

## DDH ; Screening and Prevention in Japan

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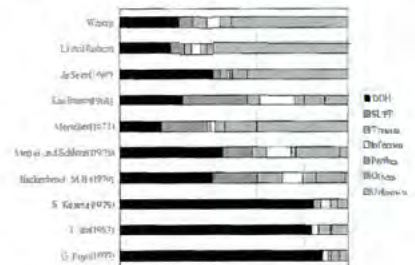
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### Introduction

In Japan more than 85% of osteoarthritis of the hip joint is secondary to DDH. This shows the marked contrast compared with the causes of DDH in European countries. So the screening and prevention of DDH is most important for the treatment of osteoarthritis of the hip joint in Japan. (Fig. 1)

Fig. 1: Causes of Osteoarthritis of the hip joint. Bottom three is Japanese.



### Screening

Clinical sign is important for very early diagnosis for DDH. And also no equipment is necessary. Click sign (Ortolani, Barlow), limited hip flexion- abduction and asymmetry of thigh skin folds have been commonly used. At 1967 neonatal mass screening using click sign was firstly introduced in Fukushima city, Fukushima prefecture.

Radiograms of hip joint are important for early diagnosis of DDH. As supplementary lines Hashimoto's line and Shiga's line were invented. As measurement parameters  $\angle L$  (lateral deviated angle Ujiiie),  $\angle \alpha + \angle L$  (Sum of two angles Ujiiie,  $\angle \alpha$  is acetabular angle of Hilgenreiner) and Yamamuro's A and B (Fig. 2) have been introduced. As indices for DDH diagnosis, Nozaki's index and Iino's index A, B & C (Fig. 3) were introduced in Japan.

In Miyagi prefecture, radiological examination for clinically suspected babies started at early 1951. At 1960 the Miyagi prefecture society of orthopaedic surgeons for DDH screening was established and radiological mass screening at 4 months started whole over prefecture. From 1960 to 1990, the consultation rate of screening has been 98.6% on an average (Fig. 4). Also radiological screening in Matsudo, Chiba prefecture started at 1971.

Ultra-sonography is very useful and necessary for early diagnosis of DDH. In Japan, it was introduced at 1985. JOA's training lecture of ultra-sonography (Echo seminar) has been held every year. So a lot of young doctors can operate this equipment correctly. Now neonatal screening of DDH by means of ECHO has become popular in Japan.

### Prevention

#### (1) Public Health Centre

In Japan, we have had a baby health check system sponsored by local governments since the 1940s. Public health nurses visit babies at their home to check them and to advise mothers on baby care. They referred the baby to the public health center where paediatricians and orthopedic surgeons screen for DDH and other abnormalities or developmental disturbances. This route was extremely effective in changing baby care methods.

#### (2) Mother-and-baby notebook

Mothers having a baby were provided with a "mother-and-baby notebook" for medical and welfare records under the guidance of the Ministry of Health and Welfare. In this notebook, we added a leaflet concerning the new baby care methods for DDH prophylaxis. (Fig. 5)

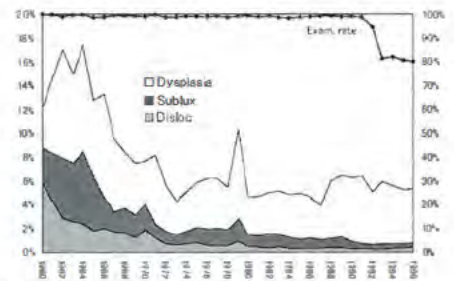
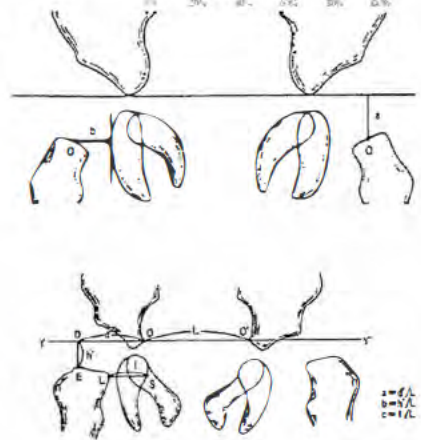


Fig. 4: Results of radiological mass screening for DDH at 4 months (Miyagi prefecture)



Fig. 5: Mother-and-baby notebook used in Fukuoka prefecture.

**(3) Baby care method**

Before 1960, most Japanese babies wore a long diaper, which wrapped around the lower legs tightly, extending the hip and knee. (The incidence of DDH was very high up-to 1.5 to 3.0 % at that period.)

In the 1960s, the triangular diaper became popular. However, it still wrapped the hip, and restricted the active movement of the baby's hip. The pants for the triangular diaper had also brought baby's hip to extension. (During this period, DDH incidence was 1.5 to 2.0%.)

In 1975, Ishida reported the results of a prophylaxis program for DDH in Kyoto. This was the first paper on prophylaxis program for DDH in Japan. He reported the remarkable decrease in incidence of DDH from 1.5% to 0.15% after changing the baby care methods (Fig. 6). The incidence of click sign also decreased from 2.75% to 0.28%. His guidelines included diaper, baby clothes and the way of carrying a baby (Fig. 7). (Ishida K: Prevention of congenital dislocation of the hip, clinical and experimental studies and practice of prevention, Seikeigeka 1975, 26:467-474, ).

In accordance with those guidelines, most of the Japanese orthopaedic surgeons who engaged in DDH began to change the form of diaper to allow free motion of the hip and knee in an attempt to decrease the high incidence of DDH. After these points were widely accepted by parents and grandparents, the incidence of DDH gradually decreased in Japan. By 1986, the incidence of DDH became 0.3 to 0.15%, depending on the area, and has been keeping this level until now. This prophylaxis programme for DDH has been carried out by the co-operation of Obstetricians, Paediatricians, Midwives, Public Health Nurses and Government Persons of Health and Welfare.

After the introduction of prophylaxis programme, reduction rate of Pavlik harness decreased from 91.3% (1969-1978) to 81.7% (1980-1988) (Fig. 9). Severe dislocation whose Yamamuro's A is under 0 mm increased from 0.8% to 13.0% after the prophylaxis (Fig. 10). Prophylaxis improved the environment influencing DDH; pre- and post-natal factors and trauma during delivery. On the other hand, genetic factor; primary acetabular dysplasia and familial joint laxity didn't change. The rate of DDH caused by genetic factor increased after DDH prophylaxis.

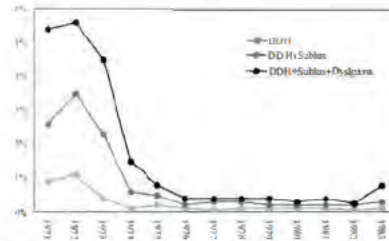


Fig. 6 : Drastic decrease of the incidence of DDH after the introduction of the prevention system in Fushimi ward, Kyoto.



Fig. 7 : Diapers, baby clothes and the way of carrying a baby

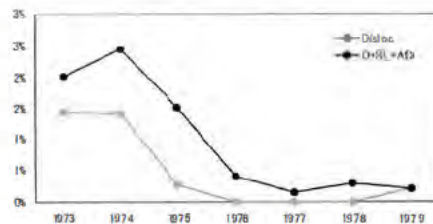


Fig. 8 : Decrease of the incidence of DDH after the introduction of the prevention system in Nagoya.

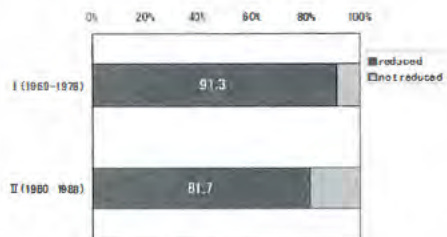


Fig. 9 : Reduction rate of Pavlik harness

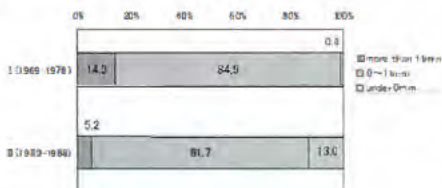


Fig. 10 : Changes of Radiological measurement parameter (Yamamuro's A)