Considerations in the Use of Ankle Braces

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The causes of ankle injuries have been increasingly investigated in recent years, as has research into methods of decreasing both the incidence and severity of these injuries. One reason for this ongoing research is the frequency of such injuries across sports. Sometimes it seems that time in the training room is spent mostly on preventing ankle injuries, as in taping ankles before practices and games, or working with athletes who have sprained an ankle.

On top of this, add the BAPS boards, Theraband®, slideboards, exercisers, etc., that are so numerous in most training rooms, and it seems apparent that ankle sprains are a common affliction. Obviously, if ways can be found to reduce the frequency and severity of ankle injuries, this would certainly make the athletic therapist’s job less hectic.

History and Trend of Injury Statistics

The history of the literature on ankle injuries actually predates the creation of the NATA. Over 50 years ago, an article in the Journal of the American Medical Association discussed how protective wrapping of the ankle can help prevent ankle sprains (Quigley et al., 1946). Apparently, ankle sprains have been a problem for some time.

Ankle injuries have been identified as comprising some 15% of all sports injuries and may be the single most common injury in sports (Garrick & Requa, 1977). In basketball, inversion sprains have been cited as the most frequent injury (Garrick & Requa, 1977).

Key Points

- Through the years, ankle injuries have accounted for the single most common type of injury in sports.
- The traditional method of dealing with ankle injuries has been taping, an important skill in the athletic therapist’s repertoire.
- When compared to ankle bracing, taping loses its supportability very quickly and is much more expensive.

The amount of time spent in diagnosis, treatment of acute symptoms, and rehabilitation, along with time lost from practice or games, presents a potentially costly problem to both athletes and athletic therapists.

A look at the statistics on ankle injuries, as compiled by the NATA (1997), may shed some light on the scope of the problem. In high school basketball, foot and ankle injuries accounted for 38.3% and 36% of all injuries to boys and girls, respectively. This was by far the most frequently injured area of the body. In high school football, ankle injuries accounted for 14% of all injuries, for a projected U.S. total of 72,014 ankle injuries in football alone.

With such a large number of injuries to one area of the body, the need for means of preventing ankle sprains became apparent. A major concern, however, is that no form of prophylaxis should be allowed to sacrifice performance in the name of improved ankle stability.

Other considerations for ankle bracing include both weight and potential limitations on normal range of motion. Limitations on range of motion will not only di-
minish performance but could perhaps also put abnormally high stresses at other areas, thus increasing the chances of injury at a point away from the ankle.

The alternative prophylactic method, one with a long history in athletic therapy, is the application of adhesive tape to the ankle. Properly applied, ankle taping provides support where it is most needed, depending on the injury. It is very lightweight and of course provides a custom fit to the athlete’s ankle, a goal that ankle braces have not yet achieved.

Ankle taping also has the advantage that a skilled therapist can modify the taping to the severity of prior injury or to compensate for any laxity. In essence, the tape is a one-time custom fitted prophylactic ankle brace.

Ankle taping is also used to prevent reinjury to the ankle. This is an area that most of the research on ankle braces has not yet addressed, that is, whether prophylactic ankle braces are more effective in preventing reinjury or in returning the athlete to sport participation after a sprain.

Ankle Anatomy
The ankle joint itself is composed of the talus articulating with the mortise formed by the tibia and fibula to create a very stable joint, known as the talocrural joint. This joint is stabilized laterally by three small ligaments, the anterior and posterior talofibular ligaments and the calcaneofibular ligament.

Medially the talocrural joint is stabilized primarily by the large, strong, deltoid ligament. The talocrural joint is designed to swing up and down, providing a considerable amount of plantar- and dorsiflexion. However, it is restricted by both bone and ligaments from moving in eversion or inversion.

The subtalar joint, which is formed by the inferior articulating surfaces of the talus and the calcaneus, provides most of the inversion and evasion in the foot. Because of the skeletal characteristics of the talocrural joint, it is extremely vulnerable to injury from inversion, most commonly resulting in damage to the anterior talofibular ligament.

To this end, prophylactic ankle braces were designed to provide additional external support to the ligaments that stabilize the ankle. These effectively limit inversion and evasion of the ankle, yet should have little effect on plantar- and dorsiflexion.

Brace Types
There are two main styles of ankle braces to choose from: the semi-rigid ankle brace and the lace-up brace. Both have their advantages and disadvantages. With the lace-up ankle braces, there are some differences between the manufacturers' products.

Most of the research has shown no significant differences between the types of ankle braces on indices of athletic performance (Paris, 1992; Pienkowski et al., 1995). But there do seem to be cost differences, with the lace-up braces generally costing less than the semi-rigid ones. Ease of application as well as comfort of the brace may also be a factor and will depend primarily on the preferences of the players and athletic therapists.

Table 1 Estimate of Cost Involved in Taping Ankles

<table>
<thead>
<tr>
<th>Football</th>
<th>Soccer</th>
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<tbody>
<tr>
<td>90 players × 2 ankles = 180 ankles/day</td>
<td>25 players × 2 ankles = 50 ankles/day</td>
</tr>
<tr>
<td>5 days per week × 16 weeks = 80 days</td>
<td>6 days per week × 16 weeks = 96 days</td>
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<tr>
<td>Total: 14,400 ankles @ $1.50/ankle</td>
<td>Total: 4,800 ankles @ $1.50/ankle</td>
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<tr>
<td>Estimated total cost: $21,600</td>
<td>Estimated total cost: $7,200</td>
</tr>
<tr>
<td>Braces: 2 pairs/player/season @ $20 each: $7,200</td>
<td>Braces: 2 pairs/player/season @ $20 each: $2,000</td>
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<tr>
<td>Percentage savings with braces: 67%</td>
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