

Technical note

Orthosis for barefoot walking

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Introduction

Most lower limb orthoses cannot be used without footwear. Occasionally, barefoot walking by patients fitted with orthoses may be necessary due to economic circumstances, to satisfy the dictates of religion, or for other reasons, such as the discomfort of conventional footwear in hot and humid climates.

Invariably a boot or shoe is the foundation for an orthosis, with a stirrup riveted directly to the sole of the shoe under the anterior section of the heel. If the shoe with the stirrup is detached from the orthosis, the biomechanical function of the brace ankle joint is lost and relative movement between the brace and body takes place. Hence if a patient fitted with a lower limb orthosis desires to walk barefooted, certain modifications are necessary in the ankle-foot section of the orthosis.

In the system described below the sole of the foot on the orthotic side is bare under the heel and forefoot with a support only under the arch. This ensures a level pelvis in barefoot standing.

The orthosis

Instead of a shoe, a moulded arch support covering the longitudinal and transverse arches of the foot of the patient is substituted as a foundation. This support can be fabricated out of polypropylene or epoxy/polyester resin fibreglass laminate. The vertical pieces of a split stirrup are incorporated in this arch support and the free ends of the stirrup are connected to the ankle joint of the orthosis. The stirrup is selected to match the ankle joint for the biomechanical function required. It is aligned to coincide with the anatomical ankle joint and obliquely set to the apex of the longitudinal arch on the medial

side. The lateral stirrup piece is set parallel to the medial piece and both pieces are fixed on the arch support by riveting. The arch support is attached to the foot by D rings and Velcro fasteners.

The orthosis with the arch support system can be used with or without footwear (Fig. 1, left) or this system can be detached and replaced by a shoe and stirrup system as an interchangeable plan (Fig. 1, centre).

For patients with drop foot, a monobar ankle-foot-orthosis with an arch support substitute system can be used (Fig. 1, right).

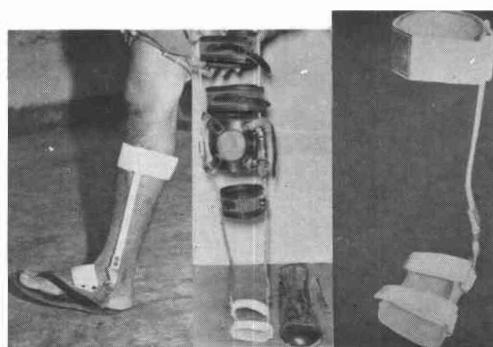


Fig. 1 Left, arch support system. Centre, arch support may be detached and replaced by shoe and stirrup system. Right, monobar AFO with arch support for drop foot.

Results

Paraplegics fitted with modified orthosis gave the following feedback on the advantages of the device.

- It is light and comfortable when compared to the shoe stirrup system.
- The device is easy to put on and take off (Donning and taking off shoes is more cumbersome).
- It is easier to walk because of the weight reduction.

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