THE EFFECTS OF ANKLE BRACING ON SPORTS-SPECIFIC CAPABILITIES

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INTRODUCTION

Ankle braces are widely used in athletes. In some professional sports leagues it is mandatory to wear ankle braces in order to get insurance. Even prophylactic bracing is often used in normal sports. The efficiency of ankle joint orthoses was already demonstrated in several studies, and different types of external stabilization devices were compared.

Especially the aspects of mechanical stabilization were discussed in these studies as well as retrospective observations of the prophylactic benefit regarding the prevention of sprains by using orthoses. Neurophysiological or psychological aspects are hardly taken into consideration in the literature when evaluating different types of orthoses.

In the presented study the proprioception with regard to the ankle joint and especially its influence by orthoses and the effect of ankle braces on sports-specific capabilities will be discussed. First of all the question is, whether the orthoses have an impact on the proprioception of the ankle joint at all. If there is an influence, then it is of particular importance for a comprehensive jugdement to document the degree of influence by each type of orthoses for the injured and not injured ankle joint. By evaluating the results of this study a possible reduction of the proprioception caused by ankle sprains will be investigated as well. This phenomenon of a posttraumatic proprioceptive deficit was already described and controversially discussed in the literature.

METHODS

The influence of four stabilizing devices (aircast brace, ligafix air-brace, malleoloc-brace, taping) on sports-specific capabilities and propioceptivity of stable and unstable ankle joints were assessed. Therefore both ankle joints of 18 uninjured volunteers and 23 injured volunteers with an old ankle sprain were tested with two different set-ups (modified Japan-test, 5 point single leg jump test). We used a modular coordination-test-system with 5 contact plates and a computer monitor that gives in randomised sequence the signal which circles of the 5 plates to jump on. We scored the total time, reaction time and standing time on the plates. For the modified Japan test the task was to reach 25 contacts by side steps and the score was total time and standing time on the plates.

RESULTS

The time for both tests as well as reaction time and contact time for each moving direction was measured and calculated by a software program. Regarding the modified Japan-test (Fig. 3; Fig. 4) and the 5 point single leg jump test (Fig. 1; Fig. 2) the injured group achieved showed significant better results ($p< 0.01$) & ($p<0,05$) with all stabilizing devices compared to no tape or brace. For the healthy

volunteers we could not document any significant difference whether using different braces, tape or not any stabilizing device at all in both test-set-ups.

Fig. 1: Single leg jumping test (injured group)

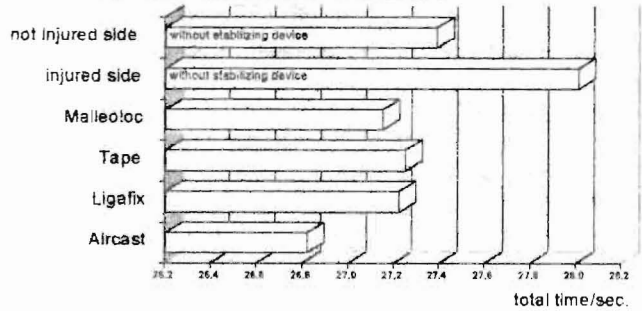


Fig. 2: Single leg jumping test (not injured group)

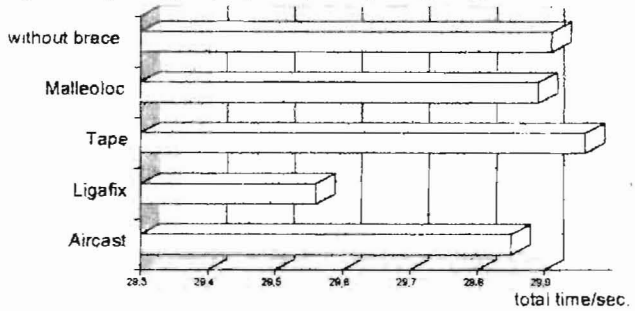


Fig. 3: Japan Test differentiated according to direction of motion (injured group)

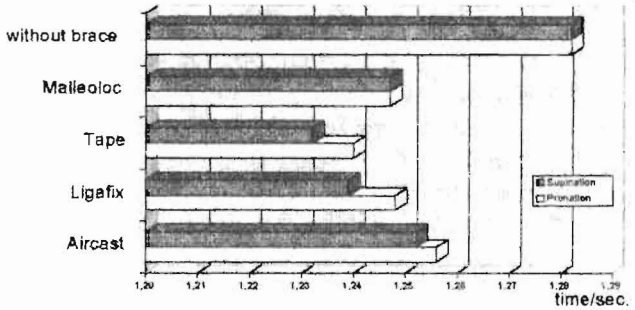
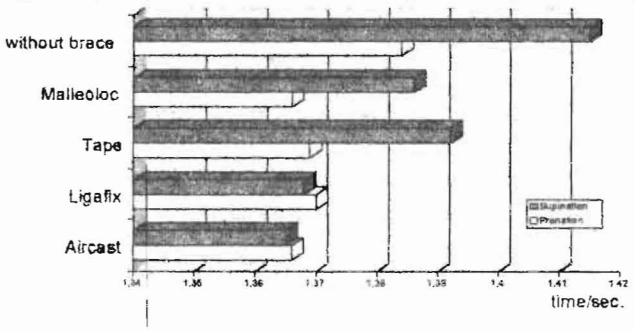


Fig. 4: Japan Test differentiated according to direction of motion (not injured group)



Conclusion

In different studies GARRICK and REQUA (1973), ROVERE et al. (1988) and SITLER et al. (1994) well documented the preventive effect of different orthoses over a period of several years. Retrospectively the frequency of injuries of differently stabilized ankle joints in the disciplines basketball and football was documented. Prophylactic taping is also able to reduce the frequency of ankle injuries (GARRICK et al. 1973; 14,GEHRKE 1992), but compared with the lace-on-brace it only has half of the prophylactic effect (ROVERE et al. 1988). The influence of the footwear on the number of injuries is described in several studies (BARRETT et al. 1993). In the literature the stabilization of the ankle joint is also improved by proprioceptive capabilities (FREEMANN et al.1965; BERENBERGER et al. 1987; FEUERBACH et al. 1994). The influence of orthoses on the proprioception was investigated by different authors (KIMUARA et al. 1987,SCHENKER 1989, SCHEUFFELEN et al. 1993, FEUERBACH et al. 1994, JEROSCH et al. 1995). Also different authors showed that the proprioception after ankle sprain is significantly reduced (FREEMANN et al. 1965; GROSS 1987; KONRADSEN 1990; GLENCROSS/THORNTON 1981; KONRADSEN/RAVN 1993; GLEITZ 1993).

In our studie the tested orthoses as well as the tape bandages significantly improve the sports-specific capabilities of injured ankles. This can be caused by a better proprioceptive control. Prophylactic bracing for uninjured ankles does not seem to have any significant impact on the sports-specific abilities in the used setup. Considering the low costs of prophylactic bracing and the reduction of ankle sprains by bracing, brace application can have positive effects in high-risk sports group. Further studies should take aim at a detailed evaluation of the influence of ankle orthoses on the proprioceptive control.

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