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EARLY OPERATIVE TREATMENT OF CONGENITAL CLUB FOOT

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Club foot, talipes equinovarus, is a common congenital malformation. Opinions concerning the optimal primary treatment are however still divergent. Hersh (1967) reported that 50 per cent of the deformities were not corrected by conservative treatment and in Tönnis's and Bikadorov's series of conservatively treated cases the result was poor in 58 per cent. The material of our hospital presented by Solonen & Parkkulainen (1957) showed that 38 per cent were treated by conservative means and 62 per cent operatively. The over-all results were unsatisfactory in 19 per cent. The cause of failures was considered to be the inability to achieve sufficient correction by manipulation in severe cases. Therefore since 1958 we have adopted early operation for cases of severe and moderate degree of malposition. A preliminary report of the results was given by Pasila & Sulamaa (1961).

As a rule, conservative treatment is recommended by most authors at an early age. Late results of early operative treatment have not been published. This paper reports a follow-up examination of 54 patients operated on for club feet under 2 weeks of age during the period 1959-1966. There were 33 bilateral cases which means that the number of operated feet was 87.

PRINCIPLES OF TREATMENT

A modification of Brockman's operation, a medial release combined with achillotenotomy, has been used. In a bloodless field, an incision is started behind the medial malleolus and extended downwards over the region of the navicular bone. The tendon of the posterior tibial muscle is severed and its distal end removed. The navicular bone is widely freed from its dorsal, proximal and plantar attachments, the talo-navicular joint thus becoming widely opened. The deltoid liga-

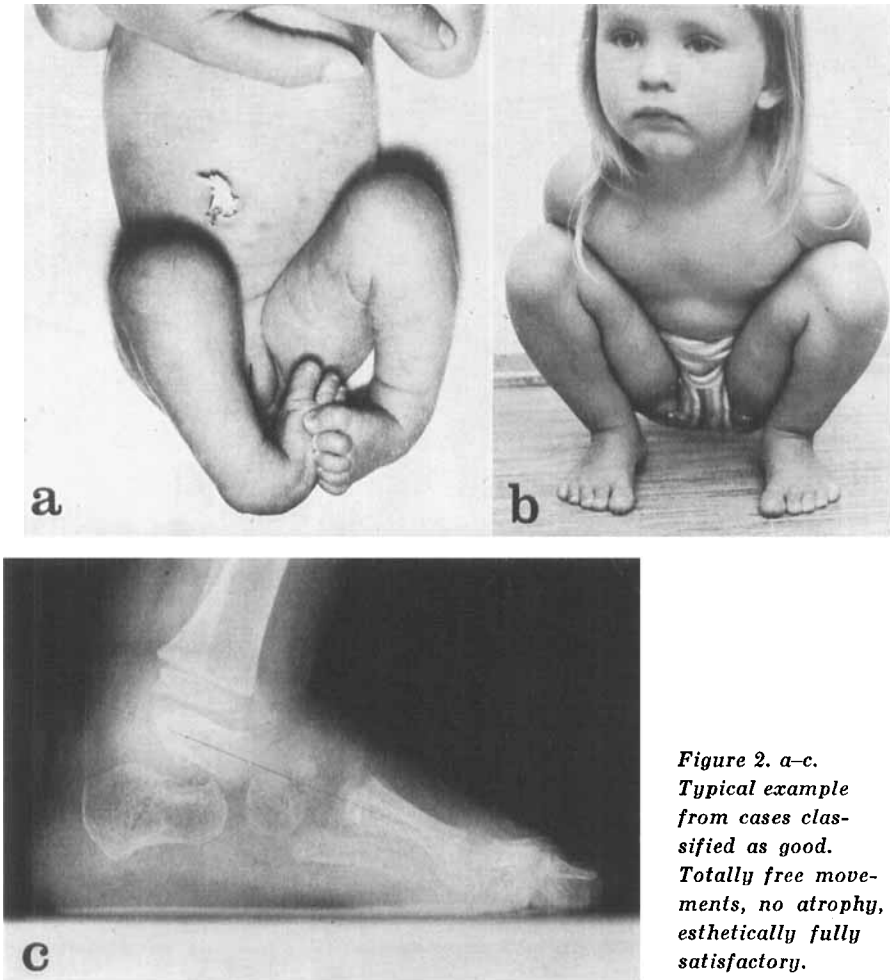


Figure 1. Typical postoperative plaster cast for immobilisation in overcorrected position.

ments are excised thoroughly and often even the talo-calcaneal joint is opened medially. The Achilles tendon is severed through the same incision. A sufficient correction is now easily seen from the relationship of navicular and talus bones. After securing hemostasis the wound is closed with catgut sutures. The overcorrected position is maintained with a flannel bandage supported by a plaster cast for about 4 months. Later Denis Browne splints are used until walking age. Night splints and talipes boots are used up to the age of 3-4 years (Figure 1).

M A T E R I A L

During the period 1959-1966 168 patients were operated on for club foot deformity and 97 were treated by conservative means only. In 73 patients or about one-fourth of the cases the operative treatment started under 2 weeks of age. Fifty-four were traced and thus a follow-up was made of a total of 87 feet, 33 cases having a bilateral malformation. In 19 cases the status has been considered satisfactory at the end of the treatment, but the patients could not be traced at the time of follow-up due to changes of the home addresses. The ratio of boys to girls was 69 per cent. Re-evaluation of the operation accounts revealed that release of the intertarsal ligaments in 18 feet had been insufficient or not radical enough; thus only 69 feet had been treated in the way which at present is considered adequate. The wound healing and the postoperative treatment were evaluated on the basis of the infection complications, the duration of plaster and splint im-



*Figure 2. a-c.
Typical example
from cases clas-
sified as good.
Totally free move-
ments, no atrophy,
esthetically fully
satisfactory.*

mobilisation, as well as the duration of the use of night splints and special boots. Twelve club feet of infants suffering from arthrogryposis multiplex or myelomeningocele teratologia cases were separately grouped, as well as 8 feet having suppurative wound infections. These infections caused no other complications, but made the immobilisation during postoperative treatment less effective. Other complications of the operation were not seen.

The follow-up examination recorded the details of growth, muscular atrophy, limitations of mobility and the residual deformities, as well as the cosmetic appearance and the functional result. From x-ray pictures the shape of the tarsal bones and their position in relation to one another were evaluated. The results were classified as good, fair and poor. Photographic demonstrations and x-ray pictures of cases belonging to these classification groups are presented in Figures 2-4.

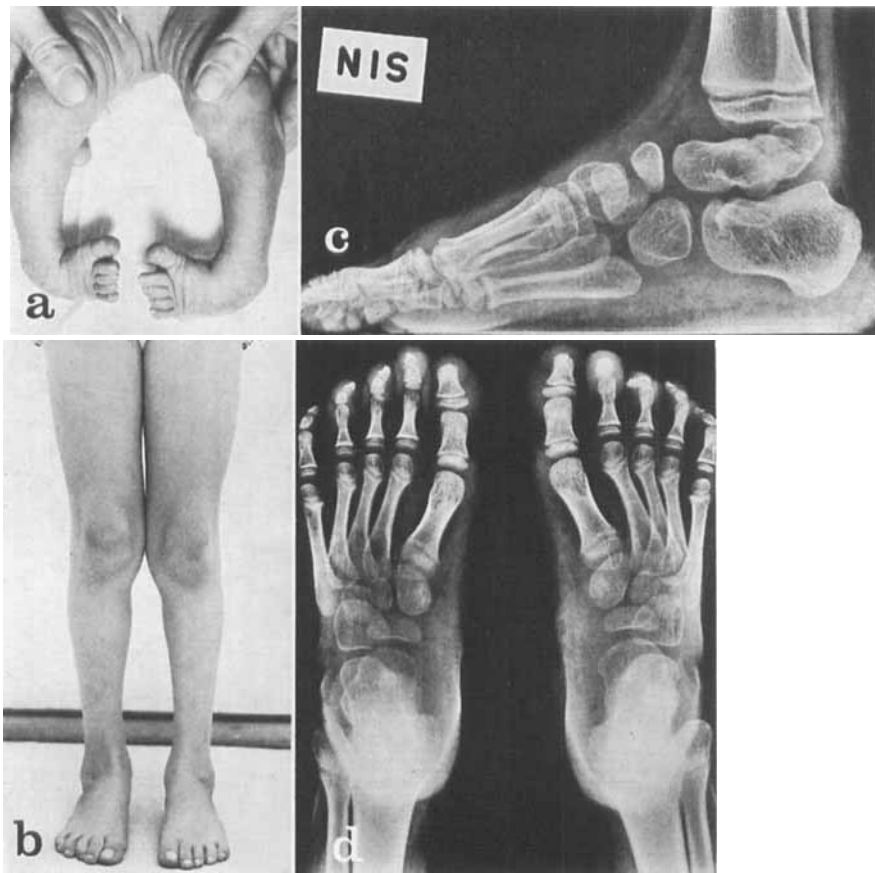


Figure 3. a-d. A case classified as fair. Satisfactory movements, muscular atrophy in the calves, slight planovalgus on both sides, cosmetic result not totally satisfactory. Radiologically horizontal talus and metatarsovarus are seen.

RESULTS

From Table 1 it can be seen that in about half of the cases combined with arthrogryposis or meningomyelocele, the result of operative treatment was poor and a good result is uncommon. Good results after postoperative infection were likewise rare. However, even after uncomplicated healing the result was poor in about 20 per cent. A clear correlation to the results could not be found concerning the extent of the ligament release in the primary operation or the duration of the postoperative plaster treatment and the use of night splints and special boots.

Table 1. Results at follow-up.

	Number of feet			total
	good	fair	poor	
Club feet associated with arthrogryposis, myelocoele, etc.	1	5	6	12
"Simple" club feet,	29	31	15	75
wound infection	(2)	(4)	(2)	(8)
Total	30	36	21	87

The following counts of residual deformities were registered:

- visible metatarsovarus in 24 feet
- equinus in 13 feet
- slightly impaired extension of the ankle in 37 feet
- some varus or valgus ankle in 55 feet

The unilateral cases presented slight length difference in 7 cases, muscular atrophy of the calf in 16 cases, the same of the thigh in 8 cases, and bony atrophy of the affected forefoot in 18 cases.

The x-ray pictures taken at the follow-up presented atrophic changes of the navicular bone in two-thirds of the operated feet. In lateral projection the talus was more or less deformed and in horizontal position in nearly half of the operated feet. Metatarsovarus deformity, seen also clinically, was found more or less severe in one-third of the operated feet. The talo-calcaneal angle was measured. At follow-up the mean in normal feet of the unilateral cases was 25° and 15° on the operated side. Only about one-third of the operated feet presented an angle of more than 20°. There seems to be a positive correlation between the clinically good result and talo-calcaneal angle of more than 20°.

DISCUSSION

An evaluation of the results of treatment of club foot deformity is difficult. In practice, cosmetic appearance and the functional capacity at follow-up after at least 3 years seem to be the most important criteria. The significance of radiologically verified tarsal bone deformities is obscure because too little is known about their late osteoarthrotic sequels. Figure 5 presents x-ray of a club foot with a horizontal

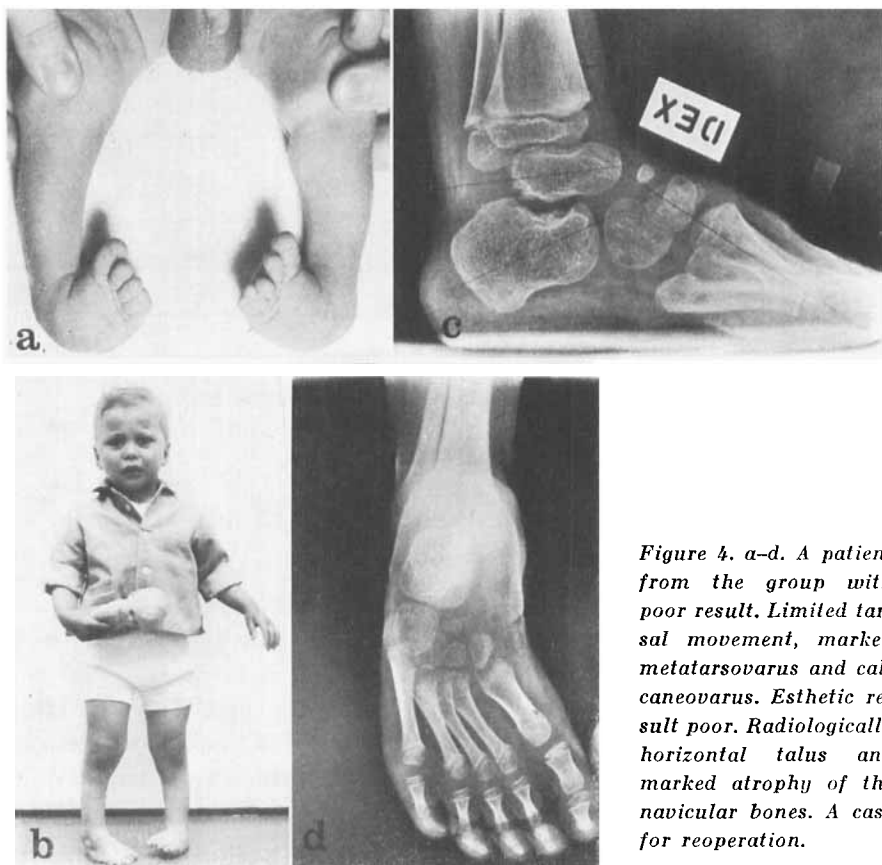


Figure 4. a-d. A patient from the group with poor result. Limited tarsal movement, marked metatarsovarus and calcaneovarus. Esthetic result poor. Radiologically horizontal talus and marked atrophy of the navicular bones. A case for reoperation.

deformed talus. The cosmetic result is poor, but the function has been rather satisfactory. There is neither pain nor arthrosis deformans. It is also pointless to compare the results in different materials consisting of patients treated at different age groups by several therapeutic methods. Conservative treatment alone leads to a satisfactory result in only 50 per cent of the cases according to Hersh (1967), and in 60 per cent in Weseley & Barenfeld's series (1968). As the soft tissue operations according to Tönnis & Bikadorov (1968) gave satisfactory results in only 70 per cent, 15 per cent poor results of all cases still remain. Reimann's series of 108 operated feet showed 10.5 per cent poor results. The 19 per cent unsatisfactory results in our first series is in accordance with these statements. Since 1958 our aim has been to adopt conservative treatment in mild cases only and operate early all cases with uncertain outlook. The 24 per cent poor

Figure 5. X-ray of a club foot treated conservatively 60 years ago.



results in our series of early operated cases of selected severity cannot be estimated unfavourably, because the share of poor results remains less than 10 per cent of all cases treated.

Failures in the operative release or in the postoperative treatment were considered to be reason for poor results, but no significant correlation could be found. A horizontal talus and a talo-calcaneal angle of less than 15° were observed at follow-up in x-rays of poor cases. In infants the measurement cannot, however, be done exactly, and thus an x-ray control has not full value during the most important time of therapy.

Scheel (1958) emphasizes the decisive importance of very early but nontraumatic manipulative treatment, and most authors postpone operative intervention to over 4 months age. Hersh (1967), however, favours achillotenotomy during the first weeks of life and soft tissue release after 3 months. Hirsch (1960) has performed soft tissue release at 2 months of age and Weseley & Barenfeld (1968) the same after 5 months of age. Jacquemain (1968), operating at 4 to 6 months had poor results in 15 per cent only, but Herwig (1958) verified deformity of the talus in 28 per cent, of the navicular in 35 per cent, and of the calcaneus in 17 per cent of the cases operated by this (Scheel's) method. In Reimann's series (1967) most poor results were found in cases where only posterior but not medial release was performed. The demand of early but forceless manipulation cannot be accomplished in rigid club feet. An attempt to prevent further shrinkage of the ligaments and malgrowth of the tarsal bones by early operative release was made in our series with success in 76 per cent, but 24 per cent of feet are poor or in need of reoperation. Our experience has shown the possibility of operation at an age of less than 2 weeks with good results. In our opinion there is no reason to postpone an operation for

more one month, if the prognosis of treatment by conservative means is uncertain.

SUMMARY

A five-year follow-up study of 87 primarily moderate or severe club feet, operated on under 2 weeks of age by medial release and achil-lotenotomy, is presented. Good or fair results were found in 76 per cent and poor results in 24 per cent. The possible advantages of early operation in severe cases are discussed.

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