

A STUDY ON CLUB FOOT BETWEEN PHYSIOTHERAPY AND ORTHOSIS⁺

اعوجاج القدم مابين العلاج الطبيعي والمساند

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Abstract:

A club foot is a congenital malformation of one or both feet, occurrence is about (1-2) cases per 1000 births, with the number of male being twice that of female, In 50% of cases club foot is bilateral. For this reason the researches carried out at Medical Rehabilitation Department of prosthesis and orthosis on (45) child with club foot within age group (0-24) month, from 1/10/2009 till 30/12/2009 by random sample, The researches designed a check list for the following prognosis after treatment .They divided the sample into three group, (15) case treated with exercises only, (15) case used splint only and (15) used exercises and splint treatment. After that data analysis used percentage and chi-square, the result was the significant with the group used (exercises and splint) more improvement than the other group .The researchers recommend ideally treatment should begin immediately after birth and correction he club foot deformity by splint and exercise.

Key word : club foot , splint , physiotherapy

المستخلص:

تشوه القدم (Club foot) اقلبه ولادي ويحدث بنسبة (١ - ٢) لكل ١٠٠٠ مولود ويكون عدد الذكور ضعف الاناث و ٥٠% يكون التشوه بالقدمين . لذا يهدف البحث الى دراسة حالات اعوجاج القدم وطرق معالجتها ، وتم انجاز البحث على ٤٥ طفل ضمن الفئة العمرية من الولادة إلى ٢٤ شهر يعالجون في قسم التأهيل الطبي / فرع صناعة الاطراف والمساند من ١ / ١٠ / ٢٠٠٩ و لغاية ٣٠ / ١٢ / ٢٠٠٩ وتم اختيارهم بشكل عشوائي ، ولقد قام الباحثان بتقسيم العينة الى ١٥ طفل يعالجون بالعلاج الطبيعي فقط و ١٥ طفل يعالجون بالمساند فقط و ١٥ طفل يعالجون بالعلاج الطبيعي والمساند . وبعد متابعتهم وتحليل الاستمارات احصائيا باستخدام النسب المئوية ومربع كاي ، وجد فرق معنوي في تحسن الاطفال الذين يستخدمون العلاج الطبيعي والمساند معا لذلك فلقد اوصى الباحثان عمل العلاج الطبيعي وعمل المساند ومعالجتهم مبكرا ومنذ الولادة .

Introduction:

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Talipes equinovarus is commonly known as club foot is considered the most significant congenital abnormality of the foot. The deformity consists of three major elements adduction of the fore foot at the Talonavicular and Calcaneocuboid joints. Supination of the entire foot including heel varus and Equines or planter flexion at the Ankle[1]

Inactivity of this lower limb lead to Muscle atrophy of the Calf muscle. The movements of the foot are severely restricted. The great majority of all persons with congenital foot malformation have Clubfoot the deformity may develop paralysis of the ankle and foot musculature [2]

Club foot or Talipes equinovarus is an inherited deformity of the foot that occurs in (1) of every (1000) birth in this malformation the foot is twisted inferiorly and medially and the angle of arch is increased [3]

Types of club foot:

The severity of the club foot does not depend on how deformed the foot is, but on the degree of correction possible. In other words how stiff the foot is. [4,5]

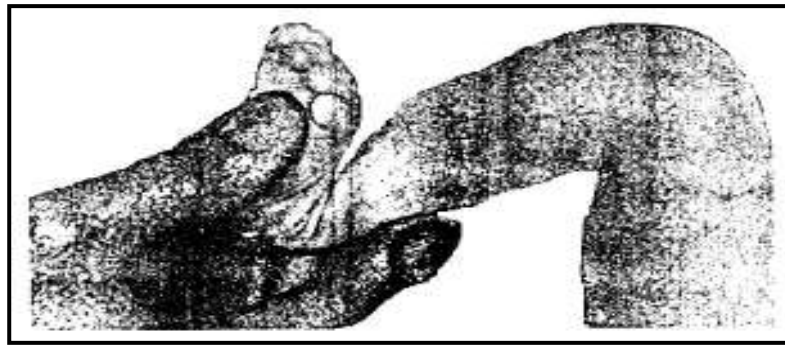
- Type 1: This foot is easily corrected and is termed supple.
- Type 2: This foot presents greater difficulty for correction and is termed stiff.
- Type 3: This foot is almost impossible to correct and is termed irreducible or very stiff.

The type of the club foot may alter, becoming suppler with treatment and developing from type 2 to type 1 example. Without the foot stiffer, from type 1 to 3. The deformity is much commoner in girls. congenital of the hip, which is much commoner in girls)[6]



One or both feet may be affected. When the infant is born it is noticed that the foot is turned inwards so that the sole is directed medially (Fig.1) [7]

Fig. 1
Congenital club
The typical
Deformity. [7]



foot.

The foot cannot be pushed

passively through the normal range of eversion and dorsiflexion. In an older child there may be obvious under-development of the muscles of the lower leg. Newborn infants should be examined routinely for evidence of club foot. It is not sufficient, for purposes of diagnosis, that the foot be found to rest in the position described, for often normal infants tend to a somewhat inverted



that the feet of lie naturally in position [8] .

Fig. 2 Correcting a club-foot deformity by manual pressure without anaesthesia [9]

Fig. 3 Plaster for maintaining correction in congenital club foot. It is essential to include the thigh, with the knee flexed to a right angle[10]

The criterion for the diagnosis of club foot is that the deformity cannot readily be corrected and over-corrected to bring the foot into eversion and dorsiflexion. It should be remembered that in normal infants under one year old it is possible to evert and dorsiflex the foot far enough to bring the little toe into contact with the shin [11]

The prognosis depends largely upon the age at which primary treatment is begun, and upon the efficiency with which it is carried out. The longer the delay before treatment, the smaller is the prospect of complete cure. Yet even with prompt treatment the outcome is uncertain. In a proportion from the time of birth, there is a tendency to relapse. These are usually the cases that present well marked lower leg, especially of the personal group.

Conservative treatment should be initiated with correction of the fore foot adduction, followed by correction of the equinus deformity if X-rays reveal that serial Orthosis can be apply to maintain correction desired. Orthosis include natural or slightly abducted fore foot, natural heel or in slight valgus, neutral of slight dorsiflexion or valgus if these methods fail, surgery is performed [12]

Treatment consist manipulating the arch and applying adhesive tape (figure4) usually soon after birth correction

For maximal effect in maintaining range of ankle motion, a 90° angle at the ankle. It should be worn through the day and night should be worn for an average of 6-7 hours of stretching per day, either day or night hours. If surgery is performed, use of an AFO is recommended as a followed-up during either day or night hours to help prevent recurrence of contracture and deformity. The AFO must be checked on a regular schedule for appropriate fit, otherwise its usefulness is diminished [14]

The aim of study is to know the effect of the exercises and splint program to correct the club foot.

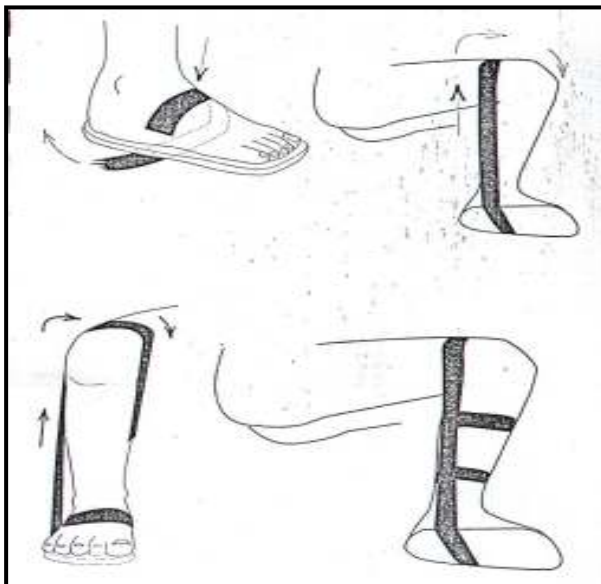
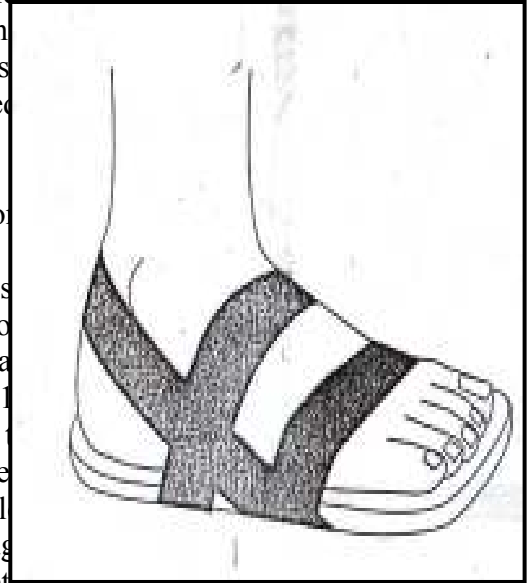


Fig. 4 corrective shoes[13]

Methodology (Patient and methods):

This study was carried out during the period between 1/10/2009 to 31/12/2009, the sample of this study was (45)patient with club foot (23 male and 22 female), they were randomly chosen from the patient who were attending the Medical Rehabilitation / Prosthesis & Orthosis department in the Medical Technical Institution.

The study detection of the effect exercises programme and splint for patient with club foot took the following process:

- 1- Preparation the check – list as in appendix (1).
- 2- Preparation of the exercises programme as in appendix (2).
- 3- Selection of the sample convenient sample of (45) patient between the age (0-24) month were divided equally into 3 group via purposive random sampling:
 - (15) patient who received list of exercises as in appendix (2) and used splint as in appendix (3)
 - (15) patient who received exercises and will not be exposed to splint
 - (15) patient who received splint and will not be exposed to exercises

A study was designed to record the information, the distribution of the sample was according to the types of club foot and the effect of exercise and splint on the club foot.

The statistical methods : the data for the questionnaire are collected from the patient about their condition chi-square frequencies and percentage were used for statistical analysis of the data $p > 0.05$ the tabulation value is (3.84)

Results:

Table (1):- Relationship of age with sex.

| Age | Male | % | Female | % |
|----------------|------|-------|--------|-------|
| Brith-5 month | 12 | 52.17 | 10 | 45.45 |
| (6-11)month | 4 | 17.39 | 5 | 22.72 |
| (12-17)month | 3 | 13.04 | 2 | 9.09 |
| (18-23) month | 3 | 13.04 | 3 | 13.63 |
| (24-...) month | 1 | 4.34 | 2 | 9.09 |
| Total | 23 | | 22 | |

- The higher percentage with boy at age (brith-5) month.
- The lowest percentage with boy at age (24-...) month.
- Deformity is much commoner in male than female.

Table (2):- Relationship of type of club foot with sex.

| Types of club foot | Male | % | Female | % |
|--------------------|------|-------|--------|-------|
| Supple | 10 | 43.47 | 15 | 68.18 |
| Stiff | 10 | 43.47 | 5 | 22.72 |
| Very stiff | 3 | 13 | 2 | 9.09 |
| Total | 23 | | 22 | |

- The higher percentage of club foot, it's "supple" at female.
- The lowest percentage of club foot, it's "very stiff" at female.

Table (3):- treatment with prognosis of club foot.

| Types of treatment | Male | | | | Female | | | |
|---------------------|-------------|-----|-----------------|-----|-------------|-----|-----------------|-----|
| | Improvement | | Non-improvement | | Improvement | | Non-improvement | |
| | No. | X | No. | X | No. | X | No. | X |
| Exercise | 4 | 3.5 | 2 | 3.3 | 2 | 1.1 | 2 | 1.5 |
| Splint | 3 | 2.6 | 2 | 3.3 | 6 | 3.3 | 2 | 1.5 |
| Splint and exercise | 10 | 5.8 | 2 | 3.3 | 10 | 5.5 | 0 | 0 |
| Total | 17 | | 6 | | 18 | | 4 | |

Table (3) shows the effect of exercise program and foot orthosis on patient suffering from club foot for study group. There is significant difference between two groups when analyzed by chi-square at level ($p > 0.05$) chi-square value was treatment of the club foot, the highest value of Chi-square was (5.8) improvement for male and (5.5) improvement for female, (5.8 and 5.5) $>$ (3.84). This means that the exercise and orthosis are very important to correct the club foot.

Discussion:

Club foot deformity is much commoner in boys than in girls (contrast congenital dislocation of the hip. Which is much commoner in girls). One or both feet may be affected. When the infant is born it is noticed that the foot is turned inwards so that the sole is directed medially.

Table (1) shows the higher percentage with boys within age group (birth -5) months (52.17%) but girls was (45.45%). The present result is similar to a study done by (1,2), they said "club foot occurrence is about 1:2 cases per 1000 births, with the number of boys being twice that of girls in 5% of cases club foot is bilateral [14]."

Table (2) shows the relationship of types of club foot with sex. The higher percentage was (68.18%) boys have supple type and (43.47%) girls have club foot with supple type, the present result is similar to a study done by (3,4).

Table (3) shows the treatment of club foot, there was a significant difference in the prognosis of club foot for patients with (exercise and splint) treatment. When analyzed by Chi-square at level $p > 0.05$. The present result is similar to a study done by (5,6). They mentioned that prognosis depends largely upon the age at which used the (splint and exercise), prefer early.

Conclusion:

After analysis the result of club foot deformity are the following:

- 1- Club foot deformity is more common within age group (birth -5) months.
- 2- A patient with supple type responds more to treatment by (exercise and splint).
- 3- A patient with a very severe type doesn't respond to treatment.

Recommendation:

Based on the result of the following of this study the following recommendations are made:

- 1- Early diagnosis of the club foot is more benefit during this age to be corrected.
- 2- To wear the splint and do exercise.
- 3- Follow up the prognosis, and to educate people how to apply the exercise as in appendix (2) .
- 4- Carrying out further studies on larger samples and for longer follow-up to cure these deformities.
- 5- To issue pamphlets on body exercises and distribute them on physiotherapy clinics.

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Appendix (1)

1- Patient name:

2- Age group at birth : 5 month

| | | |
|---------|-------|--------------------------|
| 6-11 | month | <input type="checkbox"/> |
| 12-17 | month | <input type="checkbox"/> |
| 18-23 | month | <input type="checkbox"/> |
| 24 | month | <input type="checkbox"/> |

3- Type of club foot:

| | |
|------------|--------------------------|
| Supple | <input type="checkbox"/> |
| Stiff | <input type="checkbox"/> |
| Very stiff | <input type="checkbox"/> |

4- Type of treatment:

| | | | | | |
|----------------------|--------------------------|---------|--------------------------|------------|--------------------------|
| Exercise | <input type="checkbox"/> | Improve | <input type="checkbox"/> | No improve | <input type="checkbox"/> |
| Splint | <input type="checkbox"/> | Improve | <input type="checkbox"/> | No improve | <input type="checkbox"/> |
| Splint & exercise | <input type="checkbox"/> | Improve | <input type="checkbox"/> | No improve | <input type="checkbox"/> |

5- Other notes:

Appendix (2)

There are 6 steps for treatment the Club foot deformity which are the following:^[13]

- 1st step

Pull on the calcaneum in the axis of the leg in order to free it . This traction is applied using the index finger which hooks on the calcaneum.

- 2nd step

Gently push the talus into its correct position with the thumb.

- 3rd step

Correct the varus of the calcaneum with the tip of the index finger and try to bring the calcaneum towards the exterior.

- 4th step

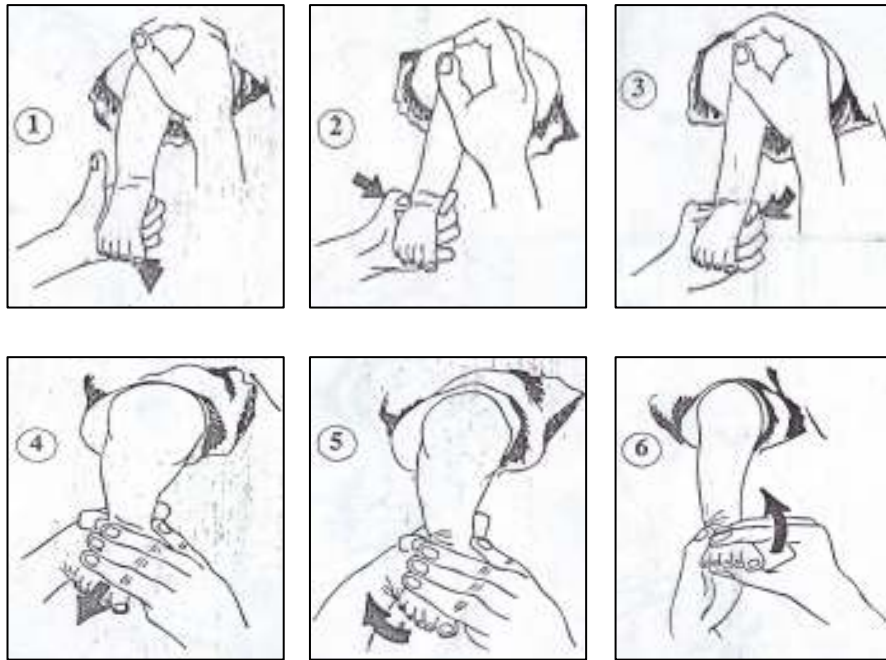
The hand which was behind the knee comes to hold the front of the foot flat. Apply traction in the axis of the foot to make space between the foot bones

- 5th step

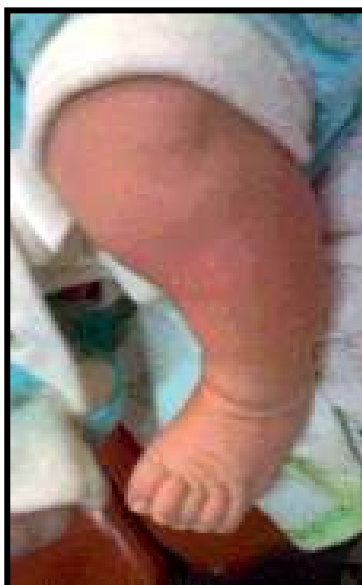
With the same hand continuing traction , correct adduction and inversion in the front of the foot.

- 6th step

Correct equines. Both hand are working at the same time . whilst maintaining the flexion already acquired , they gently bend the ankle dorsally . keep this position for several moments and then start again.



Appendix (3)



casting



Plastic manufacturing of splint

Modification



Club foot orthosis splint