Preventing Recurrent Lateral Ankle Sprains: An Evidence-Based Approach

LAUREN C. OLMSTED-KRAMER, PhD, ATC • The Pennsylvania State University
JAY HERTEL, PhD, ATC • University of Virginia

Ankle sprains are among the most common injuries suffered by athletes. The most common predisposition to suffering an ankle sprain has consistently been shown to be history of a previous ankle sprain. This has led to the widespread use of preventive measures such as taping, bracing, and balance training in an effort to reduce the risk of recurrent ankle sprains. Despite the common use of these clinical practices there is a limited amount of experimental evidence examining the effectiveness of these interventions at reducing injury rates. The purpose of this article is to summarize the best research literature examining the effectiveness of these prophylactic measures and to provide guidelines for their use in the clinical practice of athletic training and therapy using statistics that are easily interpreted by the clinicians.

Key Points
- Ankle taping and bracing are more effective at preventing sprains in athletes with a history of previous sprain.
- Rehabilitation programs emphasizing balance and coordination exercises that are carried out for at least 6 weeks are effective at reducing recurrent ankle sprains.
- Numbers needed to treat and relative risk reduction are two statistics that explain the benefits of interventions that can be easily interpreted by clinicians.
- Key Words: chronic ankle instability, balance training, bracing, taping

Ankle Taping and Bracing
Anecdotally, ankle taping is one of the most common practices associated with athletic trainers and therapists (Figure 1). Despite this, there has been only one prospective randomized controlled study published examining the effectiveness of ankle taping in preventing ankle sprains in athletes, and that article was published in 1973. Ankle bracing (Figure 2) has been commonly used in clinical practice as an alternative to taping, but this practice also has not been subjected to extensive study—there are just two reports in the literature of prospective randomized controlled trials assessing the preventive effects of ankle bracing in athletes. Ankle taping and bracing are thought to reduce the risk of ankle sprain by providing a mechanical restraint to excessive ankle motion while also enhancing proprioception and neuromuscular control about the ankle complex.

Numbers Needed to Treat
A novel approach to examining the effectiveness of taping and bracing in reducing ankle sprains is to use an analysis known as numbers needed to treat (NNT). The NNT is the number of interventions (taping or bracing) that are necessary to prevent one ankle sprain. A perfect NNT equals 1; this would mean that in order to prevent one ankle sprain, a clinician would need to tape or brace just one ankle. NNT is calculated by taking the inverse of the difference between the injury rate in the control group and the treatment group. We recently calculated...
the NNT for three prospective studies examining the effectiveness of taping or bracing on the reduction of ankle sprains.\(^7\)

**Clinical Application**

Garrick and Requa\(^2\) examined the effectiveness of ankle taping on reducing ankle sprains in collegiate intramural basketball players. When we calculated the NNT for this study, we found that in order to prevent an ankle sprain in an intramural basketball player with a history of sprain, you would need to tape 26 ankles. In order to prevent an ankle sprain in an intramural basketball player without a history of sprain you would need to tape 143 ankles. Results from this study demonstrate that you would need to tape considerably fewer people with a history of a sprain in order to prevent an injury.

Sitler et al.\(^3\) examined the effectiveness of ankle bracing using an Aircast® Sport-Stirrup® in reducing ankle sprains in military-academy intramural basketball players. When we calculated the NNT for this study, we found that in order to prevent an ankle sprain in an intramural basketball player with a history of sprain, a clinician would need to brace 18 ankles. In order to prevent an ankle sprain in an intramural basketball player without a history of sprain a clinician would need to brace 59 ankles. Results from this study again demonstrate that clinicians would need to brace fewer people with a history of a sprain in order to prevent an injury.

The effectiveness of ankle bracing using an Aircast Sport-Stirrup in reducing ankle sprains in competitive male soccer players has also been examined.\(^4\) When we calculated the NNT for that study, we found that in order to prevent an ankle sprain in a soccer player with a history of sprain, a clinician would need to brace five ankles. In order to prevent an ankle sprain in a soccer player without a history of sprain, 57 ankles would need to be braced. Results from this study also demonstrate that you would need to brace fewer people with a history of a sprain in order to prevent an injury.

These results clearly show that taping or bracing is much more effective in preventing ankle sprains in athletes with a previous history of ankle sprain than in those without such a history. The NNT analysis provides clinicians an easily understood measure of the number of treatments needed to prevent a single ankle sprain.

**Balance Training**

**After Acute Ankle Sprain**

Rehabilitation programs for athletes recovering from acute ankle sprain often involve many balance and coordination exercises after pain and swelling associated with the injury have subsided (Figures 3 and 4). These exercises are performed in an effort to restore neuromuscular function that is adversely affected after ankle sprain. It is thought that restoring neuromuscular control will reduce the risk of reinjury, but there have been only two prospective randomized controlled studies reported in the literature that have studied the effects of balance training after acute ankle sprain in preventing subsequent reinjury.\(^8,9\)

**Relative Risk Reduction**

One way to interpret the results of intervention studies is by calculating the relative risk reduction. The relative