

BioMechanics

Which Ankle Brace is Right for Your Patient?

BY SEAN P. GALLAGHER, PT

Ankle braces come in many shapes and configurations depending on the specific type of support and movement restrictions they are designed to provide. The most common support is lateral ankle stability followed by medial ankle stability (inversion and eversion respectively) and lastly subtalar support (heel lock). When selecting a brace for a patient, practitioners must go beyond simply fitting the patient according to type and severity. The patient's needs must be considered as well. Compliance is the key to any bracing therapy. Is the brace comfortable? Will it fit easily into the patient's shoes? How does the patient put it on and remove it?

Most ankle braces are either stirrup or full ankle support with stirrup variations. Stirrup braces are used primarily for inversion or eversion injuries while full ankle support braces are used for talocrural and subtalar injuries or both. Since many ankle injuries include both types of injuries, hybrid variations are often used. Stirrup braces are the easiest to put on while full ankle brace hybrids require more time.

Most stirrup braces are made with a hard plastic stirrup with some type of cushioning material on its inside surface and is secured on the outside with straps and/or Velcro. Plastic stirrup supports are not all the same. Some have hinges at the ankle joint; others do not. The real difference between these braces is the type of cushioning material found on the inside of the stirrup. Some employ a gel that can be frozen, thus providing molded cold compression and facilitated vascular pumping with ankle support. Other materials rely upon neoprene or air cushioning to provide compression and pumping support. Full ankle support braces that lace up take the most time to put on and take off, which is a major consideration.

I personally evaluated a limited number of ankle braces for their orthopedic and physical therapy value. The braces tested were not uncomfortable and could be worn inside my sneaker with little trouble. Your results may vary.

Stirrup Braces

Darco DarcoGel. DarcoGel provided good medial and lateral support while applying pressure and cold to the ankle area with its unique gel pack inserts. This model also could be used for prophylactic and chronic problems since even after the gel warmed up it still

provided added support and compression. My brace often slipped in the shoe because of the small piece of fabric used as a heel support. Regular adjustments are bearable, however, since during the acute stage of an injury the patient will be icing often. As the patient becomes more active, this constant adjustment becomes a nuisance. Straps used for holding the stirrups are made of Velcro and had a tendency to irritate the skin.

Active Ankle. The Active was designed by an athletic trainer to incorporate special features focussing on comfort. The stirrups have a hinge at the malleoli level with the lateral side lower than the medial to more closely resemble functional anatomy. The inside padding comes in two types: one made of neoprene that is used for "Training," and the "Bubble Flex Cushioning System," which provides enhanced compression for acute injuries. These inserts are interchangeable and can be adjusted to fit almost any anatomical variation. The brace's heel footplate support is made of plastic and is part of the stirrup mechanism. The Active Ankle brace avoids much of the slipping found in other braces. The straps used to hold the stirrups are made of a wide soft fabric with Velcro attached only to their ends, thus avoiding discomfort to the skin. These were the best straps of all the braces evaluated. The brace's hinged design also provided excellent inversion and eversion support while allowing plantarflexion and dorsiflexion. The Active Ankle brace is best suited for prophylactic use, but is still an excellent brace for acute inversion and eversion sprains. It also was the most comfortable brace tried. The Active is ordered by shoe size.

Joint Solutions Sure Step. The Sure Step stirrup brace is similar in many ways to the Active. The Sure Step has hinges, but they are not offset to adapt to the anatomical configuration of the ankle. The hinges can be locked to provide more stability than casting in grade three sprains. The manufacturer states, "The unique modified orthotic footplate helps maintain arch support and the subtalar joint in a neutral position." This may be true for many patients, but putting a rigid orthosis into a shoe for an ankle sprain for all types of feet may also cause other foot problems. This brace should only be used after a biomechanical evaluation of the foot is done to ensure that the orthotic support of the brace is beneficial to the patient's particular anatomical configuration of the foot. The padding is also

neoprene and can be adjusted for anatomical variations. The straps used to secure the stirrups are made of narrow Velcro material which can irritate the skin.

Aircast Air-Stirrup. Aircast's stirrups are, of course, the original item. Its models have molded sides to approximate the ankle as long as they are fitted properly. The inner stirrup support system is an adjustable air-cell mechanism with two compartments that allow for graduated compression from inferior to superior and prevent slipping of the air cushion from around the malleoli. Both air cells are also lined with a compressible foam. The adjustable heel pad is similar to the Darco brace. It has the potential for slipping and may require adjustment on a regular basis. Since there is no hinge at the ankle joint the plantar and dorsiflexion capabilities of this brace are more restricted than others. The straps used to secure the stirrup are wide and comfortable. Aircast Air-Stirrups come in three models and there is a wide overlap among the models recommended for indication and patient size.

OMNI Scientific Multi-Phase. The Multi-Phase ankle orthosis can function either as a fixed brace for acute injuries or allow plantar and dorsiflexion for post acute or prevention considerations. However, its full range of capabilities do not follow the anatomical orientation as well as other braces reviewed. This brace may be helpful for certain foot and ankle conditions but, as with the Sure Step, it does not fully address the variations of foot structure found in many patients. The straps on this brace are a little more complicated than most stirrup braces and include an extra strap on the mid-foot to hold the foot orthosis in place. The company states that its focal compression plate pad is designed to "facilitate translocation of edema up its drainage channel to the soft tissues of the leg." This brace is fitted by size and width of the foot and comes in men's and women's sizes.

Johnson & Johnson AS3. The newest entrant to the stirrup brace field is Johnson & Johnson's AS3 with Floam, which is similar to the other stirrup braces in providing medial and lateral ankle support. The AS3's Velcro straps may be uncomfortable if not fitted properly and the heel platform is a thin nylon material that allows shifting of the brace. The special Floam inserts are a combination neoprene with a foam type of resilience that is comfortable and supportive. It's also simple to put on and fits easily into most shoes.

Full Ankle Support Braces

Medical Specialties ASO. The Ankle Stabilizing Orthosis is made of a thin but strong ballistic lightweight nylon with a neoprene inner sleeve for comfort. This brace is laced up in the front of the foot and can be tightened enough to avoid slipping. It provides the most support for the subtalar joint as well as inversion and eversion through the use of nylon straps that mirror the taping techniques of athletic taping. These straps incorporate stirrup

and heel locking to provide the desired support and come with optional plastic stays for added lateral and medial stability. The straps are easy to use and can be adjusted without removing the shoe. This ambidextrous brace fits easily into most athletic shoes. Size the ASO by taking a circumferential measurement around the malleoli from the heel to the dorsal crease of the ankle with an athletic sock on.

Smith & Nephew DonJoy RocketSoc. The RocketSoc ankle brace comes in two versions: nylon and neoprene. The nylon version laces up the front. The brace has plastic stays along the medial and lateral sides as well as a half moon foam support on the superior medial and lateral sides above the malleoli. Included with the brace is an extra half moon foam support for the inferior aspect of the malleoli for acute inflammation. The Nylon RocketSoc offers three straps: two provide lateral stirrup support that also help lock the heel and the third strap anchors the first two. The straps are lettered (A,B,C) for easy identification and order of use. The neoprene ankle brace is similar to the nylon-lace up version but deploys five straps instead of three. Instead of lacing, the neoprene uses Velcro closures to allow a firm and comfortable fit of the sleeve. The five-strap mechanism is similar to the lace up version because it uses two lateral straps as stirrups and heel locks at the same time. The other three are used mainly to secure the stirrup straps. All the straps are lettered (A,B,C,D,E) for ease of application and order of use. The plastic stays and half moon inserts also are provided with this brace. These two versions are much bulkier and take more time to put on than other braces.

Swede-O Ankelok. The Swede-O ankle brace has a patented "Ankle Lok" offset flap and close spaced eyelet system that the manufacturer says will hold the ankle more securely than other lace-up ankle braces. When fitted correctly this Ankle Lok system does a good job securing the talocrural and subtalar joints. The Swede-O comes with built-in metal u-shaped stays to provide lateral support and has optional stabilizers that can be added for additional support. The supports do not work as well as some of the other braces evaluated with stirrup straps used for inversion and eversion support. This brace has an elastic back that is supposed to ensure unrestricted blood flow to the Achilles tendon and help avoid blistering.

None of the many different braces available on the market today has everything you would require for all patients, types of injuries or lifestyles. So until the ideal brace is developed, evaluate each patient's individual needs and injury and fit them with a brace that matches their specifics.

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