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Review

Effectiveness of exercise therapy for meniscal lesions in adults: A systematic review and meta-analysis

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ABSTRACT

Objectives: This study evaluated the effectiveness of exercise therapy in patients with meniscal lesions.
Design: Systematic review and meta-analysis.
Methods: Nine databases were searched up to July 2015, including EMBASE and Medline OvidSP. Randomized and controlled clinical trials in adults with traumatic or degenerative meniscal lesions were considered for inclusion. Interventions had to consist of exercise therapy in non-surgical patients or after meniscectomy, and had to be compared with meniscectomy, no exercise therapy, or to a different type of exercise therapy. Primary outcomes were pain and function on short term (≤3 months) and long term (>3 months). Two researchers independently selected the studies, assessed the risk of bias, and extracted data.
Results: Of the 1415 identified articles 14 articles describing 12 studies were included; all had some concerns about the risk of bias. There was no significant difference between exercise therapy and meniscectomy for pain (MD 0.27 [−4.30,4.83]) and function (SMD −0.32 [−0.68,0.03]). After meniscectomy, there was conflicting evidence for the effectiveness of exercise therapy when compared to no exercise therapy for pain and function. There was no significant difference between various types of exercise therapy for pain (MD 19.30 [−6.60,45.20]) and function (SMD 0.01 [−0.27,0.28]).
Conclusions: Exercise therapy and meniscectomy yielded comparable results on pain and function. Exercise therapy compared to no exercise therapy after meniscectomy showed conflicting evidence at short term, but was more effective on function at long term. The preferable type/frequency/intensity of exercise therapy remains unclear. The strength of the evidence was low to very low.

1. Introduction

Knee injuries are very common in general practice: in the Netherlands, the incidence of traumatic and non-traumatic knee injuries is 5.3 and 17 per 1000 persons per year, respectively.[1] The annual incidence estimate of a meniscus tear for primary and secondary care in Sweden was 79 [95% CI: 63,94] per 100,000 patients with an observed peak age of 15–19 years old.[2] The cause of a meniscal lesion can be either traumatic or degenerative. Most patients with a traumatic meniscal lesion are younger and have a longitudinal meniscal lesion, whereas most patients with a degenerative meniscal lesion are older and have concomitant joint cartilage damage.[3]

In the Netherlands, patients with a meniscal lesion who have knee pain or difficulty with activities of daily living and sports can consult their general practitioner (GP) or contact a physiotherapist. In primary care, it is difficult to diagnosis a meniscal tear based on history taking plus physical examination.[4] With the exception of patients presenting with a locked knee, GPs generally treat meniscal lesions by applying a wait-and-see policy, consisting of advice to rest for a few days and using pain medication on demand. Patients who consult their GP with persistent or recurrent knee complaints are referred to an orthopedic surgeon.[5] After radiographic imaging or magnetic resonance imaging of the knee, the surgeon may decide to continue the wait-and-see policy. Alternatively, depending on the state and/or duration of symptoms, arthroscopic surgery may be performed: either treating the lesion

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by meniscectomy or by suturing a torn meniscal lesion in younger patients.[6]

As part of the wait-and-see policy, or after meniscectomy, GPs or orthopedic surgeons can refer patients to a physiotherapist, whose treatment consists of exercise therapy to reduce limitations in knee function, reduce knee pain, and restore normal muscle strength.[7]

However, because the effectiveness of exercise therapy for the treatment of patients with meniscal lesions remains unclear, this review assesses the effectiveness of exercise therapy in patients with a meniscal lesion compared with: (1) no exercise therapy in non-surgical patients, (2) meniscectomy, and (3) no exercise therapy or a different type of exercise therapy after meniscectomy.

2. Methods

2.1. Search strategy

The following databases were searched up to July 2014: EMBASE, Medline OvidSP, Web of Science, Scopus, SportDiscus, the Cochrane Central Register of Controlled Trials (CENTRAL), Cinahl, PubMed and Google Scholar. Existing highly sensitive search strategies (filters) to identify randomized trials were used. See Appendix 1 for the search strategy. The protocol of the review is registered in the International Prospective register of systematic reviews [CRD42014014892].

2.2. Selection of studies

Assessment of the eligibility of the studies was performed independently by two researches (NMS and KvO). First, studies were considered for inclusion based on the title and abstract and, secondly, full-text reports were examined for compliance of the studies with the eligibility criteria. Any disagreements about inclusion were resolved by discussion; if necessary, a third person (PAJL) was consulted to reach consensus. The initial interobserver reliability (i.e. Kappa) of the selection of the studies was calculated.

Studies were included if they met the following eligibility criteria; (1) it was a randomized controlled trial (RCT) or a controlled clinical trial (CCT); (2) patients had to be aged ≥18 years; (3) the study had to investigate males or females with a degenerative or traumatic, medial, lateral or combined meniscal lesion: studies on patients with additional anterior cruciate ligament or medial or lateral collateral ligament lesions or patients with additional knee osteoarthritis (Kellgren–Lawrence grade >2) were not eligible for inclusion, neither were patients treated with open instead of arthroscopic meniscectomy or meniscal repair; (4) the intervention had to consist of exercise therapy (either in non-surgical patients or starting within one year after meniscectomy) and had to describe the provision of, the timing of, or the delivery of (e.g. supervised versus home exercises) the exercise therapy; (5) the exercise therapy had to be compared to another treatment, e.g. meniscectomy, or to no treatment, or to a different type of exercise therapy: exercise therapy consisting of neuromuscular stimulation or electromyographic biofeedback was not eligible for inclusion neither were interventions consisting of only local physiotherapy, e.g. ultrasound; (6) the study had to contain at least one primary or secondary outcome measure. The primary outcome measures were knee pain and function, and the secondary outcome measures were muscle strength and physical performance.

2.3. Risk of bias assessment

A risk of bias assessment was independently performed by two researchers (NMS and PAJL) using the Cochrane Collaboration's tool.[8] For the present review, the domains of baseline similarity, compliance and co-interventions are added separately, leading to 9 domains to be scored. For the item 'blinding of the outcome assessment', the primary outcomes were assessed (pain and function). Each domain was scored as 'low risk of bias', 'high risk of bias' or 'unclear risk of bias'. A consensus method was used to discuss and solve any disagreements between the review authors. If disagreement persisted, a third person (SMAB-Z) was consulted. The initial interobserver reliability (i.e. Kappa) of the risk of bias assessment was evaluated and reported.

2.4. Assessment of heterogeneity

Heterogeneity was assessed by looking at the forest plot and the results of the Chi-square test for heterogeneity and the I^2 statistic. The heterogeneity was considered statistical significant if the P-value for the Chi-square test was less than 0.1 and the I^2 statistic was 50% or more.[8]

2.5. Strength of the evidence

The strength of the evidence was independently determined with the GRADE approach by two researchers (NMS and PAJL).[8] A judgment of high quality, moderate quality, low quality or very low quality was made for the different outcomes. The strength of the evidence was downgraded based on the risk of bias, inconsistencies, indirectness, imprecision and publication bias with one (serious concerns) or two points (very serious concerns).

2.6. Data extraction and analysis

Extraction of data from the studies was independently performed by two researchers (NMS and MR). In case of any disagreement, consensus was achieved by discussion among the review authors. If disagreement persisted, a third person (SMAB-Z) was consulted. The following data were extracted: sex and age of the participants, the type of meniscal lesion, details on the type of interventions of the exercise and the control groups, time to follow-up, study outcomes, and results. If the article did not contain sufficient information, the original authors were contacted. Preferable outcome measures were a visual analogue scale (VAS), a numeric pain rating scale (NPRS) or the Knee injury and Osteoarthritis Outcome Score (KOOS) subscale of pain for pain; the Lysholm knee scoring scale, the subjective knee form of the International Knee Documentation Committee (IKDC), the KOOS subscale of physical function, the KOOS total score or the Hughston clinical questionnaire for function; isokinetic muscle strength at 60°/s and 180°/s, 5 maximum repetitions on a leg extension bench or isometric strength for knee muscle strength of flexion and extension; and the one-leg hop test for performance. For the above mentioned preferable outcome measures a hierarchy was used for the extraction of the data; for example if the study presented results from both the VAS and the NPRS, the first mentioned outcome is extracted. Extracted data were stratified for short-term (0–3 months) and long-term outcome (>3 months). For studies measuring on different time points at short term (for example four, eight and 12 weeks), the time point nearest by three months was considered. For long term 6, 12 and 24 months follow-up were considered. Review Manager version 5 from the Cochrane Collaboration was used for data analysis. The mean and standard deviation (SD) of the change scores from baseline to follow-up were extracted from the studies for the exercise and control groups. When the SD was not available, it was calculated out of the 95% confidence interval (95% CI). When change scores were not available, and it was not possible to calculate them because of lacking of baseline scores, follow-up scores were extracted. The mean differences (MD) between the exercise and control groups were calculated with a 95% CI. A meta-analysis was conducted in trials with

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