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Review

Contemporary Management of Meniscal Tears: From Diagnosis and Surgery to Rehabilitation Strategies

Ovidiu Chiriac [1], Vlad Catana [1,2], Adrian Vasilescu [1], Alex-Gabriel Grigore [1], Iosif-Aliodor Timofticiuc [1], Bogdan-Sorin Capitanu [1,2,*], Calin Ion Dragosloveanu [1], Dana-Georgiana Nedelea [1,2] and Romica Cergan [1,2]

1 "Foisor" Clinical Hospital of Orthopaedics, Traumatology and Osteoarticular TB, Bucharest, Romania;
2 The "Carol Davila" University of Medicine and Pharmacy, 8 Eroii Sanitari Boulevard, Bucharest, Romania

* Correspondence: bogdancapitanu98@yahoo.com

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Abstract: Meniscal tears are one of the most common knee injuries. They can happen to both young athletes and older individuals with degenerative joint changes, and their optimal management remains debated. This narrative review combines recent research from the PubMed database (screened in November 2024) and focuses on studies published in the last 10 years. These studies include randomized controlled trials, meta-analyses, observational studies, and clinical guidelines on diagnosis, surgery, rehabilitation, and additional injectable treatments for meniscal injuries. Magnetic resonance imaging, along with a clinical exam, remains the best way to diagnose. High-level evidence shows that exercise therapy is as effective as arthroscopic partial meniscectomy for degenerative meniscal tears in the short- and long-term. However, surgery may offer faster symptom relief in selected patients. After meniscus repair surgery, rehabilitation must include gradually restoring the range of motion and load-bearing. Platelet-rich plasma, hyaluronic acid, corticosteroids, and extracorporeal shockwave therapy are some of the adjunct treatments that may help control symptoms, but the evidence is still mixed. Today's treatment of meniscal tears should be personalized and focused on rehabilitation, taking into account the patient's clinical assessment, characteristics, and functional goals to accelerate recovery and, in the long term, possibly slow the progression of osteoarthritis.

Keywords: meniscus rehabilitation, exercise therapy, degenerative meniscal tear, meniscal repair, return to function, knee osteoarthritis prevention, musculoskeletal imaging

1. Introduction

The menisci are wedge-shaped fibrocartilaginous bands located between the femur and the tibia [1]. Their primary role is to absorb shocks from the knee's articular surface, ensuring knee stability and preserving the articular joint capsule. Meniscal lesions can be broadly categorized into traumatic and degenerative [2]. The importance of a meniscal lesion is defined by its clinical presentation and the subsequent surgical decision-making process. New methods to predict and prevent orthopedic complications are now being explored, such as artificial intelligence, which can play an important role as an auxiliary instrument in human decision-making [3-5].

The meniscal lesions are among the most common orthopedic injuries, with an incidence of 60 per 100.000 in the general population, with a high distribution in both young physically active individuals and inactive elderly patients [6,7].

The pattern of the meniscal lesion (longitudinal, radial, or complex), along with its localization, is a pivotal factor in deciding on the therapeutic approach (surgical vs nonsurgical) and the preoperative and postoperative rehabilitation. An untreated meniscal lesion can be the starting point for long-term consequences such as osteoarthritis (OA), along with chronic pain and instability [8]. The key feature of this mechanism is the early management of the meniscal lesion, with a tailored rehabilitation approach for non-surgical versus surgical cases. A complete, personalized rehabilitation program consisting of exercise and supervised therapy [9]. The most important exercises are strengthening the knee extensor mechanism and the biceps femoris. After Arthroscopic Partial Meniscectomy (APM), it is important that patients follow the surgeon's guidelines on knee flexion and weight bearing, with most protocols permitting partial weight bearing for multiple weeks after the surgical intervention. Meniscal tears can be clinically significant by limiting patients' flexion range of motion while walking and stepping downstairs. Valgum knee displacement was also correlated with meniscus lesions through a tridimensional kinematic system in patients with meniscal lesions [10].

2. Methods

This manuscript represents a narrative review of the current literature on the contemporary management of meniscal tears, with emphasis on rehabilitation strategies. A structured literature search was conducted in the PubMed electronic database in November 2024. The search strategy combined Medical Subject Headings (MeSH) and free-text keywords, including "meniscus tear," "meniscal injury," "meniscus tear rehabilitation," "exercise therapy," "arthroscopic partial meniscectomy," and "meniscal repair," using Boolean operators ("AND," "OR," "NOT") to refine the results.

Priority was given to studies published within the last 10 years to reflect contemporary evidence and current rehabilitation protocols. However, earlier landmark studies were included when necessary to define established terminology, classification systems, diagnostic criteria, and foundational surgical or rehabilitation principles that remain clinically relevant.

Eligible publications included randomized controlled trials, systematic reviews, meta-analyses, observational studies, and relevant clinical guidelines published in English and available in full text. Articles were excluded during title and abstract screening if they were not directly related to meniscal tears or rehabilitation strategies, or if the study population presented concomitant major knee pathologies requiring distinct management (e.g., anterior cruciate ligament reconstruction, advanced knee osteoarthritis requiring arthroplasty, or significant knee instability).

To illustrate key imaging features, representative magnetic resonance imaging (MRI) examples from the authors' institutional clinical database were included. These images were anonymized and used exclusively for educational and explanatory purposes.

Given the narrative nature of this review, no formal risk-of-bias assessment or quantitative meta-analysis was performed.

2. Meniscal Tear Development and Diagnosis

2.1. Risk factors for developing a meniscal tear

The main risk factors for developing a degenerative meniscus tear are: age (the highest incidence being in the fourth and fifth decades), increased BMI (over 25), male sex, osteoarthritis (cartilage lesions can injure the meniscus surface), joint malalignment (varus or valgus knee malalignment), and a history of sports participation [11,12].

High BMI directly promotes meniscus lesions by increasing compressive overload across the tibiofemoral joint, as the meniscus acts as a stabilizer and shock absorber and bears a disproportionate load, compromising its structural integrity. Obesity also promotes altered gait patterns and lower-limb malalignment, further unevenly distributing forces across the surface. Obesity coexists frequently with type II diabetes, which can lead to extensive neuropathy [13,14]. The chronic pro-inflammatory state, driven by high adipose tissue deposition, led to increased cytokine levels, which induced a catabolic state at the knee joint, resulting in degradation [15].

Age is a primordial factor in the mechanism of degenerative meniscus lesions, by altering cellular density and reducing the synthesis of new proteoglycans, along with the dehydration the body undergoes as it ages. The decrease in vascularization and the neovascularization also affect the self-regenerative capacity of the red zone in the meniscus.

Gender as a risk factor remains a current controversy. While the current literature widely accepts that the incidence is high in males, the underlying reasons remain unclear. One hypothesis is that greater participation in sports-related activities, which involve aggressive pivoting and twisting, increases the risk of meniscal injury. Predictive risk factors such as patient age are relevant in a variety of conditions, including meniscal tears, due to the increased susceptibility to defects caused by modifications in the mechanical stress response [16-21].

Medial Meniscus Root Tear (MMRT) has a greater chance of developing in obese patients and patients with either rotation of the tibia or varus malalignment of the knee [22,23]. Another risk factor associated with middle-aged and older patients is the presence of knee OA [24].

2.2. Classification of the meniscal tears

Meniscus tears can be classified based on the main criteria: anatomical location, tear pattern, severity, and mechanism of injury. Anatomical and zone-based classifications focus on the regions described in the literature; for example, Weiss et al. divided the medial meniscus into five equal parts, each representing exactly one-fifth of its length. This was modified by Yagishita et al., who combined the anterior and anterior junctional zones into a single zone, resulting in four zones. Five anatomical zones of the medial meniscus are distinguishable in regard to the meniscus anatomy: the anterior root (zone 1); the anteromedial zone (zone 2a and 2b); the medial zone (zone 3); the posterior zone (zone 4); and the posterior root (zone 5). The menisci present well-defined areas of blood supply that promote healing, with a range of possible anatomic variations, similar to other areas of the body [25-29]. The menisci consist of three layers, classified by their vascularization: the inner meniscus, the least vascularized (white zone), the middle meniscus (red-white zone), and the outer meniscus (red zone), considered the best-vascularized zone of the menisci [30].

Meniscal tears can be classified as longitudinal, transversal, or radial in terms of tear patterns [31]. Another way to classify meniscal tears is by their mechanism of injury: degenerative and traumatic. Our review focuses on rehabilitation, minimally invasive techniques, and surgical treatment options for degenerative medial meniscus tears [32].

2.3. Imaging meniscal tears

Medical imaging plays an essential role in the assessment of meniscal tears, and Magnetic Resonance Imaging (MRI) provides the most reliable non-invasive information in this regard [33]. MRI is currently viewed as the gold standard in the detection of medical tears, with reported sensitivities and specificities over 85% [33,34]. When the modality indications are followed, the positive diagnosis rate is expected to be up to 90% or above [33,35-38]. MRI visualizes the morphology of tears while also providing crucial information on the tear location and associated pathology, such as ligaments or cartilage injuries [39].

The standard MRI protocol usually includes proton density-weighted (PD) fat-saturated images in all three-dimensional planes, T1 images in either the coronal or sagittal plane, and T2 sequences, which are usually used to assess cruciate ligaments. Modern machines can run high-resolution 3D isotropic PD sequences, which can provide extremely detailed information and allow for good-quality multiplanar reconstructions [40,41].

MRI can identify the meniscal and vascularization zones and provide an accurate location of the tears [42]. Also, the tear pattern can be distinguished on MRI, with multiplanar imaging providing key insights into the lesion's orientation and extent (Figure 1).

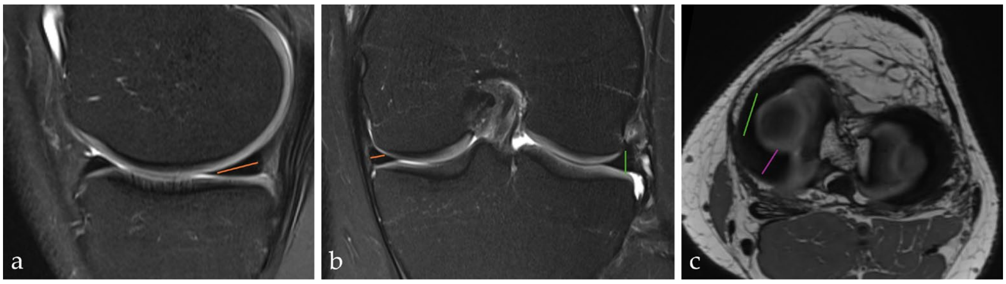

Figure 1. Magnetic Resonance Imaging investigation of the knee in proton density-weighted fat-saturated sagittal (a) and coronal (b) planes, and non-fat-saturated axial plane (c). Exemplification of horizontal (orange), longitudinal (green), and radial (pink) tears as they are visualized in various planes. Source: Authors' institutional database.

Other imaging modalities may also play a role in meniscal assessment, but their use is very limited and restricted to patients who have contraindications for MRI imaging [43]. While MRI is preferred when evaluating meniscal tears, CT angiography scans can be utilized to precisely visualize component vascularization or vascular anatomic variants in any vessel and axis, up to very small calibers [44-46]. Radiological investigations can provide general information on morphology and alignment, can assess knee joint degeneration, but play a limited role in meniscal lesion assessment [47-49]. Overall, imaging facilitates accurate diagnosis, guides treatment, and helps manage patients with meniscal tears, providing crucial information on the type, location, and associated pathology.

2.4. The importance of a detailed clinical exam in diagnosing meniscal tears

A detailed anamnesis and a complete clinical examination can diagnose meniscal tears more accurately through 4 provocative tests: Joint-line tenderness, the McMurray test, the Apley Test, and the Thessaly test [50]. Specific maneuvers for diagnosing medial meniscus tears include the McMurray and joint-line tenderness tests.

The McMurray test is performed by combining 2 types of movement at the knee joint: internal rotation, external rotation, and flexion-extension of the knee, which is also the main mechanism of meniscus injury. The McMurray test is estimated to have a highly specific positive result (84-97%); the current literature suggests a generally low sensitivity. One weakness of the McMurray test is its low sensitivity for anterior horn lesions and stable lesions.

Joint line tenderness is correctly done by the clinician, with pressure applied at the joint level. Both tests are positive when pain is elicited at any point in the examination. Though lateral meniscal lesions can be diagnosed through both Thessaly and McMurray tests, and joint line tenderness palpation [51]. Some clinical symptoms of a medial meniscus tear, such as knee anterior pain, clicking, or difficulty climbing stairs, can be very similar to mild knee OA in middle-aged patients. Another diagnosis that can mimic almost the same symptoms can be Hoffa fat pad inflammation, quadriceps, and patellar tenonitis [52].

Neither test alone can establish the diagnosis; rather, it is the combined evaluation, correlated with MRI and the patient's history, that can lead to a sustained diagnosis.

2.5. Medial Meniscus Tear and Medial Meniscus Root Tear

The medial meniscus is more prone to injuries compared to the lateral meniscus because of its unique anatomy. The medial meniscus has close contact with the medial collateral ligament, making it less mobile than the lateral meniscus and thus more prone to injuries. The medial meniscus plays an important role in knee stability. In addition, after the ACL, it absorbs much of the load when the knee has an active flexion ROM greater than 60 degrees [53]. The medial posterior root of the meniscus has the smallest mobility. MMPRT can be clinically diagnosed by limitation of knee flexion and pain during combined movement of flexion and internal rotation. Another mechanism of injuring the meniscus is by falling on the affected knee, with rotation or torsion of the knee ligaments, or by getting a valgum injury, which can involve the medial meniscus and the ACL, the medial collateral ligament, or all three of them [54].

MMRT is one of the most common meniscal tears, with the MMR being one of the least flexible parts of the menisci. According to Moon et al., the MMRT treatment of election is meniscectomy, followed by rehabilitation. APM, though, is only indicated in grade IIIc meniscus tears or tears that strongly alter the patient's walking scheme and functionality [55].

Meniscectomy is the first line of therapy for MMRT, which is combined with clinical signs and constant pain in young patients [56]. The procedure is performed arthroscopically, using parapatellar portals through which the camera and arthroscopic instruments are inserted to visualize and excise the meniscal lesion [57]. Unlike knee or hip arthroplasties, where tranexamic acid is frequently used to reduce blood loss, meniscectomy does not require this type of drug because blood loss is minimal [58]. When the blood supply is severely impaired, cases that can appear in severe trauma in the hip area, a megaprosthesis may be an extreme but necessary solution [59].

The presence of cartilage lesions (Outerbridge grades 0-2) is a critical contraindication to the surgical approach, as many studies have shown little to no clinical benefit. In these situations, total knee arthroplasty (TKA) may be indicated [60,61]. For a successful arthroplasty outcome, each patient’s anatomy and surgical planning need to be considered, as well as the possibility of using enhanced TKA procedures, such as robotic TKA [61-63].

3. Meniscus Rehabilitation and Return to Sport in Athletes

In recent years, there has been a strong tendency to treat meniscal tears in sports individuals with non-surgical procedures. Recent data suggest that every type of meniscal injury should benefit from individual rehabilitation [64].

However, there is a strong indication for arthroscopic partial meniscectomy in elite athletes. In that case, the medial meniscectomy is preferred because the lateral meniscus offers more stability and congruency to the knee joint [65]. RTS after a non-radial meniscus lesion was allowed 16 weeks on average after meniscal repair, and 24 weeks for a surgically treated radial meniscus tear, with rehabilitation treatment enhancing the chance for an earlier return [66].

Meniscal injuries in athletes represent a serious problem. While the physician has to ensure the knee is functioning properly clinically and functionally, the athlete wants to practice his or her sport as soon as possible [67]. Accelerated rehabilitation protocols, including early strengthening and early weight-bearing, should be adopted to ensure a safe return to sport. Depending on the type of meniscus tear, return to sport typically occurs 4 to 6 months after arthroscopic partial meniscectomy. For more complex or unstable tears, such as radial meniscus tears, a 9-month period is recommended, especially in contact or pivoting sports. [68].

Decision-making regarding return to sport should be based on clinical tests (McMurray test, Appley test, and joint-line tenderness) and radiological criteria. MRI findings 6 months after the meniscal injury show a continuously repaired meniscal lesion [69].

4. Rehabilitation treatment vs surgical treatment

In recent years, there has been a growing tendency to treat meniscus tears with rehabilitation rather than arthroscopy [31,70]. Although no established rehabilitation protocol after APM exists yet, this study aims to analyze, based on the specialized scientific literature, the best non-surgical solutions for healing a meniscal tear and the best rehabilitation techniques after a non-surgically treated meniscus tear or a meniscal tear treated with APM [66]. To identify and make recommendations based on the most recent articles in specialty literature, a comparison of the efficacy of different treatment combinations, such as Exercise Therapy (ET) vs APM, ET vs ET + APM, is necessary.

Because there is no clear consensus on the best rehabilitation protocol after a meniscal tear and no clear data in the literature, identifying the best actual practices may be difficult. Similar to the individualized rehabilitation for other musculoskeletal diseases, the same approach is now used experimentally for meniscal injuries [71,72].

4.1 APM + ET efficacy on pain and functionality

According to Chala et al., APM is considered the curative surgical solution for degenerative meniscal tears. Still, a complete and interdisciplinary treatment that offers better long-term outcomes is APM, followed by ET, considering pain scaled on KOOS and VAS pain scores [73,74].

ET, which is part of the rehabilitation plan, consists of therapeutic supervised exercises, stationary bicycle exercises, and home kinesitherapy [75].

Therapeutic exercises are isometric, isotonic, and proprioceptive strengthening exercises for the quadriceps, gluteus muscles, and hamstrings, whereas stretching was not shown to add superior benefits on the meniscus tear in KOOS and VAS knee pain scores [74,76].

Some specialist teams recommend rehabilitation for meniscal tears with knee instability for 8 weeks, with 3 ET sessions per week after APM, or 12 weeks of ET after APM consisting of strengthening and neuromuscular knee exercises for a meniscal tear associated with persistent pain and an affected QOL [77,78].

Alongside thigh extensor mechanism strengthening, proprioceptive exercises are also important after APM for improving stability and balance [22]. The semimembranosus muscle is another important stabilizer of the knee joint. Therefore, prevention or treatment of semimembranosus tendinosis is also part of the rehabilitation plan after a meniscal tear, because of its increased risk of developing a medial meniscus tear [79].

Nowadays, APM is considered a surgical procedure suitable for degenerative meniscal tears in middle-aged or older patients [80].

On the short-term follow-up (1,3, and 6 months), degenerative meniscus tears benefit more from APM + ET than from ET alone. But in the long term (12 to 24 months), the efficacy of these therapies on pain and functionality is very similar [81].

At a 60-month follow-up, though, moderate quality evidence suggests that APM + ET was not shown to be superior to the ET alone on the KOOS scale of pain, functionality, and ADL [82].

As a non-operative treatment for a degenerative meniscal tear after APM, ET remains the main part of the rehabilitation plan [11]. Physical therapy efficacy on the rehabilitation outcome after APM remains uncertain, but ESWT single-shot tends to become a good option, especially for avascular meniscus tears, which are by definition harder to recover [83].

ESWT also proved its efficacy by reducing knee pain and improving the aspect of the meniscus tear on T2 sagittal plane MRI at a 12-month follow-up [84].

4.2. ET versus APM

According to Li et al., ET as part of the rehabilitation plan following a degenerative meniscal tear is superior to APM at 3, 6, and 12-month follow-up, but there were no significant differences between the two forms of treatment after 24 months [85].

Another RCT showed that the efficacy of treating degenerative meniscal tears with ET for 2 months, consisting of 16 sessions in total, ½ hours each, versus APM on pain and knee functionality at a 5-year follow-up, is also similar [86,87].

ET was shown to improve knee extension force compared to APM alone, at a 3-month follow-up [88]. A degenerative meniscus tear also benefits more from an ET program in terms of pain than APM alone [89]. After 18 months, APM can worsen other symptoms like knee effusion and the quality of articular cartilage compared to ET al [90].

The exception seems to be young adults with an IRM objectified meniscal lesion, who can have stronger mechanical symptom alleviation from an early APM than an ET plan. Still, the lack of consistent results fails to prove the long-term superiority of the APM [91].

4.3 Rehabilitation after meniscal repair

Until now, there is no standard rehabilitation protocol after meniscal repair [92]. The rehabilitation process after meniscal tear repair has to maintain mobility and muscle strength, and gradually improve the knee's ROM with a knee flexion ROM situated between 0-90 degrees in the first week after surgery [93,94].

After the first 2 weeks of rehabilitation, knee flexion greater than 90 degrees has to be promoted. Recent data recommend an individualized rehabilitation program consisting of progressive physical exercises, combined with wearing an unloading brace for 7-8 weeks, and safely permitting FWB [95,96].

According to Calanna et al., longitudinal meniscus tears smaller than 3 cm can benefit more from accelerated rehabilitation protocols, whereas radial tears need a more restricted rehabilitation program after meniscal surgical repair [68].

Radial meniscus tears are perhaps the most dangerous lesions when considering the development of long-term knee OA. Nowadays, the trend is to develop rapid and safe rehabilitation protocols for radial meniscal tears. Accelerated rehabilitation protocols do not necessarily increase the risk of reinjuring. They may have the same potential long-term benefits on patient rehabilitation after meniscal repair [97].

4.4. MMRT rehabilitation

MMRTs are more frequently diagnosed in older patients [98]. Long-term rehabilitation after MMRT repair is a great challenge for surgeons and clinicians. Kawada et al. investigated the role of quadriceps femoris muscle strength in preventing medial meniscus extrusion. A greater quadriceps femoris strength before and after MMRT repair prevents meniscal extrusion, with a continuous rehabilitation program still needed [99].

According to Kim et al., rehabilitation of an MMRT after APM should start in the first week after surgery [100]. Initially, PWB and flexion knee ROM <90 degrees are allowed with a gradual progression to FWB and full ROM after 6 weeks post-surgery. The most recent data, though, suggests fast rehabilitation (earlier than 6 weeks FWB + early ROM ET) has similar clinical long-term results [101].

4.5. Rehabilitation as a prevention program for OA of the knee in patients with a meniscal tear

Developing knee OA can be prevented through multiple hospital-supervised rehabilitation programs. The patient must be correctly clinically assessed by a specialist physician before establishing an individualized ET program [102]. Another principle for preventing knee OA is by constantly limiting maximal knee flexion ROM during ET, especially after APM [103]. Knee OA modifications can also include alterations in the meniscal matrix, making it more vulnerable to injury or re-injury [104].

According to Berg et al., there is no long-term difference in degenerative meniscal tears progressing into knee OA after ET or APM [105]. Even though the 2 treatments seem to have relatively similar results, ET is preferred for its better long-term knee pain and functionality alleviation [106]. Furthermore, middle-aged and old patients who underwent APM after a meniscal tear are more susceptible to needing a TKA than patients who were treated through ET [107].

ET showed greater quadriceps force at 3- and 12-month follow-up than APM, but the difference was similar after 5 years. Thigh extensor and flexor muscles, isokinetic strengthening was also proven to prevent knee OA [108].

5. Knee Injections for Meniscus Tear

5.1 PRP injections

Recent evidence suggests that autologous therapy with PRP injections can be an effective therapy for meniscal pathology, but it seems to be suitable especially for degenerative meniscus tears, with research still needed to confirm its long-term efficacy [109].

According to Xie *et al*., PRP knee injection alleviates pain and improves functionality, as measured by VAS and Lysholm scores, but is unlikely to accelerate healing of a meniscus tear [110]. With PRP, pain can be reduced in middle-aged patients from an initial VAS score of 8 to 3 at 1 week after injection. Adding cryotherapy to the rehabilitation plan proved efficient in reducing the residual pain to the VAS 2 score. One autologous PRP injection has not proven any improvement in pain on long-term follow-up, but 3 consecutive PRP injections will alleviate pain [111].

In the current literature, it is accepted that PRP injections are more effective than hyaluronic acid for pain relief and sustained effects.

Furthermore, PRP injections enhance the rehabilitation program by reducing long-term pain and inflammation, providing supplementary benefits compared to the ET program alone [112]. For greater safety and precision, PRP knee injections can be performed under ultrasound guidance. Ultrasound can enhance the long-term effect of PRP treatment by adding more precision, and can also help treat possible complications after meniscus injury, like tendon pathology and bursitis [113].

Platelet-rich plasma is considered safe primarily because the injected substance is derived from the patient's own blood, thereby significantly reducing the risk of allergic reaction or disease transmission. However, the complications are generally mild, rare, and well supported by the patient.

Major contraindications of PRP treatment in the meniscus injury are pregnancy, hemolytic anemia, cancer, major infections, and inflammatory pathologies; the complications of PRP treatment can vary from infection, if the aseptic conditions have not been respected, to septic arthritis [112,114,115].

Long-term complications from platelet-rich plasma (PRP) injections in the knee are not well-documented in scientific literature, primarily because the procedure is generally considered safe with a low risk profile

5.2 Hyaluronic acid injections

HA injections demonstrated efficacy in improving active knee flexion ROM in patients with a degenerative meniscal tear at 2 to 6 months after APM. Hyaluronic Acid has a more mechanical effect on the articular cartilage than PRP injection does. It also reduces long-term pain after a meniscus tear combined with a physical therapy program, but especially in the first 3 months.

HA injections are a safe and efficient treatment option when combined with ET, but based on the most recent published materials, we recommend, if possible, the combination of PRP + ET.

On the complication side, most frequent adverse reactions are related to the injection procedure itself. Serious complications have been reported in a few cases and include: Pseudoseptic reaction and septic arthritis. Although HA is composed of natural substances, there have been reported allergic reactions in individuals with an atopic field for egg allergy or poultry

Though PRP and anti-inflammatory injections are not indicated in cancer or pregnancy, HA injections have a smaller spectrum of contraindications, being safe in the aforementioned ones [103].

5.3 Corticosteroid injections

For middle-aged to elderly patients with degenerative MMRT, corticosteroid injections are considered a non-operative treatment option for clinical improvement. For decades, corticosteroid injections have demonstrated efficacy for various knee pathologies, including arthrosis, bursitis, and tendinopathies. Meniscus tears also benefit from this injectable treatment, but especially when combined with regular exercise and physical therapy. The benefits can be seen in reduced pain and improved knee function, especially in the short- and mid-term, with a peak effect in the first days and lasting up to 2-3 months.

Common local complications after corticosteroid injections in the knee include post-injection flare, which is described as an increase in pain, swelling, and irritation that can last up to 48 hours after the injection, soft tissue atrophy, and septic arthritis.

Long-term complications, although being reported in a short number of cases, include accelerated osteoarthritis, subchondral insufficiency fractures, and osteonecrosis

Meniscal tears combined with Baker's Cyst can be effectively treated with conservative measures such as PT, fluid aspiration, and steroid injections. Still, more research is needed on a superior injectable treatment for alleviating long-term pain and swelling after a meniscus tear: the rich leukocyte PRP [116].

6. Future perspectives and technological advancements

Novel research also tests various biological modulators with potential anti-inflammatory and regenerative properties in the context of meniscal injury. Experimental and preclinical studies have investigated agents such as somatostatin analogues, capsaicin, and various natural antioxidant compounds; however, current evidence remains limited, and clinical validation is required before routine orthopedic application can be considered [117-125].

Creating a megaprosthesis spanning multiple orthopaedic areas, or an entire meniscus prosthesis, can now be done using 3D printing technologies. In the last decade, this technology has developed extensively in the medical field, and technologies of 3D printing and bioprinting are now being explored to combat implant infections and improve osseous integration [126-128]. Moreover, using the custom products that result from 3D additive manufacturing, solutions with antimicrobial activity can be integrated with the scaffold to enhance infection prevention [129]. One method to create a biofunctional and safe prosthesis for a potential meniscus replacement can be by the addition of anti-inflammatory and antimicrobial substances to the scaffold, thus reducing the healing period and improving the patient's quality of life [130-132].

Finally, while pain relief may alternatively be obtained through phytochemicals with anti-inflammatory effects, various other homeopathic approaches have been investigated; however, most studies demonstrate no clinically meaningful benefit beyond placebo, so it should not replace evidence-based orthopedic and rehabilitation approaches [133,134].

Future research should prioritize well-designed randomized controlled trials and long-term outcome studies to determine the safety, efficacy, and clinical applicability of these emerging therapeutic strategies.

7. Limitations

This narrative review has several limitations. At first, only one electronic database (PubMed) was used. This may have restricted the inclusion of relevant research that were indexed in alternative databases. Second, the review design did not include a formal risk-of-bias assessment or a quantitative synthesis, so the conclusions were only based on a qualitative analysis of the evidence. Third, direct comparisons between studies are constrained by variability in rehabilitation protocols, surgical indications, and injectable treatment strategies. Finally, some of the new biological and technological methods discussed in this review are based mostly on early or experimental data and need further clinical validation to ensure clinical validation.

8. Conclusions

Meniscus tear rehabilitation has gained increasing interest in recent years due to its impact on health and quality of life.

A precise diagnosis will result from a comprehensive clinical examination, using specific tests such as McMurray, Thessaly, and joint-line palpation, correlated with MRI findings. In case of grade IIIc or smaller, clinically relevant meniscus lesions, there is a surgical indication.

The management of meniscal tears has evolved into a comprehensive approach that prioritizes individualized, evidence-based treatment strategies. Arthroscopic partial meniscectomy remains the primary surgical option for symptomatic, clinically relevant tears, particularly in younger, physically active individuals.

Conservative treatment of meniscus injuries, particularly personalized exercise therapy programs, has proven strong efficacy in managing degenerative tears, with results comparable to APM on mid- and long-term follow-up. Even though APM may offer faster symptomatic relief in some patients, ET offers superior functional outcomes and may reduce the risk of future total knee arthroplasty.

Between PRP, HA injections, and CS injections, the literature suggests that PRP appears to be among the most studied minimally invasive injectable treatment for improving clinical scores and recovery when combined with supervised exercise therapy.

In conclusion, the management of meniscal tears, whether non-surgical or surgical, can significantly impact quality of life and improve patient well-being.

Abbreviations

ACL = Anterior Cruciate Ligament
ADL = Activity Daily Living
APM = Arthroscopic Partial Meniscectomy
BMI = Body Mass Index
ESWT = Extracorporeal Shock Wave Therapy
ET = Exercise Therapy
FWB = Full Weight Bearing
HA = Hyaluronic Acid
KOOS = Knee Injury and Osteoarthritis Outcome Score
LMRT = Lateral Meniscus Root Tear
MMRT = Medial Meniscus Root Tear
MMPRT = Medial Meniscus Posterior Root Tear
OA = Osteoarthritis
PRP = Platelet Rich Plasma
QOL = Quality of Life
RTS = Return to Sport
VAS = Visual Analog Scale

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References

1. Makris, E.A.; Hadidi, P.; Athanasiou, K.A. The knee meniscus: structure-function, pathophysiology, current repair tech-niques, and prospects for regeneration. Biomaterials 2011, 32, 7411-7431, doi:10.1016/j.biomaterials.2011.06.037.
2. Kuczyński, N.; Boś, J.; Białoskórska, K.; Aleksandrowicz, Z.; Turoń, B.; Zabrzyńska, M.; Bonowicz, K.; Gagat, M. The Meniscus: Basic Science and Therapeutic Approaches. Journal of Clinical Medicine 2025, 14, 2020.
3. Kopf, S.; Beaufils, P.; Hirschmann, M.T.; Rotigliano, N.; Ollivier, M.; Pereira, H.; Verdonk, R.; Darabos, N.; Ntagiopoulos, P.; Dejour, D. Management of traumatic meniscus tears: the 2019 ESSKA meniscus consensus. Knee Surgery, Sports Traumatolo-gy, Arthroscopy 2020, 28, 1177-1194.
4. Dragosloveanu, S.; Vulpe, D.E.; Andrei, C.A.; Nedelea, D.-G.; Garofil, N.D.; Anghel, C.; Dragosloveanu, C.D.M.; Cergan, R.; Scheau, C. Predicting periprosthetic joint Infection: Evaluating supervised machine learning models for clinical application. Journal of Orthopaedic Translation 2025, 54, 51-64, doi:https://doi.org/10.1016/j.jot.2025.06.016.
5. Vulpe, D.E.; Anghel, C.; Scheau, C.; Dragosloveanu, S.; Săndulescu, O. Artificial Intelligence and Its Role in Predicting Periprosthetic Joint Infections. Biomedicines 2025, 13, 1855.
6. Ahmed, I.; Radhakrishnan, A.; Khatri, C.; Staniszewska, S.; Hutchinson, C.; Parsons, N.; Price, A.; Metcalfe, A. Meniscal tears are more common than previously identified, however, less than a quarter of people with a tear undergo arthroscopy. Knee Surg Sports Traumatol Arthrosc 2021, 29, 3892-3898, doi:10.1007/s00167-021-06458-2.
7. Logerstedt, D.S.; Scalzitti, D.A.; Bennell, K.L.; Hinman, R.S.; Silvers-Granelli, H.; Ebert, J.; Hambly, K.; Carey, J.L.; Snyder-Mackler, L.; Axe, M.J. Knee pain and mobility impairments: meniscal and articular cartilage lesions revision 2018: clinical practice guidelines linked to the International classification of Functioning, disability and health from the Orthopaedic section of the American Physical Therapy Association. Journal of Orthopaedic & Sports Physical Therapy 2018, 48, A1-A50.
8. Minea, M.; Vladareanu, L.; Minea, A.; Andronache, I.-T.; Madalina Gabriela, I. Correlations Between Imaging and Clini-cal, Functional and Biological Features in Knee Osteoarthritis. Balneo and PRM Research Journal 2024, 15, 699-699, doi:10.12680/balneo.2024.699.
9. Chiriac, O.; Capitanu, B.S.; Gherghe, M.E.; Maier, C.; Preda, E.M.; Cergan, R.; Scheau, C. Personalized Rehabilitation Following Total Knee Arthroplasty: Integrating Clinical and Imaging Perspectives. Balneo and PRM Research Journal 2025.
10. Nicolas, R.; Nicolas, B.; François, V.; Michel, T.; Nathaly, G. Comparison of knee kinematics between meniscal tear and normal control during a step-down task. Clin Biomech (Bristol) 2015, 30, 762-764, doi:10.1016/j.clinbiomech.2015.05.012.
11. Thorlund, J.B.; Juhl, C.B.; Ingelsrud, L.H.; Skou, S.T. Risk factors, diagnosis and non-surgical treatment for meniscal tears: evidence and recommendations: a statement paper commissioned by the Danish Society of Sports Physical Therapy (DSSF). Br J Sports Med 2018, 52, 557-565, doi:10.1136/bjsports-2017-098429.
12. Dragosloveanu, S.; Capitanu, B.-S.; Josanu, R.; Vulpe, D.; Cergan, R.; Scheau, C. Radiological assessment of Coronal Plane Alignment of the Knee phenotypes in the Romanian population. Journal of Clinical Medicine 2024, 13, 4223.
13. Neagu, M.; Constantin, C.; Surcel, M.; Munteanu, A.; Scheau, C.; Savulescu - Fiedler, I.; Caruntu, C. Diabetic neuropathy: A NRF2 disease? Journal of Diabetes 2024, 16, e13524.
14. Daia, C.; Scheau, C.; Neagu, G.; Andone, I.; Spanu, A.; Popescu, C.; Stoica, S.I.; Verenca, M.C.; Onose, G. Nerve conduction study and electromyography findings in patients recovering from Covid-19–Case report. International Journal of Infectious Diseases 2021, 103, 420-422.
15. Savulescu-Fiedler, I.; Dorobantu-Lungu, L.-R.; Dragosloveanu, S.; Benea, S.N.; Dragosloveanu, C.D.M.; Caruntu, A.; Scheau, A.-E.; Caruntu, C.; Scheau, C. The Cross-Talk Between the Peripheral and Brain Cholesterol Metabolisms. Curr. Issues Mol. Biol. 2025, 47, 115.

16. Dragosloveanu, C.D.; Celea, C.G.; Dragosloveanu, Ş. Comparison of 360 circumferential trabeculotomy and conventional trabeculotomy in primary pediatric glaucoma surgery: complications, reinterventions and preoperative predictive risk factors. International Ophthalmology 2020, 40, 3547-3554.
17. Dragosloveanu, C.D.; Potop, V.; Coviltir, V.; Dinu, V.; Păsărică, M.; Ducan, I.L.; Maier, C.; Dragosloveanu, Ş. Prematurity—Risk Factor or Coincidence in Congenital Glaucoma? Medicina 2022, 58, 334.
18. Whittaker, J.L.; Losciale, J.M.; Juhl, C.B.; Thorlund, J.B.; Lundberg, M.; Truong, L.K.; Miciak, M.; van Meer, B.L.; Culvenor, A.G.; Crossley, K.M.; et al. Risk factors for knee osteoarthritis after traumatic knee injury: a systematic review and meta-analysis of randomised controlled trials and cohort studies for the OPTIKNEE Consensus. Br. J. Sports Med. 2022, 56, 1406-1421, doi:10.1136/bjsports-2022-105496.
19. Alpantaki, K.; Kampouroglou, A.; Koutserimpas, C.; Effraimidis, G.; Hadjipavlou, A. Diabetes mellitus as a risk factor for intervertebral disc degeneration: a critical review. Eur. Spine J. 2019, 28, 2129-2144, doi:10.1007/s00586-019-06029-7.
20. Meng, H.; Gao, Y.; Lu, P.; Zhao, G.M.; Zhang, Z.C.; Sun, T.S.; Li, F. Risk factor analysis of disc and facet joint degeneration after intersegmental pedicle screw fixation for lumbar spondylolysis. J. Orthop. Surg. Res. 2022, 17, 247, doi:10.1186/s13018-022-03082-9.
21. Georgescu, B.; Oprea, D.; Georgescu, B.-A.; Lungu, C.-M.; Borgazi, E.; Madalina Gabriela, I. Update in exploring the con-nection and clinical implications between vitamin D and knee osteoarthritis. Balneo and PRM Research Journal 2024, 15, 736-736, doi:10.12680/balneo.2024.736.
22. Bayram, E.; Şener, N.; Korkmaz, M.; Yıldırım, C.; Aydın, M.; Yurdaışık, I.; Çetinus, M.E. Internal tibial torsion is associated with medial meniscus posterior horn tears. Knee Surg Sports Traumatol Arthrosc 2023, 31, 2251-2256, doi:10.1007/s00167-022-07173-2.
23. Siller, R.L.; Raja, H.; Lindeman, R.W. Association of Posterior Horn Meniscus Tears with Obesity: A Retrospective Study. J Knee Surg 2025, 38, 1-6, doi:10.1055/s-0044-1779512.
24. Atik, I.; Gul, E.; Atik, S. Evaluation of the relationship between Knee Osteoarthritis and Meniscus Pathologies. Malawi Med J 2024, 36, 48-52, doi:10.4314/mmj.v36i1.8.
25. Enyedi, M.; Scheau, C.; Baz, R.; Didilescu, A. Circle of Willis: anatomical variations of configuration. A magnetic resonance angiography study. Folia morphologica 2023, 82, 24-29.
26. Zhang, S.P.; Tong, M.; Li, S.D.; Zhang, B.; Zhang, W.; Wang, R.; Dong, Z.Y.; Huang, Y.F. The Role of Microvascular Varia-tions in the Process of Intervertebral Disk Degeneration and Its Regulatory Mechanisms: A Literature Review. Orthop. Surg. 2024, 16, 2587-2597, doi:10.1111/os.14209.
27. Ye, K.; Lin, J.; Sun, Y.; Wu, Y.; Xu, J.; He, S. Variation and treatment of vessels in laparoscopic right hemicolectomy. Surg. Endosc. 2018, 32, 1583-1584, doi:10.1007/s00464-017-5751-2.
28. van Deventer, P.V.; Graewe, F.R. The Blood Supply of the Breast Revisited. Plast. Reconstr. Surg. 2016, 137, 1388-1397, doi:10.1097/prs.0000000000002048.
29. Kaki, A.; Blank, N.; Alraies, M.C.; Kajy, M.; Grines, C.L.; Hasan, R.; Htun, W.W.; Glazier, J.; Mohamad, T.; Elder, M.; et al. Access and closure management of large bore femoral arterial access. J. Interv. Cardiol. 2018, 31, 969-977, doi:10.1111/joic.12571.
30. Hanna, T.; Smith, N.P.; Sebastianelli, W.J. Treatment, Return to Play, and Performance Following Meniscus Surgery. Curr Rev Musculoskelet Med 2022, 15, 157-169, doi:10.1007/s12178-022-09754-7.
31. Luvsannyam, E.; Jain, M.S.; Leitao, A.R.; Maikawa, N.; Leitao, A.E. Meniscus Tear: Pathology, Incidence, and Management. Cureus 2022, 14, e25121, doi:10.7759/cureus.25121.
32. Matar, H.E.; Duckett, S.P.; Raut, V. Degenerative meniscal tears of the knee: evaluation and management. Br J Hosp Med (Lond) 2019, 80, 46-50, doi:10.12968/hmed.2019.80.1.46.
33. Chen, W.; Xu, H.; Lina, Z.; Xu, M.; Li, X.; Sun, G. The value of MRI in the diagnosis of pediatric head and neck lymphatic malformations: A study of 46 surgical cases. Eur. J. Radiol. 2024, 170, 111260, doi:10.1016/j.ejrad.2023.111260.
34. Blyth, M.; Anthony, I.; Francq, B.; Brooksbank, K.; Downie, P.; Powell, A.; Jones, B.; MacLean, A.; McConnachie, A.; Nor-rie, J. Diagnostic accuracy of the Thessaly test, standardised clinical history and other clinical examination tests (Apley's, McMur-ray's and joint line tenderness) for meniscal tears in comparison with magnetic resonance imaging diagnosis. Health Technol. Assess. 2015, 19, 1-62, doi:10.3310/hta19620.
35. An, L.; Yan, Y. MRI-based Diagnosis of Anterior Talofibular Ligament Injury. J. Coll. Physicians Surg. Pak. 2021, 31, 1369-1371, doi:10.29271/jcpsp.2021.11.1369.
36. Ye, Q.L.; Li, J.; Hou, J.D.; Cai, L.; Xiong, X.; Wang, H.J. [Comparison of multislice spiral CT and MRI in diagnosis of occult fracture of knee joint with meniscus and ligament injury]. Zhongguo Gu Shang 2022, 35, 967-970, doi:10.12200/j.issn.1003-0034.2022.10.011.
37. Scheau, A.-E.; Jurca, S.O.; Scheau, C.; Lupescu, I.G. Non-Surgical Treatment for Hepatocellular Carcinoma: What to Ex-pect at Follow-Up Magnetic Resonance Imaging—A Pictorial Review. Applied Sciences 2024, 14, 9159.
38. Tampa, M.; Georgescu, S.R.; Mitran, C.I.; Mitran, M.I.; Matei, C.; Scheau, C.; Constantin, C.; Neagu, M. Recent Advances in Signaling Pathways Comprehension as Carcinogenesis Triggers in Basal Cell Carcinoma. J Clin Med 2020, 9, 3010, doi:10.3390/jcm9093010.

39. Phelan, N.; Rowland, P.; Galvin, R.; O'Byrne, J.M. A systematic review and meta-analysis of the diagnostic accuracy of MRI for suspected ACL and meniscal tears of the knee. Knee Surg. Sports Traumatol. Arthrosc. 2016, 24, 1525-1539, doi:10.1007/s00167-015-3861-8.
40. Preda, E.M.; Constantin, N.; Dragosloveanu, S.; Cergan, R.; Scheau, C. An MRI-Based Method for the Morphologic Assessment of the Anterior Tibial Tuberosity. J Clin Med 2024, 13, 6601.
41. Chagas-Neto, F.A.; Nogueira-Barbosa, M.H.; Lorenzato, M.M.; Salim, R.; Kfuri-Junior, M.; Crema, M.D. Diagnostic performance of 3D TSE MRI versus 2D TSE MRI of the knee at 1.5 T, with prompt arthroscopic correlation, in the detection of menis-cal and cruciate ligament tears. Radiol Bras 2016, 49, 69-74, doi:10.1590/0100-3984.2015.0042.
42. Cabral, J.; Sinikumpu, J. Clinical considerations of anatomy and magnetic resonance imaging in pediatric meniscus tear, with imaging-based treatment options. J. Child. Orthop. 2023, 17, 63-69, doi:10.1177/18632521231152270.
43. Mittendorff, L.; Young, A.; Sim, J. A narrative review of current and emerging MRI safety issues: What every MRI technologist (radiographer) needs to know. J Med Radiat Sci 2022, 69, 250-260, doi:10.1002/jmrs.546.
44. Halvorson, J.J.; Anz, A.; Langfitt, M.; Deonanan, J.K.; Scott, A.; Teasdall, R.D.; Carroll, E.A. Vascular injury associated with extremity trauma: initial diagnosis and management. J. Am. Acad. Orthop. Surg. 2011, 19, 495-504, doi:10.5435/00124635-201108000-00005.
45. Baz, R.A.; Scheau, C.; Niscoveanu, C.; Bordei, P. Morphometry of the Entire Internal Carotid Artery on CT Angiography. Medicina 2021, 57, 832.
46. Kazemi, S.M.; Keyhani, S.; Sadighi, M.; Hosseininejad, S.M. Navigation of femoral and popliteal artery around the knee with CT angiography: implications for surgical interventions. Surg. Radiol. Anat. 2023, 45, 1515-1523, doi:10.1007/s00276-023-03241-5.
47. Scheau, C.; Dragosloveanu, S.; Petre, M.A.; Gherghe, M.E.; Andrei, C.A.; Georgescu, D.E.; Iliescu, M.G.; Cergan, R.; Baz, R.O. The importance of radiological parameters of proximal femoral morphology in recovery management of patients with avascular necrosis undergoing hip arthroplasty. BALNEO AND PRM RESEARCH JOURNAL 2023, 14, doi:10.12680/balneo.2023.641.
48. Yasin, P.; Yimit, Y.; Abulimiti, A.; Luan, H.; Peng, C.; Yakufu, M.; Song, X. Dual-center study on AI-driven multi-label deep learning for X-ray screening of knee abnormalities. Sci. Rep. 2025, 15, 38014, doi:10.1038/s41598-025-21895-6.
49. O'Sullivan, O.; Valdes, A.M.; Watson, F.; Kluzek, S.; Bull, A.M.J.; Bennett, A.N. Insights into knee post-traumatic osteoar-thritis pathophysiology from the relationship of serum biomarkers to radiographic features in the ADVANCE cohort. Arthritis Res. Ther. 2025, 27, 207, doi:10.1186/s13075-025-03648-y.
50. Galli, M.; Marzetti, E. Accuracy of McMurray and Joint Line Tenderness Tests in the Diagnosis of Chronic Meniscal Tears: An Ad Hoc Receiver Operator Characteristic Analysis Approach. Arch Phys Med Rehabil 2017, 98, 1897-1899, doi:10.1016/j.apmr.2016.09.122.
51. Noorduyn, J.C.A.; Teuwen, M.M.H.; van de Graaf, V.A.; Willigenburg, N.W.; Schavemaker, M.; van Dijk, R.; Scholten-Peeters, G.G.M.; Heymans, M.W.; Coppieters, M.W.; Poolman, R.W. In patients eligible for meniscal surgery who first receive physical therapy, multivariable prognostic models cannot predict who will eventually undergo surgery. Knee Surg Sports Trau-matol Arthrosc 2022, 30, 231-238, doi:10.1007/s00167-021-06468-0.
52. Hare, K.B.; Stefan Lohmander, L.; Kise, N.J.; Risberg, M.A.; Roos, E.M. Middle-aged patients with an MRI-verified medi-al meniscal tear report symptoms commonly associated with knee osteoarthritis. Acta Orthop 2017, 88, 664-669, doi:10.1080/17453674.2017.1360985.
53. Shiwaku, K.; Kamiya, T.; Suzuki, D.; Yamakawa, S.; Otsubo, H.; Suzuki, T.; Takahashi, K.; Okada, Y.; Teramoto, A.; Ohni-shi, H.; et al. The Role of the Medial Meniscus in Anterior Knee Stability. Orthop J Sports Med 2022, 10, 23259671221132845, doi:10.1177/23259671221132845.
54. Pache, S.; Aman, Z.S.; Kennedy, M.; Nakama, G.Y.; Moatshe, G.; Ziegler, C.; LaPrade, R.F. Meniscal Root Tears: Current Concepts Review. Arch Bone Jt Surg 2018, 6, 250-259.
55. Moon, H.S.; Choi, C.H.; Jung, M.; Chung, K.; Jung, S.H.; Kim, Y.H.; Kim, S.H. Medial Meniscus Posterior Root Tear: How Far Have We Come and What Remains? Medicina (Kaunas) 2023, 59, doi:10.3390/medicina59071181.
56. Carreau, J.H.; Sitton, S.E.; Bollier, M. Medial Meniscus Root Tear in the Middle Aged Patient: A Case Based Review. Iowa Orthop J 2017, 37, 123-132.
57. Koo, J.H.; Choi, S.H.; Lee, S.A.; Wang, J.H. Comparison of Medial and Lateral Meniscus Root Tears. PLoS One 2015, 10, e0141021, doi:10.1371/journal.pone.0141021.
58. Enayatollahi, M.; Azboy, I.; Dietz, M.J.; Aunon, A.; Heshmat, R.; Dragosloveanu, S.; Ehsani, A.; Scheau, C.; Shafiee, G.; Ghamgosar, A. What Are the Contraindications, if Any, for the Use of Tranexamic Acid During Knee or Hip Arthroplasty? The Journal of Arthroplasty 2025, 40, S21-S24.
59. Dragosloveanu, S.; Capitanu, B.-S.; Moise, M.N.; Vulpe, D.E.; Josanu, R.; Gherghe, M.E.; Preda, E.M.; Cergan, R.; Scheau, C. Restoring Hip Symmetry and Its Impact on Outcomes: A Case Series on Megaprosthesis Use in Non-Oncological Patients with Complications After Total Hip Arthroplasty. Symmetry 2025, 17, 322.
60. Cristea, S.; Predescu, V.; Dragosloveanu, S.; Cuculici, S.; Marandici, N. Surgical Approaches for Total Knee Arthroplasty; 2016; pp. 25-47.

61. Dragosloveanu, S.; Petre, M.-A.; Cretu, B.; Mihailescu, A.A.; Cergan, R.; Scheau, C.; Dragosloveanu, Ș. Etiology of total knee arthroplasty revisions: a two-Decade Institutional Perspective. Cureus 2024, 16.
62. Dragosloveanu, S.; Petre, M.-A.; Gherghe, M.E.; Nedelea, D.-G.; Scheau, C.; Cergan, R. Overall accuracy of radiological digital planning for total hip arthroplasty in a specialized orthopaedics hospital. Journal of clinical medicine 2023, 12, 4503.
63. Dragosloveanu, S.; Petre, M.-A.; Capitanu, B.S.; Dragosloveanu, C.D.M.; Cergan, R.; Scheau, C. Initial Learning Curve for Robot-Assisted Total Knee Arthroplasty in a Dedicated Orthopedics Center. J Clin Med 2023, 12, 6950.
64. Wedge, C.; Crowell, M.; Mason, J.; Pitt, W. Rehabilitation and Return to Play Following Meniscus Repair. Sports Med Arthrosc Rev 2021, 29, 173-179, doi:10.1097/jsa.0000000000000303.
65. Marigi, E.M.; Davies, M.R.; Marx, R.G.; Rodeo, S.A.; Williams, R.J., 3rd. Meniscus Tears in Elite Athletes: Treatment Con-siderations, Clinical Outcomes, and Return to Play. Curr Rev Musculoskelet Med 2024, 17, 313-320, doi:10.1007/s12178-024-09907-w.
66. Carder, S.L.; Messamore, W.G.; Scheffer, D.R.; Giusti, N.E.; Schroeppel, J.P.; Mullen, S.; Vopat, B.G. Publicly Available Rehabilitation Protocols Designated for Meniscal Repairs Are Highly Variable. Arthrosc Sports Med Rehabil 2021, 3, e411-e419, doi:10.1016/j.asmr.2020.10.004.
67. Wiley, T.J.; Lemme, N.J.; Marcaccio, S.; Bokshan, S.; Fadale, P.D.; Edgar, C.; Owens, B.D. Return to Play Following Menis-cal Repair. Clin Sports Med 2020, 39, 185-196, doi:10.1016/j.csm.2019.08.002.
68. Calanna, F.; Duthon, V.; Menetrey, J. Rehabilitation and return to sports after isolated meniscal repairs: a new evidence-based protocol. J Exp Orthop 2022, 9, 80, doi:10.1186/s40634-022-00521-8.
69. Gastaldo, M.; Gokeler, A.; Della Villa, F. High quality rehabilitation to optimize return to sport following lateral meniscus surgery in football players. Ann Jt 2022, 7, 36, doi:10.21037/aoj-21-32.
70. Abram, S.G.F.; Hopewell, S.; Monk, A.P.; Bayliss, L.E.; Beard, D.J.; Price, A.J. Arthroscopic partial meniscectomy for me-niscal tears of the knee: a systematic review and meta-analysis. Br J Sports Med 2020, 54, 652-663, doi:10.1136/bjsports-2018-100223.
71. Nedelea, D.-G.; Vulpe, D.; Enyedi, M.; Cergan, R.; Scheau, C.; Baz, R.O.; Dragosloveanu, S. 709 Comprehensive Approach of the Diagnosis, Treatment, and Medical Rehabilitation of Patients with Spondylolisthesis. Balneo and PRM Research Journal 2024, 15.
72. Cavanaugh, J.T. Rehabilitation of meniscal injury and surgery. The journal of knee surgery 2014, 27, 459-478.
73. Pan, H.; Zhang, P.; Zhang, Z.; Yang, Q. Arthroscopic partial meniscectomy combined with medical exercise therapy versus isolated medical exercise therapy for degenerative meniscal tear: A meta-analysis of randomized controlled trials. Int J Surg 2020, 79, 222-232, doi:10.1016/j.ijsu.2020.05.035.
74. Chahla, J.; Dean, C.S.; Moatshe, G.; Mitchell, J.J.; Cram, T.R.; Yacuzzi, C.; LaPrade, R.F. Meniscal Ramp Lesions: Anatomy, Incidence, Diagnosis, and Treatment. Orthop J Sports Med 2016, 4, 2325967116657815, doi:10.1177/2325967116657815.
75. Ma, J.; Chen, H.; Liu, A.; Cui, Y.; Ma, X. Medical exercise therapy alone versus arthroscopic partial meniscectomy followed by medical exercise therapy for degenerative meniscal tear: a systematic review and meta-analysis of randomized con-trolled trials. J Orthop Surg Res 2020, 15, 219, doi:10.1186/s13018-020-01741-3.
76. Luc-Harkey, B.A.; Safran-Norton, C.E.; Mandl, L.A.; Katz, J.N.; Losina, E. Associations among knee muscle strength, structural damage, and pain and mobility in individuals with osteoarthritis and symptomatic meniscal tear. BMC Musculoskelet Disord 2018, 19, 258, doi:10.1186/s12891-018-2182-8.
77. Skou, S.T.; Thorlund, J.B. A 12-week supervised exercise therapy program for young adults with a meniscal tear: Program development and feasibility study. J Bodyw Mov Ther 2018, 22, 786-791, doi:10.1016/j.jbmt.2017.07.010.
78. El Ghazaly, S.A.; Rahman, A.A.; Yusry, A.H.; Fathalla, M.M. Arthroscopic partial meniscectomy is superior to physical rehabilitation in the management of symptomatic unstable meniscal tears. Int Orthop 2015, 39, 769-775, doi:10.1007/s00264-014-2539-z.
79. Obaid, H.; Patel, A.; McWalter, E.; Ernst, M.; Mondal, P.; Shepel, M.L. Qualitative Magnetic Resonance Imaging Assessment of the Semimembranosus Tendon in Patients with Medial Meniscal Tears. Diagnostics (Basel) 2024, 14, doi:10.3390/diagnostics14171962.
80. Thorlund, J.B.; Rodriguez Palomino, J.; Juhl, C.B.; Ingelsrud, L.H.; Skou, S.T. Infographic. Exercise therapy for meniscal tears: evidence and recommendations. Br J Sports Med 2019, 53, 315-316, doi:10.1136/bjsports-2018-099492.
81. Choi, M.; Lee, S.J.; Park, C.M.; Ryoo, S.; Kim, S.; Jang, J.Y.; Kim, H.A. Arthroscopic Partial Meniscectomy versus Physical Therapy for Degenerative Meniscal Tear: a Systematic Review. J Korean Med Sci 2021, 36, e292, doi:10.3346/jkms.2021.36.e292.
82. Fernández-Matías, R.; García-Pérez, F.; Gavín-González, C.; Martínez-Martín, J.; Valencia-García, H.; Flórez-García, M.T. Effectiveness of exercise versus arthroscopic partial meniscectomy plus exercise in the management of degenerative meniscal tears at 5-year follow-up: a systematic review and meta-analysis. Arch Orthop Trauma Surg 2023, 143, 2609-2620, doi:10.1007/s00402-022-04579-y.

83. Huang, M.; Shao, H.; Zhang, S.; Gao, H.; Feng, S.; Sun, L.; Yu, C.; Du, X.; Chen, J.; Li, Y. Single-Dose Radial Extracorporeal Shock Wave Therapy Modulates Inflammation During Meniscal Tear Healing in the Avascular Zone. Am J Sports Med 2024, 52, 710-720, doi:10.1177/03635465231221725.
84. Hashimoto, S.; Ohsawa, T.; Omae, H.; Oshima, A.; Takase, R.; Chikuda, H. Extracorporeal shockwave therapy for degen-erative meniscal tears results in a decreased T2 relaxation time and pain relief: An exploratory randomized clinical trial. Knee Surg Sports Traumatol Arthrosc 2024, 32, 3141-3150, doi:10.1002/ksa.12384.
85. Li, J.; Zhu, W.; Gao, X.; Li, X. Comparison of Arthroscopic Partial Meniscectomy to Physical Therapy following Degenerative Meniscus Tears: A Systematic Review and Meta-analysis. Biomed Res Int 2020, 2020, 1709415, doi:10.1155/2020/1709415.
86. Lubowitz, J.H.; Brand, J.C.; Rossi, M.J. Nonoperative Management of Degenerative Meniscus Tears Is Worth a Try. Arthroscopy 2020, 36, 327-328, doi:10.1016/j.arthro.2019.11.128.
87. Noorduyn, J.C.A.; van de Graaf, V.A.; Willigenburg, N.W.; Scholten-Peeters, G.G.M.; Kret, E.J.; van Dijk, R.A.; Buchbind-er, R.; Hawker, G.A.; Coppieters, M.W.; Poolman, R.W. Effect of Physical Therapy vs Arthroscopic Partial Meniscectomy in Peo-ple With Degenerative Meniscal Tears: Five-Year Follow-up of the ESCAPE Randomized Clinical Trial. JAMA Netw Open 2022, 5, e2220394, doi:10.1001/jamanetworkopen.2022.20394.
88. Stensrud, S.; Risberg, M.A.; Roos, E.M. Effect of exercise therapy compared with arthroscopic surgery on knee muscle strength and functional performance in middle-aged patients with degenerative meniscus tears: a 3-mo follow-up of a random-ized controlled trial. Am J Phys Med Rehabil 2015, 94, 460-473, doi:10.1097/phm.0000000000000209.
89. Mao, S.; Xiao, K.; Xu, H.; Wang, Y.; Guo, X. Clinical Outcomes of Exercise Rehabilitation for Degenerative Tibial Meniscal Tears: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. J Pain Res 2024, 17, 3431-3448, doi:10.2147/jpr.S467423.
90. Collins, J.E.; Shrestha, S.; Losina, E.; Marx, R.G.; Guermazi, A.; Jarraya, M.; Jones, M.H.; Levy, B.A.; Mandl, L.A.; Williams, E.E.; et al. Five-Year Structural Changes in the Knee Among Patients With Meniscal Tear and Osteoarthritis: Data From a Randomized Controlled Trial of Arthroscopic Partial Meniscectomy Versus Physical Therapy. Arthritis Rheumatol 2022, 74, 1333-1342, doi:10.1002/art.42105.
91. Damsted, C.; Thorlund, J.B.; Hölmich, P.; Lind, M.; Varnum, C.; Villumsen, M.D.; Hansen, M.S.; Skou, S.T. Effect of exer-cise therapy versus surgery on mechanical symptoms in young patients with a meniscal tear: a secondary analysis of the DREAM trial. Br J Sports Med 2023, 57, 521-527, doi:10.1136/bjsports-2022-106207.
92. Karia, M.; Ghaly, Y.; Al-Hadithy, N.; Mordecai, S.; Gupte, C. Current concepts in the techniques, indications and outcomes of meniscal repairs. Eur J Orthop Surg Traumatol 2019, 29, 509-520, doi:10.1007/s00590-018-2317-5.
93. Favreau, H.; Maroteau, G.; Praz, C.; Ehlinger, M.; Carnesecchi, O.; Benad, K.; Louis, M.L.; Djebara, A.E.; Graveleau, N.; Freychet, B.; et al. Rehabilitation protocol after suturing the medial meniscus of a stable knee, a retrospective series of the Fran-cophone Arthroscopy Society. Orthop Traumatol Surg Res 2023, 109, 103651, doi:10.1016/j.otsr.2023.103651.
94. McCulloch, P.C.; Jones, H.L.; Hamilton, K.; Hogen, M.G.; Gold, J.E.; Noble, P.C. Does simulated walking cause gapping of meniscal repairs? J Exp Orthop 2016, 3, 11, doi:10.1186/s40634-016-0047-3.
95. Kalra, M.; Bakker, R.; Tomescu, S.S.; Polak, A.M.; Nicholls, M.; Chandrashekar, N. The effect of unloader knee braces on medial meniscal strain. Prosthet Orthot Int 2019, 43, 132-139, doi:10.1177/0309364618798173.
96. Mameri, E.S.; Jackson, G.R.; Gonzalez, F.; Kaplan, D.J.; Jawanda, H.; Batra, A.; Khan, Z.A.; Chahla, J. Meniscus Radial Tears: Current Concepts on Management and Repair Techniques. Curr Rev Musculoskelet Med 2023, 16, 182-191, doi:10.1007/s12178-023-09831-5.
97. Iii, R.; Nasr, M.; Mohamadi, A.; Deangelis, J.; Nazarian, A.; Ramappa, A. Rehabilitation following meniscal repair: A systematic review. BMJ Open Sport & Exercise Medicine 2018, 4, e000212, doi:10.1136/bmjsem-2016-000212.
98. Biały, M.; Kublin, K.; Wilczyński, B.; Forelli, F.; Gnat, R. Does Concomitant Meniscectomy or Meniscus Repair Affect Muscle Strength, Lower Extremity Balance, and Functional Tests after Anterior Cruciate Ligament Reconstruction? J Clin Med 2024, 13, doi:10.3390/jcm13113310.
99. Kawada, K.; Furumatsu, T.; Fukuba, M.; Tamura, M.; Higashihara, N.; Okazaki, Y.; Yokoyama, Y.; Katayama, Y.; Hamada, M.; Ozaki, T. Increased quadriceps muscle strength after medial meniscus posterior root repair is associated with decreased medial meniscus extrusion progression. BMC Musculoskelet Disord 2023, 24, 727, doi:10.1186/s12891-023-06858-0.
100. Kim, J.S.; Lee, M.K.; Choi, M.Y.; Kong, D.H.; Ha, J.K.; Kim, J.G.; Chung, K.S. Rehabilitation after Repair of Medial Menis-cus Posterior Root Tears: A Systematic Review of the Literature. Clin Orthop Surg 2023, 15, 740-751, doi:10.4055/cios21231.
101. Cong, T.; Reddy, R.P.; Hall, A.J.; Ernazarov, A.; Gladstone, J. Current Practices for Rehabilitation After Meniscus Repair: A Survey of Members of the American Orthopaedic Society for Sports Medicine. Orthop J Sports Med 2024, 12, 23259671231226134, doi:10.1177/23259671231226134.
102. Abed, V.; Ray, M.; Smathers, J.; Stone, A.V. Assessment of Video Quality and Reliability of YouTube Videos Regarding Meniscus Tear Rehabilitation. Cureus 2023, 15, e36299, doi:10.7759/cureus.36299.

103. Hall, M.; Nielsen, J.H.; Holsgaard-Larsen, A.; Nielsen, D.B.; Creaby, M.W.; Thorlund, J.B. Forward lunge knee biomechanics before and after partial meniscectomy. Knee 2015, 22, 506-509, doi:10.1016/j.knee.2015.03.005.
104. Tsujii, A.; Nakamura, N.; Horibe, S. Age-related changes in the knee meniscus. Knee 2017, 24, 1262-1270, doi:10.1016/j.knee.2017.08.001.
105. Berg, B.; Roos, E.M.; Englund, M.; Kise, N.J.; Tiulpin, A.; Saarakkala, S.; Engebretsen, L.; Eftang, C.N.; Holm, I.; Risberg, M.A. Development of osteoarthritis in patients with degenerative meniscal tears treated with exercise therapy or surgery: a ran-domized controlled trial. Osteoarthritis Cartilage 2020, 28, 897-906, doi:10.1016/j.joca.2020.01.020.
106. Meng, J.; Tang, H.; Xiao, Y.; Liu, W.; Wu, Y.; Xiong, Y.; Gao, S. Long-term effects of exercise therapy versus arthroscopic partial meniscectomy for degenerative meniscal tear: A meta-analysis of randomized controlled trials. Asian J Surg 2024, 47, 2566-2573, doi:10.1016/j.asjsur.2024.03.091.
107. Navarro, R.A.; Adams, A.L.; Lin, C.C.; Fleming, J.; Garcia, I.A.; Lee, J.; Black, M.H. Does Knee Arthroscopy for Treatment of Meniscal Damage with Osteoarthritis Delay Knee Replacement Compared to Physical Therapy Alone? Clin Orthop Surg 2020, 12, 304-311, doi:10.4055/cios19114.
108. Berg, B.; Roos, E.M.; Kise, N.J.; Engebretsen, L.; Holm, I.; Risberg, M.A. Muscle Strength and Osteoarthritis Progression After Surgery or Exercise for Degenerative Meniscal Tears: Secondary Analyses of a Randomized Trial. Arthritis Care Res (Hobo-ken) 2022, 74, 70-78, doi:10.1002/acr.24736.
109. Elphingstone, J.W.; Alston, E.T.; Colorado, B.S. Platelet-rich plasma for nonoperative management of degenerative meniscal tears: A systematic review. J Orthop 2024, 54, 67-75, doi:10.1016/j.jor.2024.03.009.
110. Xie, Y.L.; Jiang, H.; Wang, S.; Hu, A.L.; Yang, Z.L.; Mou, Z.; Wang, Y.; Wu, Q. Effect of platelet-rich plasma on meniscus repair surgery: A meta-analysis of randomized controlled trials. Medicine (Baltimore) 2022, 101, e30002, doi:10.1097/md.0000000000030002.
111. Thirugnana Sambandam, S.; Dominic, D.; Ravi, P.; Jadhav, A. Efficacy of Intra-articular Super-dose Platelet-Rich Plasma Injection in Improving Pain in a Middle-Aged Sedentary Female With Meniscal Tear: A Case Report. Cureus 2024, 16, e70059, doi:10.7759/cureus.70059.
112. Baria, M.R.; Sellon, J.L.; Lueders, D.; Smith, J. Sonographically Guided Knee Meniscus Injections: Feasibility, Techniques, and Validation. Pm r 2017, 9, 998-1005, doi:10.1016/j.pmrj.2016.12.012.
113. Coll, C.; Coudreuse, J.M.; Guenoun, D.; Bensoussan, L.; Viton, J.M.; Champsaur, P.; Le Corroller, T. Ultrasound-Guided Perimeniscal Injections: Anatomical Description and Feasibility Study. J Ultrasound Med 2022, 41, 217-224, doi:10.1002/jum.15700.
114. Gorecki, G.-P.; Tomescu, D.-R.; Pleș, L.; Panaitescu, A.-M.; Dragosloveanu, Ș.; Scheau, C.; Sima, R.-M.; Coman, I.-S.; Grigorean, V.-T.; Cochior, D. Implications of using artificial intelligence in the diagnosis of sepsis/sepsis shock. Germs 2024, 14, 77.
115. Caruntu, A.; Moraru, L.; Surcel, M.; Munteanu, A.; Costache, D.O.; Tanase, C.; Constantin, C.; Scheau, C.; Neagu, M.; Caruntu, C. Persistent changes of peripheral blood lymphocyte subsets in patients with oral squamous cell carcinoma. In Pro-ceedings of the Healthcare, 2022; p. 342.
116. de Castro, J.C.; Wang, D.; Celis, P.; Strakowski, J. Ultrasound-guided injection using leucocyte-rich platelet-rich plasma for treatment of meniscal injuries in a duathlete: a case report. Regen Med 2024, 19, 523-528, doi:10.1080/17460751.2024.2418705.
117. Creamer, P. Osteoarthritis pain and its treatment. Current opinion in rheumatology 2000, 12, 450-455.
118. Periferakis, A.; Tsigas, G.; Periferakis, A.-T.; Tone, C.M.; Hemes, D.A.; Periferakis, K.; Troumpata, L.; Badarau, I.A.; Scheau, C.; Caruntu, A. Agonists, Antagonists and Receptors of Somatostatin: Pathophysiological and Therapeutical Implications in Neoplasias. Curr. Issues Mol. Biol. 2024, 46, 9721-9759.
119. Periferakis, A.; Tsigas, G.; Periferakis, A.-T.; Badarau, I.A.; Scheau, A.-E.; Tampa, M.; Georgescu, S.R.; Didilescu, A.C.; Scheau, C.; Caruntu, C. Antitumoral and Anti‐inflammatory Roles of Somatostatin and Its Analogs in Hepatocellular Carcinoma. Analytical Cellular Pathology 2021, 2021, 1840069.
120. Petran, E.M.; Periferakis, A.; Troumpata, L.; Periferakis, A.-T.; Scheau, A.-E.; Badarau, I.A.; Periferakis, K.; Caruntu, A.; Savulescu-Fiedler, I.; Sima, R.-M. Capsaicin: Emerging pharmacological and therapeutic insights. Current Issues in Molecular Biolo-gy 2024, 46, 7895-7943.
121. Dumitrache, M.-D.; Jieanu, A.S.; Scheau, C.; Badarau, I.A.; Popescu, G.D.A.; Caruntu, A.; Costache, D.O.; Costache, R.S.; Constantin, C.; Neagu, M. Comparative effects of capsaicin in chronic obstructive pulmonary disease and asthma. Experimental and Therapeutic Medicine 2021, 22, 917.
122. Caruntu, C.; Negrei, C.; Ilie Ghita, M.; Caruntu, A.; Badarau, I.A.; ioan Buraga, I.B.; Boda, D.; Albu, A.; Brănişteanu, D. Capsaicin, a hot topic in skin pharmacology and physiology. Farmacia 2015, 63, 487-491.
123. Verdonk, R. Alternative treatments for meniscal injuries. The Journal of Bone & Joint Surgery British Volume 1997, 79, 866-873.
124. Scheau, C.; Mihai, L.G.; Bădărău, I.A.; Caruntu, C. Emerging applications of some important natural compounds in the field of oncology. Farmacia 2020, 68, 992-998.

125. Periferakis, A.; Troumpata, L.; Periferakis, K.; Adalis, G.; Periferakis, A.; Georgatos-Garcia, S.; Maier, C.; Costache, A.; Garofil, D.; Costache, D. Traditional Ethnomedical and Ethnobotanical Applications and Uses of Piper Nigrum. RJ Mil. Med 2025, 128, 286-303.
126. Timofticiuc, I.-A.; Dragosloveanu, S.; Caruntu, A.; Scheau, A.-E.; Badarau, I.A.; Garofil, N.D.; Didilescu, A.C.; Caruntu, C.; Scheau, C. 3D bioprinting in limb salvage surgery. Journal of Functional Biomaterials 2024, 15, 383.
127. Timofticiuc, I.-A.; Caruntu, A.; Dragosloveanu, C.D.M.; Scheau, A.-E.; Badarau, I.A.; Periferakis, A.; Dragosloveanu, S.; Didilescu, A.C.; Caruntu, C.; Scheau, C. Head and Neck 3D Bioprinting—A Review on Recent Advancements in Soft Tissue 3D Bioprinting and Medical Applications. Journal of Functional Biomaterials 2025, 16, 240.
128. Timofticiuc, I.-A.; Călinescu, O.; Iftime, A.; Dragosloveanu, S.; Caruntu, A.; Scheau, A.-E.; Badarau, I.A.; Didilescu, A.C.; Caruntu, C.; Scheau, C. Biomaterials adapted to VAT photopolymerization in 3D printing: Characteristics and medical applica-tions. Journal of functional biomaterials 2023, 15, 7.
129. Periferakis, A.; Periferakis, A.-T.; Troumpata, L.; Dragosloveanu, S.; Timofticiuc, I.-A.; Georgatos-Garcia, S.; Scheau, A.-E.; Periferakis, K.; Caruntu, A.; Badarau, I.A. Use of biomaterials in 3D printing as a solution to microbial infections in arthro-plasty and osseous reconstruction. Biomimetics 2024, 9, 154.
130. Periferakis, A.; Periferakis, A.-T.; Troumpata, L.; Periferakis, K.; Georgatos-Garcia, S.; Touriki, G.; Dragosloveanu, C.D.M.; Caruntu, A.; Savulescu-Fiedler, I.; Dragosloveanu, S. Pinosylvin: A Multifunctional Stilbenoid with Antimicrobial, Anti-oxidant, and Anti-Inflammatory Potential. Current Issues in Molecular Biology 2025, 47, 204.
131. Periferakis, A.; Periferakis, A.T.; Troumpata, L.; Periferakis, K.; Scheau, A.E.; Savulescu-Fiedler, I.; Caruntu, A.; Badarau, I.A.; Caruntu, C.; Scheau, C. Kaempferol: A Review of Current Evidence of Its Antiviral Potential. Int. J. Mol. Sci. 2023, 24, doi:10.3390/ijms242216299.
132. Periferakis, A.T.; Periferakis, A.; Periferakis, K.; Caruntu, A.; Badarau, I.A.; Savulescu-Fiedler, I.; Scheau, C.; Caruntu, C. Antimicrobial Properties of Capsaicin: Available Data and Future Research Perspectives. Nutrients 2023, 15, doi:10.3390/nu15194097.
133. Periferakis, A.; Periferakis, K.; Iftime, A.; Troumpata, L.; Periferakis, A.T.; Maier, C.; Costache, D.O. Detection of Acu-puncture Points and Meridians Based on their Electrical Properties: Current Evidence and Future Research Perspectives. ROMA-NIAN JOURNAL OF MILITARY MEDICINE 2025, 128, doi:10.55453/rjmm.2025.128.5.2.
134. Perrot, S.; Menkes, C.J. Nonpharmacological approaches to pain in osteoarthritis. Available options. Drugs 1996, 52 Suppl 3, 21-26, doi:10.2165/00003495-199600523-00005..