Proceedings of the 4th International Conference on Global Politics and Socio-Humanities
DOI: 10.54254/2753-7048/2026.33267

Sports Rehabilitation Nursing for Patients with Meniscus Tear Following Table Tennis Injury

Wenbo Wang

Institute of Nursing, Henan Medical University, Zhengzhou, China
WWB15565718682@outlook.com

Abstract. Meniscus tear is a kind of injury where the fibrous cartilage inside the knee joint is ruptured. In recent years, it has become one of the major injuries affecting the sports careers of athletes in the table tennis field. This article first briefly reviews the clinical manifestations and diagnostic methods of meniscus tears of the knee joint. Then, starting from the two most basic technical movements of table tennis - forehand and backhand techniques, it analyzes in detail the causes of meniscus tears resulting from this sport. Finally, it conducts corresponding rehabilitation nursing analyses specifically for both simple or degenerative meniscus tears and the situation after meniscus resection surgery, aiming to provide theoretical support and practical guidance for nursing staff in the rehabilitation process of meniscus tears caused by table tennis. Additionally, this article strongly emphasizes the importance of proper rehabilitation for a successful and safe return to table tennis.

Keywords: Nurse, Exercise Rehabilitation, Meniscus tear

1. Introduction

Meniscus tear is a disease characterized by the rupture of the C-shaped (medial) and O-shaped (lateral) fibrocartilaginous structures within the knee joint. It is often caused by rotational force applied to the knee joint in a semi-flexed position. It is commonly seen in sports injuries and frequently occurs in adults over 30 years old, thus attracting widespread attention [1]. Maintain the knee joint in a semi-flexed position - this anatomically vulnerable area - and frequently perform technical movements such as sudden stops and starts, twisting, and extension, which causes the meniscus of the knee joint to be highly susceptible to wear and tear. In severe cases, it can lead to rupture [2]. Previous evidence-based investigation studies have shown that among the 7,800 athletes participating in the survey, the proportion of meniscus injuries or tears among table tennis players was 7%; what is even more alarming is that 64% of these injuries occurred during competitions [3]. As a common but relatively serious knee joint disease, meniscus tear can to some extent affect the athletic performance of athletes. In severe cases, it can even end an athlete's career. Moreover, meniscus tear can reduce the stability of the knee joint and increase the risk of developing arthritis.

The current care for knee joint injuries caused by sports has received much attention from various sources. Some valuable methods and suggestions have been provided mainly for sports with physical confrontation, such as football and basketball. However, for the care of knee meniscus

© 2026 The Authors. This is an open access article distributed under the terms of the Creative Commons Attribution License 4.0 (https://creativecommons.org/licenses/by/4.0/).

DOI: 10.54254/2753-7048/2026.33267

injuries resulting from racket sports (especially table tennis), there is still a lack of systematic investigations and comprehensive rehabilitation plans. Although there have been relevant studies proposing physical rehabilitation programs such as wearing protective gear and using braces, combined with weight-bearing, strength training and fitness exercises, there are still deficiencies in the description of these programs in terms of nursing responsibilities [4]. Therefore, this article aims to develop a scientifically sound and feasible rehabilitation nursing plan by covering three aspects: the manifestations and diagnosis of meniscus tears, the mechanism by which table tennis causes meniscus tears, and the post-treatment care for meniscus tears. This will reduce the impact of meniscus tears on the injured population, promote the integration of sports and nursing, and thereby drive the healthy and sustainable development of table tennis.

2. Clinical manifestations and diagnosis of meniscal tear

2.1. Clinical manifestations

Meniscus tear refers to the damage or rupture of the fibrous cartilage that acts as a buffer within the knee joint. This is a common type of knee joint injury. After tearing, the structure of the meniscus is damaged, which can cause pain (especially when the joint bears weight or twists), swelling (fluid accumulation occurs a few hours after the injury), locking of the torn part that causes the joint to be stuck and unable to fully straighten or bend, clicking or instability (an abnormal sound inside the knee or a feeling of "slipping" when moving) and other symptoms. When athletes take lateral steps to land during their daily training and competitions, they will feel weakness and lack of support in their knee joints. After a lot of training, their knees may become swollen, and they will be unable to perform specific specialized movements (such as large-angle lunge and crossover steps, etc.). These are all specific manifestations of meniscus tears in the field of table tennis. This manifestation will gradually become stronger as the degree of meniscus tear deepens and worsens and may even be accompanied by varying degrees of pain.

2.2. Common diagnoses

In the clinical diagnosis of meniscus tears, the most widely used and frequently employed imaging method is undoubtedly Magnetic Resonance Imaging (MRI). With the advancement of technology, MRI + PDWI-SPAIR has shown excellent results in diagnosing meniscus tears. Its sensitivity is 89.3%, accuracy is 88.4%, positive predictive value is 95.1%, and negative predictive value is 72.0%.The sensitivity, specificity and accuracy of MRI + PDWI-SPAIR are all relatively high, which can provide important evidence for the clinical diagnosis of meniscus tear [5]. Although the MRI + PDWI-SPAIR method has extremely high accuracy and positive predictive value, relying solely on imaging examinations still has limitations. In contrast, the comprehensive diagnosis based on clinical history and comprehensive examination is more precise for the doctor during the diagnosis process, as it provides more detailed information about the patient's condition and a more comprehensive set of examination results. Therefore, in the clinical diagnosis of meniscus tears, a more precise approach should be to combine the traditional history collection and physical examination with the MRI + PDWI-SPAIR imaging technology. The two complement each other and jointly enhance the accuracy and reliability of the diagnosis.

DOI: 10.54254/2753-7048/2026.33267

3. Primary mechanism of meniscus tear caused by table tennis

In table tennis, rapid starts, sudden stops, lateral sliding movements and single-leg twisting actions occur frequently. The knee joints are subjected to repeated rotational shear forces and axial loads. Studies have shown that among the injuries suffered by table tennis players, knee joint injuries account for as high as 16%, ranking second among all injuries. And meniscus tear is the most severe condition of knee joint injuries [6].

3.1. Backhand stroke

When making a backhand shot or attempting to block a wide-angle incoming ball, the medial meniscus is prone to being compressed and torn due to the internal rotation of the femur, while the lateral meniscus is more likely to be injured due to sudden external rotation stress when in a bent-knee position. Such minor but cumulative injuries are often overlooked. In the early stages, they only manifest as intermittent dull pain and mild swelling, which can easily be misdiagnosed as fatigue-related discomfort. Such symptoms of fatigue and discomfort are usually the milder manifestations of a meniscus injury. If no intervention and treatment are carried out promptly, over time, the condition will progress to a meniscus tear. Furthermore, in the current era of continuous technological advancements, the backhand technique has gradually shifted from an auxiliary skill in the early 21st century to a mainstream scoring method. With the emergence and improvement of new backhand techniques such as twisting and rapid slicing, the backhand has become more powerful while also imposing a greater burden on our bodies: the technical movements become more coordinated, the force application is smoother, which requires athletes to constantly push and rotate their legs and reset them. The rotation amplitude far exceeds the range that the knees can bear, causing knee injuries, especially to the meniscus, to accumulate over time. Eventually, this may lead to a meniscus tear.

3.2. Forehand stroke

The forehand stroke, as a traditional fundamental technique in table tennis, has a history of over 90 years in the development of the sport. Even the later emergence of the reverse-swing forehand and the cross-handed forehand did not shake the dominant position of the forehand technique in the table tennis world, which features more smooth power generation and more coordinated movements. It is precisely because of the more fluid force application in the forehand technique that during the hitting process, the knee will rotate to a greater extent and at the same time receive a shear force from the bottom left to the top right (for right-handed players, it is the opposite for left-handed players). The damage to the meniscus of the knee is more severe than that of the backhand, and it is also more likely to cause a tear of the meniscus. During the process of hitting a topspin ball with the forehand stroke, the joints used by the male athlete and the female athlete are not exactly the same. Among them, male athletes tend to have problems with their knee joints and hip joints. The research indicates that the possible reason might be that the flexor muscle groups in the knees and hips of male athletes are stronger [7]. This may result in higher quality of the male athletes' returns, but at the same time, due to the technical movements, the knee joints will repeatedly rotate, which is more likely to cause damage to the meniscus. In severe cases, it can even lead to a meniscus tear.

DOI: 10.54254/2753-7048/2026.33267

4. Nursing cre after meniscus tear

In clinical treatment, the location and severity of meniscus tears vary. Different degrees and different locations of meniscus tears require different treatment plans in clinical practice. Therefore, it is particularly important to provide corresponding and appropriate care based on different diseases.

4.1. Nursing protocol for simple or degenerative meniscal tear

For patients with simple or degenerative meniscus tears, a conservative treatment plan lasting 3 to 7 weeks is a reliable approach. During the period of conservative treatment, the relevant nursing staff not only need to take simple protective measures such as using protective gear and providing corresponding support tools, but also need to design corresponding exercise rehabilitation programs for the patients (note: the exercises should be gradually adjusted according to the patient's tolerance level).According to relevant research, strengthening exercises for the quadriceps muscles at the corresponding frequency (lasting for four weeks, three times a week) can effectively enhance the knee joint function of patients by 35% [8].

A clinical study compared the efficacy of arthroscopic meniscus repair surgery and rehabilitation training in treating middle-aged degenerative medial meniscus tears. A total of 90 patients were included (48 in the repair group and 42 in the rehabilitation group).The results showed that the KOOS score of the shaping group at 3 months after surgery (64.3 ± 14.39) was significantly higher than that of the rehabilitation group (44.65 ± 1.66), with better improvement in early symptoms and functions, especially in terms of pain and daily living ability. However, there was no significant difference in the KOOS scores between the two groups 2 years after the operation (71.2 ± 14.37 vs 72.7 ± 12.15). This indicates that arthroscopic meniscus repair surgery is superior to rehabilitation therapy in treating simple degenerative medial meniscus tears in terms of short-term symptom and functional improvement. It usually achieves a more significant improvement, while rehabilitation therapy often fails to achieve satisfactory short-term clinical outcome improvement [9].

There is also a 5-year multi-center randomized non-inferiority clinical trial involving 321 patients aged 45-70 with degenerative meniscus tears. The study compares the effects of arthroscopic partial meniscectomy and 16 sessions of physical therapy on patients' self-reported knee joint function (IKDC score, non-inferiority threshold of 11 points) and the progression of knee osteoarthritis. The results showed that at the 5-year follow-up, the IKDC score improved by 29.6 points in the surgical group and by 25.1 points in the physical therapy group. The crude difference between the groups was 3.5 points (95% CI 0.7 - 6.3), which did not exceed the non-inferiority threshold; the rates of radiological osteoarthritis progression were similar in the two groups, and there were no significant differences in secondary outcomes (pain, quality of life) [10]. The physical therapy for promoting movement is expected to be no worse than surgery within five years and should be the preferred treatment option for degenerative meniscus tears.

4.2. Nursing protocol for rapid recovery after meniscectomy

Due to its unique structure and location, the removal of the meniscus often leads to decreased joint stability, limited range of motion, and recurrent swelling in patients, and may further progress to Osteoarthritis (OA).OA also known as degenerative arthritis, is a chronic joint disease characterized by the degeneration of joint cartilage and secondary bone hyperplasia. Currently, there is no cure for this condition. Therefore, in order to prevent the occurrence of osteoarthritis after meniscus

DOI: 10.54254/2753-7048/2026.33267

resection and to facilitate the rapid recovery of patients after surgery, implementing a scientific and appropriate nursing plan is of great significance.

4.2.1. Physical rehabilitation nursing program

Hanna et al. conducted an 8-week rehabilitation program for 90 football players who had undergone meniscus removal (with an average age of 22-23 years old). The program progressed from crutch-assisted walking to normal gait, followed by progressive strength, balance, and range-of-motion training to achieve full athletic recovery. The statistical results show that all 90 athletes who participated in the rehabilitation care program were able to fully engage in the sports competitions [11]. The same applies to patients engaged in table tennis, who mainly perform rapid stops and starts as well as lateral movements. Such patients can also adopt this 8-week rehabilitation care plan. As a result, table tennis players who have undergone meniscus removal surgery can return to training and competitions in an excellent state and with excellent performance, minimizing the impact of injuries on their careers as much as possible.

4.2.2. Dual comprehensive nursing model of "hospital + home"

To adapt to the development trend of rehabilitation medicine, in 2025, the European Union and the United States jointly released the "Consensus on Meniscus Rehabilitation 2024: The ESSKA-AASPT Initiative". The first part of the consensus is "Rehabilitation Management after Meniscus Surgery (Meniscus Deletion, Repair and Reconstruction)". It covers various surgical procedures such as meniscus deletion, repair and reconstruction. Regarding meniscectomy, the consensus states that the most common postoperative problems include limited knee joint movement, fluid accumulation, pain, and weakness of the quadriceps muscle. Among them, weakness of the quadriceps muscle is regarded as the most urgent obstacle that needs to be addressed first. Clinically, it is recommended to use Neuromuscular Electrical Stimulation (NMES), open kinetic chain and Closed Kinetic Chain (CKC) training to enhance muscle strength. In the early postoperative period, simple Full-weight-bearing (FWB) related training can also be conducted at home [12]. However, it is worth noting that during the postoperative treatment, the nursing staff should, based on the actual condition of the patient, decide whether to provide the patient with appropriate protective gear for protection. Based on this consensus, for the post-operative rehabilitation of table tennis players, a dual comprehensive care model combining "hospital and home" can be introduced. Some simple care procedures can be transferred to the training venue - the athlete's second home, making the rehabilitation and care process more convenient for the athletes. Moreover, by enabling the athletes to recover in a familiar environment, the effectiveness of the rehabilitation care can be further enhanced.

4.2.3. Therapeutic nursing care for osteoarthritis of the knee

Knee osteoarthritis (OA), as a chronic disease that may further deteriorate after meniscectomy, not only imposes a burden on the social healthcare system but also brings a devastating impact on the careers of table tennis players. Therefore, the treatment and care of knee osteoarthritis must be given high priority. The research summary by Lucas, Tania and Timothyde indicates that, under the premise of providing appropriate psychological care for patients, conducting moderate to high-intensity muscle strengthening exercises for 150 minutes per week or 2 days per week, combined with traditional Chinese medicine's cold and heat therapy, manual massage, taping, acupuncture, and

DOI: 10.54254/2753-7048/2026.33267

Western medicine's therapeutic ultrasound, laser, and electrical stimulation therapies, along with pharmacological methods (such as non-steroidal anti-inflammatory drugs, opioids, and nutritional supplements), can achieve a relatively good therapeutic effect on knee joint osteoarthritis caused by exercise. If this comprehensive treatment and care method fails to produce significant effects, then in clinical practice, the final method for treating osteoarthritis - surgery - can be adopted [13].

It is important to note that all of the aforementioned methods can only alleviate and reduce the discomfort and harm caused by knee osteoarthritis. Currently, there is no cure for this disease. Therefore, when caring for patients who have undergone meniscus resection, nursing staff should continuously monitor the condition of the patients' knee joints, strive to detect and treat problems early, minimize the impact of osteoarthritis on the body, and thereby help table tennis players return to training and competition in good condition as much as possible.

5. Conclusion

In conclusion, meniscus tear, as a relatively common injury in table tennis and one that significantly affects the career of table tennis players, has already attracted widespread attention. Moreover, the involvement of nursing staff to assist in the completion of corresponding rehabilitation treatment has also been widely recognized. However, there are still many deficiencies in the field of table tennis regarding meniscus tears: there is a lack of complete and highly recognized efficacy evaluation standards; the classification of meniscus tears is not yet clear; due to the complex pathogenesis of meniscus tears, the corresponding treatment methods are not clear; there is a lack of relevant case samples of meniscus tears in table tennis players, and the specificity of the samples needs to be improved.

In response to the above issues, in future research on the rehabilitation and care of meniscus tears caused by table tennis, the following aspects should be given priority for improvement: formulate a complete and reliable evaluation standard for therapeutic effects and conduct detailed classification of meniscus tears based on different causative factors and injury sites. Clarify the corresponding treatment plans for meniscus tears caused by different modes of onset. The focus is on increasing the number of case samples related to meniscus tears caused by playing table tennis and conducting timely follow-ups on the cases after treatment and care to prevent the loss of the cases.

In the future, research should focus on highlighting the significant role of nursing staff in the rehabilitation treatment of athletes' injuries, promoting the effective integration of sports, rehabilitation and nursing, and facilitating the joint progress and development of all three fields.

References

[1] Wu Haiyan. "Comprehensive Prevention and Treatment of Meniscal Tear." Health & Beauty. 06(2025): 21-23.
[2] Zhou Xingdong et al. "Research on Knee Joint Injury Mechanisms in Table Tennis Players — Analysis of Knee Joint Load Characteristics of Three Common Footwork Styles." China Sports Science and Technology, vol. 56, no. 6, June 2020, pp. 62-67. http: //dx.chinadoi.cn/10.16470/j.csst.2020026.
[3] Lambert, Christophe et al. "Epidemiology of injuries in racket sports: a cross-sectional study of specific injuries within one olympic cycle." BMC sports science, medicine & rehabilitation vol. 17, 1 95. 25 Apr. 2025, doi: 10.1186/s13102-025-01150-1
[4] Wedge, Christopher et al. "Rehabilitation and Return to Play Following Meniscus Repair." Sports medicine and arthroscopy review vol. 29, 3 (2021): 173-179. doi: 10.1097/JSA.0000000000000303
[5] Cui Yan. "Application of MRI PDWI-SPAIR in the diagnosis of meniscus tears." Journal of Henan Surgery, vol. 29, no. 4, July 2023, pp. 148-149.
[6] Biz, Carlo et al. "Epidemiology and Risk Factors of Table-Tennis-Related Injuries: Findings from a Scoping Review of the Literature." Medicina (Kaunas, Lithuania) vol. 58, 5 572. 21 Apr. 2022, doi:

DOI: 10.54254/2753-7048/2026.33267

10.3390/medicina58050572

[7] He, Yuqi et al. "Lower Limb Biomechanics during the Topspin Forehand in Table Tennis: A Systemic Review." Bioengineering (Basel, Switzerland) vol. 9, 8 336. 25 Jul. 2022, doi: 10.3390/bioengineering9080336

[8] Mangione KK, McCully K, Gloviak A, Lefebvre I, Hofmann M, Craik R. The effects of high-intensity and low-intensity cycle ergometry in older adults with knee osteoarthritis. J Gerontol A Biol Sci Med Sci. 1999 Apr; 54(4): M184-90. doi: 10.1093/gerona/54.4.m184. PMID: 10219009.

[9] Han Weifeng et al. "Comparison of efficacy between arthroscopic meniscectomy and rehabilitation training in the treatment of middle-aged degenerative medial meniscus tears." Chinese Journal of Injury and Repair (Electronic Edition), vol. 19, no. 2, Jan. 2024, pp. 134-140. http: //dx.chinadoi.cn/10.3877/cma.j.issn.1673-9450.2024.02.007.

[10] Noorduyn JCA, van de Graaf VA, Willigenburg NW, Scholten-Peeters GGM, Kret EJ, van Dijk RA, Buchbinder R, Hawker GA, Coppieters MW, Poolman RW; ESCAPE Research Group. Effect of Physical Therapy vs Arthroscopic Partial Meniscectomy in People With Degenerative Meniscal Tears: Five-Year Follow-up of the ESCAPE Randomized Clinical Trial. JAMA Netw Open. 2022 Jul 1; 5(7): e2220394

[11] Hanna T, Smith NP, Sebastianelli WJ. Treatment, Return to Play, and Performance Following Meniscus Surgery. Curr Rev Musculoskelet Med. 2022 Jun; 15(3): 157-169. doi: 10.1007/s12178-022-09754-7. Epub 2022 Apr 25. Erratum in: Curr Rev Musculoskelet Med. 2024 Oct; 17(10): 435. doi: 10.1007/s12178-022-09777-0. PMID: 35467166; PMCID: PMC9107559.

[12] Pujol N, Giordano AO, Wong SE, Beaufils P, Monllau JC, Arhos EK, Becker R, Della Villa F, Brett Goodloe J, Irrgang JJ, Klugarova J, Klosterman EL, Królikowska A, Krych AJ, LaPrade RF, Manske R, van Melick N, Monson JK, Ostojic M, Paterno MV, Piontek T, Perelli S, Rambaud A, Robinson J, Schmitt LC, Senorski EH, Snaebjornsson T, Tagliero AJ, Benjamin Ma C, Prill R. The formal EU-US Meniscus Rehabilitation 2024 Consensus: An ESSKA-AOSSM-AASPT initiative. Part I-Rehabilitation management after meniscus surgery (meniscectomy, repair and reconstruction). Knee Surg Sports Traumatol Arthrosc. 2025 Aug; 33(8): 3002-3013. doi: 10.1002/ksa.12674. Epub 2025 May 12. PMID: 40353298; PMCID: PMC12310086.

[13] Dantas LO, Salvini TF, McAlindon TE. Knee osteoarthritis: key treatments and implications for physical therapy. Braz J Phys Ther. 2021 Mar-Apr; 25(2): 135-146. doi: 10.1016/j.bjpt.2020.08.004. Epub 2020 Sep 8. PMID: 33262080; PMCID: PMC7990728.