Thorlund JE, Juhl CB, et al. Arthroscopic surgery for degenerative knee: systematic review and meta-analysis of benefits and harms. BMJ 2015;350:h2747 doi: 10.1136/bmj.h2747

Design: Meta-analysis of randomized clinical trials

Purpose of study: to determine benefits and harms of arthroscopic knee surgery involving partial meniscectomy, debridement, or both for patients with knee pain and degenerative knee disease.

PICOS:

- Patient population: Middle aged and older patients with knee pain with or without osteoarthritis
    - Patients with concomitant anterior cruciate ligament injuries were excluded
- Interventions: Arthroscopic surgery involving partial meniscectomy, débridement, or both
- Comparison interventions: nonsurgical interventions such as sham surgery (including sham lavage), exercise, or medical treatment
- Outcomes: patient-reported pain and physical function as benefits, and adverse events as harms
    - Data from the primary followup time (which could vary from3 to 24 months) was used for the primary analysis
    - Pain scores were transformed into a scale from 0 to 100 for all included studies, regardless of the scale on which they were reported
        - Pain outcomes of interest included pain during activity, pain during walking, pain at rest, SF-36 bodily pain subscale, and number of painful days
        - Functional outcomes of interest included the SF-36 physical function subscale, WOMAC subscale for physical function, and selected pain disability indices from other questionnaires
    - Adverse events of interest were deep vein thrombosis (DVT), pulmonary embolism (PE), infection, and all-cause mortality
- Study types:
    - For benefits of surgery: randomized trials only
    - For harms: randomized trials and observational cohort studies

Study selection:

- Databases included MEDLINE, EMBASE, CINAHL, Web of Science, ant the Cochrane Central Register from 2000 through April of 2014
- Two authors independently assessed all titles and abstracts for eligibility

- Study quality was also independently assessed by two authors who rated studies for risk of bias on how the random sequence was generated, concealment of allocation, blinding, handling of dropouts, selective outcome reporting, and other criteria

Results:

- The literature search yielded 1789 reports, but only 18 were considered for inclusion after review of title and abstract; 10 of these reports on 9 different trials were included in the systematic review
- The 9 included trials had data on 1270 patients who were treated with meniscectomy, debridement, or both, or a variety of control interventions
- In two trials, all patients had radiographic knee osteoarthritis (OA) of grade 2 or more on the Kellgren-Lawrence (KL) scale; in five trials, some patients had OA, and in 2 trials, no patient had OA
- The time frame for primary outcome collection varied from 3 months to 24 months
- The primary analysis for pain, using data pooled from all trials, showed a statistically significant but clinically unimportant effect of arthroscopy on pain, equivalent to 2.4 points on a 100 point scale
    - A pain benefit was observed only in the first six months; after six months, no pain benefit from arthroscopic surgery was apparent
- The analysis for knee function from pooling dat from all trials did not show a benefit of arthroscopic surgery at any of the analyzed time points from 3 months to 24 months
- Only two studies had adequate blinding; the remaining studies were not blinded
- Subgroup analyses, examining separately studies of patients with and without knee OA, did not change the results for the primary analyses
- Similarly, subgroup analyses of studies of meniscectomy, debridement, or both interventions, did not change the results for the primary analyses
- For the analysis of harms, 9 studies (2 randomized trials and 7 observational cohort studies) were included in the analysis
    - The frequency of DVT was 4.13 per 1000 procedures, venous thromboembolism with 5.68 events per 1000 procedures, PE with 1.45 per 1000 procedures, infection with 2.11 per 1000 procedures, and all cause mortality with 0.96 per 1000 procedures

Authors' conclusions:

- Arthroscopic surgery has a small and clinically unimportant effect on knee pain up to 6 months following the procedure; there is high quality evidence for this conclusion
    - The pain benefits of arthroscopic surgery are approximately the same as the pain benefits of acetaminophen, less than those of NSAIDS, and markedly less than the pain benefits of exercise

- Arthroscopic surgery has no effect on knee function at any time following the procedure; there is high quality evidence for this conclusion
- There was a high rate of consistency from all randomized trials from different countries and different populations for analyses of benefit
- There was heterogeneity of effect for the analyses of harms, reflecting differences in study size and quality of reporting of adverse events
- Most studies were not blinded, but this would be expected to favor the arthroscopic surgery treatment arms rather than the control arms, and thus does not undermine the results of the meta-analysis
- Serious adverse events from arthroscopic surgery are rare
- There is a persistent clinical perception of the impressive benefits of arthroscopy based on observations of individual patients, but the benefits of other interventions are equally impressive
- Meniscal tears are frequently seen in middle aged patients, and may be regarded as early signs of OA, but should be treated with information, exercise, and often with weight loss

Comments:

- The authors refer to a hierarchy of patient-reported outcomes for meta-analysis of knee OA trials (Juhl 2012), but do not list these in the study
    - These include the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) pain and function scales, the SF-36 body pain and function scales, and pain VAS during activity and during walking
    - Juhl reported that the most responsive single measure for pain was the VAS for "pain during activity," and the most responsive composite measure was the WOMAC pain subscale, and the most responsive measure for disability was the WOMAC function subscale
- The systematic review had a protocol which was registered at a central registry for systematic reviews at the University of York in the UK, and used the Juhl hierarchy for its analyses
- All requirements for a high-quality meta-analysis are met
- Even though several interventions (meniscectomy, debridement, and both together) were combined as if they had the same clinical effect, the homogeneity of the effect estimates in Figure 1 justifies this assumption

Assessment: High-quality meta-analysis supporting strong evidence that arthroscopic meniscectomy, debridement, or a combination of both procedures has a small, clinically unimportant benefit for nontraumatic knee pain in the first six months after the procedure, and no benefit after six months, for middle-aged and older patients with and without radiographic evidence of knee osteoarthritis . There is strong evidence that in middle aged and older patients with nontraumatic knee pain, whether or not due to osteoarthritis, there is no functional benefit

of meniscectomy, debridement, or a combination of both procedures. This evidence does not apply to knee pain with concomitant anterior cruciate ligament injury.

Reference:

Juhl C, Lund H, et al. A hierarchy of patient-reported outcomes for meta-analysis of knee osteoarthritis trials: empirical evidence from a survey of high impact journals. Arthritis 2012, article ID 136245, 10.1155/2012/136245.