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CONGENITAL METATARSUS VARUS

On the Advantages of Early Treatment

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Metatarsus varus is a rather common foot deformity (Wynne-Davies 1964). Even in non-treated cases disabling deformities do not occur. Disadvantages from cosmesis and foot-wear can cause considerable problems, but pain and impaired foot function are rare.

It seems reasonable to apply the principle of early treatment to this condition as in other types of congenital foot deformities.

The present study attempts to evaluate the need for treatment based on a clinical analysis.

MATERIALS AND METHODS

Over a 3-year period, from 1967–1969, 212 infants referred to the Orthopaedic Hospital in Copenhagen were diagnosed as having congenital metatarsus varus.

Of the total number 159 (75 per cent) had bilateral foot deformities, 103 (48.6 per cent) were girls and 109 (51.4 per cent) were boys. Eleven patients had additional congenital deformities, six had congenital club foot on the other side and five had calcaneo-valgus foot.

Treatment was administered to 84 (39.6 per cent) of the infants representing 148 (39.9 per cent) of the feet (Table 1). The rest of the patients comprising 128 infants and 223 metatarsus varus deformities were all mild cases, and thus only followed clinically until normal conditions were found.

Table 1. Material.

	Number of cases	Number of feet
Treated earlier than 1 year of age	68	117
Treated later than 1 year of age	16	31
No treatment	128	223
Total	212	371

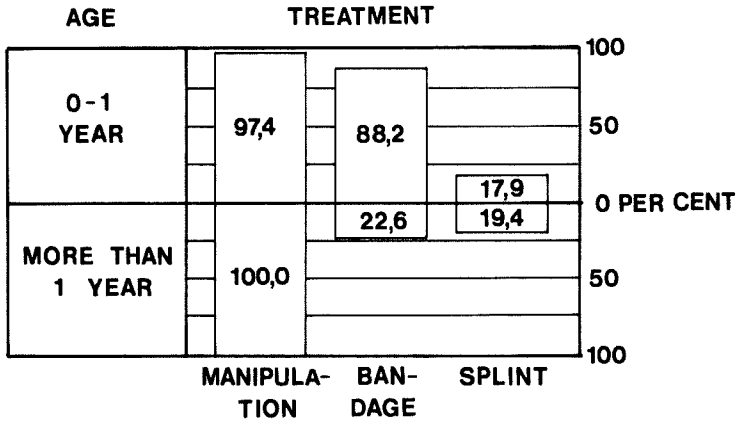

Figure 1. Diagram showing the methods of treatment used in the present study.

The 84 treated cases all showed, at the onset of therapy, a typical deformity including adduction and inversion of the fore- and midfoot, a prominence at the lateral border of the foot, impaired plantar flexion and the great toe more separated from the second toe than normal (Figure 4 a). In most cases there was a slight increased valgus of the hindfoot.

The methods of treatment are shown in Figure 1. In almost all of the cases manipulation was applied. This treatment was initially given in an out-patient ward by specially trained physiotherapists and later, after some weeks, carried out by the mother of the patient who had been properly instructed. Elastic bandages were primarily used at less than one year of age. A combined treatment including splinting was given in cases resisting several months of manipulation therapy. In three cases, however, combined manipulation and splinting were started as early as within the first 3 weeks after birth. For patients younger than one year of age, a splint made of thermoplastic material was used (Figure 2); later a leather night splint was used.

The commencement of treatment was as shown in Figure 3. The treatment was carried out for a period of 2–48 months. All cases were seen regularly by the authors with intervals of weeks to months until the clinical results of the feet were satisfactory. The average observation time was 22.9 months.

The manipulation procedure carried out was as follows:

First the decreased plantarflexion is treated, especially the contracture of the anterior tibialis tendon. The infant is placed in a supine position on the table with its feet towards the physiotherapist. The ankle joint is fixed from behind by the heteronymous hand, with the thumb on the lateral, and the index finger on the medial malleolus, and with the thenar the calcaneus is pressed in slight supination. With the thumb of the homonymous hand placed across the dorsum of the foot proximal to the insertion of the tendon of the anterior tibialis the foot is pulled in plantar flexion.

Correction of the adduction of the forefoot is the object of the next step. The hindfoot is fixed from behind with the heteronymous hand with the thumb placed

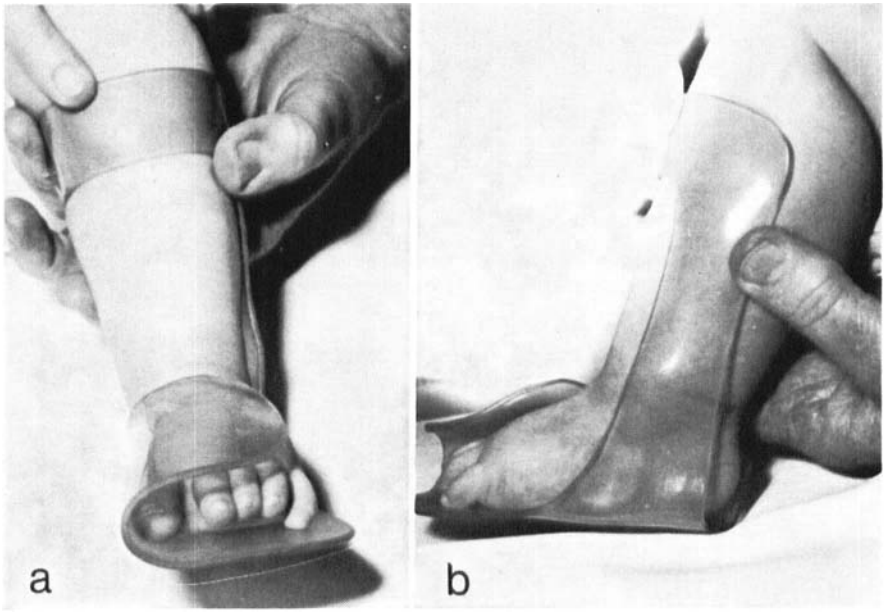

Figure 2. The Plexidur® splint used in present material. a: Front view, b: Lateral view. The splint is kept fixed by an elastic bandage. At commencement of treatment the splint is adapted to a slight equinus and supination of the foot, and following correction the splint is adapted to neutral position.

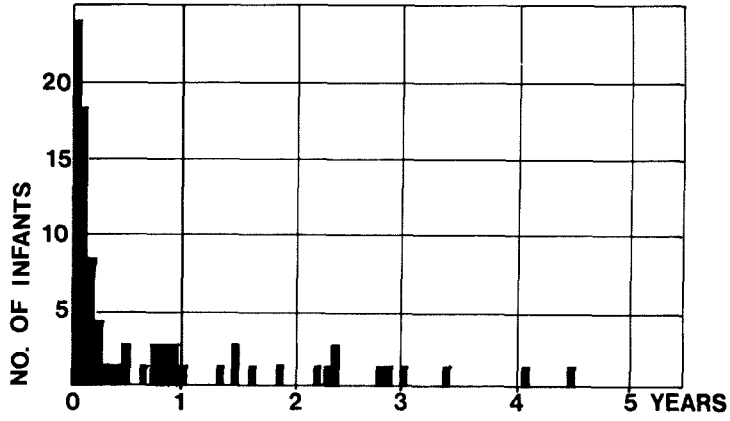

Figure 3. Diagram showing the time for commencement of treatment. In 68 out of 84 treated cases the treatment was started at less than one year of age.

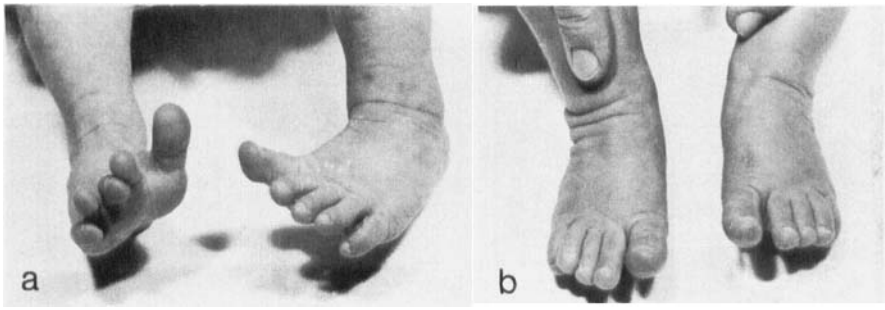

Figure 4. Girl aged 12 days with bilateral metatarsus varus (a). Same case after 5 weeks of treatment with manipulations and Plexidur splint (b).

on the lateral side of the calcaneus. With the thumb of the homonymous hand placed at the medial side of the first metatarsal base and index and third fingers across the dorsum of the foot the forepart of the foot is pressed in abduction. Simultaneously, calcaneus is pressed in slight supination by the heteronymous thumb.

The object of the final procedure is stretching of the tissues on the medial side of the foot. The ankle joint is fixed from behind with the homonymous hand. With the thumb of the heteronymous hand placed at the level of the first metatarsal bone, traction along the medial border of the foot is carried out.

RESULTS

In the group where treatment was instituted before one year of age (68 infants with 117 metatarsus varus feet) satisfactory results were achieved in 65 of the infants. Seventeen of the infants were seen for final examination before one year of age.

For a satisfactory result i.e. feet with anatomically normal shape and without prominence at the lateral border of the foot the functional criteria are: normal gait without increased adduction of the fore- and midfoot, but slight valgus of the heel allowed.

In the 3 cases grouped as unsatisfactory, treatment was instituted at the age of ¾, 1½ and 4 months, respectively, and a splint was used from the age of 1, 4 and 5 months, respectively. At the age of 2½, 4 and 5 years, respectively, a pronounced adduction of the fore- and midfoot combined with a prominence at the lateral border were present in all cases. At reexamination 2 years later only slight adduction and prominence were seen, in spite of their having received no treatment during the two years prior to final observation.

In the three cases treated with splint at less than 3 weeks of age, the

treatment being combined with manipulations, complete correction was obtained after 1.5–2.5 months (Figure 4).

In the group treated at more than 1 year of age, satisfactory results were obtained in 15 of the 16 patients.

DISCUSSION

Metatarsus varus was first described by Henke in 1863. Different terms such as pes adductus, metatarsus adductus and metatarsus varus are used (McCormick & Blount 1949), and it is still a point of discussion whether different types or degrees of severity occur.

In the present study 84 out of 212 infants showed pronounced adduction and inversion of the fore part of the foot at the time of first examination. Only in these patients with the typical appearance was indication for treatment found.

In addition to congenital club foot and vertical talus this type of metatarsus varus makes up a group of congenital foot deformities with no tendency to spontaneous recovery before weightbearing. Metatarsus varus, on the other hand, is the only deformity where correction after weightbearing can take place spontaneously.

These circumstances may be explained according to the nature of the deformity and are essential for the therapeutic principles as well as for the prognosis.

The lack of spontaneous recovery may be explained by the following reasons. The malposition at birth is caused not only by contractures in the soft tissues; subluxation in the fore- and midfoot and bone incongruity are also present (Reimann & Werner 1975). For this reason, the spontaneous muscle action is unable to overcome the resistance, as seen in calcaneo-valgus (Larsen et al. 1974).

Early conservative treatment such as manipulation or plaster cast will give good results in most cases (Kite 1950). Of 80 feet with marked metatarsus varus the results of conservative treatment were poor in only four cases (Ponseti & Becker 1966). This is in accordance with the present study.

In the three cases in which manipulative therapy was instituted together with adequate splinting during the first 3 weeks of life it was shown that complete correction was achieved within a few months.

Conservative treatment started at more than one year of age may be difficult because of resistant contractures as well as bony incongruity. Operative correction of these changes often leads to extensive capsul-

otomies in the midfoot, and occasionally to osteotomies of the metatarsal bones (Heyman et al. 1958).

Dwyer (1963) has shown, in club foot, that if the hindfoot is corrected to slight valgus the remaining part of the foot will gradually be normalized as a result of walking. This spontaneous correction may take years.

The slight valgus of the heel as seen in metatarsus varus may be responsible for spontaneous improvement during weightbearing, as opposed to the situation with club foot. The fact that metatarsus varus is rarely seen in adults also points towards spontaneous correction.

In the present study three cases not corrected at the age of 3–5 years showed spontaneous improvement during the following 2–3 years. Operative correction should thus in most cases be kept in reserve.

Conclusions

Early institution of conservative treatment with manipulations in most cases gives good results, but in combination with splinting it seems possible to reduce the period of treatment to a few months.

It is difficult to estimate the effect of conservative treatment after weightbearing as spontaneous improvement may take place.

Operative treatment is restricted to cases with severe contractures and bone incongruity.

SUMMARY

Among 212 infants with congenital metatarsus varus 84 (39.6 per cent) of the infants were treated. Only the treated group is considered in the analysis.

Daily manipulative therapy was given followed by fixation in elastic bandage or splint. The manipulations aimed at correcting the adduction of the fore part of the foot, as well as the increased valgus of the heel.

In 68 infants treatment was instituted before one year of age. The results were good in 65 of these patients and correspondingly good results were obtained in 15 out of 16 patients treated at more than one year of age.

Subluxation in the fore- and midfoot and bony incongruity present at birth are offered as a possible explanation for lack of spontaneous recovery before weightbearing as well as the occurrence of resistant cases.

Spontaneous improvement may take place during childhood and may

be explained by the influence of the position of the heel during weight-bearing.

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