

## EFFECT OF ANKLE TAPING ON BALL VELOCITY OF SOCCER INSTEP KICKS

Sasadai, J. 1), Urabe, Y. 1), Yamanaka, Y. 1), Shinohara, H. 1), Fujii, E. 1) & Takai, S. 1)

1) Dept. of Sports Rehabilitation, Graduate School of Health Sciences, Hiroshima Univ., Japan

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### Introduction

Os trigonum syndrome is a common disorder in soccer players and ballet dancers. In soccer players, it is caused by repetitive stress of ankle plantar flexion due to kicking. Protective ankle dorsal flexion taping is recommended with the belief that it prevents posterior ankle impingement. However, the most suitable angle for ankle plantar flexion without influencing the ball velocity is unclear. The purpose of this study was to determine the angle of plantar flexion not decreasing the ball velocity generated by instep kicks.

### Methods

10 male university soccer players participated in this study. The subject's ankle plantar flexion was limited using 3 elastic tapes (Nitto medical, Japan). 4 angles of plantar flexion (0°, 15°, 30°, and without taping) were formed by gradation in limitation. The subjects performed 5 maximal instep kicks at the each angle. The movements of the kicking legs and that of the ball at the ball impact were captured using 3 high-speed cameras (4 Assist, Japan) at 200 Hz. The direct liner transformation method was used to obtain 3D coordinates with a digitizing system (Ditect, Japan). One-way ANOVA was used to compare the effects of various tapings. When interactions were detected, further analysis was carried out using Scheffe's test.  $P < 0.05$  was considered significant. Data analyses were performed by using SPSS (IBM, Japan).

### Results & Discussion

Table 1 shows the mean angle of passive plantar flexion and maximal plantar flexion at the ball impact, and the ball velocity. Ankle dorsal flexion tapings could gradually limit both passive plantar flexion and plantar flexion at the impact. Only 0° limitation reduced the ball velocity of instep kick. This is because an excess limitation of plantar flexion might impair the kinetic chain while performing instep kicks. On the other hand, 15° and 30° limitations might be efficient to prevent pain because of Os trigonum syndrome induced by plantar flexion without influencing the ball velocity.

Table 1. The mean angle of the passive plantar flexion and maximal plantar flexion at ball impact, and the ball velocity.

	0°	15°	30°	without taping
passive° )	0.1± 2.1 †‡¶	14.3±1.9 *‡¶	28.7±1.6 *‡¶	55.3± 3.4 *‡‡
impact° )	18.1±10.0 ‡¶	26.2±6.8 ¶	32.0±9.2 *	40.7±10.9 *‡
velocity(m/s)	20.6± 2.1 ¶	21.7±2.1	22.6±1.9	23.3± 1.2 *

\*: vs. 0°, †: vs. 15°, ‡: vs. 30°, ¶: vs. without taping ( $p < 0.05$ )

### Conclusion

Between 15° and 30° of plantar flexion limiting taping was beneficial to prevent Os trigonum syndrome without decreasing the ball velocity generated by instep kick.

### References

1. McDougall A. (1955). *J Bone Joint Surg*, 37B(2): 257-265.
2. Tol JL. (2002). *Am J Sports Med*, 30(1):45-50.