J. Phys. Ther. Sci.
27: 2405–2406, 2015

Case Study

Effects of ankle balance taping with kinesiology tape for a patient with chronic ankle instability

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Abstract. [Purpose] To report the effects of ankle balance taping for a patient with chronic ankle instability (CAI). [Subject] A 33-year-old man with a 10 year history of chronic ankle stability. [Methods] ABT with kinesiology tape was performed for 2 months (average, 16 h/day) around the right ankle. [Results] At the end of two months, no ankle instability was noted when ascending and descending the stairs, jumping, turning, operating the pedals while driving, and lifting heavy objects. [Conclusion] The repeated use of kinesiology tape in ankle balance taping may be an effective treatment for recovering the ankle stability of patients with chronic ankle instability.
Key words: Cumberland Ankle Instability Tool, Elastic therapeutic tape, Kinesio taping

(This article was submitted Feb. 19, 2015, and was accepted Mar. 17, 2015)

INTRODUCTION

Ankle injuries are common in sports-related and recreational activities[1)], and 85% of these injuries are sprains[2)]. More than 40% of patients with ankle sprains may experience swaying of the ankle without any structural limitations or ankle instability[3)], which may eventually result in chronic ankle instability (CAI). Individuals with CAI have injury-related fear and functional deficits when performing activities of sports and daily living[4, 5)].

We report on the efficacy of ankle balance taping (ABT) with kinesiology tape for the recovery of ankle stability in a patient with CAI.

SUBJECT AND METHODS

A 33-year-old man had chronic instability of the right ankle for 10 years after he experienced right lateral ankle sprains. He reported ankle instability when ascending and descending the stairs, jumping, turning, operating the pedals while driving, and lifting heavy objects. The patient provided his written informed consent, and the study was performed in accordance with the ethical principles of the Declaration of Helsinki.

The Cumberland Ankle Instability Tool (CAIT) questionnaire, which has 9 items and a 30-point scale for measuring self-reported functional ankle deficits, was completed by the patient. The CAIT is a valid and reliable tool that is indicative of perceived ankle instability[6)]. Scores of ≤27 indicate functional ankle instability[6)], and the CAIT score for the right ankle in the present case was 10/30.

To assess static balance, we used the Balance Error Scoring System (BESS), which is a portable, objective, and inexpensive method for assessing static postural stability[7)]. It consists of performing a double-leg stance with the hands placed on the iliac crest; single-leg stance with the hands placed on the iliac crest (standing on the right leg); and a tandem stance with the hands placed on the iliac crest (right foot placed behind the left foot), on firm and foam surfaces with the eyes closed. Errors in this system include opening the eyes; lifting the hands off the iliac crests; failing to return to the starting position within 5 s; stepping, stumbling, or falling out of position; moving the hip into >30° of abduction; and lifting the forefoot or heel[7)]. A score of 1 is logged for each error, and the total BESS score for each position is 10. The patient's error scores were as follows: the double-leg stance on firm and foam surfaces, 0/10 and 0/10; single-leg stance on firm and foam surfaces, 3/10 and 10/10; and tandem stance on firm and foam surfaces, 5/10 and 10/10, respectively.

Dynamic balance was assessed using the Star Excursion Balance Test (SEBT), which is a quick cost-effective method of assessing dynamic postural control. The maximum reach distances were measured in three directions (anterior, posteromedial, and posterolateral) of the left leg while the patient maintained a right-leg stance at the center of the three

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directions[8]. The reach distances of the anterior, posteromedial, and posterolateral directions were 56.3 cm, 64.5 cm, and 63.5 cm, respectively.

In addition, the active range of motion of the ankle was measured using a universal goniometer. Initially, the range of motion for inversion, eversion, dorsiflexion, and plantarflexion of the right ankle were 15/45°, 15/20°, 20/30°, and 60/60°, respectively.

We performed ABT using kinesiology tape (BB Tape, WETAPE Inc., Seoul, Korea) around the ankle for 2 months (average, 16 h/day) for recovery of ankle stability. The ABT method consists of four steps, which involve stretching the kinesiology tape to approximately 30–40% of the original length. First, to enhance posterior talar glide, the tape was applied from the talus to the calcaneus in a slightly dorsiflexed position (Fig. 1A). Second, to enhance ankle eversion, the tape was applied above the lateral malleolus over the medial calcaneus to the inside of the instep in an everted position (Fig. 1B). Third, to enhance ankle inversion, the tape was applied above the medial malleolus over the lateral calcaneus to the outside of the instep in an inverted position (Fig. 1C). Fourth, to further enhance ankle eversion, the third step was repeated (Fig. 1D–E). Fifth, to further enhance the posterior talar glide, the first step was repeated (Fig. 1F). To prevent any interruption in therapy because of skin problems, care was taken to avoid stretching the end and starting points of the tape at every stage of the application[9]. ABT was performed repeatedly, every day, after removal of the previous tape even if there was no itching. No other treatments were used for treating CAI.

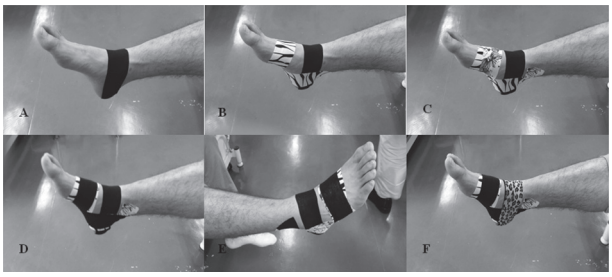

Fig. 1. Ankle balance taping using kinesiology tape

RESULTS

After 2 months of taping, the error scores for the single-leg stance on firm and foam surfaces decreased from 3/10 to 0/10 and from 10/10 to 3/10, respectively. The error scores for the tandem stance on firm and foam surfaces also decreased from 5/10 to 0/10 and from 10/10 to 0/10, respectively. The reach distances of the anterior, posteromedial, and posterolateral directions increased from 56.3 cm to 68 cm, from 64.5 cm to 90 cm, and from 63.5 cm to 88.5 cm, respectively. The range of motion for inversion, eversion, dorsiflexion, and plantarflexion increased from 15/45° to 42/45°, from 15/20° to 20/20°, from 20/30° to 30/30°, and from 60/60° to 58/60°, respectively. Furthermore, the CAIT score increased from 10/30 to 28/30. The patient no longer experienced ankle instability when ascending and descending the stairs, jumping, turning, operating the pedals while driving, and lifting heavy objects.

DISCUSSION

This case showed that the repeated application of kinesiology tape in ABT over 2 months increased the range of motion of the ankle. Kinesiology tape may stimulate cutaneous mechanoreceptors[10]. In accordance with the counterirritant theory, the excitement of the mechanoreceptors induces the release of encephalin, which inhibits the transmission of nociceptive signals[11]. Therefore, the increase in the threshold of pain transmitted by receptors of the ankle joint due to ABT may have increased the ankle range of motion in the present case.

In the early stages of ankle recovery, movement of the weakened joints is limited by the lack of power to overcome the decreased elasticity of the tape, and the ankle joint is hence supported. Thus, the recurrence of ankle sprains during activities of sports and daily living are prevented.

Moreover, kinesiology tape may improve the joint position sense[12] and support the joint structure[13]. The activation of proprioceptors as a result of the application of kinesiology tape around the ankle joint[12] increases the ankle joint position sense, which maintains the neutral ankle position. Thus, the increased ankle stability increased the reach distances in the SEBT test, decreased the error scores in the BESS test, and improved the CAIT score. However, additional research on the clinical efficacy of ABT using kinesiology tape involving more patients with CAI is required.

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