21 for cervical radiculomyelopathy, 11 for scoliosis, 14 for shoulder problems, 14 for elbow flexion, 22 for forearm pronation, 22 for wrist flexion, 20 for finger flexion, 20 for thumb deformity, 71 for hip problems, 42 for knee problems and 71 for foot deformities. The main problems noted were pain and functional deterioration. Of all the 125 patients, 79 patients suffered from pain in various parts of the body, including the hip, foot and shoulder. In all 21 patients with neck problems due to radiculomyelopathy, chief complaints were pain and sensory loss. In 28 of 71 feet, chief complaint was pain. In 40 of 71 patients with hip problems, chief complaint was pain due to osteoarthritis. Although these various problems can be treated by standard orthopaedic surgery, early intervention by OSSCS seems to be more effective and beneficial as a prophylactic measure.

JS-1-1

Early Detection and Von Rosen Splintage Gives the Best Long Term Results in DDH

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Brisbane, Australia

Treatment of late discovered DDH, by closed means or surgery, does not always produce a normal hip even in the best of hands. The best long term results should come from very early detection of the condition, and reliable early treatment. At the Mater Mothers Hospital in Brisbane, Australia, paediatricians examine the children at birth, dislocations detected are treated in a Von Rosen splint. In a 5 year period from 1983 to 1987 there were 30890 live births, 262 children were found with hip instability, 162 were treated in a Von Rosen splint, at follow up in 1991 at ages 4 to 8 years 159 had normal xrays, 1 required splintage for 4 months from age 9 months and was normal, 2 required surgery for persisting acetabular dysplasia. There were no persistent dislocations, no child born at the hospital in this 5 year period presented in our city with an abnormal hip.

JS-1-2

The Long-Term Results of Treatment of DDH by Pavlik Method

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We assessed the relationship between gender, hip stability, sonographic pathology and age at the beginning of treatment. In regards with the outcome of treatment for DDH using Pavlik's method, this method was established after diagnosis in 224 hips diagnosed with DDH (197 girls, 27 boys). The average age at the beginning of treatment: 52 days. The hips were controlled at regular intervals,

Clinically and with ultrasound until clinical stability. The Graf's classification was followed and the protocol was in place for 1 year, that is, until hips were revealed as normal. Results showed that 7.14% of the hips treated by this method failed. These hips were treated by closed or open reduction with innominate osteotomy or a subtrochanter varus osteotomy. The average follow-up was nine years with 66% of the hips reexamined. None of these hips showed AVN. Based on our experience and the literature we found Pavlik's method of treatment of DDH simple, efficient and safe.

JS-1-3

Long-Term Results After Open Reduction for Developmental Dislocation of the Hip

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PURPOSE: To search for the factors to achieve good results after open reduction (OR) for developmental dislocation of the hip (DDH).

METHODS: We reviewed 38 children (40 hips) who had undergone OR below 2 years old from 1969 to 1984 and had been followed above 15 years old. Our OR procedure consisted of the resection of the inverted limbus and the thickened ligamentum capitis femoris and the capsulorrhaphy again. We studied the correlation between the radiographic results according to Severin's classification and postoperative OE angle. The OE angle was defined as the angle between the midpoint of the proximal femoral metaphysis (O) and the edge of the acetabulum (E).

RESULTS: Three hips were rated as being in Severin's Group I, 3 in Group II, 19 in Group III, 14 in Group IV and 1 in Group V. Five out of 12 hips with ≥ 10 or more degrees of postoperative OE angle had final good results (Groups I and II), while only 1 out of 28 hips with less than ≥ 10 degrees had final good results. Fourteen hips with AVN appeared postoperatively, besides 5 preexisting hips. The results of all hips with AVN were not good. Additional surgery was necessary before the age of 15 years in 28 hips.

CONCLUSION: The concentricity of the hip joint just after open reduction was a most important factor for achieving good results.

JS-1-4

Long-Term Follow-Up Study of Extensive Anterolateral Approach for Developmental Dislocation of the Hip

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Tanabe developed in 1973 the wide exposure open reduction method using the extensive anterolateral approach with 360 degrees circumferential capsulotomy. This review of clinical findings reports 57 cases of developmental dislocation of the hip (45 patients) who underwent open reduction by our method in Okayama Medical School and Ehime Disabled Children's hospital. The patients were from one to three years old, and were followed until they were 18 years old. The average age at the time of surgery was one year and six months. There were 41 girls and four boys.

Twelve patients were bilaterally affected, and there were 17 other left and 16 other right hips. The results were assessed clinically and radiographically according to Severin's classification (Group I; 17 hips, II; 28 hips, III; 10 hips, IV; 1 hip, and V; 1 hip). Good results (Groups I and II) were obtained in 78.9%, although cystic change was recognized on the acetabulum or femoral head on the radiographs in two hips in Group II, and two hips in Group III. The high percentage of good results sustained over the skeletal developmental period demonstrates the efficacy of the method despite the disadvantages of the open reduction itself. Investigation of the method and long-term follow-up studies continue. Improvements will be reported.

JS-1-5

Longterm Results of Treatment of Developmental Dislocation of the Hip Joint

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Prognosis of developmental dislocation of the hip joint(DDH) after treatment is very much affected by viability of capital femoral epiphysis and quality of reduction. Avascular necrosis of capital femoral epiphysis (AVN) is a complication of treatment, and quality of reduction is a matter of judgement.

The purpose of this presentation is to report 1) incidence of AVN and influential factors in author's series, 2) acetabular development in reference to depth of reduction, and 3) acetabular development after AVN. One hundred-seventeen DDH's were analyzed to respond the purpose. Inclusion criteria were 1) unilateral involvement, 2) absence of other influential disease at diagnosis, and 3) treatment initiated in same institute and followed up more than 3 years.

The following observations were obtainable.

1. Of the 117 hips, incidence of AVN based on Salter's criteria was 8.5%(10/117 hips), and that by Gage and Winter's criteria was 26.4%(31 /117 hips).
2. Incidence of AVN by Salter's criteria was 19.4%(4/21) in age group less than 6 months at reduction, 7.2%(4/55) between 6 months to 18months, 5.8%(1/17) between 18 months to 3 years and 4.2% (1/24) in over 3years.
3. Incidence of AVN of closed reduction group was 9.6%(6/62), and that of open reduction group was 7.2%(4/55).
4. The center head distance discrepancy (CHDD, Kuo 1994) was measured at 1 year after reduction. Acetabular dysplasia at latest follow-up (AI > 25 degree) in group with CHDD less than 6% was 23.0%(15/65), and that in group with more than 6% was 6 3.4%(33/52).
5. Incidence of actabular dysplasia in hips with AVN of any type was 63.4%(26/41), and that in hips without AVN was 28.9%(22/76) at latest follow-up.
6. Acetabular index was observed improving progressively after reduction, more markedly between the first 6 months and a year until 2 years when it reaches plateau.

Above observations will be discussed.

JS-1-6

Early Childhood Dysplasia of the Hip ? Identification and Treatment

James KASSER

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Hip dysplasia defines a condition in which the acetabulum fails to develop properly which may or may not be accompanied by a femoral deformity. Acetabular dysplasia may be quantified by the Alpha angle on ultrasound in infants, the acetabular index or CE angle on plain x-ray and various arthrographic parameters. Spontaneous remodeling occurs in infancy and childhood in many cases. While all agree that remodeling occurs below 18 months many have shown that improvement in the acetabular index may continue through age 4. All agree that there is no significant improvement beyond age 8. Factors contributing to acetabular dysplasia are 1) hip instability, 2) genetic predisposition, 3) avascular necrosis of the femoral head and 4) femoral deformity. At the time of closed reduction, we have tried to use CT scan to identify predictors of acetabular dysplasia. While up to two thirds of patients treated for dislocated hip with closed reduction require further treatment, we were unable to identify the specific parameters indicative of this problem.

Depending on the age at identification, treatment may be observation, bracing, femoral osteotomy, or pelvic osteotomy. Abduction bracing may be of benefit but conclusive data is surprisingly lacking. Femoral osteotomy may have a role in children below age 4 with marked femoral deformity and no instability. Pelvic osteotomy in the form of Salter or Dega/Pemberton procedure is the most effective method of management of persistent acetabular dysplasia. Failure to identify and treat progressive dysplasia in childhood results in progressive hip deterioration.

JS-3-1

Legg-Calve-Perthes Disease: General Considerations, Diagnosis and Treatment Protocol of the Orthopaedic Pediatric Department of the Universidade Federal de São Paulo (UNIFESP) - BRAZIL

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The shape of the femoral head in Perthes disease is important for its prognosis and treatment.

Radiographic examination usually fail to inform the size, the shape of the femoral head and a possible extrusion; MRI and arthrography are useful tools in these situations.

Pneumoarthrography will show in detail the morphology of the hip cartilage. Laredo (1992) described a classification system for Perthes disease based on the images obtained on the pneumoarthrography of the size and shape of the femoral head and of the labrum: Type I: the femoral head is normal and has a good coverage; type II: round and large head, with labrum coverage; type III: extruded oval head with elevated labrum; type IV: large and extruded flat head with everted labrum; type V: severe head deformation ("hinge") with everted labrum.

Based in this classification, conservative treatment was indicated for type I and II hips, and surgical treatment for type III, IV and V hips. In a series of 32 patients (37 hips) with Perthes disease the best results were achieved in type III hips.

Pneumoarthrography in Perthes disease produce comparable images as the ones of MRI; the latter is not invasive and enable us an early diagnosis and staging of the disease.

In 2000, Milani used Laredo's system in the images obtained on the MRI (Laredo-Milani classification), in 60 patients with unilateral Perthes disease.

Using a specially designed computerized program, the author demonstrated that in the radiographic examination 33,33% of the hips had good coverage which was not evident in MRI; this was referred as radiographic-MRI dissociation.

Moreover, the same program showed that in Laredo's type III hips the angle of the labrum tilting changes significantly in relation to Hilgenreiner's line when compared to the contralateral normal side. Also, this program measured head extrusion by Dickens and Menelaus methodology (1978) based on radiographic examination and MRI of hips with Perthes disease. In radiographic examination of type IV and V hips the results were significantly different when compared to the normal side, whereas in the MRI type III hips were extruded in relation to the normal side; this finding corroborates the unreliability of radiographic examinations in the classification and treatment of hips with Perthes disease, mainly in type III hips when immediate surgical treatment is mandatory (early risk hips by MRI).

JS-3-2

A Paired Study of LCPD Patients Comparing Conservative and Surgical Treatment

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Abstract

Purpose: A paired study to reliably compare post-treatment radiological results for conservative or surgical treatment of mature LCPD patients. Materials and method: The conservative group had been treated by Tachdjian's or Scottish Rite orthoses before 1985. The surgical group had a varus femoral osteotomy after 1986. One patient each was selected from each treated group to create the pairs for this study. Each pair was matched in terms of age at onset, Catterall's group III or IV (Herring's group B or C) and head at risk signs, severe subluxation and/or diffuse metaphyseal cyst. Every pair was evaluated for Mose's method, Acetabular-Head index(AHI), Articulo-Trochanteric distance(ATD) and leg length discrepancy. Results: Sixteen pairings were made based on the stated criteria. In Mose's method and AHI, the surgical cohort showed better results statistically ($p<0.05$, $p<0.01$) than the conservative cohort. There were no statistical differences in ATD and leg length discrepancy between the groups.

Conclusions: Surgical treatment improved the sphericity of the femoral head and provided greater acetabular coverage than conservative treatment. The smaller ATD and bigger leg length discrepancies found in the surgical group were not shown. This study suggested surgical treatment instead of conservative treatment for severely involved LCPD patients.

JS-3-3

Long Term Follow Up of Legg-Calvé-Perthes Disease

Henri BENSACHEL (Paris)

Due to the incertainties which remain in the field of LCPD, the study of its long term follow-up is of a major concern. We have reviewed a series of 43 patients, 5 of whom having had a bilateral involvement. So, 48 cases could be analysed. The average of the follow up was 18 years. The age of the children with LCPD ranged from 3 to 12 years old. The average age of the children treated conservatively was 4 years 6. As surgery was performed in older children. The time of diagnosis was from 8 days after the onset to 12 months. As for the other clinical symptoms, the recurrence of the stiffness of the hip was a criteria of poor prognosis. According to the Waldenstrom classification, the diagnosis has been made at the stage 2 in 53% of the cases.

Although 55% of our cases were Catterall groups III and/or IV, all of them had not a poor prognosis. But 2 radiographic signs of risk were of a true prognostic value.

The good results at the end of growth have been stable in adulthood. As for the other ones, incongruency of the hip with or without functional stiffness opened the way to arthritis after 40. However, the painful and or stiff patients were few and no more than 2% of our cases had to perform surgery.

Our eclectic indications in treatment joined to the improvement in screening can explain such evolution in adults.

JS-3-4

Bony Changes of the Proximal Femur in Legg-Calve'-Perthes Diseases -Comparison between Disease Healing Stage and Skeletal Maturity-

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Generally the clinical results of Legg-Calve'-Perthes disease were evaluated at the time of disease healing. However, it is well known that the deformities of the proximal femur progress to the period of skeletal maturity. The purpose of this study was to evaluate the progression of the deformities in the proximal femur.

In a retrospective study of 60 patients with unilateral Legg-Calve'-Perthes disease, who were followed until the skeletal maturity, the bony changes of the proximal femur were compared between disease healing and skeletal maturity.

According to this study more bony deformities were identified in skeletal maturity than in disease healing ; Medial neck length quotient decreased from 60% in disease healing to 45% in skeletal maturity($P<0.001$). The femoral neck-shaft angle decreased from 128 degrees in disease healing to 125 degrees in skeletal maturity($P<0.001$). The proximal migration of greater trochanter increased from 13.8mm in disease healing to 21.3mm in skeletal maturity($P<0.001$). Severe neck shortening was more frequent in varus osteotomy group(41%) than abduction brace group(20%). However, the spherical quotient of femoral head and Stulberg rate revealed no differences between disease healing and skeletal maturity.

These results revealed that there were considerable differences of the deformities in the proximal femur at the time of disease healing and skeletal maturity.

JS-3-5

Pathophysiological Basis of Deformation of the Femoral Head and Neck in LCPD from Clinical and Experimental Results

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Here, we describe deformation of the femoral head and neck in LCPD. A radiological classification emphasizing epiphyseal and metaphyseal involvement seen on lateral views is used for prediction of the final configuration of the femoral head and neck. Clinical: Group 1 had 40 patients (44 affected hips) by containment (Tachdjian's trilateral socket hip abduction orthosis); mean follow-up was 19 years (range, 10-24 years). Group 2 had 20 patients (20 affected hips) treated by extraarticular methods (femoral or pelvic osteotomy); mean follow-up was 15 years (8-24 years). Group 3 had 16 patients (17 affected hips); necrotic heads were treated by Steele's method and mean follow-up was 23 years (11-32 years). Heads were spherical in 18 (41%) of 44 group 1 hips, in 1 (5%) of 20 hips in group 2 hips, and no hips in group 3. Experimental: We treated 76 puppies by a modification of the method of Henard and Calandruccio. The right hip was cast in full internal rotation, hyperextension, and abduction for 20-24 hours once or twice with 1 or 4 weeks intervening. Radiological and histological changes similar to those seen in human patients were found in all groups. Conclusions: A mechanical factor and a biological factor seem to be involved in deformation in this disease. Mechanical damage can be lessened by containment, but we do not know how to manage the biological factor in older patients.

JS-3-6

Prognostic Evaluation of Legg-Calvé-Perthes Disease by MRI- The Role of Physeal Involvement

Nando de SANCTIS

ITALY

In order to better predict the final outcome in Legg-Calvé-Perthes disease (LCPD) many factors both clinical [age at onset, gender and weight of the patient, recurrence of synovitis, progressive range of motion (ROM) limitation] and radiologic (extent of epiphyseal necrosis, lateral pillar height, subchondral fracture, lateral, subluxation, lateral calcification, metaphyseal changes) have been considered during the last three decades. Various radiographic parameters such as epiphyseal roundness, epiphyseal extrusion (11,16), and shortness of neck also have been used to assess the final deformity. Each author emphasized that particular aspects of the deformity would be more important in predicting the ultimate fate of the hip. Since 1981, the Stulberg classification (19) has become the most widely used method in assessing the residual deformity of the hip through five classes of congruency, which are strictly related to the secondary development of osteoarthritis. Although the majority of these articles pointed to the good correlation between the features of the disease and their outcomes, there is evidence that in a relevant percentage of the cases, the course of the disease remains unpredictable. Referring to these cases with uncertain prognosis, our question has been: is there still another unknown variable that might influence the final result? Our interest was drawn to verify the role of the growth plate and its potential disturbance in controlling the femoral head and neck shape in LCPD, as we observe similarly in postreductional avascular necrosis and in traumatic growth plate injuries.

Some authors (1-4,6,13) have dealt with abnormal growth of the proximal femoral plate occurring in severe forms of LCPD and its consequences: growth acceleration or retardation, growth arrest with bony bridge formation, influence of site and size of the bony bridge on the shape of the proximal femur (head, neck, greater trochanter).

Because of the difficulty in investigating the physis, the question regarding the responsibility of its impairment in the deformity of the hip still remains controversial.

Because magnetic resonance imaging (MRI) is recognised to be a reliable tool for the study of cartilage and bone marrow (5,7,9,15,17,20), we adopted this technique for our investigation in LCPD analysing the extent of involved bony epiphysis (EXT), the lateral extrusion of the cartilaginous epiphysis (LAT), the physeal involvement (PHY), and metaphyseal changes (MET) and focusing our attention on the physis.

Twenty-eight unselected hips affected by Legg-Calvé-Perthes disease (LCPD) in 24 patients from 1987 to 1994 had magnetic resonance imaging (MRI) performed. The patients were retrospectively reviewed at a mean follow-up of 5.4 years. An interobserver blind analysis was made to establish the reliability of four MRI parameters: extent of epiphyseal necrosis (EXT), lateral extrusion of the femoral head (LAT), physeal involvement (PHY), and metaphyseal changes (MET). The interobserver analysis resulted in a good reliability for all MRI parameters (concordance, >80%; K index, >0.45). A statistical correlation study (Spearman test) was then done between each MRI parameter and the condition of the hips at follow-up evaluated by Stulberg class and a personal scored system (total score) of clinical-radiographic condition. All MRI parameters appeared well correlated to the Stulberg class and to the total score ($S > 0.66$; $p < 0.05$): PHY resulted be the strongest correlated parameter ($S = 0.84$ for Stulberg class; $S = 0.91$ for total score). This statistical analysis was applied to another series of 31 hips, from the University of Montpellier, with same results.

Finally our statistical correlation study demonstrates physis involvement to have a high predictive value in LCPD; therefore it can be assumed as the main risk factor in formulating prognosis.

IFPOS Oral Presentations

(Free Papers)

I-1-1

Prognostic Factors in Septic Arthritis of the Hip in Children: A Twelve Years Review

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PURPOSE: To determine the variable factors related to the poor results of septic arthritis of the hips.

METHOD: Thirty two patients with septic arthritis of the hip were retrospectively reviewed. The data obtained from the records included the presentation and duration of symptom, the associated findings, the organism, the treatment and its outcome. Upon the study the patients were recalled for clinical examination and radiographic evaluation of the hips.

RESULTS: Thirty four hips were involved including 26 hips in 24 males and 8 hips in 8 females. The average follow up was 7.3 years. The age of the patients ranged from 2 weeks to 14.5 years. The duration of symptom ranged from 1 day to 2 months. The most common associated findings were septicemia and topical pyomyositis. The most common organism was *Staphylococcus aureus*. Arthrocentesis and arthrotomy were performed in all cases. From clinical and radiographic evaluation, there were excellent and good in 22 cases and fair results in 3 cases. The poor results was observed in 9 patients (10 hips) who mostly had associated pathology including septicemia, tropical pyomyositis and abscess respectively. The ultimate results were shortening avascular necrosis, slipped capital femoral epiphysis and secondary osteoarthritis from severe destruction of the joints.

CONCLUSION: The poor prognostic factors are the duration of symptom longer than 4 days, Staphylococcal infection, the presentation with associated infection particularly septicemia and pyomyositis.

I-1-2

Total Septic Arthritis in Children at Our Hospital

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(Purpose) Our aim is to analyze the treatment and prognosis of arthritis pyogenes in children from 1974 to 2000. (Material and Method) Thirty-one children were hospitalized in our hospital since August 1975 through September 2000. We examined age, sex, therapeutic modalities, and prognosis. (Result) Total number of hospitalized children was 31; hip joint: 20, knee joint: 5, shoulder joint: 2, ankle joint: 2, phalangeal joint: 2. The 25 years were divided into three periods; Period I: 1975-1983, Period II; 1984-1991, Period III; 1992-2000. The number of the children in each period was as follows; hip joint: I-6 children, II-6, III-8, Knee joint: I-2 children, II-1, III-2, Shoulder joint: III-2 children, phalangeal joint: I-1 child, II-1, Ankle joint: I-1 child, III-1. Average age on admission was as follows; hip joint: 4 years 6 months (1m -11y 6m), Knee joint: 5y 9m (1y - 11y 8m), shoulder joint: 5m (1 - 9m), ankle joint: 11y (9y 8m - 12 y3m), phalangeal joint: 11y3m (10y 2m - 12y 5m). Forty hips were treated initially in our hospital. Among then, arthrocentesis was performed for 5 children, arthrotomy for 5 children, arthroscopic lavage for 2 children, and simple antibiotic medication for 1 child. In the follow-up, coxa vara was observed in 2 hips, coxa magna in 4, and femoral head elimination in 1. (Conclusion) Aseptic arthritis in children has not decreased in these 25 years. Early appropriate treatment is essential for septic arthritis in children.

I-1-3

Utilization of Ultrasonograph in the Detection of Septic Arthritis in Children

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PURPOSE: For the early detection of the effusion of infected joint, ultrasonography was attempted as the diagnostic approach. The efficiency and advantages were assessed retrospectively. **MATERIALS and METHODS:** Between April, 1995 and March, 1998, 40 children were examined by ultrasound scanner for suspected septic arthritis in our hospital and were included in this retrospective study by chart review. **RESULTS:** Thirty-one patients were found with joint effusion, and the needle aspirations of these 31 joints confirmed septic arthritis in 22 patients. In 3 patients, in addition to the joint effusion, the joint surrounding subperiosteal abscess and cortical erosion also were found on sonography, resulting in a diagnosis of concurrent osteomyelitis. In two patients, sonography confirmed only soft tissue swelling and abscess formation on the buttock, but without hip joint effusion. These findings excluded the diagnosis of septic arthritis and helped us obviate the unnecessary attempts at joint aspiration. **CONCLUSION:** From the preliminary results, we find ultrasonography has the following advantages for the diagnosis of septic arthritis: 1.) ultrasonography is very sensitive in detecting the joint effusion of septic arthritis; 2) ultrasonography can clearly define the pathological extent of septic arthritis and help clinicians to treat the concurrent osteomyelitis by appropriate surgical debridement; and 3) ultrasonography can differentiate soft tissue abscess from septic arthritis and help clinicians obviate unnecessary needle joint aspiration.

I-1-4

The Treatment of Bone Defects Following Chronic Pyogenic Osteomyelitis in Children

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PURPOSE: To describe methods used to reconstruct bone defects in chronic osteomyelitis. **METHODS:** Twenty nine children (1-12 years) were treated between 1990-2000. Conservative treatment lasted 5-8 months before reconstruction. The tibia was involved in 20 children, femur (4), radius (4) and ulna (1). Twenty four children had sequestrectomy followed by Gentamycin bead insertion in the defect for 2 weeks. Seven children required muscle flaps for skin defects over the tibia before bone grafting. Bone defects (<2cm) were treated by onlay grafting in 6 cases, cancellous chips in cavitating defects (Papineau technique) in 2 cases and segmented iliac crest grafts threaded over a Kirschner wire in 11 cases with large defects. Fibular transfers were done in 4 cases and radial transfer onto the ulna in one case. **RESULTS:** Three children required repeat grafting. All bone defects healed by 3-6 months. Shortening of 1-5cm was seen. All children were ambulant at follow up (6 months to 8 years). Fibular transfers hypertrophied with time. **CONCLUSION:** The treatment of bone defects following pyogenic osteomyelitis is challenging. Onlay bone grafting is reliable in small defects (<2cm). Large defects can be treated with segmental iliac crest grafts. Bone transfer should be reserved for difficult cases with extensive defects.

I-1-5

Outcomes of Legg-Calve-Perthes Disease in Japan
– Multi Center Study Organized by JPOA –

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PURPOSE: To investigate the outcomes of Legg-Calve-Perthes disease (LCP) in Japan. MATERIALS AND METHODS: 725 cases (783 hips) reported by 93 hospitals and children institutes were analyzed. 656 were male, 78 were female, Ten were unknown. An averaged age diagnosed was 7 years and 1 month (ranged from 2 ys 4 mos to 15 ys 1 mon). 598 cases were evaluated by Stulberg classification. 537cases (449 conservatively, 88 operatively) were treated by containment methods. 28 cases were treated non-containment methods such as traction, non weight bearing, vulgas osteotomy. 27 cases had no treatment. In conservative containment methods, 92 patients allowed full weight bearing (FWB), 310 patients were not allowed weight bearing (NWB), 33 patients had partial weight bearing (PWB). RESULTS: In the outcomes of containment methods Stulberg type I and II were 65.2% (65.9% in conservative, 61.4% in operative). There was no significant difference between the conservative methods and the operative methods. In the outcomes of FWB, NWB, and PWB methods Stulberg type I and II were 68.5%, 62.9%, and 60.6% respectively. There was no significant difference among them. In the outcomes of non-containment methods Stulberg type I and II were 28.5. Stulberg type III, IV, and V were 71.5%. CONCLUSION: Containment methods were required for LCP disease. Weight bearing during containment methods did not affected on the outcomes.

I-1-6

Quantitative Analysis of Lateral Pillar can Enhance Prediction of Adult Consequences in Perthes' Disease.

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Purpose: Lateral pillar (LP) classification has been widely accepted in Perthes' disease. We retrospectively evaluated the chronological change in the height of LP to establish more accurate prediction of the final results. **Patients and Methods:** Fifty consecutive patients with unilateral Perthes' disease (early presentation within 3 months, 5-8 years of age at the onset and follow-up until skeletal maturity) were analyzed. All patients were treated conservatively by a unilateral brace. The LP height was measured on serial A-P radiographs by means of a tangent line to the both heads and compared with the contralateral normal side representing a percent of LP (% LP). We evaluated relationships between %LP and final results by Stulberg's classification. Intra- and interobserver reliability of % LP was estimated by intraclass correlation coefficient. **Results:** The averaged % LP showed a minimum value during 8 to 12 months after the onset indicating the optimal time of LP classification. There was a significant difference in % LP between Herring group A /B and group C which manifested evidently at 6th month. Most of cases which represented minimum %LP < 60 virtually resulted in aspherical shape of the femoral head (Stulberg 3-5). Measurements of % LP had low interobserver error with high reproducibility. **Conclusions:** We proposed a simple new measurement of LP (% LP) to standardize evaluation without individual bias. It may facilitate prediction of the adult consequences as well as indication of the treatment in Perthes' disease with accuracy.

I-1-7

Comparison between Operative and Non-Operative Treatments for Legg-Calve-Perthes' Disease

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PURPOSE : Once orthopaedic surgeon faces the patient suffering from Legg-Calve-Perthes' disease, there comes necessity to determine the strategy for treatment, i.e., non-operative treatment or operative treatment. The purpose of this study is to evaluate the long-term results of operative and non-operative treatments for LCPD and to clarify the advantages of these opposing treatments. **METHOD** : Non-operative treatment group (Group N), treated using the trilateral hip abduction orthosis, consists of 24 patients with 24 affected hips. Operative treatment group consists of 27 patients with 27 affected hips. Operative treatment means Salter's innominate osteotomy, proximal femoral varus osteotomy, and Steele's operation. Operative group was divided to two subgroups, i.e., intra-articular procedure group and extra-articular procedure group (Group E). Each hip was classified using Hirohashi's radiographical classification. At the time of skeletally matured, we evaluated the radiological finding using the Stulberg's classification and Hirohashi's final configuration of lateral view. The duration from onset to primary healing and the stages of coxarthrosis at the final examination were also evaluated between the hips classified to the same types by Hirohashi's radiographical classification to standardize the result. **RESULTS** : Statistical analysis revealed there was no difference between Group N and Group E in the duration from onset to primary healing. As for the distribution of coxarthrosis stages, there was an advantage in Group N. **CONCLUSION** : Extra-articular procedure had no advantage in treatment period, but on the other hand non-operative treatment had an advantage in final result.

I-1-8

Comparison between Salter Osteotomy and Augmented Acetabuloplasty in the Treatment of Patients with Severe Legg-Calve-Perthes Disease

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PURPOSE To compare the results of two different operative procedures used in the treatment of Legg-Calve-Perthes Disease: Salter osteotomy and Augmented Acetabuloplasty.

METHODS Group 1 comprised 50 hips submitted to Salter osteotomy. Another 40 hips (group 2) were treated by Augmented Acetabuloplasty. Average age was 6.62 years in Group 1 and 6.35 years in Group 2. Follow-up varied from 2 to 10 years in both Groups 1 and 2.

Acetabular coverage was measured by using the CE angle. Femoral head involvement was assessed according to the classifications of Salter & Thompson and Catterall. Preoperative arthrographs were graded according to Laredo. Results were graded using Mose's circles.

RESULTS Percentage difference (Δ %) between immediate postoperative and preoperative CE angle was significantly greater in Group 2. The Δ % between final and immediate postoperative CE angle was significantly greater in Group 1, and within Group 1 it was significantly greater at ages 4 to 6 years. The Δ % between final and preoperative CE angle was statistically the same in both Group 1 and Group 2.

CONCLUSION There had been a tendency of better results after Augmented Acetabuloplasty in children older than 6 years. Patients of Group 1 aged 4 to 6 years had good results in a significantly higher frequency than the older ones. Group 1 children with pre-operative Laredo III arthrography had good results in a significantly greater number of cases, as compared to Laredo grade IV.

I-1-9

Is the Salter Osteotomy Combined with Proximal Femoral Osteotomy (PFO) a Preferreable Surgical Containment than PFO Only - A Mid Term Follow Up

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Purpose: The goal of the study was to find out, if there is a benefit of combined surgical containment (CC) in LCDP, when compared to single PFO

Methods: Between 1977 and 1994 116 Children (123 hips) underwent operative treatment on LCDP in our department. 82 patients had a proximal femoral varisational osteotomy (Group I), 34 Patients were treated by combined operative containment (CC) (Group II). The mean age at O.R. was 6 years and 4 months in group I and almost 7 years (6y and 11mo) in Group II. The extend of the necrosis showed a type-Herring C in 31% a type B in 61% (Group I) versus 49% Type C und 38% B in Gruppe II. With a follow up-rate of 62% 82 hips have been examined on regular base up to an average age of 18 (group I) and 15 years (group II). We judged clinical outcome by using the IOWA-Hip Score. The radiographical outcome was assessed using the Mose-criteria and the Stulberg classification. Additionally we measured the radiometric parameters for joint coverage and congruency as described by the CE-angle, the articulo trochanteric distance (ATD) and medial joint space (MJS). In order to differentiate the outcome of late onset and severe LCPD we compared also the subgroups of age > 8 at operation (late cases) as well as of the hips presenting with Herring C.

Results: No statistical difference in clinical or radiographical outcome was found while both groups presented with good results in around 60%. A significant better joint coverage was yield, when CC was performed (CE-angle 37 vs. 30°). Herring C hips and late cases had a greater chance for a good radiographical outcome when treated by CC (39 vs. 23%/50 vs. 25%). At final follow up we also found a higher incidence for secondary procedures as leg lengthening and revalgisation in Group II (10,5 vs. 5,4%).

I-1-10

Eleven Years Follow-Up of Transtrochanteric Rotational Osteotomy of Femoral Head for Severe Legg-Calve-Perthes Disease

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Purpose : The purpose of this study is to evaluate the middle-term results of transtrochanteric rotational osteotomy of the femoral head (RO, Sugioka's osteotomy) for Legg-Calve-Perthes disease (LCP) and to determine the factors to influence the surgical outcomes. **Methods :** Twenty-nine hips in 27 patients with LCP were treated by RO. The mean age at onset of disease was 8 years 10 months and the mean age at operation was 10 years 4 months. Six hips were Catterall class III and 23 were class IV. All the patients did not have indications for varus osteotomy because of hinge abduction, etc. The initial nonoperative treatments were ineffective. Radiographical parameters included Herring's (lateral pillar) classification, the posterior pillar classification (Akazawa, 2000) and the distance between tear drop and femoral head showing subluxation of femoral head. The outcomes were evaluated using the modified Stulberg's classification (Kamegaya, 2000). **Results :** Fifteen hips (56%) had good outcomes with the modified Stulberg's classification. Significantly better outcomes were obtained in patients with the younger age at onset, more bone formation or preservation of lateral and posterior ridge of epiphyses and less subluxation of the femoral head. The age at operation and the duration until operation did not have significant correlation with the outcomes. **Conclusions :** RO is an effective salvage procedure for the patients with severe LCP. The age at onset, degree of epiphyses reconstitution and subluxation of the femoral head had influences over the surgical outcomes.

I-1-11

Chiari Osteotomy in Perthes Disease

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Purpose: To evaluate clinical and radiographic outcomes after Chiari pelvic osteotomy in Perthes disease. **Material and Methods:** We performed Chiari pelvic osteotomy (Chiari) for secondary osteoarthritis in 13 patients of Perthes disease. Two patients were male and eleven patients were female. The mean age at the time of the operation was 32 years. The mean duration of follow-up was 5.9 years. The diagnosis was pre-arthritis for six hips, the early stage for five hips, the advanced stage for two hips, and the terminal stage for one hip, according to the classification of Japanese Orthopaedic Association (JOA). Seven hips were treated with Chiari only, four with Chiari combined with the valgus osteotomy of the femur, two with Chiari with femoral lengthening, and one with Chiari combined with the varus osteotomy of the femur. Clinical assessment was performed in reference to the scoring system of the JOA. Additionally, radiographic assessment was performed. **Result:** The mean JOA hip score significantly improved from 73.6 points to 90.8 points at the time of the final follow-up examination. Radiographically, the center-edge angle improved from 8.2 degrees to 34.4 degrees. Sharp angle decreased from 44.9 degrees to 37.9 degrees. Acetabulum-head index improved from 60.9 % to 81.4 %. Acetabular edge angle improved from 8.4 degrees to 8.1 degrees. **Conclusion:** Chiari can provide good results clinically and radiographically. Our results suggested that an ascending inclination of acetabular edge is an important factor for outcomes after the operation.

I-1-12

Four Cases of Severe Forms of Perthes Disease Associated with APC Resistance due to Homozygosity for Mutant Factor V (Leiden)

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PURPOSE: To present new data on the controversial hypothesis of the etiopathologic role of thrombophilia (APC resistance) in Perthes disease.

METHOD: A retrospective screening for thrombophilia has been carried out on 47 patients (53 hips) treated for Perthes disease at the Department of Orthopaedic Surgery University Medical School Debrecen between 1991 - 1999. 9, 25 and 19 hips belonged to Catterall Group II, III and IV respectively. Control examinations for this study were performed between 1999 - 2000. Control group consisted of 30 healthy persons.

RESULTS: Activated protein C resistance was found in 5 (10,6%) of the 47 patients. One of them was heterozygous, the other four were homozygous (8,5%) for mutant Factor V (Leiden). All four homozygous patients had the most severe form of Perthes disease. Three had very early onset, at 2,5, 4 and 5 years respectively, the fourth at 12 years. The whole epiphyses were involved in all four cases and showed lateral extrusion in two. The epiphyses collapsed completely in all cases to a dense line within 10 months. Also the metaphyses were affected in all patients, and all the femoral heads were displaced laterally in the dysplastic acetabula. The femoral necks were shortened and broadened with trochanteric overgrowth even to the extreme in one case. The four cases all belonged to Catterall Group IV. Two of the patients reached skeletal maturity and could be classified into Stulberg Group IV and V respectively. The heterozygote case was a typical Catterall Group II. No significant difference was found in the values of other factors investigated for thrombophilia in this study.

CONCLUSION: The high prevalence (10,6%) of mutant Factor V (Leiden) in our patients, compared to 5-7% in healthy Hungarian population, suggests that there is a correlation between mutant Factor V (Leiden) and the development of Perthes disease in the Hungarian population. The extremely severe deformities of the four homozygote cases are in accordance with the disorder, the risk for thrombotic events being 10 times higher in homozygotes, than in heterozygotes for mutant Factor V (Leiden).

I-1-13

The Influence of Initial Treatments in Transient Synovitis of the Hip
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PURPOSE: Transient synovitis of the hip can be observed very often in childhood. We investigated the influence of initial treatments on duration of symptom and on the incidence of coxa magna following transient synovitis of the hip. MATERIALS and METHODS: We reviewed 254 children (260 hips) ranged from 1 to 15 years. 50 children were roentgenographically followed for longer than a year. We investigated the influence of initial treatments on the duration of limited range of motion and on the incidence of coxa magna comparing two different initial treatments, simple rest at home and skin traction with admission. RESULTS: 12 children (24.0%) had a coxa magna at the last roentgenogram. Initial treatment of 8 cases of these 12 coxa magna was rest at home in outpatient clinic. To regain unrestricted hip movement, it took for an average of 29.3 days for the children whose initial treatment was outpatient resting, on the other hand for an average of 21.2 days for the children who were admitted and were placed in abduction with skin traction. CONCLUSION: Coxa magna often followed transient synovitis of the hip and limited range of motion of hip joint usually extend. The transient synovitis of the hip should not be considered a harmless disease. Immediate traction therapy is recommended and long-term follow up should be necessary.

I-2-1

Evaluation of Effects of Orthopaedic Surgery on Patients with Cerebral Palsy: 10 Years Post Surgery Using Gait Analysis

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Purpose: To document the long term effects of surgical intervention in patients with cerebral palsy using gait analysis parameters 10 years post surgery.

Methods: 17 ambulatory patients with CP (27 sides) underwent surgery determined appropriate from pre-operative gait analysis which included hamstring lengthening, rectus femoris transfers/releases, gastrocnemius lengthenings and femoral derotation osteotomies. Average age at surgery 9+4 years. **Results:** All patients had 4 gait analyses, 1 prior to surgery (P0), 3 years post-op (P1), 5 years post-op (P2), and 10 years post-op (P3). Kinematic results showed improvements seen from P0 to P1 were maintained at P2 and P3 in both sagittal and transverse plane kinematics. Patients with rectus releases showed better knee extension in stance but significantly reduced peak knee flexion in swing compared to those with rectus transfers, however all release cases had improved walking velocity. Two groups were divided by preoperative walking velocity: functional walkers (70cm/sec or greater), and slower walkers (<70cm/sec). Functional walkers maintained surgical changes long-term except for loss in peak knee flexion in swing from P1 (64+8 deg.) to P3 (51+5 deg). Significant improvement in peak knee extension at initial contact from P0 to P1 (27+9 deg to 18+9 deg) was maintained at P3 at 15+9 deg.

Conclusions: Benefits achieved by orthopaedic intervention at one-year post surgery are maintained at 10 years post surgery in functional walkers. Slower walkers show initial improvement followed by a reduction in function over time. Intervention can be considered beneficial considering the natural tendency for functional decline over time without surgery.

I-2-2

Rectus Femoris Transfer for Cerebral Palsy Patients-Outcome Evaluation

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38 affected limbs in 24 patients were evaluated by comparing preoperative and one year postoperative gait analysis. In a smaller cohort of 26 limbs in 18 patients, a second gait analysis was obtained with an average of 4.6 years following surgery. Functional ambulatory status evaluation was based on level of ambulation as defined by Hoffer, requirement of walking support and usage of ankle brace. There were improvement of 9.8 degrees in maximum swing phase knee flexion and 7.0 degrees in total range of knee motion at one year gait analysis, with slight loss of knee extension in stance. Later gait analysis in the smaller cohort showed that improvement in the swing phase knee flexion was maintained, but improvement in total range of knee motion was loss due to further deterioration of knee extension. Eight children showed improvement in status of their ambulation while four deteriorated at one year after surgery. At the final follow up, ten children showed clinical improvement while three deteriorated in their ambulatory status after surgery. Improvement in swing phase knee flexion after RFT was associated with loss of knee extension. Concurrent hamstring lengthening should be considered for a better knee extension. Temporal parameters did not improve with time after surgery. Cerebral palsy children may require more than one year to recover from surgery and improvement can be expected after one year despite less favorable outcome based on parameters of gait analysis.

I-2-3

Botulinum Toxin Injections for Cerebral Palsy in the Second Decade of Life

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Purpose:To highlight the application of botulinum toxin injections in the second decade of life, all patients having reached a plateau on prolonged conservative treatment.**Methods:**We studied seventeen patients , diagnosed for cerebral palsy and spasticity treated with Botulinum toxin injections between Jan "99- Dec" 99. Their ages ranged from 10-15 years. Of these 10 were diplegics , 5 were hemiplegics, and 2 were quadriplegics. Botulinum toxin was injected in the dose 6 -8 units/kg body wt. The most common indications were 1) pre surgical assessment in diplegics 2) delaying surgery and to developing antigravity muscles and postural control 3) to treat post surgical relapses , identifying newer target areas. The most commonly injected muscles in the lower limbs were the hamstrings and the gastrocnemius. The most commonly injected muscles in the upper limbs are the pronator teres , wrist flexors , finger flexors and the thumb flexors. **Results:**Spasticity diminished in all the patients with a reduction of Ashworth score from a mean 4 to 2. Average percentage of function :Diplegics: increased from 28% to 70 % at three months decreasing again to 30 % at six months. Hemiplegics: from 16% to 70% in ambulation . There was no improvement in fine motor control of the upper limbs. **Conclusions :**Overall botulinum toxin helps in reduction of spasticity and improvement of function . It also helps in gaining trunk control and developing anti gravity muscles , which ultimately helps in the surgical outcome.

I-2-4

Calcaneal Lengthening for Flatfoot in Spastic Conditions: Radiographic, Kinematic, and Kinetic Analysis

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PURPOSE: To clarify the efficacy of the calcaneal lengthening (CL) procedure for the flatfoot deformity in spastic conditions. **MATERIAL AND METHODS:** The material for this study was 94 feet in 58 patients (cerebral palsy 56, myelomeningocele 1, hydrocephalus 1). The average age was 9.4 years and mean follow-up was 2.3 years. Following comparisons were made between the pre- and post-operatively: radiographic and clinical changes, changes of foot progression angle and ankle power generation (A2), and the type of bone graft. **RESULTS:** Bony union was achieved in all cases. All of the radiographic indices improved significantly and those were within normal range except calcaneal pitch post-operatively. Clinically, 68 feet (72%) showed excellent or good results. According to the 3-D gait analysis, foot progression angle, which was averaged 16.6 degrees of external progression pre-operatively, improved to 7.6 degrees of external progression post-operatively. Although ankle power generation (A2) decreased slightly in those cases who underwent CL and TAL or Strayer operation, A2 increased (from 4.95 to 5.99watt/kg) in cases with CL only without concomitant TAL. There was no difference in all of the results between auto- and homograft. **CONCLUSION:** Although the longitudinal arch of the foot was not restored completely, CL was an effective procedure to correct the heel valgus and forefoot abduction and thus to improve the increased external foot progression angle. CL has also additional advantage to increase the ankle power generation by means of increasing the foot lever arm.

I-2-5

The C-Sign of Talocalcaneal Coalition. Is it Useful for Diagnosis?

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[Purpose] The C-sign is generally believed as a useful diagnostic tool of talocalcaneal coalition, however we often see the patient who does not have the C-sign. To investigate the sensitivity of the C-sign, a double masking study was performed for radiographs with and without talocalcaneal coalition. [Materials and Methods] We reviewed weight-bearing lateral radiographs of 55 feet in patients with talocalcaneal coalition and 55 feet of normal controls. The average age at the time of diagnosis was 20.0 years (range, 10-66 years). Twenty patients were under 12 years. The existence of talocalcaneal coalition was confirmed by CT or operative findings. Normal controls were composed of the same sex and generation with the patient. Two foot surgeons evaluated the existence of talocalcaneal coalition and the C-sign in the randomized radiographs of all feet. If the radiograph was obtained different opinions by two observers, another foot surgeon gave the third opinion. [Results and Discussion] The sensitivity of the C-sign in patients who were under 12 years was 5%. The C-sign is characteristic of the patient with the medial type of talocalcaneal coalition and a large lesion, therefore young patients tended to show false negative. The sensitivity of the C-sign in this study was very low comparing with the reported result. We thought that the previous study did not contain younger patients and looked through small lesions. [Conclusion] The C-sign is not useful for diagnosis of talocalcaneal coalition in young patients.

I-2-6

Gait Evaluation Following Correction of Idiopathic Relapsed and Neglected Clubfoot Deformity Using Ilizarov's Soft Tissue Distraction Technique in Older Children.

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Aim: To analyse the gait in older children with clubfeet treated by Ilizarov method. **Method:** 10 children aged 3-14 years with 14 affected feet were followed up for a mean period of 2 years (range 15 -48 months) following correction by Ilizarov technique. The gait was assessed preoperatively and postoperatively by video gait analysis, sagittal kinematics, kinetics and EMG. **Results:** Stride length, walking speed, stance swing ratio, single limb support and physiological cost index were normal. The range of motion at the hip and knee were normal but were lower at the ankle. kinetics showed reduction in the medial and lateral ground reaction forces and increase in the forward forces. EMG data showed overactivity in the proximal muscles. In the distal muscles there was improvement but abnormalities still persisted in the tibialis anterior which showed additional increased activity in the stance phase and gastrocnemius which showed overactivity in swing and early stance. The lack of reciprocal activity was reflected in the sagittal kinematics where maximum plantar and dorsiflexion were not in the appropriate phase of gait cycle. Video analysis revealed abnormalities such as dynamic forefoot adduction in early stance correcting in late stance, initial contact with forefoot slap, residual varus and valgus and hyperextension of knee in some cases. **Conclusion:** The gait improved though it did not revert to normal. Persistent lack of reciprocal and increased nonphasic activity of tibialis anterior and gastrocnemius contributed significantly to gait abnormality.

I-2-7

Sternocleidomastoid Pseudotumor (SCMPOI) and Congenital Muscular Torticollis (CMT) in Infants: The Relation between Spontaneous Regression and Apoptosis

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Purpose: The mechanism of spontaneous regression of the sternomastoid mass in SCMPOI and CMT without palpable tumor is poorly understood. The aim of the present study was to document the presence of apoptotic changes during the regression of the condition. **Methods:** Forty infants with severe CMT undergoing surgical release and partial excision were included in the study. 19 were found to have pseudotumor and 33 without. The age distribution were as follow: <3 months, 7 cases; 3-8 months, 17 cases; 9-12 months, 7 cases; and >1 year, 11 cases. The surgically excised specimen were investigated by light and electron microscope and TdT-mediated dUTP nick end labelling (TUNEL) technique for in situ cell death detection. **Results:** In all the specimens, numerous cells with condensed nuclear and eosinophilic cytoplasm were found in the proliferating interstitium. The myoblasts contained numerous large vacuoles, margination of heterochromatin, breakdown of cell membrane. The fibroblasts showed karyopyknosis. Muscle showed myofibril lysis and bulla formation. TUNEL techniques detected cell death were significantly higher in the 3-12 months old patients with detectable tumour. **Conclusion:** Evidence of significant apoptosis of the cells were found in all the surgical specimens showing that apoptosis may be the basic pathological process associated with the regression of the CMT or SCMPOI. Different degrees of apoptosis of different cells may affect the extent of spontaneous regression and thus the clinical prognosis.

I-2-8

Outcome of Surgical Treatment of Congenital Muscular Torticollis

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Purpose: Congenital muscular torticollis is a common condition. For cases who has failed conservative treatment or presenting late with significant deformities, surgical treatment is the option. The objective of the present study was to analyze a series of 84 consecutive patients with congenital muscular torticollis treated surgically with a uniform treatment protocol and followup assessment methods in one center. The results were analyzed with the aim to find out the factors and determinants of the outcome of the surgically treated cases.

Methods: Eighty-four patients with congenital muscular torticollis were treated surgically in a 10 year period with a mean followup of 5 years (range, 2-13 years). All patients were subgrouped according to the type of congenital torticollis, the limitation of passive rotation of the neck, and other parameters including head tilt and craniofacial asymmetry

Results: Twenty-two patients (26.2%) were operated on before the age of 1 year, 22.6% between ages 1 and 3 years, 38.1% between 3 and 10 years and 13.1% over the age of 10 years. Post-operative management included physiotherapy for 3 to 4 months and the application of a multiadjustible torticollis brace for 10 weeks in children older than 2 years of age. Loss of the sternomastoid column was found in 82.6%, poor scar in 2.4%, lateral band in 47.2%, and 1.2% required reoperation. The final overall score showed excellent results in 88.1%, good results in 8.3%, and fair to poor results in 3.6%.

Conclusion: The most important factor affecting the overall result and outcome was found to be the age at the time of operation. However, this series also showed that for patients operated after the age of 10 years, 63.6% still has excellent result and 81.8% had good to excellent results indicating the benefit of surgery even in the late cases.

I-2-9

Long-Term Impact of Atlantoaxial Arthrodesis on the Pediatric Cervical Spine

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【Purpose】 The purpose of the present study was to investigate the long-term impact of atlantoaxial arthrodesis on the curvature of the pediatric cervical spine. 【Methods】 Eight children who underwent atlantoaxial arthrodesis for rotatory fixation or os odontoideum (two boys and six girls, mean age at the time of surgery 10.7 years) were included in the present study. All patients were followed until they grew up to be adult (mean follow-up of 11.8 years). The changes in the curvature of the cervical spine, A-P diameters of the spinal canal at C1 and C2 levels were evaluated on sequential lateral view radiographs. 【Results】 The cervical curvature was lordosis in all patients before surgery which remained lordotic in two and deteriorated to sigmoid in six patients immediately after surgery. At the final follow-up, the curvature was lordosis in five patients, sigmoid in two, and kyphosis in one. The average A-P diameters of the spinal canal at C1 and C2 were 33.0mm and 17.5mm, respectively, which were significantly smaller than those of age-matched control subjects.

【Conclusion】 Malalignment in the cervical spine improved spontaneously, presumably due to remodeling potential which resides in the pediatric spine. In contrast, the A-P diameters of the spinal canal at C1 and C2 levels did not recover significantly with time, suggesting that anatomical reduction of C1/2 segment should be obtained, since adequate remodeling may not be expected at the upper cervical region.

I-2-10

Adult Consequences of Spinal Deformity Due to Neurofibromatosis

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Purpose) Purpose of this study was to evaluate the adult consequences of spinal deformity due to neurofibromatosis treated surgically. **Methods)** Spinal deformity in 20 patients who have neurofibromatosis followed at least till 20 yrs of age were clinically and radiologically evaluated. There were 5 males and 15 females. The final operation included posterior fusion alone in 2's, posterior fusion with instrumentation in 8, with instrumentation and halo traction in 7, combined anterior and posterior fusion with or without instrumentation and/or halo traction in 3 cases. The average age at operation, after operation, at final follow up were 13.9yrs, 18.6yrs and 32.3yrs respectively. Three patients had non dystrophic type and 17 patients had dystrophic type deformity. **Results)** Average Cobb angle was 80 degrees before operation, 58 degrees after operation, 65degrees at final follow up. Five patients complain dull pain after labour or exercise, however there was no one who need drugs for pain control. Four patients in this series died. One woman died with malignant degeneration of neurofibroma into a neurofibrosarcoma. Two died from cor pulmonare, and one died from blood loss following paraspinal tumor resection. Three patients have difficulty in maintaining supine position due to residual kyphosis. Only one lady got married and another 19 patients remained single. **Conclusion)** Patients who have neurofibromatosis still have problems in terms of ADL and QOL even after drastical operations for spinal deformity.

I-2-11

Lumbar Discectomy in the Teenagers - Comparison of Arthro & Microscopic

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Purpose: To compare clinical results and radiologic changes after arthroscopic and microscopic discectomy of lumbar disc herniation in teenagers who have no degenerative change. **Methods:** From Jan 1990 to Nov 1999, 53 lumbar disc herniations below 20 years old were enlisted at our department and among them 50 cases (32: male, 18: female) could be evaluated for at least 2 year. Average age was 18.7 years (13-20 years). There were 34 cases in microscopic discectomy group and 16 cases in arthroscopic discectomy group. Mean follow-up duration was 31 months (25-43 months). We adopted the previous study for comparison regarding microscopic discectomy and arthroscopic discectomy consisted of 50-adult cases for each group. Microscopic discectomy was performed for extruded and sequestered type, and arthroscopic discectomy for protruded and extruded type that were confined within posterior longitudinal ligament without migration to superior or inferior directions. Clinical results and disc height change were compared by the criteria of Macnab between arthroscopic and microscopic discectomy group, and relationship of disc height change and others (clinical results, excised disc volume operative technique, body mass index and symptom duration) were evaluated. Statistical analysis was made using ANOVA repeated measure and t-test. **Results:** By criteria of Macnab, there were 31 excellent, 15 good, 3 fair, 1 poor case, and there was no significant difference between satisfactory groups (excellent and good) and unsatisfactory groups (fair and poor) ($P=0.623$), and between arthroscopic and microscopic groups ($P=0.425$), and the results was the same to that of adults. In 2 year-follow up, the disc height change has no correlation with body mass index ($p=0.996$), excised disc volume ($p=0.989$) and pretreatment symptom duration ($p=0.676$). **Conclusion:** Postoperative disc height in teenagers of lumbar disc herniation who have no degenerative change has significantly decreased with time, but no significant difference with clinical results, operative technique, excised disc volume, body mass index, involved disc site and symptom duration between arthroscopic and microscopic discectomy group. We think that arthroscopic discectomy is an effective method if the patients status permits because it has same results in clinical aspect and disc height change and has much advantages such as non-invasiveness, short hospitalization and early return to daily life.

I-2-12

Acoustical Technique for Early Screening of Developmental Dysplasia of the Hip

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Purpose An acoustical technique has been developed for early screening of DDH in neonates by examining the relative acoustic transmission of bilateral hip joints. **Method** Random vibratory force up to 800 Hz was applied to S2, while acoustic signals were picked up by a pair of stethoscope-microphone assemblies held at the greater trochanters. The technique measured the discrepancy defined from a modified form of transfer function in the identification of anatomical asymmetry of the hip joints. **Results** There was a high coherence (> 0.9) of the acoustic signals and a small discrepancy ($< 2\text{dB}$) for a group of 90 normal neonates. Seventeen patients with unilateral DDH, who were representative of a wide spectrum of the condition from dysplasia to complete dislocation, were examined. The coherence was remarkably low ($< 0.7 - 0.8$) in at least one of the frequency bands between 200 and 315 Hz. Any structural asymmetry in joint congruity, concentricity and coverage of the femoral head would be detected as discrepancy higher than 2dB. **Discussion** A significant difference in the discrepancy was found between normal neonates and patients with unilateral DDH in the frequency bands of 200, 250 and 315 Hz. By setting the cut-off discrepancy at 2.0 dB, the best sensitivity of 100% and specificity of 75% was achieved. **Conclusion** The results suggest that the acoustical technique can be developed further to a non-provocative, objective and non-invasive screening tool for DDH.

I-2-13

Treatment Strategy and Results of Pavlik Harness Treatment for Developmental Dislocation of the Hip (DDH) in Japan

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PURPOSE: To investigate the treatment strategy and the results of Pavlik harness treatment for developmental dislocation of the hip(DDH)in Japan.

METHOD: From recent data presented in the 33th and 39th Japanese Paediatric Hip Conference, we have analysed the strategy and the results of Pavlik harness treatment or DDH in Japan.

RESULTS: We found there is a common concept behind treatment strategy of DDH. For infants over 3 months, the Pavlik harness is advised to outpatients.

If the dislocation is not reduced, the infant is hospitalized and put into over-head traction, and manual reduction and plaster cast fixation will be done. For non reduced cases, open reduction will be carried out. The reduction rate by Pavlik harness was 80.2% on average in 835 patients. An aseptic necrosis of the femoral head occurred in 14.2% of these. By the time of the 15 years 2 months follw-up, using Severin's evaluation we found 551 patients (66.0%)were Grade I a and I b.

CONCLUSION: Pavlik harness treatment is our first choice of treatment for DDH for infants in Japan. The results of reduced hip are 66% as Severin I in adolecence.

I-2-14

Arthroscopy of Irreducible DDH

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PURPOSE : To investigate the usefulness of the hip arthroscopy in irreducible DDH. **METHOD** : From 1992 and 2000, 21 hips of 20 patients with DDH (18 female and 2male) were evaluated by arthroscopy. The age of patients ranged from 8 months to 5 years. 14 patients with irreducible hips were treated unsuccessfully by Pavlik harness. A total of 6 patients had a late diagnosis. Acetabular labrum and fibrofatty materials in the acetabular fossa were mainly examined. And the arthroscopic findings were compared with both the arthrographic evaluation and the operative findings. **RESULTS** : Acetabular labrum was inverted and hypertrophic in all cases. And the inverted labrum had extended to conceal the acetabular cartilages. Arthroscopy was useful to visualize the anterior and posterior parts of the labrum where arthrography was not useful. The materials in the acetabular fossa were fibrofatty tissues in the patients treated by Pavlik harness and fibrous tissues in the late diagnosed ones. Arthroscopy did not reveal the concentricity of the hip joints. Arthroscopic reduction was performed in 5 patients: partial limbectomy of the posterior parts and the removal of the fibrofatty materials were performed and the techniques increased the stability of the hip joints. Coxa magna was not noted after the arthroscopic reduction. **CONCLUSION** : Arthroscopy is a useful method for evaluating irreducible DDH and provides better information about the inverted labrum and the fibrofatty materials in the acetabular fossa than arthrographic evaluation.

I-2-15

Avascular Necrosis of the Femoral Head After Open Reduction in the Inveterate DDH: Comparison between Two Methods of Treatment

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PURPOSE: Evaluation of the incidence of the avascular necrosis of the proximal femoral epiphysis after surgical treatment in the inveterate DDH, comparing two distinct techniques: traction + open reduction + acetabuloplasty x femoral shortening + open reduction + acetabuloplasty.

METHODS: Fourteen four children (52 hips) with inveterate DDH were distributed in Groups A and B, according to the operative management. The Group A (21 patients and 26 hips) was submitted to previous traction of the lower limbs before the surgical assessment (open reduction and acetabuloplasty) with the follow up of 11.5 years. The 23 patients (26 hips) of Group B were not submitted to traction and underwent surgical treatment (femoral shortening, open reduction and acetabuloplasty) with the follow up of 9.5 years.

RESULTS: Twelve necrosis according to the Bucholz & Ogden classification were found in Group A which means that 46.15% of the operated hips had minor or major vascular disturbs. In Group B occurred two (7.79%) necrosis. Necrosis type III was not observed in both groups.

CONCLUSIONS: Qui-square test showed: 1) a significant amount of avascular necrosis of the femoral head in Group A in comparison to Group B; 2) a significant statistical number of cases with necrosis type I, II and IV in the Group A. The Pearson correlation coefficient demonstrated that there is no correlation between the appearance of necrosis with the children's age at the period of the surgery or with the severity of the dislocation in the patients of both groups.

I-2-16

Trochanteric Distal Advancement for Premature Arrest of the Femoral Head Growth Plate

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Purposes: This study assessed the results of trochanteric distal advancement in the patients with premature subcapital growth plate closure. **Methods:** Between 1992 and 1999, 27 patients (31 hips) with premature closure of the subcapital growth plate were treated with trochanteric distal rather than lateral advancement. After trochanteric osteotomy, a wedge of bone was removed from the greater trochanter to prevent trochanteric mass growth and projecting too far laterally. After 5 (3-8) years, 25 patients (27 hips) were reviewed by clinical and radiological methods. **Results:** All the trochanters fused without complication. Clinical improvement occurred in 23 of 27 hips as measured by pain, limp Trendelenberg sign and ROM. The neck shaft angle and lesser trochanter to articular distance remained constant. The surgery achieved a mean displacement laterally of 7.3 mm and distally 16.3 mm. Articulotrochanteric distance (ATD) improved significantly from -8.28 mm preoperatively to 8 mm at the last follow-up ($p=0.014$). No significant difference of ATD was shown between immediate postoperative ATD (12.66 mm) and the last follow-up ATD ($p=0.27$). Mean lateral displacement of trochanter (LDT) was 7.3 mm. There was no significant difference between LDT of normal side (31.25 mm) and LDT at the last follow-up (30.18 mm)($p=0.601$). **Discussion and conclusion:** Lateralization of the trochanter has been described as the more important component of any reconstruction, but our results confirms that distal transfer is sufficient. It also lessens the risk of trochanteric mass growth and lateral prominence producing trochanteric bursitis.

I-2-17

Long Term Follow Up of Ludloff's Medial Approach for Open Reduction of Congenital Dislocation of the Hip.

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We reviewed 33patients(35 hips) after open reduction of congenital dislocaton of the hip using Ludloff`s medial approach. The mean age at the time of operation was 14 months (5 to 29), and at the time of final follow up was 21.8 years (15 to 29) giving a mean duration of follow-up of 20.6 years (14.5 to 27.5). we evaluated radiological results by Severin`s classification and the extent of avasucular necrosis using the criteria of Kalamuchi. At the latest review, 17 hips(48.6 %) were in Severin`s group I or II(acceptable result) and 18 hips(51.4%) in Severin`s group III,IV,V(unacceptable result). There was evidence of avasucular necrosis in 16 hips(45.7%). The radiological results began to become worse at about the age of ten years when type II avasucular change presented in unacceptable goup. We concluded that Ludloff`s medial approach for open reduction was limited in ahieving a good result since about half of our patients(48.6%) required additional operations.

I-2-18

Long Term Follow-Up After Colonna's Hip Arthroplasty

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Purpose: Verification of deterioration in hips operated by the method described by Colonna, or by a slight modification of this method. We followed some of these patients for 34 years (range 26-44 years).

Introduction: The operation described by Codivilla in 1901 gained great popularity after Colonna published his enthusiastic report on the success of this procedure. According to Tonnis (1987), short term results of this procedure were not successful in 3-40% of cases, while excellent-to-good results were achieved in 20-70%. The short follow-up period (2-20 years) and the low number of patients (20-100, except for Dega's report on 510 patients) in Tonnis review, contributed to the relative success of the operation. Steno et al in 1987 published the results of their experience with Colonna's arthroplasty on 294 hips, with 3-19 years of follow up. Horsky et al in 1991 evaluated the same patients with 221 hips 12-25 years after surgery, although fair and poor results were achieved in 31,5% in the first report, and this number doubled to 73% in the second report.

Materials and methods: Twenty-four of 106 patients operated on between 1955 and 1973 were under continuous observation at the same orthopaedic hospital, and another 15 were re-examined for the purpose of this study.

Results: Of 39 patients (49 hips) followed-up after 26-44 years, all except three hips (in three patients) had unfavorable results, and 12 patients (15 hips) had undergone total hip arthroplasty on the operated side before the age of 50. Four hips operated on both sides were considered as fair and 16 as poor.

Conclusions: 1/ Deterioration of hips which underwent acetabuloplasty according to Colonna was unavoidable. 2/ The „breaking point“ in deterioration occurs 20-25 years after surgery. 3/ Bilaterality of surgery was the greatest reason for failure. 4/ Sophisticated methods to find the patients were not required to achieve a 40% response rate of long term follow-up. 5/ Screening today is better than the operation tomorrow

I-2-19

Osteoarthritic Change After Salter Innominate Osteotomy for CDH (Over 20 Years Follow-Up Cases)

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Purpose: We evaluated the osteoarthritic(OA) change after Salter innominate osteotomy for the treatment of congenital dislocation of the hip(CDH) and subluxation of the hip. **Material and methods:** The materials were as follows, 21 cases (man;2, female;19), 27 hips. For all cases, Salter innominate osteotomy was done and the age at Salter's op.were 2-11(ave. 4.7) years old. Follow-up terms were 20-38 (ave. 25) years. The age at final follow-up time were 24-43 (ave. 30) years old. We evaluated 27 hips on X-P as follows, Severin's classification at the point of skeletally mature age, OA change at final follow-up time. The correlation between Severin's classification and OA change was estimated. **Results:** According to Severin's classification, Group 1a were 5 hips, Group 2a; 6 hips, Group 2b; 7 hips, Group 3; 8 hips, Group 4a; 1 hip. OA change were found on 4 cases, 5 hips (3 hips from Group 2b, 2 hips from Group 3). On these 4 cases, 1 case has severe pain and 2 cases have slight pain and 1 case has no pain now. On these 5 hips, OA change on X-P started from the time at 14, 15, 16, 16, 31 years after Salter's op.. **Conclusion:** When there remains insufficient acetabular coverage or bone deformity of the hip (Group 2b, Group 3) after Salter innominate osteotomy, there exists the possibility that early OA change may occur at relative younger age.

I-2-20

Epidemiology of Slipped Capital Femoral Epiphysis in Japan: A Multicenter Study by the Japanese Paediatric Orthopaedic Association

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Purpose: The Committee of Multicenter Study of the Japanese Paediatric Orthopaedic Association carried out the nation-wide survey of the epidemiology and demographics of slipped capital femoral epiphysis (SCFE) to elucidate the incidence, clinical characteristics and common method of treatment of the disease in Japan.

Methods: Inquiries concerning SCFE cases, whose onset of disease was between January 1997 and December 1999, were sent to nation-wide 2040 hospitals which were authorized as training hospitals by Japanese Orthopaedic Association. Inquiries included initials of name, sex, date of birth, family history of SCFE, past history including endocrine disorders, date of onset, type of slip (acute, acute on chronic, chronic), height, weight, and method of treatment.

Results: From 130 hospitals, 301 cases were reported. There were 224 men and 77 women. The average annual incidence of male and female was estimated to be at least 2.1, and 0.76 per 100,000 in the population between 10 to 14 years old. These are about three times larger than those of the eastern half area of Japan (Ninomiya et al. 1976). The average age at onset was 11 year and 10 months in men and 11 years and 6 months in women. Bilateral slipping was found in 34 men (15%) and 11 women (14%). There were 43 acute-type slips (12%), 126 acute-on-chronic slips (36%), and 167 chronic slips (48%), while the type of 10 slips was unknown. Obesity (BMI>24) was found in 56% of the patient (59% in men, 45% in women). Surgical treatments included in situ pinning (61%), osteotomies (25%), pinning after manual reduction (11%) or after gentle traction (1%).

Conclusion: The SCFE cases seem to have increased in these 20 years in Japan.

I-3-1

Extreme Forms of True Congenital Hand Gigantism in Children –
New Method of Treatment

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PURPOSE: To describe method of operative treatment in the extremely expressed forms of true congenital gigantism of the hand in children. **METHOD:** 46 children in the age from 2 to 15 years with true congenital hand gigantism were surgically treated. Decreasing of the volumetric and linear sizes was necessary in all patients independently of the degree of expressiveness of the disease. Among all patients we observed those who had 300% enlargement of the involved segment (digit) comparing with age norma. Movements in the joints of the involved segment were totally absent. In traditional treatment it was impossible to obtain significant improvement of the function and appearance of the hand. Because of that we proposed microsurgical transfer of the second toe in the position of amputated enlarged digit. This method was applicated in three patients (two girls and one boy). **RESULTS:** In such method it is not necessary to do multiple operative interventions to obtain a good function of the digit and satisfactory cosmetic appearance. **CONCLUSION:** Analysis of the follow-up results up to 3 years (with new method of treatment) and up to 10 years (in traditional methods of treatment) showed that in true congenital gigantism with the extreme degree of the disease the proposed new method of treatment is much more effective.

I-3-2

Bisphosphonate Treatment for Osteogenesis Imperfecta Patients

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In order to figure out the efficacy of bisphosphonate treatment, we reviewed twelve patients with osteogenesis imperfecta who underwent oral or intravenous bisphosphonate treatment. There were 7 cases with Sillence type I, 3 with type III, and 2 with type IV. The number of fractures before the start of bisphosphonate treatment averaged 6.3 (range, 2 to 14). Oral alendronate was given in 9 patients while 3 patients had intravenous pamidronate infusion as they were too young to swallow the pill or complained of severe epigastric pain. The age at the start of treatment averaged 8+10 years (range, 1+3 years to 21+3 years). They were followed up for average 23 months (range, 15 to 26). Clinical, radiologic and biochemical changes were analyzed. Seven patients did not sustain any fracture during the treatment time. No patients were found to be up-graded in the activity of daily living although eight patients and/or their parents reported improved attitudes subjectively. Four patients showed significant increase in the height gain. Vertebral height increased significantly in five patients while the diameter of the 2nd metacarpal did not show any difference. Bone densitometry showed improvement in 9 patients. N-telopeptide of type I collagen markedly decreased in 6 patients, and osteocalcin level was elevated in 6. No hypocalcemia was observed. Transient flu-like symptoms and epigastric soreness were the only adverse effects observed. We believe bisphosphonate treatment is beneficial for osteogenesis imperfecta patients.

I-3-3

The Effectiveness of Cyclic Intravenous Pamidronate Therapy in Osteogenesis Imperfecta

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(Introduction) Osteogenesis imperfecta is a group of disorders of collagen synthesis that cause increased bone fragility. The bisphosphonate compounds are strongly inhibitors of bone resorption and they have recently been reported to have beneficial effects in osteogenesis imperfecta. We have reported the results of bisphosphonate therapy in osteogenesis imperfecta after the operative management of corrective osteotomy with intramedullary nailing. (Subjects and methods) We administered pamidronate to 4 children who had osteogenesis imperfecta after operation. Pamidronate was infused 1.0mg per kilogram of body weight, once a month during six month. At the time of each infusion, serum and urine were assay as bone metabolic stasis. The bone mineral density was determined with dual energy X-ray absorptiometry every 6 months. (Results) 4 cases were administered pamidronate for 2-3 times without side effects. All cases had no new fracture episode after the beginning of pamidronate infusion. During the treatment period, the bone resorptive marker decreased less 20%, but recovered after the final administration of pamidronate. Bone mineral density significantly increase of 10% constantly in the all region of whole body. (Conclusions) Cyclic intravenous pamidronate therapy safety improved clinical outcomes, reduced bone resorption and increased bone density after corrective osteotomy with intramedullary nailing.

I-3-4

Deformity Correction of the Knee and Leg Lengthening by the Ilizarov Method in Children with Vitamin D Resistant Rickets

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To investigate whether there is any biochemical value that is significantly related to the speed of the regenerate bone healing, we evaluated 12 patients (8 women, 4 men) with vitamin D resistant rickets who underwent deformity correction of the knee and leg lengthening by the Ilizarov method. Five patients underwent deformity correction alone in eight femora and four tibiae-fibulae; and the ten patients, concomitant deformity correction and lengthening (> 1.0 cm) in six femora, and 18 tibiae-fibulae. The correlations were investigated between the biochemical values (preoperative serum calcium, serum phosphate, alkaline phosphatase, TRP, serum PTH and 25-hydroxy & 1,25-dihydroxyvitamin D) and the healing index (H.I.), the amount of lengthening, and the extent of preoperative angular deformity. External fixation time was 3.7 months (range, 2-8) in the deformity correction alone group, and 7.5 months (range, 3.7-17.7) in the concomitant deformity correction and lengthening (mean 3.7 cm; range, 1.5-9.2) group. Knee deformities were satisfactorily corrected in all patients except one with a resultant valgus 5.5 degrees of tibio-femoral angle. There was a statistically significant negative correlation between healing index and the serum phosphate level ($p < 0.01$): those who had serum phosphate level more than 2.5 mg/dl showed relatively rapid regenerate bone healing (H.I.: 1.7) as opposed to those with less than 2.5 mg/dl (H.I.: 2.7). We conclude that serum phosphate level should be taken into consideration when to decide concomitant deformity correction and lengthening versus deformity correction alone.

I-3-5

The Response of the Muscle to Limb Lengthening

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PURPOSE: To examine the muscles to see whether the proliferative response occurs uniformly along the fibres or whether it is a disproportionate occurrence and also to see whether the muscles of animals of different age responded differently.

METHOD: In five adult and five immature New Zealand white rabbits a mid-diaphyseal tibial osteotomy was created and stabilised with an Orthofix (M-100) external fixator. After seven days delay, lengthening was carried out at a rate 1.6 mm/day until 20 percent increase in the tibial length had occurred. One hour prior to sacrifice all of the animals were injected with bromodeoxyuridine. The proliferative response of the muscle tissue was assessed by measuring the positive staining index (PSI) of BrdUrd by two step indirect immunohistochemistry, using the monoclonal antibody, Bu20a. We have accomplished this staining in transverse sections (between the proximal and middle third, and between the middle and distal third of the muscle belly) and in longitudinal sections along the myotendinous junction (MTJ) (proximal, middle, and distal third of the MTJ) of the lengthened flexor digitorum longus muscle belly.

RESULTS: All of the muscles showed a proliferative response which was significantly higher on the experimental side. There was no difference between the PSI of the proximal transverse sections and the distal transverse sections. The young animals demonstrated significantly increased PSI in all sections compared with adults. (Adult transverse section PSI: 1.67%, young transverse section PSI: 4.91%). The PSI of the longitudinal sections of MTJ showed significantly higher values than in the muscle belly. The PSI result was increased at the distal third of the MTJ in adult and young rabbit. ($p < 0.05$)

CONCLUSION: The muscles show proliferative response to elongation forming new muscle tissue. The proliferative reaction to lengthening is far greater in the muscles of growing animals compared to adults. The myotendinous junction demonstrates much more intensive proliferative activity than the muscle belly. The distal third of the myotendinous junction shows the highest PSI results. The results of this study help interpret the results of the animal model for the clinical studies and also indicate an advantage in carrying out lengthening on younger individuals.

I-3-6

Effect of Soft Tissue Release on the Growth Plate During Limb Lengthening

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Purpose: Do concomitant soft tissue releases eliminate or reduce the growth inhibition of the tibia in skeletally immature animal model undergoing limb lengthening by distraction osteogenesis?

Methods: A mini-Ilizarov fixator was applied to the right tibia of twenty skeletally immature female rabbits. These tibiae were lengthened to 40% of their original length, which has been shown to inhibit normal growth of the limb in this model. The left tibia was used as a control. In half of the animals the Achilles' tendon was lengthened at the time of osteotomy. The animals were sacrificed either 5 or 10 weeks following the end of the distraction period. Both hind limbs, including the proximal tibial physes were subjected to radiographic, histomorphometric and immunohistochemistry analysis.

Results: Based on radiographic data, the rabbits without soft tissue release experienced growth inhibition of lengthened tibia (91.8-94.9% of control). However, animals in the soft tissue release group showed either unchanged post-lengthening growth or growth stimulation of the lengthened tibia (99.0-107.0% of control). The histomorphometric changes in the proximal tibial growth plate supported the radiographic findings.

Conclusion: Concomitant soft tissue releases may help preserve the normal function of the growth plate with moderate amounts of limb lengthening. **Significance:** These findings could influence the technique of limb lengthening in children.

I-3-7

Change of Articular Cartilage After Femoral Lengthening

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Purpose: This study investigated the change of articular cartilage of the hip and knee joints after femoral lengthening.

Methods: Thirty-five rabbits (6weeks old) underwent unilateral femoral lengthening with monolateral external fixator. The amount of lengthening was from 10% to 30% of original femur length. Follow-up period was from 15 days to 7 months after femoral lengthening.

Results: Arthritic change were not reversible at long term follow-up after femoral lengthening of 20% to 30%. Articular cartilage of the distal femur showed arthritis change whereas the articular cartilage of the femoral head and the proximal tibia did not show arthritic change. Severe arthritic change of the distal femur included fissuring, loss of cartilage, and subchondral sclerosis whereas mild or moderate arthritic cartilage included hypocellularity, derangement of chondrocyte, and decreased thickness of the cartilage.

Conclusion: More weight bearing and knee flexion contracture in unilateral lengthening of normal leg may contribute to deterioration of arthritic change. Therefore, lengthening of shortened leg is necessary to avoid the effect of more weight bearing and knee flexion contracture.

Key Word: Articular cartilage ?Hip-Knee-Femoral lengthening

I-3-8

Enhanced Osteoclastogenesis in Congenital Pseudarthrosis of the Tibia

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The purpose of this study is to examine the possible pathophysiology of congenital pseudarthrosis of the tibia, one of the most controversial pediatric entities in terms of etiopathogenesis, pathology, and treatment. Eight patients with congenital pseudarthrosis of the tibia and seven adult patients with pseudarthrosis following trauma as a control were reviewed histologically, using pathologic materials. The area of congenital pseudarthrosis was divided into three parts with different morphological features; a highly cellular, fibromatosis area, a cartilagenous area and an osseous area. Interestingly, a marked number of osteoclasts, tartrate resistant acid phosphatase-positive multinucleated cells were detected on the surface of the bone and cartilage, and even in the fibrous area apart from bone surfaces. Bone histomorphometric analysis revealed that in congenital pseudarthrosis, osteoclast number (N.Oc/BS) and osteoclast surface (Oc.S/BS) were 2.66 ± 0.92 [/mm] (mean \pm SD) and $10.67 \pm 4.86\%$, respectively, while in the case of adult pseudarthrosis, N.Oc/BS and Oc.S/BS were 0.62 ± 0.33 [/mm] and $2.28 \pm 1.20\%$, respectively. Immunohistochemical study showed that RANK ligand, an essential factor for osteoclastogenesis, was highly expressed not only in the fibroblastic cells but also osteoclasts themselves in congenital pseudarthrosis. Taken together, the enhanced osteoclastogenesis is at least in part involved in the pathophysiology of congenital pseudarthrosis of the tibia. Furthermore, RANK ligand, an autocrine and paracrine factor for osteoclast differentiation and activation, might be one of the therapeutic targets for this refractory disease.

I-3-9

Comparison of the Course of Juvenile Chronic Mono-, Oligoarthritis After Conservative Treatment and After Synovectomy.

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AIM: To compare the course of juvenile chronic mono- and oligoarthritis after conservative treatment and after synovectomy. **METHODS:** We compared the course of the disease in 38 children after 48 synovectomies of the knee and ankle joints and in 39 controls with similar characteristics of the disease, treated conservatively over a 10-years period. General activity and the activity of inflammation in the operated joint, number and duration of remissions of the disease, pain, range of motion, new joint involvement, were evaluated. X-ray examination was made every 2 years. **RESULTS:** No difference in generalization rate was found between the groups. By the end of observation, 25% of children in both groups had developed polyarthritis. In 27+ patients new joint involvement occurred soon after synovectomy. Total activity of the disease was lower and the remissions longer in the surgically treated group ($P<0,1$). There was limitation of joint mobility during first year after surgery but by the end of observation it was better after surgery ($P<0,05$). The rate of recurrences of synovitis and its local activity were lower after surgery ($P<0,001$). Joint destruction during first 6 years progressed in both groups, but later appeared to be much more pronounced after synovectomy ($P<0,001$). **CONCLUSION:** Synovectomy does not significantly change the course of juvenile chronic mono-, oligoarthritis. Local effect is marked, but is often followed by the radiological deterioration of the joint. Surgery is indicated in cases with joint contractures and quick joint destruction.

I-3-10

Unicameral Bone Cysts Treated with Bone Marrow Injection or Methylprednisolone Injection

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Purpose: The results after bone marrow injection were compared with that after steroid injection to evaluate the osteogenic potential from autogenous bone graft in treating the unicameral bone cysts. **Methods:** We compare the 4-year experience using aspiration and bone marrow injection with the previous 8-year experience using aspiration and steroid injection in treating 79 consecutive patients with unicameral bone cysts. All patients were treated by the same protocol. The only difference was the substance injected into the cysts. The radiographic follow up was at least one year with a mean of 44 months to detect cyst activity. **Results:** Fourteen patients received a total of 27 bone marrow injections and the other 65 patients received a total of 99 steroid injections. Repeated injections were required in 57% of cases using bone marrow injection and 49% of cases using steroid injections. No complication was noted in either group. **Conclusion:** There is no advantage to the use of autogenous bone marrow injection over the use of steroid injection in the management of unicameral bone cysts. We believe that cyst resolution is affected more by mechanical manipulation (i.e. cyst wall perforations) than by the substance that is injected into the cyst.

I-3-11

The Fracture-Separation of the Distal Humeral Epiphysis

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PURPOSE: To investigate the results of our treatment of this rare injury. **METHOD:** Between 1988 and 1999, seven patients were treated for the fracture-separation of the distal humeral epiphysis at our hospital. Results of six patients who were available for the minimum of one year follow-up will be presented. The type of fracture-separation were Salter-Harris type 1 in one case, and type 2 in five. In all cases the fractures were displaced posteromedially. The age at injury were one to five years, with an average of three. The length of follow-up ranged from one to seven years, with an average of three. The methods of treatment were closed reduction and cast fixation in one case, closed reduction and percutaneous pinning in one, and open reduction and internal fixation with K-wires in four. **RESULTS:** At follow-up none showed any functional impairment, and bone union was resulted in all cases. However, significant cubitus varus deformity of 15 to 20 degrees were noted in two patients who were treated with cast fixation or percutaneous pinning after closed reduction. **CONCLUSION:** Complication of cubitus varus deformity due to inadequate reduction is common in this injury. Since the accurate reduction of bone-cartilage separation is difficult to be interpreted at the radiograph, we recommend open reduction and internal fixation for the treatment of this injury..

I-3-12

Chronic Radial Head Dislocation (CRHD) in Children: Results of Open Treatment

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Purpose: To report the functional results of open reduction and reconstruction. Methods: Fifteen elbows in 14 children (mean age=9.5 years) with CRHD (3 congenital, 12 traumatic) for at least 3 months (mean duration of dislocation=49.4 months) underwent radial head-sparing reconstructive surgery and were followed-up at an average of 43.5 months postoperatively. At follow-up, the patients were evaluated radiographically and clinically using range-of-motion measurements and an elbow performance score based on 4 parameters (deformity, pain, motion, and function). Results: Restoration of the congruency of the capitello-radio-ulnar joint and correction of the various dysplastic changes were mandatory during surgical correction (open reduction, annular ligament reconstruction, radial shortening, rotational osteotomy, radial head arthroplasty, ulnar flexion osteotomy, and radial notch-plasty on the proximal ulna). Ten cases had Excellent results, 3 had Good results, 1 case had Fair results, and 1 case had Poor results. The most common complication was loss of pronation (mean=-7.6 °). Discussion: Degree of preoperative carrying angle asymmetry associated with flexion contracture correlated significantly with the elbow scores ($p<0.05$). Conclusion: Radial head reduction and reconstruction is essential for prevention of the long-term sequelae in CRHD, especially in children, before considering excision after skeletal maturity.

I-3-13

Internal Fixation of Ankle Fracture with Bioabsorbable Implants

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Purpose: Bioresorbable implants may offer some advantages over conventional metallic implants which are often surgically removed in the pediatric population. A group of children and teenagers with ankle fractures who presented to a children's hospital were treated with resorbable fixation devices and were studied to determine the suitability of fixation and to document any untoward effects. **Methods:** 20 patients with displaced intraarticular ankle fractures were fixed with screws or pins of polyglycolic acid (PGA). Mean age was 13 years (range 7 to 19 years). There were 7 fractures of medial malleolus, 7 epiphyseal, 5 lateral malleolar, 1 bimalleolar and 1 syndesmosis rupture. Postoperative cast immobilization was routine. The patients were monitored for healing and untoward effects such as drainage, osteolysis, and soft tissue reaction at routine clinic visits. **Results:** Follow-up ranged from 1 to 21 months. There was no loss of fixation. Union was complete in each case. There were no cases of nonunion or delayed union. There was no soft tissue reaction to implants and no persistent osteolysis seen on radiographs. **Conclusion:** Resorbable implants are a safe and offer some advantages over metallic implants in the repair of ankle fractures in children and teenagers.

JPOA Oral Presentations

J-1-1

Multi Center Study for Legg-Calve-Perthes Disease in Japan - First Report Organized by JPOA -

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PURPOSE: Multi center study organized by JPOA for Legg-Calve-Perthes disease(LCPD) was performed in Japan from 1999. We tried to clarify the epidemiological study of LCPD in Japan. **MATERIALS AND METHODS:** We sent letters to about 2000 institutes and hospitals qualified by JOA to survey of LCPD in Japan. In the survey onset age, gender, affected side, pre-onset signs, Catterall classification, Herring classification and treatment methods were inspected. In containment methods the operative therapy and the conservative therapy were compared with the Stulberg evaluation. In conservative methods the weight bearing(FWB) and non-weight bearing (NWB) were also compared. **RESULTS:** 725 cases (783 hips) totally reported by 93 hospitals and children institutes were analyzed. 656 cases were diagnosed as LCPD at January 1, 1993 to December 31, 1995. 593 cases were evaluated by Stulberg classification. In outcomes of containment methods Stulberg type I and II were 65.2%. There was no significant difference between the conservative methods and the operative methods. In outcomes of FWB and NWB during conservative containment methods Stulberg type I and II were 68.5% and 62.9% respectively. There was no significant difference between them. **DISCUSSION:** The outcomes of LCPD in Japan was not worth than that in European countries and USA. There were many different treatment methods in Japan for LCPD. Even in the same conservative methods there were various modifications among institutes.

J-1-1

第1回ペルテス病 MCS の経過報告

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(目的) 日本小児整形外科学会 multi center study 委員会主導のもとに日本におけるペルテス病の疫学的調査を行う。

(方法) 第1回目の調査として全国の日整会研修認定病院である約2000施設にアンケートによるペルテス病の疫学的調査を行った。調査内容は発症年齢、性別、罹患側、前駆症状等の他、単純X線評価として Catterall 分類、Herring 分類について調査した。治療においては放置例、手術療法例、保存療法例について調査した。また、保存療法については荷重症例と非荷重症例について治療成績を検討した。

(結果) 93施設から回答をいただきペルテス病と診断された症例は約725例であった。そのうち1993年1月1日から1995年12月31日までの3年間にペルテス病と診断された症例は不明分を除いて656症例であった。最終調査成績として Stulberg 分類で評価された症例は593症例であった。全体として containment 療法の治療成績は約65%と成績良好であった。Containment 療法のなかで保存療法と手術療法を比較すると治療成績に有意差は認めなかった。また、保存療法での荷重療法と非荷重療法では成績に有意差を認めなかった。

(考察) 日本のペルテス病の治療成績は欧米と比較して劣っていない。保存療法ではむしろ良好な成績である。しかし治療方法がさまざまで、同じ保存療法でも施設間において微妙な差がある。

J-1-2

Late Diagnosis of Perthes Disease

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The purpose of this study was to investigate patients diagnosed late as Perthes disease and to identify the causes of late diagnosis. We reviewed 20 patients diagnosed as Perthes disease six or more months after onset. Mean age of the 20 patients at onset was 6.7 years, and mean duration between onset and diagnosis was 9.5 months.

We investigated the pain site at onset and history of a visit to another clinic before visit to our hospital, and if there was a previous visit, we also investigated both site and direction of radiographic examination at the clinic.

Pain site at onset was the hip in six patients, thigh in five, knee in six, and none in three. Five of 20 patients had no previous visit to medical facilities, and showed little or no pain. The remaining 15 patients had one or more previous visit to medical facilities. All 15 patients had undergone radiographic examinations elsewhere.

The site and direction of the radiographic examination were hip anteroposterior view only in six patients, hip anteroposterior and lateral view in two, thigh anteroposterior and lateral view in two, and knee anteroposterior and lateral view in five. Late diagnosis of Perthes disease may happen when patients visit medical facilities too late because of little or no pain, or when radiographic examination of the hip was not performed from both anteroposterior and lateral view.

J-1-2

ペルテス病診断遅延例の検討

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【目的】診断および治療開始が遅れたペルテス病の予後は必ずしも良好ではない。本研究の目的はペルテス病の診断が遅れた症例の検討を行い、診断遅延の原因を探ることである。

【対象および方法】1987年以降、当院でペルテス病の診断を受けた患者で、発症後診断確定まで6か月以上経過していた20例（男児16例女児4例）を対象とした。発症時平均年齢は6.7歳（3.6～11.1歳）で、発症後確定診断までの期間は平均9.5か月（6.1～29.4か月）であり、確定診断時の病期は硬化期2例、分節期14例、修復期4例であった。これら20例の発症後早期の症状及び他の医療機関受診歴有無、受診診療科、X線検査部位・方向について調査した。

【結果】発症後早期の主な疼痛部位は股関節6例、大腿部5例、膝関節6例、疼痛部位なし3例であり、跛行は10例に認められていた。20例中5例には医療機関受診歴はなかったが、5例中2例には疼痛がなく、残りの3例の疼痛も軽度であった。15例は発症後比較的早期に医療機関を受診しており、その診療科は整形外科8例、外科4例、小児科3例であった。15例全例がX線検査を受けており、その撮影部位及び方向は両股関節正面6例、股関節2方向2例、大腿2方向2例、膝関節2方向5例であった。

【考察・結語】疼痛がないか軽度のため親が医療機関受診の必要性を感じない場合と比較的早期に医療機関を受診するもペルテス病診断に必要な股関節2方向の撮影がなされない場合に診断遅延が起こりえる。

J-1-3

Risk Factor in the Occurrence of Bilateral Perthes'Disease

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(Introduction) We investigated a pathology and risk factor of bilateral Perthes' disease, and possibility of prediction of occurrence. (Material and Method) In 156 cases which were seen between 1970 and 1995 at our center, 25 cases had bilateral femoral head abnormality on radiographs. We investigated 21 cases among them. All cases were treated with containment method excluding one case which was operated on second side. During they were unilateral disorder, we treated with abduction brace only on the affected side. After involved bilaterally, bilateral abduction brace was used. We compared these with 46 unilateral cases seen during the same period. We classified the extent of involvement by Catterall's classification and evaluated the outcome according to Stulberg's method. (Results) The incidence of bilateral disease was 16 percent. About the interval of involvement between firstly and secondly affected hip, 47.6 percent of cases affected the contralateral hip within less than 1 year and 85.7 percent of cases affected within less than 2 years. The onset age of first hip ranged 2.1~9.0 years old (average 5.2), and that of second hip ranged 3.7~10.3 years old (average 6.7). The rate of cases which onset was before 6 years old was 76.2 percent in the bilateral cases, but on the other 26.1 percent in the unilateral cases. On the contrally the rate of cases which onset was after 7 years old was 9.5 percent in the bilateral, but on the other 65.2 percent in the unilateral. There was significant difference in the occurrence rate between bilateral and unilateral cases of before 6 years old onset ($p < 0.0001$).

J-1-3

両側ペルテス病発症に関する危険因子の検討

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【はじめに】ペルテス病両側例の病態と危険因子を検討し両側発症の予測に関して考察した。

【対象と方法】症例は1970年～1995年に当センターを初診したペルテス病児156例中、レントゲン像上両側に病変を認めた25例で、このうち全経過を追えた21例を対象とした。治療方法は入園の上でのcontainment療法を基本とし、後発側が手術となった一例を除き全例装具による保存的治療を行った。片側例である間は患側のみの外転免荷装具、両側例となってからは両股関節外転装具で完全免荷を行った。これらを、同時期に当センターを受診した片側例46例と比較検討した。障害範囲の分類にはCatterall分類、治療成績の判定にはStulberg分類を用いた。

【結果】両側発症率は156例中25例16%で、女兒は2例であった。発症間隔は、1年以内が47.6%で2年以内では21例中18例85.7%であった。先発側の発症時年齢は2.1～9.0才(平均5.2才)で、後発側の発症時年齢は3.7～10.3才(平均6.7才)であった。初発が6才未満の症例は両側例76.2%で、これに対して片側例26.1%であった。また初発が7才以上の症例は、両側例9.5%と非常に少ないのに対し片側例65.2%であった。6才未満に発症する症例は有意に両側例となることが多かった($P < 0.0001$)。

J-1-4

Reliability of Stulberg's Classification in Perthes' Disease

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Purpose: We evaluated plain radiographs of mature Perthes patients using Stulberg's classification, and surveyed the inter-observer reliability and coincidence of the classification. **Material and method:** Thirty plain radiographs (A-P & lateral view) of matured Perthes patients were selected for this study. Fifteen orthopaedic doctors who were experts in treating Perthes disease at different institutes separately evaluated these photocopies with Stulberg's classification. They were also asked to classify them into Acceptable or Unacceptable Results, based on with their first impressions. **Results:** The percentage of good results (Stulberg's class I and II) recorded by each observer ranged from 27% to 60%, which was less broad than that of the Acceptable Results (ranging from 37% to 90%). Ninety-four percent of the group classified according to class II was simultaneously placed in the Acceptable, while even in the class III group, which was categorized as a group with poor results, 42% were evaluated as Acceptable. **Conclusion:** Stulberg's classification was not reliable enough to evaluate the radiological depiction of Perthes' disease, due to a remarkable degree of inter-observer errors.

J-1-4

ペルテス病の成績評価における Stulberg 分類の問題点

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【目的】ペルテス病の治療成績評価として汎用されている Stulberg 分類の客観性と妥当性について検討した。

【対象および方法】成長終了後ペルテス病患者の30例を抽出し、その最終2方向単純X線写真について、演者を加えた15名の整形外科医（他施設）により Stulberg 分類を判定した。また、各症例について検者の第一印象から Acceptable (A 群) か、Unacceptable (U 群) かも付記した。Stulberg 分類では、通常 I・II 型を良好例、III・IV・V 型を不良例としているため、その症例が II 型か III 型かは治療成績を論ずる上で重要となる。II 型と III 型の分類について特に検討を行った。

【結果】提示した30例のうち Stulberg 分類の I & II 型（良好例）のしめる割合は、27%から60%と幅広い範囲に及んだ。さらに、第一印象で A 群とした例の割合は、37%から90%とよりばらついていた。II 型あるいは III 型と判定した中で、同時に第一印象にて A 群と判定された数を見ると、II 型では131の回答中123 (94%) が A 群と判断された。しかし、不良例とされる III 型の中にも、225の回答中94 (42%) で A 群が存在していた。

【考察】今回の結果は、Stulberg 分類による評価が、検者によりかなりのばらつきを生じさせる可能性を示唆した。今後は、より客観的で妥当性のある評価基準をつくることが必要と思われる。

J-1-5

Long-Term Results of Femoral Osteotomy and Combined Osteotomy in the Treatment of Perthes Disease

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The aim of this paper is to help determine the best indications for the operative treatment of Catterall 3 or 4 Perthes disease. The results of 15 combined innominate and femoral osteotomies were compared with those of 4 femoral osteotomies in Perthes disease. The average age at 6.9 years and average follow-up period after the operation was 13.5 years. The results were assessed according to the radiological evaluations which constitute a combination of the evaluation by the method of Mose, Heymann and Herndon and Edgren. Of the 19 hips treated by osteotomy, ten had good and five had fair and four had poor radiological results. It is concluded that the best included of combined innominate and osteotomy is for Catterall 3 or 4 hips under 7 years of age in the active phase with head-at-risk signs.

J-1-5

Perthes 病に対する術後10年以上の経過観察例の治療成績

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【目的】ペルテス病の治療は関節機能を保ちながら骨頭の修復を促進させ、変形を防止することである。Catterall Ⅲ、Ⅳ型では予後不良となる症例が多く認められる。当科では Catterall Ⅲ、Ⅳ型の分節期までの症例に対して適切な containment を得る目的で観血的手術を施行した。長期成績を評価し、その適応を検討した。

【対象と方法】当科でペルテス病に対して観血的手術を31例31関節に施行した。10年以上経過観察できた19例19関節を対象として報告する。手術時年齢は3歳7ヶ月～11歳2ヶ月（平均6歳11ヶ月）、経過期間は10年～17年2ヶ月（平均13年6ヶ月）であった。（減捻）内反骨切り術4関節、合併手術15関節であった。X線学的治療成績の判定には、Mose 法、AHI, ATD を用いて計測し当科の点数表示評価及び Stulberg 分類による治療成績を調査し、発症年齢、病型、head at risk sign (HAR sign) および lateral subluxation ratio (LSR) などとの関連から手術適応を検討した。

【結果】X線学的評価で優が10関節、良が5関節、可が4関節であった。一方、Stulberg 分類では class I が5関節、class II が11関節、class III が3関節であった。発症年齢が7歳以下の症例は良好な成績であった。HAR sign 2個以上、LSR が1.4以上は経過不良の傾向が見られた。

【結語】ペルテス病の手術は Catterall Ⅲ、Ⅳ型のうち HAR sign を有する分節期までが適応と思われ、手術時年齢が7歳以下、LSR は1.4以下が良好な成績が得られた。

J-1-6

Radiographic Evaluation in Congenital Club Foot (The Subluxation of the Cuboid on the Calcaneus)

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The malalignment of talonavicular joint is well-known in congenital club foot. Kameshita reported that precise correction of calcaneocuboid joint result in satisfactory correction of club foot without release of talocalcaneal joint. The purpose of this study was to evaluate two radiographic measurements to focus on importance of the subluxation of the cuboid on the calcaneus. 184 congenital idiopathic club feet of 127 original cases treated between 1989 and 1999 were reviewed and divided into three groups according to original severity. The stress dorso-plantar radiographs were evaluated before and after surgery. Two measurements are center-edge angle (CE: the angle between the lateral tangent of the calcaneus and the line from calcaneocuboid joint to the mid point in the cuboid), and edge-edge angle (EE: the angle between the lateral tangent of the calcaneus and the line from calcaneocuboid joint to the lateral tangent of the cuboid). In control group at 3-6 months, CE was $26.3 \pm 6.7^\circ$ and EE was $1.8 \pm 3.3^\circ$. In severe group at 3-6 months, CE was $38.7 \pm 13.3^\circ$ and EE was $14.1 \pm 13.9^\circ$. At the time of recurrence (1-3 y.o), CE was $56.6 \pm 13.0^\circ$ and EE was $27.3 \pm 17.2^\circ$ before operation. After operation, CE was $47.5 \pm 11.3^\circ$ and EE was $11.3 \pm 9.9^\circ$. The correction of foot deformity is evaluated more precisely by measurement of calcaneocuboid malalignment.

J-1-6

先天性内反足のX線診断 - 踵骨に対する立方骨の転位について -

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【目的】先天性内反足では、距骨に対する舟状骨の転位はよく知られているが、踵骨に対する立方骨の転位はあまり注目されていない。共同演者の亀下は、後内側解離術で踵立方関節解離により足外側柱の矯正を正確に行うことで変形を十分に矯正できることを報告した。今回は本症の踵骨に対する立方骨の転位の重要性に注目し、X線診断法として2つの計測法を行い検討した。

【方法】1989年から10年間に診療した特発性先天性内反足前医無治療例127例184足を対象とし重症度別に分類し、術前・術後のストレスX線背底像を計測した。方法はcenter-edge angle (CE角): 踵骨外側縁の接線と、これと踵立方関節裂隙の延長線との交点と立方骨の中心点を結ぶ直線のなす角、edge-edge angle (EE角): 踵骨外側縁の接線と、これと踵立方関節裂隙の延長線との交点と立方骨の外縁接線のなす角を計測した。

【成績】3-6ヶ月で、正常は、CE角 $26.3 \pm 6.7^\circ$ 、EE角 $1.8 \pm 3.3^\circ$ 、重症では、CE角 $38.7 \pm 13.3^\circ$ 、EE角 $14.1 \pm 13.9^\circ$ で、変形再発時(1-3歳)は、CE角 $56.6 \pm 13.0^\circ$ 、EE角 $27.3 \pm 17.2^\circ$ 、術後はCE角 $47.5 \pm 11.3^\circ$ 、EE角 $11.3 \pm 9.9^\circ$ であった。

【結論】乳幼児期のX線検査では舟状骨の骨化核が未出現のため、距踵角、脛距角、脛踵角より間接的に変形矯正状態(舟状骨の転位)を診断してきた。しかし、立方骨は乳幼児期に骨化しているので、立方骨の転位を計測することで変形矯正をより正確に評価できる。

J-1-7

Post Operative Ankle Motion After Complete Subtalar Release in Congenital Clubfoot

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[Purpose] We performed early exercise using hinged AFO to obtain good ankle motion after complete subtalar release operation(CSR). [Materials and methods] Twenty eight patients (42 feet) of congenital clubfoot treated by CSRs were reviewed. We had used a usual AFO until 1993, while since 1994 new AFO with a hinge joint have been used to improve the ankle motion. Postoperative ankle motion was physically measured in both dorsiflexion and planter flexion at 3 months, 1 year, 2 years and 3 years after surgery. Those were compared between two groups of AFO and of AFO with hinge joint using the student t-test. [Results] In the range of dorsiflexion, there was statistical difference of ankle motion between the two groups at 3 months and 1 year after surgery. In the range of planter flexion, there was also statistical difference between the two groups at 1 year, 2 years and 3 years. [Conclusion] We concluded that the early exercise using AFO with hinge joint after CSR was quite effective for obtaining good ankle motion.

J-1-7

先天性内反足に対する全距骨下解離術後の Hinge 付 AFO 使用の経験

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【目的】先天性内反足に対して距骨下全周解離術を行った症例に術後早期より Hinge 付 AFO を用い可動域訓練を行い、良好な成績を得たので報告する。

【症例と方法】1981年以降当院において全距骨下解離術を行った先天性内反足の初回手術例28例42足を対象とした。1993年までは術後に通常の AFO を用いていたが、1994年以降は足関節の可動域を改善するために Hinge 付 AFO を用いた。評価は足関節の可動域を背屈底屈でそれぞれ術後3ヶ月、1年、2年、3年で計測し、通常の AFO を用いた群と Hinge 付 AFO を用いた群で t 検定を用いて比較した。

【結果】背屈では術後3ヶ月と1年で Hinge 付 AFO を用いた群が通常の AFO を用いた群より有為に良好な可動域を得ていた。底屈では術後1年、2年、3年で Hinge 付 AFO を用いた群が通常の AFO を用いた群より有為に良好な可動域を得ていた。

【結論】全距骨下解離術後の Hinge 付 AFO を用いた足関節の早期可動域訓練の効果は十分に認められ、より良好な足関節可動域獲得のために有用であると思われた。

J-1-8

Undergoing Operations of Congenital Vertical Tali with Using Cincinnati Incision

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(Purpose) This paper is to report the usefulness of the posterior-medial-lateral release by using Cincinnati incision for congenital vertical talus. (Cases and Treatment) The subjects were 4 cases on 7 feet. The average age at their operations was 13 months old. The talor axis - first metatarsal base angle (TAMBA) was 87° on an average. In all cases the dislocations of talonavicular joints were recognized. For each case, Cincinnati incision, posterior - medial- lateral release was performed. For the posterior release, the talocrural joint and subtalar joint were dissociated. For the medial release, the deep tibiotalar ligament was preserved and the subtalar joint was dissociated. For the lateral release, The calcaneocuboid joint and the talocalcaneonavicular joint were dissociated. The lengthening of the Achilles tendon was applied to all cases, and the lengthening of the tibialis anterior tendon or extensor digitorum longus tendon were applied to 3 cases. (Results) All 7 feet acquired good plantigrade feet with a mean TAMBA improvement percentage of 72%. (Conclusion) Cincinnati incision can secure a sufficient operation field and open out the Chopart joint from the medial and the lateral side at the same time, and also open out the subtalar joint all around the circumference. It can sufficiently reduce and correct congenital vertical talus. In addition, Cincinnati incision can allow the anterior dissociation and the lengthening of the tibialis anterior tendon and extensor digitorum longus tendon in the knee joint bent position.

J-1-8

Cincinnati 皮切を用いた先天性垂直距骨の治療経験

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(目的) われわれは先天性垂直距骨に対して Cincinnati 皮切による後内外方解離術を施行したのでその有用性について報告する。(症例と治療経過) 対象は4例7足(男児1例、女児3例)であった。手術時年齢は平均1歳1ヵ月であった。術前の単純X線像では talor axis - first metatarsal base angle (TAMBA) は、平均87°で全例に距舟関節の脱臼を認めた。Cincinnati 皮切で進入し、後内外方解離術を行った。後方は距腿関節および距骨下関節を解離、内方は深層の脛距靱帯を温存して距骨下関節を解離、外方は踵立方関節と距踵関節を解離した。全例にアキレス腱延長、3例に前脛骨筋腱の延長または長趾伸筋腱の延長を行った。

(結果) 7足とも良好な plantigrade を獲得でき、術前後の TAMBA の改善率は平均72%であった。

(考察) Cincinnati 皮切は、一皮切で十分な術野を確保でき、ショパール関節を内外側から同時に展開できるだけでなく、距骨下関節を全周にわたって展開できるため、先天性垂直距骨の十分な整復と矯正が可能である。また、矯正後に距腿関節の底屈制限の強い症例では膝関節屈曲位で前方解離および前脛骨筋腱、長趾伸筋腱の延長が可能である。

J-1-9

Operative Treatment of Metatarsus Adductus

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We report 5 feet of metatarsus adductus treated by surgery in which 2 feet were congenital metatarsus adductus and 3 feet were sequelae of congenital clubfoot. The ages at operation were 3.8 to 4.2 years old, and taro-first metatarsal angle was 8 to 34 degrees. In all cases the 1st tarsometatarsal joint was corrected by capsular release and the abductor hallucis muscle was released fractionally. Four feet with pes cavus underwent plantar ligament resection. Postoperative taro-first metatarsal angle was corrected 0 to 28 degrees after 6 months to 2 years, and parents were satisfied with the appearances of the feet. We can effectively correct metatarsus adductus with release of the tarsometatarsal joint and abductor hallucis muscle. From these experiences, when we operate on clubfoot, we simultaneously correct the metatarsus adductus and release the abductor hallucis.

J-1-9

前足部内転変形に対する観血的治療の小経験

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麻痺を伴わない内転足変形の観血的治療を報告する。

【対象・方法】先天性内転足 1 人 2 足、先天性内反足加療後の遺残内転足 2 人 3 足の計 3 人 5 足に、裸足の外観の改善を目的に手術を行った。手術時年齢は 3.8~4.2 才、X-p 上の距骨第 1 中足骨角は術前 8~34 度で、足根中足関節部で内転していた。全足に第 1 趾の足根中足関節の解離、母趾外転筋の解離延長を行った。これで矯正困難であった 3 足は第 2、3、4 趾の中足骨基部の骨切りを加え、凹足合併の 4 足に、足底腱膜切離も行った。矯正位で経皮的 K-wire 固定、術後ギプス固定を行い、6 週後に抜釘、適宜靴型装具を使用し、荷重を許可した。

【結果】距骨第 1 中足骨角は術後外固定除去後 2~30 度、術後 6 ヶ月~2 年の経過後 0~28 度であった。全例とも外観や歩容は、保護者の満足を得られた。

【考察】内転足は、靴を履くと目立たないこと、保存療法の効果が期待されることから、観血的治療の報告は少ない。しかし、裸足の機会が多い場合や、内反足治療後も内転が目立つ例もあり、保護者よりさらなる矯正を望まれることがある。観血療法では、足根中足関節部の解離に加え母趾外転筋の起始部の部分切離と筋解離が矯正に効果的であった。また、今回の経験から先天性内反足手術の際に遺残内転足変形を予防するため、母趾外転筋解離、前足部内転矯正位で経皮的 K-wire 固定を行っている。

J-1-10

Clinical Results of Calcaneocuboid Joint Fusion Combined with Soft Tissue Procedures for the Paralytic Cavovarus Foot

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Cavovarus foot deformity is frequently associated with parietic diseases. The deformity has usually been treated by triple arthrodesis, but has been associated with problems, namely osteoarthritic changes in neighboring joints. To avoid these problems, we have corrected the deformity by calcaneocuboid joint fusion combined with soft tissue procedures instead of triple arthrodesis. We report the clinical results of this procedure. We analyzed a total of seven feet in six children with a mean duration of 36.3 months after surgery and a mean age at surgery of 11.4 years both by clinical and roentgenographic examinations. The deformities originated from cerebral palsy in two cases, spinal diseases in two cases and cerebral tumor and cerebral disease of unknown origin in one. At the investigation all the feet which had this deformity before surgery were well corrected with preserved eversion and inversion motion in the peritalar joint. The skin callosities present in the lateral side of the foot in five cases before surgery had disappeared in all. Preoperative radiographic parameters were also improved after surgery. We conclude that calcaneocuboid joint fusion combined with soft tissue procedures is a useful method for correcting the deformity with minimal joint fusion, preserving peritalar joint mobility.

J-1-10

麻痺性内反凹足に対する軟部処置併用の踵立方関節固定術の治療成績

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【目的】内反凹足は種々の麻痺性疾患に伴ってよくみられる。本変形に対して、我々は従来行っていた三関節固定術に代えて軟部組織手術を加えた踵立方関節固定術を行っている。今回、その成績について調査した。

【対象】調査対象は6例7足である。手術時年齢は7歳から16歳、平均11.4歳、術後経過期間は1年から8年3カ月、平均36.3カ月である。基盤となった麻痺は脳性麻痺が2例、脊髄疾患2例、脳腫瘍および原因不明の脳障害が各1例であった。術式は踵立方関節固定術に加えて腱移行術や延長術、内外側解離術あるいは足底解離術などを併用した。

【結果】内反凹足あるいは更に尖足を合併した術前の足部変形は、調査時には全例とも認めなかった。また、内返し・外返し運動は制限はあるものの全例とも比較的保たれていた。術前、足底外側に胼胝形成を有するものが5例あったが、調査時には全例消失していた。足部X線各計測値も術前に比べて、調査時には改善していた。

【結論】従来、麻痺性凹足変形は麻痺を基盤として発生していることから三関節固定術により対応することが多かった。しかし、本変形を有する患児の多くは活動性が高いことから、長期にみると関節固定が隣接関節の関節症性変化を招来することが危惧される。こうした観点から、固定範囲を限定することによって距踵舟関節の不動化を招くことなく変形を矯正、維持できうる点で本術式は有用といえる。

J-1-11

Two Cases of Sprengel's Deformity

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(Abstract) Sprengel's deformity is comparatively rare congenital abnormality that the scapula remains high on the chest wall. We treated two cases with omovertebral bone. One was operated with only Woodward's method, and the other was operated with Woodward's method and clavicular morcellation. (Case 1) A boy was operated at 3 year 6 month old. Cavendish's classification was Grade 3 and the left scapula was 40mm higher than the right scapula. We operated him with only Woodward's method. He began to exercise passive range of motion after immobilization for 3 weeks. Three years one month later, active range of motion is full and functional results are acceptable, but the left scapula remains now 30mm higher than the right scapula. (Case 2) A boy was operated at 3 year 8 month old. Cavendish's classification was Grade 3 and the right scapula was 30mm higher than the left scapula. We operated him with Woodward's method and clavicular morcellation. He began to exercise passive range of motion after immobilization for 3 weeks. One year one month later, the right scapula is located only 10mm higher than the left scapula and active range of motion is full. (Discussion) Both cases are satisfactory in function, but the cosmetic deformity was remained in case 1. Over collection has the risk of injury of the brachial plexus and subclavicular artery without clavicular morcellation. In case 2 we could avoid the complications and achieve the enough collection.

J-1-11

Sprengel 変形の 2 例

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(はじめに) Sprengel 変形は肩甲骨が異常に高位に位置する比較的まれな先天異常である。今回われわれは肩甲骨脊椎骨を伴う Sprengel 変形の二症例に対して、Woodward 法のみ施行した症例と鎖骨中央部の骨細切術を併用した症例の術後経過および問題点について検討した。

(症例 1) 3 歳 6 か月の男児。術前 Cavendish の分類 Grade 3 で、単純 X 線像では左肩甲骨は 40mm 高位に位置していた。Woodward 法による肩甲骨引き下げ術を施行した。術後 3 週間三角巾および包帯で上肢を体幹に固定した後、可動域訓練を行った。術後約 3 年 1 カ月の現在、可動域制限はなく、日常生活動作に支障はないが、左肩甲骨は約 30mm 高位に位置している。

(症例 2) 3 歳 8 か月の男児。Cavendish の分類 Grade 3 で、単純 X 線像では右肩甲骨は 30mm 高位に位置していた。3-D CT では肩甲骨や肩甲骨脊椎骨の状態をきわめて明瞭に観察することができた。Woodward 法に右鎖骨中央部で骨細切術を併用した。術後 3 週間三角巾および包帯で上肢を体幹に固定した後、可動域訓練を行った。術後 1 年 1 カ月の現在、肩甲骨の高さの差は約 10mm にとどまっており、肩関節の自動可動域に左右差を認めない。

(考察) 二症例とも肩関節機能面について満足いくものであったが、肉眼的な変形は残存した。過矯正することによる腕神経叢麻痺や鎖骨下動脈圧迫の危険があるが、鎖骨細切術を併施することによりこれら合併症を避けるとともに十分な矯正位を獲得できた。

J-1-12

Woodward Procedure in the Treatment of Congenital Elevation of the Scapula

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The purpose of this study is to evaluate Woodward procedure in the treatment of congenital elevation of the scapula. Seven patients with congenital elevation of the scapula were treated by Woodward procedure. The mean age at the time of surgery was 4 years 1 month. There were six boys and one girl. The mean duration of follow-up was 7 years 3 months. Preoperative and postoperative evaluation included (1) cosmetic appearance rated by Cavendish scale (2) measurement of the arc of total abduction (3) the position of the scapula measured by the plain radiographs. The preoperative Cavendish scale was grade 3 in four patients and grade 4 in three. At the final examination, three patients were rated as grade 1, three were rated as grade 2, and one was rated as grade 3. The mean preoperative and postoperative arc of total abduction were 91° and 133° respectively. Patients rated as grade 3 had more advanced range of motion of the shoulder than those rated as grade 4. The average scapular lowering obtained was two levels of the vertebral body compared to the preoperative level. The loss of correction was not recognized in any patient, and the more lowering of the scapula was obtained in four patients with skeletal growth. In conclusion, Woodward procedure is useful method for the treatment of congenital elevation of the scapula.

J-1-12

肩甲骨高位症における Woodward 法の治療成績

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＜目的＞先天性肩甲骨高位症における Woodward 法の治療成績を調査することを目的とした。

＜対象＞当院にて Woodward 法により手術施行した 7 症例、男 6 例、女 1 例を対象とした。全例片側例で左 5 例、右 2 例であった。手術時平均年齢は 4 才 1 ヶ月（2 才 10 ヶ月～6 才 4 ヶ月）で、術後平均経過観察期間は 7 年 3 ヶ月（1 年～11 年）であった。術前後の評価を Cavendish の分類、肩関節外転角度および X 線上の肩甲骨の位置によって行った。

＜結果＞Cavendish の分類では術前 3 度 4 例、4 度 3 例であった。3 度の 4 例中 3 例は 1 度に、1 例は 2 度に改善した。4 度の 3 例中 2 例は 2 度に、1 例は 3 度に改善した。肩関節外転角度は術前平均 91° から術後平均 133° に改善したが 4 度の症例においては改善角度は少なかった。肩甲骨の位置は術中に平均 2 椎体引き下げられ、術後経過中に健側に比べ約 1 椎体下降した症例が 4 例存在した。

＜考察＞Woodward 法は肩甲骨の引き下げと以後の経年的な下降を期待できると考えられている。今回の調査でも術中の引き下げが維持されており、術後も経年的な下降を認めた例も 4 例存在した。肩関節の可動域は 3 度では十分な改善を認めたが、4 度の症例では合併奇形の進行により改善の度合いが少なかったと思われる。

J-1-13

Conservative Treatment for Trigger Thumb in Children

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From 1984 to 2000,43 cases (50 thumbs)of trigger thumbs were treated at Nara Medical University Hospital.20 cases were shown on right hands,16 cases were shown on left,and 7 cases were shown bilateral.Patient's age at their first consultation ranged from 3 month to 8 years and 4 months old.Their average age was 2 years and 10 months old.Trigger thumb are classified into four stages according to their severities;stage 1 is tumor type,stage 2 active snapping type,stage 3 passive snapping type and stage 4 rigid type.In these cases,there were 3 cases of stage 2,24 cases of stage 3,and 23 cases of stage 4.47 thumbs out of 50 cases were treated conservatively.The average follow-up period was 7 years and 7 months.24 thumbs were healed completely,15 thumbs were improved,3 thumbs are being treated,and 5 thumbs were dropped out of treatment.In conclusion,splint therapy is effective in treating trigger thumb in children.

J-1-13

強直母指の保存療法の成績について

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【症例】1984年7月から2000年10月までに当科において治療を行った強直母指は、男児17例、女児26例の計43例50指（右側20例、左側16例、両側7例）である。発症時年齢は不明例9例を除き、生下時～4歳、平均1歳5ヵ月。初診時年齢は3ヵ月～8歳4ヵ月、平均2歳10ヵ月。杉本らの分類による内訳は、active snapping type が3指、passive snapping type が24指、rigid type が23指であった。このうち、転院例1例1指、手術選択例1例2指を除く41例47指に保存療法（外用とマッサージ指導7例8指、装具療法34例39指）を行った。装具は、母指指節間関節を可及的に伸展位で保持するものである。診察ないし電話アンケートにより経過を観察した。経過観察期間は2ヵ月～16年2ヵ月、平均7年7ヵ月である。調査時、運動制限が無く、弾発現象が消失したものを治癒とし、杉本らの分類で grade が下がったものを改善とした。

【結果】保存療法にて治癒したものの24指、改善したものの15指、不変のものの3指、保存療法の途中で脱落したもの5指であった。装具の装着期間は1ヵ月～1年6ヵ月、平均4.7ヵ月で、装具による接触性皮膚炎が2例にみられた。

【考察】本疾患には自然治癒が半数近くに認められことから、自然治癒の過程を促進させるための保存的治療が手術療法を選択する前に施行されるべきである。治療期間が長期になることや装具の装着方法を両親に対して良く説明することが必要である。

J-1-14

The New Bone Lengthening System for Congenital Anomalies

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Current development of external fixator has resulted in major advances in the treatment of congenital anomalies and deformities. Constriction band syndrome, and symbrachydactyly were treated by the technique of distraction lengthening. We developed a new lengthening device (BL2300; ME system, Japan) that is applicable as long as the length of triangle residual bone is over 10 mm, and utilized in two patients with constriction band syndrome and symbrachydactyly.

J-1-14

先天異常手に対する新しい骨延長器の使用経験

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先天性絞扼輪症候群や合短指症などの先天異常の手では指の形成が悪く、手の機能が著しく障害されている場合がある。我々は遺残骨が三角形になっていることを考慮し、pin を T 字状に刺入し延長を行っているので報告する。症例 1 5 歳男児 左手先天性絞扼輪症候群 全指中手骨遠位部での骨性の切断があり、第 5 中手骨が他の指に比べ形成が比較的良好で、第 1、2 中手骨の骨端線は近位部にある。第 5 中手骨に Mini-Hoffman 創外固定器を第 1 中手骨に BL2300 指骨延長器を使用した。Pin は Mini-Hoffman 用 2 mm Half pin を使用した。10 日の waiting period の後 0.5mm/day で 20mm の延長を行った。症例 2 9 歳男児 右合短指症 母指は MP 関節近位が遺残しているが、第 2、3 中手骨は近位部のみ遺残しており、第 4、5 中手骨はほぼ欠損している。母指の内転が可能なため、pinch 動作を獲得する目的で第 2 中手骨に BL2300 指骨延長器を使用し 17mm の仮骨延長を行った。BL2300 指骨延長器は T 字状に pin を刺入し延長するため、基部が保たれていて先端が先細りとなっているような先天異常の指骨の仮骨延長に適しており、2 mm の half pin を用い、pin 間の間隔を 1 mm にしているために 10mm 以上の骨長で仮骨延長が可能である。

J-1-15

Case of Mirror Foot

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Mirror hand and foot abnormalities are distinctly uncommon forms of polydactyly. We report a sporadic case of a Japanese infant with unilateral mirror foot deformity. A 4-month-old female infant visited our hospital for correction of left foot deformity. The left foot was broad and had 8 toes in a mirror configuration with a well-formed the first toe. Radiographic evaluation confirmed the presence of four cuneiforms and dysplastic the fourth metatarsal. No other abnormalities were detected. Surgery was performed at 2 years of age. The second to fourth rays were approached by means of dorsal and planter zig-zag incisions. The most medial cuneiform, the second to fourth rays and the proximal part of the first metatarsal were excised. The first metatarsal was fixed to the proximal part of the third metatarsal with a Kirschner wire. The wire was removed 3 weeks after surgery, and 1 week later weight bearing was permitted. At follow-up, 5 years after surgery, the hallux was 15 mm shorter than the second toe. But she had no pain and satisfied with the result.

J-1-15

第1・第3中足骨接合術を施行したミラーフットの1例

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【目的】非常に稀な多趾症であるミラーフットに対し第2-4趾切除および第1中足骨と第3中足骨の骨接合術を施行した1例を報告する。

【症例】症例は4ヶ月の女児で、主訴は左多趾症であった。現病歴は38週、頭位で正常分娩にて出生、妊娠分娩経過は正常、出生時体重は3400gであった。生後4ヶ月で産婦人科より左多趾症にて当科を紹介された。初診時現症として左足は8趾あり、第2趾先部は形成不全がみられた。他の合併奇形は認めなかった。足部X線像では楔状骨は4つ存在し、第4中足骨は形成不全がみられた。2歳にて足趾形成術を施行した。皮切は第2-4趾を切除するように背側と底側にリスフラン関節まで至るジグザグ切開とした。最も内側の楔状骨と第1中足骨近位部を切除し、第2-4趾は第3中足骨の近位部のみを残して切除した。母趾先としての形態が良好な第1趾の中足骨を骨切りし、第3中足骨近位部に骨接合し、キルシュナー鋼線にて固定した。術後3週まで膝上ギプスとし、3週後にキルシュナー鋼線を抜去、術後4週で歩行を許可した。術後5年の現在、疼痛なく走るのも可能で、患児と両親の満足度は高かった。X線像にて第1と第3中足骨の骨癒合は良好であったが、母趾は第2趾よりも15mm短かった。

【結語】ミラーフットに対し第2-4趾切除および第1中足骨と第3中足骨の骨接合術を施行し比較的良好な結果を得た1例を報告した。

J-1-16

6 Cases of Subacute Hematogenous Osteomyelitis of the Femur in Children

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Acute hematogenous osteomyelitis in children generally presents little difficulty in diagnosis. By contrast subacute osteomyelitis is often difficult in diagnosis because the sign and symptoms typical of the acute form are absent. Therefore initially many case of subacute osteomyelitis may be misdiagnosed and treatment delayed. We studied six children with subacute hematogenous osteomyelitis of the femur and found that had mild pain, few systemic or laboratory signs, and little functional impairment. There were four boys and two girls with a mean age of 7.5 years (2 to 13). The length of symptoms ranged from 5 days to 5 months. Radiograph findings frequently suggested a coxitis simplex and correct diagnosis was delayed. 4 patients underwent surgical curetting and 2 patients were made conservative treatment. All patients were followed until their bone lesions had healed and confirmed by radiography.

J-1-16

小児大腿骨における一次性亜急性化膿性骨髓炎の検討

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【目的】小児の急性化膿性骨髓炎はその典型的な臨床症状のため一般に診断に難渋することはない。その一方一次性亜急性骨髓炎は軽度の跛行等、その臨床症状の発現の仕方が緩徐であり、レントゲン所見、血液検査所見、その他において、典型的な症状に欠けるため、発症時より適切な診断を下すのに難渋し、そのため、治療開始が遅れることもある。我々は当院にて6名の一次性亜急性化膿性骨髓炎を経験したのでその診断及び治療に関して文献的考察を加えて検討した。

【方法】患者は男児4名、女児2名。2歳より13歳、平均7.5歳であった。発症から当院初診までの期間は5日から5か月、他院で撮影された単純X-P上変化がないことより単純性股関節炎等の診断で治療開始が遅れた症例もあった。

【結果】4名に外科的搔爬術を施行した。1名は抗生物質の投与を受けた。1名は骨腫瘍の疑いで精査、経過観察のみで軽快した。全例股関節の成長障害などなく経過良好であった。

J-1-17

Treatment for the Disorders in Post Septic Arthritis of the Hip by "Ilizarov-hip Method". - A Report of Two Cases -

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[Purpose] Disorders in patients of post septic arthritis of the hip involves the problem owing to the shortened femur and collapsed femoral head. The best treatment for the disorder in the adult age is not known. Here we report two cases that were treated with "Ilizarov-hip method" for disorders in post septic arthritis of the hip. [Methods] The "Ilizarov-hip method" contains valgus osteotomy in the proximal femur and lengthening in the shaft of the femur. Both of the cases were 17-year-old males. [Results] In case 1, the valgus osteotomy angle was 45° and the amount of lengthening was 10cm. In case 2, the valgus osteotomy angle was 80° and the amount of lengthening was 6cm. Both cases achieved good results after short-term follow-up.[Conclusion] Advantages of the "Ilizarov-hip method" are; 1) prediction of lateral dislocation of femoral head after femoral lengthening, 2) effect of distal-lateral advancement of the greater trochanter, and 3) adjustment of limb length discrepancy. Although we have to wait the results after long-term follow-up, the method may be useful for the treatment for disorders in the post septic arthritis of the hip in adult age.

J-1-17

成長終了期における化膿性股関節炎後遺障害に対する Ilizarov Hip Method の経験

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【目的】新生児期・乳児期における化膿性股関節炎の後遺障害として、骨頭の消失や大転子高位、著明な脚長差が生じることはよく知られた事実であるが、成長終了期においてこれらの障害に対しいかなる対策を講じるかといった点については、現時点では確立されたものが存在しない。我々は今回、このような症例2例に対し、Ilizarov 創外固定器を用いて転子下での外反骨きりを行い、股関節の形成を行って、同時に遠位で骨延長を行い脚長差を補正するという、いわゆる「Ilizarov Hip」による治療を行ったのでその経過について報告する。

【結果】症例1:17歳男性。転子下で、約45度の外反角をつけ矯正骨きりし、その遠位で約10cmの骨延長を行った。抜釘後、骨延長部での骨折を生じたが、現在骨癒合良好で独歩可能である。症例2:17歳男性。転子下で、約80度の外反角をつけ矯正骨きりし、その遠位で約6cmの骨延長を行った。現在骨癒合良好で独歩可能である。

【考察】いわゆる「Ilizarov Hip」の利点として、1)脚延長に伴う大腿骨頭の外方への脱臼を予防しうる点、2)大転子の下降効果を期待しうる点、3)脚延長と股関節形成をアライメントを調整しつつ同時に行いうる点、などが考えられる。本方法の効果については長期成績を待たねばならないが、成長終了期の化膿性股関節炎後遺障害に対する一つの治療方法として有用となる可能性がある。

J-1-18

Surgical Treatment of the Residual Deformity After Septic Arthritis of the Hip

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"Purpose" We performed hip joint reconstruction surgery for 7 hips in 6 patients who had residual deformity of the hip joint in other clinics. "Materials and Methods" The patients were 4 boys and 2 girls. The mean age at initial surgery was 8 years. The mean follow-up period from final surgery was 5.2 years. At the initial surgery, 1 of the 7 affected hips were type-IB, 4 in type-IIA, 1 in type-IIB and 1 type-IVB according to the classification of Choi residual deformity of the hip joint. A total of 12 hip joint reconstruction surgeries were performed for 7 hips in 6 patients aimed at obtaining adequate congruency and supportability of the hip joint. Surgical techniques included muscle release surgery for 6 hips, hip joint arthrodesis for 1, femoral osteotomies for 5, distal transfer of the greater trochanter for 4, open reduction for 1 and pelvic osteotomy for 2. "Results" At follow-up, none of patients had hip pain, while 3 patients limped. In the hip joint, mild limitation of flexion, abduction, and internal or external rotation were observed in 4 hips. Though hip joint radiographs revealed some articular deformity in 6 hips, good articular congruency was observed. "Conclusion" The combination of multiple procedures seem to be effective in obtaining and maintaining stability of the hips in patients with the residual deformity after septic arthritis of the hip.

J-1-18

化膿性股関節炎後の遺残変形に対する観血的治療経験

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【目的】今回我々は、他医で化膿性股関節炎の初期治療を受け、股関節の遺残変形を生じた6例7股に対し、股関節の再建手術を行ったのでその治療経験について報告する。

【対象症例および方法】症例は、男児4例、女児2例であり、初回手術時年齢は平均8歳、最終手術時から調査時までの術後経過期間は平均で5.2年であった。初回手術時の股関節遺残変形はChoiらの分類では、IB 1股、IIA 4股、IIB 1股、IVB 1股であった。股関節再建手術は、股関節適合性と支持性の獲得を目的に6例7股に計12回の手術を行った。術式の内訳は、股関節筋解離術6股、股関節固定術1股、大腿骨骨切り術5股、大転子下降術4股、観血的整復術1股、骨盤骨切り術2股であった。また全例に下肢短縮もみたが、平均13歳時の下肢短縮は23～34mmとなっていた。この中4例大腿骨仮骨延長を行い、下肢の等長化を得た。

【結果】調査時、全例股関節痛はなかったが、3例に跛行をみた。股関節可動域制限は股関節固定した1股を除き、4股に軽度制限を認めた。股関節X-Pでは、股関節固定以外の6股に何らかの関節変形を認めたが、良好な関節適合性が得られていた。

【結論】化膿性股関節炎後の股関節遺残変形の治療は、年齢、関節変形の程度や臨床症状などを考慮して適切な種々の手術方法を組み合わせて行う必要がある。

J-1-19

Humeral Callotasis for Epiphysial Arrest Caused by Neonatal Osteomyelitis: A Report of Two Cases

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Because a shortened upper limb does not normally cause dysfunction, surgery is only rarely chosen for its treatment. We encountered 2 patients with growth disorder which had occurred after neonatal osteomyelitis in the humerus, and performed callotasis using Orthofix external fixators. [Patient 1] Because of epiphysial arrest caused by neonatal osteomyelitis, a 10-year-old girl had had shortening of the left humerus by 7.3 cm. Callotasis in the left humerus was performed using Orthofix external fixators. Taking the final bilateral difference into consideration, the left humerus were extended by 9.0 cm. The fixation pins were removed after callotasis, but spiral fracture occurred at the distal site of pin insertion in the left humerus. Bone union was obtained by plaster fixation. [Patient 2] Because of epiphysial arrest caused by neonatal osteomyelitis, a 11-year-old girl had had shortening of the left humerus by 5 cm. Callotasis in the left humerus was performed. The left humerus was extended by 6.0 cm. [Discussion] It has been reported that complications such as neuromyotonia and disorder of the surrounding joints occurred after extension of the humerus. In both patients, radial neuromyotonia did not occur but in Patient 1, the left shoulder became unstable, suggesting that careful follow-up observation is necessary. Because the diameter of fixation pins in the Orthofix external fixator is large for the humerus, fracture sometimes occurs after removal of the pins as in Patient 1.

J-1-19

上腕骨骨髓炎後の上腕骨短縮に対し仮骨延長術を行った2例

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上肢の短縮は機能障害を生じにくく手術適応となることが少ないが、今回新生児上腕骨骨髓炎後に成長障害をきたした2例に対しオルソフィックス創外固定器を用い仮骨延長を施行したので報告する。

【症例1】10歳の女児。新生児骨髄炎の骨端線障害により左上腕骨の7.3cm、左大腿骨の2.7cmの成長障害を生じた。オルソフィックス創外固定器を用い、左上腕骨と左大腿骨の仮骨延長術を行った。最終脚長差を考慮し左上腕骨を9.0cm、左大腿骨を3.5cm延長した。延長部の皮質骨化が完了し固定ピンを抜去したが、左上腕骨遠位のピン刺入部にて螺旋骨折を生じた。ギプス固定にて骨癒合が得られた。

【症例2】11歳女児。新生児骨髄炎の骨端線障害により左上腕骨の5.0cmの成長障害を生じた。オルソフィックス創外固定器を用い左上腕骨の仮骨延長術を行った。最終脚長差を考慮し左上腕骨を6.0cm延長した。

【考察】上腕骨の延長の場合、神経麻痺の合併や近傍関節障害の報告もある。今回2例とも幸いに延長時において橈骨神経麻痺の合併はなかったが、症例1において延長後に左肩に不安定性をきたしており、注意深い経過観察が必要と思われた。またオルソフィックス創外固定器の場合上腕骨に対しピンの径が太く、症例1のように抜釘後骨折を生じることがあり、創外固定器の機種選択に今後考慮する必要がある。

J-1-20

Limb Lengthening for Limb Length Discrepancy with Femur and Tibia

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We report the experience of the limb lengthening for limb length discrepancy with femur and tibia in 17 patients 23 limbs. The average age at operation was 10 years (range, 3 to 19). Patients were divided into 3 groups; Group T were performed tibial lengthening. Group F was performed femoral lengthening. Group T+F was performed simultaneously femoral and tibial lengthening. We evaluated length gained, external fixation time (EFT), distraction index (DI), and external fixation index (EFI). In group T, the mean length gained was 4.2 cm, the mean DI was 15.3 days/cm, the mean EFI was 48.2 days/cm, the mean EFT was 203 days. In group F, the mean length gained was 4.9 cm, the mean DI was 9.1 days/cm, the mean EFI was 34.7 days/cm, the mean EFT was 165 days. In group T+F, the mean length gained was 5.6 cm, the mean DI was 7.4 days/cm, the mean EFI was 30.8 days/cm, the mean EFT was 152 days. Simultaneously femoral and tibial lengthening limits activity of daily life for patients. But external fixation time of single limb lengthening is longer than that of simultaneously femoral and tibial lengthening. Simultaneously femoral and tibial lengthening is one choice of limb length discrepancy with femur and tibia.

J-1-20

片側大腿下腿脚長差症例に対する脚延長術の治療成績

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【はじめに】脚長差のある症例に対して仮骨延長法による治療は一般的になりつつある。脚長差が大腿骨もしくは脛骨のみに存在する場合には問題がないが、大腿下腿ともに短縮している場合にはどちらを延長すべきか、また両者を同時に補正すべきかは議論が多い。

【対象と方法】対象は1990年から1998年までに片側大腿下腿脚長差のある症例で脚延長を行った17例23肢であり、男子14例、女子3例であった。3例で複数回脚延長術を行い、手術時平均年齢は10歳であった。これらの症例を一回の手術の際に下腿のみ延長を行ったT群、大腿のみ延長を行ったF群、大腿と下腿を同時に延長したT+F群にわけて延長量、Distraction index (DI)、External fixation index (EFI) について検討した。T+F群については大腿と下腿で延長量の合計をそれぞれの期間で除した。

【結果】それぞれの平均延長量 (cm)、平均創外固定装着期間 (days)、DI、EFI (days/cm) は、T群ではのべ14肢の延長を行ない4.2、203、15.3、48.2であった。F群は3肢の延長を行ない4.9、165、9.1、34.7であった。T+F群は4例で5.6、152、7.4、30.8であった。

【考察】下腿のみの延長は手技的に最も簡便で日常生活の制限も少ない。一方、大腿骨と下腿骨を同時に延長する場合、下肢に2つの創外固定器を装着することは患者の負担が大きい。しかし、大きい延長距離が必要な場合は創外固定期間を短縮できる方法であり1つの選択肢として考慮されても良い。

J-3-1

Ultrasound Screening in 2 Months Babies for the Diagnosis of Developmental Dysplasia of the Hip: A New Method in Our Hospital

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The screening system for developmental dysplasia of the hip (DDH) in Miyagi prefecture has changed in 2000. Pediatricians screen babies at a age of 2 months use with risk factors, and therefore many 2 months babies go to an orthopaedic clinic for the diagnosis of DDH. For 2 months babies, we usually use clinical examination, and we have started to examine ultrasonographically from September,2000. In this new system, 30 babies (9 male and 21 female) were examined; limitation of abduction were 22, asymmetry of the skin folds were 28 and Allis sign were 13. 11 babies have family history, only one was born in breech delivery. At the first time of ultrasonographical examination (Graf's technique) of 30 babies (60 hips); 42 hips were type I, 13 type IIa-b, 3 type IIc-D, 2 type III. All were reexamined; type IIb were decreased and type I were increased.

J-3-1

当科における先天性股関節脱臼 2 カ月検診の現況

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平成12年度より宮城県の先天性股関節脱臼(先天股脱)検診が、従来のレントゲン検診から変更になった。新体制では、リスクファクターによるスクリーニングで、先天股脱検診対象児が2ヵ月乳児一般健康診査から整形外科に紹介される。この新体制に対応し、当科では平成12年9月より2ヵ月乳児の先天股脱診療に超音波検査を導入している。基本的に、初診時の生後2ヵ月時にはレントゲン撮影を行わず、全例超音波検査を行う。Graf法に準じて股関節の形態を判断し、脱臼、亜脱臼(不安定股)を疑う児には前方法や動的な確認を加える。有所見児は、超音波を用いた経過観察を行い、脱臼、亜脱臼(不安定股)が明らかであれば、リーメンビューゲルなどの治療を行っている。平成12年9月から13年3月に当科を受診した児は30名(男9、女21)で、初診時の月齢が2ヵ月であった児が20名だった。臨床所見は、開排制限が22名、大腿皮溝非対称が28名、Allis徴候陽性が13名だった。家族歴ありが11名で、骨盤位分娩は1名だけだった。また、13名に明らかな向き癖を見た。30名60股の初回の超音波所見は、正常股のType I 42股で、Type IIa、bは13股、Type IIc・Dは3股、脱臼であるType IIIが2股だった。経過観察中にType IIbが6股と減少し、Type Iが49股に増加した。年間を通じたデータで今後さらに検討を行いたい。

J-3-2

Ultrasonography and Magnetic Resonance Imaging in Developmental Dysplasia of the Hip

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Forty-one developmental dysplasia of the hips were examined by ultrasonography and magnetic resonance imaging (MRI) to study the pathology of the each type of Graf's classification. All patients were girls and mean age at the time of first presentation was 3 months (range, 1-16 months). There were 8 hips of type2, 8 hips of typeD, 20 hips of type3, and 5 hips of type4 on ultrasonography. The shape of limbus was divided into three type on MRI: everted and sat on the femoral head, interposed between the femoral head and the acetabulum, and inverted within the acetabulum. There were 15 everted limbuses and one interposed limbus in type 2 and typeD hips. Fourteen limbuses were everted, 5 were interposed, and 4 were inverted in type3 hips. Four of 5 hips of type4 showed inverted limbus and one was interposed. Ultrasonographic findings in the type2,typeD,and type4 were similar to the findings of MRI. MRI presented more precise pathology than ultrasonography and clarified that the shape of limbus was varied in type3. This indicated that the different stage of developmental dysplasia were included in this group.

J-3-2

先天性股関節脱臼の超音波画像と磁気共鳴画像

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【目的】 Graf 法による developmental dysplasia of the hip (DDH) の超音波分類は必ずしも治療成績を反映していない。これは同一のタイプが同じ脱臼の程度とは限らないと考えられ、今回 Graf 分類における病態についてMRIを用いて検討したので報告する。

【対象・方法】 1992年から2000年までの間にDDHとして治療を行った例のうち整復前の超音波画像とMRIが揃っている女児41例41股を対象としてGraf法により得られた超音波画像の各タイプにおける病態をMRIの前後像を用いて観察した。

【結果】 初診時年齢は1～16ヶ月で、Graf分類ではtype 2 b 2股、type 2 c 6股、type D 8股、type 3 20股、type 4 5股であった。各typeのMRIによるリンプスの形態はtype 2とDの16股では1股をのぞいて全例外反しておりいずれも保存的に整復されていた。type 3では外反14股、介在型5股、内反型1股で4股が観血的治療を必要としていた。Type 4は介在型1股、内反型4股で後者は全例観血的治療が必要であった。

【考察】 type 2～Dでは脱臼度は軽く亜脱臼の状態と考えられた。type 4は高位脱臼で超音波画像とMRIは類似した像であった。しかしtype 3ではリンプスの形態はさまざまいくつかの異なった病態を包含しており、多様な治療成績につながっていると考えられた。

J-3-3

Indications of the Pavlik Harness for Congenital Dislocation of the Hip

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"Purpose" We investigated the effective and safe indications of using the Pavlik harness for congenital dislocation of the hip. "Methods" Among the complete dislocation patients who received the Pavlik harness at initial treatment from 1972 to 1989, we selected 34 patients (36hips) who had successful reduction with this apparatus (successful group) and 38 patients (40hips) who didn't, including 8 patients who had severe avascular necrosis (unsuccessful group). They were examined both clinically and radiographically. In measuring X-rays, we used Yamamuro's distance a and b, acetabular angle (angle α) and lateral deviation angle of the femoral head (angle L). The mean age at initial treatment was 4.0 months in both groups. "Results" In the successful group, all patients had click. Yamamuro's distance a and b were an average of 7.4mm and 11.7mm of each in the successful group, and 5.5mm and 12.9mm in the unsuccessful group. Angle α and angle L were an average of 37.5° and 45.0° in the successful group, and 38.7° and 52.1° in the unsuccessful group. Yamamuro's distance a and angle L are statistically significant among both groups. Moreover, about every patients with avascular necrosis, distance a is less than 7mm and angle L is more than 48°. "Conclusion" Patients considered to be good indications of the Pavlik harness are those who have click and Yamamuro's distance a is over 7mm and angle L is under 48°.

J-3-3

先天股脱（完全脱臼例）に対する Rb の適応

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【目的】当院にて Rb を用いて整復を試みた完全脱臼症例から有効でかつ安全な Rb の適応につき検討した。

【方法】対象は1972年から1989年までに Rb にて初療を開始した完全脱臼例のうち明らかな骨頭変形を生ずることなく整復でき、10年以上経過観察できた34例36関節（Rb 成功群）と、Rb にて整復できなかった30例32関節、及び整復されたが骨頭変形を生じた8例8関節、計38例40関節（Rb 不成功群）である。装着時月齢は生後1ヶ月から9ヶ月、平均4.0ヶ月。Rb 装着前の臨床所見（開排制限の程度、クリックの有無）と X 線所見（山室の a 値、b 値、臼蓋角、外偏位角）につき検討した。

【結果】臨床所見では Rb 成功群は全例クリックを有していた。一方、X 線所見では成功群と不成功群でそれぞれ、a 値は平均7.4mm、5.5mm、b 値は平均11.7mm、12.9mm、臼蓋角は平均37.5度、38.7度、外偏位角は平均45.0度、52.1度で、両群間において a 値と外偏位角で有意差を認めた。また、骨頭変形を生じた例はいずれも a 値が7 mm 以下でかつ外偏位角が48度以上であった。

【考察】我々は Rb は必ずしも安全な方法ではないとの観点から、1980年代半ばより、スクリーニングとして用いるのではなく、一定の基準を設ける必要性につき模索してきた。今回の検討から Rb の良い適応として、クリックを有し、a 値が7 mm より大きく、外偏位角が48度より小さい症例であると考えられた。

J-3-4

Long Follow-Up of DDH

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Total number of 56 cases of CDH and 20 cases of acetabular dysplasia or so ranging from 4 months old to 36 years old have been treated in Kinki University Hospital since 1975. Over-head traction and subsequent plaster fixation was successful in making normal hip joints without any bony operations in 15 out of 18. Open reduction was selected in 9 cases. For acetabular dysplasias, shelf operation was indicated for 10 hips and triple osteotomies was for 5 hips. As a result of drastic decrease in CDH cases in Japan, the ratio of the cases of failed Publik Harness has been increasing, and technique for over-head traction and plaster cast fixation is still mandatory. Acetabular dysplasias have both genetic and environmental backgrounds and fairly number of the cases with early osteoarthritis should visit the clinic constantly.

J-3-4

DDH の推移と長期治療成績

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【目的】当大学の開校以来 DDH に対して行われた入院治療例を分析した。

【症例】1975年以降入院・手術例は76名、151件である。生後4ヶ月のCDHから36才の臼蓋形成不全までを含み、男14例 女 62例、経過観察期間は最長25年、平均10.3年、初療病名はCDH56例、臼蓋形成不全ほか20例である。麻酔・手術機会の多数例は11回1例、6回2例などである。初代の山室隆夫教授の御在任中の3年間にCDH56例中20例が治療されている。

【結果】初回治療で観血的整復術を行った例は9例であり生後8ヶ月のfloppy baby例から、直達牽引で骨頭を下げた3歳の高位脱臼例を含んでいる。初回治療がover head traction・関節造影・整復・ギプス固定例は生後4ヶ月から1歳まで18例であり、1回で治療が終了したのは13例、2回で終了したのは2例、後に補正骨切り手術を必要としたもの2例、整復されず観血的整復を必要としたのは1例である。2回の骨切りを行った1例以外いづれも正常股関節を獲得している。臼蓋形成不全などに対しては9例で臼蓋形成術、5例で寛骨臼転骨切術などが行われ、7例で軽度の痛みを訴える。

【結論】CDHは激減し、むしろRBによる初療失敗例が増え、OHT+整復・ギプス固定で治療を終了すべき例は無くならない。また臼蓋形成不全例も遺伝・環境素因を有するために今後も減ることはないと思われる。

J-3-5

Epidemiological Study of Orthopaedic Medical Check in New Born

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"Purpose" The epidemiological study about the incidence of congenital malformation infant is very essential to investigate the intrinsic or extrinsic factors of those conditions. We have been performing the orthopaedic medical check of the infant in St. Marianna University Yokohama City Seibu Hospital since 1988. In this paper, we report the incidence of these common paediatric orthopaedic conditions, especially regarding torticollis, congenital hip dislocation, and congenital clubfoot. "Method" Since 1988 to 1998 in St. Marianna University Yokohama City Seibu Hospital, the total of 5608 of new born babies were screened by orthopedist. "Result" The incident of torticollis was 2.1 per 1000 livebirth, and the incident of congenital dislocation of the hip was 8.0 per 1000 livebirth. The incident of clubfoot was 2.0 per 1000 livebirth. "Conclusion" In our study, incidence of congenital dislocation of the hip was higher than the findings of prevalence, and also frequency formed in babies who were born in warm season.

J-3-5

新生児整形外科的検診の疫学的検討

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【目的】我々は、聖マリアンナ医科大学横浜市西部病院開院以来、当院にて出生した新生児に対し整形外科的検診を行っているので、今回、その結果を疫学的に検討した。

【方法】昭和62年の開院後、うち昭和63年から平成10年までの11年間に当院にて出生した5608例（男児2820例、女児2801例）を対象とした。触、視診による検診を出生後平均3.6日に行い、先天の形態異常について、その発生頻度、性差、左右差、合併異常などを比較検討した。

【結果】筋性斜頸は12例（0.2%）に見られたが、性差、左右差はなく合併異常もみられなかった。股関節に開排制限を含めた異常所見を認めたのは45例（0.8%）で、女児に多く見られたが、左右差はなかった。合併異常は4例にみられた。これらのうち4月から9月までの間の出生児が28例、10月から3月までの出生児が17例であった。先天性内反足は11例（0.2%）で2:9で女児に多くみられ、また左右差では左側に多くみられた。合併異常は3例にみられた。

【考察】新生児検診にて全ての異常を網羅できるわけではないが、すべての出生児に整形外科的検診を施行することによってより早期発見、早期治療が可能となると考えられる。今回、内反足は女児の方が多く、また股関節異常所見陽性例も寒冷期よりも温暖期出生児に多かった。地域的な環境因子も考えられ、興味深い結果が出たと思われる。

J-3-6

Why Has Slipped Femoral Capital Epiphysis been Overlooked?

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"Purpose" Twelve patients with slipped femoral capital epiphysis (SFCE) were treated in our hospital since 1995. Four cases of these were overlooked at first visited hospital or clinic. We investigated factors of the diagnostic error in these 4 cases. "Methods" We questioned orthopaedic surgeons on their experiences about SFCE and attentions when they examined children's leg. We got first X-ray pictures from these institutes and reviewed them. "Results" In the first case with a thigh pain, a resident (2 years after graduation) took an X-ray picture of femurs. She could not notice SFCE. The factor of diagnostic error was the misleading symptoms of pain referred to the thigh. In other 3 cases, three senior orthopaedic surgeons (22-39 years after graduation) who had 3 or 5 SFCE patients before were concerned at first. They supposed SFCE, but they failed to notice the minimal slips and irregularities of the growing plate. "Conclusion" The major reason was a poor knowledge and the misreading of the X-ray pictures. We should observe early signs of SFCE in the X-ray pictures very carefully and spend more time educating residents.

J-3-6

なぜ大腿骨頭すべり症は見逃されたか？

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【目的】長野県立こども病院を受診した大腿骨頭すべり症患者12例中4例は、初診医療施設で大腿骨頭のすべりを見逃され、うち3例はその後転倒などによりすべりが増強したものであった。すべりが軽度であればピンニングで対処できるが、高度になれば侵襲の大きい骨切り術を選択せざるを得ない。なぜすべりを見逃したのか検討した。

【方法】4例に関し初診医療施設の担当医にアンケート調査を行った。内容は大腿骨頭すべり症の診断、治療経験の有無、小児の下肢疾患をみる際留意している点などである。さらに初診時X線写真をとりよせすべり所見を検討した。

【結果】1例は大腿部痛を訴え、卒後2年目の研修医が両大腿骨正面のX線写真のみで、異常なしと診断した。本症の診断、治療経験はなかった。他の3例は整形外科歴22年から39年の勤務医1名、開業医2名で、皆3～5例の診断歴があり、病院勤務時代に治療経験もあった。小児の大腿から膝関節の痛みでは本症も念頭におくと回答した。X線写真では近位骨端線の不整、骨端線幅の拡大、微少なすべりが初診時すでに確認された。正面像のみ、側面像は患側のみを撮影した例もあった。

【考察】すべりの見逃し原因は1) 知識不足 2) 微少なすべり 3) 画像情報の不足であった。若手医師への教育と骨頭すべりの画像上初期変化を知ることが重要である。

J-3-7

A Study of the Contralateral Side of Slipped Capital Femoral Epiphysis

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The records of 16 children who had slipped capital femoral epiphysis (SCFE) and who had no endocrine disorder were studied to find the features of bilateral SCFE. Eleven had the left involvement, two had the right involvement, and three had bilateral involvement. The mean age at the time of the diagnosis of the first slip of the children who had bilateral slip was almost the same as that of the children who had unilateral slip (11.3 years compared with 11.0 years). The mean obesity rate of the children who had bilateral slip was 51.3% and that of the children of unilateral slip was 31.5%. There were 1 acute and 2 chronic slips in the children who had bilateral slips. There were 4 acute, 3 acute on chronic and 6 chronic slips in the children who had unilateral slip.

The average posterior tilt angle (PTA) of the first slip in the children who had bilateral slip was 39 degrees and that in the children who had unilateral slip was 17 degrees. The average PTA of contralateral side of the first slip in the children with bilateral slip was 26 degrees and that in the children with unilateral slip was -1 degree. There was a trend for the first slip to be more severe and for the obesity rate to be higher in the children who had bilateral SCFE. However, there were no particular features in the children who had bilateral SCFE.

J-3-7

大腿骨頭すべり症の対側発症について

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【目的】 大腿骨頭すべり症の両側発生率は10～60%と報告により差がある。初発側の対側（以下、対側）の処置として予防的内固定を勧める意見がある一方、合併症の危険から、これを行わない意見も多い。今回、対側の特徴について検討した。

【方法】 平成3年～12年に当科を受診した大腿骨頭すべり症は19例で、うちホルモン異常を確認した3例を除く16例を対象とした。発症年齢は9～13才（平均11才）。男13、女3例。患側は左11、右2、両側3例であった。後方傾斜角（PTA） 10° 以上を本症とし、経過中に両側発症を認めた例を両側例とした。両側例、片側例それぞれの年齢、肥満度、発症形式、PTAを含めたX線所見などについて検討した。

【結果】 発症年齢は両側例11.3才：片側例11.0才。肥満度51.3%：31.5%。発症形式は両側例で急性型（A）1、慢性型（C）2例。片側例でA型4、AonC型3、C型6例であった。初発側のPTAは両側例 39° ：片側例 17° 。対側PTAは両側例 26° ：片側例 -1° であった。X線所見では両側例、片側例とも全例で対側に骨端線の不整像が確認された。初診時、片側にのみすべりを認めた例は14例でこの中の1例で14カ月後に対側のすべりが生じた。両側例3例のうち他の2例は、初診時に無症候側にも骨端線離解の所見がみられPTAは 39° と 22° であった。

【結論】 両側発生例は片側例に比べて肥満傾向と初発側のPTAが大きい傾向が見られたが、両側例に特有の所見は明らかにできなかった。

J-3-8

Physcal Closure After Corrective Osteotomy in Slipped Capital Femoral Epiphysis

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Corrective osteotomy has been applied to the patients with moderate or severe slipped capital femoral epiphysis. The purpose of this study is to reveal the period of physcal closure after operation and the factors which effect on that period. Fifteen patients with chronic slipped capital femoral epiphysis were operated with ccorrective osteotomy. Eleven patients were boys and four were girls. The mean age at operetaion was 13.4 (10 to 20) years. Corrective osteotomy without fixation of the epiphysis was performed using open wedge technique with our original plate. The period of the complete physcal closure was evaluated on the follow-up roentogengrams. The mean duration between osteotomy and the complete physcal closure was 1.8 (0.2 to 3.7) years. In all cases, the epiphyseal line tended to close immediately after operation without more slipping. In the cases under 11 years of age, the epiphyseal line were visible in 2 years after operation, while in the cases over 16 years of age, it had closed within 2 years. In this study, no other clinical factors than the age at operation have influenced on the physcal closure. We think that fixation of epiphysis is unnecessary in this procedure.

J-3-8

大腿骨頭すべり症に対する矯正骨切り術後の骨端線閉鎖時期

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【目的】矯正骨切り術は中等度以上的大腿骨頭すべり症に対し行われるが、術後の骨端線閉鎖を詳細に調べた報告は少ない。今回、矯正骨切り術後の骨端線閉鎖までの期間を調査した。

【方法】対象症例は1986年以降、当科において矯正骨切り術を行った15症例である。内訳は男性11例と女性4例、両側発症例は4例であり、全例慢性発症型である。平均手術時年齢は13.4歳(10~20歳)であり、内分泌異常を2例に認めた。手術は転子間での骨切り後、当科オリジナルの屈曲ひねりプレートを用いて open wedge 位に固定し、骨端線の固定は行なわなかった。単純レントゲン像で骨端線の完全閉鎖時期を判定し、性別、手術時年齢、術前後のレントゲン計測値、発症時から手術までの期間等との関連につき検討した。

【結果】全ての症例で骨端線は術後早期から閉鎖傾向を示し、手術から骨端線完全閉鎖までの期間は平均1年9ヶ月(2ヶ月~3年8ヶ月)であった。内分泌異常を有した手術時年齢17歳以上の2例では2年以内に閉鎖しており、10歳以下の2例では、完全閉鎖までに両者とも3年以上を要していた。また、手術時年齢以外の因子に関しては明らかな関連は認めなかった。

【考察】矯正骨切り後の骨端線閉鎖には複数の要因が関わっているものと思われるが、術後再すべりを生じることも無く比較的早期に閉鎖しており、骨切り時の骨端線固定は不要と考える。

J-3-9

Risk Factors of Osteonecrosis of the Femoral Head in Childhood

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<Purpose> Few studies have shown osteonecrosis in childhood, the etiology of the disease remains unknown. MRI screenings of osteonecrosis of the femoral heads were performed on the children with high-dosage steroid treatment. It was our attempt to reveal risk factors of occurrence of steroid-induced osteonecrosis in childhood.<Patients and Methods> Twenty-two children receiving high-dosage corticosteroid administration were examined through MRI screening. Diagnosis of osteonecrosis was based on the presence of band-like zones on MRI and of nonosteonecrosis was determined by MR findings at least 6 months from the initiation of corticosteroid administration. In order to clear the risk factors of osteonecrosis, comparisons between the osteonecrosis group and the nonosteonecrosis group were made. <Results> Of the 22 cases, osteonecrosis were found in 5 hips of 3 patients. Mean age at the latest high-dosage steroid treatment was 13 in the osteonecrosis group and 11 in the nonosteonecrosis group. The osteonecrosis group revealed a tendency of higher age compared to the nonosteonecrosis group.<Discussion> Age during treatment may be important in regard to occurrence of osteonecrosis. Steroid-induced osteonecrosis in children, no matter how rare it may be observed, should not be ignored. Since relatively high-aged children during high-dosage steroid treatment was observed to have a risk of osteonecrosis, we think that MRI screening is suggested to be important in early detection of osteonecrosis.

J-3-9

小児ステロイド性大腿骨頭壊死症の危険因子

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【目的】小児ステロイド性骨壊死の報告は少なく、その病態はほとんど解明されていない。今回ステロイド大量投与を受けた小児に対し、大腿骨頭壊死のMRIスクリーニングを施行した。小児ステロイド性大腿骨頭壊死発生の危険因子を明らかにすることを目的とした。

【対象・方法】対象はさまざまな疾患に対してステロイド大量投与を受けた小児で、MRIスクリーニングを行った22例である。MRIで帯状信号像を有するものを骨壊死ありと診断した。骨壊死なしという診断は、ステロイド大量投与から少なくとも6か月以上の間隔があるMRIで行った。骨壊死発生の危険因子を検討するため、両群を比較検討した。

【結果】22例中、骨壊死の診断を得たのは3例5関節であった。最終ステロイド大量治療時の平均年齢は、骨壊死群が13歳で、非骨壊死群の11歳に比べ高い傾向があった。

【考察】骨壊死発生には治療時年齢が重要な因子であると考えられる。小児ステロイド性骨壊死症が少ないからといって、臨床的には看過できない。よって、ステロイド大量投与時年齢が比較的高い小児例は骨壊死の危険があると認識し、MRIで早期診断することが大切であると考えている。

J-3-10

Magnetic Resonance Imaging of Elbow Disorders in Young Baseball Players

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Purpose: The purpose of this study is to evaluate the MRI findings of young baseball players with elbow disorders. **Methods:** The subjects were 20 patients aged from 10 to 16 year-old (mean 13.5 year-old). MRI machines used in this study were AIRIS, AIRISII (0.3Tesla, Hitachi Co.) and Signa (1.5Tesla, GE Co.) Both coronal sections and Sagittal sections with T1 and T2 weighted images were used to evaluate the images of capitulum, trochlea, olecranon, radial head, ulnar co-lateral ligament, medial epicondyle of the humeri, and muscles around the elbow joint. **Results:** We found the abnormalities of the capitulum in 12 elbows, the trochlea in 6, the olecranon in 1, the radial head in 2, the ulnar co-lateral ligament (or the medial epicondyle of the humeri) in 9 and the muscle around the elbow joint in 1. **Conclusion:** There were multiple and complex lesions in MRI not only in the capitulum or the ulnar co-lateral ligament, which has been already reported, but also in the trochlea, the olecranon, the radial head or the muscle around the elbow joint, in the elbows of young baseball players.

J-3-10

成長期投球肘障害のMRI

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【目的】成長期における投球肘障害の病態をMRIを用いて評価検討すること。

【方法】1997年6月より2001年5月までに当院および関連病院を受診しMRIの撮像が行われた16才以下の投球肘障害20例を対象とした。男性19例、女性1例。右側18例、左側2例。年齢は、10才から16才、平均13.5才であった。MRIは、GE社製SIGNA (1.5T)、日立社製AIRIS、AIRIS II (0.3T)を用いた。冠状断、矢状断においてT1、T2強調画像をそれぞれ撮像し、上腕骨小頭、橈骨頭、滑車、肘頭、尺側側副靱帯、内上顆、関節周囲の筋肉などの異常像について検討した。

【結果】上腕骨小頭における異常は12例で、うち上腕骨小頭の軟骨面の破壊が強い2例で、橈骨頭軟骨面にも異常が認められた。肘頭の異常は1例、前腕の屈筋群起始部の異常は1例、尺側側副靱帯および内上顆の異常は9例で認められた。滑車部の異常は6例で疑われた。うち2例ではT2強調画像上高輝度の明らかな変化を認めた。

【結語】投球肘障害のMRIについては、これまでも多くの報告があるが、今回改めて詳細にわたって検討してみると、滑車部や橈骨頭軟骨面の変化など、多岐にわたる異常が複合してみられることが明らかとなった。

J-3-11

Adductor Muscle Release for the Hip Joint Disorder in Cerebral Palsy Children

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It is the purpose of this report to present the effect of an adductor muscle release for the hip joint disorder in cerebral palsy children. 17 patients, 11 males and 6 females, were received an adductor muscle release between 1984 and 1998. Their ages in the operation varied from 3 to 10 years (mean, 5 years). The follow-up periods were from 1 to 16 years (mean, 8 years). Acetabular-head index (AHI) was measured before the operation and at 1st-2nd, 3rd-8th, over 9th year postoperatively. The change of AHI of 12 patients, whose adductor longus and gracilis muscle were cut, was 55%, 63%, 55%, 59%, and that of 5 patients, whose adductor longus were lengthened and gracilis muscle were cut, was 59%, 60%, 56%. The AHI of 8 spastic diplegia patients was 59%, 64%, 56%, 56%, that of 7 spastic tri- and tetraplegia patients was 55%, 57%, 56%, 64%, and that of 2 mixed tetraplegia patients was 54%, 74%, 61%, 64%. The AHI of patients whose age in the operation were 5 years or younger was 56%, 63%, 56%, 60%, and that of patients 6-year-old or older was 58%, 58%, 57%, 55%. The AHI of 3 patients who were on level 3 of the gross motor function classification system was 77%, 77%, 69%, 75%, that of 9 patients on level 4 was 52%, 62%, 53%, 54%, and that of 5 patients on level 5 was 55%, 54%, 51%, 38%.

J-3-11

脳性麻痺児の股関節障害に対する内転筋解離術の成績

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【目的】脳性麻痺児の股関節障害に対する内転筋解離術後の骨頭被覆度の経時的変化を検討する。

【対象・方法】1984-98年に内転筋解離術を受けた脳性麻痺児17例（男11例、女6例）、34関節を対象とした。手術時年齢は3歳2ヵ月-10歳4ヵ月（平均5歳5ヵ月）、経過観察期間は1-16年（平均8年）であった。Acetabular-head index を術前と術後1-2年、3-8年、9年以上で計測した。

【結果】術式では長内転筋切離+薄筋切離群（12例）で55%、63%、55%、59%、長内転筋延長+薄筋切離群（5例）で59%、60%、56%であった。麻痺のタイプでは痙直型両麻痺（8例）で59%、64%、56%、56%、痙直型三・四肢麻痺（7例）で55%、57%、56%、64%、混合型四肢麻痺（2例）で54%、74%、61%、64%であった。手術時年齢では3-5歳で56%、63%、56%、60%、6-10歳で58%、58%、57%、55%であった。粗大運動能力分類システムではレベル3で77%、77%、69%、75%、レベル4で52%、62%、53%、54%、レベル5で55%、54%、51%、38%であった。術後10年以上経過した10例20股の内、術前に正常であった7股は全て正常を保ち、亜脱臼であった10関節中7関節は正常化した、亜脱臼の3関節と脱臼の3関節は不変であった。

【考察】術後成績の改善因子は長内転筋切離+薄筋切離、手術時3-5歳、痙直型三・四肢麻痺および混合型四肢麻痺であり、悪化因子は長内転筋延長+薄筋切離、手術時6-10歳、痙直型両麻痺、粗大運動能力分類システム・レベル5であった。

J-3-12

The Effects of Hip Spastic Control Surgery on Gross Motor Function in Cerebral Palsy

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" Purpose " The effects of the hip spastic control surgery (SCS) on the gross motor function in the patients with cerebral palsy were examined by Gross Motor Function Measure (GMFM). " Methods " 14 subjects (10 males, 4 females; 9 spastic diplegia, 5 quadriplegia; mean age: 7.8 years) had undergone SCS. The selective elongation of hip muscle group was employed in all cases. Hip fixation at abduction was ensured for 7 days, and standing and LLB-attached walking exercises were started from Week 1 and 2, respectively. GMFM was examined twice before, and 1,2,4,6, and 9 months after the operation in each case. " Results " A reduction in the total GMFM score from 58% to 51% (mean score) was observed at 1 month after SCS, then recovered to 59% at 2-month, increased to 60% at 4-month. The mean scores of the ambulatory group (4 cases) were 83% (before SCS), 69% (1-month), 82% (2-month), 84% (4-month), whereas those of the non-ambulatory group were 48%, 44%, 49%, and 51%, respectively. A significant reduction was noted in 1-month in the ambulatory group. In both groups, functional recovery took place during 2- to 4-month. A critical improvement was obtained in 6 cases at 9-month. " Conclusion " Gross motor function is temporally reduced at 1-month after hip SCS, thereafter recovers during 2- to 4-month, and the functional improvement would be obtained at around 9-month.

J-3-12

脳性麻痺の股関節痙性コントロール手術後の粗大運動能力

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【目的】脳性麻痺の股関節痙性コントロール手術（股 SCS）後の粗大運動能力の低下とその後の回復について検討した。

【方法】対象は股 SCS を施行した14名で、男子10例、女子4例、手術時平均年齢は7歳8ヶ月で、痙性両麻痺が9例、痙性四肢麻痺が5例であった。全例に両股周囲筋の選択的延長を行い、症例により膝、足の周囲筋解離術も追加した。術後は両股外転位で1週間固定し、2週より起立訓練、3週よりLLB装着での起立、歩行訓練を行った。術前2回、術後1、2、4、6、9ヶ月に粗大運動能力尺度（GMFM）を用いて検査した。

【結果】GMFMの総合点は術前平均58点で、術後1ヶ月51点、2ヶ月59点、4ヶ月60点であった。歩行群（4例）での術前総合点は術前83点、術後1ヶ月で69点、2ヶ月で82点、4ヶ月で84点であり、非歩行群（10例）ではそれぞれ48点、44点、49点、51点であった。歩行群の術後1ヶ月での機能低下が著しかった。歩行群、非歩行群とも難易度の高い項目での低下みられ、回復には2～4ヶ月間を要した。7例での術後6ヶ月での総合得点は術前と有意な改善は示さなかったが、術後9ヶ月では追跡できた6例において有意に改善していた（t検定 $p=0.01$ ）。

【考察】股 SCS の術後1ヶ月には一時的な機能低下がみられ、術後2～4ヶ月には術前の機能までに回復し、術後9ヶ月頃には機能改善がみられることが判明した。

J-3-13

Long-Term Results of Reconstruction for Spastic Palsy of Upper Extremity: Brief Report

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Although spastic palsy are not rare, long-term results over 10 years of reconstructive surgery for spastic palsy of upper extremity were rarely reported. Two such boys are presented. Case 1. A 3-year-old boy had left hemiparesis due to brain injury. Tendon transfer of flexor carpi ulnaris to extensor carpi radialis, lengthening of flexor pollicis longus tendon, intermuscular tendon lengthening of flexor digitorum profundus were performed at 15 years old. Then his hand function was improved slightly and his hand function was preserved 11 years after operation. Case 2. A 13-year-old boy with spastic palsy of left upper extremity due to cerebral palsy had tendon transfer of flexor carpi ulnaris to extensor carpi radialis and lengthening of flexor pollicis longus tendon. Training was carried for 2.5 years and hand function was improved. But after that left hand function deteriorated and he could use his left hand only for paperweight 11 years after operation. Discussion. Clinical results of one case deteriorated during long-term follow-up. We discuss disorder which causes spastic palsy and class of it.

J-3-13

学童期に再建手術を行い長期に経過観察できた上肢痙性麻痺の2例

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【目的】痙性麻痺を認める症例は多いが、上肢の痙性麻痺に対して手術治療が施行され長期に経過観察された例の報告は少ない。今回われわれは学童期に上肢痙性麻痺の再建手術をうけ10年以上経過を観察できた2例を経験したので報告する。

【症例1】手術時年齢15歳、男性、3歳時受傷の脳挫傷後遺症 左上肢痙性麻痺に対し、尺側手根屈筋（FCU）の橈側手根屈筋（ECR）への腱移行、長母指屈筋（FPL）の腱延長術、深指屈筋の筋間腱延長を行った。術後早期より機能的回復を認め術後11年の時点でも麻痺症状の増悪はなく物体の把持、解放の能力は保たれている。

【症例2】手術時年齢13歳、男性、脳性麻痺 左上肢痙性麻痺に対し、FCUのECRへの腱移行とFPLの腱延長術を受け、術後2.5年までリハビリテーションを受けていた。リハビリテーション終了後徐々に麻痺症状増悪、術後11年で左上肢は物を押さえつけること以外の利用は不能となった。

【考察】長期に経過観察すると2例中1例に成績の低下が認められた。その原因に関与すると考えられる原疾患、痙性麻痺の程度について考察する。

J-3-14

Results of Dislocation or Subluxation of Patella

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We experienced three cases of patellar dislocation without history of trauma. These three cases treated by operation with Campbell method. Ages of each case is nine, six and twelve. We speculate one is congenital, but history of other two cases were not making clear. There were many reports of operation method for patellar dislocation, we treated using Campbell method associated with gradual and gentle exercise of range of motion. These three cases were obtained satisfy with full range of motion and patellar position.

J-3-14

小児膝蓋骨脱臼・亜脱臼の治療経験

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【目的】小児の外傷の既往を伴わない膝蓋骨脱臼3例を経験したので、報告する。

【症例】1、9歳女児。以前より歩行に際し膝関節を軽度屈曲していたが、膝関節痛のため近医を受診し膝蓋骨の位置異常を指摘され、当科を紹介され、両膝蓋骨脱臼・亜脱臼を認めたので、まず右側を、ついで1年後に左側を観血的に治療した。2、6歳女児。叔母に習慣性膝蓋骨脱臼歴あり。生後6カ月で軽度の左膝伸展制限がみられ、経過を観察していた。成長とともに膝蓋骨の外側偏位を生じてきた。また他動的に膝伸展可能であり、徒手的に正常の位置に戻ったりしていたので、両親の希望もあり装具にて観察していた。しかし徐々に外側偏位が目立ってきたので、6歳時に手術を施行した。3、12歳男児。9歳時両膝関節痛で当科を受診した。X線所見では膝蓋骨の偏位や大腿骨顆部の形成も正常と思われた。しかし3年後に体育の授業後右膝関節痛を覚え、近医を受診し両膝蓋骨の位置異常を指摘された。右のみ手術を施行し、経過観察中である。3例ともCampbell法に準じた手術を行った。また症例3は併せて膝蓋腱の附着部の内側移動も加えた。

【結果】6週間のギプス固定後、徐々に関節可動域訓練を施行していった。経過観察期間は1年から4年であるが、下肢筋力、関節可動域に問題なく、手術を施行した側の膝蓋骨の位置はほぼ満足した位置に存在している。

J-3-15

Results of Semitendinosus Transfer for Habitual Dislocation of the Patella in Children with Basic Disease

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We reviewed the results of 17 habitual dislocation of the patella in 10 children with basic disease who underwent semitendinosus transfer since 1992. The average at surgery was 8 years 10 months with a range from 3 years 8 months to 13 years 8 months. The follow up period ranged from 7 months to 7 years and 10 months. Basic diseases are Down syndrome, bone dysplasia syndrome, congenital short femur, ventricular septal defect, hypoparathyroidism syndrome and hypothyroidism. All of their knees showed marked joint laxity.

The technique of operation involves radical lateral release to reduce the patella in flexion patching with medial capsule, and semitendinosus transfer. The semitendinosus tendon is cut at its insertion, and is pulled out at its musculotendinous junction. Then, the tendon is pulled down to the patella under the skin, and is passed through a drilled tunnel in the patella. Finally, the tendon is reflected and sutured to the anterior surface of the patella under sufficient tension. We found that the transferred semitendinosus tendon acted as a dynamic tenodesis to maintain patella position during knee flexion.

At follow up, patella redislocation was seen in 2 knees in children with Down syndrome. The remaining 15 knees obtained stable reduction of the patella. So, we concluded semitendinosus transfer was quite suitable for habitual dislocation of the patella in young children with basic disease.

J-3-15

基礎疾患を有する小児の習慣性膝蓋骨脱臼に対する半腱様筋腱移行術
(上崎法) の成績

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【目的】習慣性膝蓋骨脱臼に対する半腱様筋腱移行術(上崎法)は、半腱様筋を鷲足付着部で切離し、その腱を膝蓋骨の骨孔を通して縫着する方法であり、膝屈曲時に外側に脱臼する膝蓋骨を膝屈筋でdynamicに内側に牽引し、整復位を保持するproximal realignment法である。今回我々は、基礎疾患を有する小児の膝蓋骨脱臼に対する本法の成績について検討した。

【対象】1992年から2001年3月までに本法を施行した10例17膝である。手術時年齢は3歳8ヶ月から13歳8ヶ月であった。平均年齢は8歳10ヶ月であり、基礎疾患を有する場合には、本症の通常発症年齢より早く発症すると思われた。経過観察期間は7ヶ月から7年10ヶ月であった。基礎疾患の内訳は、ダウン症候群3例5膝、Ellis-van Creveld症候群2例3膝、大腿骨形成不全1例2膝、骨系統疾患1例2膝、心室中隔欠損症1例2膝、副甲状腺機能低下症1例2膝、甲状腺機能低下症1例1膝であった。

【結果】Macnabの自覚的評価で、優13膝、良2膝、可0膝、不可2膝であった。術後に可動域の悪化した症例はなかった。不可例は関節弛緩の強いダウン症候群の1例2膝であった。以上より、本法は基礎疾患を有する骨端線閉鎖前の小児の膝蓋骨脱臼により適応があると考えられる。

J-3-16

Brace Treatment for Infantile Blount's Disease

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Purpose: We examined effectiveness of brace treatment for infantile Blount's disease. **Methods:** Patient with MDA (metaphyseal-diaphyseal angle) of 11 degrees or more was diagnosed as infantile Blount's disease, and brace treatment was done. **Results:** 14 patients were diagnosed as infantile Blount's disease, but three patients were recovered spontaneously. Brace treatment was done in eleven patients, our boys and seven girls. Seven patients were bilateral affected, four were left side affected. The average age at the first visit was 25.5 months (range, 18 -39 months). The average MDA at the first visit was 15.0 degrees (range, 11-21) . And the average FTA (femoro-tibial angle) at the first visit was 201 degrees (range, 186-218). The average treatment period was 10.7 months (range, 6 -20 months). After treatment, the average MDA was 6.2 degrees (range, 2-10), and the average FTA was 181 degrees (range, 177-185). All patients were treated with brace satisfactorily. **Conclusion:** Brace treatment was effective for infantile Blount's disease.

J-3-16

Blount 病の装具療法

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【目的】 Blount 病の装具療法の効果を調査する。

方法 当園の幼児内反膝治療法は、MDA (metaphyseal-diaphyseal angle) 11° 以上を Blount 病として装具療法を行い、MDA 10° 以下を生理的内反膝として経過観察している。1996年以降当園に内反膝変形を主訴に来院した25例の内、MDA 10° 以下の生理的内反膝11例を除いた14例を Blount 病とした。このうち初診時18カ月以下で経過観察中に改善した3例を除く11例に装具療法を行った。

【結果】装具療法を行った11例は、両側7例、左側4例であった。男児4例、女児7例であった。治療開始時の月齢18～39カ月 (平均25.5カ月)、MDA 11° ～21° (平均15.0°)、FTA 186° ～218° (平均201°)であった。治療期間は6～20カ月 (平均10.7カ月)、治療終了時のMDA 2° ～10° (平均6.2°)、FTA 177° ～185° (平均181°)であった。全例軽快し、手術に至った例はなかった。

【考察】自家矯正力の限界を越えた症例 (Blount 病) に対しては早期に積極的に装具療法を行うべきである。膝伸展位の通常の長下肢装具では痛みを生じ装具の装着が困難となり、靴型装具や短下肢装具ではアライメントの矯正が十分ではない。膝20° 屈曲位の硬性長下肢装具は支柱を外側に立てることにより FTA と MDA の矯正を無理なく行える。

【結論】 Blount 病の装具療法は非常に有効であった。

J-3-17

Utilization of MRI for Diagnosis of Intervertebral Discitis in Child

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We present a case of intervertebral discitis in child followed up with MRI for the diagnosis. A three-year-old boy, who had had transient episode of low back pain, was admitted to Touyoko Hospital on September, 1998. When patient was examined on admission, the left paravertebral muscle was tender to palpation and the spinal column to sixth thoracic from fifth lumbar was tender to percussion. But neurological examination was normal. Lateral radiograph of the lumbar spine demonstrated the narrowing of disc space between the second and third lumbar vertebral bodies. T2-weighted MR Image demonstrated high and low intensity signal of the intervertebral disc and high intensity signal of the second and third lumbar vertebral bodies. Gadolinium enhanced T1-weighted MR Image demonstrated high intensity signal in areas corresponding to those enhancing on T2-weight MR Images. These MR Images were useful for early diagnosis. The patient recovered with the bed rest of one month and antibiotics. The patient was asymptomatic at the last review of three years follow-up. A follow-up radiograph and MRI showed persistent expansion of the disc space with remodeling of the adjacent end-plates of the vertebral body.

J-3-17

MRI が診断に有用であった小児椎間板炎の 1 例

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MRI が診断に有用であった小児椎間板炎の 1 例を経験し、経年的な単純 X 線、MRI 所見を検討したので報告する。症例は 3 才 10 ヶ月、男児。平成 10 年 8 月中旬頃、腰を捻り腰痛が出現、近医受診し単純 X 線で異常像を認めず経過観察となった。その後腰痛が増強し、9 月当科を受診した。初診時所見は左傍脊柱筋部に圧痛、第 6 胸椎～第 5 腰椎に叩打痛があったが、髄膜刺激症状および神経学的異常は認めなかった。単純 X 線像で L 2 / L 3 に椎間板の狭小化を認め、精査目的にて入院となった。MRIT 2 強調画像矢状断で、椎間板が高信号と低信号の混合像を呈し、L 2、L 3 椎体は高信号を呈していた。また造影 T 1 強調画像冠状断で、L 2、L 3 椎体が造影にて著明に enhance されていた。臨床所見および血液検査所見より、化膿性椎間板炎と診断した。1 ヶ月の安静と抗生剤投与により症状は軽快し、3 年後の現在、症状の再燃はなく経過良好である。3 年後の経過観察時、単純 X 線、MRI 所見を発症初期と比較すると、単純 X 線像での最小 2 mm まで減少した椎間板腔が 5 mm まで増加していた。MRI では高信号と低信号の混合像を呈していた椎間板は信号低下に変化し、椎体の高信号領域は消失していた。これらの画像所見は椎間板腔の拡大と椎体辺縁 (end-plate) のリモデリングを示唆していた。

J-3-18

Surgical Treatment for Spondylometaphysial Dysplasia with Thoracic Kyphosis and Lumbar Canal Stenosis – A Case Report –

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[Purpose] We report a case of Spondylometaphysial dysplasia with thoracic kyphosis and congenital lumbar spinal canal stenosis (LSCS). This patient needed two staged surgery for thoracic myelopathy cauda equina lesion. [Case report] A case is 15 years old girl. The reinforcement of thoracic kyphosis began 6 years old, and lumbago appeared 10 years old. So, she visited our hospital at August 1997. Her kyphosis was 52° (Th5~12) in X-ray. Both lower limbs deep tendon reflex (DTR) decelerated, but motor and sensation were intact. MRI showed compression of dural tube in lumbar spine. She complained standing and gait disturbances because of bilateral thigh posterior pain since August 1998. Next year she appeared muscle weakness and paresthesia. And DTR acceleration at left side. We planned operation two stages. The first, we performed laminectomies (from Th11 to L5) for cauda equina syndrome by LSCS at November 1999 and secondary, performed anterior fusion (from Th7 to L1 with KASS and fibula graft), for myelopathy by thoracic kyphosis at January 2000. She stand up by under arm brace wearing, and discharge with crutch gait. Pain and nerve disorder disappears in investigation for 1 year 2 months after surgery thoracic kyphosis was corrected in 38° after surgery, does not recognize a correction loss in investigation. [Discussion] The case that treated by posterior decompression for myelopathy was seen. We report because it was the rare case that merged myelopathy by thoracic kyphosis and cauda equina syndrome by LSCS simultaneous, and operated two stages.

J-3-18

胸椎後弯と腰部脊柱管狭窄に手術を要した Spondylometaphysial dysplasia の一例

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【目的】胸椎後弯による脊髄障害と腰部脊柱管狭窄による馬尾障害に対して手術を必要とした Spondylometaphysial dysplasia の一例を経験したので若干の文献的考察を加えて報告する。

【症例】症例は15歳女性。小学校入学前より胸椎後弯の増強が始まり、10歳頃より腰痛出現し、H 9 年 8 月当科初診した。来院時 X-P にて 52° (Th 5 ~12) の強度の胸椎後弯を認めた。両下肢深部腱反射は低下していた。MRI では腰椎レベルで硬膜管の圧迫を認めた。H10年 8 月頃より両大腿後面痛のため徐々に立位、歩行が困難になり翌年、両下肢筋力の低下と、左側深部腱反射亢進、paresthesia が出現し入院となった。手術は二期的に計画した。まず、脊柱管狭窄による馬尾障害に対し H11年11月椎弓切除術 (Th11 ~ L 5) を施行、両下肢筋力低下、知覚障害のみ残存した。H12年 1 月、胸椎後弯による脊髄障害に対し前方固定術 (Th 7 ~11、'KASS 使用') を施行した。術後 under arm brace 装着にて起立し、杖歩行にて退院した。術後 1 年 2 ヶ月の調査時、疼痛・神経障害は消失していた。術後胸椎後弯は 38° に矯正され調査時矯正損失を認めていない。

【考察】脊柱の変形による脊髄障害に対し後方除圧を施行した症例は散見されたが、本症例は胸椎後弯変形による脊髄障害と先天性脊柱管狭窄による馬尾障害を同時合併した稀な症例であり、両病態に手術を行ったので報告した。

J-3-19

The Evaluation of the Postoperative Local Cervical Kyphosis After the Posterior Procedures in Children and Adolescents

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Postoperative local kyphosis in the cervical spine is one of the major clinical problems in children and adolescents. The purpose of this paper is to consider postoperative spinal deformities by comparing laminoplasty and laminectomy. There were 9 male and 2 female patients aged 1 month to 16 years (average, 13.4 years). The average follow-up period was 5.5 years. Before 1982, laminectomy was performed on 5 patients and since 1982, laminoplasty was performed on 6 patients. In the laminectomy group, all patients except one showed early local kyphosis in the cervical spine. The one patient, who did not develop local kyphosis, was performed the one level laminectomy. In the laminoplasty group, all the patients except one patients did not present postoperative local kyphosis. The one patient, who showed low grade spinal kyphosis was performed combined one level laminectomy and 3 levels laminoplasty. On the basis of this experience, we should undertake laminoplasty for the prevention of postoperative spinal deformities in children and adolescents who need to have more than 2 levels posterior procedures.

J-3-19

小児頸椎後方手術における局所後彎の検討

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小児疾患における頸椎後方手術において、局所後彎変形は術後の合併症の一つである。今回、小児頸椎後方手術の追跡調査を行い、術後変形の観点から小児における頸椎椎弓形成術の意義について検討したので報告する。＜対象＞頸髄疾患により頸椎椎弓切除術、または椎弓形成術のみを行った16歳以下の11例（男性9例、女性2例）を対象とした。うち分は、椎弓切除術を5例（男性5例、11～16歳、平均13.4歳）に、椎弓形成術を6例（男性4例、女性2例、0～11歳、平均5.5歳）に行った。経過観察期間は平均5.6年であった。＜結果＞椎弓切除術を行った5例のうち1椎弓のみ切除術を行った1例を除き、全例局所後彎を早期に來していた。椎弓形成術を行った6例のうち、1例を除き、その前彎が保たれていた。1例は、4椎弓のうち、1椎弓に椎弓切除、3椎弓に形成術を施行した症例であった。＜考察＞小児頸椎疾患においてはこれまで椎弓切除術が行われてきた。今回の検討により1椎弓であれば局所後彎を術後に來す可能性は低いが、2椎弓以上の場合椎弓切除術では、術後後彎変形は必発である。小児頸椎後方手術においては、後彎変形予防のため、椎弓形成術を行うべきである。また、椎弓切除術を行わざるを得ない症例では、前方固定術の併用、インスツルメンテーションの併用を考慮する必要があると思われる。

J-3-20

A Case of Bilateral Femoral Subtrochanteric Fractures and Tibial Proximal End Fractures in a Child

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<Case>We experienced a case of bilateral femoral subtrochanteric fractures and bilateral proximal tibial fractures in a young child. Now we would like to present and discuss the treatment and the result of this case. The patient was 3 years and 2 months old boy and sustained the fractures by direct blow injury with a mass of snow which was fallen from the roof when his grandfather was removing the snow there. Closed reductions and skeletal tractions for the femoral fractures and long leg splints for the tibial fractures were performed under general anesthesia soon after admission. The displacements of subtrochanteric fractures were not reduced completely, but we could not do any more due to the severe anemia. However, good callus formation had noticed 33 days after injury by skeletal tractions and the tractions and the splints were removed and physical therapy was begun. <Discussion>This is the very rare case. Although the good reductions of displacement were not gained by skeletal tractions, the relative good functional results were obtained. However, there had not been definite description about the treatment of such a case in the reference.

J-3-20

小児両側大腿骨転子下骨折および両側脛骨近位端骨折の1例

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【目的】我々は、極めてまれと思われる小児の両側大腿骨転子下骨折、両側脛骨近位端骨折の治療を経験したのでこれを報告する。

【症例】受傷時3才2カ月の男児。祖父の屋根の雪下ろし中、屋根の下にて、落下した雪が両下肢を直撃し、受傷した。初診時、両側とも外側後方へ転位のある大腿骨転子下骨折、およびほとんど転位のない両側の脛骨近位端骨折を認めた。同日、全麻下にて両大腿骨転子下骨折に対する徒手整復を行い、その後大腿骨顆上部から直達牽引(3 kg × 2)を施行した。同時に脛骨近位端骨折に対し、両側大腿近位から下腿遠位までシーネ固定を行った。牽引後、両大腿骨とも後方へ転位したままであったが、強い貧血があり、観血整復は行わずに直達牽引のみで経過観察を行った。受傷33日目、大腿骨、脛骨とも仮骨形成が良好で、直達牽引およびシーネを除去した。受傷43日目車椅子にて転院となった。

【考察】小児の大腿骨転子下骨折に対しては、直達牽引またはギプス固定の保存的治療が一般的のようである。我々の例は、転位が強かったが、直達牽引を施行して仮骨形成が得られた。しかし、本例のような両側例は極めてまれで、転位例に対し、直達牽引のみでよいのかどうか、リモデリングされるのかどうか、文献上ははっきりした記載が見当たらない。

J-3-21

Percutaneous Pinning for Supracondylar Fracture of Humerus in Children

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From 1999.1.1 to 2001.4.1, 17 cases of supracondylar fracture of the humerus in children were operated at our hospital, of which 9 were followed up. 4 cases were classified as Mubarak(MAYO) type II B and 5 cases were classified as type III. They were treated closed reduction and percutaneous pinning. There were one of ulnar nerve palsy associated with the pinning. Cubitus varus deformity was a result of imperfect reduction rather than growth disturbance. The most important thing is a comparison the injured with the normal side in Baumann's angle after closed reduction and pin fixation.

J-3-21

小児上腕骨顆上骨折の術後成績

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我々は小児上腕骨顆上骨折の転位のある症例に対して全身麻酔下に整復し、経皮的ピンニングを行ってきた。今回それらの症例に対して追跡調査を行い、治療成績などについて検討した。

【対象および方法】対象は1999. 1. 1から2001. 4. 1までの間に当院にてピンニングを施行した17例中調査可能であった9例。受傷時年齢は2歳から14歳、全例男性、平均経過観察期間は9.8ヶ月であった。検討項目は骨折型、治療成績、可動域、神経血管障害の有無、在院期間、抜釘時期である。

【結果】骨折型はMubarakらの分類を用い、タイプII B 4例、タイプIII 5例であった。在院期間は平均3.8日、kワイヤーは術後平均29.7日目に抜釘していた。また術前正中神経麻痺を1例、術後尺骨神経麻痺を1例に認めた。治療成績評価にはFlynnの評価法を用い、cosmetic factorはexcellentが6例、goodが2例、fairが1例、functional factorはexcellentが5例、goodが4例であった。

【考察】多数の文献のなかでsagittal planeの転位はremodelingされるが、内外反変形は初期の整復いかんにかかわっており受傷後の骨成長障害のせいではないとされており、整復固定後レントゲン正面像でBaumann's angleの健側との比較を指標に正確に評価することが大切であると思われる。

IFPOS Poster Presentations

- IFPOS Poster 1
- IFPOS Fellowship Poster
- IFPOS Fellowship Poster 2

I1-P1

Surgical Treatment of Spinal Deformity in Marfan Syndrome

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(Purpose) The purpose of this study was to evaluate the results of surgical treatment for spinal deformity in Marfan syndrome. (Method and Patient Selection) The clinical records of eighteen patients treated surgically with the diagnosis of Marfan syndrome were evaluated radiologically. (Results) The eighteen patients studied included seven males and eleven females. The average age at surgery was 13 years and average post operative follow up period was 3 years 2 months (1years ~ 17years). The common spinal curve pattern was a right thoracic curve in eight, a double right thoracic left lumbar curve in five patients. Seven patients had a thoracolumbar kyphosis. Simple posterior spinal fusion was performed in thirteen patients. Combined anterior and posterior fusion was performed in five patients. Correction of scoliosis by posterior fusion alone was from 65 degrees curve to 49 degrees at the final follow up. Correction of scoliosis by anterior and posterior fusion was from 77 degrees curve to 48 degrees. Thoracic lordosis was corrected from -12 degrees to -17 degrees by posterior fusion alone and from 6 degrees to -12 degrees by combined anterior and posterior fusion. Thoracolumbar kyphosis was deteriorated from 44 degrees curve to 54 degrees by posterior fusion alone, and was improved from 56 degrees to 20 degrees by combined anterior and posterior fusion. (Conclusion) Combined anterior and posterior fusion were necessary to achieve correction for spinal deformity in Marfan syndrome in both anterior-posterior and sagittal view.

I1-P2

Comparison of Young and Adult Rat Spine on Vertebral Deformities following Posterior Destabilizing Surgery-A Radiological and Histological Study.

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Purpose Wedging of L5 vertebral body and rounding of the upper surface of sacrum are well-documented deformities associated with spondylolytic spondylolisthesis. We demonstrated clinically that vertebral slippage occurred at the endplate, and that the deformities developed or deteriorated as the progression of the slippage before maturity. However, pathology of the endplate has not been elucidated. In this study, we developed an animal model of pediatric spondylolisthesis in rats, and examined the vertebral deformities and the histological changes of the endplate. **Methods** Five 5-wks-old Wistar rats were used. Laminectomy of L5 and bilateral facetectomy of L5/6 were undertaken. Before surgery, and one-, two- and three-weeks after surgery, lateral radiographs were taken, and percent slip of L5 and lumbar index of L6 were measured. The rats were killed and the lumbar spine was evaluated histologically. Five 24-wks-old adult rats were used as controls. **Results & Conclusion** In young rats, the slippage and deformities worsened with time, while such deformities were not observed in adult rats. Histological examination in the young rats showed that at the anterior corner of the upper L6 vertebra, which showed rounding deformities on the radiographs, the normal growth layer had disappeared. These results suggested that this model reproduced slippage and deformities observed in pediatric patients with olisthesis, and that the spinal deformity and slippage are closely related with the chronic growth plate injury due to biomechanical failure caused by pars defects.

I1-P3

Three-Dimensional Deformity of Apical Vertebra of Scoliosis Analyzed with Helical Computed Tomography

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PURPOSE: To describe three-dimensional deformity of vertebral body with scoliosis, 3D computed tomography was performed for apical vertebra of idiopathic scoliosis patients. **METHOD:** Helical computed tomography (ProSeed SA Libra, GE Yokogawa Medical System, Tokyo, Japan) was performed in three patients with idiopathic scoliosis on their apex vertebra. Acquired data was analyzed with 3D analysis software package, Advantage Workstation 3.1 (GE Yokogawa Medical System). Ten serial frontal sections were composed from posterior surface of vertebral body. The height of vertebral body (VH) was measured at convex and concave side. Axial section was also composed in the center of vertebra and the anterior-posterior length of vertebral body (VL) was measured. **RESULT:** The shortening of convex-side VH was observed in all cases. The average rate of VH(concave)/VH(convex) was 1.403 (1.202 to 1.682). The VL was significantly larger at concave side than convex ($p < 0.05$). The mean rate of VL(concave)/VL(convex) was 1.123 (1.089 to 1.153). All cases had deep vertebral scalloping and ring apophysis-disappearance at convex side. **CONCLUSION:** Three-dimensional deformity of vertebral body was clearly observed with 3D-CT. Ring apophysis-disappearance at convex side indicated growth disturbance of vertebral column at the convex side.

I1-P4

Developmental Change of Social Maturity Scale for Children with Spina Bifida

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The Purpose of this study was to assess a developmental characteristic of social maturity in children with Spina Bifida by newly devised social maturity scale (SMC), and to assess relationship between the children's disability level and social maturity scale. We send questionnaires to the participants by way of the association for the Spina Bifida in Japan. Four hundred forty children who were regularly at home participate in this study. Their age ranged from three to twelve years old, 229 people were boys and other 211 were girls. Hydrocephalus complicated in 72 percent. Locomotion status was classified by Hoffer MM, the rate of community ambulator was 63.6% and the other could not walk commonly. SMC consist of a set of one hundred thirty items covering six fields of behavior: self-help, locomotion, occupation, communication, socialization, and self-direction. The mean score for the social age (SA) and chronological age (CA) were correlated by ($SA = 0.78 * CA + 8.23$). The regression coefficient of the relationship between the SA of locomotion and the CA was the lowest of all. Social Quotient (SQ: $SA/CA * 100$) of locomotion field was 60.7 % and lowest of all six fields, SQ of other field ranged from about 90 to 100 %. SQ was high in the group of community ambulator and without complication of hydrocephalus. These results suggest that locomotion disability and complication of hydrocephalus limits the development of the social skill of children with Spina Bifida.

I1-P5

Correlation between Progression of Spinal Deformity and Pulmonary Function in Duchenne Muscular Dystrophy

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Purpose: The purpose of this study was to investigate how age at and value of the plateau of vital capacity (VC-plateau) correlate with the severity of the progression of spinal deformity in Duchenne muscular dystrophy (DMD) patients. **Methods:** Charts and radiographs of 36 DMD patients were reviewed retrospectively. Average duration of follow-up was 14.8 years. The Cobb angles of scoliosis and kyphosis were measured. Patterns of progression of spinal deformity were classified into three types according to Oda's classification. As a parameter of pulmonary function, we examined changes in forced vital capacity (FVC) and determined the value of FVC at the maximal plateau phase (VC-plateau) and the age at which it occurred. The correlation between the patterns of progression of spinal deformity and the VC-plateau was examined using a discriminant analysis. **Results:** Thirty-two (89%) of 36 patients with DMD showed spinal deformity. Out of the 32 patients, six were classified as type 1, 19 as type 2 and 7 as type 3. The average value of VC-plateau was 1821 ml and the average age at which VC-plateau occurred was 13.3 years. Rapid and severe progression of spinal deformity would be expected in DMD patients whose VC-plateau was less than 1900 ml and in those in which it occurred before the age of 14. **Conclusion:** VC-plateau may be an indicator of the severity of the progression of spinal deformity in DMD patients.

I1-P6

Eosinophilic Granuloma of the Thoracic Spine with Neural Defcit

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Eosinophilic granuloma is a benign, self limiting condition most commonly in children around the age of 10 years. Its cause is unknown. The lesion is usually solitary and can involve the whole vertebral body with massive destruction and vertebral collapse "coin lesion" but this appearance is not pathognomonic. Neurologic symptoms may develop with vertebral collapse, and may be severe. We report two cases of eosinophilic granuloma, with thoracic pain and numbness to stand up and walk. Collapse vertebral and compression of spinal cord was found. The biopsy was performed and the diagnosis of eosinophilic granuloma was confirmed histologically. We performed decompression to allow for recovery of several function accomplished by short fusion to avoid kyphosis, scoliosis, or both.

I1-P7

Result on Sofield-Miller Operation in Osteogenesis Imperfecta and the Description of a Modified Technique

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Ten patients with a total of 58 multiple osteotomies done between 1972 and 1997 at Duchess of Kent Children's Hospital in Hong Kong were reviewed. The number of osteotomies, the time to bone union and the change of width of the bone during subsequent follow-up as a ratio of a/b (where a and b is the width of the intramedullary rod and the femur respectively) were noted. The earlier operations were the classical Sofield operation. From 1995 onwards, a modified technique was used to minimize the exposure, number of osteotomies and surgical trauma to the bone. We found that the bone union time was delayed and the amount of bone narrowing was more severe if more than 2 osteotomies were performed in correcting long bone deformities in patients with osteogenesis imperfecta. Both of the above findings are statistically significant. A modified technique which could minimize the no. of osteotomies and surgical trauma to the bone is described to address the above problems.

I1-P8

Elbow Deformities in Achondroplasia

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PURPOSE : To evaluate the incidence of limited elbow motion and radiographic abnormalities in patients with achondroplasia (ACH). **METHODS :** Twenty-two ACH patients (10 were male and 12 were female) were assessed with clinical examination and lateral radiographs of the elbows. Their average age was 12 years 5 months. The lateral view, standardized to be taken at 90 degrees of elbow flexion, was evaluated in 37 elbows. The degree of limited elbow extension (LEE) was measured clinically. Radiographic examination included flexion deformity of the distal humerus (posterior bowing angle : PBA) and the presence of radial head dislocation (RHD). **RESULTS :** Limited elbow extension was present in 27 of 37 elbows (73.0%). The average LEE was 14.1 degrees. Posterior bowing of the distal humerus was seen in all elbows and the average PBA was 17.2 degrees. Posterior dislocation of the radial head was observed in 9 of 37 elbows (24.3%). The average LEE in the group of patients with RHD was significantly larger than that in the group of patients without RHD (25.6 vs. 9.8). There were no significant differences between the two groups in the average PBA (16.9 vs. 20.0). **CONCLUSION :** Lack of full elbow extension is commonly seen in patients with ACH. Posterior bowing of the distal humerus is the universal radiographic abnormality. Elbow extension is more severely disturbed in the patients with posterior dislocation of the radial head.

11-P9

Twenty Five Years of Experience in Sprengel's Deformity

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PURPOSE: The first description of the deformity was done by Eulenburg in 1862, who advised subcutaneous myotomies. Surgical treatment was advocated in 1863 by Willet and Walshan, consisting in omovertebral bone resection. In despite of this fact, four cases were presented by Sprengel in 1981, given the present name to the deformity. **METHODS:** Thirty three cases were operated on between 1965 and 1990 (13 males and 20 females), ages comprised between 2 and 43 years. Preoperative evaluation was done following Cavendish parameters and grades II to IV were selected for surgery. In all cases a modified Schrock procedure was employed. **RESULTS:** Complications described: recurrences, ectopic ossifications and neurovascular compressions. In our experience only three cases of recurrence were found (one was reoperated on). Omovertebral bone, scoliosis, spinal dysraphism, costal malformations, Klippel-Feil syndrome, facial asymmetry, torticollis, pterygium coli and other associated deformities were detected. **CONCLUSION:** The low rate of complications observed in our casuistry was due to the scapular release, not including the axillary border to preserve vascularization; and acromial base osteotomy which allowed the scapular lowering and anchorage without neurovascular compressions. In 13 cases the presence of omovertebral bone (39%) was observed, representing a higher percentage when making comparison with those of Cavendish (20%) and Jeannopoulos (30%). In cases whose Sprengel deformity was associated to Klippel-Feil syndrome, the surgical efforts were directed to improve the cosmetic appearance directed to the first pathology.

11-P10

Effectiveness of Short Leg Corrective Bracing for Severe Bowlegs

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Purpose : To identify age-related change in alignment of the lower extremities in children with bowlegs, and to evaluate the effectiveness of bracing for severe bowlegs. Methods : Serial standing X-ray films of the lower extremities were reviewed in 130 children with bowlegs (260 legs) and age-related changes in the femorotibial angle (FTA) and the metaphyseal-diaphyseal angle (MDA) were identified. Twenty cases were treated with short leg corrective braces. Remaining 110 cases were observed conservatively. Results : In physiological bowlegs, mean FTA was 191 degrees at the age of 1.5 years, which decreased to less than 180 degrees at the age of 2.5 years without bracing. In severe bowlegs, mean FTA was 199 degrees at the age of 1.5 years. FTA in severe bowlegs treated with a short leg corrective brace decreased to less than 180 degrees at the age of 3 years, while in severe bowlegs without bracing it took more 0.5 years. The MDA in severe bowlegs treated with a short leg corrective brace was smaller than that in severe bowlegs observed without bracing. Discussion : In severe bowlegs, the varus deformity around the knee was found to be corrected with a short leg corrective brace rather rapidly. In severe bowlegs without bracing, the deformity of the proximal end of the tibia was corrected less completely than that in those with bracing. Bracing was concluded to be effective on prevention of deformity progression in severe bowlegs..

11-P11

O' Donoghue's Rotation Osteotomy of the Tibia for Medial Torsion of the Lower Leg

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Purpose:The purpose of this study is to assess clinical outcome of O'Donoghue's rotation osteotomy of the tibia.

Method:The material was forty-one limbs of 29 children with medial torsion of the lower leg. There were 20 boys and nine girls (mean age, 7.9 years; range, 4 to 14 years) who were treated between 1991 and 2001. Three patients had involvement in the right side, fourteen in the left, and twelve in both. Of the 41 limbs, 12 had a combined operation: A number of Grice-Green extra-articular arthrodesis of the subtalar joint was five.

Operative technique: A rectangle of bone is removed from the anteromedial surface of the tibia. The proximal cut is extended to medial half of the bone, the distal to lateral half. Medial torsion is then corrected with putting longitudinal cuts together. The osteotomy site is fixed with soft wire or bioabsorbable screws.

Results: The mean thigh foot angle increased from -30.4 degree to +2.2 degree, that is, medial torsion of the lower leg was reduced. The mean operative time was 90.5 minutes. The mean blood loss was 20.0 ml. The mean length of skin incision was 5.8 cm. All patients obtained bone union. Complication was fracture at the level of osteotomy line in three children. **Conclusion:** O'Donoghue's rotation osteotomy has an advantage of obtaining correction simply, minimal invasion and using as bone graft.

I1-P12

Use of Ilizarov External Fixator to Treat Popliteal Pterygium Syndrome – A Case Report –

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Popliteal Pterygium syndrome is a rare autosomal dominant disorder consisting of popliteal webs and craniofacial, genitourinary and extremity anomalies. The treatment is difficult because the neurovascular bundle is often displaced into the web and only moderate success has been reported. The Ilizarov technique was used for gradual correction of the popliteal pterygium (arthrodiastasis) in addition to hamstring release at the ischial tuberosity and TAL in a child with recurrence of popliteal pterygium who had had fibrotic band excision and web plasty. Full extension of the knee joint and plantigraded ankle were achieved after 9 weeks after operation; however some regression was noted after 2 years' follow-up after the operation. We believe that the Ilizarov technique provides a good treatment option for popliteal pterygium especially in the failure case of excision of fibrous band because of neurovascular bundle displaced into the web.

11-P13

Clinical Results of Humeral Lengthening Using the Callotasis Method

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Purpose: Since the clinical indications for humeral lengthening have been limited, there are a few clinical reports of this issue. The purpose of this study is to elucidate our clinical experiences of humeral lengthening by callotasis. **Methods:** We retrospectively reviewed 21 humeral lengthenings in 11 patients who were treated between 1990 and 2000 in our hospital: 5 boys and 6 girls, aged 15(5-18) years, bilateral lengthening with 7 cases of achondroplasia, a case of hypochondroplasia and a case of pseudochondroplasia, and hemilateral lengthening with two cases of post-epiphyseal injury. Eighteen limbs were treated with Hifixator II fixator and three limbs with Wagner fixator. A corticotomy was performed at mid-shaft of humerus after radial nerve exploration. After an initial delay in elongation, gradual distraction started at the rate of 0.5-1.0 mm/day. The adequate callus formation was radiologically controlled by the distraction speed. After operation, there was no limitation for using the upper extremities in daily life. **Result:** The average length gained was 7.5(4-11) cm and the healing index was 36(17-67) days/cm. Complications were observed mainly in lengthening periods. Pin-tract superficial infections were popular, while deep soft-tissue or bone infections were rare. Although sensory disturbance with incomplete radial nerve palsy was observed in 6 cases, all cases were improved perfectly by slowing down the lengthening speed. Some pins or clamps of fixators were damaged in 4 cases. **Conclusion:** We report the satisfactory clinical experiences of 21 humeral lengthenings in 11 patients.

11-P14

Epidemiology of Epiphyseal Injuries in Paediatric Fractures

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PURPOSE: To examine the epidemiology of epiphyseal injuries in paediatric fractures and compare the data from general hospitals with the data from private clinics. **METHOD:** We examined the incidence of epiphyseal injuries at our university hospital and three affiliated general hospitals for the 5 years from 1992 to 1996 and at three private clinics for the 3 years from 1995 to 1997 in terms of sex, age, fracture site, Salter-Harris type, and etiology. **RESULTS:** The incidence of epiphyseal injuries in 1556 fractures of 1511 patients was 18.9% (281 fractures). There was no significant difference in the incidence of epiphyseal injuries between boys and girls. For both sexes, incidence was highest in 12-year-olds the age of the growth spurt. The most common site was the distal humerus and the next was the finger phalangeal. Salter-Harris type II was the most common type of fracture (60.2%). Falling was the most common cause of the injury. The incidence of epiphyseal injuries at private clinics (21.6%) was higher than that of the general hospitals (16.3%). Surgical treatments were performed for 6.4% of the epiphyseal injuries at private clinics and for 39.7% at general hospitals. **CONCLUSION:** There was no significant difference in the incidence of epiphyseal injuries compared with the data from foreign papers. The incidence of fibula distal end fractures was higher than that reported from foreign papers. This difference might occur because we always took stress X-rays for fibula distal end fractures.

I1-P15

A Comparative Study of Open Tibial Fracture and the Closed in Children

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Purpose: To investigate overgrowth and spontaneous correction of tibia in both open tibial fracture and the closed.

Summary: We studied 57 open fractures and 36 closed fractures of the tibia in 70 boys and 23 girls from 2 to 12 years of age. The follow up time ranged from 2 years to 13 years and 4 months with the mean of 4 years and 8 months. The mean period for this union was 72.8 days in open fractures and 45.1 in closed fractures. At the time of bone union, deformity of the tibia such as varus, valgus, anterior or posterior was noted as 86% in open fractures and 72% in the closed. At the time of follow up, spontaneous corrections of deformity occurred in 81% of open fracture and 80% in the closed.

Regardless of age and even in cases exceeding 10 degrees, anterior or posterior deformity showed relatively good correction. In 69% of open fracture and in 43% of the closed, overgrowth of the tibia occurred. This study indicates that tibial overgrowth occurs particularly in infancy or early childhood.

Conclusion: Overgrowth of tibia occurred higher in open fracture than the closed. Anterior and posterior deformity showed relatively good correction.

I1-P16

Orthopaedic Selective Spasticity-Control Surgery for Control of Spasticity in Cerebral Palsy

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Purpose: To describe orthopaedic selective spasticity-control surgery in cerebral palsy. **Treatment concept and methods:** Orthopaedic selective spasticity-control surgery is an approach to control spasticity and athetosis in cerebral palsy. The working concept is that multiarticular muscles are less antigravity, and spasticity of these muscles can be selectively reduced by releasing these muscles. Body stability can be secured, by preserving monoarticular muscles with antigravity stability. **Patients:** Between 1982 and 1998, 1568 operations were done on 527 patients, and 1244 could be monitored for at least 2 years. The mean age at the time of surgery was 12 years. The operations conducted were; 25 for cervical involuntary movement, 23 for scoliosis, 21 for shoulder retraction, 27 for elbow rigidity, 68 for forearm pronation, 66 for wrist flexion, 66 for fingers flexion, 66 for thumb deformity, 319 for foot deformity, 191 for knee deformity, and 372 for hip deformities and dislocation. **Results:** Spasticity in each part of the body could be adequately controlled, and deformities corrected. Voluntary movement was facilitated in 62 of the 66 hands. Involuntary neck movement and radiculomyelopathy was reduced in all patients. The functions such as crawling and ga it and ADL activities improved in almost all patients. On 27, further surgery was needed because of recurrence. **Discussion:** Selection of the muscle to be released, choice of the releasing method (intramuscular or sliding), site of release (proximal or distal) and extent of release are important in decision making.

I1-P17

Gait Analysis of Toe-in Gait Children with and without Inner Wedge Insole to Prevent Easily Falling Down

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(Purpose) To gait analysis of toe-in gait children who fall down easily and to investigate to the effect of inner wedge insole with 5 mm height on toe-in gait(Methods) Seven children with toe-in gait caused to easily falling down were analysed. They were all male. Average age putting on the insole was 4.8 years. The averaged period using the insole was 6.3 months. We defined the improvement when children or their mother told us children walked easily, ran faster, or were willing to put on the insole. Gait analysis were performed by ""Anima Video Locus"" three dimensional gait analysis system. We compared changes of stick figures of shoulder, hip, knee, ankle, and forefoot with and without the insole. (Results) Five cases were effective, two cases were not effective. Effects were smaller on elder children who had more internal rotated lower extremities than younger children. All children decreased three dimensional irregular motion of the knee joint, ankle joint and forefoot during gait with the insole. (Conclusion) The inner wedge insole with 5 mm height was effective on decreasing falling down episode because the insole restricted internal rotation of forefoot and lead to their leg parallel to the going direction.

11-P18

Proposed New Grading of Findings by Axial Magnetic Resonance Imaging of Dislocated Hips in Patients with Spastic Diplegia

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The scheduling of early soft-tissue surgery to prevent spastic hip dislocation has been based on X-ray films. However, the abundant articular cartilage in children obscures the findings. Purpose: The purpose of this study was to evaluate the progress of inadaptation of the hip in patients with spastic diplegic cerebral palsy by magnetic resonance imaging (MRI). Methods: Thirty-six hips in 18 children (mean age, 4 years; range, 3 to 7 years) were examined by MRI before surgical treatment. Axial images of the hip were graded for concentric adaptation grade 1, normal; grade 2, mild lateralization, in which the femoral head has shifted laterally and the acetabulum is intact; grade 3, severe lateralization, in which the femoral head has shifted laterally and the posterior rim of the acetabulum is changed to a wedge shape of low intensity; grade 4, subluxation, in which the femoral head is subluxate posterolaterally and the posterior rim of the acetabulum is deformed, compressing such as a double floor; grade 5, dislocation. Results: Of the 36 hips, four were of grade 1, 21 were grade 2, six were grade 3, and five were grade 4. The MRI findings for the posterior rim of the acetabulum suggested a reaction to dislocative force. Conclusion: From the point of view of prevention dislocation, grade 3 seems to be critical point before subluxation, so that soft-tissue surgery should be done before this grade is reached.

I1-P19

Outcome Prediction in Legg-Calve-Perthes Disease Using Magnetic Resonance Image

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PURPOSE : To evaluate the usefulness of magnetic resonance imaging (MRI) for predicting the prognosis in Legg-Calve'-Perthes disease. **METHOD :** Thirty patients with unilateral Perthes' disease treated by abduction brace and A-cast were examined retrospectively. The mean age at onset was 7.5 years (range, 5 to 11 years). Mean time between onset and primary healing was 21.7 months (range, 15 to 32 months). Hips were classified by Catterall's classification as type II (one hip), III (twenty seven hips), and VI (two hips). Femoral head deformity at primary healing was radiographically evaluated using Mose's classification and acetabular head index. Patients were divided into 3 groups; good, fair, poor, based on radiographical outcome at primary healing. On MRI scans obtained between 6 and 10 months after onset, the following three parameters were obtained to calculate the total MRI score: the hypertrophy of the medial and lateral cartilage, and the physeal curvature of the femoral head. **RESULTS :** MRI score showed significant increases among the three groups ($P < 0.05$). Among patients whose MRI score was 7 or greater, fourteen of the fifteen patients with scores of at least 7 points had poor or fair results as seen on plain radiography. Twelve of the fifteen patients with scores of 6 points or less had good radiological results. **CONCLUSION :** The MRI scores indicated possible occurrence of femoral head deformation. Treatment method should be considered carefully when the MRI score is high.

11-P20

An Almost Percutaneous Triple Pelvic Osteotomy to Obtain Femoral Head Coverage in Children 6-14 Years of Age

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Purpose: To describe a simple method for performing pelvic osteotomies in children that will obtain appropriate femoral head coverage. **Method:** The necessary femoral head coverage was preoperatively predicted by assessing the acetabular, Wiberg, and Lequesne angles, and by 3D CAT scan evaluations of each hip. Postoperative results were evaluated in a similar manner and compared with the preoperative findings. An "almost" percutaneous triple pelvic osteotomy was performed using an adductor incision and a transverse incision. **Results:** In spite of the theoretical restrictions in this age group to acetabular movement, i.e. rigid triradiate cartilage, stiff symphysis pubis and rigid sacrospinous and sacrotuberous ligaments, adequate coverage of the femoral head was attainable with the described technique. **Conclusion:** If a pelvic osteotomy is being considered to better stabilize a child's hip due to a condition such as Legg-Calve-Perthes disease, hip dysplasia, a deformed femoral neck secondary to slipped capital femoral epiphysis or femoral head necrosis, the "almost" percutaneous triple osteotomy has a decided advantage over other well described pelvic osteotomies since it is simpler to perform and sufficiently covers the femoral head.

I1-P21

Surgical Treatment of Benign Bone Tumors and Tumor-like Lesions in Long Bones Using Artificial Bone Substitutes in Children and Adolescent

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PURPOSE: To investigate the long-term results of surgical treatment of benign bone tumors and tumor-like lesions using artificial bone substitutes (ABS) in children and adolescent. **METHOD:** Twelve young patients (seven males and five females) before closure of epiphyseal plates, who underwent implantation with ABS [hydroxyapatite (HAP) in 11 cases, and apatite-wollastonite containing glass ceramics (AWGC) in 1 case] following curettage of benign bone tumors or tumor-like lesions in long bones were examined. The mean age at the time of operation was 12.7 years and the average follow-up period was 68.9 months. Postoperative assessments were made from clinical and radiological findings. **RESULTS:** Clinical symptoms observed before surgery, such as pain (9 cases) and restriction of range of motion (4 cases) disappeared in all cases. Recurrence of the lesion was seen in two cases (fibrous dysplasia, solitary bone cyst). A radiolucent line around the ABS, which was observed in the immediate postoperative radiographs, began to disappear within one or two months in all cases. The longitudinal bone growth was not disturbed compared with the contralateral bone, except in two cases with preoperative pathological fractures. No cases showed disturbance of transverse bone growth or cortical thinning close to the ABS. **CONCLUSION:** Implantation of ABS following curettage of benign tumors and tumor-like lesions was a safe and useful method in children as well as in adults.

IF-P1

Correlation of Synovitis with Range of Motion in Perthes Disease

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PURPOSE: To study the correlation of synovitis with the range of motion in Perthes disease and to evaluate the prognostic impact of the findings on the eventual outcome in Perthes disease. **MATERIAL AND METHOD:** 60 hips in 52 patients of Perthes disease were evaluated pre-treatment and 38 hips in 32 patients were evaluated post-containment procedures after 6 months for detection of synovitis on MRI and the range of motion. The range of motion on the final follow-up was noted. The findings were correlated and analyzed. **RESULTS:** The range of motion in Perthes disease is directly influenced by grade of synovitis. The reduction in synovitis was attained after the containment procedures with increase in the range of motion, which was maintained throughout the follow - up leading to better functional hip joint. **DISCUSSION:** Synovitis in Perthes disease is directly related to the cartilage degeneration. Synovitis and the degenerated cartilage gives rise to a vicious cycle leading to deformation of femoral head and less function in hip with less congruity and containment. The containment procedures will enhance the healing and the moulding effect of acetabulum. The lesser stretch over the capsule leads to decrease in pain and this effect will give rise to increased range of motion. **CONCLUSION:** Synovitis is the factor influencing the range of motion and the eventual functional outcome in Perthes disease. Treatment of Synovitis at the early stage may hold the key to the treatment of the Perthes disease.

IF-P2

Plasty with Flap on the Base of the Latissimus Dorsi in Lost Function of the Flexor Digitorum

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PURPOSE: Multiple involvements of the forearm tissues requires a special surgical rehabilitation. **METHOD:** 18 children with congenital and acquired deformations were treated using transplantation of the latissimus dorsi to restore function of the digital flexors. Deformations were characterized by the death of the muscles, tendons, skin and bones (in some cases). Covering function of the flap was provided by the dermo-fascial part. In restoration of the motor function of the flexors digitorum we used two-stage method. First of all, after reinnervation of the thoracodorsal nerve we obtained active contractures of the graft muscle. Second step was the connection of the distal part of the graft muscle to the remaining distal ends of the tendons of deep flexors of the 2-5 digits. Kinematic function of the digits was restored by the additionally done tendinous plasty of the thumb. Supportive function of the thoracodorsal flap was obtained by the including of fragments of VIII-IX ribs into the graft. Anatomic investigations (on cadavers with body mass from 1000 to 2500 g) of the thoracodorsal flap showed the possibility of application of plasty by such flap in children of perinatal age. **RESULTS:** Many functions of the thoracodorsal flap allows to obtain several aims by one stage. **CONCLUSION:** Thoracodorsal flap is very usefull and effective in treatment of multiple deformities and may be used even in very young children.

IF-P3

Bone and Joint Tuberculosis in Childhood the Permanent Problem in Yugoslavia

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PURPOSE: To stress the permanent problem of bone and joint children tuberculosis in Yugoslavia.

METHOD: Twenty eight patients with verified skeletal tuberculosis of lower extremities are included in our investigation, eighteen of them were treated by antituberculotics combined with surgical elimination of infective focus, and the other ten patients were treated by antituberculotics and immobilization.

RESULTS: Seventeen patients (60.7%) had hip localisation of infection, four patients (14.3%) had knee localisation, four patients (14.3%) had tuberculosis of the talus, and three patients (10.7%) of the ischial bone.

CONCLUSION: Statistical analysis showed that the treatment in the first group had been more effective and with better results. Only patients from the second group were operated by reconstructive procedures.

IF-P4

Comparison between Closed Reduction with Percutaneous Pinning and Open Reduction with Pinning in Children with Closed Totally Displaced Supracondylar Humeral Fractures : Randomized Controlled Trial

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PURPOSE: To compare the effectiveness of 2 operations between closed reduction and pinning (group A) and open reduction and pinning (group B)

METHOD: The prospective randomized controlled trial of 28 children aged 1-12 years with closed totally displaced supracondylar humeral fracture. Both treatment consisted of 14 children.

RESULTS: The general characteristics in both groups were statistically the same in age, sex, side, displacement and nerve injury preoperatively ($P > 0.05$). All cases healed in good alignment without cubitus varus, and good range of motion without infection. The mean \pm SD of the Baumann's angle difference between injured and uninjured side were $2.32 \pm 1.6^\circ$ in group A and $2.45 \pm 1.8^\circ$ in group B without statistical significant difference.

By Flynn criteria, group A had 100% good and excellent result and group B had good and excellent result in 93% and fair 7% with out statistical significant difference ($p = 1$). The satisfaction score (0-10) was higher significantly in group A in both parents and blind evaluator's perspective ($P = 0.017, 0.019$ respectively).

CONCLUSION: Both treatments gave the good result. The closed reduction should be performed first and if it fails then open reduction can be done. This will also end with good results by experienced surgeons.

I2-P1

Irradiation of the Extracorporeal Shock Wave Causes Acetabular Augmentation in Rabbits

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Purpose : We conducted this study to verify whether bone formation is induced by irradiation of extracorporeal shock waves on acetabular roof, and our final goal is to actualize the nonoperative acetabuloplasty for the treatment of acetabular dysplasia. **Methods :** Eight male New Zealand White rabbits aged 9 weeks were used. Piezolith 2300™ was used to produce extracorporeal shock waves. Shock waves were irradiated on the right acetabular roof from outside. The strength and the number of the shock wave were set to be 100 MPa and 5000 times respectively. Each 4 animals of the 8 animals were grouped into Group I and II. The animals were monitored for 4 weeks in group I, and for 8 weeks in group II. After the monitoring period, the pelvises were cut into 1 mm serial coronal sections. In the contact microradiographs of these sections, the breadth of the acetabular roof was measured and the laterality was examined. Statistical analysis was conducted by Student's paired t-test. **Results :** On the contact microradiographs of the acetabular roof 4 weeks after irradiation, woven bone formation was shown on the lateral margin of the acetabular roof in exposed side and the breadth of the acetabular roof in exposed side was significantly increased. Eight weeks after irradiation, augmentation of the acetabular roof was clearly observed in exposed side and the breadth of the acetabular roof was significantly increased. **Conclusion :** Irradiation of the extracorporeal shock wave induced acetabular augmentation.

I2-P2

Soft Tissue Interposition After Closed Reduction in Developmental Dislocation of the Hip-the Long-Term Effect on Acetabular Development and Avascular Necrosis

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PURPOSE: The aim of this study is to investigate whether soft tissue interposition and changes of them after closed reduction effected radiological results at the age of full skeletal maturity. **METHODS:** We used overhead traction (OHT) to treat 312 hips of severe DDH from 1964 to 1982. Two hundred seventy three hips were satisfactorily reduced and arthrograms were performed immediately after reduction. In this study we assessed 133 hips (98 patients) which had been followed to full skeletal maturity (over 14 years of age). There were 8 boys and 90 girls with a mean age at the time of the reduction of 12 months. The mean age at the time of the final follow-up examination was 18 years, 3 months. **RESULTS:** Arthrographic factors (not only shape of limbus but thickness of soft tissue interpositions at acetabular floor) at the time of reduction have not been related to final radiological results and incidence of avascular necrosis. Even if marked soft tissue interpositions were found at the initial arthrogram, spontaneous disappearance of these interpositions was noted in 71% up to the age of five years. Secondary surgery was needed in some hips in this disappearance group but the results at skeletal maturity were not different from those hips of the group with no interpositions at the initial arthrogram. **CONCLUSION:** We suggest the indications for open reduction should not be based solely on the arthrographic findings at the time of closed reduction.

I2-P3

Evaluation of the Developmental Dysplasia of the Hip – Severin Combined with Kalamchi Classification –

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PURPOSE: It is often difficult to evaluate the developmental dysplasia of the hip (DDH) with femoral head deformity by Severin classification alone. The purpose of this study is clarifying the possibility of exact evaluation by Severin classification combined with Kalamchi classification. **METHOD:** We studied 100 hips in 91 children followed more than 5 years after reduction. We used Severin classification for the evaluation at final follow-up. We also used Kalamchi classification, and surveyed the distribution in each Severin group. **RESULTS:** According to Severin classification, 33 hips were graded in Severin I, 33 hips in Severin II, 26 hips in Severin III, and 7 hips in Severin IV. In Severin I group, all hips were graded in Kalamchi I. In Severin II group, 16 hips were graded in Kalamchi I, 15 hips in Kalamchi II, and 2 hips in Kalamchi III. In Severin III group, 10 hips were graded in Kalamchi I, 8 hips in Kalamchi II, 7 hips in Kalamchi III, and 1 hip in Kalamchi IV. In Severin IV group, 1 hip was graded in Kalamchi I, 1 in Kalamchi II, and 5 in Kalamchi IV. The group numbers of Severin and Kalamchi were almost correlated (chi-square test, $p < 0.0001$). However, some cases have poor correlation especially in Kalamchi II and III. **CONCLUSION:** Kalamchi classification may contribute to evaluating the treatment result of DDH by Severin classification, though it needs the more investigation of other factors.

I2-P4

Long-Term Results of Salter Innominate Osteotomy for Residual Subluxation After Congenital Dislocation of the Hip

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To assess the efficiency of Salter innominate osteotomy for residual subluxation after congenital dislocation of the hip, the long-term results were examined for 45 patients (50 hips), 41 girls and 4 boys, over 18 years old at the final visit to our clinic. The mean age at the time of the operation was 4.5 years old. Compared with the measurements of the normal hips, the acetabular angle of the surgically treated hips was increased by a mean of 9.8 degrees, the center-edge angle was decreased by a mean of 10.3 degrees, and the Sharp angle at the final follow-up was almost same between normal and surgically treated hips. For the final evaluation, Severin classification was used. The results showed 23 hips to be in group1, 12 hips to be in group2, and 8 hips to be in group 3 ; 7 hips treated by a revised operation (4 derotational varus osteotomies, 3 acetabuloplasties) after Salter innominate osteotomy were excluded from this evaluation. 35 hips (70%) were excellent or good (Severin group1 and 2) radiographically. In 10 of 15 hips (Severin group3 and revised operation group) with poor results, there were preoperative epiphyseal deformities or eccentric reduction in the femoral head. We concluded that, if there is no epiphyseal deformity and there is concentric reduction in the femoral head preoperatively, results of Salter innominate osteotomy should be good. *

I2-P5

Reduction of DDH by Flexion-Abduction Continuous Traction

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Purpose: To describe the method of reduction of DDH which enables high rate of successful reduction without avascular necrosis. **Method:** It consists of five steps. First step: Skin traction with the hips in 15 degrees of abduction and 30 degrees of flexion. Second step: Skin traction with the hips in 110 degrees of flexion and in 70 degrees of abduction until the femoral head can easily be placed in front of the acetabulum by pushing up the greater trochanter. Third step: Placing the femoral head opposite the acetabulum under the control of ultrasonography, followed by gradual entry of the head by reducing the traction weight. Forth step: Immobilization of the hip joint with the plaster of Paris. Fifth step: Active movement under the application of the Pavlik harness. The movement of the head is always controlled by the weight of traction and kept under strict observation on ultrasonogram. **Results:** We treated 53 complete dislocated hips in 52 patients (6 boys and 46 girls). All hips but one were reduced and there were no hips which had avascular necrosis. **Conclusion:** The principle of this method is to minimize the pressure on the femoral head by means of gradual entry of the femoral head into the acetabulum. The cause of femoral head necrosis is pressure on the femoral head during reduction process.

I2-P6

A Modified Colonna Capsular Arthroplasty for Old Unreduced DDH in Late Childhood and Adolescence

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Sixteen patients who underwent 18 modified Colonna capsular arthroplasty for old unreduced DDH between 1984 and 1992 were recalled and critically reviewed. The average age at operation was 11.5 years (range, 8.1 to 14.5 years). All of the patients had pain or discomfort of the hip and limp. Femoral shortening was combined in all patients, and 13 hips required concurrent pelvic osteotomy (Chiari osteotomy in 5 hips, Salter osteotomy in 1 and Steel osteotomy in 2) or slotted shelf augmentation in 5. At 8 years 9 months follow-up, 9 hips showed excellent, 5 good and 4 fair results according to the modified Harris hip score and IOWA hip score. All patients except one were satisfied with the outcome in terms of regaining hip stability and decrease in pain or discomfort and limp. The size and sphericity of the femoral head improved in 12 hips. The sphericity of femoral head did not change in two hips, and worsened in 4 hips due to ischemic necrosis or osteoarthritis. Complications included undisplaced femoral neck fracture during physiotherapy in 2, ischemic necrosis in 2, heterotopic ossification in 2, acetabular protrusion in 3 hips, and residual subluxation requiring additional pelvic surgery in 2 hips. In conclusion, we believe that modified Colonna capsular arthroplasty with femoral shortening is valid, if properly done, in the reconstruction of painful hip with old unreduced DDH in late childhood and adolescence.

I2-P7

A Study of the Physiological Hip Joint Instability by Ultrasonography

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(Introduction) Since November, 1997 we have been adding traction to examine the difference of the β angle and the appearance of micro bubbles during routine neonatal and infant hip joint inspection. We report of the changes in $\Delta\beta$ angle according to weekly age. (Materials and Methods) We reviewed 354 hips in 177 cases. Examination was performed according to Graf's method. Further, we selected 481 hips of normal type. These hips had traction (max.2kg) and $\Delta\beta$ angle was measured. The $\Delta\beta$ angle in each week age was compared, correspondingly. (Results) The mean value of the $\Delta\beta$ angle was 2.4 degrees in under 4 weeks, 5.0~ 6.0 degrees in over 5 weeks to 7 weeks, 7.8 degrees in over 7 weeks to 8 weeks, 7.1 degrees in over 8 weeks to 9 weeks, 6.0 degrees in 9 weeks 10 weeks, 6.8 degrees in over 10 weeks to 11 weeks, 5.5 degrees in over 11 weeks to 12 weeks, 6.1 degrees in over 12 weeks to 16 weeks, about 6.5 degrees in over 16 weeks to 24 weeks, and more than 8.0 degrees in over 24 weeks, respectively. (Conclusion) This study shows that the $\Delta\beta$ angle is small at neonatal stage, becomes larger at postnatal 7 weeks. We consider from these findings that the physiological hip joint becomes most unstable at postnatal 7 weeks and at that stage exerts some influence on the immature hip.

I2-P9

Treatment of Legg-Calve-Perthes Disease by Salter Innominate Osteotomy. Review of 37 Hips at Skeletal Maturity

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PURPOSE: A retrospective study of the results of 37 hips treated by Salter osteotomy for Legg-Calve-Perthes disease followed to skeletal maturity.

METHODS: Twenty four patients were male and 8 female. Nineteen patients were under 7 years (84 months) aged. Femoral head involvement was evaluated according to the classifications of **SALTER & THOMPSON** and **CATTERALL**. The arthrographic classification by **LAREDO** applied for 34 hips showed 19 as group III, 11 as IV and 4 as V. The mean follow-up was 115.94 months and the results were analyzed after complete re-ossification of the proximal femoral epiphysis and after closure of the physes of the hip, using the criteria of **Mose** and **Stulberg**.

RESULTS: The final radiographic evaluation according to **MOSE** showed 16 hips classified as good and 21 as poor. Considering the criteria of **STULBERG** et al. for the final evolution there were 11 hips included in class I, 5 in class II, 13 in class III and 6 in class IV.

CONCLUSION: Patients aged under 7 years showed better results. There was no significant difference between the results at first (re-ossification) and final evaluation (closing physis). There was a significant correlation between **Laredo** group III and results graded as good (**Mose**) and classes I and II (**Stulberg**).

I2-P10

Which is Better Treatment for Perthes Disease, Femoral Varus Osteotomy or Salter Innominate Osteotomy? – Comparison of Results at Bone Maturity –

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The fundamental principle in the management of Perthes disease is containment of the femoral head in the acetabulum. At present, first-line surgical methods used are femoral varus osteotomy (FVO) and Salter innominate osteotomy (SIO). The purpose of this study was to compare the results of both at bone maturity. We clinically and radiographically assessed 72 cases involved with unilateral Perthes disease that had been followed to full skeletal maturity, 46 FVO operated cases and 26 SIO operated cases. Mean age of patients at operation was 8.1 years in the FVO group and 8.7 years in the SIO group. Mean age at the final examination was 18.2 years and 17.2 years, respectively. Clinical results were almost the same in the two groups except for the scar of the wound after operation; after FVO it was very prominent, whereas after SIO it was not. According to the Stulberg classification, 28 (61%) patients had good results (class 1 or 2) in the FVO group and 17 (65%) in the SIO group. There was no significant difference in the sphericity of the femoral head between the two groups. However, the coverage of the femoral head by the acetabulum, neck-shaft angle, and the articular-trochanteric distance were closer to normal in the SIO group. Salter innominate osteotomy seemed to be the better procedure to prevent poor acetabular coverage, coxa vara, and trochanteric prominence.

I2-P11

Arthrodiastasis for Treatment of Perthes Disease

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We studied nine patients with a diagnosis of perthes disease based on the concept of arthrodiastasis. Arthrodiastasis or articulated distraction of the hip combines off-loading of muscles and body forces with distraction of the joint space by means of external fixator, which crosses the hip joint. Sagittal plane hip movement is encouraged by the addition of a hinge. Restoration of the joint function can occur particularly in the younger patients even the radiological improvement is not always seen.

12-P12

Osteochondritis Dissecans in Legg – Calve-Perthes' Disease – Twenty Years Follow Up of 7 Cases

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PURPOSE: Catterall(1982) found only published cases of osteochondritis dissecans after Lee-Calve-Perthes' disease. We report 7 cases of osteochondritis dissecans with a mean follow up of 20 years in a series of 363 Legg-Calve-Perthes' disease hips.

METHODS: Among 337 children (363 hips) with Legg-Calve-Perthes' disease, diagnosed at our hospital, seven hips (2 percent) had osteochondritis dissecans; one was Salter Group A (Catterall Groups I-II; Salter 1984) and six were Salter Group B (Catterall Group III-IV). All seven patients were boys. The mean age at the time of diagnosis was 10 years for Legg-Calve-Perthes' disease and 14 years for osteochondritis dissecans, with a mean follow-up of 20 years.

RESULTS: Treatment for Legg-Calve-Perthes' disease in these 7 boys was an abduction brace in 4, femoral osteotomy in 1, and no treatment in 2. There were no subjective symptoms related to the osteochondritis except one case, who complained of intermittent pain and a limp. He was operated on with drilling and bone grafting, but there was a strong suspicion that his symptoms were due to the deformed femoral head. Radiographically, the osteochondritis fragment disappeared in 6 of the cases. In one case the fragment was displaced and fixed in the acetabular fossa.

CONCLUSION: We conservative treatment was enough for treating osteochondritis dissecans in Perthes diseases.

I2-P13

Evaluation of Legg-Calve-Perthes Disease by Two Different Planes of Magnetic Resonance Imaging

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PURPOSE: To assess femoral head deformity and the congruity of the hip in Legg-Calve-Perthes disease three-dimensionally, we evaluated the effectiveness of two different planes of magnetic resonance imaging (MRI). **METHODS:** We evaluated MRI in 7 unilateral cases with Legg-Calve-Perthes disease. The age at onset was 2 to 8 years of age. All cases were initially treated conservatively and one case underwent surgery later. Using the coronal plane and sagittal plane of MRI, deformity of the femoral head was evaluated with T1 weighed imaging and the congruity of the hip was evaluated with T2 weighed imaging. **RESULTS:** Deformities of the femoral head were recognized in all cases in the coronal plane, and in 2 cases clearly and in 3 cases mildly in the sagittal plane. Congruity of the hip was recognized as good in 2 cases, fair in 2 cases and poor in 3 cases in the coronal plane, whereas it was recognized as good in 3 cases, fair in 3 cases and poor in 1 case in the sagittal plane. A case classified as Catterall's group 4 and with poor congruity of the hip in both planes required surgical treatment after which congruity improved. **CONCLUSION:** Deformity of the femoral head and the congruity of the hip can be recognized clearly by evaluating coronal plane and sagittal plane of MRI. MRI is especially useful in detecting the sagittal congruity of the extended hip which resembles the congruity in standing position.

I2-P14

A Modified Innominate Osteotomy in Perthes' Disease

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PURPOSE: The purpose study of this study was to evaluate the results of our modification of Salter innominate osteotomy in Perthes' disease.

METHODS: The operation was performed in 16 hips of 15 Perthes' patients; 11 boys and 4 girls. Posterior half of supraacetabular ilium was cut by Gigli saw using a conventional method. The anterior half was osteotomized by reciprocal saw with a direction of 45 degrees obliquely on the coronal plane and 30 to 40 degrees posteroinferiorly on the sagittal plane. Stable interposition of the bone block could be achieved between the osteotomy site.

RESULTS: Bone union occurred in all cases within 4 months without displacement of the osteotomy. The mean center edge angle improved from a mean 19 degrees (17-22 degrees) preoperatively to 29 degrees (22-43 degrees). The average epiphyseal extrusion improved from 24,3 percent (5-50 percent) to 9.5 percent (0-22 percent).

CONCLUSION: Our modified Salter osteotomy provided much better stability just by changing the direction of osteotomy.

I2-P15

The Effect of Botulinus Toxin Type a in the Treatment of Adductor Contractur in Perthes' Disease

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Purpose: The effectiveness of intramuscularly injected Botulinus toxin A (BTX-A) on improvement of hip motion in patients with perthes' disease was tested. **Method:** BTX-A was administered to 6 patients. All these patients clinically had an adductor contracture. Radiologically 5 hips showed lateralisation of the femoral head, but none of the hips demonstrated hinge abduction. BTX-A was injected into the adductor muscles. Afterwards physiotherapy was performed. Follow-up with examination of the hip mobility was done one and every 4th week up to the 16th week after the BTX-A injection. **Results:** One week after the Botox injection there was a significant increase in abduction ($p < 0,05$) and extension ($p < 0,05$). The average increase was 24 degrees in abduction as well as in extension. With an average improvement of 8 degrees internal rotation showed no significant increase ($p = 0,099$). We found similar values 4, 8 and 12 weeks after the BTX-A injection. After 16 weeks there was some decrease in abduction and extension. The mean abduction was 29 degrees and the mean extension-21 degrees. The average internal rotation remained constant. **Conclusion:** In Perthes' disease with radiologically absent hinge abduction injection of BTX-A into the adductor muscles produces a significant improvement of hip motion, particularly of abduction and extension, resulting in a better containment of the femoral head within the acetabulum. Because of the relatively short duration of the effect of BTX-A repeated injection has to be considered.

I2-P16

Transient Osteopenia of the Hip in Children

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<Purpose> The main complaint of transient osteopenia of the hip in children reported by Nicol in 1984 is pain in the vicinity of the hip joint, and it is a disease with a specific limp in which affected legs are fixed in an abduction-internal rotation position. It is generally known that bone atrophy seen by simple X-ray is transient and it heals along with the symptoms. The present report deals with experience and issues surrounding this disease.<Methods and Results>Subjects were five boys and four girls with an onset age ranging from four to nine years-old (average 6.3 years old). All patients complained of pains of the hip joint, and displayed a specific limp with abduction-internal rotation positioning. It was found based on the results of image diagnosis that; even though there were differences in the degree, X-ray confirmed bone atrophy in all patients. Bone scintigraphy found mild accumulation; and MRI detected mild retention of synovial fluid in some patients, and clear changes in signal area at the attachment site of the abductor muscle in others. In all patients, pains and limp spontaneously recovered and bone atrophy diagnosed by X-ray improved.<Conclusion>The results of the present study showed that there were differences between transient osteopenia in children and adult transient osteoporosis, thus suggested that the pathology of the two diseases are different, not just due to the difference in age.

I2-P17

Middle-Term Results of the Surgical Treatment of Slipped Capital Femoral Epiphysis

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PURPOSE: To evaluate the middle-term results of the treatment of slipped capital femoral epiphysis, both in-situ pinning and transtrochanteric osteotomy.

METHOD: We reviewed 60 hips in 51 patients treated between 1978 and 1999; 23 were treated with in-situ pinning, and 37 were treated with transtrochanteric osteotomy. In-situ pinning was indicated when the slip was unstable or stable with slip angle of less than 20° . Transtrochanteric osteotomy was indicated when the slip was stable and slip angle was more than 20° . There were 11 female and 40 male patients with a mean age at operation of 13 years (8 to 21 years) and a mean follow-up of 5 years (0.3 to 14.2 years).

RESULT: Avascular necrosis developed in two hips (9%) with in-situ pinning, and in one hip (3%) with transtrochanteric osteotomy. In addition, chondrolysis developed in one hip (3%), and degenerative changes developed in three hips (8%) after transtrochanteric osteotomy. At final follow-up, the mean hip score of Japanese Orthopaedic Association was 96 points for the in-situ pinning group, and 88 points for the transtrochanteric osteotomy group.

CONCLUSION: Transtrochanteric osteotomy generally provided good middle-term functional result and long delay of degenerative arthritis with low risk of complications. However, it must be emphasized that early diagnosis and treatment is very important to prevent progress of slipping because severely slipped hips showed less satisfactory results.

I2-P18

**Femoral Retroversion and Associated Lower Limb Anomalies
: A Preliminary Study**

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PURPOSE: This preliminary study was undertaken to describe significantly decreased proximal femoral anteversion (relative retroversion) associated with other lower limb anomalies in otherwise healthy children and adolescents. **METHOD:** 35 patients were included in the study (aged 3 to 15 years). They were initially evaluated clinically for gait and hip range of motion. Patients were selected based on their presenting complaint: either out toeing gait or progressively increasing genu valgum. If either or both clinical criteria were present, they were further evaluated with AP hip radiographs and CT scan determination of proximal femoral anteversion comparing the neck/head axis to the bicondylar plane. **RESULTS:** CT scanning in these patients revealed decreased femoral anteversion when compared to normal values for their age ranging from - 8 degrees to + 10 degrees. Out toeing gait was the major presenting complaint in patients older than 5 years. Progressively increasing genu valgum based either on parental opinion or objective clinical analysis was the major complaint in children under 5 years of age and over 8 years of age. Two patients had relative retroversion associated with chronic SCFE. 5 patients required surgical correction by femoral rotational osteotomy to correct major retroversion with good results. **CONCLUSION:** Relative retroversion of the proximal femur has been rarely studied as opposed to increased anteversion. Retroversion can be associated with other lower limb anomalies which may seem to evolve independently but are in fact related to the orientation of the proximal femur.

I2-P19

**Continuous Intrathecal Baclofen for Severe Spasticity in Cerebral Palsy
: Preliminary Results at Minimum 1 Year of a Prospective Study**

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PURPOSE: To describe the results of intrathecal Baclofen in severe quadriparetic cerebral palsy.

METHOD: In a prospective study ten patients, who are totally dependent on caretakers for activities of daily living, were given continuous intrathecal Baclofen, after testing the effect of the drug using a double-blind procedure. Evaluation at 3-month intervals was done using the modified Ashworth scale, spasm scale, range of motion, reflexes, cross motor function measure, Canadian occupational performance measure and video. The subjective evaluation of the caretakers and the children themselves was noted, as were the complications encountered.

RESULTS: Functional improvements were noted in most cases. Subjective evaluation of the children and their caretakers was positive and patient comfort was significantly increased. A transient cerebrospinal fluid leak was the most frequent complication.

CONCLUSION: Despite the inherent risks, continuous intrathecal Baclofen infusion is an effective treatment for severe supraspinal spasticity.

I2-P20

Ultrasonographic Evaluation of the Hip Joint in Cerebral Palsy

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PURPOSE: Dislocation of the hip joint in children with cerebral palsy results from several factors, such as muscle imbalance. Above all, we think hamstring muscles have important role. The purpose of this study is to evaluate the effect of hamstrings tightness to the hip joint by ultrasonography. **METHOD:** Fifty-eight hip joints were examined in 29 patients ranging in age 2.5 to 12 years (mean age, 5.4 years). There were 18 cases of spastic type and one case of athetotic type . All of them were underwent hamstrings release surgery and ultrasonographic examination at pre- and postoperatively. The scan were based on Graf's method, with the patients in lateral position and both hip and knee flexed 90 degree, and then knee was stretched from initial position to fully extended position. The distance from lateral border of femoral head to that of pelvic bone were measured at initial and final position. **RESULTS:** There were 17 hip joints (45%) that had dynamic lateral shift of femoral head preoperatively. In these patients, the degree of dynamic lateral shift reduced significantly in postoperative examination, and there were not significant correlation between the degree of dynamic lateral shift and age, popliteal angle, nor acetabular head index. **CONCLUSION:** There are some patients with dynamic lateralization of the femoral head due to hamstrings tightness, and ultrasonographic examination is useful in detecting dynamic lateral shift of the hip joint.

I2-P21

Evoked EMG in Prevention of Sciatic Nerve Traction Injury During Hamstring Tendons Lengthening

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PURPOSE : To investigate the efficiency of intraoperative evoked EMG in preventing sciatic nerve traction injury during hamstring tendons lengthening. **METHOD :** Ten children with spastic cerebral palsy underwent distal hamstring lengthening. The average popliteal angle before surgery was 80°. The tendons of the semitendinosus and gracilis were elongated by z-plasty and the tendons of the biceps and semimembranosus were elongated by dividing the aponeurosis. Thereafter the hip and knee were flexed to 90° and the knee slowly extended with continuous evoked EMG monitoring. In order to evoke the EMG bipolar nerve stimulation was placed near the sciatic nerve delivering rectangular impulses of an amplitude of 0.8-1.2 mA for 100 US duration. The EMG recordings were performed from the tibialis anterior muscle. **RESULTS :** A direct relationship was found between sciatic nerve stretching and EMG potential. No significant changes in the EMG were observed until the popliteal angle was above 30°. With further extension of the knee the EMG showed significant reduction in amplitude while the latencies were less effected. **CONCLUSION :** Extension of the knee less than 30° of popliteal angle in children during hamstring tendons may cause traction injury to the sciatic nerve. Intraoperative evoked EMG is a simple tool for preventing sciatic nerve traction injury during hamstring lengthening.

I2-P22

Soft Tissue Surgery for the Hips in the Patients with Acquired Brain Damage

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SPURPOSE: we report the results of the soft tissue surgery for the hips in the patients with acquired brain damage

METHOD: Soft tissue release was performed in twenty-two hips of eleven patients. Clinical records were reviewed and acetabular head index (AHI), acetabular angle, and femoral neck-shaft angle were measured.

RESULTS: Nine patients were spastic quadriplegia and two were spastic diplegia. The mean age of brain damages was 1 year 3 months and the mean age of operation was 7 years. The mean follow-up period was 6 years 10 months. The episodes were brain contusion in one patient, ischemic encephalopathy in 3, meningitis in two, subdural hematoma in one, brain hemorrhage in one, and acute encephalopathy in three. Four patients had severe scoliosis. AHI was more than 60 in 12 hips preoperatively and in 16 postoperatively, was between 30 and 59 degrees in four preoperatively and in three postoperatively, and was less than 30 degrees in six preoperatively and in three postoperatively. Three hips in less than 30 degrees of AHI postoperatively, were severe spastic quadriplegia and time interval between the damages and the operations was more than six years.

CONCLUSIONS: In comparison with the operated patients with cerebral palsy, the rate of severely involved patients is high and the timing of the operation is late. Early soft tissue release is also necessary for the subluxed or dislocated hips in patients with acquired brain damage.

I2-P23

Effect of the Hip Surgery on the Spine and Lower Extremity in Cerebral Palsy

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PUPPOSE: Some reports available on the results of soft-tissue surgeries in cerebral palsy demonstrate the pelvic obliquity and scoliosis. The purpose of this study is to review our hip stabilization surgery to evaluate its effectiveness on the spine, pelvis and lower extremity. **METHODS:** Between 1988 and 1998, seventeen patients with thirty-two hips had stabilization procedures performed. Eight (three spastic quadriplegic, four diplegic and one athetotic) patients with fourteen hips had adductor posterior transfer (TR). Seven (four spastic quadriplegic, three diplegic and one athetotic) patients with fourteen hips had adductor release (RE). Two (one spastic quadriplegic, one diplegic) patients with four dislocated hips had open reduction (OR), derotational varus osteotomy and/or pelvic osteotomy. The average age at operation was nine years five months. The average length of follow-up was four years eight months. The clinical and radiological status of the hips was determined. **RESULTS:** Hip abduction significantly increased, and scissors gait or cross leg were not seen at follow-up. Hamstrings lengthening were performed in eighteen knees during follow because of tight hamstring. Ambulatory status did not show any significant difference among the procedures. Progression of scoliosis and pelvic tilt were not seen in most patients (94%). The average of MI at follow-up was thirty percents, and there was no significant difference among the procedures. **CONCLUSION:** Knee flexion contracture with tight hamstrings was seen during follow-up. Soft-tissue surgeries did not have a significant effect on progression of scoliosis and pelvic tilt.

I2-P24

School Screening for Scoliosis with Moire Topography

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Purpose; The purpose of this study is to clarify the present condition and problems of school screening with moire topography. Methods; 21,863 members of students of elementary school or junior high school were screened for scoliosis with moire topography in our prefecture in 1998. The relationship between the results of moire topography and of direct observations or roentgenographies at the medical institutions was studied cross-sectionally. Results; 490 students (2.2%) were judged abnormal using moire topography. Except 92 patients who did not go to hospital, 398 students were examined. Thirty-five percent of them (140/398) had scoliosis over 10 degrees of Cobb angle and 6%(24/398) of students had scoliosis over 25 degrees. Problems in the screening process were reflected in 2 students out of 5 who had scoliosis over 45 degrees. One of them had not been judged as abnormal when she was first screened at the age of 10, and had the curve progressed 56 degrees when she was screened again 3 years later. Another student did not go to the hospital until her scoliosis had progressed to 63 degrees in spite of being judged as abnormal by moire screening several years before. Conclusions; 2.2% of students who underwent moire screening were judged abnormal and approximately one-third of them were found to have scoliosis of over 10 degrees. The presence of about two-thirds of false positive results by the screening with moire topography was thought to be unavoidable.

I2-P25

Asymmetric Exercise and Scoliosis – A Study on Volleyball Athletes –
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Purpose: To determine the prevalence of the scoliosis within the volleyball athletes and compare with the general population.

Materials and Methods: One hundred and sixteen volleyball athletes were examined for scoliosis who had been enrolled in the activity for more than one year. Adams forward bending test was performed with measurement of the truncal asymmetry with scoliometer. Those who showed more than 5° of measurement were selected for X-ray evaluation. Data from randomized point prevalence survey of Korean middle school students in Seoul City, which had been performed by our department, was adapted for control group.

Results: Among 116 players 60(51.7%) showed more than 5° of angle of trunk rotation, whereas control was 2.5%. Athletes with Cobb's angle more than 10° were 7(6.03%) and control 465(1.0%). Despite higher frequency, the Cobb's angle were all below 15° whereas the control showed severe scoliosis which the Cobb's angle reaching upon 45°.

Conclusion: Volleyball athletes showed higher incidence of truncal asymmetry and scoliotic spinal column than the control group. We were able to conclude that asymmetrical muscle development can produce mild scoliosis. However it seems that only by muscular factor one cannot induce structural scoliosis.

I2-P26

Review of Severe Scoliosis Operated at the Age of 10 Years or Less

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The postoperative course of a severe scoliosis operated at the age of 10 years or less was investigated and indication for surgery was discussed.< MATERIALS AND METHODS>The material consists of 10 children (8 girls and 2 boys) of 10 years old or less who have curvature of 60 degrees or more. Preoperative Cobb angle was 94.9 degrees on the average and the average age at the time of surgery was 7 years old and 8 months. The etiology of the scoliosis was idiopathic in 4 patients, congenital in 2, and paralytic in 1. Spina bifida, Sotos syndrome, and neurofibromatosis were each of one. The gain of the height after surgery, preoperative and postoperative Cobb angle and the surgical technique were reviewed.< RESULTS >The average follow-up time was 6 years 6 months. Cobb angle immediately after the operation was 57.6 degrees and 65 degrees at follow-up on the average. Posterior fusion group was 8 patients. The final fusion was done in 2 patients at the end of the course of without-fusion method. The gain of height after the operation was 4.2cm on the average.< DISCUSSION >The 3.8cm gain of the height on the average can be expected in posterior fusion group. Without-fusion is a method for satisfying two conflicting propositions of maintaining the curve correction and keeping the growth of height. However the sufficient gain cannot obtain by without-fusion method.

I2-P27

Surgical Treatment for Scoliosis in Spinal Muscular Atrophy

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PURPOSE: Scoliosis was the most common problem in patients with spinal muscular atrophy. For correcting the deformity, preventing curve progression and stabilizing the trunk, Luge segmental sublaminar wiring with Galveston technique was used for surgical treatment and these patients were retrospectively reviewed for evaluating the clinical results. **MATERIALS and METHODS:** Between 1993 and 1999, six patients with a confirmed diagnosis of spinal muscular atrophy underwent surgery at Kaohsiung Medical University Hospital by Galveston technique and segmental sublaminar wiring with or without hooks fixation. Three were males and three were females. The mean age was 15 years and the average follow-up period was 43 months. All patients were functional classified to be type II SMA. **RESULTS:** The preoperative Cobb's angle ranged from 43% to 66% (average 54.6%) and pelvic tilting ranged from 10% to 38% (average 21.3%). The postoperative Cobb's angle ranged from 6% to 35% (average: 19%) and the mean correction rate was 64.47%. Better scoliosis correction rate was found in the group with proximal distraction hooks (63.37% vs 47.86%). The post operative pelvic tilting ranged from 6% to 14% (average: 8.3%). **CONCLUSION:** The Luge segmental sublaminar wiring with Galveston technique is an efficient instruments for correction the that scoliosis in SMA patients and we found the efficiency could be increased by combining proximal distraction hooks.

I2-P28

Atlantoaxial Instability in Children with Down Syndrome: Indications for Upper Cervical Fusion

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The appropriate management of atlantoaxial instability in children (especially asymptomatic patients) with Down syndrome remains controversial. This paper discusses the indications for fusion of the upper cervical spine in children with Down syndrome. Radiographs of the cervical spine were obtained on thirty patients (age range 1-14.7 years; mean 6.2 years) with Down syndrome. Also the plain radiographic parameters in flexion-extension lateral views, such as atlas-dens interval (ADI), space available for spinal cord (SAC) and instability index were measured. Thirteen patients were found to have an ADI of 5 mm or more, therefore radiographic atlantoaxial instability was detected. Seven of the thirteen patients underwent posterior atlantoaxial fusion. Before surgery, four patients were myelopathic but three patients were entirely asymptomatic. In all seven patients who underwent surgery, the SAC was reduced to less than 10 mm (mean 7.8 mm) before surgery. On the other hand, in the six patients that did not undergo surgery, the SAC was 13 mm or more (mean 15.2 mm). All patients who underwent surgery had ossiculum terminale of dens. Neither ADI nor the instability index demonstrated any significant difference between the operative and non-operative groups. We recommend posterior atlantoaxial fusion (especially Magerl's technique) for children with Down syndrome who have atlantoaxial instability, with or without myelopathy, if the patient is 5 years old or more, hypoplasia of dens (ossiculum terminale) exists, the SAC is less than 10 mm and/or the instability index is 40% or greater.

I2-P29

Surgical Treatment for Atlantoaxial Instability in Children with Skeletal Dysplasia

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PURPOSE: To clarify the characteristic features of atlantoaxial instability (AAI) which necessitated the surgery in children with skeletal dysplasia. **METHOD:** Five patients (three girls, two boys) were surgically treated. Two patients had spondyloepiphyseal dysplasia (SED) congenita and one each suffered from SED tarda, Larsen syndrome, and Morquio's syndrome. Preoperative status, image study findings, surgical procedures, complications and prognosis were reviewed. **RESULTS:** Three patients had some preoperative symptoms. Two had transient numbness in neck or upper limb and one had tetraplegia. No neurological deficit was detected except for one with tetraplegia. X-ray showed AAI and MRI with neck flexed demonstrated spinal cord compression in all cases. Anterior spinal fusion (ASF) was performed in one case, C1-2 posterior fusion (PF) in two cases, and C1 laminectomy and C0-2 PF in two cases. Major complications were displacement of the graft in ASF case and non-union in one C1-2 PF case. In both, revision was required and fusion was obtained. Four cases except for tetraplegic case had no complaints postoperatively. Although weakness slightly recovered in the tetraplegic case, she needed tracheostomy and died by respiratory complication 7 years after operation. **CONCLUSION:** Presymptomatic diagnosis is essential because very little postoperative recovery can be expected in the severe myelopathy. AAI in children with skeletal dysplasia hardly showed persistent symptoms nor neurological deficits. Therefore, x-ray-screening is important for early detection of AAI. If AAI is present and MRI demonstrates cord compression, surgical treatment must be considered.

I2-P30

Atlanto-Axial Rotatory Fixation: Improved Diagnosis Using 3D CT

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PURPOSE: To review atlanto-axial rotatory fixation (AARF) in our patients and discuss diagnosis and management.

METHOD: We described 16 cases in which the use of spiral computed tomography (CT) scanning with 3D between 1985 and 2000. All CT scans were obtained on a Siemens Somatom Plus4. Spiral CT was carried out using 90mA, 2mm slice thickness, and reconstruction of 2mm slices at 1.5mm intervals. 3D reconstructions were obtained using the Siemens workstation supplied with the scanner.

RESULTS: 3D images showed rotation of the lateral mass of C1 over that of C2 on affected side. Clinical and radiographical reduction was obtained by gradual head halter traction in 12 patients. 1 patient had improvement of the torticollis but still had subluxation. In 1 patient the parents refused any form of treatment. There was recurrence in the 3 patients and reduction was obtained by gradual head halter re-traction.

CONCLUSION: AARF is often missed at initial clinical presentation because of its relative rarity and the difficulty of making the diagnosis on plain films. CT should be the next imaging procedure after plain films. In our review, the patients diagnosed early responded well to head halter traction followed by external support. 3D images gave a more graphical picture of the overall alignment of upper cervical spine and greatly aided diagnosis and management. Successful treatment required early detection and CT should be performed on any patient who had fixed rotation of the head on the neck.

I2-P31

Remodeling of Malunited Fractures of the Odontoid Process in Infants

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Fractures of the odontoid process in infants tend to be missed and malunited, resulting in kyphosis and anterior displacement. It has not been clarified to what extent the deformity is spontaneously corrected during growth. This paper reports two cases of infants with Anderson's type 3 fracture who were followed up until adulthood. A new parameter, the tilting angle of the odontoid process (TAOP), which is formed by the base of the body of the axis and a line tangent to the posterior surface of the odontoid process, was introduced in order to quantify the kyphotic deformity. The TAOP in normal adults is -21.4 ± 23.3 degrees.

Case 1: 3-year-old girl at injury. An odontoid fracture was diagnosed 1.5 months after the accident. The TAOP was 41 degrees and the space available for the spinal canal (SAC) was 7mm. When the fracture was united after reduction with a halo-cast, the TAOP was 6 degrees and the SAC was 12 mm. At 29 years of age, the TAOP was -12 degrees and the SAC was 15mm.

Case 2: 1-year 8 month-old girl at injury. An odontoid fracture was diagnosed 2 months after accident. The TAOP was 62 degrees and the SAC was 7mm. When the fracture was united after reduction by halo-traction, the TAOP was 30 degrees and the SAC was 13mm. At 21 years of age, the TAOP was 24 degrees and the SAC was 16mm.

Conclusion: It was verified that malunited odontoid fractures can be greatly remodeled with growth.

12-P32

Contralateral Pedicle Disorder Associated with Unilateral Spondylolysis

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Purpose: Since contralateral padicle disorder with unilateral spondylolysis has not been fully elucidated yet, purpose of this study was to clarify contralateral pedicle condition on CT and MR images. Methods: Seven patients with unilateral spondylolysis, consulted our clinic from September 2000 to February 2001, were reviewed. The mean age was 16.5 yrs. For All patients, plain radiograph and CT scans were taken. MRI was taken on patients complaining back pain at contralateral side of a pars defect. Results: All affected vertebrae showed so-called a pedicle anisocolia, i.e. contralateral pedicle showed more sclerotic compared with the lytic side. CT scans clearly demonstrated left sided pars defect and contralateral pedicle sclerosis in all cases. Only one patient was found to be a pedicle fracture on CT scans. MRI was taken in three patients. In one patient, a contralateral pedicle showed low signal intensity on both T1 and T2 weighted images, indicating the affected pedicle being sclerosis. In the patient whose CT scan indicated pedicle fracture, MRI showed the affected pedicle being as low on T1-wt, and high on T2-wt image. For the third patients whose CT showed no obvious fracture, the pedicle was found in low on T1- and high on T2-MR image, indicating pedicle being insufficiency fracture. Conclusion: This study indicated that unilateral pars defect affected the contralateral pedicle, and it was categorized into screlosis, insufficiency fracture and fracture.

I2-P33

Social Life and Orthopaedic Problem of Adult Patients in Spina Bifida

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We investigated spina bifida patients beyond 18 years old, followed from infancy, about social life and the present problem. The average age of the patients was 22.9 years old in a total of 90 persons of 43 male and 47 female. Among these, except 4 unknown, there were fifteen persons who are students, 27 employed as full-time job, 29 using some welfare institution or sheltered workshop, and the number of others was 15. The average value of IQ judged before or after entering school is 107 points as for the employed person, 111 points in the student group, and 68 in welfare-facilities user. IQ value was related the social course of leaving school. About walking ability, community ambulators occupied 93% in the employment group, while 38% of community ambulator and 42% of non ambulator in the welfare-facilities group. On the level of the lesion, there is a tendency that the level is a little high in the welfare-facilities group compared with employment or student group. Twenty seven patients (33 places) have been inveterate decubitus. The incidence was about 30 to 40%, and there were no difference between each group. Intellectual development and walking ability influence the social life, and decubitus makes activity in society difficult. So it's important, in orthopaedics, to maintain walking ability and prevent a decubitus for spina bifida patients of the adult time.

I2-P34

Orthopaedic Management for Foot Deformity in Spina Bifida

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Purpose : A review of orthopaedic management of foot deformity in spina bifida patients. **Methods :** A group of 46 patients, with 78 feet undergoing surgery, were enrolled in the study. There were 30 cysticae and 16 occultae in 15 boys and 31 girls. The average age at operation was 7 years and 8 months (ranged from 11 months to 20 years). The mean follow-up period was 6 years and 4 months. **Results :** A comparison of surgical frequency in the treatment of cysticae and occultae showed a higher percentage of motor level (either L5 or lower) in occultae. More equinus and equinovarus deformities of the foot were found in cysticae, while more varus and cavovarus ones were found in occultae. The most frequent surgery in spina bifida patients was tendon transfers to correct muscle imbalance, which were performed in more than half the cases. Soft tissue release and bone surgery were the next most common methods of treating deformities in such patients. All of the equinovarus, varus and valgus cases still required orthoses after tendon transfer, but some of the calcaneus and cavovarus cases required no orthotic treatment to attain more stable walking patterns. **Discussion & Conclusions :** This surgery was very helpful in protecting the feet from pressure sores and in making walking patterns more stable. However, no surgery improved the ability of patients to transfer to a higher level in Hoffer's classification.

I2-P35

Clinical Result of Pes Calcaneus in Myelomeningocele Over Five Years After Surgery

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PURPOSE: To describe the surgical result of pes calcaneus in myelomeningocele over 5 years after surgery.

METHOD: Thirty-one patients with paralytic pes calcaneus(49 feet) in myelomeningocele were received surgical correction of the foot deformity. Mean age at first surgery was 5 years old(2-16 years). One patient was classified into Sharrard's grade 2, 5 into grade 3, 16 into grade 4 and 9 into grade 5. Posterior tendon transfer was performed alone or with other procedures such as plication of the Achilles tendon except subtalar arthrodesis. Average follow-up period was 10 years(5-18 years).

RESULT: Ambulatory state at follow-up time was 26 community ambulators, 3 household ambulators and 2 non-ambulators. Second surgery was performed in 5 feet. Five feet were excellent in which patient could stand with tip-toe with plantigrade foot, 26 good with plantigrade foot, 15 fair with minor foot deformity without difficulty in wearing orthoses and 3 poor in which re-surgery was necessary.

CONCLUSION: Posterior tendon transfer of the tibialis anterior without subtalar fusion showed relatively good result over 10 years after surgery.

I2-P36

Flexible Flatfoot in Preschool Children: Correlating Factors and Physical Performances

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In order to elucidate the correlating factors and clinical significance of flexible flatfoot (FF) in preschool children of Taiwan, a cross-sectional study was conducted in a research laboratory equipped with gait analysis facility. Altogether 377 preschool children, 201 boys and 176 girls ranging from 2 to 6 years of age, were enrolled for this investigation. The study shows that age ($p=0.001$), height ($p=0.002$), weight ($p=0.0001$), foot progression angle ($p=0.002$), occurrence of physical knock-knee ($p=0.01$) and joint laxity score ($p=0.001$) correlate with FF. Children with FF compared with children without performed physical tasks poorly ($p<0.05$) and walked slowly as determined by gait parameters ($p=0.001$). The FF should not simply be regarded as a problem of static alignment of the ankle and foot complex, but may be the consequence of a dynamic functional change of the lower extremity. Better understanding of the correlating factors and the clinical relevance of FF may prove helpful in deciding what treatment is the most appropriate for a particular patient.

I2-P37

The Open Technique for the Release of Syndactyly in the Foot

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Web construction for syndactyly in the foot brings a patient cosmetic improvement because it causes neither disability nor functional loss. Hence, skin grafts should be avoided. In order to avoid skin grafts, we simply created the web and left skin defects open for spontaneous epithelization. We would like to present long-term results of 19 feet with simple cutaneous syndactyly in 15 patients who were treated with open technique. Age at operation ranged from 6 months to 16 months (mean, 10.3 months). Follow-up period was 5.7 years on average (range, 3 to 9 years). The bottom of web was covered with a dorsal rectangular flap and the remaining skin defect was left open, waiting for spontaneous epithelization. There was no infection and all webs healed uneventfully. Skin defect was gradually covered with newly formed skin, the appearance of which resembled to the plantar skin, relatively thick and white. The period between operation and complete epithelization was 4.2 weeks on average (range, 3 to 5 weeks). At final follow-up, no hypertrophic scar or pigmentation of the skin was observed. Creeping of the web was observed only during the first postoperative year. The final depth of the web satisfied the families of all of the patients. Considering the aim of web construction for syndactyly in the foot, it can be concluded that this simple method is a reasonable treatment for this condition.

I2-P38

Long Follow-Up Study of Anterior Tibial Tendon Transfer for Congenital Clubfoot

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The goal of treatment for congenital clubfoot is a functional, pain-free, plantigrade foot, with good mobility and without calluses. We reviewed 18 clubfeet treated with anterior tibial (TA) tendon transfer. Seventy-three clubfeet were treated from the first with corrective manipulation and serial application of casts. Five feet(7%) underwent TA tendon transfer. Twenty-one relapsed or late treated clubfeet also underwent TA tendon transfer with posterior release or posteromedial release. The median age of first visit to our hospital was 2 years old. Eighteen of 26 feet were examined with radiological and physiological findings at averaged 10 years 5 month after TA transfer. Radiological findings: all feet remained the medial displacement of navicular bone and median angle was 22 degrees. Forefoot adduction was well corrected and naviculo-metatarsal angle was 87 degrees. Physiological findings: Pain-free and plantigrade feet were well achieved in all of tendon transferred feet. The dorsi-flex power of ankle joint was compared with no-trasferred sides in 5 cases and the weakness was not observed in transferred sides. Calluses were not also observed in all feet. Severe or moderate toe-in-gait was observed in 2 feet, mild toe-in-gait was observed in 9 feet. The surgical indication of TA tendon transfer is not broad for clubfoot, because TA transfer does not correct hindfoot deformity. But this is one of the effective options to correct forefoot adduction deformity.

I2-P39

The Treatment of Congenital Clubfoot
– Evaluated by Pedobarography –

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Purpose : To assess the result of the operative treatment of congenital clubfoot by clinical and pedobarographical measures. Methods :We evaluated 14 patients and 21 clubfeet. The subjective evaluation was performed by interviewing. The objective evaluation consisted of the comparison between the healthy foot and the affected one clinically and pedobarographically. We compared the pedobarographic result in ten healthy children. Results : The passive ankle plantar and dorsiflexion was 48., 10.8 degrees., respectively (for the unaffected, 53.8., 18.8). The subjective evaluation were all excellent. The pedobarographic analysis were as follows; in the midfoot, total force of maximum-pressure picture was 54.3 % body weight (in control, 28.0), peak pressure, 14.3 N/cm² (in control, 9.7), pressure time integral, 4.8 N-secs/cm² (in control, 3.0), and force time integral, 18.4 % body weight □ secs (in control, 7.1) ; in the metatarsal heads, the total area of maximum pressure was 20.5 cm² (in control, 27.0) ; in the lateral toes, the total area of maximum pressure was 6.0 (in control, 8.0), and force time integral, 2.5 (in control, 3.6). Conclusion : The increased pressures in midfoot would be suggested that the limitation of the dorsiflexion result in transfer of weight from the heel to midfoot, and mild decreased total area of maximum pressure, force time integral under lateral toe would be suggested a mild medial transfer of weight bearing.

I2-P40

Incidence of Congenital Club Foot in West Coast of Maharashtra
– 568 Cases in 231000 Infants Born During 1984-1998 in Sindhudurg District –
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PURPOSE : The incidence of congenital club foot, neurological diseases excluded was studied over a period of fifteen years (1984-1998).

METHOD : Door to door survey was performed by Auxillary Nurse Midwives of Sindhudurg Zilla Parishad, Health Department under the supervision of Medical Officers of 38 Primary Health Centres catering whole of the Sindhudurg District with a population of 8,77,514. Children born alive with club foot since 1st January, 1984 were documented birth date wise. Detailed census data was also available. All these surveyed children with club foot were examined to reconfirm the diagnosis at Rural Hospital Kudal on three consecutive days by the author excluding cases secondary to neurological disorders, and postural cases. The total number of infants born alive from 1st January 1984 to 31st December 1998 were taken from Vital Statistics branch of Health Department of Sindhudurg District. The analysis was done talukawise, to know the impact of geographical distribution over incidence of club foot in the whole of the district.

RESULTS : Altogether 2,31,030 living infants were born and of these 568 had congenital club foot. 256(45%) were bilateral and 310(54.5%) were boys. The total incidence was 2.45 per thousand live births. The annual incidence was practically the same during the 15 years period.

CONCLUSION : This total incidence of 2.45 per thousand children is three times higher than that of Europeans (0.7 per thousand infants : Elliot-1961). Whereas the infants of this district run one and half time higher risk of being born with club foot than Americans (1.5 per thousand live births : Ivy-1957).

I2-P41

The Treatment for Gigantism of the Foot

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PURPOSE: To describe the results of surgical treatment and discuss about operative methods and convenient time for surgery. **METHODS:** We monitored eight cases with congenital gigantism of the foot between 1983 and 2001. Six patients were treated surgically and two patients await surgical treatment. Six were girls and two were boys. The longest follow up period was 15 years and the shortest was 6 months. **RESULTS:** Two patients, one with macrodystrophia lipomatosa and one with lymphangiomatosis and congenital dislocations of bilateral knees and hips had operations several times, included debulking of soft tissues, epiphyseal plate arrest and ray amputation. Their cosmetic results were poor but functional results were good. Four patients with nerve territory oriented macrodactyly or idiopathic gigantism had epiphyseal plate arrest. All of four had good cosmetic and functional results. **CONCLUSION:** The operative methods should be chosen by affected area which was entire foot or only one or two toes. The goal of treatment are both cosmetic and functional improvement. Although the ray amputation is not good in cosmetic results, we suggest complete ray amputation in the patient affected entire foot to prevent recurrence.

I2-P42

Treatment of Congenital Brachymetatarsia: By Callotasis or Autogenous Bone Graft

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PURPOSE:We retrospectively compared the result of callotasis with that of autogenous bone graft for treatment of congenital brachymetatarsia.**Clinical materials:**Callotasis was performed on 7 females (9 feet), with an average age of 15 years (11-20). A unilateral fixator was used for distraction and 0.35-0.7 mm/day lengthening was performed. One-stage lengthening with an autogenous iliac bone graft was performed on 6 females (8 feet), with an average age of 21 years (13-31). The osteotomy site was fixed by K-wires and a cast was applied for 2-4 weeks. The average follow-up period was 2.5 years (7 months to 9 years).**Results:**The average amount of lengthening was 18 mm in the callotasis group and 11 mm in the bone graft group. Percentage elongation was 41% and 22%, respectively. The Healing-Index averaged 70 days/cm in the callotasis group. The cast was applied for an average of 31 days in the bone graft group. Postoperative complications included slight stiffness of the MTP joint in two cases of the callotasis group and slight pain after sports activities in two cases of the bone graft group.**Conclusion:**The advantage of callotasis was that a greater amount of lengthening without bone grafting was obtained. However, long-term treatment was needed. The advantages of bone graft included a short period of treatment and minimal surgical scar. However, lengthening more than 10 mm seemed difficult. Advantage and disadvantage for both techniques should be considered when determining surgical indication.

I2-P43

Radiographic Findings between Tibia Ray Deficiency and Fibula Ray Deficiency

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Purpose: Children with a congenital deficiency of the fibula or tibia may have significant shortening of the involved extremity. In addition to unequal limb length, pathology may also be present in the tibia, fibula, or foot. Tibia ray deficiency (TRD) and fibula ray deficiency (FRD) are diseases with various clinical presentations. This study focuses on the relationship between the length of the tibia and fibula, the number of toes, and the size of the first toe. **Methods:** We evaluated 18 patients with TRD and 23 with FRD, as well as 150 with lower limb length discrepancies as a control group. The ratios of tibia to fibula length (TRD) and fibula to tibia length (FRD) are defined the severity of the disorder. We evaluated the length of the tibia and fibula, the number of toes, and the size of the first toe radiographically. **Results:** The severity of TRD correlated with the length of the fibula, however, the severity of FRD did not correlate with the length of tibia. There was no correlation between the severity of either TRD or FRD with either the number of toes or size of the first toe. **Conclusions:** TRD has more of an effect on the fibula than FRD has on the tibia. The seriousness of TRD or FRD did not appear to affect the toes. These findings suggest that TRD may involve the fibula more than FRD involves the tibia.

I2-P44

Vascularized Fibular Graft for Congenital Pseudarthrosis of the Tibia

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INTRODUCTION: Congenital pseudarthrosis is one of the most difficult conditions to treat. We selected vascularized fibular grafting for the treatment of congenital pseudarthrosis of the tibia (CPT). The purpose of this study was to review the result of our treatment retrospectively. **METHODS:** 8 patients with CPT were reviewed. These patients received vascularized fibular bone grafting ipsilaterally except two patients. The mean age at the time of grafting was 7 years and 3 months of age (range, 1 year 11 months to 11 years 6 months). The mean duration of follow-up was 12 years and 4 months. The final results of these patients were evaluated. **RESULTS:** All patients achieved bone union finally. Leg length discrepancy, atrophy of the foot and/or ankle stiffness remained in all 5 patients who had multiple operations previously. 3 patients without previous operation did not have severe complications except a 23 month old child who needed to add the second grafting from the contralateral fibula at 7 years and 4 months of age. **DISCUSSION:** This vascularized fibular grafting generally obtained satisfactory results. However, the possibility remains that grafted bone does not get union even in the first operated cases, due to not only technical difficulties but also unsolved factors. The factor of age might be important in vascularized fibular grafting. **CONCLUSION:** Vascularized fibular grafting is recommended as the primary treatment of CPT. The timing of operation is still a question.

I2-P45

Congenital Dislocation of the Knee

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PURPOSE: To report our experience in the treatment of a series of patients with CDK, including the effects of associated musculoskeletal abnormalities and joint instability on the outcome.

METHOD: Between February 1988 and December 1999. 29 congenital dislocations of the knee joints (21 patients) were treated with closed methods including immediate reduction, serial casting, or traction in patients from 10 min to 26 days old or surgical reduction after failed closed methods.

RESULTS: At an average follow-up of 7 years and 10 months, an excellent or good result was achieved if there were no associated anomalies. Fair or poor results were the result of delayed treatment or associated musculoskeletal anomalies including arthrogryposis multiplex congenita or Larsen's syndrome.

CONCLUSION: Our treatment protocol according to the age and severity affords satisfactory results. Routine check of the hip dislocation is suggested. The dislocated knee should be reduced before treating the hip dislocation. Concomitant treatment of the congenital dislocation of the knee and the hip with Pavlik harness provided satisfactory results. Associated anomalies should be tailored individually. When progressive genu valgus deformity occurred because of global instability of the knee and asymmetric physeal growth, reconstruction of the medial structures of the knee and prolonged bracing provided good results.

I2-P46

Immediate Treatment of Congenital Knee Dislocation in Neonates

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PURPOSE: To determine optimal treatment for correction of congenital knee dislocation and restoration of normal knee motion.**METHOD:** 8 neonates with congenital knee dislocation underwent early conservative correction during the period from 1986 to 2000. Treatment was started at the age of 3-7 days of life. First step included application of von Rosen splint. Hyperextended knees were moved into correct position twice a day for about 3 to 5 degrees during each procedure. Knee flexion up to the right angle was achieved in all patients during the period of 2-4 days. Second step consisted of plaster cast applications. Knees were flexed to the right angle. The reserve space was created at the side of correction by special pads. The duration of cast fixation was 10-14 days. Therefore we obtained full range of motion at the joint. During the third step flexed splints for knee were applied.**RESULTS:** Mean follow-up period was 8 years. We used 5 clinical and X-ray criteria to evaluate the results. All results were good and excellent, and no surgical procedures were necessary.**CONCLUSION:** Treatment of congenital knee dislocation should be started in the first week of life. We believe that this condition could be a primarily reversible, but the possibility of correction siminishes significantly with every day of patient's life. Application of von Rosen splint followed by circular casts with reserve space provides good final results in all patients.

12-P47

Tightness and Weakness of the Knee Muscles in Adolescent Soccer Players with Osgood Schlatter Disease

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An orthopaedic medical check including measurement of muscle tightness and muscle strength around the knee was performed on 240 adolescent well-skilled soccer players. The mean values of the players were age, 12.5 years (range, 11.9-13.5); body height, 152.1 cm (range, 135-170), and body weight, 41.3 kg (range, 29-61). The incidence of sports injuries was, low back pain, 32%, Osgood-Schlatter's disease (OSD), 23%, Sever's disease, 23%, Achilles tendonitis, 18%, and disturbance of the sesamoid bone of the hallux, 15%. In the 55 injured knees of OSD, the number of the kicking side is 12, the opposite side is 24 and the both side is 19. In cases with OSD, The quadriceps muscles was significantly stiffer in the kicking side than in cases without OSD ($p < 0.05$). The isokinetic torques of the quadriceps in the kicking side and of bilateral hamstrings affected by OSD were significantly lower ($p < 0.05$). In cases with OSD, H/Q ratio on 180 and 300 deg/s was lower than in cases without OSD (N.S.). Overall results indicated that muscle tightness and weakness of the knee muscles may influence the development of Osgood-Schlatter's disease.

I2-P48

Sternal Segment Dislocation in Children

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(Purpose) Sternal segment dislocation is rare and only five cases have been reported. It remains unclear whether or not the dislocated segment should be reduced surgically. We report three cases of this condition, which were conservatively observed. (Materials and Methods) The primary mechanisms were direct blow in a four-year old boy, coughing in a three-year old boy, and osteomyelitis in a ten-year old boy. The two former cases were dislocated at the junction of the manubrium with the sternal body and the latter case was at the junction of the first and second sternal segment. (Results) The dislocated segments in all cases were gradually rotated for approximately one week, and were finally stabilized after rotation of 90 degrees. However, they were all conservatively left in the dislocated state. Radiographs of all cases showed gradual remodeling as time went by; i. e., the anteroposterior diameter of the segment had become shorter and the superiorinferior diameter of the segment had become longer. The dislocated segments were completely remodeled over one year of follow-up. (Discussion) The most frequent site of dislocation was at the junction of the manubrium with the sternal body. The mechanisms were not severe enough to produce internal injuries. Four of five reports recommended surgical treatment such as excision or open reduction and fixation. In our cases, as in one previous report, all the dislocated segments were remodeled conservatively, thus showing that surgical treatment is not inevitably necessary.

12-P49

The Study of Secondary Surgical Treatment for Thumb Polydactyly

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Introduction: Residual deformities after initial thumb polydactyly were difficult problem for patients and surgeons. We report the study of secondary surgical treatment for 14 cases (11 boys and 3 girls) 14 hands of thumb polydactyly. Materials and Methods: According to the Wassel's classification before initial surgery, the type II or III, IV or V, VI, floating type were in 5 hands, 7 hands, 1 hand and 1 hand respectively. Examination points were (1) deformities and dysfunction which needs secondary operations (2) results of secondary operations (the criteria of Tada et al.). Results: The average follow-up period after secondary operation was 34 months (12-90). 5 hands of initial type II and III had problem of deviation and/or instability of the IP joint. For that secondary operations were corrective osteotomy + tenoplasty and/or col.lig.repair. Their results were all good. 7 hands of initial type IV and V were divided into 3 groups (A, B and C). For group A (ulnar deviated deformity) corrective osteotomy with/without tenoplasty were performed. Their results were good. For group B (zigzag deformity) corrective osteotomy with Z-plasty were performed. Its result was good. For group C (radial deviated deformity) many operations (tenoplasty, col.lig.repair, Add. contracture release and chondrodesis) were performed. Only chondrodesis became good result. 2 hands of initial type VI and floating type had problem of deviation of the IP joint or instability of MP joint. For that chondrodesis were performed. Their results were good. Conclusion: The group C deformity was difficult to correct without chondrodesis.

I2-P50

The Congenital Musculoskeletal Abnormalities in THAI's Newborns

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We examined 13,443 newly born babies within a few days of life prospectively in order to establish a numerical base of reference for occurrence of certain relatively common congenital deformities of the musculoskeletal system not only for Thailand but may represent for Southeast Asia region. The deformities were recorded and investigated and treated as usual fashion as soon as the deformities were found. The most common congenital deformities were in the foot region as metatarsus adductus followed by calcaneovalgus. There were metatarsus adductus 4.39 per 1,000 live births; calcaneovalgus 1.49 per 1,000 live births; clubfoot 1.12 per live births and curly toes 0.50 per live births. The incidence of congenital hip instability were less than 2 per 1,000 live births. The congenital hand deformities were 0.52 per 1,000 live births and polydactyly is the most common deformity. Every case was followed until satisfactory results were obtained.

I2-P51

Fairbank Multiple Epiphyseal Dysplasia

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PURPOSE: To perform easier diagnosis of Fairbank Disease and avoid confusion with some muscular dystrophy. **METHODS :** A group of 8 children have been examined in outpatient clinics for difficulties in running, jumping or, even, walking. Five were males and three females. Their ages ranged from 3 to 14 , average of 9 . In this retrospective study, a complete check up has been performed combined to assessment of functional capacities, muscles testing, joints evaluation, biologic tests, muscle biopsy and imaging procedures. **RESULTS :** In each case, the pregnancy had been normal as was the delivery. Each child started to walk around 12 months . In fact, the children waddled along and went up stairs with difficulty. Only one child had limitation of his joints .Biologic tests were normal. Four out of the eight children had an electromyogram: one evoked a muscular disorder. Five children underwent a muscle biopsy of which result was normal. Later on, the dysplastic aspect of femoral heads appeared on Xrays..These divergences of the check up combined to the follow up of these children allowed us to set up the diagnosis of Fairbank Dysplasia. **CONCLUSION:** In some cases with difficulties of walking in childhood, it is needful to perform a complete check up for eliminate some muscular dystrophy. Later on, the Xrays of the hips will reveal progressively the bone dysplasia.

I2-P52

Changes in the Intercellular Matrix of Growth Cartilage During its Autotransplantation

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The growth cartilage transplantation is an important procedure in a great number of skeletal disorders. However due to the poor results in the completion of this procedure, it is rarely performed. One of the main reasons for failure is the lack of complete understanding of the fine mechanisms taking place in the transplanted cartilage. We carried out ultrastructural and immunohistochemical study on growth cartilage of "Vistar" rats, taken from the metatarsal bones and transplanted on the tibia. An image analyzer additionally processed the received electronogrammes. The results of our investigations showed, that the initial changes in the extracellular matrix in the autotransplant, are those in the globular structures of the aggrecan. This leads to destruction of the collagen fiber connections, which maintain the normal spaces between them. These changes are reversible till the moment they occupy the whole territorial matrix and the cellular membranes are blocked. Our results enable us to monitor and detect the earliest alterations in the autotransplant and to be able to predict and eventually interfere in the process of transplant rejection.

I2-P53

Treatment for Fracture-Separations of the Proximal Humeral Epiphysis

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Purpose Fracture-separations of the proximal humeral epiphysis with small displacement require no attempt for precise reduction because functional results are satisfactory due to wide mobility of the shoulder joint and remodeling potential. Treatment for displaced fracture-separations, however, is still controversial. To elucidate the necessity for surgical intervention on displaced separations, we analyzed our cases retrospectively.

Methods Between 1972 and 1999, we treated 21 children, 22 shoulders with displaced fracture-separation of the proximal humeral epiphysis which needed closed or open reduction to obtain acceptable alignment. Mean

age of the patients was 12 years old (3 to 16), 17 males and 4 females. Grade II and III displacements described by Neer and Horwitz were seen in 6 shoulders and in 4, respectively. Displacements in the remains

were classified into grade IV. **Results** In 2 shoulders of grade II displacement and in one of grade III, they were treated successfully without surgery. In 1 shoulder of grade III and in 5 of grade IV, percutaneous

pinning was necessary to maintain alignment obtained by closed manipulation. In 3 of grade II, in 2 of grade III and in 8 of grade IV, open reduction was required and in these cases, the tendon of the long head of biceps

or other soft tissue prevented closed reduction. **Conclusion** Severely displaced fracture-separations with no contact between fragments tend to need surgical procedures because of instability after reduction or difficulty to achieve satisfactory alignment by closed reduction.

I2-P54

Treatment of Displaced Flexion Type Supracondylar Fracture of the Humerus in Children

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Purpose: Clinical feature of the flexion type supracondylar fracture of the humerus was investigated by comparing with the extension type.

Material and methods: 68 extension type (40 type III, 28 type II) and 7 flexion type (all type III) supracondylar fracture of the humerus were investigated in 50 boys and 25 girls, averaging 5.3 years of age (2 year-14 year). Changes in Baumann's angle, humeroulnar angle, carrying angle and the clinical result (pain, deformity, joint motion) were evaluated after averaging follow-up, 18 months (12-43 months).

Results: Mean changes in Baumann's angle were 4.6°, 9.3° and those in the humeroulnar angle were 3.8°, 8.0° respectively in extension and flexion type ($P=0.047$, $P=0.021$, respectively). All the 3 patients (1 fair, 2 poor) in extension type with more than 10° change of carrying angle represented varus change. However, in 4 patients in flexion type with more than 10° change of carrying angle, 2 patients resulted in varus, and 2 patients resulted in valgus change. Clinical results were Excellent or Good, Fair, Poor in 59, 6, 3 children in extension type and 3, 4, 0 children in flexion type, respectively ($P=0.002$).

Discussion and Conclusion: Changes of carrying angle in flexion type were greater than those in extension type. Cubitus varus as well as cubitus valgus can be occurred in flexion type. We suggested that treatment for flexion type supracondylar fractures requires more meticulous care with attentive radiological evaluation and follow-up.

I2-P55

Second Fracture of the Distal Humerus Following Varus Malunion of Supracondylar Fracture in Children

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Purpose: Little is known about a subsequent fracture of cubitus varus deformity secondary to supracondylar fracture of the distal humerus. To address this issue, we studied second fractures of the distal humerus in children following the union of an ipsilateral supracondylar fracture. **Methods:** From 1987 to 1996, we treated nine children with a second fracture of the distal humerus following an ipsilateral supracondylar fracture. There were eight boys and one girl. The children were aged from 1 to 5 years old (mean, 3.5 years) at the first injury, the supracondylar fracture. After the malunion of the supracondylar fracture, each child suffered a second fracture of the ipsilateral distal humerus, when aged from 1 to 8 years old (mean, 5 years). The mean interval from the supracondylar fracture to the second fracture was 1.5 years (range, 0.3 to 3.6 years). **Results:** In all cases, the second fracture was an epiphyseal injury of the distal humerus associated with fracture involving the lateral metaphysis below the evidence of the prior supracondylar fracture. The diagnosis of the second fracture of the distal humerus following an ipsilateral supracondylar fracture was a lateral condylar fracture or a fracture-separation of the entire distal humeral epiphysis. **Discussion:** The results that the second fracture is an epiphyseal injury of the distal humerus suggest that the physis and epiphysis tend to be more subject to injury than the posttraumatic metaphysis of the distal humerus in children.

I2-P56

Dome Corrective Osteotomy for the Cubitus Valgus Deformity Associated with Old Lateral Condylar Non-Union

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PURPOSE: Open reduction and osteosynthesis for established non-union of lateral humeral condylar fracture has been plagued by a high incidence of complications. For treating these cases, a new technique which including the functional reduction of the non-union and dome osteotomy for the associated cubitus valgus was developed. The efficiency of this new method was retrospectively reviewed. **MATERIAL and METHODS:** Between 1995 and 1998, 8 patients had been treated by this new method. During open reduction of the lateral condylar non-union, anatomic reduction was precluded because of the remodeling of the distal fragment. After the osteosynthesis of non-union with functional reduction, the cubitus valgus was corrected by the dome osteotomy. All the surgical procedures were performed via a posterior approach by triceps muscle splitting in the pre-puberty group and by olecranon osteotomy in the post-puberty group. **RESULTS:** Pre-operative carrying angles ranged from 24° to 35° (average: 29.5°) and post-operative carrying angles ranged from 3° degrees to 7° (average: 4.5°). After an average 2.8 years follow-up, all the non-union achieved solid union. No loss of correction at the osteotomy site was observed and all the osteotomies united smoothly. The average pre-operative arc of motion on the extension-flexion plane was 120.62° (6.15° - 126.87°) and the post-operative arc was 113.8° (6.8° - 120.6°). **CONCLUSION:** 1. Functional reduction for the lateral condylar non-union can avoid the AVN and elbow stiffness efficiently. 2. The dome osteotomy is very stable for maintaining the obtained correction. 3. The posterior scar is more cosmetically acceptable.

I2-P57

Sleeve Fractures of the Patella in Children, a Report of 5 Cases

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PURPOSE :To remind the early diagnosis of the sleeve fractures of the patella in children. The infrequent fractures are often missed and substantially delayed. **METHOD** : Four children under suspicion of having sleeve fractures of the patella had lateral X ray views of the injured knee and the controlateral one in the same flexion position. The presence of proximal migration of the patella and a small fragment of the distal pole of the patella was relevant to the diagnosis of sleeve fractures of the patella. **RESULTS** : Through the comparison of the lateral views of the injured knee and the controlateral one in the same flexion position, four cases of sleeve fractures of the patella were recognized easily. **CONCLUSION** :The comparison of the lateral views of the knees in flexion is useful to detect the sleeve fractures of the patella in children.

I2-P58

A Proposal for Classification of Children's Ankle Fracture

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Purpose : To propose a new classification of children's ankle fracture and to evaluate the therapeutic and prognostic efficacy of proposed classification system.

Methods : A careful radiological evaluation of thirty-five cases of children's ankle fractures was done with attention to three anatomical landmarks (articular surface and growth plate of distal tibia, growth plate of distal fibula) which we thought to have prognostic significance. The classification system is based on the number of the above mentioned structures that are fractured. Type I: one structure is fractured. Type II: two structures are fractured. Type III: all three structures are fractured including three fragments triplane fracture. Type IV: crushing injury of either growth plate or articular surface of distal tibia including 4 fragments triplane fracture. We analysed the final results with modified Weber protocol.

Results : Of the thirty-five ankles, twenty-one (60%) were classified as having Type I (excellent 17, good 4); five (14%), Type II (excellent 4, good 1); seven (20%), Type III (excellent 3, good 4); two (6%), Type IV (fair 2).

Conclusion : All cases could be classified with our proposed method. But, the number of patients for studying was too small and final follow up period was not enough to generalize this proposed classification method. In the future, far more prospective and systemic study will be needed to come over these problems.

I2-P59

Physeal Injuries in Association with Severe Osteoporosis

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Purpose: The physeal injuries in children occur result of trauma, infection, metabolic or ischemic disease, and these conditions cause significant problems, such as growth disturbance, deformity and premature closure of physis. The purpose of this study are evaluation of pathomechaism of physeal injuries in severe osteoporotic children.

Material and Method: The authors experienced 7 cases of children who had angular deformity of knee and limb shortenings, but no history of obvious causes of physeal injury. All of these cases had and long term steroid therapy.

Result: Patients were range of age from 4 to 9 years and had common clinical features, which were angular deformities of knee, limb shortening. Also they had common radiographic findings, that were severe porosis, metaphyseal sclerosis and it some cases, pop corn like calcification around physis we supposed that chronic mechanical stress in osteoporotic bone make physis be damaged due to loss of capillay circulation and this event appear to result from collapse of bone plate, through which epiphyseal vessel penetrate.

Conclusion: The children with severe osteoporosis should be observed carefully about physeal injuries, which pathomechanism are perhaps deprivation of capillary circulation through bone plate. Therefore, We should try to protect bone plate by being conscious of its existence.

I2-P60

Iliopsoas Hemorrhage in Hemophilia : Relationship between Location of Hematoma and Clinical Symptoms

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PURPOSE: To clarify the relationship between location of hematoma and clinical symptoms about iliopsoas hemorrhage in hemophilia patients.

METHODS: We investigated six patients with hemophilia A who suffered from iliopsoas hemorrhage and underwent computed tomography(CT). Factor VIII deficiency was mild in one patient, moderate in one, and severe in the other four. The age at the time of first iliopsoas hemorrhage ranged from nine to twenty-three years of age with a mean of sixteen. We evaluated the location of hematoma by CT, and studied its relationship to the existence of flexion contracture of the hip and femoral nerve palsy.

RESULTS: Three patients showed iliacus hematoma only, and the other three patients showed both iliacus and psoas hematoma. No patient showed psoas hematoma only. Five patients (two with iliacus hematoma and three with both iliacus and psoas hematoma) showed more than 30 degrees of flexion contracture of the hip and four patients (two with iliacus hematoma and two with both iliacus and psoas hematoma) showed femoral nerve palsy.

CONCLUSION: CT revealed two types of hematoma location, iliacus only and both iliacus and psoas. The existence of flexion contracture of the hip and femoral nerve palsy was not related to the type of hematoma location.

JPOA Poster Presentations

- Yamamuro-Ogiwara Fellowship Poster
- JPOA Fellowship Poster
- Tohoku Fellowship Poster
- JPOA Poster

JYOF-P1

Treatment of the Congenital Dislocation of the Hip in Patients of Three Years and Older, in the Hospital Civil de Guadalajara a Preliminary Report

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Purpose: Treatment of congenital dislocation of the hip in older patients is a complex problem. There are only few articles in the recent literature that advocates the problem and reviews the outcome of the patients. **Methods:** The main objective of this study was to determine the outcome of patients 3 years and older treated of CDH. We review the files and measured the X rays using the Severin classification to evaluate the outcome of the procedure on the latest follow up visit. **Results:** We reviewed 75 cases but we were only able to collect the complete data from 45 cases 42 patients (three were bilateral), of the 42 patients 38 were female and 4 male (ratio 10.5:1). The average age at treatment was 5.6 years (3-12), it was more common on the left hip 27 vs. 18 right hips. The average follow up time was 30 months (5-78). According to Severin's radiographic classification there were 20 excellent, 6 good, 2 fair, 13 poor and 2 failures. On clinical evaluation 6 presented limited range of motion, 3 permanent pain, 5 occasional pain, 9 presented Trendelenburg sign, 6 had leg length discrepancy and 1 had impairment of daily living activities. **Conclusion:** Despite the improvements in surgical techniques it is imperative to identify this pathology as early as possible. Although our results yield a high index of fair to excellent results we should not forget that is a very large surgery for a small patient.

JYOF-P2

Garland Type III Supracondylar Fractures of the Humerus in Children- A Prospective Study

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PURPOSE. To describe the incidence of complications related with supracondylar fractures of the humerus in children. **METHOD.** In a prospective study, critical evaluation was realized in 131 consecutive children with Gartland type III supracondylar fractures (extension type). All cases were managed either close or open reduction and crossed pin fixation. Clinical evaluation was documented at admission, following reduction and at Hospital discharge by at least one of the authors. Sequential evaluation in out patient's clinic was also realized in a minimal period of one year. **RESULTS.** Compartamental syndrome occurred in two patients (1.5%), both with "floating elbow", and both under percutaneous pin fixation and flexible nail in forearm fractures; both were treated by fasciotomies. There were 6 patients with open fractures (4.5%); one of this developed osteomyelitis. Anterior interosseous nerve was affected in 16 cases (12%). Median nerve 2 cases (1.5%). Radial nerve in 12 cases (9%). Ulnar nerve damage was observed in 11 cases (8.3%), 8 injuries (6%) occurred after percutaneous crossed pin fixation (iatrogenic). Brachial palsy was observed in one patient. Seven patients presented associated injuries: fractures forearm (4), humerus (1), clavicle (1), Polytrauma (1). **CONCLUSIONS.** Based in our results, the incidence of complications is higher than literature. Suspect vascular complications in "floating elbow". Most common nerve affected was anterior interosseous nerve. The high incidence of iatrogenic ulnar nerve lesion oblige us to recommend other alternatives for fixation: two lateral pins, medial mini-incision or avoid medial pin fixation in extreme flexion.

JF-P1

Intramedullary K-Wiring of Open, Unstable or Malunited Forearm Fractures in Children

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BACKGROUND Diaphyseal both-bone fractures in children poses a therapeutic challenge for it has a recognized 7-32% failure in conservative treatment and requires surgical treatment. The decision to intervene is a difficult one, requiring clinical judgment. It is difficult to determine the acceptable limits of angular and rotational malunion and the expected remodeling and this makes predictions for an individual difficult. This prospective study evaluates the efficacy of standard intramedullary Kirschner wires (K-wires) for the treatment of open, unstable or malunited diaphyseal forearm fractures in 36 children with a mean follow-up of 15 months.**METHODS** There were 24 boys and 12 girls. The mean age is 8.5 years, 16 were operated primarily for unstable or open fractures and 20 patients were operated for subsequent displaced fractures treated with both in cast immobilization. Percutaneous K-wire 1.6mm was used and fixation was done in a closed method under image intensifier and open reduction was performed after failure of the close method. The fixation was supplemented with cast immobilization.**RESULTS** 31 patients had excellent result, 4 had good result and 1 had poor result-non union. There is minimal complication of lack of range of movement and wound infection. 3 patients had superficial wound infection and this was attributed to the K-wire ends which were left outside the skin. There is no implant infection nor any implant breakage. The average time to bony union is 8 weeks and the K-wires and Plaster of Paris were removed at an average of 9 weeks.**In conclusion**, K-wires with cast immobilization provide an effective alternative treatment for the problematic unstable or open forearm fracture when closed management has failed.

JF-P2

Scoliosis in Arthrogryposis Multiplex Congenta: Results After Nonsurgical and Surgical Treatment

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PURPOSE: To determine the prevalence, characteristics of the curve, and outcome of treatment in patients with arthrogryposis multiplex congenital who had scoliosis. **METHOD:** Forty-six patients (25 male and 21 female) with arthrogryposis multiplex congenital who were seen at the Alfred I. duPont Hospital for children between the years 1940 and 1997 were evaluated to assess the prevalence and patterns of scoliosis and the long-term results after both nonsurgical and surgical treatment methods. **RESULTS:** We found the prevalence of scoliosis to be 65.9% (32 of 46 patients). A single thoracolumbar curve was the predominant curve pattern. No congenital curve types or vertebral anomalies were seen in our group of patients. In the nonsurgical group, the mean curve was <30 degrees centigrade at follow-up. In the surgical group, the mean primary curve before spinal arthrodesis was 78.5 degrees centigrade. Three patients in the surgical group who were nonambulators have become household ambulators at the most recent follow-up. **CONCLUSION:** We recommend bracing in patients who are ambulators and have curve of <30 degrees centigrade. Combined anterior and posterior spinal arthrodesis gave the best results.

JF-P3

Evaluation of Healing Process of Metaphyseal Cyst with Serial MRI in Legg-Calve-Perthes Disease

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Purpose: Sixty-three patient (68 affected hips and 58 unaffected hips) with LCP were reviewed in order to evaluate the prognostic significance of metaphyseal change in radiograph and MRI. **Methods:** We used T1, T2 Proton, and Gd-enhanced T1W1 MR images in coronal and sagittal planes. **Results:** The mean age was 8.2 years. According to Catterall criteria, there were 6 hips in group I, 13 in group II, 20 in group III, and 29 group IV. There were 22 hips which showed metaphyseal cyst in both radiographs and MRI. 7 hips showed no cyst in radiographs but had cyst in MRI. 3 hips had no cyst in MRI but had cyst in radiographs. 13 hips had osteoporosis of the metaphysis in radiographs and marrow edema in MRI. According to MRI, 16 hips had isolated cyst below the physis which had water content and no physeal involvement. and 13 hips had tongue shape cyst which had granulation or fibrocartilage content due to physeal involvement. There were 15 hips which showed no metaphyseal change in radiographs and MRI. The results were evaluated by the radiographic findings: physeal convexity, coxa breva, overgrowth of the greater trochanter, coxa magna, lateral subluxation, medial bowing of the femoral neck, and premature physeal closure. **Conclusion:** The group with metaphyseal cyst had poor result regardless of the type of cyst compared to group with marrow edema or without metaphyseal change. MRI was useful to identify the metaphyseal changes which can have prognostic significance in LCP.

JF-P4

Surgical Treatment of the Atlantoaxial Luxation in Children

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Objective To summarize the surgical treatments and outcome of the atlantoaxial luxation in children. **Method** 9 cases of atlantoaxial luxation treated by surgery from 1994 to 2001, aged 6-14 years, were reviewed. The outcome was evaluated by the myelopathy scoring system of JOA for the patients with myelopathy. **Result** 4 cases were rotation luxation; they complained neck pain and stiffness. Halo traction reduced the luxation in 3 cases. The posterior fusion of C1 to C2 was taken for all 4 patients. 2 in 9 cases were Anderson II dens fracture and atlantoaxial luxation. Neck pain and stiffness were their only symptoms. 1 case was reduced by halo traction; the other can be reduced when cervical spine extended. The posterior fusion of C1 to C2 was taken. 3 cases were congenital deformity and atlantoaxial luxation with myelopathy. One was the congenital anomalies of the dens; posterior laminectomy of C1 and the posterior occipital cervical fusion was performed. The second was the congenital malformation of the base of the skull. The occipital fusion was performed after reduction. Occipital cervical internal fixation and bone grafts were done in third case. The recovery rate on those 3 cases was 83%. In All cases except the case with internal fixation the Halo vest external immobilization was used for 8 to 12 weeks and the radiographic union rate were 100%. **Discussion** The atlantoaxial luxation showed neck pain and stiffness with or without myelopathy. Posterior fusion of C1 to C2 was the effective treatment. The range of fusion should include the occiput if the laminectomy of C1 was done or there was occipitocervical instability. 8 to 12 weeks halo vest external immobilization is necessary for radiographic union except internal fixation. **Conclusion** For traumatic or congenital atlantoaxial luxation in children, the treatment includes preoperative halo traction, posterior fusion of C1 to C2 or occipitocervical fusion and postoperative halo vest fixation. The outcome is excellent. Posterior internal fixation can replace halo vest in some cases.

JF-P5

Chronic Slipped Capital Femoral Epiphysis Reduction by Gradual Distracton with External Fixation Followed by In-Situ Percutaneous Canulated Screw Fixation, A Case Report

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PURPOSE To demonstrate the successful relocation of the slipped femoral epiphysis and maintain its vascularity by gradual distraction with an external fixator, followed by in-situ fixation **MATERIAL AND METHOD** An 11 years old girl reported with 6 months history of pain left hip joint. Radiography showed Chronic slipped capital Femoral epiphysis grade 2. She was treated by gradual distraction method using three percutaneously introduced threaded pins at the ilium and three similar pins into the proximal femoral shaft. mounted to two Half rings with and a distraction connecting rod. Distraction was started from the 2nd post operative day at the rate of 1mm /day, By the 19th post operative Day radiograph picture showed the femoral epiphysis was brought to its normal head-neck relationship and in-situ canulated fixation was performed under general anaesthesia **RESULTS** Excellent remodelling of the head and neck contour, closure of the physal plate was achieved in less than a years time and the patient was back to near normal functions. **DISCUSSION AND CONCLUSION** The safe relocation and the preservation of the vascularity of the femoral head and the preservation of the vascularity of the femoral epiphysis that followed this method of treatment of slipped capital femoral epiphysis needs a new discussion on the question that comes to the fore on the accepted method of in-situ fixation without attempted reduction for fear of the compromise on the vascularity. This was done on a chronic patient, but perhaps it would be applicable in all types and grades of slipped epiphysis. It is difficult to favourably conclude on the feasibility of this method of treatment for SCFE based on this one study but the encouraging result seen no doubt should tempt others to try it out so that concrete observations can be made.

JF-P6

Callotasis Mineralisation in Achondroplasia Tibial Lengthening -An Individualised Treatment Process-

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Distraction osteogenesis had wide variation among achondroplasia patients. We studied 8 selected achondroplasia patients all had bilateral tibial lengthening between 91-2000. The Callotasis Bone Mineralisation Density changes during lengthening were analysed with respect to age, baseline Pre-Operative BMD, Rigidity of frame construct, Rate of lengthening, the effects of supplementary treatments with dynamisation, ultrasonic stimulation and bone marrow injections. The mean age of patients at time of operation were 12.2 years (9.8-14.1). There were 6 girls and 2 boys. 1 patient had Ilizarov, 5 had Ilizarov Hybrid and 2 had Orthofix fixators. The average lengthening was 10.4 cm (5.5-17). The average BMD pre operation was 0.723 (0.399-0.982) and 0.736 (0.399-0.997) gm/cm². The Lengthening Index were 30.69 (16.47-40.11) and 30.72 (16.47-39) days/cm for left and right tibia respectively. Younger age, Pre-operative BMD had a positive while frame rigidity had a negative correlation with callotasis BMD changes. Ultrasonic stimulation, bone marrow injection and most importantly dynamisation lead to a delayed rise of BMD in the callotasis and the host bone. The observation from the studied factors indicate age, frame construct, rate of lengthening should be individualised. Close BMD monitoring is very useful during lengthening to allow introduction of strategies to enhance mineralisation.

JF-P7

Crossed and Lateral Pinning in Supracondylar Fractures

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A retrospective study was done on 56 patients treated with percutaneous pinning of displaced supracondylar fractures of the humerus in the Paediatrics Institute of Hospital Kuala Lumpur between November 1999 and October 2000, to ascertain whether there is any significant clinically in the stability of two different pinning constructs. The percutaneous pinning configuration was either a crossed pinning medial and lateral pinning method or 2 laterally placed divergent K-wires. There were equal number of patients in each group (28 patients). The radiographs were evaluated for change in Baumann's angle and Lateral Humero-capitellar angle from immediate post-op until the last follow-up. The changes in the angles did not reveal any statistically significant difference in the ability to maintain reduction of the fractures. There was 3 instances of iatrogenic ulnar nerve injury in the crossed pinning group; the lateral pinning group had 1 case each of anterior interosseous nerve and radial nerve injury post operatively. No vascular injury was noted. 2 cases of superficial pin tract infection was present in each group. The lateral pinning technique of percutaneous pinning of displaced supracondylar fractures of the humerus therefore offers a viable alternative to the crossed pinning group as it offers the same stability without the incipient risk of iatrogenic ulnar nerve injury.

JTF-P1

Endoapparatus for Hip-Joint Restoration of Treatment for Legg-Perthes Disease

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PURPOSE: To observe and analyse the results using endoapparatus for hip-joint restoration of treatment for Legg-perthes disease.

METHODS: Ten cases of Legg-perthes disease treated by endoapparatus for hip-joint restoration have been followed-up in an average four and half years. According Catteral criteria for the classification of the disease: two patients were in group I, six in II and two in III. All cases began to walk after 2-4 weeks operation. Average time of the remaining the endoapparatus were 18 months.

RESULTS : The action of suffered hip has gotten a great progress in all cases. The necrosis of the femoral head no longer was serious after 3 months operation. It showed that the femoral head recovered gradually. There were 7 cases in which the femoral head recovered to nearly normal. Six cases were in group I or II among them. Acetabular-head index was more than 82%.

CONCLUSION: Endoapparatus for hip-joint restoration is suitable to treat Legg-Perthes disease with group I and II. A good result can be made and the natural course be shorted. But the patient would suffer from second operation.

JTF-P2

Clinical and Radiographic Evaluation of 57 Hips of 50 Patients with Untreated Developmental Dysplasia of the Hip Submitted to Surgical Treatment

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To evaluate the results of the surgical treatment in Developmental Dysplasia of the Hip lately diagnosed or treated, we reviewed 57 hips in 50 patients operated between February of 1985 and September of 1997. These ones were divided in two distinct groups according to the methodology of treatment applied. The group A is constituted by 24 hips of 20 patients, two male and 18 female, with the ages between 35,00 and 139,00 months, with the average of 65,92 months. The pre-operation traction was used in this group for a period of 15 to 28 days and an open reduction and the SALTER (1961) or CHIARI (1953) osteotomies were performed. When an appropriate reduction was not observed, it was accomplished an intertrochanteric femoral shortening, derotational and varus osteotomy. The group B is composed by 33 hips of 30 patients, one male and 29 female, with the ages between 20,00 to 148,00 months and the mean age of 52,88 months. In these ones it was not installed the previous traction and as the first surgical procedure it was accomplished just the diaphyseal femoral shortening followed by the open reduction and the pelvis osteotomy by the original or modified SALTER (1961) technique or the CHIARI (1953) one. We develop a functional evaluation to apply in the operated hip that considers: the range of motion, Thomas test, Trendelenburg test, neurological assessment, and the presence of pain. Then, we observed, by the functional point of view: 14 (58,33%) good results, 10 (41,67%) regular ones in the group A; 23 (69,70%) good and 10 (30,30%) regular ones in group B.

Radiographic assessment used plain pelvis x-rays accomplished in AP and Lauenstein views and we analysed: acetabular index; acetabular angle; Shenton line; Hilgenreiner line; the c/b, c/h, acetabulum-center and acetabulum-head ratios; the width of the triradiate cartilage; the trochanter and femoral head relationship and the femoral head's shape. We developed our own radiographic methodology of evaluation, so we considered the following parameters: the WIBERG angle (1939) which normal values were extracted from LAREDO FILHO paper; the avascular necrosis according to KALAMCHI & MacEWEN (1980); the sphericity of the femoral proximal epiphysis by the concentric circles of MOSE (1971); and the leg length discrepancy between the lower limbs. Then, at the radiographic analysis, we obtained 9 (37,50%) good, five (20,83%) regular and 10 (41,67%) poor results in the group A and 23 (69,70%) good, five (15,15%) regular and five (15,15%) poor results in the group B. After statistical analysis, we observed that the patients of the group B present better radiographic results. The clinical and radiographic evaluation present statistical agreement just for the patients of the group B.

JTF-P3

Immediate Treatment of Congenital Knee Dislocation In Neonates

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PURPOSE: To determine the optimal treatment program for correction of congenital kneedislocation and restoring normal knee motion.

METHOD: 8 neonates with congenital knee dislocation underwent early conservative correction during the period from 1986 to 2000. The treatment was started at the age of about 3 to 7 days.

The first step included application of von Rosen splint. Hyperextended knees were moved into correct position twice a day for about 3 to 5 degrees during each procedure. Knee flexion up to the right angle was achieved in all patients during the period of 2 to 4 days.

The second step consisted of plaster cast applications. The knees were flexed to the right angle.

The reserve space was created at the side of correction by special pads. The duration of cast fixation was 10-14 days. Therefore we obtained the full range of joint motion.

During the third step knee flexed splints were applied.

RESULTS: The mean follow-up is 8 years. We used 5 clinical and radiological criteria to evaluate the results. All results were good or excellent, and no surgical procedures were necessary.

CONCLUSION: The treatment of congenital knee dislocation should be started in the first week of life. We believe that this condition could be a primarily reversible, but the possibility of correction diminishes drastically with every day of patient's life. Application of von Rosen splint followed by circular casts with reserve space provides good final results in all patients.

J-P1

Outcome Prediction Using Epiphyseal Quotient on Magnetic Resonance Images of Legg-Calve-Perthes Disease

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PURPOSE: We try to make the outcome prediction using Epiphyseal Quotient (EQ) on MR images at the early fragmentation stage of Perthes disease. **MATERIALS and METHODS:** Thirty patients with uni-lateral Perthes disease were investigated. They were twenty-seven boys and three girls. Onset age was ranged from 4 to 11 years (ave. 7 years 5 months). In Catterall's classification, one was group II, 27 were group III, and two were group IV. We treated all of patients conservatively, twenty-three patients with abduction braces without weight bearing and seven patients with A-cast braces. These patients divided into two groups. Group A was defined as slightly collapsed of femoral heads in which the EQ were equal or over 70 percent on MR images. Group B was relatively more collapsed under EQ of 70 percent on MR images. These MR images were taken within 6 months after onset. We evaluated them with Mose's classification and Acetabular Head Index (AHI) on X-rays when they were primarily healed. **RESULTS:** Fifteen were good, ten were fair, and five were poor in primary healings. In group A, thirteen were good, seven were fair, and one was poor. In group B, two were good, three were fair, and four were poor. Group A with slightly collapsed epiphysis had good outcome. **CONCLUSION:** It is useful for the outcome prediction of Perthes disease using EQ on MR images non-invasively compared to arthrograms of the hip joints.

J-P1

MRIにおけるEQを用いたペルテス病の予後予測

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【目的】ペルテス病の予後を予測する上でMRIにおけるEQの有用性について検討したので報告する。
【対象および方法】30例30股の片側ペルテス病患者児を対象とした。男児27例、女児3例、発症年齢は平均7歳5カ月（4歳～11歳）であった。Catterall分類ではII型1例、III型27例、IV型2例であった。全例保存的に加療を行い、23例は外転免荷装具、7例はA-cast型装具を使用した。初期治癒までの期間は平均21.7カ月（15～32カ月）であった。予後判定のためのMR画像の計測は発症後6カ月以内のT1強調画像を用いた。その大腿骨頭中央冠状断像において軟骨を含む大腿骨頭骨端核の高さを横径で除したepiphyseal indexの健患側比をepiphyseal quotient（以下EQ）として計測した。EQが70%以上をA群、EQが70%未満をB群として結果を比較した。結果としては、初期治癒時の単純X線像における骨頭形態をMose法、acetabular head indexを用いてgood、fair、poorに分類し、両評価のうち悪い方を総合成績としてgood、fair、poorとした。

【結果】初期治癒時のX線総合成績ではgood15例、fair10例、poor5例であった。そのうちA群ではgood13例、fair7例、poor1例であり、B群ではgood2例、fair3例、poor4例とA群で成績が良好であった。

【考察】MRIにおけるEQの計測は関節造影に比較して非侵襲的であり、ペルテス病の予後予測に有用であると考えた。

J-P2

The 2D-Finite Element Method Analysis of the Femoral Head in Perthes Disease

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<PURPOSE> To evaluate the changes of strains distribution in the femoral head with Perthes disease under several condition.

<METHOD> Models were constructed by reference to radiographic images and magnetic resonance images(MRI) of the intact hip joint. The hip model was divided into 1009 quadrangular elements. The model was divided into five parts : cancellous bone, articular cartilage, necrotic bone, cortical bone, physal cartilage. Material properties were allotted to these components by the past literature. The body weight and abductor muscle force were applied as loading. This model was set up to several conditions in order to study the effect of age, the extent of necrosis, lateralization of the femoral head and abduction of hip joint. Strain distribution was evaluated on these condition.

<RESULTS> There was no significant difference in strains distribution patterns regardless of extent of necrosis if non-necrotic area of femoral head didn't exist under weight bearing area of the acetabular side. The strains of epiphysis indicated greater value than on the young child model than on the elder child model. By lateralization of femoral head, great strains was concentrated on the lateral portion of the epiphysis under the acetabular edge. The great strain area of the femoral epiphysis was decreased with abduction of hip joint.

<CONCLUSION> The femoral head deformity in Perthes disease was more affected by the lateralization and the extent of necrosis than by the age from a mechanical point of view. Containment method is effective for Perthes disease.

J-P2

二次元有限要素法を用いたペルテス病の検討

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【目的】 ペルテス病における骨頭内の歪み分布について検討する。

【方法】 二次元有限要素モデルは、ペルテス病患児の健側股関節の単純X線像、MR画像を用いて作成した。荷重条件として片脚起立を想定し体重および股関節外転筋力を加えた。皮質骨、海綿骨、関節軟骨、壊死骨、骨端線のヤング率、ポアソン比は文献を参考に与えた。壊死範囲、年齢因子、骨頭の側方化、股関節外転角度を変化させ、骨頭内歪み分布の変化を検討した。解析は汎用有限要素プログラム COSMOS / M.Ver.1.71を用いて行った。

【結果】 1. 壊死範囲による影響：健常部が荷重部に残存するモデルでは、この健常部に応力が集中し、壊死部の歪みは低下した。しかし、荷重部が壊死した状態では骨頭内の歪み分布は壊死範囲の大きさに影響されなかった。2. 年齢因子の影響：骨端核が小さく軟骨が厚い年少児モデルでは骨端核が大きく軟骨の薄い年長児モデルに比べて骨端核外側の歪みが大きかった。3. 側方化の影響：大腿骨頭の側方化により骨端核内の歪みの大きい領域は、骨端核内側の臼蓋縁直下に変化した。4. 骨端核内の歪みの大きい領域は股関節に外転を加えることにより減少した。

【考察】 骨頭内の歪み分布の変化より見ると、ペルテス病の骨頭変形に関与する因子としては年齢よりも壊死範囲と骨頭側方化の影響の方が大きいと考えられた。Containment 療法はペルテス病の有効な治療法である。

J-P3

Opening Wedge Femoral Osteotomy in Perthes Disease

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We describe a surgical technique used to perform a varus femoral osteotomy for severe but containable perthes disease, that maintains limb length. The procedure was performed by, or under the supervision of, a single surgeon. An acute opening wedge osteotomy using a single cut with bony point contact medially and an intact periosteal sleeve was made, with fixation using the Richards Intermediate Hip Screw system. 24 osteotomies have been performed, all of which have united satisfactorily with no complications. Excision of a bone wedge with additional varisation of the femoral neck contribute to limb shortening, when shortening may already be present due to the disease process. Derotation may cause a fixed external rotation deformity. We advocate use of this technique which avoids excessive shortening, is not technically difficult and yields reliable results.

J-P4

Treatment of Legg-Calve-Perthes Disease

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<Purpose> To determine the outcome of a group of hips with Legg-Calve-Perthes disease treated by the modified Batchelor apparatus, 453 hips in 445 patients with radiographic follow-up were reviewed. <Methods>

All patients were treated by the modified Batchelor apparatus from 1968 to 1994. The average age at onset of disease was 6 years 9 month (range, 2 years 1 month to 13 years 1 month). Outcome was determined according to the Stulberg classification. <Results> 278 of 453 hips were considered a satisfactory result (61.4% spherical femoral head, Stulberg class 1 and 2). Nine hips who had onset of disease before the age of 3 years, had 67% Stulberg class 1 and 2 results. 158 hips who had onset of disease between 3 and 6 years, had 63% good results (35% class 1, 38% class 2, 23% class 3, 4% class 4). 214 hips who had onset of disease between 6 and 9 years, had 57% good results (17% class 1, 40% class 2, 34% class 3, 9% class 4). Seventy-two hips who had onset of disease after the age of 9 years, had 47% good results (17% class 1, 30% class 2, 36% class 3, 17% class 4). <Conclusion> The age at onset influenced the result. In patients after 9 years at onset, the outcome was significantly worse.

J-P5

Transtrochanteric Rotational Osteotomy of the Femoral Head for Osteochondritis Dissecans in Legg-Calve-Perthes Disease

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PURPOSE: To present two cases of symptomatic osteochondritis dissecans(OCD) following Legg-Calve-Perthes disease(LCPD) and to describe the effectiveness of transtrochanteric rotational osteotomy of the femoral head by Sugioka for this rare complication.

METHOD: Two cases of unilateral LCPD in males were treated conservatively; the age at onset was 9 and 11 years respectively. They were totally asymptomatic until they experienced sudden sharp pain and occasional catching sensation in the same hip at the age of 20 and 21. The symptoms were not relieved by conservative measures. Definite diagnosis of OCD was made by roentgenograms and diagnostic arthroscopy which showed the OCD lesion in the antero-superior region of the femoral head. Unexpectedly, the latter case was complicated with synovial chondromatosis which was washed out partially during arthroscopy. At the age of 21 and 22, transtrochanteric rotational osteotomy of the femoral head was done in both cases; the rotation angle was 90 degrees anteriorly. And in the latter case, concomitant removal of synovial chondromatosis was performed at the same time.

RESULTS: The length of follow-up after the operation was 4 and 2 years. Following the operation the hip became asymptomatic and regained good function. Healing of osseous and cartilaginous lesion of OCD was ascertained by postoperative roentgenograms and second-look arthroscopy.

CONCLUSION: These data support the usefulness of transtrochanteric rotational osteotomy of the femoral head as one of the major surgical options for OCD following LCPD.

J-P7

Let's Call it Pavlik's Method

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PURPOSE: To change the nomenclature from 'Pavlik's harness' to 'Pavlik's method' for the treatment of Developmental Dysplasia of the Hip [DDH], as it is the method and not the harness which treats the problem. **METHOD/RESULTS:** The literature concerning the treatment of DDH [formerly CDH] is reviewed and Pavlik's reports on his methods are presented. The misunderstanding in the use of Pavlik's method is described and the results of treatment are explained. The low rates of avascular necrosis and the high rates of success achieved with the correct use of Pavlik's method are discussed. **CONCLUSIONS:** To avoid misunderstanding of Pavlik's method of treatment, the change in nomenclature will lead to an understanding of the philosophy behind the mode of treatment.

J-P8

Experience of Arthroscopic Surgery for Congenital Dislocation of the Hip

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New open reduction method for congenital dislocation of the hip using arthroscopic surgery technique was reported in this study. Case1: 4-year-old female, the dislocation of the left hip progressed together with the start of a walk (at 3-year-6-month-old) accompanied with the mind development delay. Case2: 1-year-6-month-old female, Patients have not been treated until 1-year-6-month-old. An arthroscopic surgery was done using anterior, anterolateral and lateral approaches. The femoral head ligament was removed by using the electric scalpel (VAPR) first, and next fibrous tissue in the bottom of the acetabula was fully removed as a process of reduction. And finally, limbectomy were performed using hook-shaped VAPR blade, and limbs tuned over in the outside. Femoral head, which was pseudo-reduction before the surgery, was returned to the normal position after arthroscopic surgery. As usual method of the open reduction for CDH is an invasive method, the overgrowth of femoral head and femoral neck will be occurred after open reduction. Less-invasive technique is needed for CDH. New open reduction method using arthroscopic surgery technique is expected as a useful cure of the congenital dislocation of the hip.

J-P8

先天性股関節脱臼に対する鏡視下整復術の経験

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(目的) 今回、先天性股関節脱臼(以下CDH)に対し、鏡視下に整復術を行ったので報告する。(症例および方法) 症例は精神発達遅滞を伴い、3歳6ヶ月の歩行の開始とともに左股関節の脱臼が進行した4歳女児(症例1)と、異常を指摘されながらも放置された1歳6ヶ月の女児(症例2)の2例である。鏡視方法は、前方、外側および前外側より行い、鏡視所見としては、骨頭靱帯の延長と、関節唇の内反が認められ、臼底には線維性の組織が充満していた。整復の手順としては、まず、延長した骨頭靱帯を電気凝固メス(VAPR)を用い切除、次に、臼底を埋めている線維性の組織を十分に切除した。さらに内反した関節唇を鉤状のVAPRブレードを用い放射状に切開し、外側に反転し骨頭を内側に整復した。(結果) 症例1では、すでに臼蓋との不適合も生じていたため完全な整復位は得られなかったが、術後骨頭は内側に移動し、関節造影では、術前8mmあった関節唇の内反による陰影欠損は、術後4週の関節造影で4mmと半減した。症例2では、臼底の線維組織の切除により、術前偽整復であった骨頭が、ほぼ完全に整復された。(考察) CDHに対する観血的整復術の手術侵襲は大きく、術後に大腿骨頸部や骨頭の過成長が問題となることがある。今回、CDH症例に対し侵襲が少ない鏡視下での整復術を行い、脱臼の改善を認め、鏡視下観血的整復術は先天性股関節脱臼の有用な治療法として期待される。

J-P9

Modified Salter's Innominate Osteotomy to Prevent Femoral Head Compression and Iliac Bone Deformity

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PURPOSE: Our new method of modified Salter's innominate osteotomy is invented to prevent femoral head compression and iliac bone deformity as the complication of Salter's innominate osteotomy. We report short-term results of our modified osteotomy. **METHOD:** Seven patients were treated with our modified osteotomy to prevent the complications mentioned above. The characteristics of this operation method are as follows. The reversed triangular shaped bone for graft is cut away from the open osteotomy site. The distal fragment is rotated, and then, the reversed triangular shaped bone is grafted in the open osteotomy site reversely (medial side to lateral) and fixed using two Kirschner wires. The radiographic outcome was evaluated for seven patients. **RESULTS:** Six girls with residual subluxation had the modified innominate osteotomy between 4 to 6 years old. One girl with avascular necrosis (AVN) complicating developmental dysplasia of the hip had the operation at 2 years old. Severin's groups of the all seven hips at final examination (range: 3 years and 8 months to 11 years and 10 months; mean: 7 years and 2 months) were groups Ia. **CONCLUSION:** One of advantages of this modified operation method is to prevent femoral head compression, especially used for AVN case. The other is to produce no iliac bone deformity because of unnecessary cutting iliac crest for graft. Although this procedure has demerit of insufficient stability in the distal fragment fixation, it could be overcome using external fixator.

J-P10

Hip Ganglion Cyst Associated with Developmental Dysplasia of Hip in a Child

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PURPOSE: Ganglion cysts communicating with the hip joint have rarely been reported and all the reported cases involved only adult patients with advanced arthritis in the hip region. However, a ganglion cyst was found on the left hip of a boy. We traced back his health history, and tried to find out the possible underlying etiology. **MATERIALS and METHODS:** A 2 years and 11 months old boy was referred because of a tumor mass over his left inguinal area. He was diagnosed with left dislocated developmental hip dysplasia (DDH) when he was 14 months old and was treated by closed reduction and hip spica. In past 3 months, his parents noted a mass over his left inguinal area and the mass was found to be growing progressively in size. The magnetic resonance image revealed a well-defined cystic lesion, which was located anterior to the left hip joint and lateral to the iliopsoas muscle. **RESULT:** In surgical exploration, the ganglion cyst was found with a stalk attached to the anterior hip joint capsule. After removal of the cyst, a radial-directed labral tear located 3mm from the margin of the acetabular bony roof was observed through the orifice of the stalk. **CONCLUSION:** From the surgical findings, the inappropriate mechanical pressure happened to the acetabular labrum during closed reduction of DDH and hip spica-cast was inferred to induce the labral tear, and even the occurrence of the ganglion cyst.

J-P11

Effects of Circumferential Capsulotomy on Surgical Treatment of Hip Dislocation Caused by Cerebral Palsy Patients

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Although we are performing surgical treatment to hip dislocation of cerebral palsy patients, it is not rare to also use open reduction(OR), detorsion varus shortening osteotomy(DVO) together in addition to selective muscle release for control of spasticity(SMRCS). Since we apply circumferential capsulotomy performed to congenital dislocation of hip and have studied comparatively good results in case we use OR, DVO together, we perform the report this time now. Objects are 19 cerebral palsy patients, 24 hip joints which performed SMRCS, OR and DVO in our hospital from April,1998 to March,2001. Except for one example, standing is altogether impossible for all cases at the spastic type. In addition to SMRCS, OR and DVO including circumferential capsulotomy are performed. Although capsulotomy had separated only anterior before, femoral head is centered into the acetabulum compared with that time, it becomes easy to improve concentric position and range of motion to abduction is also good. In hip dislocation of cerebral palsy patients, contracture of capsule is a serious problems similar to congenital dislocation of hip. It is important to release not only anterior but posterior of capsule. If posterior of capsule is remained, however it might perform DVO, we think that good concentric position and range of motion were hard to be obtained.

J-P12

Arthrographic Findings of the Acetabulum in Patients with Cerebral Palsy

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Purpose We investigated the cartilaginous coverage and the occlusion of the acetabular floor using hip arthrography in patients with cerebral palsy (CP). **Method** Hip arthrography was conducted on 69 hips in 37 patients with CP. Age at arthrogram ranged from 3 to 15 years. The cartilaginous center-edge (CCE) angle and migration index (MI) were measured on arthrograms. These hips were graded in 4 groups according to the degree of MI. As an assessment of the lateral cartilaginous coverage, we subtracted center-edge (CE) angle from CCE angle. The distance from the lateral border of the tear drop figure to the medial line of the dye (ATDD) was measured in order to assess the thickness of the acetabular floor. An average of ATDD in each group was calculated. **Result** There was a significant difference between the average of ATDD in group 1 (MI<30%) and the one in group 4 (MI>60%). In 38 hips with CE angle<0, there was a significant correlation between the age and ATDD. In 25 hips which had a normal acetabular angle, the significant correlation was found between MI and the degree of the lateral cartilaginous coverage. **Conclusion** The occlusion of the acetabular floor was influenced with the age of the patients and the lateral displacement of the femoral head. Cartilaginous development at the lateral portion of the acetabulum was relatively increased in unstable hips with CP.

J-P12

脳性麻痺の股関節造影 - 軟骨性臼蓋被覆と臼底の変化について -

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【目的】脳性麻痺(以下 CP)の股関節造影を用いて臼底の変化と軟骨性の臼蓋被覆について検討した。
【方法】1971年から2000年の間に当センターで CP 児に対して行われた股関節造影 37 症例 69 股を対象とした。男性 28 例, 女性 9 例, 造影検査時の年齢は 3 歳から 15 歳 (平均 6.9 歳) であった。麻痺のタイプは痙直型四肢麻痺 27 例, 痙直型両麻痺 7 例, アテトーゼ型 3 例であった。股関節造影より CE 角および軟骨性 CE 角 (以下 CCE 角) を計測し, CCE 角 - CE 角を算出した。臼底肥厚の指標として涙痕外側縁から造影剤の最内側までの距離 (以下 ATDD) を, 骨頭側方化の指標として Migration Index (以下 MI) を計測した。69 股を MI の程度により 4 群に分け, MI と ATDD との関係を調べた。また, CE 角が 0 度以下の 38 股において, 年齢と ATDD との相関を調べた。さらに臼蓋形成不全を呈した症例を除外した 25 股において MI と CCE 角 - CE 角との相関について調べた。【結果】MI の増加に伴い ATDD も増加していた。年齢と ATDD の間に相関係数 0.70 の相関を認め, 加齢とともに臼底肥厚が進行していた。また MI と CCE 角 - CE 角の間には相関係数 0.67 の相関を認め, 側方化の増大は関節唇の外側への伸展を生じた。【結論】臼底肥厚は年齢、骨頭側方化に影響を受け, 骨頭側方化が強くなれば関節唇の発育が助長されることが示唆された。

J-P13

Selective Spasticity-Control Surgery for the Hip in Adult Patients with Cerebral Palsy

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Purpose: Matsuo et al. reported that the combined procedure including release of the adductor longus and gracilis, lengthening of the psoas and rectus femoris, and proximal release of the hamstring could correct the hip deformity in children with cerebral palsy. The preserved adductor brevis and iliacus prevented hyperabduction and hyperextension, and stabilized the hip. The purpose of this paper is to evaluate the effects of this procedure in adult patients. **Methods:** Eighteen adult patients were treated with Matsuo's combined procedure. According to the aim of the surgery, the patients were classified as follows. Group 1: pain relief (seven patients), Group 2: improvement of gait pattern (six), Group 3: development of standing ability (three), Group 4: improvement of posture (two). **Results:** Group 1: Four had athetosis, two spastic quadriplegia and one spastic hemiplegia. Age at surgery ranged 26-54 years (average; 40). The pain disappeared or decreased in all patients. Group 2: Three had spastic diplegia and three spastic hemiplegia. Age at surgery ranged 19-38 years (average; 30). The crouching was reduced in all patients. Group 3: Two had spastic quadriplegia and one athetosis. Age at surgery ranged 18-26 years (average; 21). The standing ability with supports were improved. Group 4: Both patients had severe spastic quadriplegia. One was 20 years old, the other 30. The scissoring was reduced in both patients. **Conclusion:** Matsuo's combined procedure is useful for the hip in adult patients with cerebral palsy.

J-P13

成人脳性麻痺患者に対する股関節周囲筋解離術

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【目的】松尾らは、短内転筋と腸骨筋を温存し、長内転筋、薄筋、大腰筋、大腿直筋の中枢腱、ハムストリングの中枢腱を延長することにより、内転・屈曲筋力を温存しながら、脳性麻痺のこどもの股関節変形を治療できることを報告した。この研究の目的は成人の脳性麻痺患者に対するこの手術の効果を調べることである。

【方法】1991-2000年の10年間に、当園で松尾の股関節周囲筋解離術を受けた18歳以上の脳性麻痺の患者18例(30股)を対象とした。主な手術目的により、1群：除痛(7例)、2群：歩容改善(6例)、3群：立位改善(3例)、4群：姿勢改善(2例)、の4群にわけて、手術の結果を調べた。

【結果】1群：病型は混合型(痙直+アテトーゼ)四肢麻痺4例、痙直型四肢麻痺2例、痙直型片麻痺1例で、年齢は26-54歳(平均40歳)であった。全例で疼痛は消失または軽減した。2群：痙直型両麻痺3例、痙直型片麻痺3例で、年齢は19-38歳(平均30歳)であった。全例でかがみ肢位が軽減した。3群：痙直型四肢麻痺2例、混合型四肢麻痺1例で、年齢は18-26歳(平均21歳)であった。全例でかがみ肢位が改善し、車椅子移乗が容易になった。4群：2例とも痙直型四肢麻痺で、年齢は20歳と30歳であった。2例ともはさみ肢位が改善し、全身的な筋緊張もゆるまった。

【結論】この手術は小児のみならず成人の脳性麻痺患者に対しても有用である。

J-P14

Differentiating between Septic Arthritis and Transient Synovitis of The Hip in Korean Children-Clinical, Laboratory and Radiographic Findings

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PURPOSE: The purpose of this study was to identify diagnostic variables for differentiating between septic hip and transient synovitis.

METHODS: Medical records and plain radiographs of 124 patients with acute hip pain in children were reviewed. Diagnostic variables were analyzed with respect to age, gender, laboratory findings, joint space distance and displacement of the periarticular fat pad.

RESULTS: Twenty-seven patients had a septic coxitis and ninety-seven patients had transient synovitis. The mean age of twenty-seven coxitis and ninety-seven synovitis were 6.7 years and 5.7 years respectively. A history of initial body temperature (37.71°C versus 36.56°C, $p<0.001$), WBC count (18,162/mm³ vs 8,366/mm³, $p<0.001$), ESR (79.13mm/hr vs 21.47mm/hr, $p<0.001$) and CRP (10.1mg/dL vs 0.865mg/dL, $p=0.001$) were significant diagnostic predictors of septic coxitis. In plain radiographic findings, septic arthritis showed more large medial joint space widening comparative to normal side (4.0mm vs 1.2mm, $p=0.007$) and 22 cases with transient synovitis did not show blurring nor displacement of the periarticular fat pads, but all cases with septic arthritis showed blurring and/or displacement of the periarticular pads.

CONCLUSIONS: Although several variables overlap in the intermediate ranges, we have to consider the significant predictors for early diagnostic parameters to differentiate septic coxitis from transient synovitis of the hip.

J-P15

Perihip or Peripelvic Infections Mimicking Septic Arthritis of the Hip in Children

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PURPOSE: The purposes of this report are to emphasize the efficacy of MRI in the diagnosis of the perihip or peripelvic infections and to propose a CT guided aspiration as an effective and less invasive treatment procedure for the perihip or peripelvic abscess.

METHOD & RESULT: We reviewed six patients who were confirmed as the perihip or peripelvic infections with a provisional diagnosis of a septic hip. We performed MRI in five, CT scan in one, Tc99m bone scanning in four cases. Six cases included three cases with an abscess of iliacus, two cases of an abscess of the obturator muscle, and an abscess of gluteal muscle with osteomyelitis of the ilium. The abscesses were treated with a CT guided aspiration and i.v antibiotics. The duration of the i.v antibiotic ranged from 13 days to 28 days (mean 18 days). The causative organism was *Staphylococcus aureus* (*S. aureus*) with multiple drug sensitivities. All cases were healed without any complications.

DISCUSSION: As the diagnostic images, Ultrasound, CT, and MRI are commonly used. Ultrasound, favored as an inexpensive screening test, can be confusing and yield non diagnostic results. There have been some reports that CT is very helpful in the accurate diagnosis of the perihip or peripelvic abscess. However, the diagnosis of the cases in those reports were made before MRI was popularly used. In cases with the presence of an abscess confirmed, a surgical drainage and postoperative short course of i.v antibiotics have been reported to be an appropriated treatment method. A CT guided aspiration was tried and the results was excellent.

CONCLUSION: MRI can be very helpful for diagnosis of patients with the possibility of the perihip or peripelvic abscess. An evacuation of the abscess with a CT guided aspiration and the use of i.v antibiotics, are one of effective and less invasive treatment option.

J-P16

Two Cases of Congenital Dislocation of the Knee

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(case1) Four days after the birth, female. The right knee was fixed at 60 degree hyperextension. Drehmann type I. At the first treatment, the patient was performed manual reposition and fixed 40 flexion with plaster. By gradual mobilization, the 19 days after the birth, the plaster was removed. Six months after the birth, the subluxation was reposed well and no limitation of ROM. (case2) Two days after the birth, female, the right knee was fixed at 70 degree and left knee was fixed at 50 degree hyperextension. Drehmann type I. At the first treatment, the patient was performed manual reposition and fixed 60 flexion and 90 flexion with plaster. One year after the birth, the subluxation was reposed well and no limitation of ROM. (discussion) The prognosis of congenital dislocation of the knee is seemed to be good. However these cases are juvenile females. So periodical follow up may be important.

J-P17

Clinical Results in Mentally Retarded Children with Patellar Dislocation Treated by a Triangular Flap

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[Purpose] To report about the clinical results by a medial triangular flap and lateral parapatellar capsulo-retinacular release that the Koshino et al. of Yokohama city university reported as the surgical procedure against the dislocation of patella for children.

[Materials & Methods] Three knees of three children with habitual patellar dislocation and one knee of a child with congenital permanent dislocation were involved in this study. All children have mental retardation and the intelligence quotient was not able to measure except one case. The mean age at surgery was 12.8 years. The mean follow-up period was 27 months (range, 4-41 months). A long leg cast with slightly knee flexion was applied for 6 weeks.

[Results] At follow-up, there was no dislocation and subluxation of patella and the clinical results were satisfactory in all patient. Although we applied a long leg cast for 6 weeks after operation due to hypermobility of the joint those who have mental retardation, there was no problem about knee without the recovery of the muscle power being delayed.

[Conclusion] This procedure for children has advantage of being able to get the stability of patella and retains the functional power of the quadriceps. It is convenient and effective to the mentally retarded children, too.

J-P17

知的発達障害を伴った小児膝蓋骨脱臼に対する楔状弁法の治療経験

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【目的】小児膝蓋骨脱臼に対する術式として、横浜市立大学の腰野らが報告した楔状弁法による治療経験について報告する。

【対象と方法】対象は4例4膝（男児1例、女児3例）。先天性1例、反復性3例で、全例に知的障害を合併し、知能指数（IQ）は4例中3例で測定不能、1例は57であった。手術時平均年齢は12歳10ヵ月、術後平均観察期間は2年3ヵ月間であった。手術は楔状弁法により膝蓋骨内方移行術を施行し、術後は軽度屈曲位で6週間のギプス固定とした。

【結果】4例とも膝の問題は消失し術前以上の移動レベルとなった。知的障害の合併のため術後は長期間のギプス固定を施行したが、筋力の回復が遅れたこと以外特に問題はなかった。

【考察】小児の膝蓋骨脱臼は、放置により関節の形成不全をきたし将来的な機能障害の原因になる。我々の4例は知的障害を合併し、これによる関節弛緩や創保護のため術後6週間のギプス固定を施行した。しかしギプス固定による悪影響はほとんどなく、術後成績は良好であった。今回報告した楔状弁法は、小児で知的障害を伴う場合にも比較的簡単に確実な制動効果が得られ有用であると考ええる。

J-P18

Treatment of Synovial Shelf Syndrome in Children

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Purpose: We report the results of treatment of 10 children aged 9 to 12 years with synovial shelf syndrome.

Method: In the shelf induction test, pain was noted and a crepitation was heard in the medial region of the patella in all patients. Arthroscopy showed, white hypertrophy of the plica synovialis mediopatellaris, and six of the knees were type C by Sakakibara's classification, with covering the front surface of the medial malleolus of the femur.

Results: Self resection was done by arthroscopy for all patients, after which both pain and limitations in excursive movements decreased. Shelf tissues showed inflammation caused by mechanical stimulation.

Conclusion: These results suggest that if trauma is a wide range of the shelf structure, shelf disorders may develop in patients who are still children.

J-P19

Redosurgery of Clubfoot: Results and Strategy

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PURPOSE:To precise our strategy about redosurgery of clubfoot, we studied 56 clubfeet.

METHOD:The first procedure was in 54 cases an MPR and twice a PR. The average age at first surgery was 10 months . In 40 cases , recurrence of deformities was in varus and medial rotation of hindfoot, in 13 cases it was combined to equinus. 3 feet were operated on for supination or adduction forefoot .The average age at redosurgery was 4 . The procedure for the first redosurgery was in 33 cases again STR. Additional procedures were performed in 13 cases. In 10 cases various osteotomies were performed. The follow up was 4 to 12 years,the average age being 16 .**RESULTS:**13 recurrences were treated successfully by redosurgery . We performed 2 STR, 4 os calcis osteotomies , 4 Ilizarov distraction. 3 supinated or adducted feet were operated on by osteotomy around Lisfranc joint. 26 other feet were overcorrected , mixing lateral translation and valgus foot. In 17 cases redosurgery had to be repeated. All 43 feet had been treated by extensive STR.

CONCLUSION: Nowadays we perform the first STR around standing up age. When a recurrence occurs, we start with plastercasts. And redosurgery is made of STR combined or not to osteotomies, depending upon age of the child.

J-P20

Vertical Astragalus

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Female patient, 11 months old, with congenital deformity of the internal and plantar surface of the foot, with no neurological alterations, that presents disappearance of the internal arch becoming convex, pronation of the hind foot, with valgus and flexion of the fore foot. In their muscular evaluation, present reduction of the sural triceps muscle, anterior tibial muscle, common flexor digitorum muscles and peroneal muscles. With the anatomical and radiological evaluation, with dynamic positions in flexion and forced extension, we diagnose vertical astragalus demonstrating the dislocation of the scaphoids toward the neck of the astragalus when the foot is in flexion, as well as the lateral portion of the superior face of the astragalus was inside the tibiofibular syndesmosis. The conservative treatment is complicated and it requires dedication and experience. This treatment consists in take the hind foot towards flexion, inversion and adduction, with traction of the calcaneus to avoid the equinus. In most of the cases, the conservative treatment is not successful, so we decided to carry out the surgical treatment. With the Cincinnati approach and the opening of the medial lateral and dorsal joints and restore the astragalus position over the calcaneus. The surgery was decided according to age and deformity (type 2 of Rigault et Poulighen classification), obtaining a successful result.

J-P21

Medium-Term Results of Vulpus Lengthening of Gastrocnemius Combined with Heel Cord Advancement for Spastic Pes Equinus Deformity

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Vulpus lengthening of gastrocnemius combined with heel cord advancement was performed on 21 feet of 18 patients with spastic pes equinus deformities, and satisfactory mid-term postoperative results were obtained. Mean age at surgery was 10 years (range, 5-7 years) and mean duration of follow up after surgery was 7 years and 11 months (range, 5 years and 7 month - 9 years and 11 months). There have been no recurrences of pes equinus deformity and no appearance of pes calcaneus deformity in any of the 18 patients. Movement ability improved in two patients and did not deteriorate in any of the patients. Eight of the patients became able to stand on only the affected foot after the operation. On the other hand, callosity formation, which was not seen in any of the feet at the time of the short-term postoperative evaluation, was seen in five feet at the time of the mid-term postoperative evaluation.

J-P22

Intercalary Allografts in The Treatment of Congenital Pseudarthrosis of the Tibia in Young Child.

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PURPOSE: Two young children (the average age is 2years) with Type II congenital pseudarthrosis of the tibia, failed one or two surgical attempts at union, are successful united by using intercalary allografts and intramedullary rodding.

METHOD: A 2 year-3 month-old boy with neurofibromatosis, after a attempt at microvascular live fibular transplant from the opposite leg, it has failed; a subsequent intramedullary rodding and autogenous bone grafting has been performed and it also has failed. Intercalary allograft (3 cm in length) and intramedullary steinmann pin fixation was used after thorough excision of the diseased tibia and surrounding hamartomatous tissue. Another 1 year-10 month-old girl, refracture was treated with autogenous bone grafting and intramedullary rodding but failed. Intercalary allograft (6 cm in length) and intramedullary pin fixation was chosed. Postoperatively the limbs were immobilized in an above knee plaster of Paris cast, followed by a knee-ankle-foot polypropylene orthosis until skeletal maturity is reached.

RESULTS: Within an average time of 14 months, there is good incorporation at each end and the pseudarthroses has united.

CONCLUSION: Management of congenital pseudarthrosis is one of the most challenging problems in orthopedics. Preliminary results of two young children appears to be promising by using intercalary allografts and intramedullary rodding. It has advantages of thorough removing the diseased tibia, replacing it with a desirable length of allograft and correction of deformity feasible at the same time as grafting; no needs of experience with microvascular techniques as free vascularized bone graft; no delayed surgery and difficulty problems of Ilizarov technique. Problems are spontaneous extrusion of the nail through the sole of the foot and employed intramedullary tarsotibial pinning, which may injured the ankle joint and the distal tibial epiphyseal growth plate.

J-P23

Long Term Changes of Cubitus Varus and Range of Motion in a Case of Separation of Distal Humeral Epiphysis

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PURPOSE: To show the progression of cubitus varus and range of motion in a case of separation of distal humeral epiphysis. **METHOD:** For the period of 8 years, a case of 5-year-old boy who suffered the separation of distal humeral epiphysis was closely traced. He underwent an open reduction. One year after the injury, he had the second operation of the resection of medial metaphysis to improve the flexion. After 6 years from the initial injury, he had the third operation of the lateral closing wedge and external rotation osteotomy. **RESULTS:** The registered carrying angles of his left arm were as follows, -15 degrees in 2 weeks, 3 months, 6 months, 1 year and 6 years after the first operation of OR and IF, and 7 degrees in 3 months and 2 years after the third operation of corrective osteotomy. The extension-flexion ranges of motion of his left elbow were as follows, 0-90 degrees in 1 year after OR and IF, 0-90 degrees in 3 months and 0-110 degrees in 5 years after the resection of medial metaphysis, 20-115 degrees in 3 months and 20-135 degrees in 2 years after the corrective osteotomy. **CONCLUSION:** The cause of cubitus varus in this case can be attributed to malreduction instead of growth abnormality. And the ROM of the injured elbow is most likely to be influenced by the arm-forearm alignment.

J-P24

Correction of Angular and Shortening Deformities of Long Bones After Epiphyseal Injury in Children and Angulation Plane

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PURPOSE: We corrected the angular and shortening deformities of four long bones after epiphyseal injury in children by callotasis. But the deformities were expected to worsen even after surgery, because the children were still growing. We therefore overcorrected them. **METHODS:** Four children were treated from 1992 to 1995, having predicted the final leg discrepancy and angulation at the age of maturity. Three distal epiphyseal lines of the femur had been involved and a distal epiphseal line of the tibia; their ages ranged from 11 to 12, and mean follow-up period was 57 months (48 - 65 months). **RESULTS:** The necessary amount of correction and lengthening for each bone could be obtained by callotasis. The mean lengthening of bones was 6.1cm(range, 4.6 - 8.1cm). The mean correction of angular deformities was 25 degrees (16 - 37 degrees). The mean healing Index was 34 day/cm (28 - 45 day/cm). Final range of motion of the knee and ankle joint was satisfactory. **CONCLUSIONS:** It is important to correct angular deformity in three-dimensionally. When correction is on the angulation plane, the angulation on both views three-dimensionally is corrected at the same time. The direction of pins of external fixation is important with using uni-lateral external fixator. We inserted pins into long bones parallel to the angulation plane. It is still difficult to predict bone growth accurately. Correction of the angular and shortening deformity of long bone by callotasis is safe and effective

J-P25

Clinical Features and Deformities in Multiple Osteochondromatosis: A Review of 10 Cases

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Purpose of Study:To identify clinical features and common deformities of the extremities in patients with multiple osteochondromatosis.
Methods:10 patients known to have multiple osteochondromatosis were reviewed and were examined physically and radiologically. The mode of inheritance was identified.
Results:Of the 10 patients suffering from multiple osteochondromatosis, 5 of them had the pathology ran in families. All patients are of short stature and had symmetrical shortening of the extremities. The most common disability is limitation in supination or pronation related to bowing of the forearm bones. Dislocation of the radial head is common. The hip joints are in valgus because of increase in anteversion and hypertrophy of the femoral metaphyses. Although ankle joints were affected in most patients, none of them had problems on walking. Surgery was done for 2 children. A Masada type I forearm deformity had the ulna lengthened in order to correct bowing of the forearm. The other had excision of knee osteochondroma done for pain over an adventitious bursa. No malignant transformation of the tumour was found.
Conclusions : Multiple osteochondromatosis is an inheritable disease. In additions to multiple bony swellings, it presents with characteristic clinical features: dwarfism, short limbs and bowing of forearms.

J-P26

Experience with Malignant Bone Tumor in Children and Adolescent

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Purpose: Management of osteogenic sarcoma in children has made a fantastic step on the survival rate, but there still remains an unexpected late failure of prosthesis. Therefore, we examined functional status after the surgical treatment. **Materials and Methods:** Since 1989, 8 cases of malignant bone tumor were analyzed. Of the 8 patients, 5 were boys and 3 were girls. An average age was 12 years. Mean follow-up time was 6 years. The histologic diagnoses were osteosarcoma in 7 cases and malignant fibrous histiocytoma in 1. Seven patients received wide resection, and one had an amputation after adjuvant chemotherapy. The bony defect was reconstructed by the segmental knee prosthesis in four, rotationplasty in two, and intraoperative extracorporeal radiation in one. **Results:** Five patients were alive and disease free. One patient had local recurrence. Two patients died from metastases. The overall 5-year disease specific survival rate was 73%. All the patients who received limb salvage surgery had no difficulty in walking. The average functional score of Musculoskeletal Tumor Society was higher in 4 patients who had prosthesis than in 2 patients who had rotationplasty. Two patients who had a reconstruction of extensor mechanism using gastrocnemius muscle flap had no extension lag of the knee. Revision of the prosthesis was performed in 1 patient with femoral component breakage. **Conclusion:** In children and adolescents, prosthetic knee reconstruction can provide a useful function. In selected cases, irradiated bone can be an alternative for reconstruction.

J-P26

小児悪性骨腫瘍の治療成績

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【目的】小児悪性骨腫瘍の治療は、長期成績が要求され、治療法の選択に難渋する事が多い。今回、下肢発生例を検討し、問題点などを考察した。

【対象及び方法】1989年以降の8例を対象とした。性別は男性5例、女性3例で年齢は平均12歳、経過観察期間は平均5年10カ月であった。組織型は骨肉腫7例、悪性線維性組織球腫1例であった。手術は患肢温存術が7例で、再建法は人工関節4例、Rotationplasty 2例、放射線照射骨1例であった。切断術は1例であった。全例に化療を施行した。

【結果及び考察】最終時点での転帰はCDF 5例、NED 1例、DOD 2例であった。Kaplan-Meier法による5年累積生存率は73%であった。機能評価では、患肢温存症例は、全例が独歩可能となった。しかし人工関節例では弛みや破損、非人工関節例では整容面や骨吸収などの可能性があり、個々の症例に応じた手術法の選択が必要である。

J-P27

Operative Treatment Associated with a Dose of Diphosphonate for Fibroplasia Ossificans Progressiva

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We report the case of a child with fibroplasia ossificans progressiva (FOP) who was treated surgically and with a dose of diphosphonate (EHDP). Case: The patient is a 12-year-old girl who has been followed at our hospital. When the child was 18 months of ages, her mother noticed a red and swollen area on the child's neck and back after a falling accident. The area was generally hardened and developed a bony consistency. At 6 years of age, the patient was diagnosed a showing FOP and was treated with chemotherapy. However, the disease gradually progressed and developed into severe hyperlordosis. The patient couldn't look ahead without being in an anterior flexion position. At 12 years of age, she received EHDP, and the ectopic bone in her back was surgically removed. Results: After the surgery, the patient was able to look ahead smoothly. The patient's sagittal curve (Occ-L5) was significantly improved from 118 degree to 56 degree, however, her scoliosis had progressed from 36 degree to 43 degree. Six months later, a radiograph showed no recalcification. The patient was satisfied with the improvement. Discussion: There are many reports that surgical resection is ineffective in patients with FOP since heterotopic bone reforms at the operative site. Therefore, we tried to achieve a better position for the patient so that she could look ahead without any forced supine position, even if the occification reoccurred.

J-P28

Anterior and Posterior Surgery for Thoracolumbar Kyphoscoliosis Associated with Spondyloepiphyseal Dysplasia Congenita – Report of a Case –

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We report and discuss an atypical case of kyphoscoliosis associated with spondyloepiphyseal dysplasia congenita treated successfully corrected by anterior and posterior fusion. A 27-year-old woman, whose chief complaints were low back pains and dyspnea, was admitted to our hospital. She had a severe thoracolumbar kyphoscoliosis between Th8 and L3, Cobb angle of which was 127 degrees in the coronal plane and 119 degrees in the sagittal plane. Further simultaneous experimental study by a pediatricist diagnosed her as spondyloepiphyseal dysplasia congenita. Anterior and posterior fusion was performed to correct the kyphoscoliosis. After the surgical procedure, her Cobb angle in between Th8 and L3 was reduced to 57 degrees in the coronal plane and to 78 degrees in the sagittal plane. After 3 and half years' follow up, her low back pain and dyspnea disappeared. Among spinal deformities associated with spondyloepiphyseal dysplasia congenita, kyphoscoliosis is unusual and difficult to treat. As far as we have searched, there are a few reports of successful spine fusion for patients with spondyloepiphyseal dysplasia congenita. Significant factor in our case is that we performed both posterior and anterior surgeries and applied anterior strut graft to get load sharing for the severe deformity. In addition, an intensive care by the anaesthesiologists has made thoracotomy for such a respiratory insufficient patient possible.

J-P29

Oblique Posture in 77 Infants

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"Purpose" The oblique posture is asymmetrical patterns consist of skull deformity, postural scoliosis and limitation of abduction in the flexed hip. This is the prospective study of the relation between oblique posture and hip joint.

"Methods" From 4/1991 to 3/2001, we treated 77 infants with oblique posture. There were 30 boys and 47 girls. The age ranges 3-12 months old.

"Results" The diagnoses were 31 oblique posture only, 23 congenital dislocation of the hip, 7 acetabular dysplasia of the hip, 6 cerebral palsy, 5 torticollis, 2 spina bifida and 3 other diseases. Fifty-five cases were on the right side and 22 were on the left about the direction of oblique posture. In the limitation of abduction in the flexed hip, 28 cases were right sided and 49 were left sided. Both oblique posture and limitation of abduction in the flexed hips were on the right in 6 cases.

"Conclusion" These results indicated that 46(59.7%) of 77 infants with oblique posture had some orthopedic disease. In conclusion, the serial examinations are very important for those infants.

J-P29

斜位姿勢を呈した77例の検討

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【目的】乳児期にみられる斜位姿勢（向き癖）は頭部変形・開排制限・側彎などを特徴とする非対称姿勢である。今回当園で経験した斜位姿勢を呈する症例について斜位姿勢と股関節に注目し検討したので報告する。

【方法】対象は平成3年4月から平成12年3月までの10年間に当園を受診した1歳以下の乳児371例中、明らかな斜位姿勢を呈した乳児77例である。性別は男30例、女47例であり、初診時年齢は3ヶ月～12ヶ月であった。

【結果】これらの最終診断は斜位姿勢のみで器質的疾患がない一過性の姿勢異常（開排制限のみを含む）31例、先天性股関節脱臼23例、臼蓋形成不全7例、脳性麻痺6例、筋性斜頸5例、二分脊椎2例、その他の疾患3例であった。斜位姿勢の方向では右55例、左22例で、開排制限は右28例、左49例であった。斜位姿勢の方向と開排制限が同側であったものは6例で全て右であった。

【考察】斜位姿勢といわれる非対称性姿勢は、原始反射の一つである非対称性緊張性頸反射の関与が大きいと考えられている。ただ二次性（症候性）の場合は原疾患が先行し、これが原始反射と関連して非対称姿勢を形成することも考えられる。いずれにせよ77例中46例（59.7%）に何らかの整形外科的疾患が合併しており、明らかな斜位姿勢を呈する乳児の場合は慎重な経過観察が必要である。

J-P30

Compression Plating of Femoral Shaft Fractures in Children 6 to 12 Years Old

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Purpose : This study reviews our results with compression plating for femoral shaft fractures in children between the ages of 6 and 12 years.

Methods : 58 patients with a closed femoral shaft fracture were treated with compression plating. Open, pathologic, subtrochanteric and physeal fractures were excluded. Age at the time of injury was 8.3 years (range 6.0 to 11.9 years). Malunion was defined as an angulation over 10 degrees in the coronal plane, or 15 degrees in the sagittal plane, a malrotation over 15 degrees, and a length discrepancy over 15 mm compared with the other femur.

Results : All patients had been followed until union. 42 patients (27 boys, 15 girls) were followed for at a minimum of 3 years and form the basis for this study. The average hospital stay was 6.6 days. Average time on crutches was 6 weeks. There was one infection (1/42). Early in the series 6 plates broke (all shorter than 13 cm), these were all successfully treated with re-plating using thick plates longer than 14 cm. All had unlimited hip and knee motion. There were no nonunions, refractures, angulatory or rotatory malunions. Clinically, 3 patients had a leg length discrepancy, none required treatment. 23 patients complained about the scar.

Conclusion : Plating is a good treatment method in this patient population. Plates larger than 14 cm should be used. The main drawbacks are a high incidence of hypertrophic scar and the need to remove the plate.

J-P31

Functional Disturbance of Sacroiliac Joints and Costovertebral Joints could be One of the Significant Factors in the Etiology of Atlantoaxial Rotatory Fixation (AARF)

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AARF is predominantly a lesion of childhood. The characteristic posture is with the head rotated in one direction and tilted in the opposite direction. The etiology of AARF is still unknown. Arthrokinematic approach (AKA), which is based on the arthrokinematics, is the method that combines the diagnosis and the treatment for the functional disturbance of synovial joints, especially the disturbance of the intra-articular movements such as joint play, or sliding of joint surface. The purpose of this study was to investigate the etiology of AARF and the effectiveness of AKA for AARF. Fourteen cases of AARF were treated with AKA. They were 7 men and 7 women. The average age of the patients was 9.7 years old. The diagnosis was determined by plain roentgenograms and CT scan. AKA was done for sacroiliac joints, costovertebral joints and/or cervical intervertebral joints. The cock robin head position in 7 cases was corrected with AKA for just sacroiliac joints and constovertebral joints. It was corrected with the following AKA for cervical intervertebral joints in the other cases. In conclusion, AKA is one of the most useful conservative treatments for AARF. The functional disturbance of not only cervical intervertebral joints but also sacroiliac joints and costovertebral joints could be one of the significant factors in the etiology of AARF.

J-P32

Treatment of Spondylolysis in the Growth Period Using Low-Intensity Ultrasound

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PURPOSE: With conservative therapy for spondylolysis in the growth period, the time needed to achieve bony fusion of the separated portion of the vertebral arch is prolonged, with the separated portion readily developing pseudoarthrosis. Here we report our experience with ultrasound therapy aimed at overcoming this delay in the bony fusion of the separated portion in spondylolysis in the growth period.

METHODS: New cases of bilateral separated vertebral arches were studied, namely 8 males aged 14 ~ 18 years (mean 15.8 years). The level of the affected vertebral arch was L3 in 2 cases, L4 in 2, and L5 in 4. The ultrasound therapy was begun after a definitive diagnosis was made. At the same time, trunk external fixation was applied as routine conservative therapy. A Sonic Accelerated Fracture Healing System (SAFHS 2000, Exogen Co.) was used to provide the ultrasound irradiation. The ultrasound waves were irradiated from the dorsal side of the vertebral arch root, with only a unilateral arch treated.

RESULTS: Bony fusion of all separated vertebral arches was obtained. In the bilateral cases bony fusion was hastened on the side that was subjected to ultrasound irradiation as compared to the side that was not.

CONCLUSION: By applying ultrasound therapy from the early period after onset of spondylolysis in the growth period, the time needed until completion of bony fusion of the separated portion of the vertebral arch was shortened.

J-P32

低出力超音波を用いた成長期脊椎分離症の治療

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【目的】成長期脊椎分離症は保存療法による椎弓分離部の骨癒合までの期間は長く、また分離部は偽関節に陥り易い。成長期脊椎分離症の分離部骨癒合遅延を改善することを目的に超音波治療を行ったので報告する。

【方法】両側椎弓分離の新鮮例を対象とした。症例は8例で全例男であった。治療開始時年齢は14歳から18歳で平均15.8歳であった。罹患分離椎弓高位はL3椎弓2例、L4椎弓2例、L5椎弓4例であった。初診時の分離の程度は、L3椎弓の2例は両側椎弓の不全分離であり、L4椎弓の2例は両側椎弓の完全分離であった。L5椎弓例のうち1例は両側椎弓完全分離で、3例は片側の椎弓は不全分離で、対側の椎弓は完全分離であった。超音波治療は診断確定後から開始した。同時に通常の保存療法として外固定を行った。超音波照射はExogen社製 Sonic Accelerated Fracture Healing System (SAFHS 2000)を用いた。超音波は椎弓根部の背側から照射し、一側の椎弓のみとした。

【結果】全ての分離椎弓に骨癒合が得られた。また、両側椎弓分離のうち超音波照射を行った椎弓の方が照射を行わなかった椎弓より骨癒合が加速された。骨癒合完成までの期間は平均3.2ヵ月であった。

【結論】成長期脊椎分離症は発症早期から超音波治療を行うことにより、椎弓分離部の骨癒合完成までの期間は短縮した。

J-P33

Unsolved Problem? Kyphotic Sequela of Older Patients Involving in Tuberculous Spondylitis in Their Childhood

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This retrospective study is to present our experiences on the kyphotic sequela of the older patients involving TB Spine in childhood. Two examples of unique conservative treatment could not prevent the severe kyphosis for young children. Two examples of Hong Kong technique without addicted posterior fusion involving in thoraco-lumber spinal tuberculosis could not prevent the severe kyphotic development after few years follow up. One patient involving the pseudo-temporal aspect with severe destruction of L 3 was operated by large posterior eradication, instrumentation by CDI without anterior addicted Hong Kong technique resulting in a very little aggravated lumber kyphosis after 20 months FU. Was only posterior CDI instrumentation combined with the antituberculosis medication able to prevent kyphosis? One patient involving the high thoracic spinal tuberculosis presented an almost complete paralysis and severe dyspnea relieved only by skull traction. The long duration and difficulties of surgical management even with good recovery is not a comfortable solution for the late sequela of severe kyphosis. The high-risk injury to omega shape aorta, difficulty in decompression and grafting technique in severe kyphotic thoraco-lumber spinal tuberculosis were the most interesting and hard works during surgery. The missed cervical TB usually accompanied by severe kyphosis, high risk of quadriplegia and morbidity. The most important steps were no doubt the early detection and adequate antiTB medication. Tuberculous spondylitis with severe kyphosis is still the difficult problem for the spine surgeons.

J-P34

Musculoskeletal Conditions of Acute Leukemia in Children

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Purpose: Acute leukemia is one of the most common cancer in childhood and may exhibit various musculoskeletal conditions. The purpose of this study was to analyze the clinical, radiographycal, laboratory findings in the leukemia patients with the chief complain of orthopaedic conditions.

Materials & Methods: Sixteen patients who visited to several childrens hospitals with the chief complaint of orthopaedic conditions, but who were all diagnosed as leukemia subsequently were reviewed. The mean age was 4.5 years old (range, 16 months to 12 years). Diagnosis was confirmed by bone marrow biopsy in all patients. Thirteen had acute lymphoblastic leukemia and three had non-Hodgkin lymphoma.

Results: Twelve patients had initial symptoms related to the extremities and four had back pain. On presentation, elevation of body temperature was observed in 9 patients. White blood cell count was elevated in two patients, decreased in two, and normal in twelve. Hemoglobin was decreased in 10 patients and C-reactive protein was elevated in 10 patients. Radiographycally, osteopenia was observed in thirteen patients, osteolytic lesions in six, periosteal reaction in six and pathological fracture in five. Of these five patients with pathological fracture, four had vertebral body fracture.

Conclusion: Since the initial presentation of leukemia involve the musculoskeletal condition, orthopaedist must have a high index of suspicion.

J-P34

整形外科を初診した白血病

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【はじめに】白血病は小児における悪性腫瘍の中で最も一般的な疾患である。本疾患はしばしば整形外科の愁訴を有することが知られている。今回我々は整形外科の主訴で来院したものの精査の結果白血病であった疾患についてその病態、臨床所見につき調査を行ったのでここに報告す。

【対象】当院および静岡県立こども病院、千葉県立こども病院、国立小児病院、福岡市立こども病院において整形外科的主訴で来院したものの精査の結果白血病（悪性リンパ腫を含める）であった16例につき調査を行った。初診時年齢は1歳4ヶ月から12歳で平均4.5歳であった。確定診断は全例骨髓穿刺により行い急性リンパ性白血病13例、非ホジキン悪性リンパ腫3例であった。

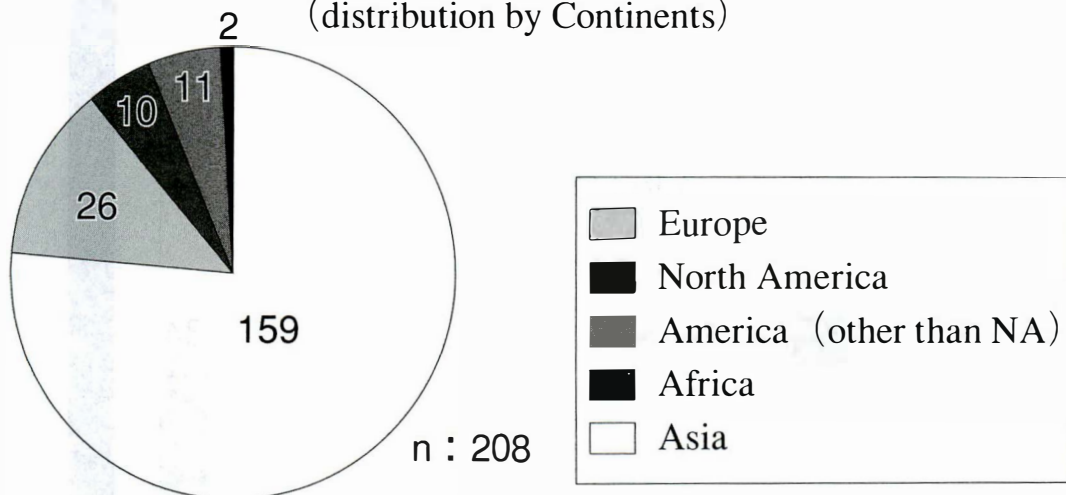
【結果】四肢痛を主訴に来院したものが12例、腰痛を主訴に来院したものが4例あった。血液検査所見において白血球数は2例が増加、2例が減少、12例は正常であった。ヘモグロビン値の減少は10例に、CRP陽性も10例に認めた。単純X線所見において最も多く認められた所見は骨萎縮であり他にも溶骨性変化、骨膜反応、病的骨折などが認められた。

【考察】白血病は生命予後にも関係する重篤な疾患であり本疾患の初発症状が四肢痛などの整形外科の主訴である場合があることは充分考慮に入れねばならない。

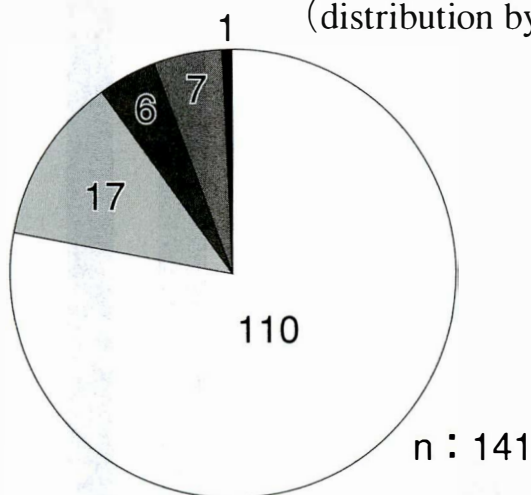
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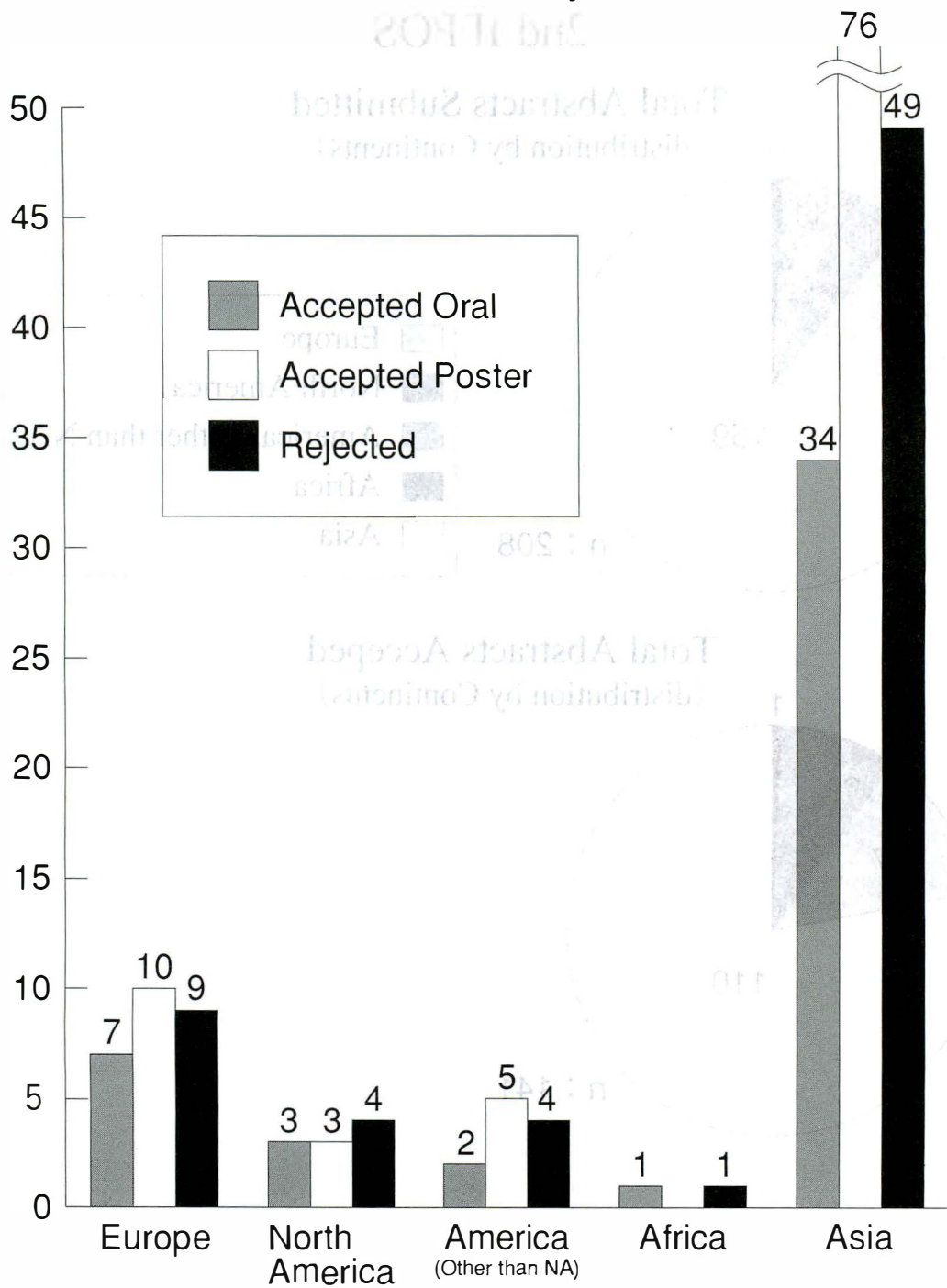


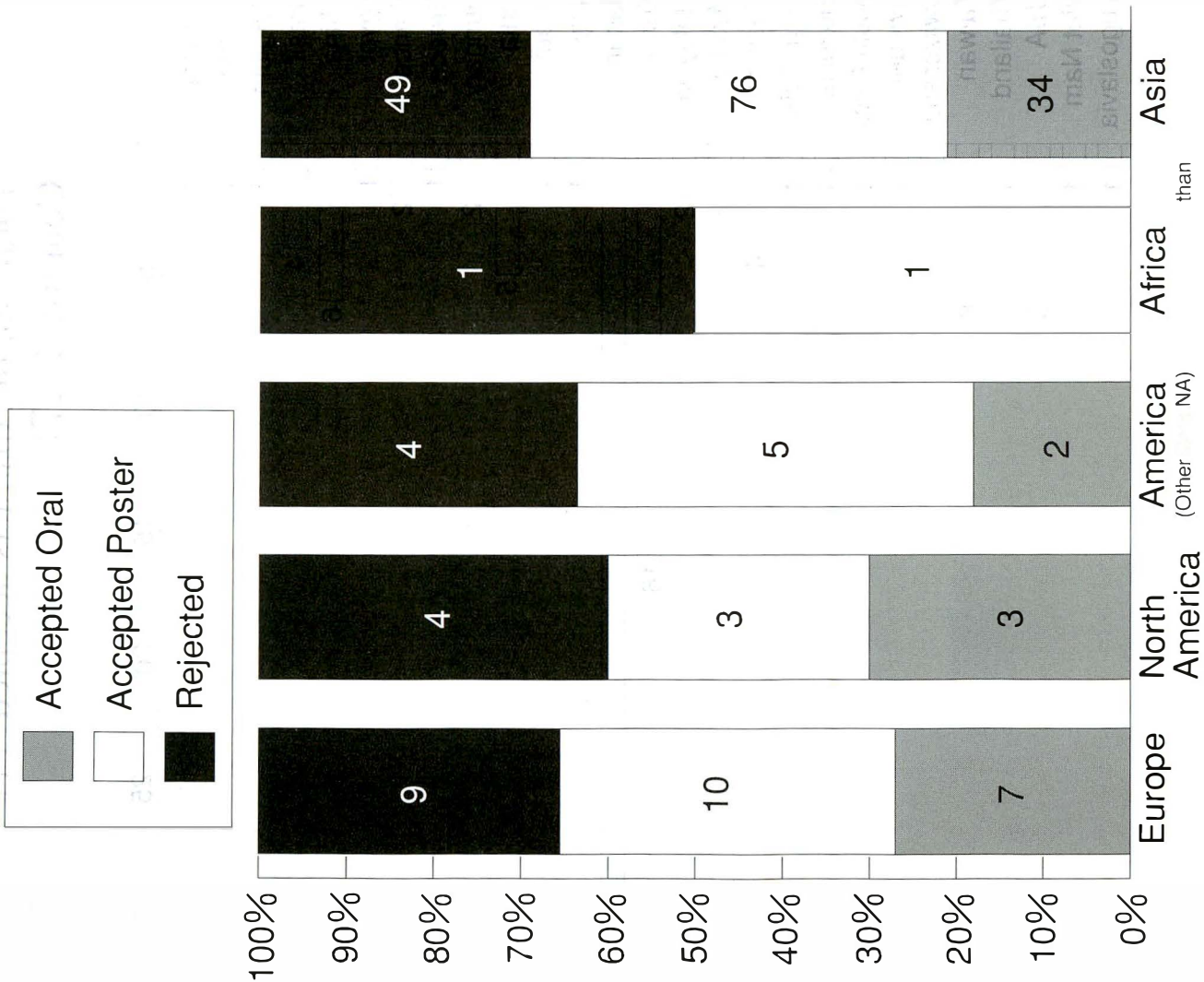
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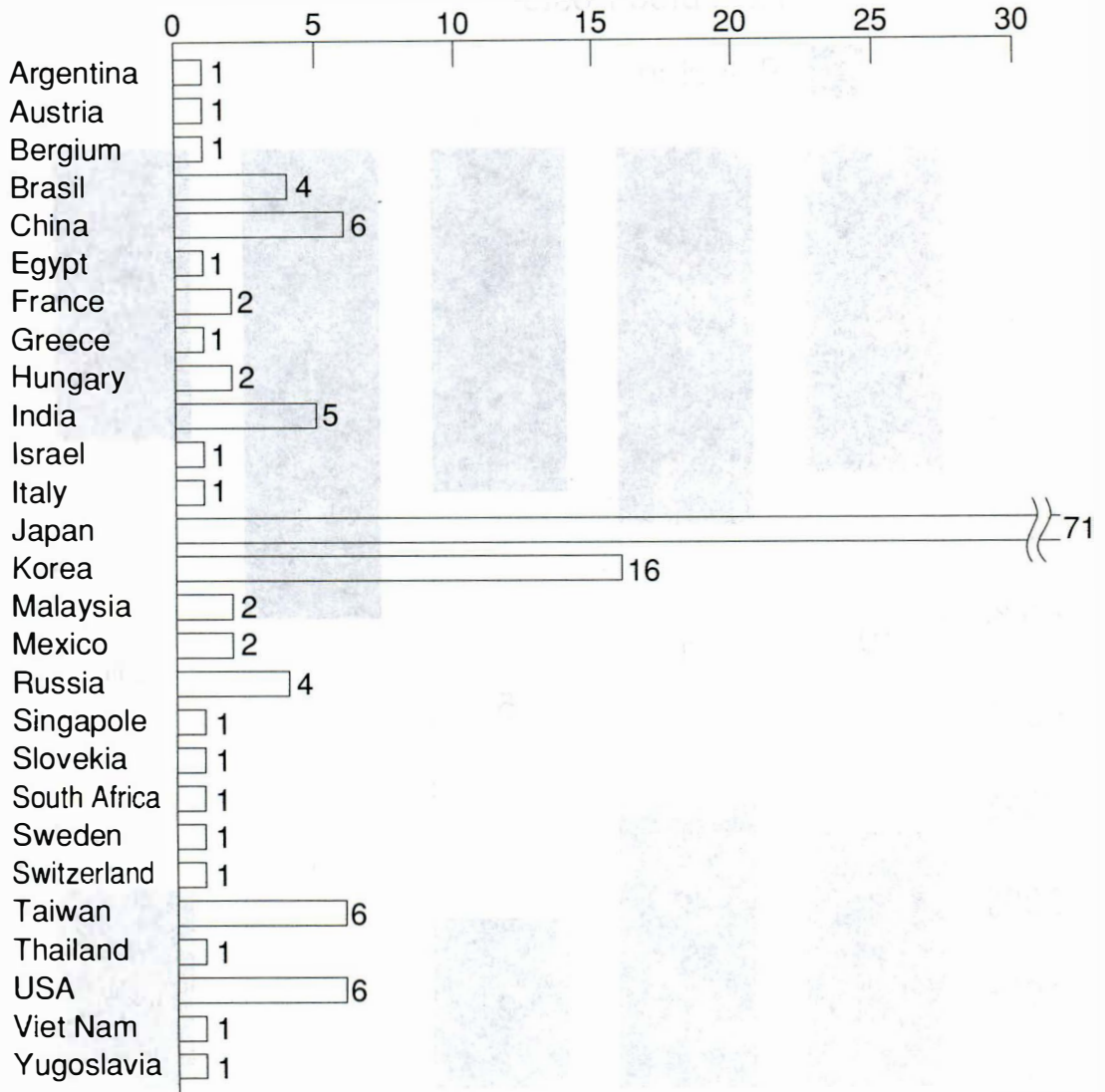




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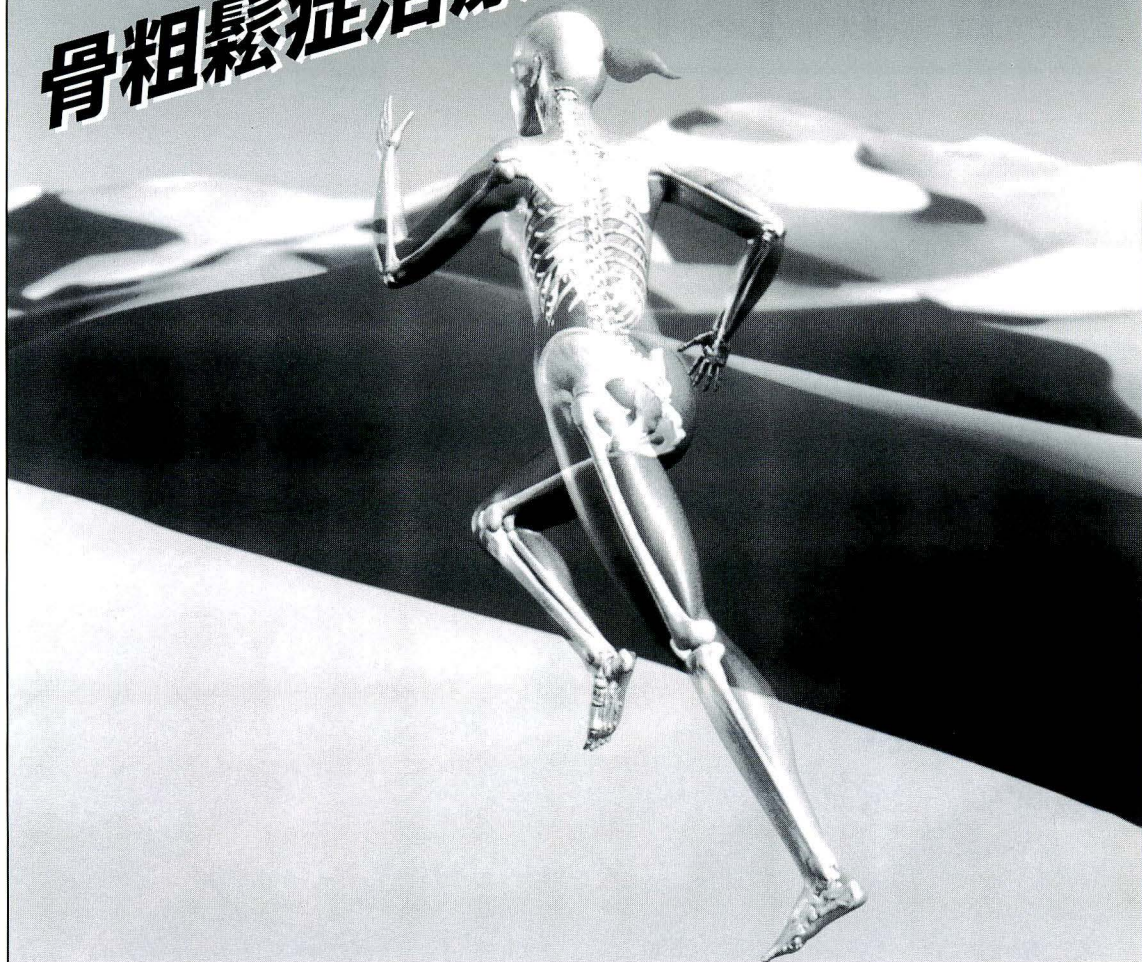
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