



# Insights into Meniscal Injuries Among Young Football Athletes: A Scoping Review

Riki Likardo<sup>1</sup>, Hendri Neldi<sup>1</sup>, Roma Irawan<sup>1</sup>, Willadi Rasyid<sup>1</sup>, Dally Rahman<sup>2\*</sup>, Yovhandra Ockta<sup>1</sup>, Firunika Intan Cahyani<sup>1</sup>

<sup>1</sup>Faculty of Sports Sciences, Universitas Negeri Padang, Padang, Indonesia

<sup>2</sup>Faculty of Nursing, Universitas Andalas, Padang, Indonesia

Received: October 27, 2023

Revised: December 17, 2023

Accepted: December 25, 2023

Published: December 31, 2023

Corresponding Author:

Dally Rahman

[dallyrahman@nrs.unand.ac.id](mailto:dallyrahman@nrs.unand.ac.id)

DOI: [10.29303/jppipa.v9iSpecialIssue.7761](https://doi.org/10.29303/jppipa.v9iSpecialIssue.7761)

© 2024 The Authors. This open access article is distributed under a (CC-BY License)



**Abstract:** This comprehensive literature review delves into the prevalence, risk factors, management strategies, and outcomes related to meniscal injuries, particularly focusing on young football athletes. Drawing from eight scholarly articles, it covers various aspects of meniscal injuries, including incidence rates, treatment options, rehabilitation techniques, and long-term implications. Meniscal injuries are highlighted as significant in sports, notably in high-mobility activities like football, where sudden movements and twisting motions increase the likelihood of such injuries. The review explores common treatment methods such as meniscal repair, transplantation, and partial meniscectomy, along with tailored rehabilitation approaches aimed at facilitating athletes' return to play. Research indicates that while meniscal injuries are common among athletes, particularly in contact sports like football, early detection and proper treatment are crucial to mitigate lasting effects. Understanding knee joint anatomy and biomechanics is emphasized, along with the implementation of effective rehabilitation protocols to enhance joint stability and prevent re-injury. In summary, this literature review offers valuable insights into the multifaceted nature of meniscal injuries among young football athletes. By synthesizing evidence from diverse sources, it contributes to a deeper understanding of the epidemiology, management, and rehabilitation of meniscal injuries, informing clinical practices and guiding future research in sports medicine.

**Keywords:** Football athletes; Meniscal injuries; Rehabilitation strategies; Young Football

## Introduction

The participation of adolescents in sports has dramatically increased (Aira et al., 2021; Howie et al., 2020; Strandbu et al., 2020). Physical activity plays a crucial role in the physical and emotional well-being of adolescents. Over the past 15 to 20 years, there has been an increase in youth sports participation, providing numerous health benefits, including character development such as confidence and team spirit, along with socialization among peers. However, the involvement of adolescents and children in professional sports has led to an increase in trauma incidents, particularly knee injuries, underscoring the need for

awareness of injuries, especially knee injuries, among the young population. (Herdea et al., 2022). One of the most common injuries among football players is meniscus injury.

Meniscal injury is one of the most common orthopedic issues worldwide. Research indicates that stenosis in the intercondylar notch of the femur and small medial tibial spine are associated with an increased risk of meniscal injury. (Wang et al., 2022). Meniscal injuries commonly occur in sports that involve twisting and sudden changes in direction, such as football, basketball, handball, and skiing. (Sari & Kurniawati, 2022). The common mechanism of meniscal injury involves a varus or valgus force directed at the

### How to Cite:

Likardo, R., Neldi, H., Irawan, R., Rasyid, W., Rahman, D., Ockta, Y., & Cahyani, F. I. (2023). Insights into Meniscal Injuries Among Young Football Athletes: A Scoping Review. *Jurnal Penelitian Pendidikan IPA*, 9(Special Issue), 198–205. <https://doi.org/10.29303/jppipa.v9iSpecialIssue.7761>

flexed knee while the foot is planted, and the femur is rotated inward. The valgus force applied to the flexed knee can result in a tear of the medial meniscus. (Patel et al., 2017). On research (Gee et al., 2020), Meniscal injuries often occur in the elderly population. Horizontal and complex tears are the most common and are found within the spectrum of osteoarthritis. Epidemiological data on high school and collegiate athletes indicate that football, basketball, and wrestling have incidences in both youth and adults. While tears more frequently manifest symptoms in physically active younger patients, these symptoms are more commonly seen in elderly adults, affecting approximately 31% of the largest population of meniscal injury cases. (Smoak et al., 2020).

The concomitance of uncertain cartilage degeneration with meniscal injury can lead to an increase in mesenchymal stem cells within the synovial fluid. If synovial fluid is sequentially collected immediately after a meniscal injury, the number of mesenchymal stem cells in the synovial fluid may initially increase due to knee bleeding, decrease after bleeding cessation, then continue to increase along with cartilage degeneration due to meniscal dysfunction. (Matsukura et al., 2014). The meniscus plays a crucial role in shock absorption and load transmission during walking or other activities. It is also responsible for providing stability to the knee joint, limiting flexion and extension of the knee joint at extreme angles, and providing proprioception. (Islam, 2023).

The standard of care in managing meniscal tears continues to evolve, especially for athletes and patients with high demands. (Slipek et al., 2023). Meniscal repair, meniscal transplantation, and partial meniscectomy are commonly performed, alongside rehabilitation methods. For instance, timely reconstruction in individuals with ACL injury is necessary to reduce the risk of further medial meniscus damage in patients injured for more than 1 year. (Guenther et al., 2014). Menurut Sebastianelli et al., 2022, Tidak ada cara The standards for addressing meniscal tears lack definitive guidelines regarding the expected timeframe or optimal return to sports, and it's challenging to predict athletes' performance post-surgery. Disrupted physical growth due to injury can result in length discrepancies, angular deformities, or changes in joint mechanics, leading to significant long-term disabilities. Even a slight reduction in the number of sports injuries holds substantial significance for the health of young athletes and can have long-term economic implications on healthcare costs.

Meniscal injury is a condition where the meniscus, a piece of cartilage in the knee, experiences a tear or rupture (Perkins et al., 2021). Hence, meniscal injury is also referred to as a torn meniscus. The consequence of

this injury is impaired mobility, as the knee can become very painful, and in some cases, individuals may be unable to walk at all (Kopf et al., 2020). Meniscal injury is a common occurrence among athletes, especially football players. It causes pain in the knee and difficulty walking. Football players are particularly susceptible to meniscal injuries due to the high mobility required in the game, especially in the knee area (Redler et al., 2021). Young Football players are highly susceptible to meniscal injuries, highlighting the importance of coaches' understanding of the various risk factors that can lead to such injuries. In this study, the researchers aim to conduct an in-depth examination of meniscal injuries in young football athletes through a literature review. The purpose of this research is to educate both athletes and coaches on understanding meniscal injuries and how to address them effectively, thus providing an alternative approach to reducing the risk of meniscal injuries.

## Method

This literature review uses literature that can be accessed fulltext in pdf format and *scholarly (peer reviewed journals)*. The criteria for the reviewed journals are English-language research journal articles with the subject *Meniscus Injury*. Journals that match the criteria are then reviewed. Research articles that are in accordance with the criteria are then collected and made a journal summary including the name of the researcher, article title, year published, research design, samples, research content, and research results. The summary of the research journal is included in the table, as a way to further clarify the analysis of the abstract and full text of the journal. The summary of the journal is then analyzed on the contents contained in the research objectives and research results / findings. The analysis method used uses journal content analysis. The stages of this research are presented in Figure 1.



Figure 1. The Stages of the Research

## Result and Discussion

This literature review delves into the realm of meniscal injuries among football players, drawing insights from a collection of eight articles sourced from international journals via a Google Scholar search using the keyword "Meniscus Injury." Employing Critical Appraisal analysis, the literature was scrutinized to address the research problem comprehensively. Through this method, the core of each journal and the

study results were meticulously examined to discern both commonalities and disparities among the articles. By consolidating findings from diverse sources, this review aims to contribute to a deeper understanding of the prevalence, risk factors, management strategies, and outcomes associated with meniscus injuries in the context of football, potentially informing future research directions and clinical practices in sports medicine. For more details, please refer to the Table 1.

**Table 1.** Literature Review Summary of Results

Author	Heading	Method	Result
(Pichler et al., 2022)	Functional Outcome of All-Soft-Tissue Quadriceps Tendon Autograft in ACL Reconstruction in Young and Athletic Patients at a Minimum Follow-Up of 1 Year.	The study involved 40 patients (average age 31.3) who underwent ACL reconstruction with QT autografts from August 2018 to December 2020. Outcomes were assessed up to 16.8 months, with no infections reported and minor complications in 2 patients.	The study included 40 patients (average age 31.3, 73% male) who underwent ACL reconstruction with QT autografts. Over a 16.8-month follow-up, no reruptures occurred. Range of motion and functional outcomes significantly improved, especially in IKDC score and Tegner activity scale..
(Wilson et al., 2018)	Incidence, Presentation, and Treatment of Pediatric and Adolescent Meniscal Root Injuries	The study included pediatric and adolescent patients with meniscal injuries from March 2012 to February 2015, excluding certain conditions. It analyzed demographics, injury mechanisms, and treatments, using statistical tests to describe meniscal root injury prevalence, presentation, and outcomes.	Out of 314 patients, 58 (18.5%) had posterior meniscal root injuries, averaging 16 years old. Most injuries were noncontact, often linked with sports like football and basketball. Root injuries commonly involved ACL injuries and showed higher meniscal extrusion.
(Giuliani et al., 2011)	Treatment of meniscal injuries in young athletes.	The paper discusses meniscal injury treatment in young athletes, highlighting the outside-in repair technique to reduce neurovascular injury. Despite clinical success, younger patients often show incomplete healing and earlier failure compared to older patients.	The research highlights preserving meniscal tissue in young, active patients to reduce pain and maintain chondroprotective properties. Partial meniscectomy shows better outcomes than complete meniscectomy. Meniscal allograft transplantation offers pain relief, but long-term outcomes are unclear.
(Vaishya et al., 2020)	Meniscal Injuries in the Olympic and Elite Athletes	Researchers conducted a literature search on meniscalis injuries in professional athletes using PubMed and Scopus. They analyzed data from Summer, Winter, and Youth Olympics, identifying trends, common injuries, and incidence rates using Microsoft Excel 365.	The knee, particularly the meniscus, is frequently injured in elite athletes, with football having the highest rate of meniscal injuries. Knee injuries are the second most common in the Olympics, with detailed data often lacking in epidemiological studies.
(D'Ambrosi et al., 2023)	In elite athletes with meniscal injuries, always repair the lateral, think about the medial! A systematic review	The systematic review adhered to PRISMA guidelines and was registered in PROSPERO (CRD42022351979). Quality	The study included 421 elite athletes (415 men, 6 women) from various sports. After partial meniscectomy, 84.7% returned to

		<p>assessment used the AMSTAR-2 checklist. Data collection involved a Microsoft Access tool, focusing on patient data, injuries, treatments, and outcomes. Study selection minimized bias, with disagreements resolved by a senior investigator. Quality assessment used MINORS and ROBINS-I tools.</p>	<p>sports, but 3.7% needed revision surgery. Following meniscal repair, 85.1% returned to sports, but 17.0% required further treatment. Eight studies with a mean MINORS score of 8.5 were analyzed.</p>
<p>(Gastaldo et al., 2022)</p>	<p>High quality rehabilitation to optimize return to sport following lateral meniscus surgery in football players</p>	<p>The review offers a rehab framework for lateral meniscus surgery rehab in football, emphasizing short- and long-term health balance. It details early, mid, and late-stage goals, and highlighting progressive loading and management and multidisciplinary interventions, urging use of advanced RTS tests.</p>	<p>The paper offers a rehab framework for footballers post-lateral meniscus surgery, emphasizing short- and long-term health balance. It details early, mid, and late-stage goals, and highlighting progressive loading and management and multidisciplinary interventions, urging use of advanced RTS tests.</p>
<p>(Lee &amp; Chu, 2012)</p>	<p>Clinical and Basic Science of Cartilage Injury and Arthritis in Football (Soccer) Athlete</p>	<p>Football players face a high risk of joint injuries, especially in the knee, hip, and ankle, leading to cartilage damage and potential osteoarthritis (OA) development. increased odds of hospital admissions, mainly for hip and knee OA, associated with meniscal Chondrocyte apoptosis post-injuries, ACL tears, and injury accelerates cartilage deterioration.</p>	<p>Former pro soccer players often suffer from osteoarthritis (OA), affecting the knee, ankle, and hips, with up to 49% diagnosed. They have increased odds of hospital admissions, mainly for hip and knee OA, associated with meniscal Chondrocyte apoptosis post-injuries, ACL tears, and injury accelerates cartilage deterioration.</p>

Sports injuries pose a threat to both athletes and coaches. This is because the risk of sports injuries is prevalent among individuals with high mobility, such as young football athletes. Sports injuries cannot be avoided. In this study, the researcher elaborates on how to implement efficient rehabilitation training techniques to not only aid in the quick recovery of injured joints but also maximize the functionality of intact knee joints to prevent sports injuries. Suspension training methods are considered more effective in the targeted rehabilitation of injured joints, thereby enhancing knee joint flexibility and stability. (Block et al., 2022). Suspension set training focuses on athletes' core muscle strength, thereby enhancing flexibility and reducing the risk of sports injuries. (Makki et al., 2022). Flexibility and joint muscle stability training help athletes recover from injured areas as quickly as possible, maximize joint and muscle strength, enhance joint flexibility, improve musculoskeletal system dysfunction, reduce sports injury disturbances in athletes, and enhance on-field performance. (Zhang, 2023).

In cases of athletes experiencing sports injuries, particularly meniscal injuries, there is no difference between athletes who sustain injuries before or after surgery. Clinical outcomes resulting in degenerative changes in the knee joint are influenced by variations

dependent on the athlete in meniscal extrusion. (Popper et al., 2023). Uchida et al., 2023, Reports indicate that the rate of return to pre-injury status and full recovery periods at the competitive level are not entirely adequate, leading athletes to continue consulting with physiotherapists. During treatment or exercise sessions, physiotherapists are present in the training room to meet the needs of patients, utilizing specialized exercise equipment to categorize exercises according to their function. (Blanchard et al., 2020). Athletes who sustain knee injuries, especially in competitive settings, are expected to undergo full rehabilitation and ensure the readiness of the injured muscles before deciding to return to sports.

Knee discomfort resulting from injury occurs due to pain associated with traumatic meniscal damage. (Razi & Javad Mortazavi, 2020). Therefore, determining whether arthroscopic surgery or medical exercise therapy is more effective in treating patients diagnosed with chronic knee pain and degenerative meniscus is essential. (Østerås et al., 2012). Rehabilitation therapy is required to restore the range of motion and muscle strength in the injured area to pre-injury levels. (Luvsannyam et al., 2022). Because lateral meniscal injuries are less common than medial meniscal injuries, athletes who sustain lateral meniscal injuries may

require more rehabilitation exercises (Testa et al., 2021). A study on ice hockey players in university sports leagues found that they could return to play more quickly with a rehabilitation training program. Rehabilitation treatment focusing on functional performance was reported to provide positive long-term outcomes and accelerate athletes' return to the sports arena (Kang et al., 2023).

Athletes who have undergone previous meniscal surgery typically have a better understanding of meniscal injuries and their management compared to those who haven't. (Marigi et al., 2021). Compared to meniscectomy, meniscal repair is considered the most commonly performed treatment. (Bhan, 2020). Athletes' primary concern when it comes to meniscal injuries is the possibility of needing more surgeries and the potential for joint inflammation after meniscal surgery (Brophy et al., 2015). Meniscal injuries are associated with early symptoms such as discomfort, swelling, decreased function, and activity levels. Professional and amateur athletes experience meniscal tears at a rate of 1.58 to 2.98 injuries per 10,000. Football is one of the sports that most commonly causes meniscal tear injuries among its athletes. (Nicholls et al., 2021). Additionally, medical issues or side effects may occur following meniscal tear surgery. (Sonnerly-Cottet et al., 2020). Many orthopedic surgery sources explain that during meniscal surgery, mesenchymal stem cells are often selected and differentiated into various types of tissue, including fat, muscle, bone, and cartilage. (Willinger et al., 2022). Improved healing rates, better tissue quality, long-lasting functional improvements, and better clinical outcomes have been reported with stem cell transplantation. (Tomihara et al., 2023). Scientists propose that stem cell therapy can provide an additional option for patients with meniscal tears and other orthopedic injuries, which may shorten healing time, improve function, and reduce degenerative osteoarthritis. (Andrews & Gallicchio, 2022).

In physically active youth, especially those engaged in level 1 contact sports like football, which often involve rotational movements, it's crucial to make an accurate diagnosis and provide appropriate treatment when someone suffers a meniscal injury. Given the high level of physical activity at a young age and the necessity of both the medial and lateral meniscus for proper knee function, it's imperative to ensure timely and proper diagnosis and treatment for meniscal injuries. (Kilcoyne et al., 2012). Understanding the anatomy and function of the meniscus, the epidemiology of meniscal tears, and the mechanisms of injury are crucial for coaches to minimize the occurrence of injuries. (Martínez-Silván et al., 2021).

Significant concomitant injuries will also be discussed. Relevant patient history, comprehensive

physical examination, and appropriate imaging procedures are required to make a diagnosis. When young athletes experience meniscal tears, non-operative treatment is rarely effective, hence meniscal repair is often required. (Hietamo et al., 2023). When diagnosing and treating injuries, doctors must consider all aspects related to meniscal injury. For physically active individuals who want to maintain knee function, it's crucial to identify and treat meniscal tears correctly. Meniscal tears commonly occur in young patients participating in sports. Accurate diagnosis requires relevant patient history, physical examination, and necessary imaging studies. In young athletes, non-operative therapy for meniscal injuries is rarely effective (Tachibana et al., 2021). For young athletes, every effort should be made to repair meniscal tears, with partial resection only considered if repair is not feasible. (Laboudie et al., 2022). When diagnosing and treating meniscal injuries, which are often complex, doctors must consider aspects related to the athlete's injury issues. (Poulsen & Johnson, 2011).

Currently, meniscal tears are increasingly common injuries across all age groups, stemming from both trauma and osteoarthritis. A comprehensive investigation into the patient's history, physical examination, and characteristics of the meniscal tear will facilitate a better understanding of pathogenesis and therapy. The vascular supply to the knee joint plays a crucial role in tissue healing and repair. Therefore, identifying the correct location of the tear will contribute to the treatment and rehabilitation plan for athletes with meniscal injuries.

## Conclusion

The provided image appears to be a part of a literature review on meniscal injuries, particularly focusing on young athletes, such as football players. The review highlights the increasing participation of adolescents in sports and the corresponding rise in sports-related injuries, especially meniscal injuries. It delves into the anatomy, mechanisms, and implications of meniscal tears, emphasizing the importance of timely and appropriate diagnosis and treatment to prevent long-term disabilities. The literature reviewed indicates that meniscal injuries are common in sports involving twisting and sudden changes in direction, such as football and basketball. The treatment options discussed include meniscal repair, meniscal transplantation, and partial meniscectomy, alongside rehabilitation methods aimed at restoring knee function and preventing further injuries.

The review also underscores the role of rehabilitation in enhancing recovery and preventing re-

injury. It suggests that advanced rehabilitation techniques, such as suspension training and specific core muscle strengthening exercises, can improve knee joint flexibility and stability. The importance of a multidisciplinary approach involving physiotherapists during the rehabilitation process is highlighted, with a focus on functional performance and readiness for return to sports. Additionally, the potential of stem cell therapy in improving healing outcomes for meniscal injuries is mentioned, offering a promising avenue for future treatment. Overall, the literature review aims to educate athletes and coaches about meniscal injuries and provide insights into effective management and prevention strategies to enhance the well-being of young athletes.

#### Acknowledgements

Thank you to the lecturers at the Faculty of Sports Science who have provided extraordinary guidance, knowledge, and inspiration. Don't forget to also thank your comrades in arms in the Master of Sports Education Study Program who have always been a source of inspiration and motivation

#### Author Contributions

This article was written by seven contributors. Riki Likardo contributed to the writing of the introduction, methodology, literature review, results, and conclusions. Hendri Neldi, Roma Irawan, Willadi Rasyid, Dally Rahman contributed to the process of conceptualization, methodology, review, and finalization of articles. Yovhandra Ockta contributed to the finalization and improvement of the content of the article. Firunika Intan Cahyani contributed to reviews in different thought sections.

#### Funding

This research was not funded by any party. The funding comes from the author of this article.

#### Conflict of Interest

The content of this article does not create a conflict of interest.

#### References

- Aira, T., Vasankari, T., Heinonen, O. J., Korpelainen, R., Kotkajuuri, J., Parkkari, J., Savonen, K., Uusitalo, A., Valtonen, M., Villberg, J., Vähä-Ypyä, H., & Kokko, S. P. (2021). Physical activity from adolescence to young adulthood: patterns of change, and their associations with activity domains and sedentary time. *International Journal of Behavioral Nutrition and Physical Activity*, 18(1), 1–11. <https://doi.org/10.1186/s12966-021-01130-x>
- Andrews, K., & Gallicchio, V. S. (2022). The Effect Of Stem Cells On Bronchopulmonary Dysplasia. *Journal of Stem Cell Research*, 3(1), 1. [https://doi.org/10.52793/jscr.2022.3\(1\)-28](https://doi.org/10.52793/jscr.2022.3(1)-28)
- Bhan, K. (2020). Meniscal Tears: Current Understanding, Diagnosis, and Management. *Cureus*, 12(6), 8–13. <https://doi.org/10.7759/cureus.8590>
- Blanchard, E. R., Hadley, C. J., Wicks, E. D., Emper, W., & Cohen, S. B. (2020). Return to Play After Isolated Meniscal Repairs in Athletes: A Systematic Review. *Orthopaedic Journal of Sports Medicine*, 8(11), 1–11. <https://doi.org/10.1177/2325967120962093>
- Block, A. M., Eisenberg, M. T., Inclan, P. M., & Nepple, J. J. (2022). Treatment Trends in Meniscal Pathology in the Setting of Concomitant ACL Injuries in Pediatric and Young Adult Patients: An Insurance Database Study. *American Journal of Sports Medicine*, 50(9), 2367–2373. <https://doi.org/10.1177/03635465221098141>
- Brophy, R. H., Gefen, A. M., Matava, M. J., Wright, R. W., & Smith, M. V. (2015). Understanding of meniscus injury and expectations of meniscus surgery in patients presenting for orthopaedic care. *Arthroscopy - Journal of Arthroscopic and Related Surgery*, 31(12), 1–6. <https://doi.org/10.1016/j.arthro.2015.05.003>
- D'Ambrosi, R., Meena, A., Raj, A., Ursino, N., Mangiavini, L., Herbort, M., & Fink, C. (2023). In elite athletes with meniscal injuries, always repair the lateral, think about the medial! A systematic review. *Knee Surgery, Sports Traumatology, Arthroscopy*, 31(6), 2500–2510. <https://doi.org/10.1007/s00167-022-07208-8>
- Gastaldo, M., Gokeler, A., & Della Villa, F. (2022). High quality rehabilitation to optimize return to sport following lateral meniscus surgery in football players. *Annals of Joint*, 7(4), 0–3. <https://doi.org/10.21037/aoj-21-32>
- Gee, S. M., Tennent, D. J., Cameron, K. L., & Posner, M. A. (2020). The Burden of Meniscus Injury in Young and Physically Active Populations. *Clinics in Sports Medicine*, 39(1), 13–27. <https://doi.org/10.1016/j.csm.2019.08.008>
- Giuliani, J. R., Burns, T. C., Svoboda, S. J., Cameron, K. L., & Owens, B. D. (2011). Treatment of meniscal injuries in young athletes. *The Journal of Knee Surgery*, 24(2), 93–100. <https://doi.org/10.1055/s-0031-1280877>
- Guenther, Z. D., Swami, V., Dhillon, S. S., & Jaremko, J. L. (2014). Meniscal injury after adolescent anterior cruciate ligament injury: How long are patients at risk? *Clinical Orthopaedics and Related Research*, 472(3), 990–997. <https://doi.org/10.1007/s11999-013-3369-9>
- Herdea, A., Struta, A., Derihaci, R., Ulici, A., Costache, A., Furtunescu, F., Toma, A., & Charkaoui, A. (2022). Efficiency of platelet-rich plasma therapy for healing sports injuries in young athletes. *Experimental and Therapeutic Medicine*, 23(3), 1–6.

- <https://doi.org/10.3892/etm.2022.11139>
- Hietamo, J., Rantala, A., Parkkari, J., Leppänen, M., Rossi, M., Heinonen, A., Steffen, K., Kannus, P., Mattila, V., & Pasanen, K. (2023). Injury History and Perceived Knee Function as Risk Factors for Knee Injury in Youth Team-Sports Athletes. *Sports Health*, 15(1), 26–35. <https://doi.org/10.1177/19417381211065443>
- Howie, E. K., Daniels, B. T., & Guagliano, J. M. (2020). Promoting Physical Activity Through Youth Sports Programs: It's Social. *American Journal of Lifestyle Medicine*, 14(1), 78–88. <https://doi.org/10.1177/1559827618754842>
- Islam, W. (2023). Meniscus Injury and Physiotherapy Rehabilitation. *Orthopaedics Case Reports*, 2(2), 1–8. <https://doi.org/10.31579/2835-8465/016>
- Kang, T. K., Lee, D. W., & Lee, S. Y. (2023). Rehabilitation and Return to Play of an Ice-Hockey Athlete after Lateral Meniscus Repair : A Case Report. *Research Square*, 1–22. <https://doi.org/10.21203/rs.3.rs-3362400/v1>
- Kilcoyne, K. G., Dickens, J. F., Haniuk, E., Cameron, K. L., & Owens, B. D. (2012). Epidemiology of meniscal injury associated with ACL tears in young athletes. *Orthopedics*, 35(3), 208–212. <https://doi.org/10.3928/01477447-20120222-07>
- Kopf, S., Beaufils, P., Hirschmann, M. T., Rotigliano, N., Ollivier, M., Pereira, H., Verdonk, R., Darabos, N., Ntagiopoulos, P., Dejour, D., Seil, R., & Becker, R. (2020). Management of traumatic meniscus tears: the 2019 ESSKA meniscus consensus. *Knee Surgery, Sports Traumatology, Arthroscopy*, 28(4), 1177–1194. <https://doi.org/10.1007/s00167-020-05847-3>
- Laboudie, P., Douiri, A., Bouguennec, N., Biset, A., & Graveleau, N. (2022). Combined ACL and ALL reconstruction reduces the rate of reoperation for graft failure or secondary meniscal lesions in young athletes. *Knee Surgery, Sports Traumatology, Arthroscopy*, 30(10), 3488–3498. <https://doi.org/10.1007/s00167-022-06956-x>
- Lee, H. H., & Chu, C. R. (2012). Clinical and Basic Science of Cartilage Injury and Arthritis in the Football (Soccer) Athlete. *Cartilage*, 3(1 SUPPL.). <https://doi.org/10.1177/1947603511426882>
- Luvannyam, E., Jain, M. S., Leitao, A. R., Maikawa, N., & Leitao, A. E. (2022). Meniscus Tear: Pathology, Incidence, and Management. *Cureus*, 14(5). <https://doi.org/10.7759/cureus.25121>
- Makki, A. R. K., Tahir, M., Amin, U., Bin Tabassum, M. M., Kamran, M., & Tahir, F. (2022). Mechanism of Meniscal Injury and its Impact on Performance in Athletes. *The Healer Journal of Physiotherapy and Rehabilitation Sciences*, 2(3), 232–237. <https://doi.org/10.55735/hjprs.v2i3.98>
- Marigi, E. M., Keyt, L. K., LaPrade, M. D., Camp, C. L., Levy, B. A., Dahm, D. L., Stuart, M. J., & Krych, A. J. (2021). Surgical Treatment of Isolated Meniscal Tears in Competitive Male Wrestlers: Reoperations, Outcomes, and Return to Sport. *Orthopaedic Journal of Sports Medicine*, 9(1), 1–6. <https://doi.org/10.1177/2325967120969220>
- Martínez-Silván, D., Wik, E. H., Alonso, J. M., Jeanguyot, E., Salcinovic, B., Johnson, A., & Cardinale, M. (2021). Injury characteristics in male youth athletics: A five-season prospective study in a full-time sports academy. *British Journal of Sports Medicine*, 55(17), 954–960. <https://doi.org/10.1136/bjsports-2020-102373>
- Matsukura, Y., Muneta, T., Tsuji, K., Koga, H., & Sekiya, I. (2014). Mesenchymal stem cells in synovial fluid increase after meniscus injury. *Clinical Orthopaedics and Related Research*, 472(5), 1357–1364. <https://doi.org/10.1007/s11999-013-3418-4>
- Nicholls, M., Ingvarsson, T., & Briem, K. (2021). Younger age increases the risk of sustaining multiple concomitant injuries with an ACL rupture. *Knee Surgery, Sports Traumatology, Arthroscopy*, 29(8), 2701–2708. <https://doi.org/10.1007/s00167-021-06538-3>
- Østerås, H., Østerås, B., & Torstensen, T. A. (2012). Medical exercise therapy, and not arthroscopic surgery, resulted in decreased depression and anxiety in patients with degenerative meniscus injury. *Journal of Bodywork and Movement Therapies*, 16(4), 456–463. <https://doi.org/10.1016/j.jbmt.2012.04.003>
- Patel, D. R., Yamasaki, A., & Brown, K. (2017). Epidemiology of sports-related musculoskeletal injuries in young athletes in United States. *Translational Pediatrics*, 6(3), 160–166. <https://doi.org/10.21037/tp.2017.04.08>
- Perkins, C. A., Christino, M. A., Busch, M. T., Egger, A., Murata, A., Kelleman, M., & Willimon, S. C. (2021). Rates of Concomitant Meniscal Tears in Pediatric Patients With Anterior Cruciate Ligament Injuries Increase With Age and Body Mass Index. *Orthopaedic Journal of Sports Medicine*, 9(3), 1–6. <https://doi.org/10.1177/2325967120986565>
- Pichler, L., Pichler, L., Liu, M., Payr, S., Binder, H., Kaiser, G., Hofbauer, M., & Tiefenboeck, T. (2022). Functional Outcome of All-Soft-Tissue Quadriceps Tendon Autograft in ACL Reconstruction in Young and Athletic Patients at a Minimum Follow-Up of 1 Year. *Journal of Clinical Medicine*, 11(22). <https://doi.org/10.3390/jcm11226706>
- Popper, H. R., Fliegel, B. E., Elliott, D. M., & Su, A. W. (2023). Surgical Management of Traumatic Meniscus Injuries. *Pathophysiology*, 30(4), 618–629. <https://doi.org/10.3390/pathophysiology30040044>

- Poulsen, M. R., & Johnson, D. L. (2011). Meniscal Injuries in the Young, Athletically Active Patient. *The Physician and Sportmedicine*, 39(1), 123-130.
- Razi, M., & Javad Mortazavi, S. M. (2020). Save the Meniscus, A good strategy to preserve the knee. *Archives of Bone and Joint Surgery*, 8(1), 1-4. <https://doi.org/10.22038/abjs.2019.45438.2242>
- Redler, L. H., Sugimoto, D., Bassett, A. J., Kocher, M. S., Micheli, L. J., & Heyworth, B. E. (2021). Effect of Concomitant Meniscal Tear on Strength and Functional Performance in Young Athletes 6 Months After Anterior Cruciate Ligament Reconstruction With Hamstring Autograft. *Orthopaedic Journal of Sports Medicine*, 9(11), 1-7. <https://doi.org/10.1177/232596712111046608>
- Sari, M., & Kurniawati, I. (2022). Physiotherapy Management in Meniscus Injury. *Kinesiology and Physiotherapy Comprehensive*, 1(1), 19-21.
- Sebastianelli, W. J., Hanna, T., & Smith, N. P. (2022). Treatment, Return to Play, and Performance Following Meniscus Surgery. *Current Reviews in Musculoskeletal Medicine*, 15(3), 157-169. <https://doi.org/10.1007/s12178-022-09754-7>
- Sliepka, J. M., Saper, M. G., Sorey, W., Mand, S., Battan, S., Kweon, C. Y., Gee, A. O., Schmale, G. A., & Hagen, M. S. (2023). Effect of Increased Time to Surgery on the Ability of MRI to Rule Out Medial Meniscal Tears in Young Athletes With ACL Injury. *Orthopaedic Journal of Sports Medicine*, 11(1), 1-6. <https://doi.org/10.1177/23259671221141664>
- Smoak, J. B., Matthews, J. R., Vinod, A. V., Kluczynski, M. A., & Bisson, L. J. (2020). An Up-to-Date Review of the Meniscus Literature: A Systematic Summary of Systematic Reviews and Meta-analyses. *Orthopaedic Journal of Sports Medicine*, 8(9), 1-14. <https://doi.org/10.1177/2325967120950306>
- Sonnery-Cottet, B., Serra Cruz, R., Vieira, T. D., Goes, R. A., & Saithna, A. (2020). Ramp Lesions: An Unrecognized Posteromedial Instability? *Clinics in Sports Medicine*, 39(1), 69-81. <https://doi.org/10.1016/j.csm.2019.08.010>
- Strandbu, Å., Bakken, A., & Stefansen, K. (2020). The continued importance of family sport culture for sport participation during the teenage years. *Sport, Education and Society*, 25(8), 931-945. <https://doi.org/10.1080/13573322.2019.1676221>
- Tachibana, Y., Tanaka, Y., Amano, H., Kinugasa, K., Tsujii, A., Uchida, R., Shiozaki, Y., & Horibe, S. (2021). Isolated peripheral longitudinal tears in the anterior-middle segment of medial meniscus among young soccer players: A case series. *International Journal of Surgery Case Reports*, 89(November), 106630. <https://doi.org/10.1016/j.ijscr.2021.106630>
- Testa, G., Gurrieri, L., Andolfi, M., Caponnetto, M., Via, D. Di, Puglisi, G., D'Amato, S., & Pavone, V. (2021). Our Experience in Meniscus Tears and Differences in Sport Recovery between Medial and Lateral Partial Meniscectomy in Young Athlete. *Journal of Orthopaedic Science and Research*, 2(3), 1-16. <https://doi.org/10.46889/JOSR.2021.2206>
- Tomihara, T., Hashimoto, Y., Takahashi, S., Taniuchi, M., Takigami, J., Tsumoto, S., & Shimada, N. (2023). Analyses of associated factors with concomitant meniscal injury and irreparable meniscal tear at primary anterior cruciate ligament reconstruction in young patients. *Asia-Pacific Journal of Sports Medicine, Arthroscopy, Rehabilitation and Technology*, 32, 12-17. <https://doi.org/10.1016/j.asmart.2023.04.001>
- Uchida, R., Horibe, S., Tanaka, Y., Tsujii, A., Tachibana, Y., Kinugasa, K., & Shino, K. (2023). Clinical outcomes after repair of an isolated radial tear in the middle segment of the lateral meniscus - All-inside suture repair vs trans-capsular suture repair. *Asia-Pacific Journal of Sports Medicine, Arthroscopy, Rehabilitation and Technology*, 33, 25-31. <https://doi.org/10.1016/j.asmart.2023.08.002>
- Vaishya, R., Kambhampati, S. B. S., & Vaish, A. (2020). Meniscal Injuries in the Olympic and Elite Athletes. *Indian Journal of Orthopaedics*, 54(3), 281-293. <https://doi.org/10.1007/s43465-020-00049-y>
- Wang, P., Gao, F., Sun, W., Li, Z., Wu, X., Shi, L., Xu, X., Li, T., Fan, X., Li, C., & Li, Z. (2022). Morphometric characteristics of the knee are associated with the injury of the meniscus. *Journal of Orthopaedic Surgery and Research*, 17(1), 1-8. <https://doi.org/10.1186/s13018-022-03380-2>
- Willinger, L., Balendra, G., Pai, V., Lee, J., Mitchell, A., Jones, M., & Williams, A. (2022). Medial meniscal ramp lesions in ACL-injured elite athletes are strongly associated with medial collateral ligament injuries and medial tibial bone bruising on MRI. *Knee Surgery, Sports Traumatology, Arthroscopy*, 30(5), 1502-1510. <https://doi.org/10.1007/s00167-021-06671-z>
- Wilson, P. L., Wyatt, C. W., Romero, J., Sabatino, M. J., & Ellis, H. B. (2018). Incidence, Presentation, and Treatment of Pediatric and Adolescent Meniscal Root Injuries. *Orthopaedic Journal of Sports Medicine*, 6(11), 1-7. <https://doi.org/10.1177/2325967118803888>
- Zhang, X. (2023). Control of Joint Injuries in Aerobic Gymnasts. *Revista Brasileira de Medicina Do Esporte*, 29, 1-4. [https://doi.org/10.1590/1517-8692202329012022\\_0522](https://doi.org/10.1590/1517-8692202329012022_0522)



