The Impact of Kinesio® Tape on the Concentric Force Production of the Gastrocnemius in Healthy, Non-Injured Individuals

Kelly Hermes, SPT, Reginald Bastien, SPT, CSCS, Mollie Venglar, DSC, MSPT, NCS, Jason Craddock, EdD, ATC, LAT, CSCS
Florida Gulf Coast University – Department of Rehabilitation Sciences

Introduction

Kinesio® Tape (KT) is an elasticized tape designed by Dr. Kenzo Kase that is designed to impact multiple areas of the body. Facilitating muscle strength is one of the many claims made by KT. There is limited research on the effectiveness of KT and not many studies have measured the effects of KT on peak torque force production during concentric contraction of the gastrocnemius. This force is similar to that of an athlete during a vertical leap. Due to the limited and conflicting research on the effectiveness of KT, it was imperative to perform this research study to see the implications of KT on the force production produced by the gastrocnemius.

Objective & Hypothesis

- **Objective**: The purpose of this study is to compare peak concentric muscle torque production before and after KT intervention in the gastrocnemius muscles.
- **Research Question:** Does KT have an effect on the concentric force production of the gastrocnemius in healthy, non-injured individuals?
- **Hypothesis**: There is no effect from KT on the concentric force production of the gastrocnemius is health, non-injured individuals.

Methods

Thirty-nine participants (24 males, 19 females, 24 + 2 years; avg. weight 76.02 + 2 kg.) volunteered to participate in the study. Participants were randomly selected to be taped or not taped during the first trial of the Biodex testing and Side Hop Test and would repeat the measures with opposite taping conditions. The KT was applied with a strip of tape vertically from origin to insertion of the gastrocnemius, applying a 50% stretch to the middle of tape and utilizing anchor points at each end. Participants were positioned in the Biodex and performed two sets of five repetitions at two different resistances, 120 degrees/second and 60 degrees/second, with a 3-minute rest break in between each set. The Side Hop Test consisted of hopping over a 30-cm. line as many times as possible in 30 seconds for one trial.

Data Analysis & Results

- **Data analysis:** IBM SPSS Version 22 was utilized in this study for analyzing the data collected from the study. The testing included Multivariate ANOVA and paired T-test without a Bonferroni Correction. The three independent variables were KT application, the velocity of the dynamometer, and the Side Hop Test.
- **Results**: Comparing peak torque at 120 degrees with and without KT resulted in a significance level of 0.814 within subjects, 95% confidence interval, mean square 2.197. Comparing peak torque at 60 degrees with and without KT resulted in a significance level of 0.371 within subjects, 95% confidence interval, mean square 76.579, P < .05 without a Bonferroni correction.

Measure	Velocity	Mean Total	Std. Deviation Total
Peak Torque (ft/lb)	120*	48.876	14.0273
	120	50.585	17.4240
	60*	68.718	19.6635
	60	70.451	22.0433
Avg. Power (watts)	120*	65.877	21.4039
	120	67.136	26.3033
	60*	53.321	16.2202
	60	54.377	16.9287
Max Repetition Total Work (ft-lbs)	120*	33.218	10.6908
	120	34.046	13.4012
	60*	38.995	12.7876
	60	40.072	14.7508
Number of Hops	Hop*	52.641	17.0672
	Hop	50.590	18.7571
Peak Torque/Body Weight (ft-lbs/lbs)	120*	29.513	7.2342
	120	30.323	8.8397
	60*	41.541	10.2571
	60	42.392	11.0037
Time to Peak Torque (milliseconds)	120*	202.051	42.5614
	120	191.282	40.5994
	60*	267.692	47.1538
	60	273.077	51.5116

The velocity with the symbol (*) indicates an absence of Kinesio® Tape

Discussion

- There was a significant difference between males and females during the study with all of the test variables, but that difference cannot be attributed to the KT, but instead the biological differences between the physical strength of males and females, specifically in the lower extremities.
- There were no significant differences found in any of the statistical analyses as well as no interaction between gender and the variables analyzed.
- Limitations of the study:
  - The participants (n=40) of our study were college-aged with no recent history of injury.
  - Some participants stated that they had previous experience with KT, which may have introduced bias.
  - Our methodology was not properly accounting for the placebo effect. Without a placebo tape group we are unable to determine whether any statistical differences were due to KT or from taping alone.
  - There may have been a learning effect during the Side Hop Test. Observations during data collection, which were made by both researchers, revealed that many participants had with the side hop test, and occasionally required multiple attempts to clear the tape distance through the practice trials
- Future researchers may benefit from collecting data from a wider variety of subjects who have limited experience with KT as well as an older population or those who have had recent history of injury. Also, incorporating the use of a placebo group with sham tape should be considered to minimize potential bias resulting from KT intervention. To ensure methodological quality, the appropriate blinding of subjects and assessors as well as a control and placebo tape group is necessary.

Conclusion

- KT has no significant difference in concentric force production of the gastrocnemius. When applying KT to patients in a clinical setting, there is no added benefit to force production when performing therapeutic activities. Further research is needed on this topic.

Key References:

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Full reference list available by emailing kahermes1444@eagle.fgcu.edu