**Wajon A, Vinycomb T, Carr E, Edmunds I, Ada L. Surgery for thumb (trapeziometacarpal joint) osteoarthritis. Cochrane Database of Systematic Reviews 2015, Issue 2. Art. No.: CD004631. DOI: 10.1002/14651858.CD004631.pub4**

**PMID: 25702783**

Design: Meta-analysis of Clinical Trials

Purpose of study: to compare the effectiveness of common surgical techniques for the treatment of trapeziometacarpal osteoarthritis

PICOS:

* Patient population: patients of any age and gender with a clinical diagnosis of radiographically defined Stage I-IV OA of the base of the thumb
  + Stage I: slight widening of the joint space with normal articular contours
  + Stage II: slight narrowing of the joint space with minimal sclerotic changes and with joint debris less than 2 mm in diameter
  + Stage III: markedly narrowed joint space with cystic changes, sclerotic changes, joint debris greater than 2 mm in diameter, with varying degrees of dorsal migration but with preservation of the scaphotrapezial joint
  + Stage IV: Stage III deterioration of the trapeziometacarpal joint plus narrowing of the scaphotrapezial joint with sclerotic and cystic changes
* Interventions: surgical interventions for thumb OA
  + Metacarpal osteotomy
  + Trapeziometacarpal arthrodesis
  + Trapeziectomy alone
  + Trapeziectomy with ligament reconstruction
  + Trapeziectomy with ligament reconstruction and tendon interposition (LRTI)
  + Trapeziectomy with interpositional arthroplasty (IA)
  + Trapeziometacarpal joint replacement
  + Artelon joint resurfacing
  + Sham surgery in which the patient undergoes anesthesia and incisions but without further surgical procedures
* Comparisons: all of the above interventions
* Outcomes:
  + Major outcomes were pain, physical function on functional scales, quality of life, patient global assessment, adverse events, reoperation rates, and thumb joint imaging
  + Minor outcomes were range of motion and lateral pinch strength
* Study types: randomized or quasi-randomized trials and controlled trials which measured relevant outcomes, regardless of methodological quality

Study selection:

* Databases were searched through August 13 and included Cochrane, MEDLINE, CINAHL, clinicaltrials.gov, EMBASE, and the World Health Organization portal
* Studies were eligible for inclusion if they were randomized, quasi-randomized, or controlled, with all patients receiving a surgical intervention
* The Cochrane Risk of Bias tool was used to assess the methodological quality of the included studies
* Two authors worked independently to assess studies for inclusion in the review and to assess study quality

Principal results:

* 1357 records were identified in the database searches, 192 were deemed potentially relevant, 18 studies were included in a qualitative synthesis of results, and 11 studies were included in a quantitative synthesis (meta-analysis)
* No studies compared any surgical intervention with a sham surgical intervention; all comparisons were between different actual operations
* Six comparisons were made between different types of operation
  + Trapeziectomy with LRTI versus trapeziectomy
  + Trapeziectomy with LRTI versus trapeziectomy with ligament reconstruction
  + Trapeziectomy with LRTI versus trapeziectomy with IA
  + Trapeziectomy with IA versus Artelon implant
  + Trapeziectomy with LRTI versus arthrodesis
  + Trapeziectomy with IA versus trapeziometacarpal joint replacement
* Briefly, for the major outcomes, most of the six comparisons did not find group differences at followup
  + For the comparison between trapeziectomy with IA versus Artelon joint resurfacing, the trapeziectomy with IA group had significantly less pain on a 100 point scale (14 points, 95% CI between 4.94 and 23.06) than the Artelon group, and the trapeziectomy plus IA group also had less mild to moderate swelling
  + For one of the minor outcomes, there were 8° more range of motion in the trapeziectomy plus LRTI than in a group which had trapeziectomy plus ligament reconstruction
  + For another minor outcome, trapeziometacarpal joint imaging, the scapho-metacarpal distance was significantly less in the trapeziectomy plus IA group than in the group with trapeziometacarpal joint replacement
* Many studies did not report sufficient data (such as standard deviations) which would have permitted the authors of the meta-analysis to make meaningful outcome comparisons

Authors’ conclusions:

* There is insufficient evidence to conclude that any one procedure confers greater benefits in pain relief, physical function, global assessment, or range of motion than any other
* There is sufficient evidence to conclude that no one procedure produces greater benefits in strength than any other or fewer adverse events than any other
* Further research needs to improve methodological quality to reduce the risk of bias; for example, future randomized trials need to ensure that the allocation sequence is adequately concealed, that intention-to-treat analysis is used as the primary method of statistical comparison, and that blinding of outcomes is done and reported

Comments:

* Most of the conclusions of the current meta-analysis agree with those of a previous Cochrane review (Wajon 2005) by most of the same authors: there is insufficient evidence to determine whether one surgical approach is more advantageous than any other with respect to pain relief, physical function, and global assessment of benefit
* However, there were two conclusions in the 2005 review which were not confirmed in the current review:
  + There is sufficient evidence to conclude that trapeziectomy alone is accompanied by fewer complications than trapeziectomy combined with interpositional arthroplasty
  + Unless there are strong indications to do otherwise, trapeziectomy alone should be preferred to procedures that combine it with other procedures
* Three basic differences between the 2005 and 2015 review appear to account for the changes in the conclusions favoring simple trapeziectomy with respect to postoperative complications
  + First, the 2015 meta-analysis incorporated two studies from 2012 which had not been published in the 2005 Cochrane
  + Second, the 2015 meta-analysis excluded three studies which had been included in the 2005 review
    - Two of these studies reported on patient cohorts which had been included in the 2012 studies
    - One of the studies in the 2005 Cochrane was removed entirely from the analysis; this was a study which involved the implant of a porcine graft and was terminated early for adverse events; this porcine graft is no longer used and would be irrelevant
  + Third, the authors had reservations about combining diverse unfavorable outcomes from different studies under the umbrella of “adverse events”
    - For example, one study counted adverse events as recurrent pain, instability, neuroma, sensory loss, and rupture the flexor carpi radialis (FCR); a different study counted superficial radial nerve dysfunction, palmar cutaneous branch of the median nerve dysfunction, FCR/pollicis longus pulling sensation, tendon scar, and complex regional pain syndrome
* In addition, the authors used a different method of assessing the quality of the evidence which was not available in 2005, namely the “GRADEpro 2014” software which downgrades study quality on structured criteria for which the earlier review did not have access
* However, the forest plot on page 18 (Figure 5) which appears to show no difference between trapeziectomy alone and the more complex operations shows a risk ratio of 1.89 with 95% confidence intervals from 0.96 to 3.73; this confidence interval includes the null value of 1.0 but also includes a clinically important difference in the risk of adverse events
* Importantly, the authors emphasize that future research could change all of their conclusions and comparisons, and that the actual strength of the evidence is weak
* The authors were unable to find any studies comparing any surgical intervention with any sham interventions or with any nonoperative interventions

Assessment:

* High quality meta-analysis which shows that there is currently a lack of convincing evidence that any operative intervention for osteoarthritis of the base of the thumb is more or less effective than any other operative intervention
* There is a lack of evidence that any surgical intervention is more effective than nonoperative treatment
* There is uncertainty regarding the risk of adverse events between simple trapeziectomy and trapeziectomy combined with other procedures, but a lower risk of complications with simple trapeziectomy cannot be ruled out

Reference:

Wajon A, Ada L, Edmunds I, Carr E. Surgery for thumb (trapeziometacarpal joint) osteoarthritis. Cochrane Database of Systematic Reviews 2005, Issue 4. Art. No.: CD004631