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Injury Patterns and Physiotherapeutic Management Strategies in Pickleball: A Scoping Review

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Abstract
Pickleball has recently emerged as the fastest-growing sport in the United States and throughout the world, with participation increasing by more than 150%, particularly among those 35 and older. Similar to racket sports such as tennis, but customized to pickleball's compact court and hybrid motions, this quick growth is connected with an increase in injury complaints, primarily from emergency departments and sports medicine clinics. A scoping investigation is necessary to map the data and identify gaps in the existing literature, which is fragmented and lacks a complete synthesis of injury epidemiology and rehabilitation techniques. This review aims to assess the injury pattern and physiotherapeutic management strategies in pickleball. It analyses and explores the clinical relevance in the injury pattern and management strategies. A comprehensive literature review in accordance with PRISMA-ScR was conducted using electronic databases from PubMed, Web of Science and Google scholar, focusing on full text articles from 2018-2025. Pickleball injuries are on the rise, with a 68.5% yearly frequency, largely resulting in knee, thigh, and shoulder strains from faulty mechanics or overexertion. While most instances are treated non-surgically with physical therapy and bracing, return-to-play rates remain poor, despite clinical improvement. However, preventive physiotherapy and balance training have shown effective in lowering these risks and enhancing athlete stability. Physiotherapy effectively addresses pickleball injuries through phased, sport-specific interventions, but prospective trials are needed for prevention standardization.

Keywords: *Pickleball, sports injuries, injury patterns, physiotherapy, rehabilitation, lower overuse injuries, prevention strategies, return-to-play.*

1. Introduction
Pickleball is quickly becoming one of the world's most popular sports, primarily in the United States, and emerging sports in other nations. with a significant increase in participation among various age groups, especially those aged 35 and older1. Pickleball is considered a combination of tennis, ping pong and badminton. Pickleball combines tennis, ping pong, and badminton. Pickleball players must constantly adjust their weight and orientation based on the ball's speed, spin, and trajectory. Those movements maintaining balance and reacting quickly requires synchronized motions from the entire body1. Injury prevalence varies with age, gender, and type of injury. Overall, the 12-month injury prevalence for all-complaint injuries was sixty-eight percentage, with male players seventy percentage having a greater prevalence than female players seventy percentage 2. Overall, the most common injury site was the knee twenty-nine percentage, followed by the thigh, leg, or foot twenty-seven percentage and the shoulder twenty-two percentage. The age of injury ranged from 12 to 82 years, with a median of 65 years [1]. The most common injury category was soft tissue strain or rupture (n = 296; forty-eight percentage). Pickleball needs a large amount of physical activity, such as sprinting (acceleration and deceleration), leaping, and rapid changes in movement direction. All of these multi-directional motions show the body to axial and torsional stress, increasing the risk of injury. While the sport's quick growth is most visible

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among younger age groups, pickleball has gained widespread popularity across older age groups due to its cardiovascular advantages, accessibility, ease of learning, and flexibility across fitness/activity levels 2'3. Conservative treatment includes steroid injections (11, 4.2%), physical therapy (92, 35.7%), and braces, splints, or orthotics (147, 57.1%), with others (2.7%) receiving various conservative treatment approaches 4. With the growing injury burden, the role of Physiotherapy has become crucial in managing these conditions. Lower extremity muscular groups that can be frequently strained include the hamstrings, quadriceps, hip flexors and adductors, and calf. Many strains can cause a partial tear of the muscle body or tendon. In Physiotherapy management for sprain and strain consisting of RICE protocol (rest, ice compression, elevation), Exercises for eccentric loading and targeted tendon stretching. A comprehensive review makes it necessary to thoroughly map the current research, identify prevalent injury patterns, and assess physiotherapeutic interventions in pickleball players. This will help in developing evidence informed clinical guidelines, improving patient outcomes, and guiding future research in this emerging area 5'6. This review aims to assess the injury pattern and physiotherapeutic management strategies in pickleball. It analyses and explores the clinical relevance in the injury pattern and management strategies [2].

2. Method

2.1.Literature Search Strategy

A comprehensive literature search was conducted using electronic databases in PubMed, Google Scholar, ScienceDirect and Research gate. The search focused on full-text articles published in English between 2018 till 2025. Relevant keywords used in the search included: "Pickleball", "sports injuries" "injury patterns", "physiotherapy", "rehabilitation", "lower overuse injuries", "prevention strategies", "return-to-play".

2.2.Eligibility criteria

Articles that follow certain requirements were included: a) Studies conducted between 2018 to 2025; b) Randomized controlled trial (RCTs), cross sectional studies, whereas exclusion criteria were reviews, meta-analysis, book notes, conference proceedings, thesis or dissertations, letters and abstracts. Two independent reviewers checked the records that were found using search approach for eligibility. In order to find pertinent research through data bases in the first stage the PRISMA- SCR (Preferred reporting items for systematic reviews and meta-analyses for scoping reviews) flow chart was utilized. A total of 23 articles that met the study criteria as represented in table 1, were selected for this scoping review shown in Figure 1.

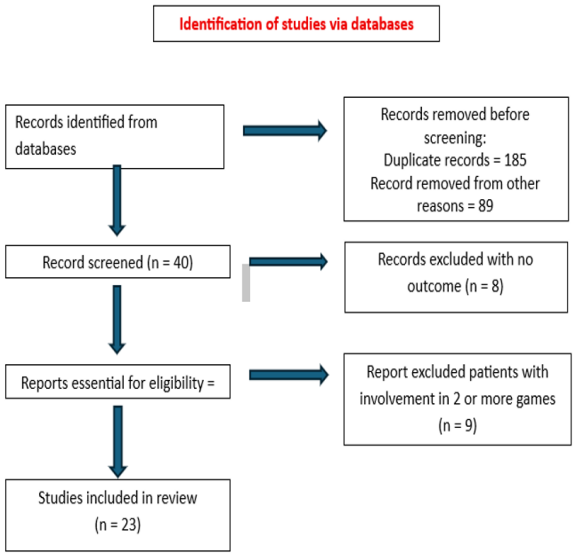

Figure 1 PRISMA SR- Flowchart

3. Results and Discussion

3.1. Results

The result of this scoping review emphasizes a notable and growing number of injuries linked to pickle ball with a twelve months prevalence rate of sixty-eight percentage, somewhat higher among males compared to female the knee is the most frequently injured area followed by the lower leg and the shoulder with muscle strains and tears being the most common type of soft tissue injuries [3]. Lower limb injuries including ankle sprain and issues with Achilles tendon are frequently encountered and are often linked to inadequate fitness, incorrect movement pattern and excessive participation in sports. The

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majority of injuries are treated conservatively, with physiotherapy, orthotic devices, and periodic steroid injections being the most common. Surgery is not required. Rehabilitation focuses on pain-relief, stretching, strengthening, and neuromuscular training, but the rate of return to play remains low. Preventing physiotherapy activities have produced better outcomes in term of balance.

3.2. Discussion

Pickleball sport has gained popularity from past few years. Along with popularity, high prevalence of injuries are also reported. National surveillance studies reporting thousands of incidents per year and a steep increase notable after 2014 [4]. This shows a steep rise in participation in these particular sports among older individuals. Finding of this review has documented lower extremity injuries are most common including ankle sprains, knee injuries and Achilles tendon rupture. Finding of this study is in line with results of study conducted by Opera OA et al. (2024)6 approximately 22 percent of lower limb injuries, whereas Achilles tendon injuries cause considerable functional limitations. Due to nature of this sport, quick lateral movements, turning, and sudden deceleration, lower extremity injuries are common [5]. Overuse injuries, especially among recreational and new players is one of the contributing factors. Muscles and tendon injuries accounts for 31%, ankle sprain up to 28%. Inadequate trainings, poor knowledge of biomechanics and, fatigue are most common causes for these injuries.3,6 Physiotherapy management which includes Pain management, progressive strengthening, neuromuscular training, and functional retraining are proven to be effective techniques. Neuromuscular training gains in balance and gait, bolstering its significance in fall prevention and functional development. Comprehensive physiotherapy management is proven to be effective to reduce chances of injury and increase return to play rate as well. The finding of this study is aligned with Betsy Myers et al (2025)3’7 who conducted on senior Pickleball players by incorporating 10 weeks comprehensive program, they reported 25% reduction on falls, boost in confidence [6-8]

Clinical recommendations from Vitale K et al (2020)8, highlight the significance of sport specific physiotherapy care, which includes patient education and history check, implementation of proper warm-up and stretching routine, strength training (especially hip and lower limb), neuromuscular control, balance training, biomechanical correction, technical instruction, and load control are critical for lowering injury risk, particularly among older and inexperienced players.

Conclusion

This study concludes that Physiotherapy's multimodal rehab pain management, strengthening, neuromuscular training and preventative strength, balance programs are used to treat lower limb injuries caused by pickleball's popularity among older persons, such as sprains and strains from dynamic play. Sport-specific research is currently lacking, hence prospective RCTs and regular monitoring are needed to provide evidence-based preventative suggestions for future study.

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