At 7-year follow-up, Bankart lesions repaired with polygluconate-B polymer implants had results similar to those repaired with poly-L-lactic acid polymer implants.

**Background:** Polygluconate-B polymer (PGA) implants absorb quickly; and although they may not cause long-term joint or bone damage, they may cause synovitis and may not last long enough to effect healing. Poly-L-lactic acid polymer (PLLA) implants absorb much more slowly but may cause delayed reactions or changes years after reconstruction.

**Objective:** To compare the clinical and radiographic results of PGA and PLLA implants for arthroscopic Bankart repairs.

**Design:** Prospective, randomized controlled trial.

**Participants/Methods:** 40 patients with recurrent anterior shoulder instability underwent arthroscopic Bankart repair, half with a Suretac (Smith-Nephew) PGA implant, and half with the Bionx Bankart tack (Linvatec) PLLA implant. Patients underwent clinical and radiographic assessment preoperatively to include a C-reactive protein level in the blood. Both groups underwent similar postoperative rehabilitation and guidelines for return to sports.

**Results:** 35 of the 40 patients were available for follow-up at a mean of 80 months (range, 69-96). The groups were very similar demographically for age, sex, number of dislocations, and follow-up. The mean time from initial dislocation to repair was 34 months (range, 8-262 months). Both groups had very similar clinical exam and Rowe and Constant scores. At final follow-up, patients had very similar external rotation. Both groups had approximately 10° less on the operated side than on their contralateral side. Both groups had similar Isobex strength and similar Constant and Rowe scores. Neither group had elevated C-reactive protein blood levels at day 1, day 4, or 6 weeks postoperatively. In the PGA group, there were 3 failures, 2 dislocations, and 1 subluxation. In the PLLA group, there were 2 failures, 1 dislocation and 1 subluxation. This did not reach statistical significance. The failure rate for this cohort was 14% at 7 years. The previously reported rate for this group at 2 years was 5%. Seven patients had early complications (3 in PLLA, 4 in PGA) of pain, low-grade fever, and grinding. One PGA patient had development of a reflex sympathetic dystrophy. Two PLLA patients had a severe restriction in motion, with one developing significant radiographic degenerative changes. Radiographically, the PLLA group had a significantly greater number of visible drill holes still visible at 7 years compared with the PGA group. Both groups showed an increase of degenerative changes by radiography at 7 years.

**Conclusions:** PLLA and PGA arthroscopic Bankart reconstructions had similar clinical results 7 years after surgery.

**Reviewer’s Comments:** This article shows no clear advantage of PLLA implants over PGA implants. The redislocation or failure rate was 14% at 7 years: very acceptable. Both implants demonstrated a similar rate of development of early synovitis. This article provides a good standard to compare newer arthroscopic fixation devices for Bankart repairs. (Reviewer-John H. Wilckens, MD).

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**Keywords:** Arthroscopy, Bankart Repair

**Print Tag:** Refer to original journal article
Osgood-Schlatter Surgery May Involve Residual Pain

Long-Term Outcome After Surgical Treatment of Unresolved Osgood-Schlatter Disease in Young Men.

Pihlajamäki HK, Mattila VM, et al:


Excision of symptomatic Osgood-Schlatter residua results in excellent or good long-term function.

Objective: To review the clinical outcome of surgically treated symptomatic Osgood-Schlatter disease.

Design: Retrospective cohort study.

Methods: Over a 13-year period, 178 recruits in the Finnish Army were identified with symptomatic Osgood-Schlatter disease that failed conservative treatment and had surgical treatment. Surgical indications included x-ray evidence of Osgood-Schlatter disease, at least 1 year of symptoms, inability to continue military training, and inability to kneel or squat. Patients underwent one of 2 surgical techniques. For 87 knees, a vertical incision was centered on the distal patellar insertion, with splitting of the patellar tendon and excising of the Osgood-Schlatter ossicle and/or prominent tubercle. The second surgical approach in the remaining knees consisted of a 5-cm transverse incision 1 cm proximal to the tibial tubercle, with the ossicles and tubercle excised from the lateral border of the patellar tendon, leaving the tendon intact. Postoperatively, patients underwent physiotherapy and modified their military activity for 6 to 12 weeks.

Results: Of the 178 surgically treated subjects, only 107 (65%) agreed to follow-up examination. Mean follow-up was 10 years (range, 6 to 19 years). The incidence of symptomatic Osgood-Schlatter disease was 42 per 100,000 military recruits. Median age at onset of symptoms was 15 years, and mean duration of symptoms before surgery was 4 years. All recruits returned to training and completed their obligated military service. Among the patients, 87% reported no restrictions with activities of daily living at final follow-up, and 75% were able to return to their previous level of sporting activity. Only 38% reported a complete absence of pain. The mean modified Kujala score at final follow-up was 95. Six postoperative complications were identified: 3 infections, 2 hematomas, and 1 deep vein thrombosis. Two patients underwent additional surgery for continued symptoms. There were no reported differences in outcome between the two surgical approaches. There were no radiographic changes except the expected reduction in tibial tubercle thickness. Duration of symptoms or age did not affect outcomes scores. Patients with bilateral disease and surgery had a higher visual analog pain score.

Conclusions: Excision of symptomatic Osgood-Schlatter disease is a simple and safe operation with good long-term relief.

Reviewer’s Comments: Whereas Osgood-Schlatter disease may be common during adolescence, at 10% to 12%; it is uncommon to be symptomatic in young adulthood. Although the authors reported very good results in this young, active military population, 39% continued to have some pain, especially with kneeling. This is important for patients to understand preoperatively. The surgery and rehabilitation are safe and simple, with 75% of patients returning to their preoperative activity level. The authors mention that age and duration of symptoms do not contribute to outcome, so conservative treatment should be maximized. (Reviewer—John H. Wilckens, MD).

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Keywords: Osgood-Schlatter Disease

Print Tag: Refer to original journal article
Patellar and Hamstring ACL Reconstructions Have Similar Outcomes

Patellar Tendon Versus Hamstring Tendon Autografts for Anterior Cruciate Ligament Reconstruction: A Randomized Controlled Trial Using Similar Femoral and Tibial Fixation Methods.

Taylor DC, DeBerardino TM, et al:


There is no clear advantage of hamstring or bone-tendon-bone patellar tendon autografts for anterior cruciate ligament reconstructions in an active patient population.

**Objective:** To compare clinical outcomes of hamstring versus patellar tendon autograft anterior cruciate ligament (ACL) reconstructions.

**Design:** Randomized controlled trial.

**Methods/Participants:** Over a 3-year period, 64 patients with an ACL injury were randomized into either a hamstring or patellar tendon autograft ACL reconstruction. Except for graft harvest, all patients underwent similar reconstruction technique, including drilling of bone tunnels and graft fixation. Each graft was fixed on the femur with an Endobutton and a bioabsorbable interference screw. On the tibia, each graft was fixed with a bioabsorbable interference screw and 6.5 cancellous screw and washer post. All patients underwent a similar postoperative rehabilitation program and return to full activity. Patients were followed up at 2, 3, and 4 years postoperatively, with SANE score, Tegner and Lysholm Score, IKDC score, KOOS score, and radiographs.

**Results:** Of the 64 patients, 53 were followed up for at least 2 years or until graft failure. The two groups were very similar demographically for age, sex, and time from injury to surgery. At follow-up, the two groups had very similar laxity; isokinetic strength; and KOOS, Lysholm, and IKDC score. On Tegner score, the patellar tendon group scored higher and had a higher return to preinjury activity (81%) compared with the hamstring reconstructions (52%). The patellar tendon group had a higher SANE score (90.7) than the hamstring group (88.5), but the difference did not reach statistical significance. Both groups demonstrated similar thigh atrophy and reported little or no pain with kneeling. Four hamstring grafts sustained a rerupture, 3 of them prior to 1 year after initial reconstruction. All of 3 patellar tendon graft ruptures all occurred after 1 year. The only deep infection occurred in a hamstring reconstruction.

**Conclusions:** Anterior cruciate ligament reconstructions utilizing patellar tendon or hamstring tendon autografts had very similar clinical outcomes in an active young athletic population.

**Reviewer's Comments:** This may be the best randomized control study comparing patellar tendon and hamstring ACL reconstructions. This is a very active, young, athletic population: military cadets at the U.S. Military Academy at West Point. Although both groups had very similar clinical outcomes, 3 salient points are worth noting. The hamstring reconstructions seemed to fail within the first year, whereas the patellar tendon group was after 1 year. The patellar tendon group had a higher rate of returning to pre-injury activity. And, for donor site morbidity, kneeling pain was not a distinguishing problem in the head-to-head study. I suspect the authors routinely bone graft the patella defect. Finally, postoperative infections in ACL reconstructions are rare, but they are more common in hamstring reconstructions. (Reviewer-John H. Wilckens, MD).

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Keywords: ACL, Hamstring Vs Patellar

Print Tag: Refer to original journal article
In cases of scaphoid fracture, return-to-play criteria and planning should cover potential complications of playing with an unhealed fracture.

**Literature Review:** The authors review current knowledge about sports-related wrist injuries in adults. Emergent problems requiring immediate treatment include open fracture or dislocation, the rare traumatic amputation, dysvascular hand, and acute nerve compression. Acute carpal tunnel syndrome requires immediate attention. The most common wrist fracture is the distal radius fracture, common in skating sports. The second most common fracture encountered in sports-related wrist injuries is dorsal cortical triquetral fracture, which may result from the triquetrum striking against the distal ulna. These are treated with immobilization for 2 to 3 weeks. A fall on an outstretched hand can result in a scaphoid fracture. Any displaced fracture should be reduced and fixed. Nondisplaced fractures can be treated nonoperatively. Scaphoid fracture complications can be difficult to manage; complications include non-union, avascular necrosis, and malunion. Criteria for immediately returning to play in a cast after scaphoid fracture has been treated operatively or nonoperatively have been documented. The authors note the potential for post-play complications. Hamate fractures are seen in baseball, golf, and tennis. Patients present with localized tenderness over the hamulus. MRI or CT is helpful to identify the fracture pattern. Therapy is usually excision of the fragment and immobilization for 2 weeks. Soft tissue injuries about the wrist include a scapholunate ligament tear. In identifying this tear, the Watson test may produce pain or a clunk. The tears are typically pinned acutely. Chronic scapholunate ligament may require a reconstruction. Perilunate dislocation is scapholunate ligament disruption that extends more in an ulnar direction through the capito-lunate articulation and the lunotriquetral ligament. Direct attention should be made to the lunate or the *spilled teacup sign* to make this diagnosis. This injury requires closed reduction and internal fixation. Triangular fibrocartilage complex tears can be acute and/or chronic. Central tears are successfully treated conservatively or with wrist arthroscopy. Peripheral tears are more amenable to repair. Extensor carpi ulnaris subluxation is commonly seen in swinging sports. The patient may just have pain and swelling or frank subluxation of the extensor carpi ulnaris with wrist motion. The issue of return-to-play criteria is a complex one that includes ability to protect the wrist, quality of stabilization, player's position and sport, and other factors. The patient needs to understand about the consequences of an irrecoverable injury. Salvage operations about the wrist typically are not as good as acute definitive treatment.

**Conclusions:** Scaphoid fractures are a common athletic sports-related injury, and treatment and return-to-play criteria should be discussed in some detail including complications before embarking on a treatment algorithm.

**Reviewer's Comments:** The anatomy and evaluation section should be a minimum exam for the sideline physician in evaluating sports-related wrist injuries. The authors present a balanced approach to these injuries. They do not discount early return to play but recommend documenting a discussion of potential complications of such a treatment plan. This article is well worth reading by sideline physicians. (Reviewer-John H. Wilckens, MD).

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Keywords: Wrist Injuries

Print Tag: Refer to original journal article
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Carragee EJ, Don AS, et al:
Spine 2009; 34 (21): 2338-2345

Diagnostic discography resulted in degenerative changes on MRI after 10 years.

Background: Discography is a common diagnostic technique in the evaluation of discogenic pain. Animal studies have shown some evidence of disk degeneration after annular punctures. Previous studies have also shown increases in back pain in volunteers subjected to discography.

Objective: To evaluate long-term effects of discography as seen on MRI of the disk.

Design: Prospective, matched-cohort study.

Participants/Methods: 75 volunteers without significant low back pain underwent standard discography from L3 to S1. Subjects included patients with history of cervical disk disease, history of previous lumbar disk herniation, or history of somatization disorder. Another 75 matched subjects were recruited from similar groups into the observation cohort. Baseline MRIs were obtained. All volunteers were contacted at 10 years after the beginning of the study. If they had an MRI done within past 3 years, it was used for the analysis. Otherwise, a new MRI was obtained. The scans were evaluated for presence of degenerative changes and recurrent herniations. L1 to L3 levels served as controls.

Results: The follow-up rates at 10 years were 69% and 67% for the discography and the control group, respectively. There were no demographic differences between the groups and the subjects lost to follow-up. The MRI analysis of L3 to S1 levels in the discography group showed significantly more frequent progression of disk degeneration, more new disk herniations (especially on the side of annulotomy), and more degenerative endplate changes and disk height loss. There was no difference found at L1 to L3 levels between the groups. Whether or not the disk was painful during the discography did not correlate with the rate of degeneration.

Conclusions: The authors concluded that standard diagnostic discography may lead to disk degeneration, although almost half of the subjects did not have any new degenerative changes. Volunteers were selected from the populations that were thought to be at an increased risk of degenerative disk disease, making the results less applicable to the general population. The MRI was obtained in the beginning and at 7 to 10 years only; it is unclear when the degenerative changes occurred during that period. The authors suggest caution when deciding whether to send a patient for discography.

Reviewer’s Comments: This was a well-conducted study suggesting that discography may lead to disk degeneration. The study did not include evaluation of subjects’ symptoms. It is unclear whether the new MRI findings were clinically significant. Nevertheless, physicians must be cautious when sending a patient for discography, as it is not a benign test. Risks and benefits of this procedure should be discussed with the patient. (Reviewer-Vladimir Sinkov, MD).

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Keywords: Discography

Print Tag: Refer to original journal article
Antibiotic cement during total knee arthroplasty does not decrease the rate of infection.

**Background:** Deep knee infection can be a devastating complication of total knee arthroplasty (TKA). Infection rates of 1% to 3% have been reported in patients undergoing knee arthroplasty for osteoarthritis and up to 8% for patients having a knee replacement for rheumatoid arthritis. This is a rising problem and is expected to reach 6.8% by 2030. The health care cost for treating joint sepsis after arthroplasty is estimated at more than $55,000 per case. Prevention of infection would save the patient significant morbidity and the health care system significant cost. The use of antibiotic-laden bone cement (ALBC) is thought to decrease the incidence of deep infection; however, this assertion lacks evidence.

**Objective:** To determine whether the prophylactic use of ALBC decreases the deep infection rate compared with plain bone cement following primary TKA at 1-year follow-up.

**Participants/Methods:** The study cohort consisted of 1625 consecutive patients: 811 (49.9%) had their knee replacement with ALBC and 814 (50.1%) had plain bone cement (PBC). Joint pain and function were assessed at baseline and at 1-year follow-up with WOMAC scores. The incidence of deep infection at 1-year follow-up was recorded.

**Results:** The deep infection rate in the ALBC group was 2.2%; it was 3.1% in the PBC group. The overall infection rate was 2.6% at 1-year follow-up. There were no differences in WOMAC scores between groups at 1-year follow-up.

**Conclusions:** Antibiotic-laden bone cement was not predictive of a lower infection rate at 1 year. Antibiotic-laden bone cement did not reduce the incidence of deep infection following primary total knee arthroplasty at 1-year follow-up.

**Reviewer’s Comments:** This interesting study adds to the controversy regarding the use of antibiotic bone cement. However, the limitation of this study is that the authors did not consider obesity and diabetes in their analysis. This could have helped uncover differences in the infection rates. I routinely use antibiotic bone cement in patients undergoing total knee arthroplasty who are morbidly obese and in those with diabetes. Increased infection rates have been described for those patients, and antibiotic bone cement would be beneficial in this high-risk group. Furthermore, the low-dose antibiotic-impregnated bone cements have negligible reductions in fatigue strength, and implant fixation is not compromised in these patients. (Reviewer-Kris J. Alden, MD, PhD).

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Keywords: Antibiotic Cement

Print Tag: Refer to original journal article
No significant differences were detected between patients who underwent resurfacing of the patella during total knee arthroplasty compared with those left unresurfaced.

**Background:** Although there have been several randomized clinical trials comparing resurfacing with nonresurfacing of the patella in total knee arthroplasty, few investigators have reported long-term results.

**Objective:** To report the results, after a minimum of 10 years of follow-up, of a prospective, randomized clinical trial comparing resurfacing with nonresurfacing of the patella in total knee arthroplasty. The authors emphasized anterior knee pain, patellofemoral revisions, and clinical and functional outcomes. The current report is an update of a prospective, randomized clinical trial initiated in 1992 and for which the 3-year and 5- to 7-year results have been previously reported.

**Participants/Methods:** 86 patients (118 knees) underwent primary total knee replacement and were randomized into 2 groups: those treated with and those treated without resurfacing of the patella. Outcomes included the Knee Society scores, the scores according to a 41-question patellofemoral-specific patient questionnaire, patient satisfaction, global and anterior knee pain scores, radiographic findings, and complications and revisions. Fifty-seven patients (78 knees) were followed up for a minimum of 10 years.

**Results:** No significant differences were identified between the 2 groups in terms of range of motion, Knee Society scores, satisfaction, global knee pain, or anterior knee pain. The overall revision rates in the original series of 118 knees were 12% in the nonresurfacing group and 9% in the resurfacing group. Seven patients (12%) in the nonresurfacing group and 2 patients (3%) in the resurfacing group underwent revision for a reason related to a patellofemoral problem. The overall rate of reoperations, including those for reasons related and not related to a patellofemoral problem, was 9% (5 of 58) for the patients with a resurfaced patella. There was no significant difference in the overall revision rate between the knees with a nonresurfaced patella (12%) and those with a resurfaced patella (9%).

**Conclusions:** On the basis of these findings, the authors concluded that with the type of total knee arthroplasty used in their patients, similar results may be achieved with and without patellar resurfacing. However, the authors continue to resurface the patella when the patient has an inflammatory condition of the knee.

**Reviewer's Comments:** This study demonstrates in a long-term randomized trial that the decision to resurface the patella does not alter the long-term outcome of total knee arthroplasty. The major limitation of this study, however, is the relatively small size of the patient population secondary to a significant number of patients being lost to follow-up. It seems likely that a larger study is required to detect differences in clinical outcomes. Nevertheless, this study does provide evidence that the decision to resurface the patella in non-inflammatory arthropathy is essentially dependent upon the clinical practice of the surgeon. (Reviewer-Kris J. Alden, MD, PhD).

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Keywords: Knee Replacement, Patella Resurfacing

Print Tag: Refer to original journal article
Open Debridement Plus Component Retention Doesn’t Stop MRSA

The Fate of Acute Methicillin-Resistant Staphylococcus aureus Periprosthetic Knee Infections Treated by Open Debridement and Retention of Components.

Bradbury T, Fehring TK, et al:

J Arthroplasty 2009; 24 (September): 101-104

Background: The treatment of acute periprosthetic knee infection remains controversial. The success rate of open irrigation and debridement with component retention varies widely and is likely the result of the multiple variables that are difficult to control in a retrospective study platform. These variables include time between the index surgery and onset of infection, duration of symptoms of infection, the host's immune system, and the surgical technique used during debridement.

Objective: To determine the outcome of patients treated with irrigation, debridement, and component retention for acute periprosthetic knee-joint infections secondary to methicillin-resistant Staphylococcus aureus (MRSA).

Methods: A multicenter retrospective review of acute periprosthetic MRSA knee infections from 1990 to 2007 at 4 institutions was performed. Cases were identified through databases maintained by hospital infection monitoring systems or through institutional joint registries. Institutional review board approval was obtained from each center. Inclusion criteria were as follows: (1) clinical presentation consistent with acute deep infection presenting within 4 weeks of index surgery or acute presentation of a late hematogenous infection, (2) absence of an established draining sinus tract, (3) absence of radiographic evidence of prosthetic loosening or osteitis, (4) a deep culture with growth of MRSA, (5) treatment with open debridement and component retention, (6) postoperative intravenous antibiotic therapy with vancomycin for 4 weeks or greater, and (7) clinical follow-up for at least 2 years.

Results: Of the 19 cases that satisfied the inclusion criteria, 16 failed. The failure rate of treatment with open debridement with component retention and at least 4 weeks of intravenous vancomycin was 84%. Among the 16 failures, 13 (68%) required component resection and antibiotic-impregnated spacer placement to control their infection, 2 required a repeat debridement procedure, and 1 patient died secondary to MRSA sepsis. For the cases that required component removal, the average time interval between initial debridement and component retention was 7 months.

Conclusions: The theoretical advantages of open debridement with retention of prosthetic components over a 2-stage exchange procedure in the setting of an acute prosthetic joint infection are numerous: fewer operations, less expense, conservation of bone stock, and better function of the knee during treatment. Unfortunately, success rates of open debridement and component retention are poor in the setting of MRSA infection.

Reviewer's Comments: This is a valuable study, which can give surgeons some guidance for the treatment of acute infection with MRSA. Certainly, the influence of the offending organism’s species will affect the success rate of open debridement and component retention. However, in the setting of MRSA, the success rates are poor, and component retention cannot be supported by this study or a review of the orthopedic literature. (Reviewer-Kris J. Alden, MD, PhD).

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Keywords: MRSA Infection, Open Debridement

Print Tag: Refer to original journal article
Objective: To evaluate the Metaizeau technique in the management of pediatric displaced radial neck fracture. Methods: All patients at 2 centers in Germany (Mainz and Nuremberg) who had a radial neck fracture with significant displacement were studied after >2 years of follow-up. Fractures were classified according to the method of Judet, with I being undisplaced, II being <30°, III being 30° to 60° angulated, and IV being >60° angulated. The Metaizeau technique was used for those with >30° of angulation. Mean age at surgery was 8 years (range, 5-11). The authors describe their technique. An attempt at closed reduction is made with fluoroscopy. Then, a titanium elastic nail is introduced retrograde from just proximal to the radial growth plate at the wrist. The authors used a 2.0- to 2.5-mm diameter nail. The nail is advanced to the fracture, and again manipulation is performed. Then the nail is engaged in the epiphysis and rotated 180° using a T-clamp. In difficult cases with severe displacement such that the nail cannot be entered into the epiphysis, a K wire is used to push it over. Four patients required this. Two patients required open reduction and were then stabilized by the elastic nails. The skin is closed over the nail distally.

Results: 28 patients were studied, and mean follow-up was 32 months. There were 82% excellent and 18% good results by the Mayo score and no poor results. The Judet type was predictive, as all of the Judet type III had excellent results. Interestingly, all of the patients treated with K-wire manipulation and also with open reduction had excellent results. There were no infections or cases of avascular necrosis. However, there were 3 cases of radial head enlargement. There were 3 cases of malunion, defined as angulation >20°. Mean angulation preoperatively was 65°, reduced to 11° postoperatively and at follow-up. Only 4 patients had loss of >20° of motion. Conclusions: The Metaizeau technique is effective at obtaining (in most cases) and maintaining range of motion after displaced radial neck fractures in children. It allows early range of motion. There was no significant stiffness seen in this study. Clinical results were excellent or good in all cases.

Reviewer's Comments: This is an appealing technique. The elastic nail can assist both in obtaining reduction and maintaining it. The other option, which is an oblique K wire going across the radius from the corner of the neck to the metaphysis, is not very stable and can lead to infection. Nevertheless, the authors caution that some cases require open reduction even in experienced hands. I recommend this article to those who treat pediatric trauma. The use of a 2.0- to 2.5-mm nail should be remembered. (Reviewer-Paul D. Sponseller, MS, MD).

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Keywords: Radial Neck Fracture, Metaizeau Technique

Print Tag: Refer to original journal article
Surgical Technique Addresses Crouch Gait in Cerebral Palsy

Distal Femoral Extension Osteotomy and Patellar Tendon Advancement to Treat Persistent Crouch Gait in Cerebral Palsy. Surgical Technique.

Novachek TF, Stout JL, et al:


A surgical technique in the treatment of crouch gait in cerebral palsy involves distal femoral extension osteotomy and patellar tendon advancement.

Crouch gait is a challenging problem in cerebral palsy. It is a sign of weakness as well as muscle spasticity. The group at Gillette Children's Hospital has come up with a procedure that can address both the weakness and the contracture. It involves patellar tendon advancement distally. In immature patients, the Krackow sutures are used to suture the advanced tendon beneath a periosteal flap. In skeletally mature patients, the tubercle is advanced as a bone block. In both cases the repair is reinforced with fiber tape. When the child has a flexion contracture of up to 30°, a distal femoral extension osteotomy is done. A blade plate is used for rigid fixation of the femoral osteotomy, which will allow early range of motion. The knee should be immobilized in slight flexion initially to avoid stretching the sciatic nerve. A continuous-passive-motion machine is used to begin controlled range of motion. Contraindications for this procedure are listed as a flexion contracture of >30°, patella baja, or significant malrotation. Those with significant hip flexion contractures should have this addressed as well. All patients in this study were evaluated with preoperative and postoperative gait analysis. The results of the procedure are largely gratifying. The range of knee flexion increased 15° to 20°, and the knee flexion in stance was restored to the normal range of 10° in patients who underwent patellar tendon advancement as part of their procedures. Patients who had an osteotomy alone without the patellar tendon advancement did not have an improvement in their crouch postoperatively. The study did not have a control group. Longer-term follow-up to maturity is also needed.

Reviewer's Comments: Personally, I would have concerns about the weakness recurring in this population. I would like to see more specifics about which children would benefit, in terms of gait velocity or need for a walker. The authors have beautiful photographic illustrations of the technique, for anyone interested in performing this type of surgery. I recommend it to anyone caring for children with cerebral palsy. (Reviewer-Paul D. Sponseller, MS, MD).

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Keywords: Crouch Gait, Distal Femoral Extension Osteotomy, Patellar Tendon Advancement

Print Tag: Refer to original journal article
The American Academy of Orthopaedic Surgeons has published a set of clinical practice guidelines for treating pediatric diaphyseal femur fracture.

The authors present recommendations and evaluate options in the treatment of pediatric diaphyseal femur fracture. The first recommendation is the strongest: that children aged under 36 months should be evaluated for child abuse. The evaluation should take the form of a complete history and physical examination for signs of abuse or neglect, involving social services or child abuse teams where available. This risk is highest under age 1 year, where the risk of abuse is as high as 10% to 15%. The final conclusion is rarely easy to make but is typically decided by other experts, often after an orthopedic surgeon gets the ball rolling. The second recommendation is that for children under 6 months of age, Pavlik Harness and spica casts are equally effective, with the Pavlik harness having perhaps less skin difficulty. The third recommendation is that children aged 6 months to 5 years with <2 cm of shortening should have spica casting either early or after a period of traction. The level of evidence is II. The authors concede that for children from 4 to 5 years of age, there may be some cases where other treatment options are equally valid. This leads into the fourth and fifth recommendations, which are nonrecommendations, with the authors stating that they are unable to address whether there is a maximum weight for use of spica casts. There is also no evidence as to what is best for children with >2 cm of shortening. This is probably because a moderate degree of shortening is extremely well tolerated in children, especially after they partially compensate by the overgrowth phenomenon. Recommendation 6 is almost a nonrecommendation; it states that when a child shortens >2 cm in a spica, altering the treatment is an option. The guideline also states that there are no data showing that a specific degree of angulation or rotation is harmful for children in spica casts. The eighth guideline is more definitive and helpful, stating that it is an option for physicians to use flexible intramedullary nailing to treat children aged 5 to 11 years. The authors present more options and also mention more procedures that cannot be recommended due to lack of evidence.

Reviewer’s Comments: I think it interesting to see how little definitive evidence there is for specific guidelines. This is undoubtedly because most pediatric femoral fractures do well, and overgrowth and remodeling compensate for many positions. It is sometimes hard to design prospective randomized studies to settle these issues. These types of guidelines will undoubtedly proliferate as regulatory agencies gain more power to dictate how treatment decisions should be made, in the hopes of improving outcomes and with an eye on the most effective expenditure of everyone's money. Nevertheless, the number of treatment decisions a physician must make in practice is almost unlimited and cannot always be covered by treatment guidelines. (Reviewer-Paul D. Sponseller, MS, MD).

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Keywords: Pediatric Diaphyseal Femur Fractures, AAOS Clinical Practice Guidelines

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Gastrocnemius and Soleus Lengthening Normalizes Ankles in Cerebral Palsy

Outcomes of Gastrocnemius-Soleus Complex Lengthening for Isolated Equinus Contracture in Children With Cerebral Palsy.

Tylkowski CM, Horan M, Oeffinger DJ:


Hip and knee kinematics can normalize after gastrocnemius and soleus lengthening in patients with cerebral palsy.

Objective: To assess whether hip and knee kinematics can normalize after gastrocnemius and soleus lengthening in patients with cerebral palsy (CP).

Participants/Methods: The study took place at Shriners Hospital for Children in Lexington, Kentucky. A group of 27 patients with cerebral palsy and isolated gastrocnemius and soleus contractures were studied with preoperative and postoperative gait analysis. The subjects were selected for surgery because they had at least 5° of fixed equinus when the knee was extended. The patients underwent a lengthening of the gastrocnemius and soleus complex by a percutaneous 3-incision technique. The ankle was dorsiflexed to neutral and cast for 4 weeks. Then the patients wore a hinged ankle foot orthosis for at least 8 hours per day and were instructed to carry out stretching until the cessation of growth. The patients were a mean of 11 years old, ranging up to 17. The 27 patients underwent 36 lengthenings. There were 14 hemiplegic and 13 diplegic patients. They underwent instrumented gait analysis preoperatively and at least 1.5 years postoperatively. These patients were compared with 15 able-bodied patients who did not have CP and were also studied by gait analysis.

Results: The ankle moments and powers became more normalized in the CP patients, although in the CP patients the powers did not completely normalize. There were no instances of adverse effects at the hip or the knee. No patient required repeat lengthening. There were no changes in the oxygen costs of gait postoperatively. There were no compensatory changes at the hips or the knee joints.

Conclusions: Gastrocnemius lengthening for isolated contracture does not result in overcorrection if the patients are selected to have no involvement of other joints. These results suggest that overcorrection is a reflection of cerebral palsy type.

Reviewer's Comments: This article is reassuring. Dietz and others have shown that ankle overcorrection is a concern, especially in diplegic and totally involved patients. This technique was a simple percutaneous technique with a relatively brief period of postoperative casting. It does not suggest what to do for patients who need multilevel surgery, but it does advocate confidence to recommend this surgery to patients with isolated contracture. Proper technique should be followed to avoid dorsiflexion past neutral at the time of surgery and cast application. (Reviewer-Paul D. Sponseller, MS, MD).

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Keywords: Gastrocnemius & Soleus Lengthening, Cerebral Palsy

Print Tag: Refer to original journal article
The most important factor for a patient when choosing a graft for anterior cruciate ligament reconstructive surgery is the recommendation of their surgeon.

**Background:** No studies have focused on the factors affecting patient selection of a particular graft type for anterior cruciate ligament (ACL) reconstruction.

**Objective:** To explore the individual patient’s rationale behind graft selection for ACL reconstruction and then to record and collate patients’ evaluations about the procedure.

**Design:** Retrospective review.

**Participants/Methods:** 1038 patients who underwent ACL reconstruction from 2000 to 2005 were included in this study. Five different surgeons were involved in this study, and all of the patients were given the option of selecting autograft or allograft for their ACL reconstruction by their surgeon. At a minimum of 2 years postoperatively, patients were sent a questionnaire regarding graft-selection issues. The patients were asked what type of graft they chose and what was the primary factor influencing their decision. The patients were given a list of 4 sources of influence for their graft selection and were instructed to rank the order of importance each factor had on their choice. These sources of influence were (1) physician recommendation, (2) family/friend recommendation, (3) media influence, and (4) coach recommendation. The patients were also asked whether they were satisfied and whether they would choose the same graft again.

**Results:** 240 of the 1038 patients (23%) completed and returned the questionnaire. Among the responders, 63.3% had selected an allograft, and 35.4% opted for an autograft. Grafts included bone patellar tendon bone (BPTB) autograft (29.5%), hamstring autograft (5.5%), quadriceps tendon autograft (0.4%), BPTB allograft (14.7%), Achilles tendon allograft (9.3%), soft-tissue allograft (tibialis or hamstring tendons) (7.2%), and unknown allograft (32.1%). The surgeon’s recommendation was the most common factor influencing graft selection (74.2%). Other factors influencing graft selection included family/friend recommendation (11.0%), media influence (6.4%), coach recommendation (3.4%), risk of disease transmission (5.1%), and recovery time (16.5%). Ninety-three percent of the patients were satisfied with their graft selection, and 12.7% claimed that they would choose another graft if they had to do it over again. The majority of these patients (63.3%) stated that they would have opted for an allograft over an autograft.

**Conclusions:** The most important factor for a patient when choosing a graft for anterior cruciate ligament reconstructive surgery is the recommendation of their surgeon. This underscores the importance of physicians’ understanding of the graft options available and the pros and cons of each option.

**Reviewer’s Comments:** This study is limited by the low response rate (23%). In addition, the retrospective nature of this study subjects it to recall bias. It would be interesting to see how the factors of cosmesis and expected pain influenced patients’ graft selection; in my practice, many patients select an allograft for these reasons. (Reviewer-Adam J. Farber, MD).

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Keywords: Anterior Cruciate Ligament, Allograft Vs Autograft, Patient Satisfaction

Print Tag: Refer to original journal article
Arthroscopic Treatment of Shoulder MDI Pleases Athletes

Arthroscopic Treatment of Multidirectional Shoulder Instability in Athletes: A Retrospective Analysis of 2- to 5-Year Clinical Outcomes.

Baker CL III, Mascarenhas R, et al:


Background: Historically, the standard method of treatment of multidirectional instability (MDI) of the shoulder has been open capsular shift. Arthroscopic techniques are currently being used and studied. However, there are few reports in the literature on the outcomes of arthroscopic treatment of MDI of the shoulder.

Objective: To report on the outcomes of 40 symptomatic athletes with shoulder MDI who underwent arthroscopic reconstruction after failure of nonoperative management.

Design: Retrospective case series.

Methods: 43 shoulders in 40 athletic patients (24 males and 16 females; mean age, 19.1 years [range, 14-39]) with MDI of the shoulder were treated via arthroscopic surgical techniques between 2002 and 2005 and were included in this study. All patients were athletes who competed at either the high school, collegiate, or organized recreational level. Diagnosis and surgical treatment were based on patient history, physical examination findings, MRI findings, examination under anesthesia findings, and pathologic findings at diagnostic arthroscopy. Patients with a patulous capsule without a discrete labral tear received a capsulolabral plication with or without suture anchors. Those with labral tears received a capsulolabral plication with suture anchors. All patients underwent a standardized postoperative course of physical therapy following 4 to 6 weeks of immobilization. At final follow-up, validated outcome measures included the American Shoulder and Elbow Surgeons (ASES) and Western Ontario Shoulder Instability (WOSI) scoring systems. In addition, patient-reported stability, strength, and range of motion were recorded at final follow-up.

Results: The mean final postoperative follow-up was at 33.5 months (range, 24-65). Using a subjective stability scale (0-10, with 10 being completely unstable), the mean stability score was 1.8 (range, 0-7); 93% of patients had excellent or good stability at the most recent follow-up. Ninety-one percent of patients reported full or satisfactory range of motion, and 98% reported normal or slightly decreased strength. Eighty-six percent of patients were able to return to their sport with little or no limitation. The mean ASES score postoperatively was 91.4 of 100. The mean WOSI percentage score postoperatively was 91.1 of 100. All 40 patients thought their surgery was worthwhile and would have it again. There were no neurovascular injuries, superficial or deep infections, or cases of adhesive capsulitis in the study population.

Conclusions: Arthroscopic methods can provide an effective treatment for symptomatic multidirectional instability in an athletic population.

Reviewer’s Comments: This study is limited by its retrospective nature, lack of preoperative ASES and WOSI scores, and lack of a control group. Furthermore, the heterogeneity of pathology associated with MDI and the heterogeneity of the procedures required to address this pathology limit this study. Nonetheless, this study provides encouraging results. (Reviewer-Adam J. Farber, MD).

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Keywords: Multidirectional Shoulder Instability, Athletes

Print Tag: Refer to original journal article
The new modified dynamic labral shear test is very useful for assessing superior labrum anterior and posterior lesions of the shoulder.

**Purpose:** To evaluate 2 new tests, the upper cut for biceps injuries and the modified dynamic labral shear (DLS) for superior labrum anterior and posterior (SLAP) lesions. **Design:** Prospective cohort study.

**Participants:** 101 patients (59 men; mean age, 49 years; range, 28-64) with shoulder pain.

**Methods:** The subjects underwent a standardized physical examination including the following previously established tests: Yergason's, Speed's, bear hug, belly press, O'Brien's, and anterior slide. In addition, 2 new tests were performed: the upper-cut test and the modified DLS test. The upper-cut test was performed by the examiner resisting the fist of a patient as they attempted to bring a clenched fist up towards their chin with the forearm supinated and elbow flexed to 90°; a positive test was pain or a painful pop. The modified DLS test is performed as the involved arm is flexed 90° at the elbow, abducted in the scapular plane to >120°, and externally rotated to tightness. The joint is then guided into maximal horizontal abduction. Then the examiner applies a shear load to the joint by maintaining external rotation and lowering the arm from 120° to 60° of abduction. A positive test is indicated by posterior pain and/or a painful click between 120° and 90° of abduction. Clinical examination findings were then correlated with arthroscopic findings at the time of surgery.

**Results:** The modified DLS test resulted in the highest ratings in all categories (sensitivity=0.72, specificity=0.98, accuracy=0.84, positive predictive value=0.97, positive likelihood ratio=31.57) for detecting labral disease; whereas O'Brien's test was next highest in all categories. For biceps tendon pathology, the upper-cut test had a sensitivity of 0.73, accuracy of 0.77, and positive likelihood ratio of 3.38. This test was the most accurate, produced the highest positive likelihood ratio, and was the second most sensitive test behind the bear hug test (0.79). Statistical analysis revealed that the combination of upper-cut and Speed's tests was significantly better at detecting biceps lesions ($P = 0.021$) than other tests.

**Conclusions:** The newly described upper-cut test is useful in evaluating biceps tendon pathology, especially in combination with Speed's test. The newly described modified dynamic labral shear test is extremely useful in evaluating superior labrum anterior and posterior lesions, especially in conjunction with O'Brien's test.

**Reviewer's Comments:** This study describes two new tests that should help clinicians evaluate biceps tendon and SLAP lesions. Future studies by examiners other than the ones who first described these tests are needed to validate these findings. (Reviewer-Adam J. Farber, MD).

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Keywords: Shoulder Pain, Diagnostic Testing

Print Tag: Refer to original journal article
Recreate Distal Biceps Tendon Footprint Anatomy With 2 Incisions, Suture Anchors

Distal Biceps Tendon Repair: A Cadaveric Analysis of Suture Anchor and Interference Screw Restoration of the Anatomic Footprint.

Jobin CM, Kippe MA, et al:


When performing a distal biceps tendon repair, a 2-incision approach with double suture-anchor fixation may yield a more anatomically correct repair than a 1-incision approach using an interference screw.

Background: Distal biceps tendon repairs can be performed using either a 1- or 2-incision surgical approach. Tendon fixation can be performed with a variety of different methods, including interference screws and suture anchors. Although numerous studies have examined fixation strength of different repair techniques, there are no published reports examining the accuracy and ability of the repair to recreate the anatomy of the native tendon footprint with these devices and approaches.

Objective: To identify the insertion characteristics of the biceps tendon before and after repair.

Design: Controlled laboratory study.

Methods: 9 matched pairs of fresh-frozen human cadaveric arms were used in this study, and 36 distal biceps repairs were performed after computer-generated randomization to a 1-incision or a 2-incision approach as well as to fixation method with either 2 suture anchors or an interference screw. Suture-anchor fixation was performed with two 5.5-mm suture anchors; interference screw fixation was performed with an 8- x12-mm Bio-Tenodesis screw (Arthrex, Naples, FL). For each matched pair, 1 arm received either a 1-incision suture anchor repair followed by a 2-incision interference screw repair or this sequence reversed. The other arm of the matched pair received either a 1-incision interference screw repair followed by a 2-incision suture anchor repair or this sequence reversed. Therefore, each set of matched-pair elbows received all 4 combinations of surgical approach and fixation techniques in a randomized allotment. Native and repaired distal biceps tendon footprint area and centroid location were calculated with a 3-dimensional digitizer.

Results: The footprint area was significantly affected by fixation device but not by surgical approach. In contrast, the footprint location was significantly affected by the approach but not by the fixation device. The native footprint area (259 mm²) was found to be statistically larger than the repaired footprint area with suture anchors for both 1-incision (187 mm²) and 2-incision (201 mm²) approaches, which in turn was statistically larger (P =0.013) than the footprint area of the interference screw fixation for 1-incision (133 mm²) and 2-incision (138 mm²) approaches. The repaired distal biceps footprint was significantly more anterior (2.51 mm) when a 1-incision approach was performed compared with a 2-incision approach (P =0.001). Conclusion: When performing a distal biceps tendon repair, a 2-incision approach allows better recreation of the native footprint position than does a 1-incision technique. Fixation with suture anchors more closely recreates the footprint area compared with interference screw fixation.

Reviewer's Comments: Although this study is limited by the fact that it is a cadaveric study that lacks the ability to measure healing capacity, the study provides interesting data. Future studies are needed to determine whether these differences in recreating the footprint translate into clinically significant differences in terms of outcomes. (Reviewer-Adam J. Farber, MD).

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Keywords: Distal Biceps Tendon, Interference Screws, Suture Anchor

Print Tag: Refer to original journal article
According to the current literature, there are no clinical outcome differences at 1-year follow-up between patients who undergo arthroscopic rotator cuff repairs with double-row techniques versus single-row repair techniques.

**Background:** Numerous cadaveric studies have suggested improved biomechanical properties of double-row rotator cuff repair constructs compared with single-row constructs. Controversy exists as to whether the double-row repair leads to an improvement in clinical outcomes. No systematic review of the literature has summarized the findings of the investigations comparing the clinical outcomes of single-row repair versus double-row repair.

**Objective:** To review the existing literature and determine whether there is a difference in the clinical outcome between single-row and double-row rotator cuff repairs.

**Design:** Systematic review.

**Methods:** All clinical studies investigating and comparing double-row and single-row rotator cuff repair techniques were reviewed. Inclusion criteria were English-language and Levels I and II studies involving single-row versus double-row rotator cuff repair. Exclusion criteria were <1 year of follow-up, no clinical assessment of outcome, assessment of only single-row or double-row repair, retrospective study design, and follow-up of the study population <70%. Quality appraisal of the included studies was performed. The results were then reviewed to make conclusions regarding the clinical differences, if any, between single-row and double-row rotator cuff repair techniques.

**Results:** Five studies met inclusion criteria for the systematic review. All 5 studies were prospective studies with at least 1 year of follow-up: 3 were Level I studies (randomized controlled studies) and 2 were Level II studies (cohort studies). At short-term follow-up with a minimum of at least 1 year, clinical outcomes for both the double-row and single-row arthroscopic rotator cuff repairs were equivalent, with no statistically significant clinical differences.

**Conclusions:** According to the current literature, there are no clinical outcome differences at 1-year follow-up between patients who undergo arthroscopic rotator cuff repairs with double-row techniques as opposed to single-row repair techniques.

**Reviewer’s Comments:** Although the biomechanical data may be convincing, this well-done study clearly shows that the clinical data supporting the superiority of double-row rotator cuff repair techniques are currently lacking. It is important to note that none of the studies utilized a trans-osseous–equivalent double-row repair technique. I believe that this modification of the double-row repair technique may lead to improvements in clinical outcomes. In addition, most of the studies included in this review did not measure postoperative strength; I wonder whether double-row repair techniques, which reproduce the anatomy better and which are associated with increased healing rates, would provide patients with greater strength over single-row repair techniques. Clearly future, prospective controlled studies with longer follow-up data are needed to determine the role of double-row rotator cuff repair techniques. (Reviewer-Adam J. Farber, MD).

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Keywords: Double-Row Repair, Single-Row Repair

Print Tag: Refer to original journal article
After Arthroscopic Treatment, Young Males Have Increased Risk for Recurrent Shoulder Dislocation

Predisposing Factors for Recurrent Shoulder Dislocation After Arthroscopic Treatment.

Porcellini G, Campi F, et al:

Age <22 years, male sex, and an interval from time of first anterior shoulder dislocation until surgery of 6 months or more are risk factors associated with an increased risk for recurrent instability following arthroscopic Bankart repair.

Purpose: To identify the risk factors for recurrent anterior glenohumeral instability in a series of patients with traumatic unidirectional anterior glenohumeral instability that underwent arthroscopic Bankart repair.

Design: Retrospective review.

Methods: From January 2000 to December 2003, a single surgeon operated on 625 consecutive patients (647 shoulders) with a mean age of 28.7 years (range, 16-63 years) for anterior unidirectional instability with a Bankart or an anterior labroligamentous periosteal sleeve avulsion lesion. Patients were included in this study if they had a traumatic onset of instability, no history of voluntary dislocation, no signs of hyperlaxity, an interval of <12 months after the time of the first dislocation, <7 dislocations, a Bankart or anterior labroligamentous periosteal sleeve avulsion lesion, no glenoid erosion, no previous shoulder surgery, and were not lost to follow-up. Based on these criteria, 385 patients (278 men and 107 women) were included in this study. All patients underwent a standard arthroscopic Bankart repair using suture anchors and a uniform postoperative rehabilitation protocol. Demographic data were retrospectively reviewed. Final postoperative clinical follow-up was performed at 36 months. Recurrence of instability, as determined on the basis of either a subjective sense of subluxation or objective documentation of a dislocation, was considered as failure.

Results: At final follow-up, the overall rate of recurrent instability was 8.1%. Age at the time of the first dislocation was a significant risk factor for recurrence ($P<0.05$). The rate of recurrent instability in patients under 22 years of age was 13.3%; in contrast, in patients over the age of 22 years, the rate of recurrent instability was 6.3%. In addition, male sex was a significant risk factor for recurrent instability ($P<0.05$). The rate of recurrent instability in male patients was 10.1% as opposed to 2.8% in female patients. Finally, the time from the first dislocation until surgery was also a significant risk factor for recurrent instability ($P<0.05$). For patients who had surgery within 6 months from the time of first dislocation, the rate of recurrent instability was 4.8%. In contrast, for patients who had surgery more than 6 months from the time of first dislocation, the rate of recurrent instability was 11.9%.

Conclusions: Age <22 years, male sex, and an interval from time of first anterior shoulder dislocation until surgery of 6 months or more are factors associated with an increased risk for recurrent instability following arthroscopic Bankart repair.

Reviewer’s Comments: This well-done study provides useful information for surgeons concerning counseling patients about the risk of recurrent instability after arthroscopic Bankart repair. This study is limited by the lack of a control group (ie, patients who underwent nonoperative treatment or open Bankart repair). (Reviewer: Adam J. Farber, MD).

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Keywords: Shoulder Instability, Arthroscopic Treatment, Bankart Repair

Print Tag: Refer to original journal article
Open Supraspinatus Repair Shows Long-Term Improvement

Long-Term Clinical and MRI Results of Open Repair of the Supraspinatus Tendon.

Nich C, Mütschler C, et al:

Clin Orthop Relat Res 2009; 467 (October): 2613-2622

Re-rupture of supraspinatus tendon after repair did not affect the functional result.

**Background:** Open repair of full-thickness tears of the rotator cuff (RTC) reliably improves pain and function. A 7% to 31% failure rate exists for the repair of small-to-intermediate tears, and a higher failure rate is associated with massive tears. Retears do not always lead to clinical failure, but they are usually associated with poorer function and more severe degenerative changes of the RTC muscles than are successful repairs. **Objective:** To document the 5-year functional outcome of patients who underwent open repair of a full-thickness supraspinatus tear; to document the status of repair, fatty infiltration, and muscle atrophy of the supraspinatus on postoperative MRI; to determine the influence of the postoperative MRI findings on the functional outcome; and to determine whether the repair benefits glenohumeral arthritis. **Design:** Level IV retrospective review. **Methods:** Patients with a chronic, retracted, full-thickness supraspinatus tear who underwent open repair, had at least 5 years of clinical and radiographic follow-up, and were <65 years of age were included. Patients were excluded if they had a prior repair, a tear retracted to or proximal to the glenoid rim, rheumatoid disease, or advanced glenohumeral osteoarthritis. Mean age at the time of surgery was 58.8 years. Forty-four patients (46 shoulders) were included. In 8 shoulders, a full-thickness tear of the infraspinatus tendon was also present. Repair of the supraspinatus was achieved using a bone trough at the cartilage-bone junction and transosseous sutures. Four patients were unable to return for postoperative MRI. **Results:** The mean Constant-Murley scores improved postoperatively. Scores for pain, activities of daily living, active flexion, and overall average abduction strength all improved. MRI showed healing of the supraspinatus tendon in 37 of the 42 shoulders and re-rupture in 5 (12%). All 5 retears occurred at the greater tuberosity. Supraspinatus muscle area increased or remained stable after healing of the tendon. When the tendon retears, supraspinatus muscle area decreased. Fatty infiltration of the supraspinatus, infraspinatus and subscapularis muscles progressed regardless of tendon healing. Radiographic centering of the humeral head was preserved and glenohumeral arthritis remained stable. Subacromial space height was not influenced by supraspinatus tendon healing. **Conclusions:** Open repair of a complete detachment of the supraspinatus tendon consistently led to functional improvement. Failure of the repair occurred in few patients and did not influence long-term functional results. Supraspinatus muscle atrophy could be reversed after successful repair. Glenohumeral arthritis progression was limited. **Reviewer’s Comments:** This study is limited by its retrospective design. Its strength lies in the high percentage of MRI follow-up to document the reversal of supraspinatus muscle atrophy and continued fatty infiltration. It was interesting to see that failure of the repair did not affect the functional outcomes. (Reviewer: Carl H. Wierks, MD).

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Keywords: Supraspinatus Repair

Print Tag: Refer to original journal article
Definitive diagnosis of superior labral anterior-posterior tears is confirmed on arthroscopic examination.

**Background:** The authors present current information on superior labral anterior-posterior (SLAP) tears. SLAP tears were first described in 1985 by Andrews and classified in 1990 by Snyder. **Anatomy:** The superior and anterosuperior labrum are less vascular than the posterior and inferior regions. Approximately half of the biceps tendon originates from the supraglenoid tubercle, with the remaining fibers inserting directly into the superior labrum. Normal variations of the anterosuperior labrum include a sublabral foramen or absence of the anterosuperior labrum, both of which are often associated with a cord-like middle glenohumeral ligament. **Pathogenesis:** Common injury mechanisms include forceful traction loads to the arm and repetitive overhead throwing activities. Predisposing factors in the overhead athlete may include increased external rotation in the late cocking phase and posterior capsule contracture. **Classification:** Snyder described 4 major variants of SLAP tears. Type-I lesions consist of superior labral fraying. Type-II lesions are characterized by detachment of the superior labrum/biceps anchor from the glenoid. Type-III lesions result in a bucket-handle–type tear of the superior labrum with an intact biceps anchor. Type-IV lesions have a bucket-handle tear of the superior labrum with extension of the labral tear into the biceps tendon. **Diagnosis:** Pain is the most frequent complaint of patients with a SLAP tear. Clinical diagnosis is often difficult because of the lack of specific examination findings and the frequency of concomitant shoulder injuries. MRI is the preferred imaging technique for patients with suspected SLAP tears. **Management:** Rehabilitation goals include improving posterior capsular flexibility and strengthening of the rotator cuff and scapular stabilizing muscles. Surgical indications include failure of nonsurgical treatment lasting at least 3 months in a patient with a suspected SLAP tear. High-level athletes are generally treated in the post-season. **Technique:** Type-I lesions may be debrided. Unstable type-II lesions should be repaired when symptomatic, particularly in a young active patient. Type-III lesions are treated with resection of the unstable fragment and repair of the middle glenohumeral ligament, if it is attached to the torn fragment. Treatment of type-IV lesions depends on patient age and amount of biceps tendon involvement. When <30% of the tendon is involved, the labral tear and involved tendon is debrided. Tears involving >30% of the biceps tendon generally are treated with biceps tenodesis and labral repair in younger patients or, in older patients, with labral debridement and biceps tenotomy or tenodesis. **Conclusions:** While diagnosis and management of superior labral anterior-posterior tears continues to improve, the clinician must correlate clinical findings with symptoms and imaging findings and be aware of the high incidence of associated shoulder pathologies. **Reviewer’s Comments:** This is an excellent review of a complex pathology. I recommend it to anyone who takes care of patients with SLAP tears. (Reviewer-Carl H. Wierks, MD).

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**Keywords:** SLAP Tears

**Print Tag:** Refer to original journal article
Electrical Bone Stimulation Does Not Improve Fusion Rates in Elderly

The Effect of Electrical Stimulation on Lumbar Spinal Fusion in Older Patients: A Randomized, Controlled, Multi-Center Trial. Part 2: Fusion Rates.

Andersen T, Christensen FB, et al:

Spine 2009; 34 (21): 2248-2253

Electrical bone stimulation did not improve fusion rates in uninstrumented lumbar fusions in patients over 60 years of age.

**Background:** Electrical stimulation has previously been shown to improve lumbar fusion rates in young patients and those considered at high risk for pseudoarthrosis. Other methods to improve fusion rates, such as addition of instrumentation or iliac crest autograft, are controversial in the elderly, due to increases in operative time and donor site morbidity.

**Objective:** To evaluate the effect of electrical stimulation on fusion rates and functional outcomes in patients >60 years of age.

**Design:** Randomized, controlled multicenter trial.

**Participants/Methods:** 107 patients undergoing uninstrumented lumbar fusion were randomly assigned to receive electrical stimulation using 40-µA or 100-µA direct current (DC) via implanted electrodes and battery for 6 months or dummy electrodes implanted to create similar radiographic appearance. The stimulator batteries were removed 6 months to 1 year postoperatively. All patients also received a fresh frozen femoral head allograft and wore a brace for 3 months postoperatively. They were followed up for 2 years. Fusion was assessed with thin-slice CT. Functional outcomes were evaluated with the Dallas Pain Questionnaire, Low Back Pain Rating Scale (LBPRS), and SF-36.

**Results:** Two-year follow-up CT scans were available for 89% of the patients. For the functional outcome questionnaires, however, 2-year data were collected from only 73% of patients. Fusion rates according to the CT scan were surprisingly low in all groups: 33.0% in controls, 32.5% in those who received 40-µA stimulation, and 50% in the group that had 100-µA stimulation (no statistically significant differences). Smokers, women, and patients with multiple-level surgeries were found to have significantly lower fusion rates across all study groups. Functional outcomes in the treatment group were higher in 3 of 4 categories of the Dallas Pain Questionnaire. However, no statistically significant differences were seen in LBPRS and SF-36 scores, improvements in walking distance, or subjective satisfaction. Further analysis of the data showed that patients who went on to solid fusion had significantly better improvement in functional outcomes according to all questionnaires and trends toward better improvement in walking distances and subjective satisfaction.

**Conclusions:** The study demonstrated that stimulation with direct current did not improve lumbar fusion rates in patients >60 years of age. There was a trend towards better fusion chances when 100-µA current was used, even though that subgroup of patients also had disproportionately more multilevel cases. The study also revealed that overall fusion rates in elderly patients undergoing uninstrumented fusion with allograft were quite low. As seen in previous studies, patients with successful fusions had better outcomes.

**Reviewer's Comments:** This was a well-designed, randomized controlled study. The low fusion rates are surprising and suggest that elderly patients may be at a higher risk for pseudoarthrosis. Serious consideration should be given to the use of instrumentation and other graft options in this population. Further research is needed to evaluate fusion success with use of 100-µA currents. (Reviewer-Vladimir Sinkov, MD).

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Keywords: Spinal Fusion, Electrical Stimulation

Print Tag: Refer to original journal article
Autologous chondrocyte implantation results in durable and successful outcomes in patients from a diverse population.

**Background:** Autologous chondrocyte implantation (ACI) is used as a second-line procedure for large, irregular chondral lesions after failed first-line treatments.

**Objective:** Factors associated with subjective improvement after ACI were studied in this patient cohort.

**Participants/Methods:** Patients receiving ACI for chondral defects of the knee were prospectively studied. The cohort included 137 subjects (140 knees) who had symptomatic, full-thickness defects of the patella, trochlea, or femoral condyles that failed prior treatment (microfracture, debridement, or osteochondral autograft transplantation). The patients’ average age was 30.3 ± 9.1 years (range, 13.3-49.9), and the mean defect size was 5.2 ± 3.5 cm² (range, 0.8-26.6 cm²). Outcome measures included clinical assessment and the Lysholm, Noyes, Tegner, IKDC, and KOOS scales, as well as the SF-12. Concurrent procedures were performed as indicated.

**Results:** The patients’ previously failed cartilage restoration procedures included microfracture (43%), chondroplasty (4%), and osteochondral autograft transplantation (3%). Seventeen percent had 2 defects, 3% had 3 defects, and 1 patient had 4 defects. Completed survey data sets were available for 122 patients (87%), and the mean follow-up was 4.3 ± 1.8 years after ACI. The outcome measures showed statistically significant improvement (P <0.01) on the Lysholm, Tegner, Noyes, IKDC, KOOS, and the SF-12. Twenty-two percent of patients regained preinjury activity levels, and 66% improved Tegner scores from their preoperative scores. Eighty-three percent said they would have the surgery again. Multivariate analysis showed that age and worker's compensation were independent predictors of Lysholm outcome score improvement. Those patients with increasing age and the worker’s compensation cohort both had lower follow-up Lysholm scores. Periosteal hypertrophy and partial patch delamination were observed postoperatively, and 15% of the patients required reoperation with debridement. Reoperations occurred at an average of 27 months (range, 5-73 months) after ACI. ACI failed in 9 knees (6.4%) and was revised with reimplantation (n=2), osteochondral allografts (n=4), and total knee replacement (n=3).

**Conclusions:** Autologous chondrocyte implantation resulted in improvement of symptoms and function in patients who had failed a first-line surgical intervention. Increasing age and worker’s compensation were predictors of outcome. Reoperation rates were similar to those previously published (15%-30%). Failure rates range from 4% to 22% in the literature and are higher in older patients, as was seen here. This relates to possible decreased synthetic capabilities of older chondrocytes and lower growth-factor response.

**Reviewer's Comments:** This study is important in that it demonstrates ACI as a durable treatment option with improvement in symptoms and function for patients with this difficult problem. The strengths of the paper are that it was performed on a diverse population of patients and was a single-center single-surgeon study. The weaknesses included the retrospective nature of the study, lack of controls or comparison group, and that it was nonrandomized. (Reviewer-Mark Clough, MD).

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**Keywords:** Autologous Chondrocyte Implantation

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