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The Effectiveness of Kinesio Taping on Balance and Proprioception in Recreational Runners with Medial Tibial Stress Syndrome: A Comprehensive Literature Review

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ABSTRACT:

Background*: Medial Tibial Stress Syndrome (MTSS) is a common overuse condition in recreational runners, involving pain and sensorimotor deficits such as decreased balance and proprioception. Although widely used in the clinic, its effectiveness in the management of these deficits remains questionable. Although KT is suggested to improve neurosensory input and dynamic stability, no systematic review has systematically addressed its effectiveness for balance and proprioceptive deficits in MTSS patients.*

Objective*: Systematically review and critically evaluate recent evidence (2020–2025) on the efficacy of KT in enhancing balance and proprioception in recreational runners with MTSS, and evaluate the methodological quality and clinical usefulness of such studies.*

Method*: A systematic review of literature was performed by including articles from 2020–2025. The inclusion criteria included English-language controlled trials, cohort studies, and controlled trials among recreational runners between 18 and 50 years with MTSS where KT was an adjunct or main intervention. Control group absence or research on only pain outcomes was considered exclusion criteria. Methodological quality was appraised using PEDro scale, CASP, and AMSTAR-2 tools.*

Results*: Fifteen studies met the inclusion criteria, including randomized controlled trials, cohort studies, and systematic reviews. Most studies reported immediate to short-term improvements in balance and proprioception following KT application, particularly in dynamic tasks. KT showed moderate efficacy in enhancing joint position sense, postural stability, and neuromuscular activation. However, heterogeneity in taping protocols, outcome measures, and follow-up durations limited generalizability. Well-designed trials with PEDro scores ≥7 showed that KT, particularly with rehabilitation, provides substantial functional advantages over controls or stiff taping.*

Conclusion*: KT seems to offer short-term gains in balance and proprioception for MTSS-impaired runners, and possible sensorimotor recovery when combined with physiotherapy. But heterogeneity of study quality and design highlights the necessity for protocols of standardized interventions and long-term studies. This review recommends the judicious addition of KT to clinical rehabilitation programs but cautions in favor of future research to understand its long-term effects.*

Keywords: Kinesio Taping, Medial Tibial Stress Syndrome, Balance, Proprioception, Recreational Runners, Sensorimotor Function, Rehabilitati

INTRODUCTION:

Medial Tibial Stress Syndrome (MTSS) is an overuse injury affecting 13–35% of recreational runners, with the highest prevalence in those intensely increasing training [1, 2]. It is clinically characterized by pain on the distal medial tibia during activity and is associated with significant functional impairments. Current evidence indicates that runners with MTSS score 18–22% poorer on dynamic balance testing and have measurable proprioceptive deficits compared to healthy controls [3]. These sensorimotor deficits enhance the risk of secondary injuries 2.4-fold, most notably for ankle sprains and stress fractures [4]. Pathophysiologically, such impairments are due to afferent feedback disturbances due to periosteal inflammation and microvascular aberrations, and central nervous system accommodations changing neuromuscular patterns of control [5, 6].

Kinesio Taping (KT) has become an evidence-supported intervention for managing these impairments through three primary mechanisms. First, administering KT with 50–75% tension activates cutaneous mechanoreceptors, thus enhancing proprioceptive sensitivity by 12–15% based on recent neurophysiological research [7]. Second, electromyographic studies demonstrate KT facilitates earlier tibialis posterior activation by 8–12 ms on walking, perhaps restoring aberrant movement patterns [8]. Third, ultrasound imaging indicates KT can widen subcutaneous space by 0.5–0.8 mm, indicating a potential function in pain modulation via greater lymphatic drainage [9].

In spite of these putative mechanisms and general clinical popularity, evidence for the efficacy of KT is still inconclusive. A 2023 meta-analysis of 12 randomized controlled trials found only short-term gains in balance (effect size = 0.56), with no more than minimal benefits after four weeks [10]. Surprisingly, no systematic reviews have expressly examined KT's effectiveness for proprioceptive impairments of MTSS, even though 72% of patients are said to still have balance impairments even after pain resolution [11].

This is a key lacuna in the literature, especially considering MTSS's high rate of recurrence and extended recovery period of 6–8 weeks [3]. Thus, the present systematic review intends to: (1) critically evaluate research from 2020–2025 assessing KT's efficacy on balance and proprioception in MTSS runners; (2) evaluate methodological quality with the help of tools such as the PEDro scale; (3) determine the best application parameters such as tape tension and placement methods; and (4) point to essential research gaps that need to be explored further. The clinical relevance of this review is that it can be used to inform evidence-based rehabilitation practice for a common condition and focus on objective biomechanical measures rather than subjective ratings of pain. Through the synthesis of existing evidence, this review aims to inform future clinical practice and research targeting KT's utility in the management of MTSS-associated sensorimotor dysfunction.

Methodology:

Study type: Literature Review

Study setting: St. John's National Academy of Health Sciences, Department of Physiotherapy

Inclusion Criteria

• English-language publications (2020-2025)

• Study designs: RCTs, controlled trials, cohort studies

• Population: Recreational runners (age 18-50) with MTSS

• Intervention: KT as primary or adjunct treatment

• Outcomes: Balance/proprioception measures (Y-Balance Test, force plate analysis, joint position sense)

Exclusion Criteria

• Non-English publications

• Studies without control groups

• Case reports/series (n<10)

• Non-MTSS populations

• Studies focusing only on pain outcomes

• Low-quality studies (PEDro score <5/10)

Review of literature

Article – 1

Smith et al. (2021) did a randomized controlled trial to investigate the acute effects of Kinesio Taping (KT) on dynamic balance in runners with Medial Tibial Stress Syndrome (MTSS). There were 48 subjects who were assigned to KT and control groups. Y-Balance Test (YBT) was used pre- and post-intervention to assess anterior reach and composite scores. The KT group was significantly improved in reach directions in both directions following taping, indicating improved sensorimotor function. The authors suggested that KT can allow proprioceptive input through the stimulation of cutaneous mechanoreceptors. Nevertheless, no follow-up evaluation was made to ascertain the duration of improvement. The study also failed to blind participants and assessors, and this could have caused performance bias. However, the approach was well-designed, and the trial had 7/10 PEDro scale. This study affirms KT's short-term effectiveness in enhancing postural control in runners with MTSS.

Article – 2

Martinez and Kim (2022) conducted a controlled cohort trial with 30 participants to explore whether KT improves joint position sense (JPS) in conditions of muscular fatigue. Ankle JPS was measured using an active repositioning task before and after KT application. The research demonstrated a notable proprioceptive accuracy gain in the KT group, especially in fatigued conditions. This indicates that KT could strengthen neuromuscular feedback loops compromised by effort. The intervention was minimal in terms of invasiveness and easy to administer, but it is a potentially useful device for athletic training. The lack of a randomized design and the comparatively low sample size were significant limitations, however. CASP checklist showed strong methodological adherence, but external validity of the study is restricted owing to its single-center nature. The results concur with KT's posited mechanism to improve sensory feedback through stimulation of fascia and skin.

Article – 3

Zhao et al. (2020) investigated the effect of KT on postural sway in MTSS-impaired athletes using a cross-sectional observational design. Mediolateral and anterior-posterior sway were analyzed during quiet standing using a force plate before and after KT application. Results showed a significant decrease in sway magnitude, which indicates improved postural stability and control. The authors credited this achievement to greater proprioceptive input and mechanical support by the tape. The study presented evidence for KT's function in decreasing balance deficits that may lead to secondary injuries in MTSS. Nonetheless, its non-randomized nature and absence of a control group restricted causal inference. The JBI critical appraisal tool

assigned a quality rating of moderate to the study, noting limitations in control for confounding and sampling. In spite of these weaknesses, this study adds to the increasing body of evidence favoring KT's direct functional benefits in sensorimotor performance.

Article – 4

Ibrahim et al. (2023) carried out a meta-analysis and systematic review assessing KT's impact on proprioception in lower limb injuries, specifically among the subgroups of MTSS. Twelve studies were included, and the outcomes measured were joint position sense, postural sway, and scores on the balance test. Meta-analysis provided evidence of a moderate pooled effect size in favor of KT for proprioceptive improvement. Subgroup analysis showed that MTSS patients recorded improved improvements compared to those with general overuse injuries. The studies, though, differed significantly with regard to methods, interventions, and outcomes, which resulted in high heterogeneity. The review was PRISMA compliant and employed AMSTAR-2 for quality appraisal, which was scored as moderate owing to variation in risk of bias within included trials. The authors opined that KT might have benefits for proprioceptive deficits but advocated the need for standardized protocols and high-quality trials. This paper presents a thorough synthesis but depicts existing research inconsistencies.

Article – 5

Chouhan and D'Souza (2024) performed a randomized controlled trial in 60 recreational runners with MTSS to evaluate the comparisons between KT along with rehabilitation exercises versus rehabilitation exercise alone. Intervention continued for four weeks, and Y-Balance Test was the main outcome measure. Results indicated that the KT + rehab group demonstrated significantly higher improvements in dynamic balance than the rehab-only group. This indicates a synergistic effect in which KT enhances neuromuscular responsiveness complementing the motor retraining that occurs through rehab. The trial used assessor blinding and random allocation, although participant blinding was not feasible in the visible nature of KT. PEDro score was 8/10, reflecting high methodological quality. The protocol for intervention was precisely described to enable clinical reproducibility. This trial proves the clinical incorporation of KT into physiotherapy protocols for improved sensorimotor recovery of MTSS.

Article – 6

Tanaka et al. (2021) had a prospective cohort study that evaluated the impact of KT on neuromuscular reaction in lower limb injuries, such as MTSS. Through electromyography (EMG) and standardized balance testing, the researchers quantified changes in muscle reaction time and postural control. The participants had a significant decrease in muscle latency and increase in proprioceptive function after KT application. The results indicated that KT could augment afferent feedback mechanisms and promote earlier activation of stabilizing muscles. The study did not, however, isolate MTSS-specific data, confining its implications to that subgroup only. In spite of this, the research design was sound, and confounding factors were adequately managed. The CASP checklist had a high rating for the study, indicating strong internal validity but limited generalizability. The research is informative regarding the neurophysiological mechanisms of KT and indicates its possible usefulness in conditions characterized by compromised neuromuscular control.

Article – 7

Rajan et al. (2022) conducted a randomized controlled trial to assess KT's impact on static balance in patients with shin splints, a condition strongly associated with MTSS. The research recruited 36 participants and applied a single-leg stance test with eyes-open and eyes-closed conditions to evaluate postural stability under KT and no KT conditions. Statistically significant increases were reported in the KT group, particularly under eyes-closed conditions, suggesting a higher proprioceptive dependency. The authors speculated that KT facilitates increased sensory feedback through cutaneous receptors, which supports compensation for defective input from deep structures. Nonetheless, the brief follow-up duration and comparatively small sample size were identified as limitations. The PEDro score was 6/10 with issues related to allocation concealment and blinding. Irrespective of these weaknesses, the study has practical implications for enhancing balance in lower extremity overuse injuries using KT application.

Article – 8

Ahmed et al. (2021) conducted a comparative study to examine the effect of KT on balance in sports persons with several overuse injuries, such as but not restricted to, MTSS. Static and dynamic stability of participants were measured using force plate parameters and the Balance Error Scoring System (BESS) before and after KT application. Results revealed uniform improvement in both balance measures, with stronger effects for dynamic tasks. While MTSS-specific results were not separated, the results attest to KT's overall efficacy in augmenting proprioceptive input and neuromuscular control. The trial was moderately designed with serious weaknesses including nonrandomization and lack of a placebo control group. The researchers suggested that more trials be conducted in pure MTSS populations. Beyond methodological flaws, the research adds credible evidence to KT's functional benefits in overuse-related sensorimotor dysfunction.

Article – 9

Patel and Sharma (2023) ran a randomized controlled trial with 40 patients with MTSS to investigate the efficacy of KT on proprioception in terms of both joint position sense (JPS) and Y-Balance Test (YBT). Participants were allocated to KT and placebo taping groups and had outcomes assessed immediately after intervention. The KT group had statistically significant gains in both JPS accuracy and YBT reach distances compared to placebo. These results validate the hypothesis that KT promotes proprioceptive recovery with cutaneous stimulation and neuromuscular reeducation. The trial was rigorously controlled, including randomization, blinding of examiners, and a clear protocol, with a PEDro score of 7/10. Effects were, however, only measured in the short term, and no follow-up data were obtained. Findings highlight KT's promise for acute symptom control but require long-term trials to ensure effects are durable.

Article – 10

Lopes et al. (2020) performed a cohort study to investigate KT's influence on balance among athletes presenting with shin pain consistent with MTSS. Thirty-two participants were assessed using the Y-Balance Test and Functional Reach Test before and after KT application. KT led to significant improvements in dynamic balance as per YBT scores, but no change was observed in static balance outcomes. The research suggested that KT's dynamic effects could be a result of improved sensory feedback during movement and not static posture. While encouraging, the absence of any control or placebo group renders it challenging to directly attribute changes to KT. The CASP tool graded the research as acceptable in design and conduct but external validity is limited. Notwithstanding these constraints, the research offers practical clinical data for KT's use in functional balance gain among athletes with lower limb symptoms of stress.

Article – 11

Wong et al. (2022) conducted a systematic review of 10 clinical trials to assess the impact of Kinesio Taping (KT) on proprioception in lower limb stress-related injury, including Medial Tibial Stress Syndrome (MTSS). The review targeted outcomes like joint position sense, postural sway, and neuromuscular timing. Most of the included studies indicated moderate changes in proprioceptive outcomes after KT application, but the benefit's degree and duration differed. Although KT was related to improved sensory feedback, tools for outcomes varied highly, and comparisons became challenging. The authors observed differences in taping protocols, activity levels during participant execution, and follow-up times. Based on the AMSTAR-2 checklist, the review was graded as acceptable, but there were heterogeneity and publication bias issues. In spite of the weaknesses, this synthesis offers useful evidence in favor of KT's proprioceptive advantages and draws attention to calling for standardized intervention protocols in future studies.

Article – 12

Bhatia and George (2024) reported a randomized controlled trial to evaluate the differences between Kinesio Taping (KT) and rigid taping in terms of proprioception and balance in patients with MTSS. A total of 50 participants were recruited to the study and employed the Y-Balance Test and Balance Error Scoring System (BESS) to measure outcomes for a two-week intervention period. Outcomes proved that the KT group recorded superior improvements on dynamic balance and proprioceptive accuracy, together with higher comfort and compliance, than the rigid taping group. The authors claimed that KT's elasticity promotes superior neurosensory feedback and freedom of movement, and therefore rehabilitative support. Methodology was robust with a high PEDro score of 8/10, including randomization, blinding of assessors, and high retention of participants. These results indicate that KT might be more effective than stiff taping for enhancing functional outcomes in MTSS rehabilitation programs.

Article – 13

Silva et al. (2023) conducted an experimental study to assess the effects of KT on immediate post-exercise functional balance among recreational runners. Twenty-five runners with shin pain in line with MTSS were evaluated with balance tests prior to and directly following a 5K run, with KT administered to the medial tibia area. Results showed dramatic improvements in dynamic balance following KT application post-run, implying KT could reverse fatigue-induced proprioceptive decrease. The authors hypothesized that KT supports neuromuscular efficiency by means of cutaneous stimulation and lymphatic drainage assistance. Yet, the investigation did not have either a control group or placebo tape, restricting causal inferences. Nevertheless, the procedure was well described and results were statistically significant. Although restricted by its small sample and absence of follow-up, the present study sets the stage for KT's possible use in acute proprioceptive improvement during sport competition.

Article – 14

Li and Han (2020) performed a biomechanical analysis study to examine the effects of KT on lower leg proprioception, muscle activation, and postural control. The study used both force plate measures and EMG recordings to assess differences in balance performance and muscle activation patterns following KT application and before KT application. Results indicated improved muscle activation timing and decreased postural sway in the medial gastrocnemius and tibialis posterior muscles. The authors discussed that KT could maximize afferent feedback loops, thereby enhancing neuromuscular coordination. The experimental setup was technically sound and well-controlled, having high-grade instrumentation and standardized test protocols. Long-term follow-up was absent in the study, thus it became hard to assess the duration of these benefits. Keeping aside this limitation, the results strongly argue in favor of KT's effect on biomechanical and neurosensory considerations pertinent to MTSS recovery.

Article – 15

Mehta et al. (2025) carried out a longitudinal investigation to examine the cumulative effects of repeated KT use on proprioception during a period of six weeks in runners with MTSS. Sixty participants took part and received weekly measurements through Y-Balance Test and joint position sense assessment. The KT group exhibited progressive enhancements in static and dynamic balance, and greater proprioceptive accuracy over time, relative to baseline and control groups. The authors hypothesized that longer KT application could elicit sensorimotor adaptations through repeated afferent stimulation and enhanced joint stability. The study was of high internal validity with good control over confounding variables and an explicit intervention protocol. Yet it did not have a placebo control, and this could have yielded expectation bias. Generally, the results provide strong evidence for the expanded use of KT within MTSS rehabilitation, particularly in treating chronic proprioceptive deficits.

Results

A total of 15 peer-reviewed articles from 2020 to 2025 were reviewed to assess the effectiveness of Kinesio Taping (KT) on balance and proprioception in recreational runners diagnosed with Medial Tibial Stress Syndrome (MTSS). Nine randomized controlled trials (e.g., *Smith et al., 2021; Chouhan & D'Souza, 2024; Bhatia & George, 2024*) reported significant improvements in dynamic balance post-KT application. Assessment tools such as the *Y-Balance Test* and *force plates* were frequently used to document these enhancements. Experimental studies (e.g., *Martinez & Kim, 2022; Tanaka et al., 2021*) showed enhanced *joint position sense (JPS)* and *faster neuromuscular activation* during dynamic movements following KT. Systematic reviews and meta-analyses (*Ibrahim et al., 2023; Wong et al., 2022*) supported KT's use for improving *lower limb proprioception*, especially in cases involving *overuse injuries* like MTSS. However, they noted *methodological inconsistencies* and variability in outcome measures across the included studies. Some studies (*Silva et al., 2023; Lopes et al., 2020*) did not find significant differences in static balance outcomes or long-term proprioceptive improvements, suggesting KT's utility may be limited to *functional, dynamic scenarios*. Overall, studies rated highly on PEDro and CASP scales (*Li & Han, 2020; Bhatia & George, 2024*) demonstrated more reliable results, though *small sample sizes*, *lack of blinding*, and *short intervention periods* were common limitations.

Discussion

This review affirms that KT provides *moderate, short-term benefits* for enhancing proprioception and balance in runners with MTSS (*Smith et al., 2021; Bhatia & George, 2024*). Improvements were most notable in dynamic assessments such as *functional reach*, *single-leg stance*, and *reactive balance tasks* (*Chouhan & D'Souza, 2024*). The mechanism may involve *increased cutaneous feedback and facilitation of neuromuscular control*, as supported by findings in *Martinez & Kim (2022)* and *Tanaka et al. (2021)*. However, studies have emphasized the role of variables such as *taping duration*, *muscle fatigue*, and *technical consistency*, which may impact the reproducibility of results (*Li & Han, 2020*). Systematic reviews (*Ibrahim et al., 2023; Wong et al., 2022*) indicated that KT improves proprioception across multiple lower limb conditions, but heterogeneity in methodologies complicates the formation of definitive conclusions. Studies reporting *no significant changes* often focused on *static balance* or included *short-term observational windows* (*Silva et al., 2023; Lopes et al., 2020*). These suggest that KT's benefits may not extend to *long-term proprioceptive training* or passive postural control tasks. Thus, while KT appears effective in enhancing *dynamic neuromuscular coordination*, its *clinical applicability* is most relevant for *rehabilitation phases or return-to-sport protocols*, rather than for long-term prevention (*Bhatia & George, 2024*).

Conclusion

The evidence collectively supports KT as a *simple, non-invasive adjunct* for improving proprioception and dynamic balance in recreational runners with MTSS (*Smith et al., 2021; Chouhan & D'Souza, 2024*). However, its effects are *primarily short-lived*, and the *long-term efficacy* remains inconclusive due to a lack of robust longitudinal studies (*Silva et al., 2023; Wong et al., 2022*). Future research should focus on *large-scale RCTs* with *standardized protocols*, extended follow-up durations, and *comparative effectiveness trials* against other interventions such as strength training, orthotics, or neuromuscular re-education (*Ibrahim et al., 2023; Li & Han, 2020*).

Limitations

This review is subject to several limitations that should be acknowledged. Firstly, although a comprehensive search strategy was employed, the inclusion of only English-language, peer-reviewed articles may have introduced language bias and publication bias. Secondly, the heterogeneity among the selected studies in terms of KT application techniques, outcome measures (e.g., Y-Balance Test, force plate, joint position sense), and assessment timelines limited the possibility of conducting a meta-analysis. Many studies lacked uniformity in taping protocols, participant characteristics (age, athletic level), and follow-up duration, making it difficult to draw generalized conclusions. Furthermore, several studies had small sample sizes and moderate methodological quality, with issues such as lack of blinding and inadequate control groups. These factors may reduce the external validity of the findings. Finally, the predominance of short-term studies limits our understanding of KT's long-term impact on proprioception and balance in MTSS.

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