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MODIFICATION OF THE POSTERIOR LEAF-SPRING ORTHOSIS

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For two years we fitted many posterior leaf-spring ankle-foot orthoses with the idea that they were contraindicated when medial or lateral instability was present. The types of cases where this instability was present are numerous, and when stroke cases are added, the number of cases with medial or lateral instability are enormous. We felt surely that some type of modification could be made to provide adequate control so that the many thousands of patients who have this common combination of ankle pathomechanics could take advantage of the plastic posterior leaf-spring ankle-foot orthosis (AFO).

Fig. 1 shows the ideal location of the resultants of the forces needed to correct varus of the ankle joint. Obviously, it would not be wise to bring pressure to bear directly on the lateral malleolus; however, from a mechanical standpoint, the closer the force vector is to the ankle joint the better.

Our first approach was to attach an aluminum extension to the plastic orthosis. These lateral extensions worked so well that we experimented with simply extending the plastic on the lateral side in the area superior to the lateral malleolus, as shown in Figure 2.

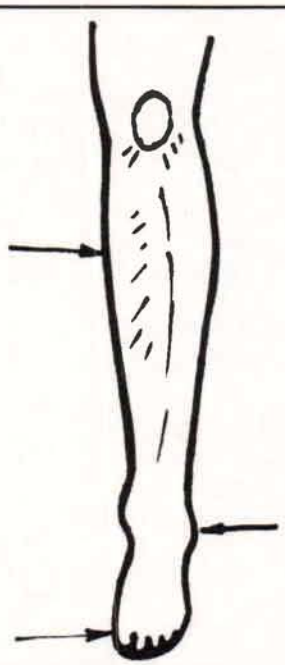

Fig. 1. Ideal location of the resultants of the forces needed to correct varus of the ankle joint.

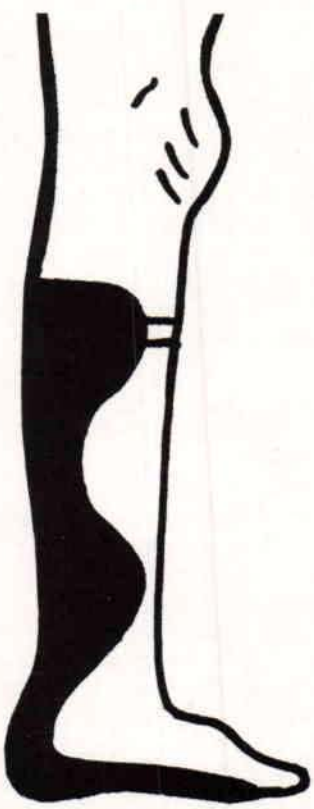

Fig. 2. Outline of the lateral wall of the modified posterior leaf-spring ankle-foot orthosis.

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Fig. 3. The modified leaf-spring ankle-foot orthosis to control varus.

As we progressed with this technique we began to lower the extension closer to the malleolus. Finally we began to lower the extension to a point where the trim line fell over the apex of the malleolus or even encompassing the entire area. However it is not necessary to do this in order to control the usual varus or valgus condition. The closer the medially directed force is to the anatomical ankle joint, the more effective is the control of lateral instability.

These same principles can be applied to solution to the opposite problem, valgus of the ankle complex, by simply reversing the location of the extension. We have also some cases where both a lateral and medial extension has been indicated, and were fitted with good success.

I have used the terms ankle joint and ankle joint complex loosely when referring to varus and valgus. Perhaps we, as orthotists, should be more specific and refer to the subtalar joint as the primary joint in varus and valgus of the foot, since the ankle joint actually has very little movement in the frontal plane.