

# Declining of Timing in Brace, Is It the Factor of Recurrent Clubfoot?

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**Background:** The treatment of the clubfoot with Ponseti casting technique is the most popular and becoming the standard treatment. Early study shown high recurrent rate so bracing after casting was introduce worldwide. Due to tropical weather, Bracing became burden of the treatment. Although health care providers provided information, treatment, and financial support, the brace were not proper worn as the recommendation protocol.

**Objective:** to identify if the declining of timing in brace is the factor of recurrent clubfoot.

**Methods:** The retrospective study of clubfoot who treated with casting and percutaneous tendo Achilles lengthening successfully. The data of timing of brace in first three months, timing of night splint after the first three month and outcome were collected. Descriptive statistics were employed from data analysis by the SPSS program.

**Results:** From 109 feet, recurrent clubfoot was found in 23 feet (21%). There were 12 feet in non-brace group and 97 feet in the brace group, second group shown statistically significant of better outcome (11% VS 89%,  $p=0.003$ ). 55 feet worn brace for less than eight hours (50.5%) and 42 feet worn brace for more than eight hours (38.5%) shown the later group have 9.1 times better outcome with statistically significant ( $p=0.001$ , odd ratio 9.1, median = 6.5 hours, max = 18 hours). The recurrent rate of the non-brace, worn less than eight hours, and worn more than eight hours are 58.3%, 25.5%, and 4.8% ( $p<0.001$ ). After first three months, 62 feet didn't wear the night brace (63.9%) and 35 feet wear the night brace.

**Conclusion:** After Ponseti casting technique, Declining of bracing time have risk of recurrent. To our knowledge, eight hours per day is enough and result comparable to report by the Ponseti groups.

## Introduction

The treatment of the clubfoot with Ponseti casting technique is the most popular, high success rate, high function and slightly less stiffness<sup>6)</sup>. Unfortunately 56 percent had recurrent. Later, Ponseti introduces foot abduction orthosis

which could decrease the recurrent rate. These orthosis were recommended to be worn full time for 3 months and night time up to 2-4 years. Bracing in clubfoot is a critical part of most current treatment. Many countries propose the bracing protocol claiming the main factor for long-term success of the treatment<sup>3)</sup>.

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**Key words :** clubfoot, night bracing, recurrent

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Due to tropical weather and cultures, bracing became burden of the treatment. Although health care providers provided information, treatment, and financial support, the brace were not proper worn as the recommendation protocol.

The purpose of this study is to identify if the declining of timing in brace is the factor of recurrent clubfoot.

### Methods

The retrospective study were collected from the orthopedic department of Siriraj Hospital, outpatient data between January 2006 and December 2014, Our study focused on the duration of bracing after the foot was corrected to proper position.

#### Inclusion criteria

All clubfoot patients who were diagnosed by a pediatric orthopedist. Both unilateral and bilateral Idiopathic congenital clubfoot was included.

#### Exclusion criteria

Acquired clubfoot patient who was diagnosed by a pediatric orthopedist. Recurrent and relapsed clubfoot as the result of failed surgical treatment and/or other conservation treatment was excluded.

Ponseti casting technique and percutaneous tendoachilles tenotomy at Siriraj Hospital was done with Ponseti protocol. At the ending of casting treatment, which the foot had neutral heel and external rotation up to 60–70 degree, the percutaneous tendoachilles tenotomy was done, the foot can dorsiflexion at least 15 degree. The patient was given foot abduction orthosis, information, and bracing protocol. The Ponseti protocol was used as guidelines for the treatment and follow the patients.

### The data collection

72 patients were treated with Ponseti casting technique and percutaneous tendoachilles tenotomy at Siriraj Hospital. 60 patients were enrolled, 12 patients were dropout due to lack of recording problems. The data of starting age of bracing (mean = 6 months, minimum = 9 months, maximum = 16 months), timing of brace in first three months (mean = 7.6 hours, minimum = 1 hour, maximum = 18 hours), Age of stop using night splint after the first three month (mean = 24.5 month old, minimum = 5 month old, maximum = 144 month old) and recurrent outcome were collected (Table 1).

In the first three month of bracing, we divided the patient into two groups; non-brace and bracing group. On bracing group, we also divided this group into two subgroup; on brace for less than eight hours group and on brace for more than eight hours group. The night bracing after the first three month was divided in to two group as night bracing and non night bracing (Fig. 1).

### Statistics analysis

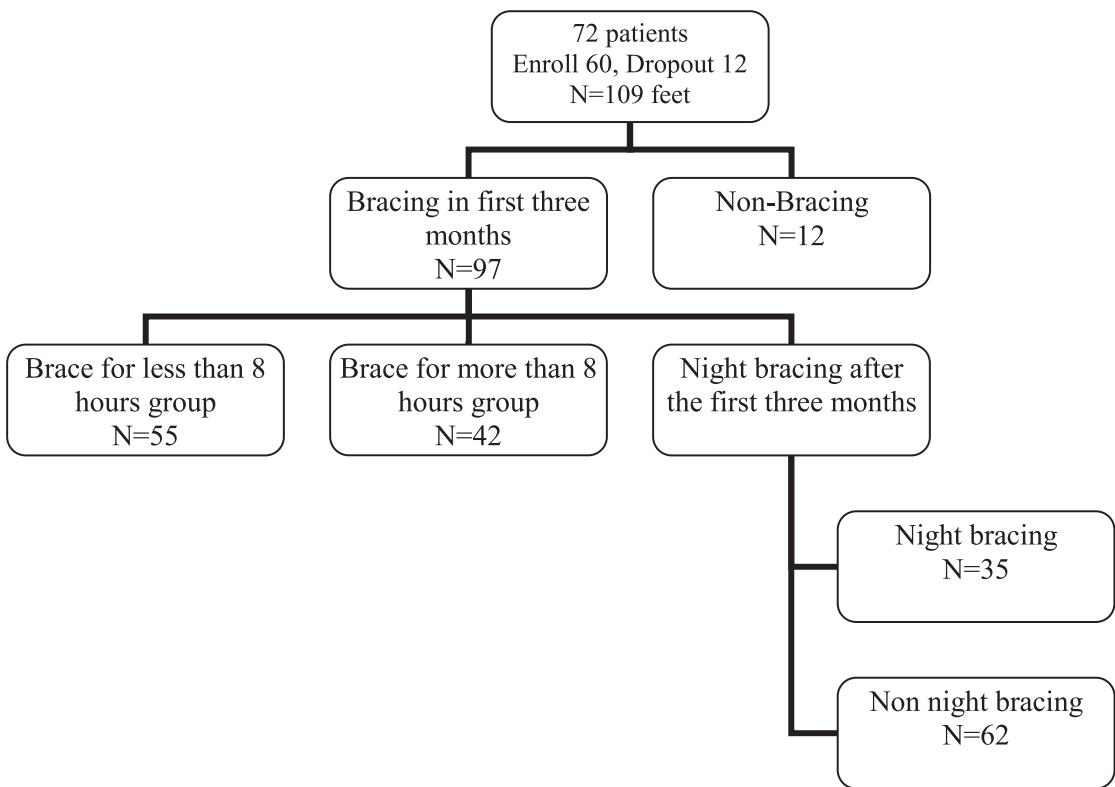
Descriptive statistics were employed from data analysis by the SPSS program. Chi square test was used to compare categorical variable between groups. Student's T-test, odd ratio, and Mann-Whitney test was used to assess the difference of the recurrent and non-recurrent group. A p-value of less than 0.05 was considered statistically significant.

### Results

From 109 feet, recurrent clubfoot were found in 23 feet (21%). There were 12 feet in non-brace group (recurrent 7 : 58%), and 97 feet in the brace group (recurrent 16 : 16%). The

**Table 1.** Demographics

Parameter	Number of feet (N = 109)	Mean	Minimum	Maximum
Gender				
Female	43			
Male	66			
Age of starting bracing (month)		6	9	16
First three month				
Non-brace	12			
Brace	97			
Timing of bracing ( hour)		7.6	1	18
After three month				
Non-brace	74			
Night brace	35			
Up to age (month old)		24.5	5	144



**Fig. 1.** Patients

brace group shown statistically significant by Fisher’s Exact test of better outcome ( $p = 0.003$ ) (Fig. 2). By Pearson Chi-Square, 55 feet worn brace for less than eight hours (50.5%) and 42 feet worn brace for more than eight hours (38.5%) shown the later group have 9.1 times

better outcome with statistically significant ( $p = 0.001$ , odd ratio 9.1, median = 6.5 hours, max = 18 hours) (Table 2). The recurrent rate of the non-brace, worn less than eight hours, and worn more than eight hours are 58.3%, 25.5%, and 4.8% ( $p < 0.001$ ). After first three months, 62 feet

### Comparing Outcome

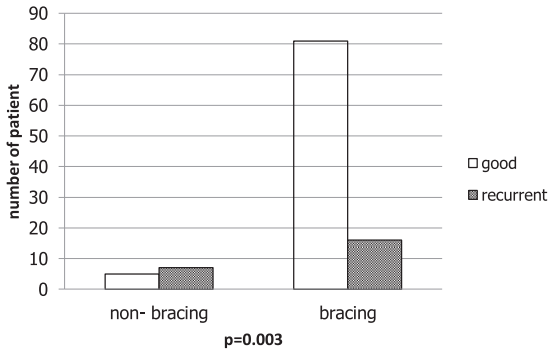


Fig. 2. The comparing outcome of the non-bracing group and bracing group in the first month after the foot was corrected. The brace group shown statistically significant by Fisher’s Exact test of better outcome

didn’t wear the night brace(63.9%) and 35 feet wear the night brace(36.1%). The night brace

were worn until 6-42 month old (Mean = 24 month old) (Fig. 3). The data also shown the later group have 4.8 times better outcome with statistically significant ( $p=0.032$ , odd ratio 4.8) (Table 3).

### Discussion

Clubfoot had become more concerned the past decade. Better and better treatments have been developed worldwide. Both prevention and treatment method were proposed to help treat the clubfoot, still recurrent occur. To prevent the recurrent of clubfoot, brace had been developed some note as critical part of treatment. Bracing time frame was recommended.

There was limitation of distribution and com-

Table 2. Timing of wearing brace in the first three month ( $p=0.001$ , odd ratio 9.1)

	Good	Recurrent
Brace < 8 hours (n = 55)	41 (74.5%)	14 (25.5%)
Brace > 8 hours (n = 42)	40 (95.2%)	2 (4.8%)

### Night brace duration

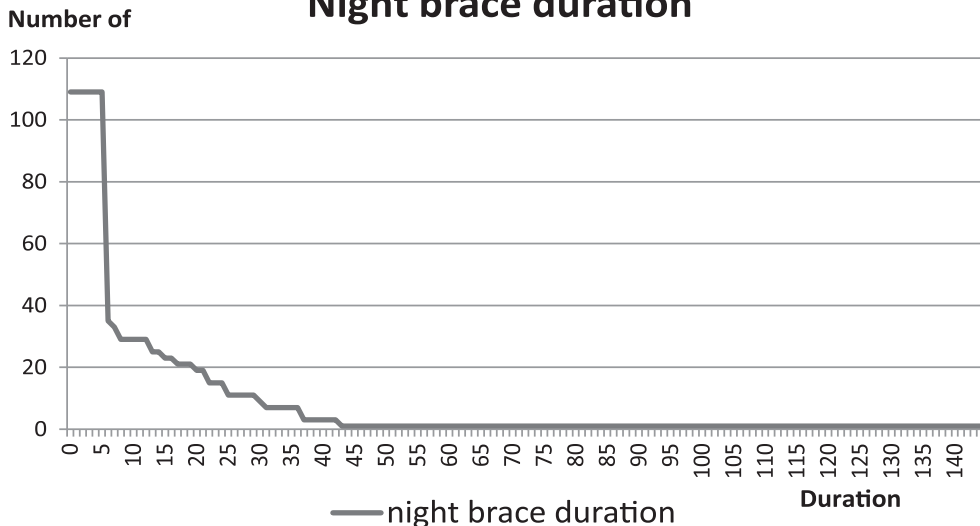


Fig. 3. Night brace duration after the first three month

Table 3. After first three months, the night brace worn data. ( $p=0.032$ , odd ratio 4.8)

	Good	Recurrent
Night brace after three month (n = 35)	35 (100%)	0 (0%)
Non-night brace after three month (n = 62)	46 (74.2%)	16 (25.8%)

pliant of brace. Different kind of brace and technique were introduced worldwide. Multiple surgeons identified bracing as a major risk factor for the recurrence of the deformity<sup>2)4)7)</sup>. However in some surgeons didn't use brace but give the home stretching program achieved 77-95 percent of non extensive surgeries<sup>1)5)</sup>.

It is very difficult for the parents and child to go with the ponseti protocol especially when the child develops gross motors, they will remove brace by themselves. From our study eight hours per day may be enough and result comparable to report by the ponseti groups. The night brace is also one of the problem we facing due to financial problem, cultures, and weather. The night brace become difficult to wear although it is the essential part of the treatment. In our study, only a small number of the patients wear the night brace and almost all did wear the brace until the recommendation age of four.

We have to find a innovation for the children with clubfoot in order for them to worn easily and to be able to walk and stand easily in brace without limiting by connecting bar.

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