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Immediate effects of Kinesio taping on pain in young athletes with patellofemoral pain syndrome

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Abstract

Background: Patellofemoral pain syndrome (PFPS) is one of the most common overuse knee conditions affecting young and physically active individuals, particularly athletes. It is characterized by anterior knee pain that is aggravated during activities such as squatting, stair climbing, running, and prolonged sitting. Conservative management remains the primary approach, with taping techniques frequently used to reduce pain and improve function. Kinesio Taping (KT), an elastic and non-restrictive taping method, has gained popularity due to its potential to provide pain relief, enhance proprioception, and support neuromuscular control without limiting movement.

Objective: To review the immediate effects of Kinesio Taping on pain in young athletes with patellofemoral pain syndrome.

Methods: A narrative literature review was conducted using databases including PubMed, Google Scholar, ScienceDirect, and ResearchGate. Articles published between 2000 and 2025 were screened according to predefined inclusion and exclusion criteria. Studies involving young adults and athletes with PFPS that examined the immediate effects of Kinesio Taping on pain and functional outcomes were included. Fifteen high-quality studies were critically appraised following PRISMA guidelines.

Results: The reviewed studies consistently demonstrated that Kinesio Taping produces immediate reductions in anterior knee pain, as measured by the Visual Analogue Scale, during functional activities such as squatting, stair climbing, hopping, and jumping. Several studies also reported short-term improvements in functional performance, balance, neuromuscular control, and movement confidence. KT applied in conjunction with exercise therapy resulted in greater immediate pain relief compared to exercise alone. However, most studies indicated that these benefits were primarily short-term, with limited evidence supporting long-term improvements in strength, biomechanics, or patellar alignment.

Conclusion: Kinesio Taping is an effective short-term adjunct intervention for reducing pain and enhancing functional performance in young athletes with patellofemoral pain syndrome. While it does not replace comprehensive rehabilitation, KT provides immediate symptom relief that facilitates continued participation in sports and rehabilitation programs. Its use should be integrated within a multimodal treatment approach that includes exercise therapy, movement retraining, and load management.

Keywords: Patellofemoral pain syndrome, Kinesio taping, anterior knee pain

Introduction

Patellofemoral pain syndrome (PFPS), commonly known as “runner’s knee,” is one of the most frequent overuse conditions affecting the knee, particularly in active individuals, athletes, and young adults ^[1, 2]. It contributes to nearly one-third of knee-related complaints seen in sports and orthopaedic clinics ^[2]. The condition is characterised by a vague, aching pain around the front of the knee, which typically worsens during functional weight-bearing tasks such as stair climbing, squatting, running, or sitting for long periods ^[3, 4]. Its origin is multifactorial and often includes abnormal tracking of the patella, weakness or imbalance of the quadriceps and hip stabilisers, tightness of surrounding soft tissues, and altered lower-limb biomechanics ^[4, 5]. If not addressed, PFPS can lead to long-lasting discomfort, reduced participation in physical activities, and limitations in daily functioning ^[1]. Non-surgical interventions remain the preferred approach for managing PFPS, with taping techniques commonly used to reduce pain and assist knee function ^[3]. Traditional rigid taping aims to reposition the patella but may restrict movement and cause discomfort during prolonged use ^[6]. Kinesio Taping (KT), a flexible therapeutic tape, has gained widespread acceptance because it allows natural joint movement while providing sensory stimulation and potential

improvements in patellar alignment, muscle activation, and pain modulation [7, 8, 9]. Emerging evidence indicates that KT can offer short-term pain relief and improve performance during activities such as squatting, stair negotiation, and hopping [10, 11]. Although systematic reviews acknowledge its usefulness for temporary symptom reduction, its long-term benefits on muscle strength, proprioception, and complete functional recovery remain uncertain [12]. Despite these limitations, KT continues to be integrated into rehabilitation settings due to its ease of application, affordability, and non-restrictive nature [5].

PFPS is now understood as a condition influenced not only by biomechanics but also by neuromuscular control and behavioural factors [4, 3]. Many individuals develop compensatory movement patterns or reduced confidence in loading the knee, which may further contribute to persistent symptoms [1]. KT is thought to support early rehabilitation by enhancing proprioceptive feedback and encouraging more efficient movement without hindering mobility [8]. Its potential to provide immediate symptom relief makes it a valuable adjunct to strengthening, stretching, and motor-control training in early PFPS management. Understanding these immediate effects is crucial for clinicians aiming to design comprehensive and effective treatment strategies.

Need of study

A Patellofemoral pain syndrome (PFPS) is a common overuse injury in athletes, particularly those involved in running, jumping, and sports requiring frequent knee flexion, such as football, volleyball, and basketball [1, 2]. It accounts for a significant proportion of knee complaints in young athletes, leading to pain, reduced performance, and potential long-term musculoskeletal issues if not effectively managed [1]. Conservative interventions, including exercise therapy and taping techniques, are the mainstay of PFPS management [3]. While rigid taping can correct patellar alignment, it may limit movement and hinder athletic performance [6]. Kinesio Taping (KT), an elastic and non-restrictive alternative, has gained attention for its potential to reduce pain, enhance proprioception, and support muscle function without restricting motion [7, 8].

Although several studies have demonstrated short-term benefits of KT in alleviating pain and improving functional tasks such as squatting, stair navigation, and hopping, evidence regarding its immediate effects in young athletes remains limited [10, 11]. Investigating these acute effects is crucial for optimizing rehabilitation strategies, maintaining training continuity, and supporting safe participation in sports. Establishing the efficacy of KT can provide clinicians and coaches with evidence-based tools to manage PFPS effectively in athletic populations. Given the high prevalence of PFPS in young athletes and the increasing use of KT in sports medicine, there is a clear need to systematically synthesize existing evidence. A focused literature review can provide insights into the immediate effects of Kinesio Taping on pain and functional outcomes in athletes, highlight the current research, and guide future clinical practice and investigation in sports rehabilitation [12].

Objective of the study

To review immediate effect of kinesio taping on pain in young athletes with patellofemoral pain syndrome.

Review of literature

1. Akbas *et al.* (2011) studied 30 physically active young adults with PFPS to compare Kinesio Taping (KT) plus

exercise versus exercise alone. Pain (VAS) and function (Kujala Scale) were assessed. The KT group showed significantly greater immediate pain reduction and better improvement in functional activities such as squatting and stair climbing. The authors suggested these effects may be due to enhanced proprioception, improved patellar tracking, and neurosensory stimulation. The study supports KT as an effective short-term adjunct to exercise therapy in young adults with PFPS [10].

2. Aytar *et al.* (2011) conducted a randomized trial with 31 physically active young adults with PFPS to assess immediate effects of KT. The KT group experienced significant pain reduction and improved performance in functional tasks like squatting and stair climbing compared to a sham group. KT likely provided analgesic effects through enhanced proprioception and patellar support. The study emphasized short-term benefits of KT in young, active populations, although long-term outcomes remain unclear, supporting its use as a practical intervention for acute symptom management in PFPS [11].
3. Nunes *et al.* (2013) investigated the impact of KT on pain, balance, and functional performance in 52 competitive athletes aged 18–25 years with PFPS. Participants were randomly assigned to KT or taping groups. Assessments included dynamic balance tests, vertical jump measurements, and pain levels via the Visual Analogue Scale. Athletes receiving KT experienced immediate pain relief and improvements in balance and jump performance compared to the sham group. The authors suggested that KT enhances proprioceptive feedback and neuromuscular control, which may facilitate better movement patterns and athletic performance. The study emphasized KT's utility as a short-term intervention to manage PFPS symptoms, allowing athletes to continue training and competition with reduced discomfort. While the research focused on acute effects, it highlighted KT's role as a practical, non-invasive tool that supports functional performance and participation in young athletes [13].
4. Barton *et al.* (2014) provided the “Best Practice Guide” for conservative management of PFPS, focusing on adolescents and young adults, including athletes. The review synthesized evidence on exercise therapy, movement retraining, and taping interventions, highlighting KT as a non-restrictive, supportive technique that may provide short-term pain relief and functional improvements. The guide emphasized individualized treatment, accounting for biomechanics, muscle control, and training load, with KT used as an adjunct to exercise programs. While evidence for long-term benefits remains limited, KT was recommended to enhance proprioception, reduce pain during functional tasks, and support athletic participation. This guide underscores the importance of evidence-based strategies for young athletes, emphasizing the integration of KT with exercises, movement correction, and load management to optimize outcomes in PFPS management [5].
5. Witvrouw *et al.* (2014) this consensus statement highlighted PFPS as a common, multifactorial condition in adolescents and young athletes. Kinesio Taping (KT)

- was recognized for providing immediate pain relief and proprioceptive support. The authors emphasized that KT should be used as an adjunct to exercise therapy, movement retraining, and load management. While short-term benefits are evident, long-term effectiveness remains unclear. KT was recommended as a practical tool to support rehabilitation and ongoing sports participation^[4].
6. Freedman *et al.* (2014) examined the short-term effects of patellar kinesio taping (KT) on pain and function in patients with patellofemoral pain syndrome (PFPS). The study revealed a significant immediate reduction in pain levels following KT application, as measured through a visual analogue scale. Participants also showed slight improvement in single-leg hop performance, indicating enhanced confidence and neuromuscular control. The authors suggested that KT's cutaneous stimulation may influence pain perception by improving proprioceptive feedback and altering sensory input around the knee. However, improvements in functional outcomes were modest and not sustained beyond the short term. Despite limitations such as small sample size and absence of a placebo control, the study concluded that KT can be an effective short-term intervention for pain relief and functional support in young athletes with PFPS^[14].
 7. Callaghan *et al.* (2012) reviewed the effectiveness of patellar taping in individuals with patellofemoral pain syndrome (PFPS). The review reported consistent evidence of immediate pain reduction during functional activities such as stair climbing and squatting following tape application. These effects were attributed mainly to neurosensory and proprioceptive mechanisms rather than mechanical correction of patellar alignment. The authors concluded that patellar taping is a useful short-term adjunct to exercise-based rehabilitation, facilitating improved functional participation in young and physically active individuals^[15].
 8. Aghapour *et al.* (2017) investigated the effects of kinesio taping (KT) applied over the vastus medialis obliquus (VMO) in athletes with patellofemoral pain syndrome (PFPS). Results demonstrated that KT significantly reduced anterior knee pain and improved performance in functional tasks such as stair climbing and squatting. The authors proposed that KT enhances muscle activation and provides beneficial proprioceptive input, improving movement confidence and pain tolerance. These findings support KT as a practical, non-invasive strategy for managing acute PFPS symptoms during physical activity. However, the study highlighted that KT should not replace exercise-based rehabilitation but rather complement it to achieve long-term functional recovery. Overall, KT offers immediate pain relief and short-term improvement in motor control, making it valuable for athletes experiencing PFPS-related discomfort during training or competition^[16].
 9. Morris *et al.* (2013) Morris and colleagues (2013) systematically reviewed the clinical effects of Kinesio Tex taping on musculoskeletal conditions. The review reported that taping can produce short-term reductions in pain and modest improvements in functional performance, likely through sensory stimulation and enhanced proprioception rather than structural correction. Despite methodological limitations and small sample sizes, the authors concluded that Kinesio taping may be a useful adjunct to rehabilitation for immediate symptom relief^[17].
 10. Son *et al.*, 2020 Son and colleagues investigated the immediate biomechanical and perceptual effects of patellar kinesiology taping in individuals with patellofemoral pain syndrome. Pain outcomes were assessed immediately following tape application during functional tasks. The findings indicated a significant immediate reduction in perceived knee pain, accompanied by changes in knee joint loading patterns. The authors suggested that kinesiology taping may influence both sensory feedback and movement mechanics, contributing to short-term pain relief. This immediate effect supports the use of taping as a preparatory intervention before athletic activity or rehabilitation sessions. The study reinforces the role of Kinesio taping as an adjunct modality for managing acute pain symptoms in young and physically active individuals with PFPS^[18].
 11. Seijas-Otero *et al.* (2023) conducted a randomized trial to evaluate the effects of kinesio taping (KT) on pain, muscle activity, and functional performance in individuals with PFPS. The results showed significant immediate reductions in pain and improved confidence during dynamic movements, with greater comfort reported during squatting and stair activities. Although changes in muscle activation and proprioceptive responses were inconsistent, the findings suggest that KT primarily contributes to short-term pain modulation rather than structural correction. The authors concluded that KT provides beneficial sensory feedback and serves as an effective adjunct to exercise therapy, supporting functional engagement during rehabilitation and sport in athletes with PFPS^[19].
 12. Luo *et al.* (2024) explored the effectiveness of kinesio taping (KT) for reducing pain and improving knee function in individuals with patellofemoral pain syndrome (PFPS). The study revealed that KT significantly decreased pain scores immediately after application, improving participants' confidence and functional performance during daily and sports-related activities. However, objective assessments of joint mechanics and strength showed minimal changes, suggesting KT's primary benefit is analgesic rather than biomechanical. The authors proposed that KT enhances sensory feedback and proprioception, allowing for more stable and pain-free movement. They concluded that KT is a valuable short-term intervention for athletes seeking rapid symptom relief, especially when combined with corrective exercises for long-term rehabilitation. Overall, the study highlighted KT's potential as a safe, supportive tool in managing PFPS symptoms^[20].
 13. Jiao *et al.* (2025) conducted a systematic review evaluating the therapeutic effects of kinesio taping (KT) on patellofemoral pain syndrome (PFPS). The review found consistent evidence supporting KT's ability to reduce pain intensity and enhance comfort during physical activities in the short term. The authors suggested that KT may modulate nociceptive input through cutaneous stimulation, thereby improving proprioceptive awareness and movement confidence.

While most studies indicated immediate analgesic benefits, evidence for long-term improvement in strength, range of motion, and joint stability remained inconsistent. The review emphasized that KT is a low-cost, safe, and easily applicable intervention, especially beneficial for young athletes who require pain management during activity. Nonetheless, it recommended combining KT with strengthening and flexibility exercises for more lasting outcomes^[12].

14. Crossley *et al.*, 2000 Crossley and colleagues investigated the effects of patellar taping on pain and function in patients with patellofemoral pain syndrome. Pain was assessed during functional tasks immediately after tape application. The study reported a significant immediate reduction in pain during activities such as squatting and stair ambulation. The authors emphasized that patellar taping alters pain perception through enhanced proprioceptive feedback and reduced nociceptive input. Although long-term benefits were not the primary focus, the immediate analgesic effect was considered clinically important. These findings are particularly relevant to young athletic populations, as short-term pain reduction can facilitate continued participation in sport and improve tolerance to rehabilitation exercises during the early stages of treatment^[1].
15. Lan *et al.* 2010 examined the immediate pain-relieving effects of patellar taping in individuals with patellofemoral pain syndrome and explored predictors of treatment response. Pain was measured during functional activities immediately after taping. The results indicated a significant immediate decrease in pain intensity following tape application. However, the magnitude of pain relief varied among individuals, with factors such as body mass index influencing responsiveness. The authors proposed that the immediate analgesic effect of taping is primarily related to neurosensory modulation rather than mechanical correction of patellar alignment. This study highlights the value of taping as a short-term pain management strategy, particularly useful for young athletes who require immediate symptom reduction to continue training or engage effectively in therapeutic exercise

programs^[21].

Methodology

- **Study design:** Literature review
- **Search engines:** PubMed, Google Scholar, Science Direct, Research Gate
- **Keywords:** Kinesio taping, patellofemoral pain syndrome, knee pain, young athletes, physical activity, exercise therapy, visual analogue scale.
- **Search year:** 2000-2025

Inclusion criteria

1. Full text articles in the English language, including only after 2000
2. **Population:** Young adults (aged 17-35), including athletes
3. **Intervention:** Including patellofemoral pain syndrome, pain management, young athletes, exercise therapy, kinesio taping, physical activity

Exclusion criteria

Studies involving children, the elderly, individuals with disabilities, or clinical populations were excluded. Reviews, editorials, and conference abstracts were also excluded.

Procedure

- **Phase 1: Article selection according to PRISMA guidelines**

This narrative review was conducted in alignment with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) statement. A manual search was also performed in the reference list, including articles and previously published reviews, in order to find articles.

- **Phase 2: Articles selected are screened based on inclusion and exclusion criteria**

The total number of articles screened based on inclusion and exclusion criteria and then selected for critical appraisal.

- **Phase 3: Critically appraising the articles**

The articles filtered are critically appraised with a score of more than 9 out of 11 considered high for view, where n=15 articles based on the level of evidence.

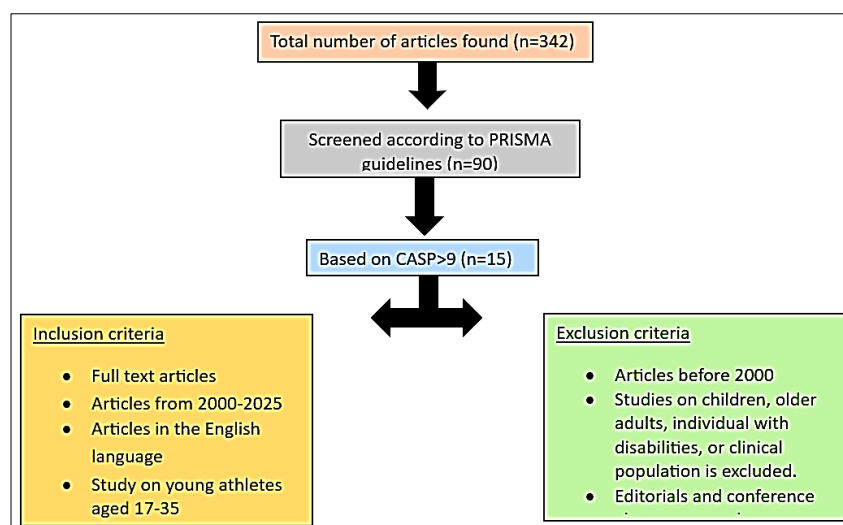


Figure 1: PRISMA flow diagram illustrating the literature search and study selection process

Results

Across multiple studies examining Kinesio Taping (KT) in individuals with patellofemoral pain syndrome (PFPS), consistent findings demonstrate immediate and clinically meaningful reductions in anterior knee pain along with improvements in functional performance. Participants commonly reported decreased pain during activities that aggravate PFPS, such as squatting, stair climbing, hopping, and other dynamic movements. Several studies showed significant reductions in pain intensity measured by the Visual Analogue Scale (VAS) immediately after KT application. Functional outcome measures, including the Kujala Anterior Knee Pain Scale, also indicated improved ability to perform weight-bearing knee flexion tasks with less discomfort. In addition to pain relief, KT was associated with short-term enhancements in neuromuscular performance, including improved balance, coordination, and lower-limb power. Improvements in dynamic balance tests, hop performance, and jump measures were accompanied by increased movement confidence and perceived stability. When KT was applied over the vastus medialis obliquus, further benefits in muscle activation and functional task performance were reported, suggesting improved quadriceps control and patellar support. Studies comparing KT combined with exercise therapy to exercise alone consistently found greater immediate pain reduction and functional improvement in the KT groups, supporting its role as an adjunct intervention.

Most studies emphasized that KT effects are predominantly acute and short-term, with limited evidence of lasting changes in muscle strength, joint mechanics, or long-term functional adaptation. However, KT consistently enhanced proprioceptive feedback and neuromuscular coordination without restricting movement. Overall, the collective evidence supports KT as a safe, non-invasive, and practical tool for short-term pain management and functional support in young, physically active individuals with PFPS, enabling continued participation in rehabilitation, training, and sport.

Discussion

The evidence from multiple studies suggests that Kinesio Taping (KT) provides meaningful short-term benefits for individuals with patellofemoral pain syndrome (PFPS), particularly among young and physically active populations^[10, 11]. The immediate reduction in anterior knee pain observed across studies is likely mediated through sensory and neuromuscular mechanisms rather than structural changes^[8, 14]. Cutaneous stimulation from KT may modulate nociceptive input, altering pain perception and allowing participants to perform functional tasks with greater comfort^[9, 18]. Enhanced proprioceptive feedback appears to improve movement awareness and coordination, enabling athletes to maintain balance and stability during activities that typically provoke symptoms^[15, 16]. The improvements in functional performance, such as vertical jumps, single-leg hops, squatting, and stair climbing, indicate that KT supports both confidence and neuromuscular control, which are critical for safe participation in sport^[10, 11, 13].

KT's application over specific musculature, particularly the vastus medialis obliquus, may further optimize quadriceps activation, contributing to improved patellar tracking and load distribution during dynamic movements^[16, 18]. These findings underscore KT's role as a non-restrictive, supportive intervention that complements, rather than

replaces, traditional exercise therapy. When combined with strengthening, movement retraining, and load management, KT enhances the overall efficacy of conservative PFPS management by providing immediate symptom relief that facilitates continued participation in training and competition^[4, 5]. This acute improvement is particularly valuable for athletes who require uninterrupted engagement in sport, as it allows for the maintenance of performance while underlying biomechanical or muscular imbalances are addressed through rehabilitation^[6, 9].

Despite consistent short-term benefits, long-term effects of KT on muscle strength, joint alignment, proprioception, and functional recovery remain inconclusive^[12, 19]. Most studies reported minimal objective changes in structural or biomechanical outcomes, suggesting that KT's primary advantage lies in its analgesic and proprioceptive effects rather than in correcting underlying dysfunctions^[8, 14]. Therefore, clinicians should consider KT as a temporary supportive measure that enables safe movement and functional engagement, while emphasizing the importance of comprehensive rehabilitation for lasting outcomes^[4, 5]. Additionally, KT's non-invasive and easily applied nature makes it a practical tool in both clinical and athletic settings, requiring minimal training while providing immediate benefits^[8].

Overall, the integration of KT into PFPS management aligns with a multimodal, individualized approach, addressing pain, functional limitations, and participation goals. By reducing discomfort and enhancing confidence during movement, KT helps bridge the gap between symptom management and active rehabilitation, allowing athletes to engage effectively in training and sport. The current evidence highlights its role as a short-term adjunct that supports functional performance and neuromuscular control, emphasizing the need for continued research into optimal application protocols, long-term efficacy, and combined interventions for sustained improvements in PFPS management^[4, 15].

Conclusion

The collective evidence indicates that Kinesio Taping (KT) is an effective short-term intervention for managing patellofemoral pain syndrome (PFPS) in young and physically active individuals. Multiple studies report immediate reductions in anterior knee pain during functional activities such as squatting, stair climbing, and sport-specific movements. KT also enhances proprioceptive input, neuromuscular control, and movement confidence, leading to improvements in functional performance, including balance and hop tasks. Owing to its non-restrictive, safe, and easily applied nature, KT is a practical adjunct in both clinical and athletic settings, particularly for athletes who need to maintain training and competition. However, evidence suggests that KT does not produce lasting changes in strength, biomechanics, or patellar alignment. Therefore, KT should be used as a supportive modality within a multimodal rehabilitation approach, alongside exercise therapy, movement retraining, and load management, rather than as a standalone treatment.

Limitation and future consideration

The present review highlights several limitations that may affect interpretation of the findings. Many included studies had small and heterogeneous samples, limiting

generalizability. Variations in Kinesio taping techniques, application duration, and tape tension further restrict standardization. Most studies emphasized short-term outcomes, while long-term effects remain unclear. Future research should focus on larger, well-designed randomized controlled trials using standardized taping protocols and extended follow-up periods. Incorporating biomechanical and electromyographic analyses may also improve understanding of the mechanisms underlying Kinesio taping in patellofemoral pain syndrome.

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