

Straight from the Shoulder

A Look at Arthroscopic Rotator Cuff Repair

By Brian J. Cole, MD, MBA, and Paul Lewis, MS

Aron Sele, pitcher for the Anaheim Angels, left the 2002 season early complaining of soreness in his right shoulder. It was later determined that the cause of this pain was a tear in his rotator cuff.

Following arthroscopic surgery, he returned to the Angels and had a successful 2003 season. In addition to athletes such as pitchers, swimmers, and tennis players, workers who perform overhead activities, including painting, stocking shelves, and construction, are prone to tears in their rotator cuffs.

A tear in the shoulder's rotator cuff, whether it is partial or full thickness, can occur because of a sudden injury (e.g., a fall or sudden jerklike lifting) or develop slowly from joint overuse. Most rotator cuff tears occur in the supraspinatus at the tendon's insertion site just posterior to the biceps tendon (the "critical zone").

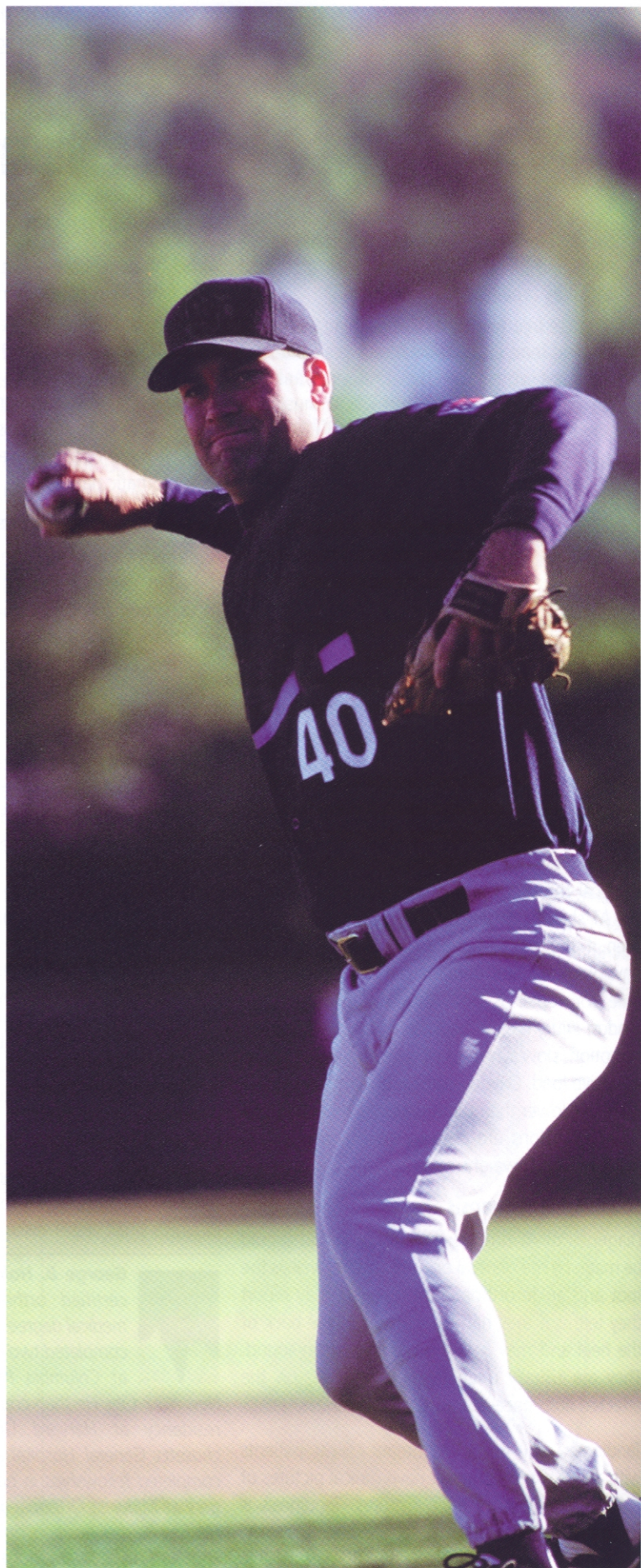
This junction has a relatively poor blood supply, making the rotator cuff tendons especially vulnerable to degeneration with aging. This may explain why rotator cuff tears are fairly common after the fifth decade.

Diagnosing a rotator cuff problem requires a thorough review of the patient's symptoms, a physical examination, x-rays, and magnetic resonance imaging (MRI). It is more common in our practice to see patients over the age of 40 years with gradually worsening symptoms due to rotator cuff damage. Although their complaints may include shoulder weakness and pain, many patients with known rotator cuff tears have surprisingly few symptoms.

Without Warning

When the tear occurs with an injury, there is often sudden acute pain, a snapping sensation, and an immediate weakness of the arm. The patient may feel radiating pain down the side of the arm that persists even when the patient is not engaged in any lifting or reaching activities. Other symptoms may include stiffness and loss of motion. Patients may also complain of difficulty sleeping due to pain, especially when they lie on the affected shoulder.

As the disease progresses, discomfort and stiffness increase. Sometimes a catching sensation is felt when the arm is lowered. Weakness and inability to raise the arm, as well as severe night pain, may indicate a rotator cuff tear.



On physical examination, the patient's range of motion or shoulder strength may be compromised. Specifically, weakness in external rotation with the arm in adduction or abduction may indicate a significant tear of the anterosuperior or posterosuperior rotator cuff tendons, respectively.

Other indications of a rotator cuff tear include atrophy of the muscles around the shoulder, a painful acromioclavicular joint, pain or weakness when lifting or lowering the arm, and crepitus upon shoulder movement. Before treating the tendon tear, radiographs are useful to reveal any evidence of arthritis, spurs within the shoulder, loose bodies, fractures or fracture malunions, avascular necrosis, and anterior or proximal migration of the humerus.

The use of MRI can sometimes distinguish between a full-thickness tear of the tendon and a partial tear, whether the tear is within the tendon itself, or if the tendon is detached from bone. MRI is also useful to determine the chronicity of the tear by evaluating sagittal oblique views for muscle atrophy or fibrous replacement.

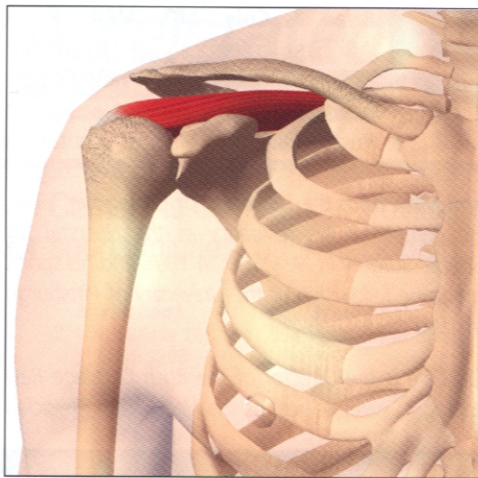
Unless there is evidence of a complete tear with minimal muscle atrophy or tendon retraction, initial treatment options may include rest, limited overhead activity, use of a sling, anti-inflammatory medications, steroid injections, strengthening exercises, and/or formal physical therapy. In the case of an acute or chronic tear that fails nonoperative management, surgery may be the best option.

Visualization Through Television

Arthroscopic rotator cuff repair is widely accepted as an alternative to traditional open or mini-open rotator cuff repair. The procedure is performed on an outpatient basis under general anesthesia with a regional nerve block for postoperative pain control. Patients are typically discharged within two hours of their operations.

The technical aspects of this procedure have been substantially refined over the last five years. Four arthroscopic portals (approximately 1 cm in length) are made to allow for the insertion of a fiberoptic scope and small instruments. The scope is connected to a television monitor, and we perform the repair through manual manipulation of instruments and intra-articular video observation.

With the use of preoperative x-rays, we are able to appropriately debride the undersurface of the acromion and flatten and smooth it to eliminate bony impingement. Retracted tears are mobilized by releasing soft tissue contractures arthroscopically.



Superior view of the supraspinatus, the most frequently injured rotator cuff tendon

The tendon edge is repaired to the humerus with the use of "resorbable bone anchors." Following placement of between one and four anchors, the sutures within the anchors are passed through the rotator cuff, and using specialized knot-tying techniques, the tendon is approximated to the bone where it originated from prior to tearing. Our attention is then turned to splits within the tendon that are repaired by placing sutures to approximate the edges of the tear. Once we are assured of the integrity of the repair, the instruments are removed, and the arthroscopic portals are closed. Patients are placed in a sling for comfort, and an ice compression dressing is placed over the shoulder.

Physical therapy to maintain and improve the range of shoulder motion begins immediately following surgery. The initial discomfort following the surgery gradually lessens over the first three to four weeks, when the sling is ultimately discarded. Emphasis on passive range of motion and early muscle function is important for the first six to eight weeks. It takes about 12 weeks, however, for the tendon to heal completely.

We advise our patients that rerupture of the repaired rotator cuff is possible if too much force is placed on the tendon before it is fully healed. Strengthening continues for four to six months, whereby patients are permitted to return to all activities in an unrestricted fashion.

Patient Follow-Up Study

To evaluate the effectiveness of the arthroscopic rotator cuff repair procedure, we examined outcome data in nearly 400 patients who had undergone this procedure at Rush University Medical Center with a minimum of two years of follow-up.

We used objective strength testing and validated shoulder surveys (e.g., Constant, Rowe, American

Shoulder and Elbow Surgeons [ASES] shoulder score, and SF-12) to evaluate outcomes following arthroscopic surgery in our first 30 patients. Twelve months after surgery, the visual analog scale for pain and all shoulder survey scores improved significantly compared with the preoperative scores. There was continued significant improvement in these scores during the second postoperative year.

Patients demonstrated significant strength improvement in the affected shoulder as well. All patients reported that they would repeat the surgical and rehabilitation process to achieve the same results. The level of functioning of the repaired shoulder was rated, on average, 85% of the normal shoulder function. Other studies have shown that the use of this procedure produces good to excellent outcomes in more than 90% of patients surveyed four to 10 years after surgery.

These outcomes need to be balanced against the skill and experience of the surgeon. Arthroscopic rotator cuff repair is a technically difficult procedure, which limits its successful application to experienced surgeons. >>

OrthoFact

Shoulder injuries are often caused by sports activities that involve excessive overhead motion like swimming, tennis, pitching, and weightlifting. People involved in everyday activities like washing walls, hanging curtains, and gardening also can get shoulder injuries due to excessive overhead arm motion.

Athletes are especially susceptible to shoulder problems. A shoulder problem can develop slowly in athletes through repetitive, intensive training routines.

What Are the Warning Signs of a Shoulder Injury?

If you are experiencing pain in your shoulder, ask yourself these questions:

- Is the shoulder stiff? Can you rotate your arm in all the normal positions?
- Does it feel like your shoulder could pop out or slide out of the socket?
- Do you lack the strength in your shoulder to carry out your daily activities?

If you answer yes to any one of these questions, you should consult an orthopaedic surgeon for help in determining the severity of the problem.

Source: American Academy of Orthopaedic Surgeons, www.aaos.com

While the vast majority of people undergoing rotator cuff repair surgery have a positive outcome, complications such as problems with anesthesia, infection, re-tear, numbness in the arm, weakness, and arthritis rarely occur. Shoulder stiffness and loss of motion are also potential complications after rotator cuff repair when patients are not compliant with postoperative rehabilitation.

Future Outlook

Small tears have a better outcome than larger tears. If the tear is large, the extent of recovery is not accurately predicted until the repair and rehabilitation are completed. Older tears (several months or longer) are difficult or sometimes impossible to repair due to poor tissue quality. In some instances, transferring a local tendon to replace the lost function of the rotator cuff is successful in reducing pain and improving function.

Arthroscopic rotator cuff repair provides superior visualization and mobilization of the joint. A 3-D assessment of both the degree and configuration of the rotator cuff tear provides physicians with the opportunity to formulate a strategy for repair.

Additionally, the arthroscope allows us to visualize the bursal aspect of the rotator cuff and intra-articular structures in an effort to diagnose and treat concomitant pathology (e.g., labral tears, cartilage defects, bicep tendonitis). By avoiding the significant deltoid incisions required in open procedures, an arthroscopic procedure results in less postoperative pain and, therefore, less need for prescription pain medication without the complications of deltoid detachment or subdeltoid scarring.

In summary, the use of the arthroscope in the repair of rotator cuff tears provides the advantages of glenohumeral inspection, treatment of intra-articular lesions, smaller incisions, no deltoid incisions, less soft tissue dissection, less pain, and more rapid rehabilitation.

Future developments in the treatment of rotator cuff repair include novel arthroscopic instruments that improve the efficiency and accuracy of the procedure. Research is also being conducted on "orthobiologic" tissue implants, which promote growth of new tissue in the shoulder. We are actively investigating means to stimulate local growth factors at the time of repair and methods to reinforce the rotator cuff to minimize the incidence of re-tears. We remain encouraged that our current results following arthroscopic rotator cuff repair exceed our experiences following mini-open repair, and we will continue to investigate novel approaches to maximize our outcomes. ☺



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