

Effects of kinesio taping on the timing and ratio of vastus medialis obliquus and vastus lateralis muscle for person with patellofemoral pain

Wen-Chi Chen, Wei-Hsien Hong*, Tien Fen Huang, Horng-Chaung Hsu
Department of Sports Medicine, China Medical University, Taichung, Taiwan
*Corresponding author: Wei-Hsien Hong

INTRODUCTION

Person with patellofemoral pain syndrome (PFPS) may be due to inadequate medial control from the vastus medialis obliquus muscle (VMO). This inadequate control could be due to a reduction in the tension-producing capacity of the VMO or a problem with the timing of VMO activity in persons with PFPS (Voight and Weider, 1991). The PFPS manifest as anterior knee pain aggravated by activities such as squatting and stair climbing. The patellar taping has been used to treat the PFPS, but there were the inconsistent findings in previous studies (Ng and Cheng, 2002; Salsich et al., 1999).

Kinesio taping, created by Kenzo Kase in 1996, is a specialized tape which is thin, elastic and can be stretched up to 120%~140% of its original length, making it quite elastic, compared with the conventional taping. It allows a partial to full range of motion for the applied muscles and joints with different pulling forces to the skin. However, only few researches have measured the effectiveness of Kinesio taping and, however, these revealed inconsistent results (Murray and Husk, 2001; Robbins, 1995), and no study assessed the effects of tape in person with PFPS. Therefore, the purpose of this study was to examine The effects of Kinesio taping on the timing and ratio of VMO and vastus lateralis (VL) for person with PFPS.

METHODS

Fifteen women diagnosed with PFPS by an experienced musculoskeletal physiotherapist were recruited and exclusion criteria were based on previous studies. Ten normal subjects were recruited as control group in this study. Subjects were taped for pulling VMO up and pulling VL down in accordance to Kinesio taping manual (Kase et al., 1996), and white athletic tapes were in same position as the placebo condition. Taping procedures were applied by the principal investigator (a certified athletic trainer) to ensure consistency throughout this study.

A MA-300EMG system (Motion Lab System, LA, USA) was used to record the EMG activity of VMO and VL. The stair included a 60 cm platform with two steps of 25 height and was placed in the center of walkway. Subjects completed a stair stepping task during ascent and descent for five consecutive trials.

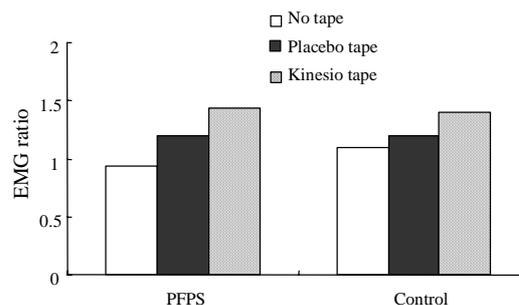
The timing and EMG activity ratio of VMO and VL were calculated for no tape, placebo tape, and tape conditions for PFPS and control groups. A repeated measures ANOVA were used to compare the effect of taping. The level of significance was set at $p < 0.05$.

RESULTS AND DISCUSSION

The results showed that the onset of VMO activity occurred earlier movement in Kinesio tape compared with

no tape condition ($p < 0.05$), but there was no difference between placebo tape and no tape condition. The earlier activation of the VMO should allow for a more optimal positioning of the patella into the trochlea (Fulkerson and Hungerford, 1990). It may help to improve the timing of force distribution and decrease the pressure placed on a particular portion of the articular cartilage.

Fig 1 shows the EMG activity ratio (VMO/VL) in the three taping conditions for control and PFPS groups. The results showed there were significant differences Kinesio taping compared to no taping condition in the PFPS group ($p < 0.05$), and no differences between taping conditions in the control group. The Kinesio taping applied to the skin surface apparently provided tactile input, which interact with motor control by altered the excitability of the central neuron system (Simonea et al., 1997). The tactile input generated by Kinesio taping might be strong enough to modulate muscle power.



CONCLUSIONS

The results showed Kinesio tape would change in timing of VMO and improve the ratio of VMO/VL for the mechanism of efficacy.

REFERENCES

1. Kase K, Tatsuyuki H, Tomoko O. Development of Kinesio tape. Kinesio Taping Perfect Manual. Kinesio Taping Association 1996;6-10,117-8.
2. Macgregor K, Gerlach S, Mellor R, et al. J Orthop Res 2005;23:351-8.
3. Ng GYF. Am J Phys Med Rehabil 2005;84:106-11.
4. Salsich GB, Brechter JH, Farwell D, et al. J Orthop Sports Phys Ther 2002;32:3-10.
5. Voight M, Weider D. Am J Sports Med 1991;10:131-7.
6. Murray H, Husk L. J Orthop Sports Phys Ther. 2001;31,A37.
7. Robbins S, Waked E, Rappel R. Br J Sports Med 1995;29:242-7.
8. Simoneau GG, Degner RM, Kramper C, et al. J Athl Train 1997;32:141-7.
9. Fulkerson J, Hungerford D. Disorders of the patellofemoral joint, 2nd ed. Baltimore, Md: Williams & Wilkins, 1990.