

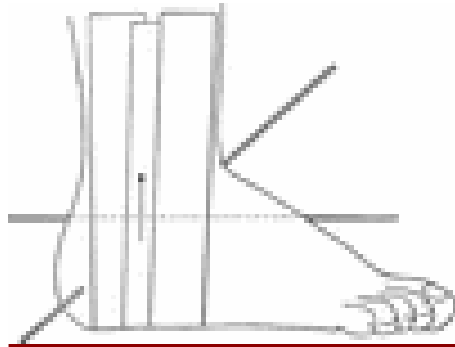


Taping Vs Bracing

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Overview



- Taping
- Bracing
- Taping and bracing studies
- Effects of taping and bracing on performance
- Proprioception
- Peroneal activation
- Deceleration and ROM restrictions
- Brace review
- Conclusion and questions

Taping

**2 year study -
2,526 basketball
players ¹³**

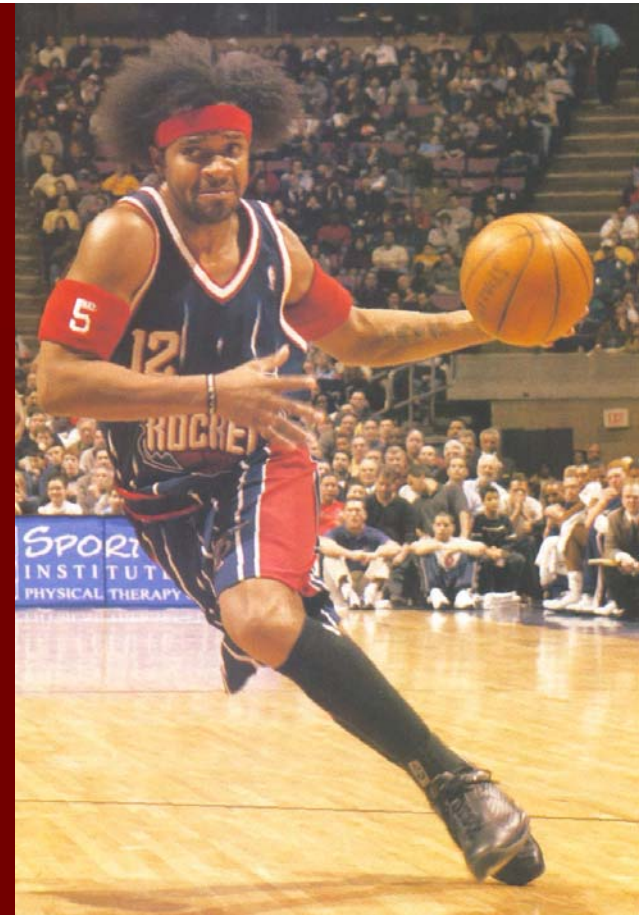


- Taping reduced the incidence of sprains (14.7 sprains per 1,000 player games versus 32.8 sprains per 1,000 player games).
- Decrease in severity of ankle sprains in taped group.

Bracing

2-year study 1,601 intramural basketball players **11**

- Injury rate of 1.6 per 1,000 athlete-exposures (brace group)
- Injury rate of 5.2 per 1,000 athlete-exposures (no brace group)
 - using a semirigid ankle orthosis



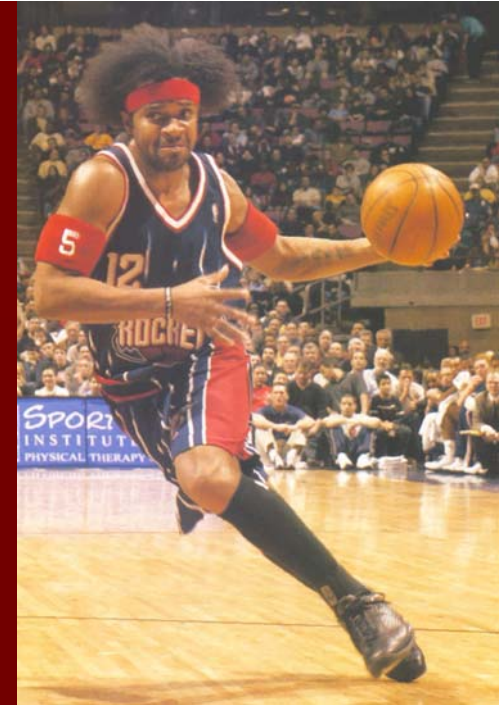
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Bracing

1 year study – 504 soccer players - sport stirrup 4

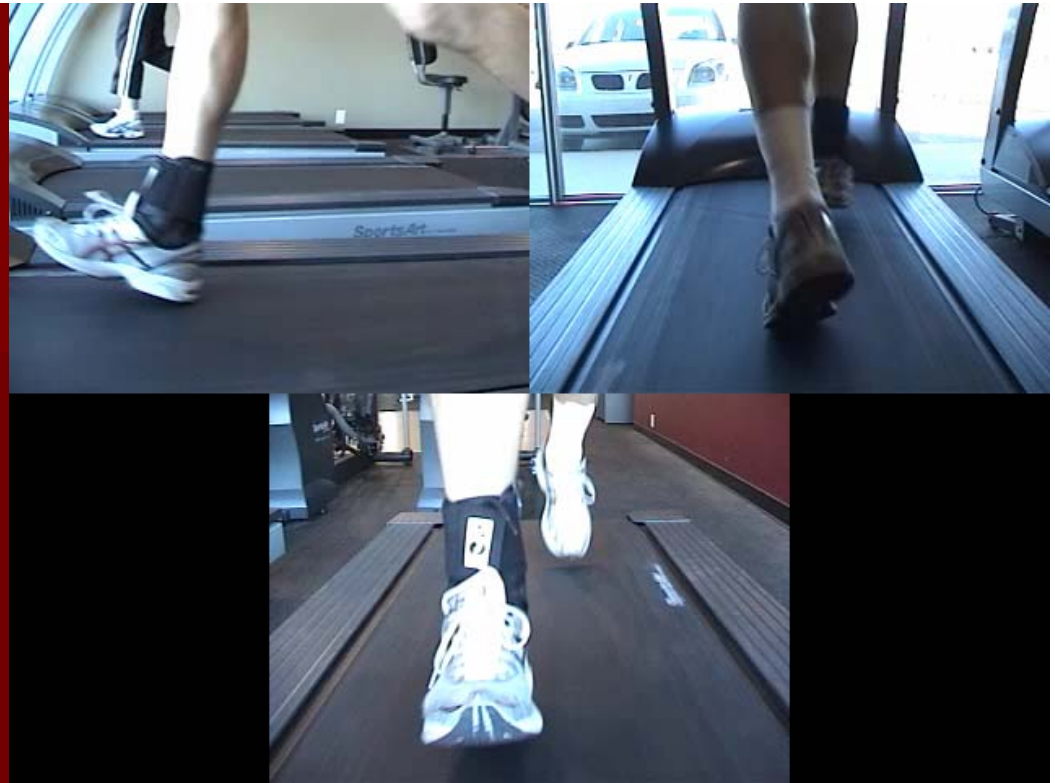
- significant reduction in the incidence of ankle sprains in the **braced** group with previous sprains (0.14) compared with the **nonbraced** group with previous sprains (0.86). (injuries/1000 playing hours)
- incidence of ankle sprains was significantly higher in the nonbraced group **with** previous sprains (0.86) compared with the nonbraced group **without** previous sprains (0.46).

Thus, in this study, a semirigid orthosis significantly reduced the incidence of recurrent ankle sprains in soccer players with previous history of ankle sprains.



Braces and tape

6 year retrospective study - compared taping with laced ankle stabilizers in 297 college football players ¹⁴



- Laced ankle stabilizers (2.56 sprains/1,000) were twice as effective in preventing ankle injuries than taping (4.91 sprains/ 1,000).
- Suggested that by retightening the stabilizers, the players periodically returned the stabilizers to their level of maximal support, while the tape loosened with time and mechanical stress.
- Their study, however, compared only two groups (prophylactic taping and laced stabilizers) and did not contain a control group with athletes wearing no prophylactic measures.

Braces and Tape



Tape becoming loose

- tape can lose 40% of its initial support after 10 minutes of use **12**
- losses in taping restriction for both inversion and eversion at 20 minutes into exercise. Semirigid orthosis may be more effective than taping in providing initial ankle protection and in guarding against ligamentous reinjury. **10**

Braces and Tape



Time, experience, and cost

- requires the time and expertise of the trainer or coach to apply the tape – football season – 97 minutes/ ankle during the season.
- the projected cost savings for an athletic program using prophylactic bracing could be substantial when compared with the use of prophylactic taping of the ankle.
- the use of braces is more cost effective and braces are more easily to apply than tape **2**
- Taping over an entire season could be as high as three or four hundred dollars **12**

Performance

- Many performance variables have been studied
 - vertical jump
 - sprinting
 - agility
 - peak impact forces



- Twenty-six male athletes performed an agility run, a 40-yard sprint, and a vertical jump while wearing: 1) adhesive tape, 2) Air-Stirrup brace, and 3) no support (control). Observed data suggest that both taping and bracing have no substantial effect on agility, sprinting speed, or vertical jumping ability.³

Performance

- **Comparing braces**

- no clear conclusions can be drawn concerning the relative effects of different brace designs (eg, semirigid versus lace up)



- Most studies comparing the effects of taping and bracing on performance have not demonstrated significant differences.
- Some researchers found that various forms of ankle support decreased vertical jump height by 3% to 5%, whereas others did not observe a significant effect **16**

Performance

- **Forceplate** was used to collect ground reaction force data under the dominant foot. Athletes performed stiff and soft drop landings before and after a 20-minute treadmill exercise bouts

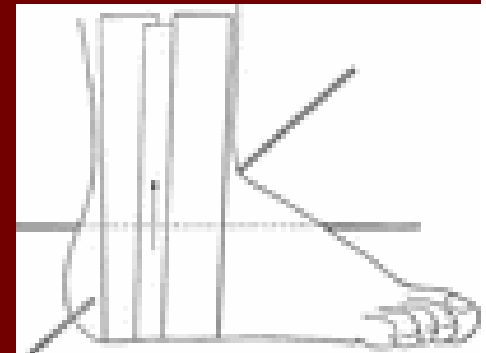


- It appears that ankle taping and bracing decrease the time to reach peak impact forces.
- Whether these effects are detrimental over time remains speculative at this point and requires further research. 15

Biomechanical and Neuromuscular Effects of Ankle Taping and Bracing

Gary B. Wilkerson

- The effects of ankle taping and bracing on
 - proprioceptive input to the central nervous system
 - peroneal muscle activity,
 - deceleration of ankle motion may be as important as restriction of the range of ankle inversion for sprain prevention.



Proprioception

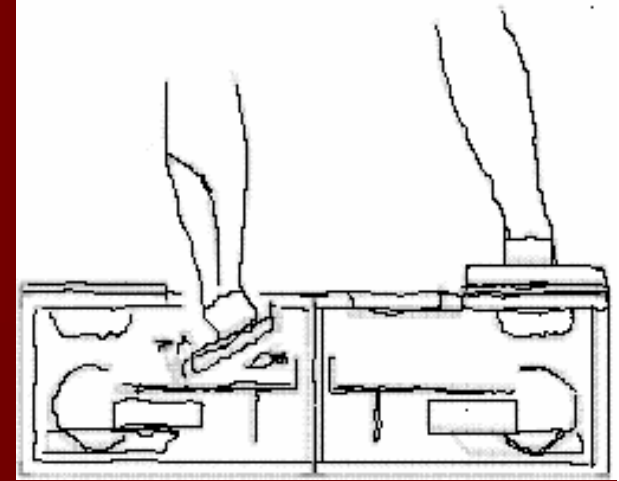
- **Active replication of reference ankle positions**
 - stirrup brace improved the accuracy of ankle position in 3 planes
 - tape straps adhered to the skin significantly improved joint position sense in nonweight-bearing plantar flexion
 - taping and a lace-up brace both significantly improved the ability of subjects to actively reproduce a specific plantar-flexion joint angle.
- **Awareness of ankle-joint position**
 - most important immediately before ground contact
 - peroneal muscle activation is essential to counteract a potentially injurious force after landing.

Peroneal activation

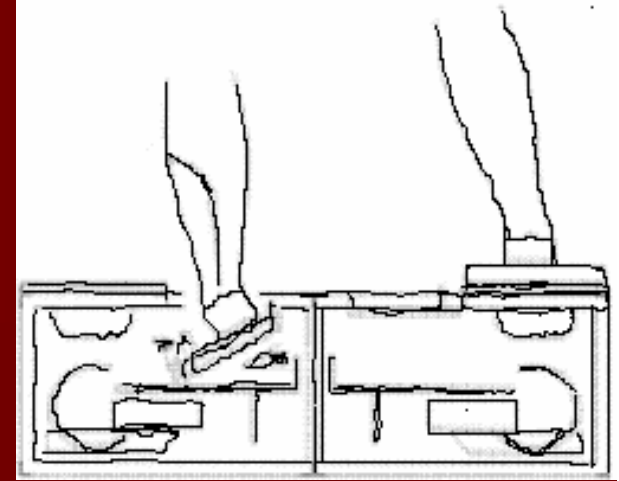
- Peroneal Activation while taped
 - found that the peroneus brevis muscle was active for a longer period of time at the end of the swing phase, just before footstrike, when the ankle was taped
 - taping did not prevent the evtor musculature from being vigorously activated
 - the greatest improvement in response speed was in ankles with the greatest degree of instability
 - that reduction in the angular velocity of displacement with tape, combined with restricted displacement amplitude, permitted relatively greater peroneal activation per degree of motion than the untaped condition

Deceleration of ankle motion

- Weight-bearing sprain simulation
 - induced 50° of inversion displacement – using radiographic cinematography to assess the effect of ankle bracing on inversion velocity. A stirrup-type brace decreased the distance that stable and mechanically unstable ankles were displaced during a 40-millisecond high-velocity phase of the sprain simulation by approximately 15% to 20%.
 - trapdoor platforms - relatively similar to those observed for subtalar eversion during running, the velocity of ankle displacement associated with jump landing may exceed $1000^{\circ} \cdot s^{-1}$



Deceleration of ankle motion



- When sprains occur between 30 and 50 milliseconds after ground contact inversion velocity must be greater than $1000^{\circ}\cdot s^{-1}$ to produce ankle displacement beyond 50° in less than 50 milliseconds
- The research done in this area suggests that both the deceleration and motion-restriction effects of taping and bracing are rate dependent and are relatively more effective at high velocities of ankle displacement.

Bracing Options

Upwards of 30 to 35 different types of ankle braces on the market

Types of braces include lace up, semi rigid, stirrup, air stirrup. Each of these groups have different manufacturers

Questions to ask prior to deciding

Brace used for prophylaxis or post-traumatically?

Is it easily applied and re-adjustable during play?

Is it economical?

Is it realistic for the sport they are involved in?

Life expectancy?

Will you get compliance?



When to brace

- Acute ankle sprains

- Use of a semi-rigid ankle support resulted in a significantly shorter time to return to work and sport when compared with an elastic bandage and tape

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- After recurrent sprains

- Reduction in the incidence of ankle sprains in athletes with previous sprains⁴

- For prevention

- The prophylactic use of semirigid ankle braces appears warranted to reduce the incidence of initial and, in particular, recurrent ankle sprain injuries for individuals who participate in activities that have the highest risk for these injuries ⁸

Conclusion

- The use of either tape or braces reduces the incidence of ankle sprains.
- The use of tape or braces results in less severe ankle sprains.
- Braces seem to be more effective in preventing ankle sprains than tape.
- There is conflicting studies regarding taping and bracing effecting performance
- Benefits through proprioception, peroneal firing and deceleration of ankle motion

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