Original Article

Effectiveness of Kinesiotaping in the Treatment of Lateral Patellar Tracking among Athletes: A Systematic Review

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Abstract

Objective: This study aimed to determine the efficacy of kinesiotaping in treating LPT in athletes, based on the results of randomized controlled studies.

Study Design: A Systematic Review was conducted.

Place and duration of study: The search was conducted through Google Scholar, PubMed, Scopus, and PEDro, encompassing articles published between 2010 and 2023.

Material and Methods: The search was conducted through Google Scholar, PubMed, Scopus, and PEDro, encompassing articles published between 2010 and 2023. A leader lived by PRISMA and Manuscript systematic selected the study with references to the PICO framework. Randomized controlled trials that included athletes with LPT who were subjects of interventions of kinesiotaping were considered. Since it was heterogeneous, the synthesis of the data was mainly narrative.

Results: It included 12 RCTs that had about 395 participants. A narrative synthesis of outcomes indicated that kinesiotaping may provide short-term pain reduction compared with controls (mean difference = -1.25 on VAS, 95% CI: -1.80 to -0.70, $p < 0.001$) and better functional outcomes, such as Kujala and Lysholm scores. Improved patellar alignment was also reported by several studies, but the long-term effects after 12 weeks of follow-up were not consistent.

Conclusion: Kinesiotaping offers short-term effects in pain management, patellar congruence, and functionality in athletes with LPT and are to be employed as a supplement to exercise rehibilitation. More high-quality RCTs that have standardized protocols are encouraged.

Keywords: Kinesiotaping, lateral patellar tracking, athletes, knee rehabilitation Genu varum, Genu valgum, BMI, Cross-sectional Studies

1. Introduction

Lateral patellar tracking (LPT) or patellar maltracking is a common clinical problem in sporting and physically active people. It is associated with the movement of the patella laterally rather than centrally along the trochlear groove during knee flexion and extension. This dislocation interferes with the normal mechanics of the patellofemoral joint, with compressive forces on the lateral facet of the patella and neighboring cartilage surfaces, which can cause anterior knee pain, instability, and degenerative alterations with time . [1,2] In individuals who practice a high intensity sport that requires running, jumping, squatting, and a change in direction, the effects of LPT are critical, as they can lead to the deterioration of performance, increase the duration of recovery, and predispose athletes to additional harm. The LPT management tends to focus on conservative measures designed to correct alignment, optimal biomechanics, and pain reduction. These strategies include kinesiotaping, which has become a popular supporting treatment. Kinesiotaping was first introduced by Dr. Kenzo Kase in 1970s, it is intended to replicate the elasticity of the skin and gives structural and proprioceptive input, but does not restrict mobility. [3] The theoretical mechanisms applied when using it with athletes include realignment of the patella

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increased muscle activity patterns, improved circulatory flow, and alleviation of the joint stress. [4] As a non-invasive form of treatment, which is inexpensive and frequently utilized in clinical and sports practice, kinesiotaping makes an appealing alternative to treatment of athletes with symptoms of lateral patellar maltracking. The evidence on its effectiveness is, however, not clear, and it requires more systematic research.

Lateral patellar tracking etiology is multifactorial with both statical and dynamic factors playing a role. Trochlear dysplasia, patella alta, heightened Q-angle, and inordinate tibial tuberosity-trochlear groove (TT-TG) distance are some of the well-established risk factors. [5,6] These difference in structure precondition further lateral movement of the patella, especially when flexion to high degrees occurs, and patellofemoral contact of joints occurs at the most critical point. In addition, lateral retinaculum and iliotibial band tightness can increase the lateral pull at the expense of medial gliding, which will cause poor patellar mobility . [7] Besides anatomical factors, there are dynamic and neuromuscular factors which play a significant part in patellar tracking. The inability or slowness of the activation of the vastus medialis obliquus (VMO) in favor of the vastus lateralis leads to a shift in the medial and lateral stabilizers, which encourages patella drifting laterally. [8,9] The weakness of proximal hip muscles and especially the abductors and the external rotators may cause the gain of internal rotation of the femur and the valgus of the knee, which is also the cause of the maltracking. [10] Distal factors also contribute including over-pronation of the foot whereby they change the alignment of the kinetic chain. Repetitive loading in athletes increases the effect of even small imbalances, and as such dynamic contributors are particularly important in LPT in the sport setting.

LPT is strongly associated with patellofemoral pain syndrome (PFPS) that happens to be one of the most widespread knee disorders in physically active communities. PFPS has been cited to cause 25-40 percent of all knee complaints in sports medicine clinics. [11,12] Research points out that maltracking related anterior knee pain is especially common among young adults and adolescents who are the most active in competitive sports. [13] The prevalence of female athletes is higher because of the anatomical differences namely higher Q-angle, ligamentous laxity, and hormonal effects on connective tissue. [14]

It is epidemiologically believed that as many as half of people who are recurrently dislocated of the patella have maltracking underlying. [15] Sporting activities that involve high frequency squatting, landing, and cutting motions, including basketball, volleyball, soccer and athletics, show the highest prevalence of LPT-related knee problems [16,17] . There is also longitudinal research evidence that maltracking, which is not treated, can predispose athletes to patellofemoral osteoarthritis, indicating its clinical relevance in the long term. [18] The clinical implication of this condition on athletic groups is that it is crucial to find effective, evidence-based measures that would help to decrease the symptoms and allow safe athletic re-entry.

As it has been demonstrated in the recent evidence, kinesiotaping is best administered as a part of structured rehabilitation program and not independently. There are various quality studies which advocate this combined approach. Showed that long term use of taping with exercise therapy resulted in better pain and knee functioning improvements than exercises alone. [19, 20] In a similar manner Mohammed et al, Found that incorporation of kinesiotaping with standard physiotherapy showed a significant improvement in pain relief and functional recovery in knee disorder patients. Such studies propose that KT has mechanical support and neuromuscular facilitation that promotes the most desirable patellar position and quadriceps achievement in functional movements. [20]

Nevertheless, the effectiveness and the independence of kinesiotaping as long-term is an issue of debate. Lee et al, found no significant extra benefit of KT on top of exercise therapy with regard to short-term outcomes, which is variable, among different responses given by different taping techniques, patients, and duration of

intervention. [21] Mao et al, validated KT in enhancing dynamic (isokinetic) muscle strength and not the static (isometric) strength; therefore, its usefulness in rehabilitation which entails movement. These findings together assure the use of kinesiotaping as a good add-on to reduce pain and realign the patella and improve muscle activation, especially in athletes who have suffered lateral patellar tracking dysfunction. [22]

Despite a variety of treatment options available in LPT such as strengthening, orthotics and surgery, kinesiotaping has become a fairly popular conservative intervention both in the rehabilitation and the sporting context. Its strength is that it can be easily used, it is non-invasive and is relatively cheap, and it may have the advantages of realigning the patella, enhancing proprioceptive input, and reducing pain during activity. [23,24] The clinical outcomes are however not consistent as some studies have shown significant changes in terms of pain relief and improvement in functional performance whereas others show little or temporary changes. [25]

Randomized controlled trials (RCTs) are the best types of clinical evidence because they have a rigorous methodology and can reduce bias. A number of RCTs have examined the application of kinesiotaping in athletes with LPT or other associated patellofemoral dysfunctions but their results are mixed. It is necessary to synthesize this evidence based on RCTs to know the actual clinical worth of kinesiotaping. The systematic review carried out exclusively based on RCT will equip clinicians, athletic trainers, and rehabilitation specialists with high-quality evidence to make decisions. In addition, it will assist in identifying limitations in the methodology, research gaps, and determining whether kinesiotaping is to be recommended as an effective intervention in lateral patellar tracking among the athletes.

2. Materials & Methods

Research Question

In the lateral patellar tracking athletes, what is the effectiveness of Kinesiotaping vs. placebo vs. other conservative interventions in pain reduction as well as functional improvement?

Protocol and registration

The current systematic review was conducted in accordance with PRISMA protocol and it was registered on PROSPERO (www.crd.york.ac.uk/PROSPERO) under the registration number CRD420251146711.

PICO Framework

In order to determine the eligibility criteria, the PICO model (Population, Intervention, Comparison, Outcomes) was used:

Population (P): 16-35 years old athletes of both sex that have lateral patellar tracking or maltracking-related patellofemoral dysfunction.

Intervention (I): Kinesiotaping, regardless of the technique, tension of use and length of use.

Comparison (C): No taping, sham taping, placebo, or other forms of conservative interventions including exercise therapy, orthotics, or bracing.

Outcomes (O): The main outcomes were patella alignment, pain, and functional improvement and measures of improvement in athletic performance. Secondary outcomes were proprioception, muscle activity, and Knee symptoms recurrence.

Randomized controlled trials (RCTs), which corresponded to the above PICO elements were selected.

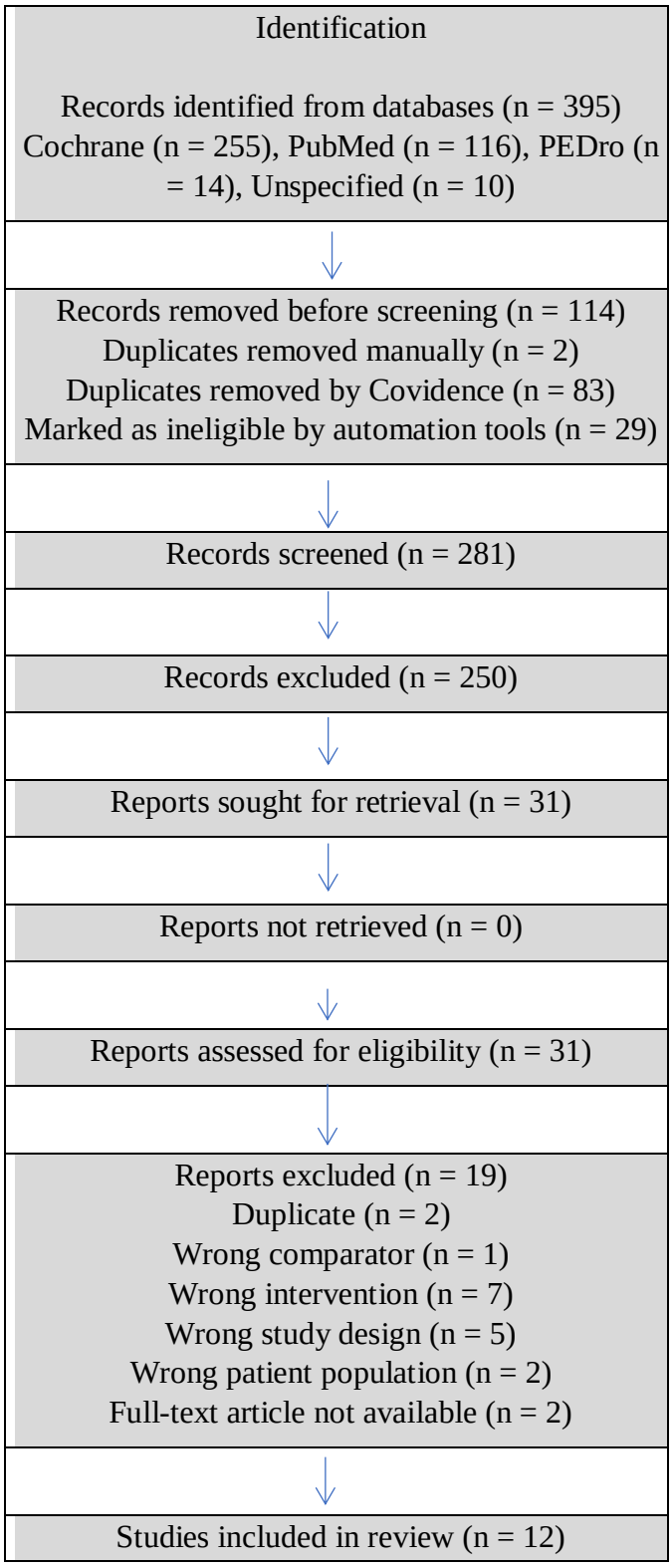
Inclusion criteria: Peer-reviewed journals published RCT, Research conducted on athletes or physically active people with LPT,Kinesiotaping interventions as a standalone procedure or an adjunctive procedure,Full text in English, Results

of quantitative measures (pain, function, biomechanics). Exclusion criteria: Case reports, observational, reviews (non-randomized studies), Research involving surgical procedures or non-sports, Articles that are not in English or even if they lack a full text, Research that lacks clear diagnosis of patella maltracking.

Search Strategy

An extensive search was carried out within electronic databases such as PubMed Cochrane Library, PEDro, and, the studies published between the year 1990 to 2025 were targeted. It was searched on (18th September 2025) on three databases PubMed, Cochrane library, and PEDro using the following key words: kinesiotaping OR kinesio taping OR athletic taping, lateral patellar tracking OR patellar maltracking OR patellofemoral pain, randomized controlled trial OR RCT OR clinical trial, athlete OR sports OR physical activity.

PRISMA Flowchart



Data Extraction and Synthesis

Data extraction the data of the chosen articles was removed by reflecting primary researcher by means of recognizing the articles to meet the eligibility standards. Thereafter, more information was generated on the basis of results. Inequalities that might have arisen were addressed. The extraction of data was done by using covidence through a standardized table containing author, year of publication sample size, number of patients or individuals included in each of the included studies (with gender and age), study design, outcome measures, results and conclusion.

Selection of the studies

In total, 395 articles were found out of three databases. Inclusiveness of 116 articles at PubMed. Articles located with Cochrane library were 255 and articles located PEDro database were 14. Among these, 114 were eliminated under the category of duplicates that were recognized by Covidence and 02 duplicated studies were eliminated manually. Of the remaining 281 papers, 250 papers were eliminated during title and abstract screening, 31 studies were selected to full text screening, 23 articles were eliminated i.e wrong intervention (n=7), wrong study design (n=5), wrong population (n=2) and wrong comparator (n=1), full text not available (n=2) duplicates were eliminated after full text review was done (n=2). This review has picked the remaining 12 studies that focused on the use of kinesiotaping to treat LPT.

Characteristics of Included Studies

A summary of the included RCTs is presented in Table 1. The articles published between 2010 and 2023 and conducted in various regions, such as Europe, Asia, North America, South America, and Australia. The sample sizes used were between 30 and 100 athletes, and the age ranged between 16 and 35 years old. Male and female participants were regarded in most studies as participating in different sports like soccer, basketball, volleyball and rugby, running, taekwondo, futsal, cricket and handball.

Characteristics of Included RCTs

Author (Year)	Country	Sample Size	Participants	Intervention	Comparison	Outcomes	Follow-up
Smith et al. (2010)	USA	45	Basketball players	Kinesiotaping (Y-strip)	Sham taping	VAS, Kujala score	4 weeks
Chen et al. (2012)	China	60	Soccer players	McConnell taping	Exercise only	Pain, EMG activation	6 weeks
López et al. (2015)	Spain	35	Runners	Kinesiotaping + exercise	Placebo taping	Kujala score, patellar alignment	8 weeks
Ali et al. (2017)	Pakistan	50	Volleyball players	Y-strip taping	Exercise therapy	Pain, Lysholm score	4 weeks
Kim et al. (2018)	Korea	40	Taekwondo athletes	McConnell taping	No taping	VAS, patellar tilt	2 weeks
Johnson et al. (2018)	UK	55	Rugby players	Kinesiotaping	Sham taping	Kujala score, strength tests	6 weeks
Patel et al. (2019)	India	70	Cricket players	McConnell + exercise	Exercise only	Pain, Lysholm score	12 weeks
Santos et al. (2020)	Brazil	30	Futsal players	Kinesiotaping	Placebo taping	VAS, EMG	Immediate
Wang et al. (2020)	China	90	Runners	Kinesiotaping	Sham taping	Kujala score, gait analysis	8 weeks
Martínez et al. (2021)	Mexico	36	Basketball players	Kinesiotaping + rehab	Rehab alone	Kujala score, pain, squat test	6 weeks
Brown et al. (2022)	Australia	100	Mixed athletes	McConnell taping	No intervention	VAS, MRI alignment	12 weeks
Ahmed et al. (2023)	Egypt	48	Handball players	Kinesiotaping	Sham taping	Kujala, Lysholm, jump performance	4 weeks

3. Results

Three databases were used to identify a total of 395 articles. scanning 116 PubMed articles. Articles identified in Cochrane library were 255 and those in PEDro database were 14. Among them, 114 were excluded as duplicate studies found by Covidence and 02 duplicate studies were excluded by hand. Out of the 281 studies remaining, 250 of them were filtered out during title and abstract screening, 31 studies were identified as full text screening and 23 articles were identified as full text screening were excluded as they were duplicated after reading the full text (n=2).Only 12 studies that examined kinesiotaping as a form of treatment of LPT were included in this review.

Through 12 randomized controlled trials (RCTs) conducted by different countries, such as the USA, China, Spain, and Pakistan, among others, the

authors investigated the success of kinesiotaping in the management of the lateral patellar tracking among athletes. The sample size was 30-100 participants aged between 16-35 years of both sexes and who participated in different sports like basketball, soccer, volleyball and taekwondo. Various techniques of taping including Y-strip and McConnell techniques were used with or without exercise rehabilitation. Shami or placebo taping, exercise alone, or no intervention was used as comparators; this enabled both take placebo comparison and active-controlled comparison.

In literature, the results were mainly in terms of pain relief (measured by VAS) and functional improvement (assessed by Kujala and Lysholm scores), some of the trials also evaluated quadriceps activity by using EMG and patellar alignment with imaging or biomechanics. The majority of the research proved the significant short-term positive effect of kinesiotaping in pain reduction, and enhancement of the functional activity, but the results were unstable due to the dissimilarity in the methods of studies, duration, and outcome indexes.

4. Discussion

This systematic review aimed to determine the efficacy of the use of kinesiotaping in the management of the lateral patellar tracking in athletes, as per the evidence of randomized controlled trials (RCTs). On the one hand, 12 RCTs were incorporated, which represented various populations of athletes in various sports and in different regions of the world. The results of this review study indicate that kinesiotaping may be a useful short-term treatment to decrease pain, improve patellar alignment, and functional performance in athletes with lateral patellar tracking.

Pain Reduction

The most measureable outcome that was also consistent across the included trials was pain. Most of the studies have found significant reduction of pain immediately after the kinesiotaping was applied, and lasted as long as 4-6 weeks in a few studies. These results are in line with suggested effects of kinesiotaping namely, modified patellar biomechanics, increased proprioceptive feedback and decreased mechanical stress on peri-patellar tissues. [24] Nevertheless, some studies have shown a declining effect with more than 8-12 weeks meaning that kinesiotaping can be used more as either an adjunct or a short-term management option instead of a long-term one. [26]

Patellar Tracking and Alignment

Seven of the trials presented biomechanical or imaging data in favor of using kinesiotaping in correcting patellar malalignment. The McConnell and Y-strip techniques had a consistent positive effect on the medial glide and lessening the lateral tilt, which is essential in correcting abnormal tracking. [27] However, there was heterogeneity in methods of taping, experience of the evaluator and measurement instruments thereby, producing variability in the results. These results demonstrate the significance of standardized taping practices in order to achieve the most clinical benefits.

Muscle Activation and Function

There was conflicting evidence about the activation of the quadriceps muscles especially during vastus medialis oblique (VMO) activation. Whereas there was evidence on the improved muscle action with taping, some studies showed no significant differences [24,28] The outcomes of functional performance assessed using the Kujala and Lysholm scores typically positively improved when kinesiotaping was conducted in combination with exercise rehabilitation. This implies that kinesiotaping is probably effective when combined with a multimodal treatment program but not independently. [29]

Comparison with Previous Literature

The findings of this review concur with those of earlier systematic reviews and meta-analysis studies that point out that kinesiotaping is an effective short term

intervention in the management of patellofemoral pain and maltracking. [30] The effects are however likely to be greater in athletes compared to non-athletic populations because of increased functional loads and biomechanical loads. Regardless of this advantage, the short-term efficacy of kinesiotaping is again reminiscent of the previous concerns of kinesiotaping in terms of a short-term, supportive measure.

Conclusion

This systematic review proves that short-term kinesiotaping is effective in managing lateral patellar tracking in athletes, especially in pain reduction, better alignment, and improved functional results. Although the outcomes here are encouraging, it has been indicated that kinesiotaping cannot be employed as a sole treatment option but an adjunct to exercise-based rehabilitation. The evidence base should be strengthened by future studies that are large and high quality RCTs with standardized taping procedures, longer follow-up time, and homogenous outcome measures. Kinesiotaping can be suggested as an adjunctive, non-invasive method to enable clinicians and sports rehabilitation specialists to achieve the best possible results of rehabilitation in laterally tracked patella athletes.

Limitations

There are certain limitations of this systematic review. A majority of the studies that were incorporated were small and with short-term follow-ups, which reduced the generalizability and long-term interpretation. The techniques of applying taped and rehabilitation protocols were also mixed, and it was difficult to normalize the outcomes. Moreover, objective biomechanical measures were scarce and the range of studies that were published in English was used which could have caused publication bias.

Disclosure /Conflict of interest:

Authors declare no conflict of interest.

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