THE EFFECTS OF QUADRICEPS TAPING AND NON-TAPING APPROCHES ON COUNTERMOVEMENT JUMP PERFORMANCE

Po-Teng Huang, Sheue-An Yu, Jia-Hao Chang
Department of Physical Education, National Taiwan Normal University, Taipei, Taiwan

Kinesio is one of the most common adhesive therapeutic tapes. Expect for clinical applications, kinesio claims to be able to enhance muscle activity performance. The purpose of this study was to investigate the effect of kinesio taping on quadriceps during a maximal countermovement jump. Six healthy men was recruited in this study (Height: 173.8 ± 4.2 cm; Weight: 68.8 ± 7.3 kg; Age: 22.9 ± 2.3 yrs). The kistler force plate was used to measure the jump height, takeoff force and landing force. No significant differences between two groups. The results showed that kinesio tape did not affect muscle activity and ground recreation force, jumping height and landing force.

KEY WORDS: kinesio, force plate, tape

INTRODUCTION: Kinesio is wildly used in sports competitions for injury prevention and healing. Recently, the effects of kinesio taping methods on muscle strength has been a content of research with controversial results (Fu et al, 2008; Murray, 2000; Nosaka, 1999). Kinesio is an elastic taping, and it has been used to improve the performance (Vithoulka et al, 2010; Morrissey, 2000). Studies indicated that the kinesio taping did not affect sports performance (Fu et al., 2008; Janwantanakul et al., 2005). Countermovement jump (CMJ) with force plateform are widely used to measure the quadriceps ability, and the data analysis are including kinetics, kinematics and EMG (Adamczyk et al., 2012; Fantini et al., 2007). Therefore, the purpose of this study was to compare the performance while taping and non-taping on quadriceps. It was hypothesized that kinesio taping would increase the jump height, jump force and decrease landing force.

METHODS: Six healthy male volunteers participated in the study (Height: 173.8 ± 4.2 cm; Weight: 68.8 ± 7.3 kg; Age: 22.9 ± 2.3 yrs). All volunteers were no injuries in lower extremity with in the past six months. All volunteers had written informed consent for study participation. A VICON analysis system (Oxford Metrics Group, Oxford, UK) with one KISTLER force plates (Switzerland) used to record the ground reaction force at 1000 Hz. We taped the kinesio on

dominant leg (Figure 1.), kinesio were placed at the rectus femoris (RF), vastus medialis (VM), vastus lateralis (VL), because the muscle is a good method to calculate the jump ability. Each participants were asked to perform a CMJ with both legs and land on two legs on the force plate. The jumping trail was performed at three times by each subject, and the force platform (Kistler) was used to measured the ground reaction force (GRF). The success data was choice for analysis, and was defined as the best performance by air time. The jump height was calculated by air time, and the force platform force data was to normalize by body weight. The jump height, jump force and landing reaction force was analysis by Paired-Samples T Test. The significant level was set at .05.

Figure 1. Quadriceps Taping

RESULTS: Table 1 shows the biomechanics comparisons of the taping and non-taping trials. Jump height in taping trail was higher than non-taping (almost 1.5cm), but there was no significance in this study. No significant difference in the jumping GRF and landing GRF between taping and non-taping.

Table 1: Comparisons of the taping and non-taping

	Mean	SD	p
Notapeheigth(cm)	33.61	10.88	.123
Tapeheigth(cm)	35.08	8.70	.123
Notapejump(bws)	2.45	0.14	.839
Tapejump(bws)	2.46	0.26	.839
Notapelanding(bws)	4.08	0.81	.309
Tapelanding(bws)	4.28	0.89	.309

*Significant level set at .05

*bws: body weight standardization

DISCUSSIONS: Athletes use kinesio in order to facilitate their performance and techniques. In our study, the results were different from previous studies which indicated that taping could decrease impact in landing. (Su, 1996; Wang et al., 1994; De Clercq et al., 1994). However, some previous studies did not find significant differences after kinesio taping (Kim et al., 2013; Vercelli et al., 2012; wong et al, 2012). Lins (2013) evaluated the effects of taping quadriceps muscle, and the result found no significant difference. In this study, we only discussed the difference in GRF (include jump and landing) and jump height. Participants may change their landing pattern after taping, and this may cause the same result in this study. Although, there was no significant difference in this study, the taping may have the other benefit in movement.

CONCLUSIONS: There is no different jumping performance in taping or non-taping group on the quadriceps, including the jump height, impact absorbing and improves performance.

REFERENCES

De Clercq, D., Aerts, P., & Kunnen, M. (1994). The mechanical characteristics of the human heel pad during foot strike in running: an in vivo cineradiographic study. Journal of biomechanics, 27(10), 1213-1222.

Vithoulka, I., Beneka, A., Malliou, P., Aggelousis, N., Karatsolis, K., & Diamantopoulos, K. (2010). The effects of Kinesio-Taping® on quadriceps strength during isokinetic exercise in healthy non athlete women. Isokinetics and Exercise Science, 18(1), 1-6.

Kim, H., & Lee, B. (2013). The effects of kinesio tape on isokinetic muscular function of horse racing jockeys. Journal of physical therapy science, 25(10), 1273.

de Almeida Lins, C. A., Neto, F. L., de Amorim, A. B. C., de Brito Macedo, L., & Brasileiro, J. S. (2013). Kinesio Taping® does not alter neuromuscular performance of femoral quadriceps or lower limb function in healthy subjects: Randomized, blind, controlled, clinical trial. Manual Therapy, 18(1), 41-45.

Vercelli, S., Sartorio, F., Foti, C., Colletto, L., Virton, D., Ronconi, G., & Ferriero, G. (2012). Immediate effects of kinesiotaping on quadriceps muscle strength: a single-blind, placebo-controlled crossover trial. Clinical Journal of Sport Medicine, 22(4), 319-326.

Wong, O. M., Cheung, R. T., & Li, R. C. (2012). Isokinetic knee function in healthy subjects with and without Kinesio taping. Physical Therapy in Sport, 13(4), 255-258.
Nosaka, K. (1999). The effect of kinesio taping® on muscular micro-damage following eccentric exercises. In 15th Annual Kinesio Taping International Symposium Review (pp. 70-73). Kinesio Taping Association Tokyo.
Murray, H. (2000). Effects of kinesio taping on muscle strength after ACL-repair. J Orthop Sports Phys Ther, 30(1), 14.
Morrissey, D. (2000). Proprioceptive shoulder taping. Journal of Bodywork and Movement Therapies, 4(3), 189-194.
Fantini, C., Araújo, S., Pacheco, F., Menzel, H. J., & Chagas, M. (2007, November). Acute effect of quadriceps stretching on vertical ground reaction force, muscle activity and vertical jump performance. In ISBS-Conference Proceedings Archive (Vol. 1, No. 1).
Adamczyk, J. G., Boguszewski, D., & Siewierski, M. (2012). Physical effort ability in counter movement jump depending on the kind of warm-up and surface temperature of the quadriceps. Baltic Journal of Health and Physical Activity, 4(3), 164-171.