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Technical Note

The AFO and Ankle Control

The molded ankle-foot orthosis is being used more and more for different types of injuries and disabilities. This article deals with eversion and/or inversion control incorporated in a molded AFO (Fig. 1). This design replaces the metal "short leg" orthosis that is provided with a T-strap.

If this procedure is to be successful, the patient must agree to purchase shoes that fit properly after the orthosis is completed. Usually one size longer and one size wider is sufficient.

The principle behind inversion-eversion control on an AFO is basic leverage. The weight of a person on the plantar surface of the orthosis often creates more torque than the ankle joint complex can resist, thus causing inversion or eversion.

An AFO is used to:

1. Control eversion and inversion of ankle during weight-bearing.
2. Control everted or inverted calcaneus during weightbearing.
3. Control flaccid ankle and forefoot.
4. Maintain alignment of bones of foot during growth years.

Fig. 1. Molded AFO designed especially to provide inversion control.

Casting Procedure

Since there are a variety of ways to use the AFO, it is not surprising that the casting procedure should be varied so as to provide the best end results; for example, casting for an everted calcaneus is slightly different from casting for eversion control. For the everted calcaneus, the calcaneus is in a neutral position between inversion and eversion while the mold is setting. For eversion control of the ankle, depending on the severity of eversion, the calcaneus could be held in position from a neutral position to an inversion position while the mold is setting. For pronation of the forefoot, the toes of the foot are raised while the cast is setting, making sure that the first and fifth metatarsals are flat on the footboard. The mold should be taken on the footboard with a ⅝-in. heel. The foot is positioned in the middle of the footboard with the ankle in

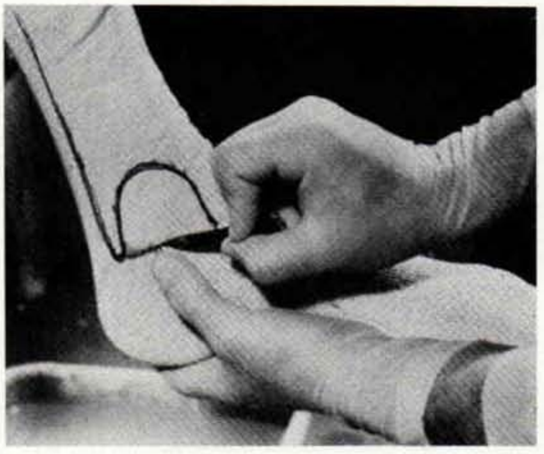

Fig. 2. To obtain eversion control the trim line is established by first determining the center point between the heel cord and the distal edge of the malleolus and drawing a line about the periphery of the malleolus.

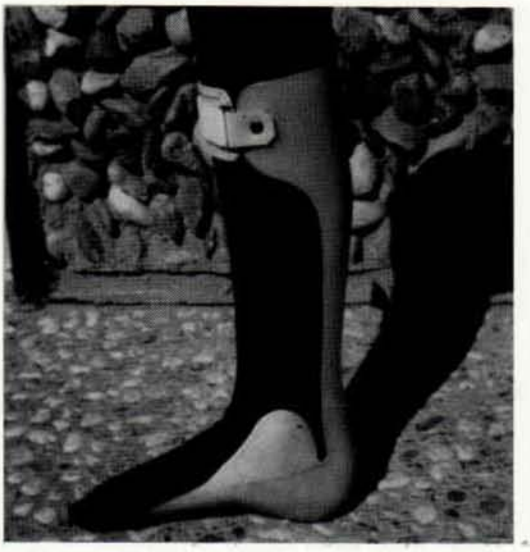

Fig. 3. The finished AFO for inversion control.

10 to 15 deg of dorsiflexion, to allow sufficient room for the posterior calcaneus while giving sufficient assistance to dorsiflexion.

Trim Lines

Variations of casting procedures are not great, but the variations in trim lines are many and important. For example, to obtain eversion control of the ankle, or to control an everted calcaneus and still have dorsiflexion assist, the trim line is established by determining the center point between heel cord and the distal edge of the malleolus (Fig. 2), drilling a 5/16-in. diameter hole in the plastic at this low point, and following the periphery of the malleolus. This is the most distal trimline point of the "leaf spring" and the start of the trimline that will control eversion (Fig. 2).

Padding is used at the discretion of the orthotist. When used, a thickness of at least ¼-in. of padding should be maintained.

Fig. 4. The lateral trimline for inversion control.

A medial view of the finished orthosis is shown in Figure 3.

The lateral trim line for inversion control is shown in Figure 4.

For a hemiplegic to don the orthosis, it will be necessary to add a circumferential strap just proximal to the ankle controls on the orthosis.

Thickness of Material

To determine the thickness of the plastic sheet to be used, the weight of the patient should be taken into consideration. When the distal trim line is drawn between the malleolus and heel cord, leaving the distal portion of the "leaf spring" approximately 1½-in. wide, a guide for plastic thickness is:

Weight Range of Patient	*Thickness of Polypropylene*
Walking age to 100 lbs.	1/8 in.
100 lbs. to 200 lbs.	3/16 in.
200 lbs. to 300 lbs.	1/4 in.

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