

# The Effects of Kinesio Tape on Proprioception of the Lower Body

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## ABSTRACT

**Purpose:** Proprioception is an important factor in rehabilitation and prevention of injuries. Kinesio Tape has gained recent popularity for its proposed favorable influence on range of motion, injury prevention, and proprioception. Currently, there is limited scientific data to determine if Kinesio Tape improves proprioception. The aim of this study was to determine the effects Kinesio tape has on the proprioception of the lower body, and evaluate any possible differences between ankle and knee taping on proprioception in healthy young adults. It is hypothesized that kinesio taping will improve lower body proprioception, but will not show varying effects between the ankle and knee Kinesio taping. **Methods:** Twelve (6 male and 6 female) healthy young adults were recruited to participate in a series of six testing sessions which included two baseline testing sessions, and four subsequent tests after the application of the tape to either the ankles or knees. The Biodex DS and the Balance Error Scoring System (BESS) test were used to evaluate the ankle and knee body proprioception at baseline, and days 1, 3, and 5 of Kinesio Tape. **Results:** Baseline results for the BESS Test on a firm surface were  $4.1 \pm 3.4$  errors for the ankle and  $4.1 \pm 3.4$  errors for the knee and day five results were  $2.3 \pm 2.7$  errors for the ankle and  $3.5 \pm 2.1$  errors for the knee. For the BESS Test on a foam surface, baseline results were  $8.8 \pm 4.1$  errors for the ankle and  $8.8 \pm 4.1$  errors for the knee whereas day five results were  $6.9 \pm 3.1$  errors for the ankle and  $7.2 \pm 3.1$  errors for the knee. Results from the Biodex DS assessment showed no improvements in proprioception from baseline to day five for both static and moving surface. **Conclusion:** Kinesio tape has been thought to improve many physiological functions of the body but was found to have no effect on lower body proprioception in this study. The use of Kinesio Tape may have other benefits for populations that have evidence of proprioceptive deficits; however, it appears that its influence on proprioception is limited in young healthy adults.

## BACKGROUND

- Proprioceptors are sensors that provide information about joint angle, muscle length, and muscle tension, which is integrated to give information about the position of a limb in space.
- Reduced proprioception has been associated with knee and ankle ligament injuries and poor balance and stability.
- Kinesio tape (KT) is a thin, cotton, porous fabric with acrylic adhesive that is latex free which is typically applied to the skin for 3-4 consecutive days.
- KT may decrease muscle and joint pain, improve range of motion, and enhance neuromuscular proprioception.
- There are also anecdotal reports to suggest that the application of KT may adjust misalignment in joints, improve blood flow, and improve lymphatic circulation, all of which may exert a beneficial effect on exercise performance, and injury prevention and recovery.
- However, There are very few well-designed scientific studies that have examined the potential favorable effects of KT on neuromuscular function, particularly proprioception.

## EXPERIMENTAL AIM AND HYPOTHESIS

To determine if Kinesio tape has a beneficial effect on proprioception of the lower body, and evaluate any possible differences between ankle and knee taping on proprioception in healthy young adults.

We hypothesize that Kinesio tape will improve lower body proprioception, but will not show varying effects between the ankle and knee.

## METHODS

### Subjects

- Twelve healthy (6 women, 6 men) subjects between the ages of 18-25 years participated in this study.
- A health screening questionnaire was administered to determine eligibility and basic health assessments (Table 1).
- Recruitment through social media and kinesiology classes.

Table 1. Subject Characteristics

Variable	Mean $\pm$ Std. Deviation (N=12)
Age, years	21.9 $\pm$ 1.9
Height, inches	67.4 $\pm$ 3.1
Weight, lbs	165.5 $\pm$ 27.2
SBP, mmHg	119 $\pm$ 6
DBP, mmHg	77 $\pm$ 6
Pulse, bpm	71 $\pm$ 9

### Kinesio Tape Proprioception Testing Protocol

1. Balance Error Scoring System test (BESS) in the absence and presence of Kinesio Tape.
  - Completed on Firm and Airex foam pad
    - Double leg stance with feet together
    - Nondominant single leg stance
    - Tandem stance (nondominant foot in back; heel to toe)
  - All positions include eyes closed and hands on hips for 20 seconds.
2. Postural Stability Biodex Balance System SD in the absence and presence of Kinesio Tape.
  - Three trials on both a static and unstable platform to evaluate postural balance.
  - Scores were accumulated by the Biodex and documented for their postural stability.

### Kinesio Taping Procedure

- **Ankle** - Stirrup method was used for ankle taping.
- **Knee** - Post-acute taping of the anterior cruciate ligament method



## STATISTICAL ANALYSIS

Measures of central tendency for subject demographic data were analyzed by descriptive statistics. Balance Error Scoring System test was analyzed by repeated measures ANOVA. Scoring differences across time for stability index using the Biodex device were determined by the Friedman test. Data are presented as mean  $\pm$  SD. Statistical analyses were performed using SPSS software version 17.0 (SPSS Inc). Statistical significance was set at  $P < 0.05$ .

## RESULTS

Table II. Ankle Proprioceptive Ability

	Baseline	Day 1	Day 3	Day 5
<b>BESS Firm</b>	4.1 $\pm$ 3.4	4.1 $\pm$ 3.2	3.3 $\pm$ 3.4	2.3 $\pm$ 2.7
<b>BESS Foam</b>	8.8 $\pm$ 4.1	7.2 $\pm$ 2.7	8.7 $\pm$ 4.0	6.9 $\pm$ 3.1
<b>Overall Stability</b>	0.3 $\pm$ 0.1	0.32 $\pm$ 0.1	0.3 $\pm$ 0.1	0.28 $\pm$ 0.1
<b>Anterior-Posterior Stability</b>	0.24 $\pm$ 0.1	0.25 $\pm$ 0.1	0.25 $\pm$ 0.1	0.22 $\pm$ 0.1
<b>Medial-Lateral Stability</b>	0.12 $\pm$ 0.04	0.14 $\pm$ 0.1	0.14 $\pm$ 0.1	0.13 $\pm$ 0.1

Table III. Knee Proprioceptive Ability

	Baseline	Day 1	Day 3	Day 5
<b>BESS Firm</b>	4.1 $\pm$ 3.4	4.0 $\pm$ 4.6	2.4 $\pm$ 1.9	3.5 $\pm$ 2.1
<b>BESS Foam</b>	8.8 $\pm$ 4.1	8.9 $\pm$ 5.1	7.3 $\pm$ 2.5	7.2 $\pm$ 3.1
<b>Overall Stability</b>	0.29 $\pm$ 0.1	0.32 $\pm$ 0.1	0.32 $\pm$ 0.1	0.31 $\pm$ 0.1
<b>Anterior-Posterior Stability</b>	0.24 $\pm$ 0.1	0.23 $\pm$ 0.1	0.27 $\pm$ 0.1	0.23 $\pm$ 0.1
<b>Medial-Lateral Stability</b>	0.12 $\pm$ 0.04	0.14 $\pm$ 0.05	0.13 $\pm$ 0.05	0.14 $\pm$ 0.07

## CONCLUSIONS

- Our study shows Kinesio Tape has little to no effect on proprioception of the ankle or knee joints.
- This information will benefit health care providers in their choice of treatment and rehabilitation that involves proprioception.
- For further investigation, we recommend decreasing the amount of days tape being worn as well as keep times of testing consistent for each subject.
- Based on our conclusions, we would not suggest the use of Kinesio tape to improve proprioceptive abilities in a young healthy population. However, in populations characterized by proprioceptive defects (e.g., aging, injuries, post-operative surgeries), KT may confer favorable effects.

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