

Brace Management for Ankle Arthritis

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KEYWORDS

• Ankle arthritis • Bracing • Osteoarthritis • AFO

Isolated ankle arthritis, regardless of origin, can be a difficult condition to treat. Ankle arthritis is relatively rare, and, most often, it is posttraumatically induced, which includes cartilaginous injury and ligamentous insufficiency.¹ Ankle arthrodesis remains the surgical goal standard for management of ankle arthritis. As with all arthrodesis procedures, it is not without the potential for nonunions and complications.^{2,3} Bracing can play a key role in patients who have degenerative disease of the ankle because it can prolong surgical intervention.

Although various noncustom and custom braces are available, not all are well-suited to address ankle joint arthritis specifically. Devices like walker boots and generic ankle braces may be useful in the short term but are cumbersome, inadequate, and not ideal for long-term use.

This article discusses a practical approach in describing the types of braces, fabrication details, and modifications necessary for the practitioner to be better equipped to prescribe and evaluate braces for ankle arthritis.

BRACING GOALS

The ankle joint axis lies close to the transverse and frontal planes; thus, principal motion occurs in the sagittal plane as dorsiflexion and plantarflexion. Movement within the joint, even minimal in severe arthritic cases, can elicit a great deal of pain and limitation with weight bearing and ambulation. As ankle arthritis and deformity worsen, increased forces are transmitted through the subtalar and talonavicular joints and result in degenerative change.⁴ An effective brace should therefore function to control and limit sagittal plane motion within the ankle joint and should maintain the joint in neutral position. Because of the design of these braces, total triplanar motion within the hind foot can be limited as well.

The practical aspect of bracing goals is patient compliance with the brace. Aspects like bulkiness, discomfort, and accessibility with shoe gear are factors that can contribute to patient apprehension. Understanding the fabrication, materials, and modifications is important in achieving success with patient satisfaction and compliance.

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BRACE MATERIALS AND SPECIFICATIONS

The most important concept in understanding brace technique is having an understanding of the plastic shell. The plastic shell (encompassed by two layers of leather) is the foundation of the brace. Creating a proper shell is more an art than a science. The concept is to maintain control (rigidity) in the malleoli area while creating flexibility in the distal portion of the brace corresponding to the plantar aspect of the foot. You accomplish this by beginning with a 0.125-inch polypropylene shell (thicker plastics create a bulky brace that compromises shoe fit). The plantar portion is to be grinded to 0.0625 inch, tapering proximally to 0.125 inch in the malleoli region. Bony prominences (most commonly, navicular tuberosity) need to be accommodated with 0.125-inch extra firm material (soft rubber). A plastic interface on bony prominences leads to pain and intolerance by patients. There should be no plastic in the heel portion, which is referred to as “hammocking the heel” (**Fig. 1**). This characteristic allows for easy shoe fit, prevents the need for split shoe sizes, and ensures less irritation at the patient’s heel. The trim line of the distal shell should end at the midshaft of the first metatarsal on the medial aspect and at the base of the fifth metatarsal on the lateral side. This design allows for easy fit and usability. The standard height of these braces is 5 inches above the malleoli. Those patients who are older or exhibit skin atrophy can usually only tolerate braces 1 inch above the ankle. Patients who have a large distal leg girth with severe ankle pathologic findings usually require braces higher than 5 inches on the leg. Caution should be exercised with braces crafted higher than 5 inches, however, because they create a painful area in the posterior aspect of the leg. The plastic shell should be lined with 0.125-inch pink plastazote to provide a shock absorptive interface (**Fig. 2**). Poron has a tendency to create a bulky brace.

Leather selection is an important factor in brace fabrication. The senior author (F.B.) prefers garment leather because it is soft, thin, and moldable. Calfskin does wear



Fig. 1. “Hammocking” involves creating an opening in the posterior inferior distal portion within the inner plastic shell of the custom brace.

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