THE EFFECTS OF SPORTS TAPING ON IMPACT FORCES AND MECHANICAL BEHAVIORS OF SOFT TISSUE DURING DROP LANDING

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INTRODUCTION: Wakeling *et al*. (2002) proposed that resonant soft tissue vibrations caused by impact force may be potentially harmful. Bartold et al. (2009) reported that longitudinal strain of the plantar fascia was significantly reduced under the tape condition and it affected alleviating the symptoms of plantar fasciitis. Accordingly, if sports taping may develop the goal of reducing the strain and stress of muscle, it can be illustrated to help muscle tuning to minimize soft tissue vibration and prevent injury. Since the proven mechanical effects of sports taping not established, the purpose of this study was to determine how sports taping affects impact force and mechanical behaviors in the lower extremity.

METHODS: Twelve male university students (19.9±0.5 yrs, 175.2±5.5 cm, 646.6±40.9 N) were recruited. Kinematic data from a high speed camera (S.V.T., Motion Pro X3, 1000 frames/s) and GRF data from a force platform (AMTI OR6-5) were collected while subjects landed bilaterally from a drop height of 0.5 m with and without sports taping (Kinesio Tex, Japan) in random order. Twenty two reflective markers were attached to the right-hand side of the lower extremity to acquire strain and stress values calculated by using Marc 2005 (MSC software, USA). Strain and stress, peak VGRF and loading rate were determined for each trial. For each dependent variable a paired *t*-test was performed between the taping group (TG) and control group (CG) ($p<.05$).

RESULTS AND DISCUSSION: Strain is the amount by which a material deforms under stress. In the average and maximum values, longitudinal and principal strains in the thigh during the landing phase (LP) were reduced significantly in the TG. During the deceleration phase (DP) after impact, the maximum longitudinal strain in the TG was significantly decreased.

Table 1 Average and max strains for each phase

	TG (ave)	CG (ave)	*p*	TG (max)	CG (max)	*p*
LP longitudinal strain	1.036±0.021*	1.049±0.019*	.021	1.048±0.021*	1.063±0.018*	.010
LP principal strain	1.046±0.019*	1.058±0.016*	.030	1.061±0.019*	1.074±0.016*	.040
DP longitudinal strain	0.972±0.046	0.962±0.061	.424	1.046±0.022*	1.060±0.024*	.014

Lieber et al. (1993) showed that strain influences the amount of muscle damage. Since sports taping may not only increase the stability of lower limbs but also reduces excess stress and strain, it seems reasonable to suggest that sports taping is effective in preventing lower limb injuries. There were no significant differences in the shank during both phases. Since the strain was calculated by 2D analysis, it was too difficult to discreet real strain of the shank during the deceleration phase in particular. Peak VGRF and loading rate decreased in sports taping group but not significantly.

CONCLUSION: Wakeling *et al*. (2002) and Bartold *et al*. (2009) reported that resonant soft tissue vibrations caused greater movement of tissue compartment. The less strain values showed from sports taping may reduce the possibility of injury through minimizing movement of soft tissue at the landing event. To prove the effects of sports taping more accurately, future studies should examine 3D analysis of mechanical behaviors of the lower extremity during landing.

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