

Protective Reflexes of the Peroneal Longus Muscle in Response to Sudden Inversion Movement in Badminton Athletes and Sedentary Persons

Shun-Hwa Wei Shui-Ho Lee* Tzyy-Yuang Shiang**

Purpose: The objective of this study was to investigate the mechanism of ankle protection reflex and to compare the reflexive differences between person with and without receiving ankle proprioceptive exercise training. **Method:** Twenty-two subjects voluntarily participated in this study. Subjects were categorized into two groups. Group one was the exercise group in which all subjects received at least six weeks of ankle proprioceptive exercise. Group two was the non-exercise group in which all subjects were exercise less than one hour a week. A self-designed foot sudden inversion plate was used. EMG activity of common peroneal longus (CPL) muscle was investigated when the subject sustained an unexpected sudden ankle inversion movement. Ankle motion range and EMG activities were simultaneously collected at a sampling rate of 1000 Hz. **Results:** The results showed that subjects in exercise group had less ankle inversion angle ($16.0 \pm 9.8^\circ$) than that of subjects in non-exercise group (20.0 ± 7.60). However, this difference did not reach the significant level ($p > 0.05$). The CPL's reaction time during ankle sudden inversion in the exercise group had significantly shorter reaction time (56.5 ± 11.6 msec) than that of the non-exercise group (68.8 ± 9.7 msec). **Conclusion:** Our results support the theory that ankle protection reflex can be improved through ankle proprioceptive exercise. (FJPT 2001; 26(2): 85-90)

Key words: Ankle sprain, Ankle proprioceptive exercise, Reaction time.

INTRODUCTION

Inversion ankle sprains are the most common injuries in sports activity. The majority of ankle sprains occurs to the lateral ligaments, especially the lateral tibiofibular ligament.^{1,2,3} These injuries vary in their degree of severity that can affect both length of rehabilitation and levels of participation in sport-related activities. Ankle sprains produce trauma not only to

joint ligaments and supporting musculature, but also to sensory nerves endings within the joint capsule.⁴ These nerve fibers provide feedback from the joint mechanoreceptors and assist in stabilization of the ankle during physical activity. The most complication of ankle inversion injury is joint instability.^{5,6,7} Ankle instability has been attributed most frequently to joint laxity, muscle weakness, and proprioception deficits.^{3,6}

In order to restore the ankle dynamic stability,

* Chang Hung Nurse Academy, Lin Kou

** Graduate Institute of Coaching Science, National College of Physical Education and Sports
Correspondence to : Shun-Hwa Wei. Department of Physical Therapy, National Yang Ming University, Taipei, Taiwan