Talectomy for equinovarus deformity in arthrogryposis

A 13 (2–20) year review of 17 feet

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Ten children (17 feet) with arthrogryposis multiplex congenita and severe, rigid equinovarus deformity underwent talectomy to bring the foot plantigrade. One child had a bilateral talectomy after only one manipulation, whereas the others were operated on an average of three times before talectomy. After a mean follow-up of 13 years, 14 out of 17 feet were satisfactory. We recommend that children with arthrogryposis and severe rigid equinovarus deformity be treated with talectomy before the expected age of walking.

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In arthrogryposis multiplex congenita nearly 90 percent of the children have severe bilateral clubfoot (Friedlander et al. 1968), and the treatment of the foot is the dominant orthopedic problem throughout the first year of life. Nonoperative corrections or traditional surgical treatment, such as tendon elongations and soft-tissue loosening, is often inadequate for rigid arthrogrypotic equinovarus deformity (Fisher et al. 1970, Menelaus 1971), and talectomy has been recommended (Lloyd Roberts and Lettin 1970, Menelaus 1971, Drummond and Cruess 1978).

We report the long-term results after talectomy of the rigid equinovarus foot in arthrogryposis multiplex congenita.

Patients and methods

From 1965 to 1985, children with arthrogryposis multiplex congenita admitted to our department for pediatric orthopedic surgery were reviewed. All 10 children (17 feet) had severe rigid clubfoot and were treated with talectomy. The mean age at the time of operation was 8 (2–17) years, and 3 patients (four feet) were more than 10 years old. The average follow-up was 13 (2–20) years. One child with bilateral clubfoot underwent talectomy on both sides after only one manipulation. The remaining children (15 feet) underwent before talectomy an average of three (1–12) different operative procedures, such as soft-tissue loosening, tendon elongations, capsulotomy, and supramalleolar and tarsal osteotomy, but the result was a recurrence of a severe rigid equinovarus position of the foot, with difficulties in walking, problems in fitting a shoe or a brace, and pain and callosities.

Operative procedure

The talectomy was carried out in a bloodless field. Through a slightly curved horizontal incision on the lateral side of the foot, the ligaments and capsules of the ankle joint, the subtalar joint, and anteriorly, the calcaneo-cuboid and talonavicular joints were divided. The talus was dissected free and removed in toto. Through a separate incision posteriorly, the Achilles tendon was elongated. Thereafter, it was possible to correct the equinus and the varus position of the hindfoot, as well as the supination, adduction, and, in certain cases, the plantar position of the forefoot. The correct position of the calcaneus beneath the tibia was secured by transfixation with one or two K-wires from the foot sole through the calcaneus into the tibia. Finally, the foot and leg were immobilized in a plaster of Paris cast. After 6–8 weeks, the cast and K-wires were removed.

Clinical and radiographic evaluation

The result of the treatment was considered satisfactory if the foot was painless and plantigrade at the time of reexamination. Up to 10° of supination and adduction of the forefoot was accepted. The radiographic evaluation was based on anterior, lateral, and axial projec-

tions of the foot and the ankle. Attention was directed to whether any remnants of the talus remained and whether osseous healing between the tibia and calcaneus had taken place.

Results

In one case, a serious postoperative complication occurred with total skin necrosis laterally on the foot after release of a calcaneotibial synostosis. The skin necrosis was covered with a myocutaneous patch, which healed satisfactorily.

Immediately after removing the plaster cast, all 17 feet were satisfactory. At reexamination, 14 feet (8 patients) showed a satisfactory result. Talectomy as the only operation was sufficient in nine feet, whereas in five feet further operations were necessary. There was no relation between age at the time of the operation and the treatment result. Of the five feet that had further operations, one foot had a supramalleolar osteotomy twice because of hindfoot varus. Two feet in 1 patient had to be mobilized tarsometatarsally because of forefoot equinus. Two feet were operated on twice with tarsometatarsal release because of respectively equinus of the forefoot and lysis of the calcaneotibial joint caused by synostosis and hindfoot equinus. Six patients (11 feet) were able to wear normal footwear and 2 patients (three feet) had to use custom-made footwear, but all 8 patients had unrestricted walking abilities.

Two patients (three feet) achieved an unsatisfactory result, and both had to use specially made footwear and splints. One of these patients was only able to stand because of additional severe brain damage, and the other patient could walk indoors.

Radiographically, calcaneotibial synostosis occurred in five feet. A complete talectomy had been performed in 13 feet, and remnants from the talus was left in four feet. There was no relation between the radiographic findings and the final result.

Discussion

In spite of the clubfoot deformity, most arthrogrypotic patients obtain good walking function, but this depends on the surgical treatment of the feet, bringing them plantigrade before the walking age (Friedlander et al. 1968).

In 1971, Menelaus published the results of talectomy in 41 feet with severe rigid clubfoot. The observation time was short, and the mean age at surgery was 3 years. Seventy percent of the patients had arthrogryposis, and the remaining patients had myelomeningocele. A satisfactory result was obtained in 79 percent of the patients, and it was concluded that the most optimal time for operation was between the 1st and 5th year of life. In older children, triple fusion is to be preferred; but no results were given. Green et al. (1984) also published good results after talectomy in arthrogrypotic clubfoot, with a satisfactory outcome in 24 of 34 feet. The average age at talectomy was 2 years and 5 months. Drummond and Cruess (1978) performed talectomy in 14 feet—11 times as a primary procedure and three times as a revision; in all, 6 of 14 feet were satisfactory. Triple arthrodesis was done for 10 feet in 6 children (mean age 12 years), and good results were obtained in all of them. Soft-tissue operations were only recommended in mild cases of equinovarus deformity. Failure of talectomy was the result of poor technique, often a combination of partial excision of the talus and incorrect placement of the calcaneus below the tibia, allowing posterior drift and recurrence of the equinous position.

Our experience with subtalar triple arthrodesis in arthrogryposis equinovarus deformity is limited. The disadvantage of this method is that the operation cannot be carried out until the child has reached the age of 10–12 years, because an operation earlier than this will reduce the growth of the foot significantly (Tachdjian 1990). Until the age of 10–12 years, several corrective soft-tissue operations must be carried out, possibly also osteotomies, which, as shown by us, seldom can bring the foot plantigrade—but instead causing the child problems as regards walking, footwear, and chafing.

In the light of our experience and reports in the literature, we recommend talectomy for the treatment of severe rigid equinovarus deformity in children with arthrogryposis multiplex congenita either as a primary procedure or for recurrence; however, the number of other corrective operations can be reduced or eliminated if the talectomy is carried out as a primary procedure before the expected age of walking. In children older than 10–12 years, it seems that triple arthrodesis produces the best results.

The key to success in talectomy is a careful operative technique. To reduce the risk of posterior dislocation of the calcaneus under the tibia creating a new equinus position of the hindfoot, transfixation of the calcaneo-tibial joint with one or two K-wires is recommended.

References

Drummond D S, Cruess R L. The management of the foot and ankle in arthrogryposis multiplex congenita. *J Bone Joint Surg* (Br) 1978; 60 (1): 96–9.

Fisher R L, Johnstone W T, Fisher W H Jr, Goldkamp O G. Arthrogryposis multiplex congenita: a clinical investigation. *J Pediatr* 1970; 76 (2): 255–61.

Friedlander H L, Westin G W, Wood W L Jr. Arthrogryposis multiplex congenita: A review of forty-five cases. *J Bone Joint Surg* (Am) 1968; 50 (1): 89–112.

Green A D, Fixsen J A, Lloyd Roberts G C. Talectomy for arthrogryposis multiplex congenita. *J Bone Joint Surg* (Br) 1984; 66 (5): 697–9.

Lloyd Roberts G C, Lettin A W F. Arthrogryposis multiplex congenita. *J Bone Joint Surg* (Br) 1970; 52 (3): 494–508.

Menelaus M B. Talectomy for equinovarus deformity in arthrogryposis and spina bifida. *J Bone Joint Surg* (Br) 1971; 53 (3): 468–73.

Tachdjian M O. *Pediatric orthopedics*. W. B. Saunders Co, Philadelphia 1990: 2521.