

## 1. Nonoperative versus operative treatment for thoracolumbar burst fractures without neurologic deficit: a meta-analysis.

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### BACKGROUND

Decision-making regarding nonoperative versus operative treatment of patients with thoracolumbar burst fractures in the absence of neurologic deficits is controversial. Lack of evidence-based practice may result in patients being treated inappropriately and being exposed to unnecessary adverse consequences.

### PURPOSE

Using meta-analysis, we therefore compared pain (VAS) and function (Roland Morris Disability Questionnaire) in patients with thoracolumbar burst fractures without neurologic deficit treated nonoperatively and operatively. Secondary outcomes included return to work, radiographic progression of kyphosis, radiographic progression of spinal canal stenosis, complications, cost, and length of hospitalization.

### METHODS

We searched MEDLINE, EMBASE®, and the Cochrane Central Register of Controlled Trials for 'thoracic fractures', 'lumbar fractures', 'non-operative', 'operative' and 'controlled clinical trials'. We established five criteria for inclusion. Data extraction and quality assessment were in accordance with Cochrane Collaboration guidelines. The main analyses were performed on individual patient data from randomized controlled trials. Sensitivity analyses were performed on VAS pain, Roland Morris Disability Questionnaire score, kyphosis, and return to work, including data from nonrandomized controlled trials and using fixed effects meta-analysis. We identified four trials, including two randomized controlled trials consisting of 79 patients (41 with operative treatment and 38 with nonoperative treatment). The mean followups ranged from 24 to 118 months.

### RESULTS

We found no between-group differences in baseline pain, kyphosis, and Roland Morris Disability Questionnaire scores. At last followup, there were no between-group differences in pain, Roland Morris Disability Questionnaire scores, and return to work rates. We found an improvement in kyphosis ranging from means of 12.8° to 11° in the operative group, but surgery was associated with higher complication rates and costs.

### CONCLUSIONS

Operative management of thoracolumbar burst fractures without neurologic deficit may improve residual kyphosis, but does not appear to improve pain or function at an average of 4 years after injury and is associated with higher complication rates and costs.

## 2. Does Timing to Operative Debridement Affect Infectious Complications in Open Long-Bone Fractures?: A Systematic Review.

Schenker ML, Yannascoli S, Baldwin KD, Ahn J, Mehta S.

*J Bone Joint Surg Am.* 2012 May 9. doi: 10.2106/JBJS.K.00582.

### BACKGROUND

Existing guidelines recommend emergency surgical debridement of open fractures within six hours after injury. The aim of this study was to systematically review the association between time to operative debridement of open fractures and infection.

### METHODS

Searches of the MEDLINE, EMBASE, and Cochrane computerized literature databases and manual searches of bibliographies were performed. Randomized controlled trials and cohort studies (retrospective and prospective) evaluating the association between time to operative debridement and infection after open fractures were included. Descriptive and quantitative data were extracted. A meta-analysis of patient cohorts who underwent early or delayed debridement was performed with use of a random effects model.

### RESULTS

The initial search identified 885 references. Of the 173 articles inspected further on the basis of the title, sixteen (six prospective and ten retrospective cohort studies with a total of 3539 open fractures) were included. No significant difference in the infection rate was detected between open fractures debrided early or late according to any of the time thresholds used in the included studies. Sensitivity analyses demonstrated no difference in infection rate between early and late debridement in subgroups defined according to the Gustilo-Anderson classification, level of evidence, depth of infection, or anatomic location.

### CONCLUSIONS

The data did not indicate an association between delayed debridement and higher infection rates when all infections were considered, when only deep infections were considered, or when only more severe open fracture injuries were considered. On the basis of this analysis, the historical "six-hour rule" has little support in the available literature. It is important to realize that additional carefully conducted studies are needed and that elective delay of treatment of patients with open fractures is not recommended.

## 3. Meta-Analysis of Navigation vs Conventional Total Knee Arthroplasty.

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*J Arthroplasty.* 2012 Jun;27(6):1177-82.

Navigated total knee arthroplasty (TKA) is promoted as a means to improve limb and prosthesis alignment. This study involved a systematic review and meta-analysis for all randomized controlled trials in the literature from 1986 to 2009 comparing alignment outcomes between navigated and conventional TKA. Alignment outcomes were pooled using a random-effects model, and heterogeneity was explored. Twenty-three randomized controlled trials were identified comparing navigated vs conventional TKA involving 2541 patients. Patients who underwent navigated TKA had a significantly lower risk of implant malalignment at more than 3° as well as more than 2°. In addition, the risk of malalignment was reduced for the coronal plane tibial and femoral components as well as femoral and tibial slope. This meta-analysis demonstrates that navigated TKA provides significant improvement in prosthesis alignment.

#### 4. The Role of Subacromial Decompression in Patients Undergoing Arthroscopic Repair of Full-Thickness Tears of the Rotator Cuff: A Systematic Review and Meta-analysis.

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*Arthroscopy. 2012 May;28(5):720-7.*

##### PURPOSE

The purpose of this study was to determine the efficacy of arthroscopic repair of full-thickness rotator cuff tears with and without subacromial decompression.

##### METHODS

We searched the Cochrane Central Register of Controlled Trials (third quarter of 2011), Medline (1948 to week 1 of September 2011), and Embase (1980 to week 37 of 2011) for eligible randomized controlled trials. Two reviewers selected studies for inclusion, assessed methodologic quality, and extracted data. Pooled analyses were performed by use of a random effects and relative risk model with computation of 95% confidence intervals.

##### RESULTS

We included 4 randomized trials and 373 patients. Methodologic quality was variable as assessed by the CLEAR NPT (Checklist to Evaluate a Report of a Non-pharmacological Trial) tool. One trial showed that there was no difference in disease-specific quality of life (Western Ontario Rotator Cuff questionnaire) between the 2 treatment groups. A meta-analysis of shoulder-specific outcome measures (American Shoulder and Elbow Surgeons or Constant scores) or the rate of reoperation between patients treated with subacromial decompression and those treated without it also showed no statistically significant differences.

##### CONCLUSIONS

On the basis of the currently available literature, there is no statistically significant difference in subjective outcome after arthroscopic rotator cuff repair with or without acromioplasty at intermediate follow-up.

#### 5. Preoperative predictors for mortality following hip fracture surgery: A systematic review and meta-analysis.

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*Injury. 2012 Jun;43(6):676-85.*

##### BACKGROUND

Hip fractures are always associated with a high postoperative mortality, the preoperative predictors for mortality have neither been well identified or summarised. This systematic review and meta-analysis was performed to identify the preoperative non-interventional predictors for mortality in hip fracture patients, especially focused on 1 year mortality.

##### METHODS

Non-interventional studies were searched in Pubmed, Embase, Cochrane central database (all to February 26th, 2011). Only prospective studies and retrospective studies with prospective collected data were included. Qualities of included studies were assessed by a standardised scale previous reported for observational studies. The effects of individual studies were combined with the study quality score using a previous reported model of best-evidence synthesis. The hazard ratios of strong evidence predictors were combined only by high quality studies.

##### RESULTS

75 included studies with 94 publications involving 64,316 patients were included and the available observations was a heterogeneous group. The overall inpatient or 1 month mortality was 13.3%, 3-6 months was 15.8%, 1 year 24.5% and 2 years 34.5%. There were strong evidence for 12 predictors, including advanced age, male gender, nursing home or facility residence, poor preoperative walking capacity, poor activities of daily living, higher ASA grading, poor mental state, multiple comorbidities, dementia or cognitive impairment,

diabetes, cancer and cardiac disease. We also identified 7 moderate evidence and 12 limited evidence mortality predictors, and only the race was identified as the conflicting evidence predictor.

##### CONCLUSION

Whilst there is no conclusive evidence of the preoperative predictors for mortality following hip fractures, special attention should be paid to the above 12 strong evidence predictors. Future researches were still needed to evaluate the effects of these predictors.

#### 6. Scarf Versus Chevron Osteotomy for the Correction of 1-2 Intermetatarsal Angle in Hallux Valgus: A Systematic Review and Meta-analysis.

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*J Foot Ankle Surg. 2012 Apr 7.*

The chevron and scarf osteotomies are commonly used for the surgical management of hallux valgus (HV). However, there is debate as to whether one osteotomy provides more 1-2 intermetatarsal (1-2 IMA) correction than the other. The objective of this systematic review and meta-analysis was to compare the effectiveness of 3 types of first metatarsal osteotomy for reducing the 1-2 IMA in HV correction: the chevron osteotomy, the long plantar arm (modified) chevron osteotomy, and the scarf osteotomy. A systematic search for eligible studies was performed of the following databases: Medline, Embase (Ovid), CINAHL (EBSCO Host), and The Cochrane Database of Systematic Reviews and Cochrane Central Register of Controlled Clinical Trials. Only English-language studies previous to May 2010 were included in the review. Additional hand and electronic content searches of relevant foot and orthopaedic journals were performed. Criteria for inclusion in this analysis included systematic reviews of randomized controlled trials, prospective and retrospective cohort studies, and case-control studies, as well as case-series studies involving the chevron, scarf, or long plantar arm chevron osteotomy of >20 participants with a minimum of 80% follow-up. Quality of evidence of the included studies was assessed with the Grading of Recommendations Assessment, Development and Evaluation system. All pooled analyses were based on a fixed effects model. There was a total of 1351 participants who underwent either a chevron (n = 1028), scarf (n = 300), or long plantar arm chevron osteotomy (n = 23). Only one study for the long plantar arm chevron group fitted the eligibility criteria for this review; however, it was not amenable to meta-analysis. The chevron osteotomy was associated with a mean reduction of 1-2 IMA from preoperative to postoperative of 5.33° (95% confidence interval, 5.12 to 5.54, p < .001), and the scarf osteotomy was associated with a mean reduction of 6.21° (95% confidence interval, 5.70 to 6.72, p < .001). There was a statistically significant 0.88° increase in the correction of the 1-2 IMA in favor of the scarf osteotomy compared with the chevron osteotomy. The studies included in this review were of very low- to low-quality evidence. Our findings indicate that the scarf osteotomy provides greater correction of the 1-2 IMA when used for HV correction. However, only a weak recommendation in favor of the scarf osteotomy can be made based on the low quality of evidence of the studies included in this analysis.

#### 7. Outcome of revision anterior cruciate ligament reconstruction: a systematic review.

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##### BACKGROUND

Revision anterior cruciate ligament (ACL) reconstruction is believed to have an inferior outcome compared with primary ACL reconstruction. The available literature on the outcome of revision ACL reconstruction is sparse compared with that for primary reconstruction. The purpose of this systematic review was to test the hypothesis that the outcome of revision ACL reconstruction compares unfavorably with the historical outcome of primary ACL reconstruction.



## METHODS

A systematic review of studies evaluating the outcome of revision ACL reconstructions with a minimum of two years of follow-up was performed. Pooled data were collected when appropriate and a mixed-effect-model meta-analysis was performed for important outcome measures that were reported in several studies (objective graft failure, Lysholm score, International Knee Documentation Committee [IKDC] subjective score, and IKDC objective score). Objective failure was defined as repeat revision, a side-to-side difference of  $\geq 5$  mm measured with use of a KT1000 arthrometer, or a pivot-shift grade of 2+ or 3+.

## RESULTS

Twenty-one studies were included, and 863 of the 1004 patients in these studies had a minimum of two years of follow-up and were analyzed. The pooled mean age of the patients at the time of the revision procedure was 30.6 years, and 66% were male. Objective failure occurred in  $13.7\% \pm 2.7\%$  of the patients (95% confidence interval, 8.0% to 19.4%). The mean Lysholm score in 491 patients was  $82.1 \pm 3.3$  (95% confidence interval, 74.6 to 89.5) according to a mixed-model meta-analysis. The mean IKDC subjective score in 202 patients was  $74.8 \pm 4.4$  (95% confidence interval, 62.5 to 87.0).

## CONCLUSIONS

Revision ACL reconstruction resulted in a worse outcome compared with primary ACL reconstruction. Patient-reported outcome scores were inferior to previously published results of primary ACL reconstruction, but these differences may not be clinically important. A dramatically elevated failure rate was noted after revision ACL reconstruction; this rate was nearly three to four times the failure rate in prospective series of primary ACL reconstructions.

## 8. Complications after flexor tendon repair: a systematic review and meta-analysis.

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*J Hand Surg Am. 2012 Mar;37(3):543-551.e1.*

### PURPOSE

Although outcomes after flexor tendon repair have reportedly improved with modern treatment, complications are common. The purpose of this study was to determine the incidence of these complications and the potential contributory factors within the published literature.

### METHODS

We performed a systematic review of the available literature to identify publications in which patients with flexor tendon ruptures were surgically treated. We extracted demographics, zone of injury, core suture technique (only modified Kessler or a combination of techniques), use of epitendinous suture, and date of publication (before or after January 1, 2000). We excluded articles if they did not report information on reoperation, rupture, or adhesions. We used unadjusted pooled meta-analysis to report the incidence of complications, and meta-regression to describe the potential contributory factors for each complication while controlling for age, gender, and zone of injury.

### RESULTS

Unadjusted meta-analysis revealed rates of re-operation of 6%, rupture of 4%, and adhesions of 4%. Meta-regression analysis of 29 studies showed that core suture technique or use of an epitendinous suture does not influence rupture. However, the presence of an epitendinous suture decreases re-operation by 84%. Adhesion development is 57% lower when the modified Kessler technique is used. The incidence of complications did not vary with publication date.

### CONCLUSIONS

The published literature supports use of the modified Kessler repair technique with an epitendinous suture to minimize complications. Although complication rates are low, our data suggest that there has been no definitive improvement in reported complications before and after 2000.

## 9. Diagnostic accuracy of clinical tests for subacromial impingement syndrome: a sys-

## tematic review and meta-analysis.

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*Arch Phys Med Rehabil. 2012 Feb;93(2):229-36.*

### OBJECTIVE

To examine the accuracy of clinical tests for diagnosing subacromial impingement syndrome (SIS).

### DATA SOURCES

A systematic literature search was conducted in January 2011 to identify all studies that examined the diagnostic accuracy of clinical tests for SIS. The following search engines were used: Cochrane Library, EMBASE, Science Direct, and PubMed.

### STUDY SELECTION

Two reviewers screened all articles. We included prospective or retrospective cohort studies that examined individuals with a painful shoulder, reported any clinical test for SIS, and used arthroscopy or open surgery as the reference standard. The search strategy yielded 1338 articles of which 1307 publications were excluded based on title/abstract. Sixteen of the remaining 31 articles were included. The PRISMA (preferred reporting items for systematic reviews and meta-analyses) guidelines were followed to conduct this review.

### DATA EXTRACTION

The number of true positives, false positives, true negatives, and false negatives for each clinical test were extracted from relevant studies, and a 2x2 table was constructed. Studies were combined using a bivariate random-effects model. Heterogeneity was assessed using the variance of logit-transformed sensitivity and specificity.

### DATA SYNTHESIS

Ten studies with 1684 patients are included in the meta-analysis. The Hawkins-Kennedy test, Neer's sign, and empty can test are shown to be more useful for ruling out rather than ruling in SIS, with greater pooled sensitivity estimates (range, .69-.78) than specificity (range, .57-.62). A negative Neer's sign reduces the probability of SIS from 45% to 14%. The drop arm test and lift-off test have higher pooled specificities (range, .92-.97) than sensitivities (range, .21-.42), indicating that they are more useful for ruling in SIS if the test is positive.

### CONCLUSIONS

This systematic review quantifies the diagnostic accuracy of 5 clinical tests for SIS, in particular the lift-off test. Accurate diagnosis of SIS in clinical practice may serve to improve appropriate treatment and management of individuals with shoulder complaints.

## 10. A meta-analysis of randomised controlled trials comparing the clinical and radiological outcomes following minimally invasive to conventional exposure for total knee arthroplasty.

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*Knee. 2012 Jan;19(1):1-7. Epub 2010 Dec 31.*

Proponents of minimally invasive total knee arthroplasty (TKA) state accelerated patient recovery and increased patient satisfaction as advantages. However, retractors state a greater incidence of iatrogenic nerve injury, implant mal-positioning and increased rates of revision. This study compares the clinical and radiological outcomes of minimally invasive and conventional exposure TKA using a meta-analysis. A search of published and unpublished literature was performed. Eighteen studies including 1582 TKAs were reviewed: 822 minimally invasive versus 760 conventional exposure TKAs. The findings of this study suggest that whilst incision length was significantly smaller in MIS ( $p=0.001$ ), and flexion range of motion was significantly greater following MIS ( $p=0.01$ ), there was no statistically significant differences in all other clinical or radiological outcomes between MIS or conventional approach TKA surgery ( $p>0.05$ ).

