

## OPERATIVE TREATMENT OF PES PLANOVALGUS STATICUS JUVENILIS

*Preliminary Communication*

*By*

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The term pes planovalgus staticus juvenilis designates a condition in which the physiological planovalgus position occurring when the child begins to walk fails to disappear spontaneously during later childhood or becomes more marked. When loaded, such a foot shows the typical deformity, while when unloaded it is, at least initially, of normal clinical and roentgenological appearance.

This is the commonest type of pes planovalgus, and in most cases it responds favourably to conservative treatment. Some cases, however, show no tendency to improve despite long treatment with exercises, arch supports, etc.

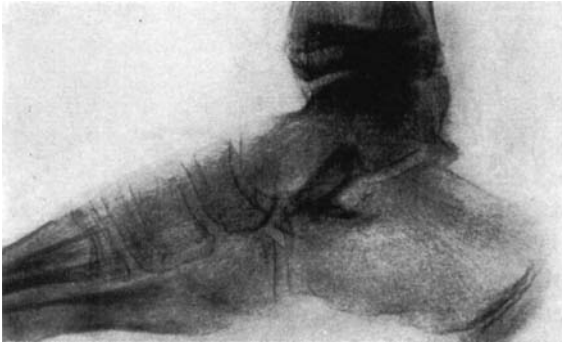
As is known, if this condition with displacement of the foot bones on weight bearing is not corrected in time, it will result in deformation of the foot skeleton and joint surfaces together with impairment of the function of the muscles and ligaments. Finally, the previously corrigible deformities become irreversible with increasing symptoms.

Some authors have therefore proposed various operations for those juveniles cases not yielding to conservative treatment (*Miller 1927, Hohmann 1931, Hoke 1931, Young 1939, Milch 1942, Chambers 1946, Niederecker 1959*). These operations are generally regarded as prophylactic, their purpose being mainly to induce as normal a further development of the foot as possible.

Since 1954 fifty-four feet of this type have been operated upon at the Department of Orthopaedics, University Hospital, Lund.

The routine method aims at correcting and preventing the pronated-abducted position of the loaded calcaneus but this, by lowering of the

sustenaculum tali and the plantar calcaneo-navicular ligament supporting the caput tali results in subluxation of the talus, elimination of the medial longitudinal arch and abduction of the anterior part of the foot with supination of the first ray. We maintain this correction by placing a homogenous bank-bone transplant into the tarsal sinus. The method is based largely on that described by *Grice* (1952, 1955) for talo-calcaneal arthrodesis, which he used in the treatment of pes planovalgus paralyticus.



*Fig. 1.*

We use cortical bone wedges and place them into the tarsal sinus with the base laterally. In order to prevent subluxation and rotation of the talus, the lower end of the transplant is placed more ventrally than the upper end. We produce an arthrorhisis talo-calcanea preventing pronation-abduction of that of the foot under the talus. (Fig. 1).

In 24 feet the operation was extended to include transposition of the tendon at the tibialis anterior muscle, the insertion of which was transposed to the scaphoid bone. This muscle is normally both a pronator and a supinator because the direction of its pull coincides with the axes of the subtalar joints (Fig. 2; uninterrupted line). The pronating effect may become predominant in pes planovalgus. By the transposition the direction of pull of the muscle is turned somewhat medially with the result that its supinatory effect is increased and its pronatory effect decreased (Fig. 2: interrupted line). In addition the tendon is attached to the vertex of the medial longitudinal arch, and thereby tends to increase the curvature of the latter.

As mentioned above, all of the patients had first received conservative treatment for long periods (average: about 4 years).

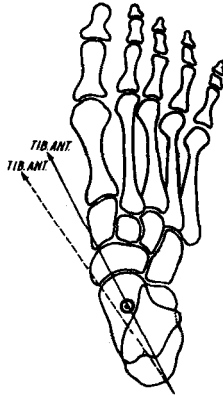


Fig. 2.

Essentially after Niederecker.

The patients' age at the time of the operation ranged from 3 years 9 months to 10 years 10 months (average 6.3 years).

The interval between the operation and the after-examination varied between 4 months and 7 years: it was 1 year or more for 50 feet, and more than 2 years for 34 feet.

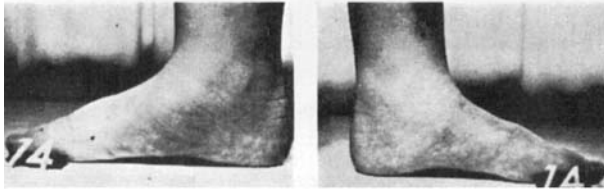
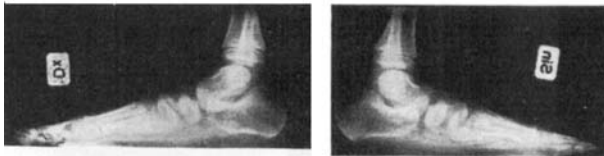
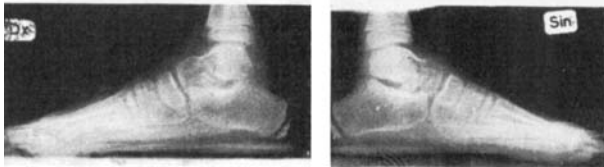
Thirty feet had local symptoms before the operation. Of these, 21 were symptom-free at the after-examination. The symptoms persisted in 6, but they were less severe than before the operation. 1 foot had more severe symptoms, 2 had been operated upon too recently to permit evaluation.

At the after-examination the loaded calcaneus had a valgus position of  $5^\circ$  or less in 48 feet, which must be regarded as normal (*Lanz & Vachsmuth* 1935). Three feet showed  $10\text{--}15^\circ$  valgus, while 3 showed slight varus.

In 51 feet the medial longitudinal arch was less depressed than before operation. In 42 of them the arch was judged as normal, while in 9 it was still partially depressed. In 3 feet the medial longitudinal arch was still completely depressed when loaded.

In the 42 feet, where the medial arch was normal, a mean angle of  $22^\circ$  was roentgenologically found between the longitudinal axis of the talus and the floor, a finding in agreement with that of other authors (*Niederecker* 1959).

The mean angle between the talus and the floor in the 9 feet with partial depression of the arch was  $30^\circ$ . In the feet with complete depression of the arch the angle was, on the average,  $36^\circ$ .

*Fig. 3.**Fig. 4.**Fig. 5.**Fig. 6.*

## DEMONSTRATION OF CASES

Figs. 3 and 4. The operation was performed when the child was 4 years 4 months old. Fig. 3 shows complete depression of the medial longitudinal arch of the loaded feet before operation. Fig. 4 shows the reconstructed arches of the feet 2 years 8 months after operation.

Figs. 5 and 6. The operation was performed at 6 years 4 months. The roentgenograms were taken with the foot loaded. The talus-floor angle before operation (Fig 5) was  $35^{\circ}$  (right) and  $42^{\circ}$  (left). At the after-examination 2 years 3 months after operation the angles were  $25^{\circ}$  and  $22^{\circ}$ , respectively (Fig. 6).

Figs. 7 and 8. Operation at 10 years 4 months. Fig. 7 shows the pre-operative complete depression of the medial longitudinal arch when loaded, which is also apparent from the pedogram. The calcaneus is pathologically pronated when loaded. Fig. 8 was taken 4 months after

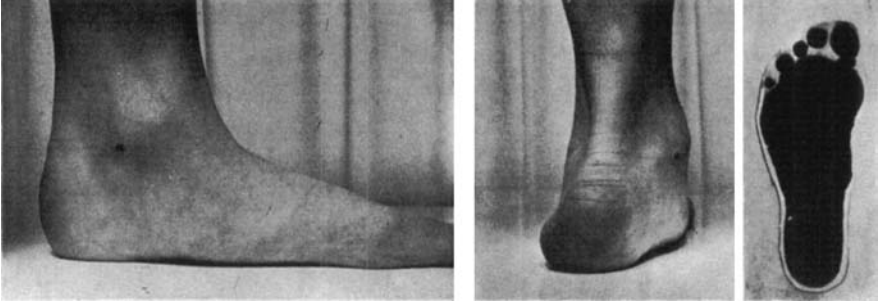


Fig. 7.

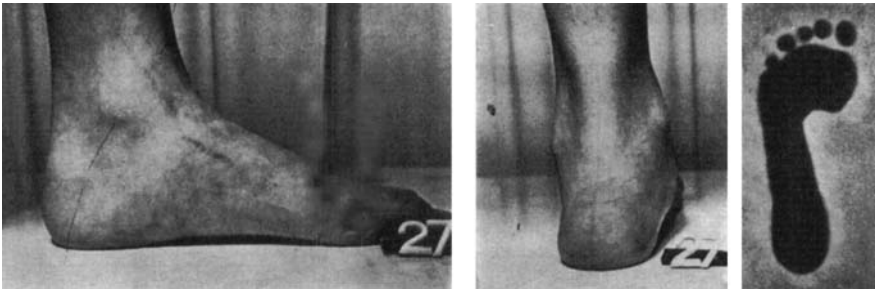


Fig. 8.

the operation and shows that the medial longitudinal arch has been reconstructed, the heel is in normal position when loaded, and the pedogram is normal.

#### S U M M A R Y

Though most cases of pes planovalgus staticus juvenilis respond favourably to conservative treatment, some remain refractory. Recent literature shows an increasing tendency to prophylactic operation of such refractory cases.

The material consisted of 54 feet of this group operated upon because they were refractory to conservative treatment. The patients' ages at the time of operation ranged from barely 4 to barely 11 years (average 6.3).

*Operative procedures.* Arthrorhisis talo-calcanea with homogenous bank-bone transplant placed into the tarsal sinus. In 24 feet the operation also included transposition of the insertion of the Tibialis anterior tendon to the scaphoid.

The interval between the operation and the after-examination was 4 months to 7 years.

At the after-examination it was found that of 30 feet with symptoms before the operation, 21 were now free of such symptoms. The position of the loaded heel was normal in 48. In 51 the depression of the medial longitudinal arch was less marked after operation. In 42 of these the curvature of the arch of the loaded foot was judged as normal.

#### RESUME

Parmi de nombreux cas de pieds planovalgus au stade juvénile, traités avec résultats favorables par traitement conservateur, certains sont demeurés réfractaires. La littérature récente montre une tendance accrue à l'opération prophylactique de ces cas réfractaires.

Le matériel d'observation comprend 54 pieds du groupe opéré parce qu'ils étaient réfractaires au traitement conservateur. L'âge des malades au moment de l'opération s'établit entre à peine 4 ans et à peine 11 ans (en moyenne 6,3 ans).

*Méthode opératoire.* Arthrorhisis talo-calcanea avec transplantation d'os homogène placé dans le sinus tarsal.

Dans 24 pieds l'opération comprenait aussi la transposition de l'insertion du tendon antérieur tibial au scaphoïde.

L'intervalle entre l'opération et l'examen complémentaire s'est établi entre 4 mois et 7 ans.

A l'examen complémentaire, il a été trouvé que sur les 30 pieds présentant des symptômes avant l'opération, 21 étaient libérés de ces symptômes. La position du talon en charge était normale dans 48 pieds. Chez 51, la dépression de l'arc médial longitudinal était moins marquée après l'opération. Parmi ceux-ci la courbe de l'arc du pied en charge a été jugée normale chez 42.

#### ZUSAMMENFASSUNG

Obwohl die meisten Fälle von pes planovalgus staticus juvenilis günstig auf konservative Behandlung reagieren, verhalten sich doch einige refraktär. Die neuere Litteratur zeigt, dass eine zunehmende Neigung besteht solche widerspenstige Fälle prophylaktisch zu operieren.

Das Material besteht aus 54 Füßen, die operiert wurden, weil sie auf konservative Behandlung nicht ansprachen. Das Alter der Patienten

reichte zur Zeit der Operation von nur 4 bis 11 Jahren (Durchschnitt 6,3).

*Operatives Vorgehen.* Arthrorrhisis talo-calcanea mit homogenem Transplantat von einer Knochenbank, das in den sinus tarsalis eingelegt wird. Bei 24 Füßen wurde auch die Transposition des Ansatzes der Tibialis anterior Sehne auf das Naviculare ausgeführt.

Die Zeitspanne zwischen der Operation und der Nachuntersuchung war 4 Monate bis 7 Jahre.

Bei der Nachuntersuchung wurde gefunden, dass von 30 Füßen, die Symptome vor der Operation hatten, 21 frei von solchen Symptomen waren. Die Stellung der belasteten Ferse war normal bei 48 Füßen. Bei 51 Füßen war die Senkung der medialen Längswölbung weniger ausgesprochen nach der Operation. In 42 von diesen wurde die Wölbung des Bogens des belasteten Fusses als normal angesehen.

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