

Diagnostic and treatment algorithm for degenerative meniscus lesions

Introduction

Degenerative meniscus lesions (DML) develop slowly, usually in patients over 50 years old. It is defined as a lesion occurring without any history of significant acute trauma in a patient over 35, according to the European Society of Sports Traumatology, Knee Surgery & Arthroscopy (ESSKA). Their incidence increases with age. Most frequently they are horizontal, non-traumatic lesions found accidentally during examination. Menisci play an important role in load distribution, shock absorption and knee joint stability. Symptomatic degenerative meniscus lesions can be a source of discomfort for a significant number of patients. Because only one third of the meniscus is vascularized, the healing potential is low in degenerative lesions. Anamnesis and physical examination are key to determine the source of pain. Joint line tenderness, positive McMurray test and knee locking can suggest meniscus lesion. Diagnosis is made based on anamnesis and physical examination, with confirmation using magnetic resonance imaging (MRI) and/or arthroscopy. Treatment of degenerative meniscus lesions include both conservative and operative treatment. Data available in the literature show that there is no superiority of an arthroscopic meniscectomy over a non-operative treatment or sham surgery. Thereupon, in 2016 ESSKA developed a consensus related to the diagnostic and therapeutic algorithm for degenerative meniscus lesions (Fig. 1).

ESSKA Meniscus Consensus algorithm

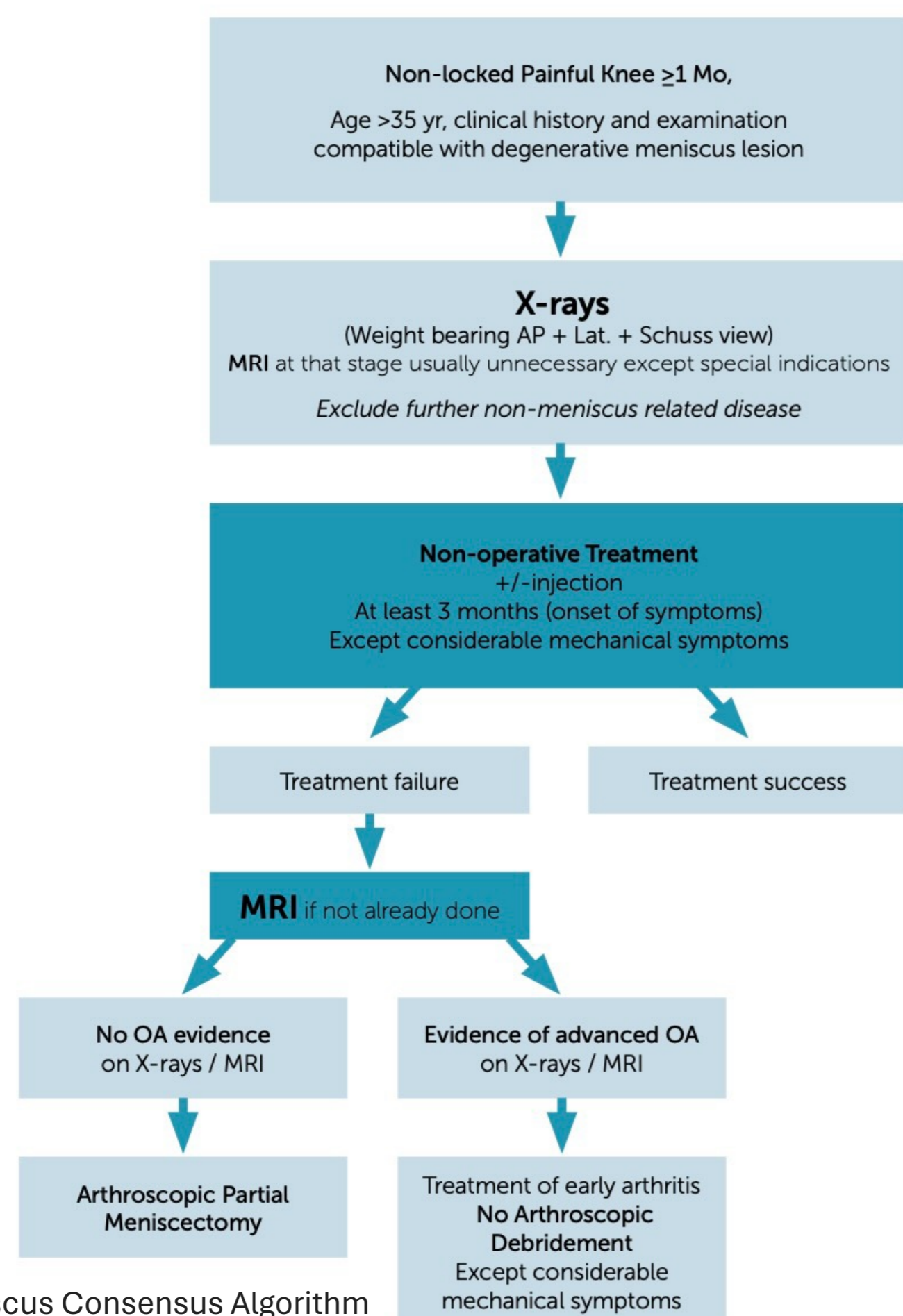


Fig. 1 – ESSKA Meniscus Consensus Algorithm



Fig. 2 – Magnetic resonance imaging studies showed the horizontal and degenerative meniscal tear within the lateral meniscus. T2-weight gradient echo image.



Fig. 3 – Arthroscopic view of a degenerative medial meniscus posterior horn tear.

Study hypothesis

The hypothesis of the study assumes an improvement of the assessed parameters.

In all groups we expect the improvement in VAS, IKDC, Lysholm scale and KOOS scales as well as symptoms subsiding. We expect to find elevated levels of pro-inflammatory cytokines as well as MMPs and PGE2 after meniscal trauma, but then the decrease of their concentration and improvement in MRI images.

Aim of the study

The aim is to develop diagnostic and therapeutic algorithm for treatment of degenerative meniscus lesions and to validate and assess effectiveness of the ESSKA consensus algorithm. By doing so, we plan to improve the quality of care for patients suffering from degenerative meniscus lesions. We want to develop recommendations and indications for types of conservative treatment by observing the menisci healing response.

Material and methods

Inclusion criteria:

- Over 35 years old
- Painful, non-locked knee
- History and examination compatible with DML
- Informed consent

Exclusion criteria:

- Congenital meniscal defects
- Post-traumatic meniscus injury

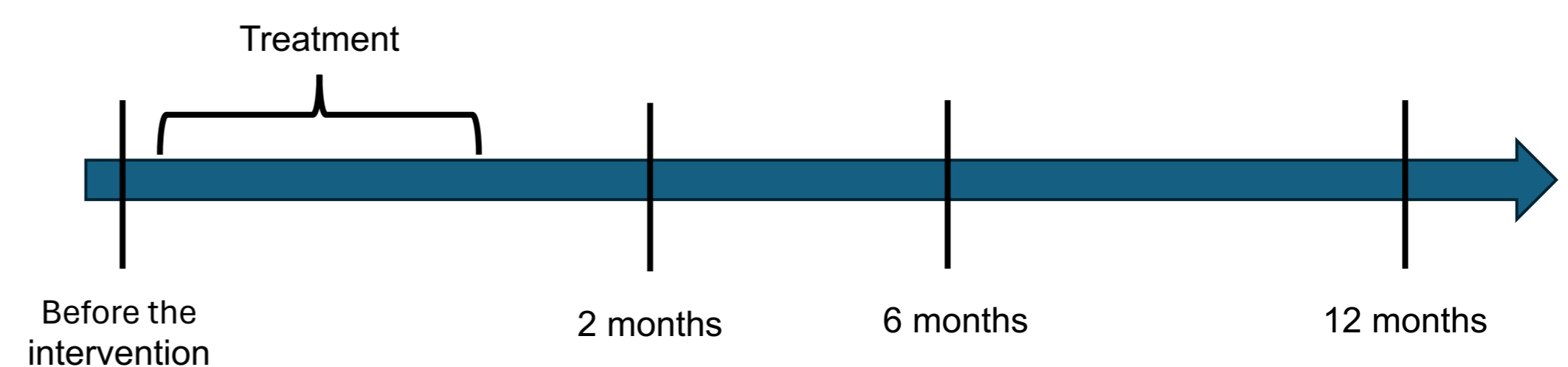
Randomization

Rehabilitation

Hybrid Hyaluronic Acid injections

Platelet Rich Plasma injections (PRP)

Assessment



Injections will be administered in series of three at one-week intervals. Just before the injection, 1 ml of synovial fluid will be collected, and the peripheral blood sample will be obtained, and plasma separated. Peripheral blood samples will be obtained in all groups before the start of the treatment and after 2, 6 and 12 months. ELISA will be used to quantify the levels cytokines (IL-1 beta, IL-6, IL-8, IL-10, TNF-alfa), matrix metalloproteinases (MMPs) – MMP-2 and MMP-3 and prostaglandin E2 (PGE2) in plasma and synovial fluid. Symptoms, physical examinations, Visual Analogue Scale (VAS), Lysholm Knee Scoring scale, International Knee Documentation Committee Subjective Knee Form (IKDC) and Knee Injury and Osteoarthritis Outcome Score (KOOS) scales will be assessed before the intervention and after 2, 6 and 12 months of treatment.

References:

- ESSKA Meniscus Consensus Project: Degenerative meniscus lesions <https://cdn.ymaws.com/www.esska.org/resource/resmgr/Docs/2016-meniscus-consensus-proj.pdf>
- Hohmann E. Treatment of Degenerative Meniscus Tears. *Arthroscopy*. 2023;39(4):911-912. doi:10.1016/j.arthro.2022.12.002
- Howell R, Kumar NS, Patel N, Tom J. Degenerative meniscus: Pathogenesis, diagnosis, and treatment options. *World J Orthop*. 2014;5(5):597-602. Published 2014 Nov 18. doi:10.5312/wjo.v5.i5.597
- Ozeki N, Koga H, Sekiya I. Degenerative Meniscus in Knee Osteoarthritis: From Pathology to Treatment. *Life (Basel)*. 2022;12(4):603. Published 2022 Apr 18. doi:10.3390/life12040603
- Elbaz A, Beer Y, Rath E, et al. A unique foot-worm device for patients with degenerative meniscal tear. *Knee Surg Sports Traumatol Arthrosc*. 2013;21(2):380-387. doi:10.1007/s00167-012-2026-2
- Beaufils P, Becker R, Kopf S, et al. Surgical management of degenerative meniscus lesions: the 2016 ESSKA meniscus consensus. *Knee Surg Sports Traumatol Arthrosc*. 2017;25(2):335-346. doi:10.1007/s00167-016-4407-4
- Mine, Ueda, Ihara, Kawamura, Kuriyama, Tominaga, Yasunari. Possibility of Meniscal Repair for Degenerative and Horizontal Tears. *The Open Orthopaedics Journal*. 2019. 13. 260-265. 10.2174/1874325001913010260.
- Doral MN, Bilge O, Huri G, Turhan E, Verdonk R. Modern treatment of meniscal tears. *EFORT Open Rev*. 2018;3(5):260-268. Published 2018 May 21. doi:10.1302/2058-5241.3.170067