TALECTOMY FOR ARTHROGRYPOSIS MULTIPLEX CONGENITA

A. D. L. GREEN, J. A. FIXSEN, G. C. LLOYD-ROBERTS

From the Hospital for Sick Children, London

Eighteen patients (34 feet) with arthrogryposis multiplex congenita treated by talectomy for rigid equinovarus deformity were reviewed. The average follow-up was 11 years. Twenty-four feet (71%) were considered satisfactory; the remainder were improved. Seven feet required further operations to correct recurrence of the deformity, but finally all could be fitted with boots or shoes and all patients could walk. The history of talectomy is reviewed and the operative details described.

Arthrogryposis multiplex congenita is a syndrome, present at birth, which usually affects all four limbs and sometimes also the spine; it is associated with muscular and ligamentous abnormalities. Clinical studies have shown that the foot and ankle are the most commonly affected areas, and rigid equinovarus is the most frequent foot deformity (Friedlander, Westin and Wood 1968; Gibson and Urs 1970; Lloyd-Roberts and Lettin 1970).

Treatment by serial plasters and soft-tissue surgery alone has generally proved ineffective (Fisher et al. 1970; Menelaus 1971) and talectomy has therefore been advised in order to obtain a plantigrade foot (Lloyd-Roberts and Lettin 1970; Menelaus 1971; Drummond and Cruess 1978).

The aim of this study was to assess the long-term results of talectomy for the treatment of severe rigid equinovarus deformity in arthrogryposis multiplex congenita.

History of talectomy

The first known report of talectomy was by Hildanus (1641) who described its successful outcome for the treatment of a patient with a compound dislocation of the talus. In 1872, Edward Lund of Manchester described talectomy for the treatment of congenital talipes equinovarus and devised a special knife for the operation.

Royal Whitman published his first paper on talectomy for paralytic talipes calcaneovalgus in 1901. Further papers followed in 1908 and 1910, the operation becoming known as Whitman’s operation. During the following 10 to 20 years it was practised extensively, particularly in the United States.

Evans (1928) reported that talectomy gave good results in the treatment of paralytic calcaneovalgus and fair results in the treatment of equinovarus deformity due to spastic paralysis, spina bifida or progressive muscular atrophy.

Leikkonen (1950) and son Holmdahl (1956) held conflicting views on the value of talectomy in treating deformity caused by poliomyelitis. Leikkonen was generally critical of the operation whereas son Holmdahl reported good results in over 80% of those treated and found it particularly valuable for correcting equinus.

In 1970 several workers recommended talectomy for the treatment of rigid equinovarus in arthrogryposis (Gibson and Urs 1970; Lloyd-Roberts and Lettin 1970).

Fig. 1
Shape of the feet and legs in infancy; the deformities are clearly seen.

MATERIAL AND METHODS

Thirty-four feet in 18 children with arthrogryposis were treated by talectomy for rigid equinovarus; each patient was personally reviewed in a special clinic. The original diagnosis (Fig. 1) was made after clinical examination by orthopaedic surgeons and neurologists. The average age at talectomy was 2 years 5 months. Half the operations
were performed on infants under the age of 18 months. The oldest child was over 5 years. Follow-up was from 4 to 20 years with an average of 11 years; seven patients had reached skeletal maturity.

Before talectomy all the patients had undergone conservative treatment. In addition 21 operations (18 feet) had been performed: lengthening of the tendo calcaneus (4); posteromedial release (15); and Dillwyn Evans operation (2). Only one foot treated by soft-tissue release had a successful result. Figures 2 and 3 show the typical appearance of the feet after lengthening the tendo calcaneus.

**Operative technique.** The operation is performed under general anaesthesia and with a thigh tourniquet. The patient lies in the supine position with a small sandbag under the buttock on the side of operation. An anterolateral incision is made over the ankle and extended distally to the level of the navicular. The head and neck of the talus are exposed starting from the anterior aspect of the ankle; this is a useful landmark, particularly in a small foot where the talus is largely cartilaginous. It is most important to remove the talus completely; this may be difficult when it is adherent to the surrounding structures, but a small fragment left behind will almost invariably grow and cause recurrence of deformity.

The tendo calcaneus should be lengthened by excision of 1 to 2 cm, rather than by "Z" lengthening which can predispose to recurrence of the equinus. The lengthening is carried out through a second incision made directly over the tendon. After complete removal of the talus and excision of a portion of the tendo calcaneus, the foot should be easily correctable to the neutral plantigrade position. In some patients it may be necessary to remove all or part of the navicular to achieve this. All equinus must be corrected as any remaining after operation will persist and tend to increase. The calcaneus is stabilised in the corrected position by a Kirschner wire driven up through the skin of the heel into the tibia. The end of the wire is left protruding and is bent over to prevent migration.

A below-knee plaster is applied with the foot in the corrected position. This plaster is changed after three weeks when the Kirschner wire is removed and the patient allowed to bear weight. Figure 4 shows the radiographic appearance shortly after operation. Plaster is retained for six to eight weeks in all.

**RESULTS**

A painfree plantigrade foot which would accept normal boots or shoes or specially fitted boots, was considered satisfactory (Figs 5 to 7). Twenty-four feet (71%) were satisfactory at review; 19 of these had talectomy alone and 5 had required further operative treatment. Ten feet (29%) were considered unsatisfactory (Table I).

---

**Fig. 2**

Shape of the feet and legs in a child aged five years, after lengthening the tendo calcaneus, but before talectomy.

**Fig. 3**

Radiographic appearance shortly after talectomy.

**Fig. 4**

The talus is exposed starting from the anterior aspect of the ankle.
Movement at the tibiocalcaneal pseudarthrosis was severely limited. Twenty-four joints were almost fused, none having more than a few degrees of movement. Lateral radiographs revealed bony fusion in 11. At the midtarsal joint seven feet were stiff; the other 27 had only a jog of movement.

Relapse. All patients were satisfactory after the initial talectomy; any relapse into equinovarus or cavus occurred between two and six years later. This was a problem in seven feet and 11 further operations had to be performed. In four feet the tendo calcaneus which had previously been "Z" lengthened was now excised. Remnants of the talus had to be removed from four feet. Two feet developed severe cavus deformity and both required wedge tarsectomy; in one a subsequent release of the plantar fascia and flexor hallucis longus was also required.

Conclusion
Talectomy is a useful operation to correct the rigid equinovarus foot in arthrogryposis multiplex congenita and to convert it into one which, though still rigid, is a functionally useful plantigrade foot. It is recommended either as a primary procedure for such feet or as one to be used after the failure of less radical treatment.

I would like to thank Brigadier Jack Coull, Consultant Advisor in Orthopaedic Surgery to the Army, for his help and support with this paper. Miss Maria Phelan for her secretarial assistance, and also Miss Marshall from the Department of Medical Records.

REFERENCES

Leikkonen O. Astralectomy as ankle stabilizing operation in infantile paralysis sequelae: with special reference to astralectomies and total arthrodoses performed in Finland. Acta Chir Scand 1950; 100: 668–70.