Abstract

Kinesiology Tape usage has increased in popularity due to its potential effects on muscle rehabilitation and stability. We aimed to determine if Kinesiology Tape or Athletic Tape on the arm affected grip strength. Additionally, we examined the relationship between Kinesiology Tape and proprioception. Either Kinesiology Tape or Athletic Tape was applied to the dominant flexor muscles of the forearm of the 19 athlete and non-athlete Westminster students. Participants squeezed a hand dynamometer at maximum grip nine times. The mean maximum grip strength did not differ based on the type of tape applied. There was also no significant difference between the type of tape application and the participants average 50% maximum grip strength or between the type of tape applied and the participants’ proprioception. We concluded that there are no musculoskeletal/physiological effects of Kinesiology Tape on maximal grip strength. Kinesiology Tape is more effective in muscle rehabilitation and stability after injury.

Introduction

Kinesiology Tape (KT) is an elastic adhesive that is applied to the skin and is becoming popular in rehabilitation and sports medicine. Additionally, KT can be used to improve proprioception by providing constant cutaneous afferent stimulation of the skin (Mohammadi et al. 2014). KT application, in the direction of the origin and insertion of the muscle, records in the same direction as muscle relaxation (Kuo et al. 2013), therefore assisting and increasing muscle strength as well.

Grip strength is the ability of the fingers and hand to generate muscle force and force and is a key component in many sports (Chang et al. 2010). If forearm strength were to decrease, the flexor and extensor muscles of the forearm could be at risk of injury. Another mechanism to increase grip strength is KT that is to increase proprioception by providing cutaneous afferent stimulation through the skin (Chang et al. 2010). Proprioception is the ability of mechanoreceptors in the body to provide signals, relative to body movements in space (Chang et al. 2010). These mechanoreceptors exist on the skin, and by applying KT over them, it will stimulate the receptors and send more signals to the brain. Therefore, KT can increase muscle strength, specifically grip strength, through stimulation of mechanoreceptors on the skin.

We aimed to determine the effects of Kinesiology Tape or Athletic Tape application on grip strength and if there is a relationship between Kinesiology Tape and proprioception.

Methods

Nine-teen athlete and non-athlete Westminster College students were recruited to participate. All participants signed an informed consent and were assigned a participant number. The determination of which tape was applied (KT or Athletic Tape) was predetermined and followed a repeating pattern of Kinesio Tape, Athletic Tape, and no tape before each participant entered the study area. The average grip strength of each participant without tape was calculated from three sequential squeezes of the hand dynamometer (Figure 1). Then, the tape was applied to their dominant forearm flexors, from insertion to origin of the muscle, recoils in the same direction as muscle relaxation (Chang et al. 2010). If forearm strength were to decrease, the flexor and extensor muscles of the forearm, but no significant increase in grip strength occurred. However, compared to a study conducted by Lee et al., grip strength increased when KT was applied to the flexor muscles of the forearm (2010). Schneider et al. had participants sit in an upright position on the elbow joint flex(90°) and in supination. In this study, participants grip strength was recorded with the forearm in supination, but they did not sit in an upright position with 90° of elbow flexion.

In the study conducted by Kuo et al., we examined the effects of Kinesio Tape or Athletic Tape on maximal grip strength, our results did not differ. In this study, KT was applied to the flexor muscles of the forearm, but no significant increase in grip strength occurred. However, compared to a study conducted by Lee et al., grip strength increased when KT was applied to the flexor muscles of the forearm (2010). Schneider et al. had participants sit in an upright position on the elbow joint flex(90°) and in supination. In this study, participants grip strength was recorded with the forearm in supination, but they did not sit in an upright position with 90° of elbow flexion.

In the study conducted by Kuo et al., both forearm of participants were measured, but tape was applied to the extensor muscles of the forearm. The Y-shaped technique was applied to the dominant side, and the L-shaped technique to the non-dominant side. No increase in grip strength occurred from the dominant forearm, but there was an increase on the non-dominant forearm. Our study only examined grip strength on the dominant forearm flexors but used the Y-shaped technique. We did not find any significant increase in grip strength among the participants.

Future research should examine a larger number of participants. Our study had 19 participants. In Kuo et al.’s study they had 19 participants, and Chang et al.’s study had 21 participants. More participants could have provided a more significant difference in the effects of Kinesiology Tape on grip strength. Also, we only assessed grip strength among the participants.

Results

We used Jamovi data analyses system to perform a one-way ANOVA to examine any effect of tape on the average maximum grip strength and the effect of tape type on 50% of maximum grip strength and the mean proprioception. We also performed three separate ANOVAs to look at the relationship between the activity level, athlete status, and sex of the participants and the type of tape applied in relation to average maximum grip strength.

There was no significant difference between the type of tape applied and the average maximum grip strength (p=0.649) (Figure 1). Similarly, there was no significant difference between the type of tape application and the participants average 50% maximum grip strength (p=0.649), or between the type of tape applied and the participants’ proprioception (p=0.538) (Figure 2). There was no significant difference between the type of tape applied and activity level on average maximum grip strength (p=0.873). There was no significant difference between the type of tape applied and whether the participant was an athlete on average maximum grip strength (p=0.906). There was no significant difference between the type of tape applied and sex on average maximum grip strength (p=0.493), but there was a significant difference between sex alone and average maximum grip strength (p=0.003) (Figure 3).

Discussion

Previous research suggests that Kinesio Tape can be used to improve proprioception (Mohammadi et al. 2014) and increase muscle strength (Kuo et al. 2013). However, in this study, we reject our hypotheses, and found no physiological effect of Kinesio Tape on maximal grip strength. Schneider et al. proposed that an external mechanism could stimulate sensory mechanoreceptors and enhance proprioceptive input. However, there was no significant difference in proprioception among the treatment groups. In the absence of visual cues, we rely on tactile input, or sense of touch for orientation (Silverthorn et al. 2013). Therefore, the application of tape on the body could cause and effect a patient’s proprioception due to tactile input the tape should create.

Compared to the previous research we found on testing the effect of Kinesio Tape on maximal grip strength, our results did not differ. In this study, KT was applied to the flexor muscles of the forearm, but no significant increase in grip strength occurred. However, compared to a study conducted by Lee et al., grip strength increased when KT was applied to the flexor muscles of the forearm (2010). Schneider et al. had participants sit in an upright position with elbow joint flex(90°) and in supination. In this study, participants grip strength was recorded with the forearm in supination, but they did not sit in an upright position with 90° of elbow flexion.

In the study conducted by Kuo et al., both forearms of participants were measured, but tape was applied to the extensor muscles of the forearm. The Y-shaped technique was applied to the dominant side, and the L-shaped technique to the non-dominant side. No increase in grip strength occurred from the dominant forearm, but there was an increase on the non-dominant forearm. Our study only examined grip strength on the dominant forearm flexors but used the Y-shaped technique. We did not find any significant increase in grip strength among the participants.

Future research should examine a larger number of participants. Our study had 19 participants. In Kuo et al.’s study they had 19 participants, and Chang et al.’s study had 21 participants. More participants could have provided a more significant difference in the effects of Kinesiology Tape on grip strength. Also, we only assessed the short-term effects of KT and Athletic Tape on the forearms. Chang et al. suggests that KT must be worn longer than traditional tape, around 2-3 days, to show significant improvements in data (2010).

Citations


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