Specialty Update

What’s New in Sports Medicine

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This update is based on the scientific and investigational activities in the specialty of sports medicine from September 2013 to August 2014. It includes a review of pertinent research and articles published in the three premier journals of our specialty, namely, The Journal of Bone & Joint Surgery, The American Journal of Sports Medicine, and Arthroscopy: The Journal of Arthroscopic and Related Surgery.

Shoulder

Rotator Cuff Disease and Surgery

Literature related to rotator cuff disease and surgery continues to be the most common shoulder research published within the timeframe of our review. The societal and individual impact and cost of rotator cuff disease can be substantial, which is reflective of the prevalence of the disease. A recent Markov analysis demonstrated that surgical repair of symptomatic tears may result in not only substantial societal savings, but also improved individual quality-adjusted life-years relative to nonoperative treatment.

Predictors of outcome following either operative or nonoperative treatment of rotator cuff disease remain a topic of great interest. A recent cross-sectional study of 393 patients from the Multicenter Orthopaedic Outcomes Network (MOON) Shoulder Group demonstrated that objective tear characteristics (i.e., tear size, muscle atrophy, and retraction) did not correlate with patient pain symptoms. Rather, patient demographic characteristics (i.e., lower educational level, greater number of comorbidities, and race) appeared to be associated with greater pain symptoms at initial presentation.

Recognition of these pain-associated risk factors may allow a clinician greater insight into the etiology of shoulder pain in the setting of a rotator cuff tear.

Retears after rotator cuff repair do occur with frequency and can be a challenging clinical scenario to treat. Research on methods to improve structural healing rates after rotator cuff repairs remains active. The efficacy of platelet-rich plasma as an augment in rotator cuff repair is still unclear. One clinical study suggested that microfracture of the rotator cuff footprint prior to repair may permit egress of bone marrow elements and mesenchymal stem cells, which may aid rotator cuff healing in medium-sized tears (2 to 3 cm) and may reduce retear rates.

The debate continues whether structural healing after repair is critical to a successful patient outcome. A recent systematic review of available Level-I and II studies suggests that structural integrity of the repair (or lack thereof) does not seem to correlate with validated patient subjective outcome measures.

Treatment of irreparable rotator cuff tears in the young population is challenging. Latissimus dorsi transfers have been an option with good short-term to intermediate-term results. Gerber et al. reported their long-term results with the technique. The authors reported maintained patient subjective and objective outcomes to ten years following surgery for both primary and revision scenarios. Factors that were associated with poorer outcomes included subscapularis and teres minor insufficiency as well as large critical shoulder angles.

Shoulder Instability

Outcomes after arthroscopic anterior stabilization are approaching those after traditional open techniques. Although the current trend is toward arthroscopic repairs, the literature continues to demonstrate the superiority of open repairs in high-risk individuals. Mohtadi et al. demonstrated a recurrent dislocation rate of 23% (twenty of eighty-seven patients) in their arthroscopic repair group compared with 11% (nine of eighty patients) in their open repair group. The authors concluded that young male patients with visible Hill-Sachs lesions on radiographs may be better treated with open repairs than arthroscopic repairs. Their findings also perhaps highlight

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whether suture anchor repair of the labrum alone is adequate in high-risk male patients. Additional indicated adjuncts to Bankart repairs, such as remplissage, may be able to reduce the redislocation rate following surgery. Posterior instability episodes are relatively rare in the young athletic population. In a prospective cohort of 714 young athletes, posterior instability accounted for only 10% of shoulder instability events. The most significant risk factor for posterior instability in that cohort was increased glenoid retroversion. Posterior capsulolabral repair is successful in athletes with unidirectional posterior instability. Improvement in pain, stability, and function can be expected following surgery. Return to play was 90% in a cohort of 183 athletes; however, only 64% returned to the same level of play postoperatively. The authors also reported better outcome with suture anchor-based repairs than anchorless capsulolabral plication.

**Acromioclavicular Joint**

**Concomitant Acromioclavicular Arthritis During Rotator Cuff Surgery**

Clinically asymptomatic, radiographically evident acromioclavicular arthritis often coexists with rotator cuff disease. Although it may be tempting to prophylactically treat the acromioclavicular arthritis with a distal clavicle excision at the time of the rotator cuff surgery, Oh et al. suggested that not only is this unnecessary, but it may also result in postoperative morbidity. In a randomized trial of seventy-eight patients, the authors found that prophylactic distal clavicle excision for asymptomatic acromioclavicular jointarthrosis provided no additional improvement when compared with just addressing the rotator cuff tear alone. Furthermore, they noted a 5% complication rate (two of thirty-nine patients) related to postoperative acromioclavicular joint pain or protuberance with prophylactic distal clavicle excision.

**Knee**

**Anterior Cruciate Ligament (ACL)**

**ACL Outcomes**

Outcomes after ACL reconstruction continue to garner substantial research interest. In a prospected randomized trial comparing single and double-bundle reconstruction with use of hamstring autograft, Ahldén et al. found no differences in pivot shift or clinical scores at two years. Studies on graft failure showed variable rupture rates. One study from the Swedish registry of approximately 13,000 patients found only a 1.6% revision rate at two years, irrespective of autograft type, associated meniscal injury, or femoral fixation. In contrast, Paterno et al. reported that young patients involved in pivoting or cutting sports had a substantially higher rate (9%) of ACL retear following ACL reconstruction at twenty-four months in a prospective study. The youngest cohort within the study (mean age of 17.1 years) had an even higher rate (20.5%) of contralateral ACL tear, six times higher than the age-matched controls. Shelbourne et al. investigated return to play after revision ACL reconstruction with a bone-patellar tendon-bone autograft. High school and collegiate athletes returned to their preoperative performance level 74% of the time, and the five-year retear rate was 2.3% for high school athletes and 5.1% for collegiate athletes.

**Risk Factors for ACL Outcomes**

Concomitant meniscal and chondral injuries are frequently encountered at the time of ACL reconstruction, but their long-term effect on outcomes is unclear. As part of the MOON consortium, Cox et al. found that Outerbridge grade-III and IV articular cartilage injuries and medial meniscal repair were associated with lower clinical scores, and knees with small, untreated lateral meniscal tears fared better at six years.

Kim et al. investigated the degree of anterior laxity in the uninjured knee in patients scheduled for unilateral ACL reconstruction. The group with anterior laxity of >7.5 mm in the uninjured knee had poorer functional scores and higher side-to-side laxity measurements compared with patients with <7.5 mm of laxity. Two insightful studies documented the detrimental effects of smoking on outcomes after ACL reconstruction. Side-to-side arthrometer differences and clinical outcome scores were negatively impacted by smoking, but patients who quit at least one month prior to surgery showed equivalency to nonsmokers. The authors recommended bone-patellar tendon-bone autograft for smokers who are unable or unwilling to quit.

**ACL Nonoperative Treatment**

Nonoperative treatment of an ACL injury is a well-established treatment option for less active patients without gross instability, but its application in an active population is less studied. Grindem et al. found no significant differences in International Knee Documentation Committee (IKDC) scores or strength at two years in 143 active patients in an intention-to-treat model comparing operative and nonoperative treatments. Notably, the nonoperative group was significantly older and less likely to have played level-I sports pre-injury. In addition, twenty-one (33%) of the sixty-four patients who initially chose nonoperative treatment later decided to undergo ACL reconstruction because of dynamic instability during sport or daily activities.

**ACL Injury Prevention or Rehabilitation**

Continued efforts sought to characterize risk factors for noncontact ACL injury to augment prevention via targeted neuromuscular training. Bracing after ACL reconstruction remains controversial. Giroti et al. found in a kinematic analysis that both prophylactic braces and patellofemoral sleeves limited some of the residual increased tibial rotation that remains despite ACL reconstruction, but the clinical impact of this remains unknown. The role of “prehabilitation” in the setting of subacute ACL injury was the subject of a rigorous
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randomized controlled trial of twenty patients at a mean time of 6.7 months after their injury⁴⁰. At twelve weeks postoperatively, the treatment group showed sustained improvements in single-leg hop and Cincinnati scores, but peak torque and muscle mass gains had regressed to levels similar to those of control patients.

ACL Tunnels
ACL surgeons continue to debate transtibial and anteromedial transportal techniques for femoral tunnel placement. In a large prospective multicenter study, the patients undergoing transtibial techniques had a 2.5 times higher risk of undergoing repeat ipsilateral knee surgery at six years, but clinical outcomes were not different at the time of the latest follow-up⁴⁴. The technical aspects of anatomic femoral tunnel placement were the subject of multiple studies³⁵-³⁷. Kim et al. compared anteromedial transportal with outside-in drilling for double-bundle ACL reconstruction and concluded that transportal tunnel architecture was superior in terms of aperture shape and entry angle⁴⁵. Despite evidence that transtibial femoral tunnels are consistently more anterior than transportal tunnels³⁶, Lee et al. demonstrated no significant radiographic differences via application of anterior drawer, varus, and external rotation forces on the tibia at 90° of flexion during transtibial drilling³⁷.

ACL Graft
Graft selection in ACL reconstruction is multifactorial, but subtle differences emerged in two large registry studies in favor of bone-patellar tendon-bone autografts over hamstring tendon⁴⁶-⁴⁷. Overall revision rates at five years were higher for hamstring tendon autografts (4.45%) compared with bone-patellar tendon-bone autografts (3.03%), especially in the youngest subset of patients who had received a hamstring autograft⁴⁸. Further studies are needed to elucidate these findings. The oft-mentioned third autograft option is becoming increasingly popular. Lund et al. investigated quadriceps tendon-bone and bone-patellar tendon-bone grafts and reported fewer positive pivot shifts (14% compared with 38%) and fewer occurrences of anterior knee pain (7% compared with 34%) for the quadriceps tendon-bone cohort⁴⁹. Contralateral autograft harvest remains a viable option, and a recent Level-I study identified no benefits or drawbacks with contralateral hamstring autograft tendon harvest⁵⁰.

Osteoarthritis After ACL or Meniscal Injury
Evidence regarding the relationship between ACL injury and the development of osteoarthritis continues to evolve⁵¹-⁵⁶. Barenius et al. reported a 57% prevalence of radiographic medial compartment osteoarthritis at fourteen years, with no observed differences between hamstring grafts and bone-patellar tendon-bone grafts⁵⁵. An age-matched population study found a 1.4% prevalence of total knee arthroplasty in the case cohort compared with a 0.2% prevalence in the general population⁵⁶. Double-bundle and single-bundle ACL reconstruction achieved similar clinical outcomes⁵⁷-⁵⁸ and rates of osteoarthritis (10%) at four years⁵⁹. Kim et al. explored the implications of a torn discoid lateral meniscus left untreated until adulthood and contrasted that cohort with a cohort who had symptomatic tears of a non-discoid meniscus. Varus-pattern osteoarthritis and more chondral damage occurred in patients with a discoid lateral meniscus, leading the authors to recommend careful monitoring for loss of valgus in this patient population⁶⁰.

Meniscus
Operative treatment of degenerative meniscal tears in the setting of osteoarthritis provided discouraging results in two randomized trials totaling nearly 500 patients⁶¹,⁶². Partial meniscectomy was not more effective than physical therapy and showed no mean differences in the Western Ontario and McMaster Evaluation Tool (WOMET) or Lysholm scores compared with a sham procedure⁶². In the setting of isolated meniscal repair, a Level-I study by Lind et al. challenged conventional wisdom regarding optimal postoperative rehabilitation⁶³. Sixty patients were randomized into either a traditional protocol with toe-touch weight-bearing and hinged brace use for six weeks or free rehabilitation with no restrictions after two weeks. Magnetic resonance imaging (MRI) was used to assess healing, and second-look arthroscopy was performed when symptoms lingered. Partial healing or a lack of healing occurred in 28% in the free rehabilitation group and in 36% in the traditional group; all other outcomes were similar.

Posterior Cruciate Ligament (PCL)
The development of tunnel volume enlargement following arthroscopic ACL reconstruction is a disconcerting finding with many proposed mechanisms, but the prevalence and clinical effects of widening after PCL reconstruction are not well studied. Kwon et al. reported an overall low prevalence (3.6%) at one year and no significant differences between an Achilles allograft and a hybrid autograft or allograft when using a remnant bundle preservation technique⁵. Debate continues with regard to single-bundle compared with double-bundle PCL reconstruction. Li et al. found similar satisfaction and activity scores but superior side-to-side posterior translation in favor of double-bundle reconstruction after two years⁵⁵.

Cartilage
Outcomes
Maximal efforts continued as researchers tackled the challenging issues regarding articular cartilage injury. Cell-based regenerative techniques such as autologous chondrocyte implantation received considerable attention. Nawaz et al. performed either autologous chondrocyte implantation or matrix-induced autologous chondrocyte implantation, finding similar overall postoperative survival rates of 78% at five years and 51% at ten years, but the failure rate was five times higher for the patients who had undergone a prior regenerative
compared with microfracture for lesions of Osteoarthritis Outcome Score (KOOS) when prospectively plantation provided a superior short-term Knee Injury and osteotomy with or without microfracture for chondral injury stem cells improved the two-year outcomes of high tibial weight-bearing

The safe return to activity after cartilage repair remains an

Biologics and Cartilage Regeneration

The biologic frontier of cartilage restoration has remarkable promise, but much work remains before long-term clinical outcomes are available. Injectable autologous mesenchymal stem cells improved the two-year outcomes of high tibial osteotomy with or without microfracture for chondral injury with varus malalignment. Stanish et al. reported short-term outcomes on BST-CarGel (Piramal Life Sciences), a novel chitosan-based device designed to be mixed with whole blood and applied to a microfractured defect. The treated lesions demonstrated greater filling and superior repair tissue compared with the control group (conventional microfracture); clinical benefit and safety were not different at twelve months.

Rehabilitation Following Cartilage Repair

The safe return to activity after cartilage repair remains an open question, but evidence continues to support early weight-bearing. Edwards et al. conducted a randomized controlled trial comparing accelerated with conventional rehabilitation. The accelerated group reached full weight-bearing by six weeks, two weeks earlier than the conventional cohort, and reported higher quality-of-life scores with no adverse effects at the repair site. Following osteochondral autograft transplantation of small lesions (with a mean size of 0.72 cm²), early weight-bearing was associated with fewer deep vein thrombosis and arthrofibrosis complications in a retrospective study of 567 patients.

Patellofemoral Instability

Reconstruction of the medial patellofemoral ligament has become a well-accepted treatment for patellofemoral instability, but concomitant procedures should be carefully considered on the basis of pathologic conditions and alignment. Following isolated medial patellofemoral ligament reconstruction, 100% of young patients returned to sport, with 53% at an equal or higher level and 47% at lower levels.

Multiligament Knee Injury

Multiligament knee injuries are well known as serious injuries that pose a high level of morbidity for patients and severe challenges for surgeons. These concerns were compounded by obesity in a retrospective study by Ridley et al., who noted the odds ratio of complication increased by 9.2% for every 1 unit of body mass index (BMI). A large case series by Werner et al. found an 11% prevalence of the unusual ultra-low velocity mechanism of multiligament knee injury that occurs in morbidly obese individuals. The cohort had a mean BMI of 49 kg/m² and had a five times higher rate of peroneal nerve injury and vascular injury. Effective rehabilitation following multiligament knee injury is problematic because of the paradoxical nature of two of the most common postoperative complications, arthrofibrosis and recurrent instability. Stannard et al. reported that hinged external fixation (Compass Knee Hinge; Smith & Nephew, Memphis, Tennessee) used for six weeks to supplement ligament reconstruction led to fewer ligament failures and equivalent motion when compared with hinged bracing.

Hip

Femoroacetabular Impingement

Substantial interest continues regarding hip arthroscopy as the understanding of femoroacetabular impingement continues to evolve. Cam deformities, considered to be major risk factors for hip osteoarthritis, were recently demonstrated to gradually develop during skeletal maturation in youth soccer players. The authors suggested that the adjustment of athletic activities during a small period of skeletal growth may limit the development of femoroacetabular impingement and subsequent hip osteoarthritis.

Pathological Extra-Articular Hip Conditions

Although less studied than intra-articular hip problems, extra-articular disorders of the hip can cause overlapping clinical symptoms that require diligence to diagnose and manage. Proximal hamstring tears typically occur in more active populations and create treatment dilemmas. A Level-IV study evaluated the outcomes of nineteen patients (mean age, fifty-nine years) with complete proximal hamstring avulsions treated conservatively. The authors determined that nonsurgical treatment yielded notable subjective outcome and strength deficits at a mean of thirty-one months postoperatively.

In an athletic population with acute hamstring injuries, platelet-rich plasma injections combined with rehabilitation were compared with rehabilitation alone in a Level-II study. The authors found a significantly decreased return-to-play time in the group that received a single autologous platelet-rich plasma injection combined with a rehabilitation program (twenty-seven days) compared with the group that received rehabilitation alone (forty-three days).
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Hip Arthroscopy

Hip arthroscopy remains an important surgical option for patients who fail conservative management of pathological structural hip conditions.

There continues to be a lack of Level-I and II studies on outcomes after hip arthroscopy. Wilkin et al. found retrospectively that arthroscopic labral debridement in patients forty-five years of age or older was associated with a relatively high reoperation rate and minimal overall improvement in outcome measures75.

Elbow

Overuse Syndromes

The efficacy of platelet-rich plasma in the treatment of chronic elbow overuse syndromes continues to be a topic of interest. A double-blinded, prospective, multicenter Level-II study evaluated the efficacy of a platelet-rich plasma injection for chronic lateral epicondylitis76. A total of 230 patients at twelve centers over five years who had at least three months of symptoms and had failed conservative therapy were randomized to a platelet-rich plasma group (n = 116) and an active control group (n = 114). At twenty-four weeks, clinically meaningful improvement was found in patients treated with leukocyte-enriched platelet-rich plasma compared with an active control group as measured by a visual analog pain score76.

In contrast, another recent Level-I study compared platelet-rich plasma for lateral epicondylitis with a glucocorticoid or saline solution injection and found no significant differences between the groups at three months77. The authors reported that platelet-rich plasma did not reduce pain or disability at three months any more than placebo. However, the results of that study have been recently questioned78.

Traumatic Injuries to the Elbow

Elbow trauma can lead to high morbidity and is associated with arthrofibrosis and chondral injury despite appropriate treatment. A Level-II study evaluated the efficacy and reliability of combining three validated clinical tests for identifying complete distal biceps tendon ruptures78. In this prospective cohort study, the hook test, the passive forearm pronation test, and the biceps crease interval test were applied in sequence with standard history and physical examination in forty-eight patients with suspected distal biceps ruptures. When all three tests were in agreement, the result had 100% sensitivity and specificity for a rupture78. In equivocal cases, soft-tissue imaging was utilized to evaluate the injury further.

Foot and Ankle

Achilles Tendon

The treatment of Achilles tendon injuries continues to be a widely researched area in the orthopaedic literature. Surgical compared with nonsurgical treatment of acute Achilles tendon ruptures remains an often debated issue. The ideal weight-bearing status recommendation in the setting of nonsurgical treatment is unclear. In their randomized controlled trial, Young et al. followed eighty-four patients over a two-year period; patients were randomized into a weight-bearing cast with a Böhler iron or a non-weight-bearing cast for eight weeks. The rerupture rate was low for both groups and showed no significant difference. Furthermore, return to work was equivalent for both groups79. A blinded, randomized controlled trial looked at the role of dynamic rehabilitation in the nonoperative treatment of Achilles tendon injuries. Patients were randomized to either a day-one weight-bearing group or a six-week non-weight-bearing group. The Achilles tendon Total Rupture Score (ATRS) at one year was the primary outcome, with heel-rise work, rerupture rate, and health-related quality of life evaluated as secondary outcomes. There was no significant difference in heel-rise work or the ATRS. The overall rerupture rate in that study was 9%80.

In another randomized controlled trial, Olsson et al. evaluated stable surgical repair and accelerated rehabilitation compared with nonoperative management. One hundred patients were randomized into each group. The ATRS at one year was the primary outcome. The surgically treated group showed superiority in both the drop countermovement jump and the hopping domains. There were no reruptures in the surgical group but five reruptures in the nonsurgical group. There were six superficial infections in the surgical treatment group, but they did not affect the final outcome. Functional deficits were still present for both groups at twelve months. The authors concluded that surgical repair can result in optimal outcome without rerupture or major wound complications; however, surgical repair was not found to be superior to nonoperative treatment in terms of functional results, physical activity, or quality of life81.

Ankle Ligament Injuries

Ankle sprains continue to represent the most commonly occurring sports-related injury. Bracing and physical therapy with neuromuscular training represent essential elements of the treatment and prevention protocols for these injuries. A cost-effectiveness analysis was done to compare one group that received neuromuscular training, a second group that received brace therapy with all sports activities for twelve months, and a third group that received combined neuromuscular training and ankle bracing for eight weeks with all sports activities. A total of 340 athletes were randomized into each group. Cost analysis on the recurrence of ankle sprains was performed over a one-year follow-up period. Incremental cost-effectiveness ratio results showed that bracing was the single dominant secondary preventive intervention82.

Miscellaneous

Concussion

Head injuries and concussions sustained during athletic contests have garnered heightened public awareness and media attention. Prolific research is emerging regarding the understanding, prevention, and treatment of these frequently perplexing and sometimes devastating injuries. The risk of
sports-related concussion appears to be independent of the helmet brand worn by high school football players. McGuine et al. reported that the most significant risk factor for concussion in this population is a previous concussion within the prior twelve months46. Furthermore, young athletes with a history of three concussions or more were still impaired eight days after a concussion and took significantly longer to recover than athletes with one or no prior concussions46. Recent evidence also demonstrates that some sex disparities exist after sport-related concussions, as female athletes exhibit lower performance on visual memory and higher scores on total symptoms than male athletes after concussions47.

Reporting of concussions is improving in all levels of athletics from high school to the professional level, but much work remains. Although an increasing onus has been placed on athletes to report any potential symptoms, a recent study evaluated the effect of coach education on reporting of concussions47. The authors of this Level-II study found that 69% of concussed athletes reported playing with symptoms and 40% reported that their coach was not aware of their concussion. The fact that these claims occurred despite recent outreach to improve concussion awareness calls for renewed vigor in the task of creating a culture change among athletes and coaches, as legislative action alone will likely fall short47.

**Female Athletes**

Female athletes have unique biomechanical characteristics that predispose them to specific injuries. Numerous studies have demonstrated that neuromuscular control deficits increase the risk of ACL tears in female athletes. In addition, a recent study found an alarming overall incidence of injuries in adolescent female soccer athletes, including many severe injuries48. Although playing level was not associated with the risk of severe injury, lower participation frequency was associated with a significantly higher injury risk compared with more frequent participation. The playing surface for female soccer athletes may have some effect on injuries, as a recent prospective investigation found a significantly lower total injury incidence rate and lower rate of substantial injuries on FieldTurf compared with natural grass during game play49.

**Evidence-Based Orthopaedics**

The editorial staff of *The Journal* reviewed a large number of recently published research studies related to the musculoskeletal system that received a Level of Evidence grade of I or II. In addition to articles published previously in this journal or cited already in the Update, six additional Level-I and/or Level-II articles were identified that were relevant to sports medicine. A list of those titles is appended to this review after the standard bibliography. We have provided a brief commentary about each of the articles to help guide your further reading, in an evidence-based fashion, in this subspecialty area.

### References


MacDonald PB. Arthroscopic partial meniscectomy was not more effective than physical therapy for meniscal tear and knee osteoarthritis. J Bone Joint Surg Am. 2013 Nov 20;95(22):2058.
Evidence-Based Articles Related to Sports Medicine

Longo UG, Loppini M, Rizzello G, Ciuffreda M, Maffulli N, Denaro V.

The authors synthesized available randomized controlled trials regarding surgical and nonsurgical treatment of first-time anterior shoulder dislocation. Thirty-one studies with 2813 shoulders were included, and the pooled data showed no statistically significant difference in recurrence rates between surgical and nonsurgical treatments. The authors noted the lack of evidence for patients in other categories.


Park et al. conducted a systematic review to evaluate the clinical implications of low-dose irradiation or other tissue-processing methods on an active young adults who sustain anterior shoulder dislocation, but the authors noted the lack of evidence for patients in other categories.
ACL allograft. Knees with nonirradiated allografts had higher mean Lysholm scores, less laxity on knee examination, and lower rates of revision surgery when compared with low-dose irradiated grafts. The results were limited by an insufficient amount of data on several of the cryopreservation techniques, but the authors concluded that nonirradiated grafts may be superior.


This review encompassed the full spectrum of musculoskeletal applications of platelet-rich plasma to assess three primary outcomes: function, pain, and adverse events. Currently, insufficient evidence exists to recommend the use of platelet-rich therapies for treating any musculoskeletal injuries.


The suprascapular nerve supplies 70% of the sensation within the shoulder, especially superior and posterior, but lateral sensation is primarily from the axillary nerve. This Level-I study compared combined axillary and suprascapular nerve blocks with suprascapular nerve block alone after rotator cuff surgery. The primary outcomes were postoperative pain and satisfaction within the first forty-eight hours. The cohort with combined axillary nerve block and suprascapular nerve block had a lower amount of pain and a lower frequency of rebound pain in the first thirty-six hours. The suprascapular nerve block is a useful block but, when combined with an axillary nerve block, it provides superior early postoperative pain control.


The highest-quality literature pertaining to postoperative mobilization following arthroscopic rotator cuff repair was synthesized in this Level-II meta-analysis and revealed that only a small number of high-level studies are available. The best available evidence shows that early passive motion results in improved forward flexion of 15° at three months and 5° at six and twelve months and in no apparent increased retear rate compared with strict sling immobilization. Surgeons should use best judgment based on tear configuration until more conclusive evidence emerges, but the best available evidence supports early mobilization.


This was a review of five randomized controlled trials comparing conventional ACL or PCL reconstruction with computer-assisted surgery augmentation. In light of low-quality evidence reporting either no difference or clinically inconsequential differences, the authors concluded that available evidence does not support improved outcomes with computer-assisted surgery for ACL or PCL reconstruction.