The effect of ankle taping on lower limb and performance of single-legged drop jump

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Summary

The purpose of this study was to clarify the changes in the lower limb and ground reaction forces caused by ankle joint taping during single-legged drop jump (SDJ) and to investigate the factors that influence jump performance. Thirty-five male track and field athletes (jumpers and decathletes) performed SDJ with maximal effort without taping (Control) and with taping (Taping). The jumping motion was captured by a Vicon MX system (250 Hz) and ground reaction force was recorded by a force plate (1000 Hz). Using above measured the kinematic variables were calculated.

This study compared Control and Taping. There was no significant difference between taping in the maximum vertical ground reaction force. However, taping may have reduced the shock absorption capacity of the lower limb joints in the sagittal plane, suggesting that hip adduction in the frontal plane occurs as a compensatory action.

Introduction

Ankle sprains are common in sports. One of the most common methods for prevention and relapse prevention of lateral ankle sprains is the use of external support, such as ankle taping or bracing (1). There was a lack of evidence for the effects of taping on injury prevention and sports performance.

The purpose of this study was to investigate the effect of ankle taping on jump performance with the change in lower limbs and ground reaction force during the single-legged drop jump (SDJ).

Methods

The participants were 35 male jumpers and combined athletes who belonged to the university track and field club. Two types of taping were used: an underwrap that is wrapped directly onto the skin, and non-stretch tape for fixing. One athletic trainer certification performed the taping, and the technique used was the basic taping for ankle sprains involving forced supination.

The participants each task performed 5 times single-legged drop jump (SDJ) with maximum effort without taping (Control) and with taping (Taping). The height of the box was set at 0.3 m. The marker's motion was captured with a 12-camera motion capture system (Vicon, Oxford, UK, 250Hz). During the dynamic trials, ground reaction force (GRFs) were collected synchronously with marker trajectories using one ground-embedded force plate (Kistler, Switzerland, 1000Hz). IBM SPSS Statistics 29 was used for statistical processing. The significance level of less than 5% and a significance trend level of less than 10%.

Results and Discussion

This study compared Control and Taping. There was no significant difference between taping in the maximum vertical ground reaction force (Figure 1).

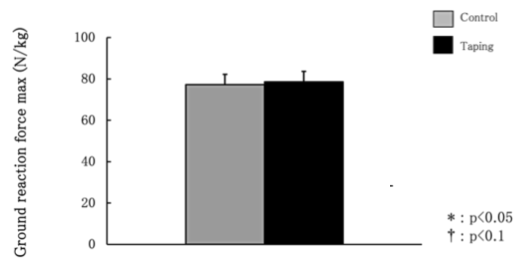

Figure 1: Comparison of mean maximum vertical ground reaction force.

Compared with Control, Taping smaller knee and hip flexion range. However, compared with Control, Taping larger hip adduction range.

It is important for shock absorption that knee and hip flexion in landing. In addition, it is stated that when single-leg landing cannot be controlled, compensatory movements occur in frontal and horizontal planes of the hip joint, trunk and pelvis, and that the hip adduction is a typical example of this (2).

The decrease in shock absorption capacity in the sagittal plane was compensated for in the frontal plane, resulting in no change in the maximum vertical ground reaction force.

Conclusions

Taping may have reduced the shock absorption capacity of the lower limb joints in the sagittal plane, suggesting that hip adduction in the frontal plane occurs as a compensatory action.

References

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