

1. Meta-analysis of joint preservation versus arthroplasty for the treatment of displaced 3- and 4-part fractures of the proximal humerus.

Gomberawalla MM, Miller BS, Coale RM, Bedi A, Gagnier JJ.

Injury. 2013 May 9.

PURPOSE:

This meta-analysis compares the clinical outcomes of joint preservation versus arthroplasty in the treatment of displaced proximal humerus fractures.

METHODS:

Medline, CINAHL, and EMBASE were searched for studies published between 1970 and 2011 reporting outcomes of the treatment of 3- or 4-part proximal humerus fractures using the Constant-Murley score in skeletally mature patients. Randomised and cohort studies with ≥ 1 -year follow-up were included. Two individuals independently extracted data, and study results were divided into subgroups based on type of treatment.

RESULTS:

A meta-analysis with meta regressions was performed on the mean Constant score. Of 610 total participants in the studies analysed, 340 were treated with joint-preserving techniques. The random-effects mean Constant score across all treatment types was 62.7 (95% CI, 61.6-63.9, $P < 0.001$), with joint-preserving treatments demonstrating higher scores than arthroplasty (70 vs. 49, $P < 0.001$). The studies displayed significant heterogeneity (Q statistic=516, $P < 0.001$, $I^2=94.8$). In the meta-regression analyses, Constant scores decreased significantly with increasing age, fracture severity, and rate of osteonecrosis ($P < 0.001$).

CONCLUSIONS:

In the existing literature, displaced proximal humerus fractures demonstrate improved Constant scores when treated with joint-preserving options. Age, fracture pattern, and complication rate are significant predictors of the Constant score independent of the selected treatment. Given the observed heterogeneity and variance in treatment techniques in the included studies, more comparative studies are needed to definitively recommend joint-preserving techniques versus arthroplasty for specific fracture patterns.

2. Is Lateral Pin Fixation for Displaced Supracondylar Fractures of the Humerus Better Than Crossed Pins in Children?

Zhao JG, Wang J, Zhang P.

Clin Orthop Relat Res. 2013 May 8.

BACKGROUND:

Closed reduction and percutaneous pin fixation is considered standard management for displaced supracondylar fractures of the humerus in children. However, controversy exists regarding whether to use an isolated lateral entry or a crossed medial and lateral pinning technique.

QUESTIONS/PURPOSES:

We performed a meta-analysis of randomized controlled trials (RCTs) to compare (1) the risk of iatrogenic ulnar nerve injury caused by pin fixation, (2) the quality of fracture reduction in terms of the radiographic outcomes, and (3) function in terms of criteria of Flynn et al. and elbow ROM, and other surgical complications caused by pin fixation.

METHODS:

We searched PubMed, Embase, the Cochrane Library, and other unpublished studies without language restriction. Seven RCTs involving 521 patients were included. Two authors independently assessed the methodologic quality of the included studies with use of the Detsky score. The median Detsky quality score of the included trials was 15.7 points. Dichotomous variables were presented as risk ratios (RRs) or risk difference with 95% confidence intervals (CIs) and continuous data were measured as mean differences with 95% CI. Statistical heterogeneity between studies was formally tested with standard chi-square test and I² statistic. For the primary objective, a funnel plot of the primary end point and Egger's test were performed to detect publication bias.

RESULTS:

The pooled RR suggested that iatrogenic ulnar nerve injury was higher with the crossed pinning technique than with the lateral entry technique (RR, 0.30; 95% CI, 0.10-0.89). No publication bias was further detected. There were no statistical differences in radiographic outcomes, function, and other surgical complications. No significant heterogeneity was found in these pooled results.

CONCLUSIONS:

We conclude that the crossed pinning fixation is more at risk for iatrogenic ulnar nerve injury than the lateral pinning technique. Therefore, we recommend the lateral pinning technique for supracondylar fractures of the humerus in children.

3. Do we really need tranexamic acid in total hip arthroplasty? A meta-analysis of nineteen randomized controlled trials.

Zhou XD, Tao LJ, Li J, Wu LD.

Arch Orthop Trauma Surg. 2013 Apr 25.

BACKGROUND:

Studies have shown that tranexamic acid reduces blood loss and transfusion need in patients undergoing total hip arthroplasty. However, no to date, no study has been large enough to determine definitively whether the drug is safe and effective. We examined whether intravenous tranexamic acid, when compared with placebo, was safe and effective in total hip arthroplasty.

METHODS:

The literature search was conducted using the PubMed, Cochrane Library, MEDLINE, EMBASE, and China National Knowledge Infrastructure (CNKI) databases. Data were evaluated using the generic evaluation tool designed by the Cochrane Bone, Joint and Muscle Trauma Group. Ultimately, 19 randomized controlled trials involving 1,030 patients were included.

RESULTS:

The use of tranexamic acid significantly reduced total blood loss by a mean of 305.27 mL [95 % confidence interval (CI) -397.66 to -212.89, $p < 0.001$], intraoperative blood loss by a mean of 86.33 mL (95 % CI -152.29 to -20.37, $p = 0.01$), postoperative blood loss by a mean of 176.79 mL (95 % CI -236.78 to -116.39, $p < 0.001$), and "hidden" blood loss by a mean of 152.70 mL (95 % CI -187.98 to -117.42, $p < 0.001$), resulting in a meaningful reduction in the proportion of patients requiring blood transfusion (odds ratio 0.28, 95 % CI 0.19 to 0.42, $p < 0.001$). There was no significant difference in occurrence of deep vein thrombosis, pulmonary embolism, or other complications among the study groups, or cost or hospitalization duration.

CONCLUSIONS:

The data from this meta-analysis indicate that intravenous tranexamic acid may reduce blood loss and transfusion need in patients undergoing total hip arthroplasty without increasing the risk of complications. However, high-quality randomized controlled trials are required to validate the results.

4. Evidence-based computer-navigated total hip arthroplasty: an updated analysis of randomized controlled trials.

Li YL, Jia J, Wu Q, Ning GZ, Wu QL, Feng SQ.
Eur J Orthop Surg Traumatol. 2013 Apr 16.

BACKGROUND:

Total hip arthroplasty (THA) has evolved over the years to be a reliable, reproducible, and successful orthopedic procedure. Nowadays, THA is increasingly performed on patients using less invasive, tissue-preserving techniques. Accordingly, the use of computer navigation in total joint arthroplasty has become more prevalent. However, there is still lack of high-quality evidence to verify the most effective technique for THA.

METHODS:

A search was conducted in PubMed, Medline, Embase, Cochrane Central Register of Controlled Trials, and Google Scholar databases. Clinical trials published from 1966 to Feb 2012 that assess conventional techniques THA or computer-navigated techniques THA for placing the acetabular component. The main outcome measures included abduction angles, anteversion angles, percentage of acetabular outliers, operation time, decrease in Hb/24 h, and wound secretion/48 h.

RESULTS:

The pooled analysis across all studies showed a significant difference in anteversion angles and acetabular outliers (difference -0.22, 95 % CI -0.67, 0.24; $p = 0.346$, $I^2 = 71.9\%$) and (difference 8.34, 95 % CI 4.15, 16.74; $p = 0.000$, $I^2 = 0.0\%$). However, no significant difference in abduction angle and decrease in Hb/24 h (difference -0.22, 95 % CI -0.67, 0.24; $p = 0.346$, $I^2 = 71.9\%$) and (difference 0.03, 95 % CI -0.36, 0.41; $p = 0.888$, $I^2 = 0.0\%$). For the operation time, computer-navigated THA was longer (difference -0.73, 95 % CI -1.32, -0.15; $p = 0.014$, $I^2 = 74.4\%$).

CONCLUSIONS:

This meta-analysis demonstrated computer-navigated THA was a more favorable method for placing the acetabular component and decreased the number of acetabular cups implanted outside the desired range of alignment. More high-quality RCTs were needed to support the evidence.

5. Patellar resurfacing versus nonresurfacing in total knee arthroplasty: A meta-analysis of randomised controlled trials.

Chen K, Li G, Fu D, Yuan C, Zhang Q, Cai Z.
Int Orthop. 2013 Jun;37(6):1075-83.

PURPOSE:

Patella resurfacing or nonresurfacing in total knee arthroplasty remains controversial. The aim of this study was to evaluate the efficacy of patellar resurfacing through an evaluation of the current literature.

METHODS:

We carried out a meta-analysis of randomised controlled trials comparing total knee arthroplasties performed with and without patellar resurfacing. Outcomes of reoperation, anterior knee pain and knee scores were analysed.

RESULTS:

Fourteen trials assessing 1,725 knees were eligible. The absolute risk of reoperation was reduced by 4 % (95 % confidence interval, 2-6 %) in the patellar resurfacing arm (between-study heterogeneity,

$P = 0.05$, $I^2 = 42\%$), implying that one would have to resurface 25 patellae (95 % confidence interval, 17-50 patellae) in order to prevent one reoperation. There was no difference between the two groups in terms of anterior knee pain, knee pain score, Knee Society score and knee function score. But in the studies followed up for a mean time of not less than five years, a difference was found between the two arms in Knee Society scores (RR = 2.14, 95 % confidence interval, 0.76-3.52; $P = 0.002$).

CONCLUSIONS:

The available evidence indicates that patellar resurfacing reduces the risk of reoperation after total knee arthroplasty. Patellar resurfacing patients may make a difference in long-term follow-up (five or more 5 years) of Knee Society scores. In other aspects, the benefit of patellar resurfacing is limited. Additionally, more carefully and scientifically designed randomised controlled trials are required to further prove the claim.

6. A meta-analysis comparing the results of cervical disc arthroplasty with anterior cervical discectomy and fusion (ACDF) for the treatment of symptomatic cervical disc disease.

Gao Y, Liu M, Li T, Huang F, Tang T, Xiang Z.
J Bone Joint Surg Am. 2013 Mar 20;95(6):555-61.

BACKGROUND:

Anterior cervical discectomy and fusion is a standard treatment for symptomatic cervical disc disease, but pseudarthrosis and accelerated adjacent-level disc degeneration may develop. Cervical disc arthroplasty was developed to preserve the kinematics of the functional spinal unit. Trials comparing arthroplasty with anterior cervical discectomy and fusion have shown unclear benefits in terms of clinical results, neck motion at the operated level, adverse events, and the need for secondary surgical procedures.

METHODS:

Only randomized clinical trials were included in this meta-analysis, and the search strategy followed the requirements of the Cochrane Library Handbook. Two reviewers independently assessed the methodological quality of each included study and extracted the relevant data.

RESULTS:

Twenty-seven randomized clinical trials were included; twelve studies were Level I and fifteen were Level II. The results of the meta-analysis indicated longer operative times, more blood loss, lower neck and arm pain scores reported on a visual analog scale, better neurological success, greater motion at the operated level, fewer secondary surgical procedures, and fewer such procedures that involved supplemental fixation or revision in the arthroplasty group compared with the anterior cervical discectomy and fusion group. These differences were significant ($p < 0.05$). The two groups had similar lengths of hospital stay, Neck Disability Index scores, and rates of adverse events, removals, and reoperations ($p > 0.05$).

CONCLUSIONS:

The meta-analysis revealed that anterior cervical discectomy and fusion was associated with shorter operative times and less blood loss compared with arthroplasty. Other outcomes after arthroplasty (length of hospital stay, clinical indices, range of motion at the operated level, adverse events, and secondary surgical procedures) were superior or equivalent to the outcomes after anterior cervical discectomy and fusion.

7. Posterior cruciate-retaining versus posterior-stabilized total knee arthroplasty: a meta-analysis.

Bercik MJ, Joshi A, Parvizi J.
J Arthroplasty. 2013 Mar;28(3):439-44.

The objective of this meta-analysis was to compare outcomes of posterior cruciate-retaining and posterior stabilized prostheses. A computerized literature search was conducted to identify randomized



controlled trials comparing the clinical outcomes of cruciate-retaining and posterior-stabilized designs. The table of contents of four major Orthopaedic journals and the references section of two arthroplasty text books were reviewed to identify other relevant studies. Ultimately, 1114 patients (1265 knees) were compared. Statistical analysis revealed a significant difference in flexion and range of motion in favor of posterior-stabilized knees, but no difference in complication rates. The clinical importance of this remains unknown. The decision to use one design versus the other should rest with the surgeon's preference and comfort with a particular design

8. Acetabular components in total hip arthroplasty: is there evidence that cementless fixation is better?

Toossi N, Adeli B, Timperley AJ, Haddad FS, Maltenfort M, Parvizi J.

J Bone Joint Surg Am. 2013 Jan 16;95(2):168-74.

BACKGROUND:

The use of cementless acetabular components in total hip arthroplasty has gained popularity over the past decade. Most total hip arthroplasties being performed in North America currently use cementless acetabular components. The objective of this systematic review and meta-analysis was to compare the survivorship and revision rate of cemented and cementless acetabular components utilized in total hip arthroplasty.

METHODS:

A primary literature search in PubMed identified 3488 articles, of which 3407 did not meet the inclusion criteria and were excluded. Only English-language articles on either the survivorship or revision rate of primary total hip arthroplasty at a minimum of ten years of follow-up were included. The present study analyzed forty-five articles reporting the long-term outcome of cementless acetabular components, twenty-nine reporting the outcome of cemented acetabular components, and seven comparing cemented and cementless acetabular components. Meta-analysis (with a random-effects model) was performed on the data from the seven comparative studies, and study-level logistic regression analysis (with a quasibinomial model) was performed on the pooled data on the eighty-one included articles to determine a consensus. The studies were weighted according to the number of total hip arthroplasties performed.

RESULTS:

The meta-analysis did not reveal any effect of the type of acetabular component fixation on either survivorship or revision rate. The regression analysis revealed the estimated odds ratio for survivorship of a cemented acetabular component to be 1.60 (95% confidence interval, 1.32 to 2.40; $p = 0.002$) when adjustments for factors including age, sex, and mean duration of follow-up were made.

CONCLUSIONS:

The preference for cementless acetabular components on the basis of improved survivorship is not supported by the published evidence. Although concerns regarding aseptic loosening of cemented acetabular components may have led North American surgeons toward the nearly exclusive use of cementless acetabular components, the available literature suggests that the fixation of cemented acetabular components is more reliable than that of cementless components beyond the first postoperative decade.

9. Mid- to long-term outcomes in adolescent idiopathic scoliosis after instrumented posterior spinal fusion: a meta-analysis.

Lykissas MG, Jain VV, Nathan ST, Pawar V, Eismann EA, Sturm PF, Crawford AH.

Spine. 2013 15;38(2):E113-9.

STUDY DESIGN:

Meta-analysis on mid- to long-term outcomes in adolescent idiopathic scoliosis after instrumented posterior spinal fusion.

OBJECTIVE:

To compare mid- to long-term outcomes and complications of the

most commonly used instrumentation systems in adolescent idiopathic scoliosis.

SUMMARY OF BACKGROUND DATA:

A meta-analysis of mid- to long-term results of different methods of instrumentation, including the most currently used all-pedicle screw construct, is lacking.

METHODS:

A structured literature review was conducted for studies concerning management of patients with adolescent idiopathic scoliosis with instrumented posterior fusion. Pooled means, standard deviations, and sample sizes were either identified or calculated on the basis of the results of each study.

RESULTS:

Meta-analyses were performed on outcomes from 27 studies. Overall, 1613 patients who had been treated with Harrington rods, 361 patients who had undergone Cotrel-Dubousset instrumentation, and 298 patients who managed with all-pedicle screw constructs were reviewed. The mean follow-up was 14.9 years. Cotrel-Dubousset and pedicle screw instrumentations achieved a significantly greater degree of correction of the thoracic curve than Harrington rods (40.3° vs. 14.7°; $P < 0.001$ and 21.9° vs. 14.7°; $P = 0.005$, respectively). Cotrel-Dubousset technique achieved a significantly higher degree of correction than all-pedicle screw construct in both the thoracic (40.3° vs. 21.9°, respectively; $P < 0.001$) and lumbar curves (37.2° vs. 16°, respectively; $P < 0.001$). Similarly, Cotrel-Dubousset construct achieved a greater correction of both thoracic kyphosis (33.5° vs. 23°, respectively; $P < 0.001$) and lumbar lordosis (46° vs. 50.7°, respectively; $P = 0.002$) than pedicle screws. All-pedicle screw fixation was associated with the lower risk of pseudarthrosis, infection, neurological deficit, and reoperation.

CONCLUSION:

This study confirms the negative effect of Harrington rods on sagittal alignment. We further found that the degree of correction in the coronal and sagittal planes was higher after Cotrel-Dubousset instrumentation than all-pedicle screw fixation. All-pedicle screw constructs offered the lower risk of mid- to long-term complications and revision surgery

10. Is venous foot pump effective in prevention of thromboembolic disease after joint arthroplasty: a meta-analysis.

Pour AE, Keshavarzi NR, Purtill JJ, Sharkey PF, Parvizi J.

J Arthroplasty. 2013 ;28(3):410-7.

The goal of this meta-analysis was to evaluate the efficacy of venous foot pumps in prevention of venous thromboembolism following joint arthroplasty. Using different databases, we found 13 prospective clinical trials published meeting our inclusion criteria. In total, 1514 patients were included in the final analysis. Venous foot pump devices are effective in prevention of venous thromboembolic disease after total hip and knee arthroplasty compared to chemoprophylaxis. This was especially significant in prevention of major deep vein thrombosis and pulmonary emboli rate. The use of mechanical devices like venous calf or foot pump, either alone or in combination with less potent chemical prophylaxis, on the other hand can reduce the rate of venous thromboembolism and complications of potent chemoprophylaxis like wound hematoma.

