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Original Research

Direct Effect of Using Kinesio Taping (KT) on Balance in Young People

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ABSTRACT

Background: *This study investigated the immediate effects of the Kinesio Taping (KT) mechanical correction technique on balance, joint mobility, and muscle strength in healthy young adults. The purpose of this study: was to examine the immediate effects of kinesio taping on balance among adolescents.*

Methods: *A pre-experimental, one-group pre- and post-test design was employed. Accidental Sampling technique 106 healthy individuals aged 18-25 years (20 males, 86 females) participated. KT was applied to the gastrocnemius, soleus, and Achilles tendons using specific techniques (10-50% stretch for gastrocnemius, Method I for Achilles, and Y method for gastrocnemius). Balance was evaluated through the Star Excursion Balance Test (SEBT), which measures reach distance in eight specific directions. Range of motion and muscle strength were also examined and differences before and after the KT intervention were analyzed using a paired sample t-test.*

Results: *The participants had an average age of 19.20 years and a mean BMI of 21.63. Pre-intervention SEBT scores ranged from 38 to 84 (mean = 55.48, SD = 8.733), while post-intervention scores ranged from 37 to 79 (mean = 59.06, SD = 10.068). A paired sample t-test demonstrated a statistically significant improvement in SEBT scores following the KT intervention ($p < 0.001$), indicating enhanced balance performance after taping.*

Conclusion: *This study indicates that applying KT's "mechanical correction" technique to the ankle joint can immediately enhance dynamic balance in healthy young adults. These results highlight the potential role of KT as a supportive intervention to improve balance and possibly minimize the risk of injury.*

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INTRODUCTION

Balance is a fundamental aspect of human movement. It allows young people to perform daily activities with ease and reduces the risk of injuries. Postural stability is attained by controlling the position of the body's center of mass relative to its base of support. A process influenced by our nervous system, muscles, and senses. Factors such as flexibility, coordination, strength, and endurance also contribute to balance. Good balance enables us to move efficiently and adapt to changing (Joveini et al., 2024; Marcolin et al., 2022).

Postural balance control, a fundamental aspect of neuromuscular control, is a crucial factor in determining an individual's ability to maintain equilibrium and perform daily activities. Postural balance control is the intricate ability of the human body to maintain, achieve, or regain stability in any given position or during any movement. It serves as a fundamental cornerstone for daily life, contributing to improved life quality and the maximization of athletic performance in both amateur and elite sporting contexts sporting endeavors (Demir, 2019).

Furthermore, understanding the mechanisms of postural control in healthy populations is essential as a baseline for comparing the responses to therapeutic interventions in clinical populations (Marcolin et al., 2022). Kinesio Taping (KT) is an elastic taping method with proposed mechanisms of action including enhanced proprioception, muscle support, and joint repositioning (Brogden et al., 2018). While research has predominantly focused on KT's effects on muscle function, its potential to influence joint alignment through "mechanical correction remains an area of interest.

This approach, particularly at the ankle joint, has been hypothesized to exhibit effects comparable to joint mobilization techniques. However, existing scientific evidence shows mixed results, particularly regarding the effectiveness of KT in producing significant functional changes, thus requiring further research to verify this mechanism (Demir, 2019). Based on the theory above, the potential for confounding factors such as the placebo effect and natural disease progression, it is crucial to isolate the specific effects of KT.

This study employed a sham-controlled trial design utilizing healthy individuals. The primary objective was to investigate the immediate impact of KT's "mechanical correction" technique, specifically applied to the ankle joint, on key performance parameters, including balance, range of motion (ROM), and muscle strength. The use of sham-controlled designs is considered important because it minimises sensory perception bias, which commonly occurs in taping-based interventions (Sheng et al., 2019).

The novelty of this study lies in examining the immediate effects of the Kinesio Taping mechanical correction technique specifically applied to the ankle joint in healthy young adults (Gufron et al., 2022), a population that has been minimally explored in previous KT research. The aim of this research was to clarify whether acute KT application can directly influence dynamic balance, joint mobility, and muscle strength, providing new insight into KT's short-term functional impact. Thus, this study not only offers a more comprehensive understanding of the acute functional response to KT, but also provides a scientific basis for the use of KT in the context of injury prevention and physical performance enhancement.

MATERIALS AND METHOD

This pre-experimental study utilized a one-group pretest–posttest design, in which participants received KT application. The one-group pretest–posttest design was chosen because it enables direct measurement of the immediate effects of Kinesio Taping by comparing each participant's performance before and after the intervention. This approach is efficient for studies involving healthy subjects, reduces individual variability by using participants as their own controls, and is well-suited for evaluating short-term physiological or functional changes without requiring complex group comparisons.

The research aimed to evaluate the immediate effects of kinesio taping on balance in young adults (Liu et al., 2019). This study employed an accidental sampling technique, selecting healthy young adults aged 18–25 who were readily available and willing to

participate, making it an efficient method for obtaining participants that met the inclusion criteria within the research setting. The inclusion criteria, there is male and female adolescents, willing to be research subjects.

And the exclusion criteria acute injury to the lower extremities, radiating lower back pain, presence of open wounds, visual disturbances, uncoordinated movement, infection, skin allergies and cellulitis (Liu et al., 2019). The independent variable in this study is the application of the KT mechanical correction technique, which serves as the intervention administered to the participants. The dependent variables are the participants' balance performance measured using the Star Excursion Balance Test (SEBT), along with changes in joint range of motion and muscle strength, which reflect the outcomes influenced by the taping intervention.

To enhance postural stability, KT can be applied to lower extremities such as the gastrocnemius, soleus, and Achilles tendons. Application techniques vary: 10-50% stretch for the gastrocnemius, Method I for the Achilles tendon, and the Y method for the gastrocnemius. These findings suggest that KT techniques can contribute to better postural control and a decreased risk of gastrocnemius strain (Gulsen et al., 2019).

KT works by supporting muscle function and enhancing contraction efficiency even in the presence of weakness, pain, or fatigue. This improvement in muscle performance contributes to increased range of motion, better postural stability, enhanced joint support, and improved overall mobility. KT also stimulates subcutaneous mechanoreceptors within the fascia and muscle layers, providing sensory feedback to the central nervous system. This input modulates motor output, regulates muscle tone, and helps coordinate balance and movement through neuromuscular adjustment (Ager et al., 2023).

According to the literature, the skin is first prepared by ensuring it is clean and free of oils, sweat, or lotion to optimize tape adhesion. The taping technique is selected based on the targeted structure: the gastrocnemius is typically taped using a Y-shaped strip with a moderate degree of tension, while the soleus is taped with gentle to moderate stretch following the natural orientation of the muscle. The Achilles tendon is commonly treated using an I-strip applied with minimal to moderate elongation (Tomruk et al., 2022).

During application, the anchor of the tape is placed without tension, and the central portion is stretched according to the intended technique before being laid down along the path of the muscle or tendon. Once applied, the tape is lightly rubbed to activate its heat-sensitive adhesive. The tape is generally worn for a short duration, depending on skin sensitivity and comfort, as recommended in previous guidelines (Affandi & Rochmania, 2021).

Balance was measured using the SEBT, a dynamic postural control assessment that requires the participant to stand on one leg while reaching as far as possible in several predefined directions with the opposite leg. During the test, the participant maintains single-leg stance, controls trunk and pelvic alignment, and reaches along each direction without losing balance or shifting the supporting foot. The distance reached in each direction is recorded, providing a sensitive measure of lower-limb stability, proprioception, and neuromuscular control (Juanda et al., 2019).

Pre and post test measurements with SEBT. SEBT was employed to assess postural control, strength, balance, and lower extremity proprioception both before and after the intervention. SEBTs, a dynamic stability test, offers a more comprehensive evaluation of lower extremity function compared to static, quiet standing assessments. Healthcare professionals frequently utilize postural control assessments to identify injury risk,

evaluate impairments following injury, and monitor recovery progress after therapeutic interventions.

Postural control and balance are typically categorized into static and dynamic components. Static postural control tasks involve maintaining a steady base of support while minimizing movement of body segments throughout the assessment period. These evaluations may use sophisticated tools like force platforms or standardized clinical scales that have been proven valid and reliable, such as the Balance Error Scoring System or the Berg Balance Scale (Juanda et al., 2019).

While static postural assessments offer valuable clinical insights, the requirement to remain as motionless as possible during these tasks may not accurately reflect the dynamic movements encountered during physical activity. SEBT involves the participant reaching as far as possible in eight pre-defined directions while maintaining balance on a single, contralateral leg. This task challenges the standing leg, demanding a range of motion encompassing ankle dorsiflexion, knee flexion, and hip flexion.

Successfully completing SEBTs requires not only adequate leg muscle strength but also relies heavily on proprioceptive input and effective neuromuscular control to maintain balance throughout the reaching motion (Juanda et al., 2019).

Statistical analysis for testing data normality was performed using the Kolmogorov–Smirnov test, as the number of subjects exceeded 50. Since the data were normally distributed, differences between pre- and post-test results were analyzed using a paired sample t-test. A p-value of less than 0.05 was considered statistically significant.

The study received ethical approval from the Health Research Ethics Committee of dr. Soedjono Hospital TK II.04.05.01, under clearance number 880/EC/IV/2024. All participants provided informed consent before taking part in the research. They were given a clear explanation of the study's purpose, procedures, potential risks, expected benefits, and their right to withdraw at any time without any consequences. Written consent was obtained to confirm voluntary participation and understanding of the study information.

RESULTS

The characteristics of the participants in this study included age, gender, body mass index (BMI), and the subjects' initial dynamic stability condition, which was assessed using the SEBT before and after the treatment:

Table 1. Demographic and Anthropometric Characteristics of Participants (n = 106)

Variable	Mean	Range	n (%)
Age (years)	19.20	18–25	–
Sex – Male	–	–	20 (18.9)
Sex – Female	–	–	86 (81.1)
BMI (kg/m²)	21.63	17–31	–
Total participants	**–**	**–**	**106 (100)**

This study involved 106 participants, consisting of 20 males and 86 females. Dynamic balance among young adults was assessed using the SEBT. No participants dropped out during the study. The participants' ages ranged from 18 to 25 years, with an average age of 19.20 years. Based on gender distribution, 20 participants (18.9%) were

male and 86 (81.1%) were female. Body mass index (BMI) values ranged from 17 to 31, with a mean of 21.63.

The normality test of the data in this study was conducted using the Kolmogorov–Smirnov test on the entire sample of 106 participants. The test results showed that both the pre-test and post-test SEBT data had a significance p-value of 0.200. This value is above the threshold of 0.05, so it can be concluded that both data sets are normally distributed. Thus, the data meets the normality assumption and is suitable for analysis using parametric statistical tests.

Table 3. Acute Effect of Kinesio Taping on SEBT Performance (n = 106)

Variable	Mean ± SD (Pre)	Mean ± SD (Post)	Mean Difference	*p*-value*	Interpretation
SEBT Score	55.48 ± 8.73	59.06 ± 10.07	+3.58	< 0.001	Significant improvement

Note: *Paired Sample t-test

The average SEBT score increased from 55.48 (SD = 8.73) in the pre-intervention measurement to 59.06 (SD = 10.07) after the intervention. This average increase of 3.58 points was statistically significant with a p value < 0.001. These findings indicate that the application of Kinesio Taping can provide an immediate improvement in dynamic balance performance in research participants. Thus, this intervention demonstrates a short-term functional effect on postural control as measured by the SEBT.

DISCUSSION

According to the results of the statistical analysis, variables such as age, gender, BMI, and the pre- and post-SEBT scores following the application of kinesio taping were examined. Age plays a significant role in balance development and maintenance, even in adolescents. The aging process, even at this stage of life, can introduce static conditions that negatively impact balance.

These changes can include tissue degeneration, the replacement of healthy tissue with less functional scar tissue, and a reduction in fluid content within joints and tissues. These factors contribute to diminished bone and muscle stability, potentially leading to reduced bone elasticity and ultimately triggering symptoms of decreased balance in adolescents. KT intervention, by promoting lymphatic vasodilation and influencing both postural and dynamic stability, may offer a potential countermeasure to these age-related changes and support improved balance performance in this population (Joveini et al., 2024; Yu et al., 2025).

The higher prevalence of dynamic stability issues observed in women compared to men strongly suggests that gender plays a significant role in influencing the risk of musculoskeletal complaints. This disparity can be attributed, at least in part, to physiological differences between the sexes. Women generally exhibit lower muscle capacity compared to men, a factor that can directly impact dynamic stability and increase vulnerability to musculoskeletal problems.

This gender-based difference in susceptibility to musculoskeletal complaints is further corroborated by observations across a range of other musculoskeletal conditions, reinforcing the importance of considering gender as a key variable in understanding and addressing these issues (Kim & Lee, 2023; Y. Li et al., 2024). The research subjects, based on the WHO 2020 standard scale, presented an average condition of obesity class

2. This level of overweight poses a significant health risk, as excessive body weight places undue stress on the spine.

This increased pressure forces the back muscles to work harder, potentially leading to strain and damage. Consequently, the lumbar vertebral structure becomes particularly vulnerable, increasing the risk of injury and long-term complications. The added weight can compromise spinal stability and biomechanics, making individuals with class 2 obesity more susceptible to back pain, disc problems, and other related musculoskeletal issues (Lemos et al., 2023a; Li & Chen, 2023; Yuan et al., 2025).

The extended duration of the research subjects' activities presented a significant risk to their posture. Prolonged periods of static postures and repetitive movements can lead to muscle weakness, particularly in the lower extremities. During muscle contraction, oxygen is essential for proper function.

If movements are repeated while muscles are already overly contracted or tense, and sufficient oxygen has not yet reached the tissues, fatigue will set in rapidly. Furthermore, suboptimal positioning and poor ergonomics contribute to inefficient energy transfer, shifting the burden from the muscles to the skeletal tissues, further exacerbating muscle fatigue. The application of KT in this context resulted in a significant increase in both posterolateral and posteromedial reach distances, suggesting a positive influence on balance and stability (Ahmadizadeh et al., 2021; Lemos et al., 2023b; Zhou et al., 2024).

The findings of this study suggest that the immediate application of Kinesio Taping using the mechanical correction technique can enhance dynamic balance in healthy young adults. This implies that KT may be used as a supportive strategy to improve postural control in populations requiring rapid functional readiness, such as athletes or students engaged in high physical activity. This study is limited by its pre-experimental one-group pretest–posttest design, which does not include a control group for comparison.

The use of accidental sampling reduces generalizability, and the findings reflect only short-term effects since no follow-up measurements were conducted. Additionally, the sample consisted solely of healthy young adults, restricting applicability to other age groups or clinical populations. Future studies are recommended to use randomized controlled designs to strengthen causal interpretation. Including a sham-taping control group would help isolate the true effect of KT. A more diverse sample across different age groups or clinical populations is encouraged, along with the inclusion of long-term follow-up assessments to evaluate sustained effects of Kinesio Taping.

CONCLUSION

That in this study has an effect in the provision of acute kinesiotaping. Kinesio taping has been shown to enhance both postural and dynamic stability, as assessed through the SEBT. Incorporating kinesio taping alongside exercise can serve as an effective complementary intervention. Especially in adolescents because they have many activities as students. Based on these findings, it is recommended that future research include a control or sham-taping group, apply randomized sampling methods, and examine long-term effects to strengthen the evidence for KT as a balance-enhancing intervention.

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DECLARATION OF USE OF AI IN SCIENTIFIC WRITING

AI tools were used solely for grammar and language editing. The authors take full responsibility for the content and integrity of the manuscript.

CONFLICT OF INTERESTS

The authors declare no conflicts of interest.

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