TIBIALIS SPASTIC VARUS FOOT WITH TARSAL COALITION

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Anomalies of tarsal coalition have been described by anatomists (Anderson 1880, Pfitzner 1896) but their correlation with the clinical manifestation of spastic flat foot was not appreciated until Slomann (1921) and Badgley (1927) published their reports. Harris and Beath (1948) described the important part played by tarsal coalition as a cause of peroneal spastic flat foot. Their contribution created wide interest, and various reports have appeared during the past fourteen years (Webster and Roberts 1951, Outland and Murphy 1953, Jack 1954, Kendrick 1960).

It is now accepted that tarsal coalition is commonly associated with peroneal spastic flat foot. In these cases the peroneal muscles are always in spasm and the long extensors of the toes and the tibialis anterior muscle may also be so (Hohmann 1934, Lapidus 1946, Jack 1954). Kendrick (1960) reported a case of a calcaneo-navicular bar associated with tibialis anterior spasm, but no particular deformity of the foot was mentioned. Lapidus (1946) described spastic flat foot as "a painful condition of the foot and ankle, associated with spasm always limited to the pronator (evertor) group. Chiefly the peroneal muscles, sometimes the long extensors of the toes, occasionally also the anterior tibial muscles are contracted, all acting as pronators."

The mechanism by which the peroneal muscles are put into spasm is not clear, and the reason why these muscles are the ones to be affected is not evident.

The purpose of this paper is to suggest the possibility that reflex spasm associated with tarsal coalition may affect other muscles than the peronei, producing a different clinical deformity.

CASE REPORTS

Case 1—A girl of eight and a half presented in 1958 with a history that, four to five months before, she had suffered inversion strains of her left foot while skating. The foot was painful and she limped. The limp had persisted after the last strain and her mother noticed that she threw the foot outwards. The limp was worse in the morning, and also after getting up after sitting.

On examination she presented a typical left peroneal spastic flat foot. Peroneal spasm was present and there was localised tenderness over the lateral aspect of her foot in the region of the calcaneo-navicular junction. There was no spasm or deformity on the right side.

Radiographs of the feet showed a well developed calcaneo-navicular bar on the left side, there being a ragged line of division across the bar. On the right side there was a less well developed calcaneo-navicular junction.

A month later the left calcaneo-navicular bar which had a cartilaginous intersection was excised, and the origin of the extensor digitorum brevis muscle was interposed into the defect. Two months after operation the spasm and pain were relieved and there was a full range of movement.

A month later she began favouring her opposite foot. She tended to walk on the outside of the foot, with the heel in varus. She began to complain of pain over the lateral aspect of the foot and the symptoms increased. The deformity persisted, and it was noted that the tibial muscles appeared to be in spasm pulling the foot inward. Her shoe became misshapen and she had pain with crepitus and tenderness in the region of the calcaneo-navicular junction.

Six and a half months after the first operation the calcaneo-navicular pseudarthrosis was excised on the right side and the origin of the extensor digitorum brevis muscle was interposed.
The bar was a small one and two and a half months after this operation she had a full range of movement and relief of pain and spasm. Five and a half years later she was free of pain and there was no deformity.

After the operation on the left side it was suspected that she might develop symptoms on the right because of the smaller calcaneo-navicular bar on that side. When the symptoms persisted little importance was attached to the inverted position held by the right foot and the apparent spasm of the tibial muscles. It was felt at that time that she was trying to protect the pseudarthrosis from painful movement by holding her foot in forced inversion.

**Case 2**—A girl of nine was seen in 1959 with a history that for six months to a year her mother had noticed her walking on the outer side of the left shoe, and that she appeared to be turning the left foot inwards. Two or three months before she was seen she developed an increasingly painful deformity of the left foot, which was held in fixed inversion (Fig. 1).

On examination the left foot was in varus with obvious spasm of the tibial muscles. She was unable to evert the foot, and passive eversion was prevented by spasm of the tibial muscles (Fig. 2). Localised tenderness was present at the calcaneo-navicular junction. The right foot appeared normal. Radiographs revealed a calcaneo-navicular bar in the left foot (Fig. 3), but not in the right.

The left calcaneo-navicular bar was excised and the origin of the extensor digitorum brevis muscle was inserted into the gap. The bar was complete and rigid from calcaneus to...
navicular, although the middle part was cartilaginous. Two and a half months after operation she had a full range of movement and no pain or spasm (Figs. 4 and 5). In four and a half years there has been no return of trouble. She engages in all normal activity, including basketball, dancing and skating.

Case 3—A boy of twelve was seen in 1961 with a history that for two years he had suffered intermittent attacks of pain in the left foot with a tendency to limp. His family physician observed that the foot turned inwards and he was treated with intermittent strapping. However, his symptoms persisted and later became continuous. He walked over on the outer side of the sole of his shoe, deforming it.

On examination he walked favouring the left foot, which he held in varus with associated spasm of the tibial muscles. Movement of the mid-tarsal joint was restricted. There was associated tenderness over the region of the left calcaneo-navicular junction. Radiographs confirmed the presence of a calcaneo-navicular bar.

It was considered that the chances of successful relief by excision of the bar alone were diminishing because of his age. The possibility that he might require a triple arthrodesis was accepted. The left calcaneo-navicular bar was excised and the origin of the extensor digitorum brevis muscle was interposed. Pain was relieved and the range of movement improved for four to six months. By then he was indulging in normal activities, and indeed he fell at basket-ball, breaking his forearm. He has remained free of pain for the three years since the operation.
In the period during which these cases were seen eleven other cases of tarsal coalition with painful foot deformity were encountered, all with typical peroneal spastic flat feet. One patient of the latter group presented initially with a peroneal spastic flat foot on the left side, followed later by a tibialis spastic varus foot on the right.

In the three cases presenting with tibialis spastic varus feet the associated tarsal anomaly was a calcaneo-navicular bar. In each of them successful treatment was carried out by excision of the calcaneo-navicular bar and interposition of the origin of the extensor digitorum brevis muscle. It is strongly recommended that when excision of the bar is undertaken it should be radical and complete through to the sole of the foot. We suspect that the reason for the bad reputation of the operation is because it is carried out too late. Ideally it should be carried out well before full bony growth of the foot has occurred.

**SUMMARY**

1. Tarsal coalition often presents with the clinical picture of a peroneal spastic flat foot, but may present with a painful varus foot and spasm of the tibial muscles.
2. Three cases of tibialis spastic varus foot are described with a calcaneo-navicular bar as the associated anomaly.
3. Complete excision of the bar with interposition of the origin of the extensor digitorum brevis muscle appears to be a satisfactory method of treatment when carried out at a sufficiently early age.

I would like to express my appreciation to Dr Santokh Singh for his helpful criticism of the manuscript and for his survey of the literature.

**REFERENCES**


