

Common Elective Orthopaedic Procedures and Their Clinical Effectiveness: Umbrella Review of Level 1 Evidence

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The objective of this study was to determine the clinical effectiveness of common elective orthopaedic procedures compared with no treatment, placebo, or non-operative care and assess the impact on clinical guidelines. It is primarily a meta-analysis of randomized controlled trials (except for when no meta-analyses were available).

Ten of the most common elective orthopaedic procedures were studied:

- Arthroscopic anterior cruciate ligament reconstruction
- Arthroscopic meniscal repair of the knee
- Arthroscopic partial meniscectomy of the knee
- Arthroscopic rotator cuff repair
- Arthroscopic subacromial decompression
- Carpal tunnel decompression
- Lumbar spine decompression
- Lumbar spine fusion
- Total hip replacement
- Total knee replacement

The “clinical effectiveness of a treatment” is how beneficial the treatment is under usual or everyday conditions, compared with doing nothing or opting for another type of care.

Randomized controlled trials are considered the best method to evaluate the clinical effectiveness of an intervention. **[Important]**

KEY POINTS FROM THIS ARTICLE:

1) “According to the World Health Organization, the most common and disabling musculoskeletal conditions are osteoarthritis, back and neck pain, fractures associated with fragility of the bone, injuries, and systemic inflammatory conditions such as rheumatoid arthritis.”

- “Musculoskeletal conditions are typically characterized by persistent pain and restricted mobility.”

- “According to the 2017 Global Burden of Disease study, musculoskeletal conditions were the biggest contributor to global disability.”
- “Many musculoskeletal conditions can be managed in primary care through a combination of core interventions such as exercise, weight management, physical therapies, psychological therapies, and drug treatment.”

2) “Total joint replacement is one of the most common elective orthopaedic procedures performed worldwide for end stage osteoarthritis, the most common musculoskeletal condition.”

- “Total joint replacement accounts for enormous expenditures in the health system.”

3) Many orthopaedic surgical interventions “do not have readily available or high-quality evidence on their clinical effectiveness to support their use,” therefore:

- The overall quality of existing guidelines is suboptimal.
- “Consensus recommendations are not always supported by the best available evidence.”

I Arthroscopic Anterior Cruciate Ligament Reconstruction for End-Stage Osteoarthritis:

- The pooled analyses showed no difference in patient reported outcome measures between surgery and non-surgical approaches.
- Two randomized controlled trials were included and “each reported no differences in patient reported outcome measures between surgical treatment and non-surgical treatment.”

II Arthroscopic Meniscal Repair of the Knee for Traumatic Tears:

- There were no reviews of randomized controlled trials comparing arthroscopic meniscal repair with no treatment, placebo, or non-operative care.
- The studies reviewed suggested that surgical treatment was superior to non-surgical treatment.

III Arthroscopic Partial Meniscectomy of Knee for Degenerative Tears:

- “In all six reviews of randomized controlled trials, arthroscopic partial meniscectomy did not show clinically important benefit over conservative treatment for knee function and pain.”

- “Surgical treatment should not be considered the first line intervention for patients with knee pain and meniscal tear.”

IV Arthroscopic Rotator Cuff Repair for Acute Rotator Cuff Tears:

- “Arthroscopic rotator cuff repair provided little or no clinically important benefits for pain, function, quality of life, or participant rated global assessment of treatment success compared with non-operative treatment.”
- The best available evidence showed no clinically important benefits of arthroscopic rotator cuff repair over non-operative care.

V Arthroscopic Subacromial Decompression for Subacromial Impingement Syndrome

- All reviews indicated that subacromial decompression did not provide clinically important improvement in pain, function, or quality of life compared with other treatments.
- The two randomized controlled trials “reported no clinically important differences in patient reported outcomes and adverse events between arthroscopic subacromial decompression and placebo surgery.”

VI Carpal Tunnel Decompression for Carpal Tunnel Syndrome:

- Surgical treatment was shown to relieve symptoms significantly better than non-surgical treatment.
 - “However, surgical treatment was associated with more complications.”
- “In all three selected randomized controlled trials that represented the best body of evidence and compared carpal tunnel surgery (mostly open release) with non-surgical treatment (wrist splinting, steroid injection, or hand therapy), surgery was more effective in most outcome measures (overall symptom improvement, paraesthesia, function, median nerve distal motor latencies, and sensory nerve conduction velocity).”

VII Lumbar Spine Decompression for Spinal Canal Stenosis:

- Surgical procedures included decompression, spinal fusion, and laminectomy.
- Comparing surgical treatment with non-surgical treatment showed similar outcomes.

VIII Lumbar Spine Fusion for Degenerative Disc Disease:

- Studies comparing lumbar spine fusion with non-operative management reported no differences in Oswestry Disability Index scores; “however, one review reported that lumbar spine fusion was associated with surgical complications.”

IX Total Hip Replacement for End-Stage Osteoarthritis:

- There were no individual randomized controlled trials comparing total hip replacement versus non-surgical treatment.
- The evidence on functional outcomes was inconclusive.

X Total Knee Replacement for End-Stage Osteoarthritis:

- “Findings showed that treatment with total knee replacement followed by non-surgical treatment resulted in greater pain relief and functional improvement after 12 months compared with non-surgical treatment alone; however, total knee replacement was associated with a high number of serious adverse events.”

4) “Randomised controlled trials have shown that arthroscopic anterior cruciate ligament reconstruction, arthroscopic partial meniscectomy, arthroscopic repair for acute rotator cuff tears, arthroscopic subacromial decompression, lumbar spinal decompression for spinal canal stenosis, and spinal fusion for degenerative disc disease have similar outcomes to non-operative care.”

5) “Although seven of the procedures (namely, arthroscopic anterior cruciate ligament reconstruction for anterior cruciate ligament rupture, arthroscopic meniscal repair of the knee for traumatic tears, arthroscopic rotator cuff repair for acute rotator cuff tears, carpal tunnel decompression for carpal tunnel syndrome, lumbar spine decompression for spinal canal stenosis, and total hip replacement and total knee replacement for end stage osteoarthritis) have been recommended for use by national guidelines, a high quality body of evidence on the clinical effectiveness to definitively support these recommendations does not exist for most of these procedures.”

6) “Surgery is expensive and associated with considerable morbidity, increased risk of complications attributed to the surgical intervention, and excess mortality.”

- “A cogent argument can be made for surgery being used as a second line treatment when non-surgical measures have failed.” **[Very Important]**

7) “The observation that most commonly used and recommended orthopaedic procedures had a limited and low-quality evidence base relating to their effectiveness is concerning.” **[Important]**

- “Another important reason for the lack of evidence is the failure of investigators to report their negative findings, the refusal of journals to publish such findings, or both.”
 - “With these findings, a need exists for an improved and more rigorous approach to the recommendation of procedures with limited evidence on their clinical effectiveness.”
- 8) “Of the 10 procedures that we studied, carpal tunnel decompression had the strongest evidence base supporting it.”
- 9) “Most of the procedures recommended by national guidelines and used by surgeons have insufficient readily available, high quality evidence on their clinical effectiveness.”
- “This forces patients and clinicians to make decisions based solely on observational evidence.”
- 10) “Most common elective orthopaedic interventions are not backed up by readily available high-quality evidence, mostly owing to a lack of definitive randomized controlled trials.”
- 11) “Of the procedures studied, carpal tunnel decompression and total knee replacement showed superiority over non-operative care.”