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WHAT I HAVE LEARNED

What I've learned about open shoulder surgery

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Bob Cofield trained in orthopaedics at the Mayo Clinic, the institution in Rochester, Minnesota, with which he has been associated all of his professional life. Cofield was a founding member of the American Shoulder and Elbow Surgeons (ASES), and served as its inaugural secretary/treasurer and later was President of ASES from 1987–89. He was the first editor of the *Journal of Shoulder and Elbow Surgery*, serving from 1991–95, and was later chairman of the Board of Trustees of *JSES*. At the Mayo Clinic his practice was in adult reconstruction, focusing on the shoulder, with an emphasis on the design and clinical uses of shoulder arthroplasty. Cofield served for many years as chairman of the Orthopaedic Department at the Mayo Clinic. We are pleased to have Dr. Cofield present the first of the "What I've Learned" series for *JSES*. – W.J.M.

Learning is a continuous process because knowledge, and hopefully, any wisdom coming from that are moving targets. We learn from many people and in many ways: mentors, other orthopedic surgeons, fellows and residents, and many different members of other medical specialties in the health care team by listening, by reading, by attending lectures and related educational offerings, and importantly, by doing patient care—and a lot of it. Volumes of patient care must be met with mental and physical endurance. I was continually trying to master the subspecialty but also remain as broad as possible in learning and practice. Learning quickly helps because one is always refining thoughts and actions. Periods of focused attention are essential, as is passion for the subject. In teaching a subject, one not only needs to be correct but also be able to organize and present in clear, succinct words and actions. Researching a subject demands discipline and precision while attempting to answer important clinical questions.

Helping patients is the key. Looking back, the segment of practice I most miss is meeting with a new patient. That session asks the physician to understand the patient's wants and needs and personal character. The problem or problems requiring care are then defined, and a solution or solutions are developed and explained. It is exceedingly helpful to preassess new patients before the visit to understand whether you are the best person to see them or whether the patient should be directed to another type of health care provider. Learn about the physical and social support the patient will have during a postoperative period. Insist on early return visits for assessment and adjustments in arm support, activities, and therapy. If appropriate social support is not available nor are return visits, it is unlikely the surgery will be as successful as everyone would wish it to be. I have been probably too liberal in agreeing to do surgery for a condition that has a marginally successful treatment option in a patient with less than a full and focused commitment to making the outcome as good as it can be. Be acutely aware that unsuccessful earlier surgery carries with it a lesser chance of success with further surgery—especially if a dramatically different approach to the structural problem is not part of the plan.

The above are broader concepts. Below are details of approaches to patient care with thoughts about surgical techniques as they are applied to specific issues such as degenerative conditions, injuries, and various forms of arthritis.

Rotator cuff disease

Treatment for the rotator cuff and related problems are the core of adult shoulder surgery. Chronic, attritional, full-thickness rotator cuff tearing, with or without a superimposed low-energy traumatic event, is the main condition being considered for surgery. If there is a specific acute injury with a

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dramatic change in shoulder function, early surgical repair should be strongly considered to regain the most shoulder function—especially for medium or larger tears. In the chronic presentation, nonoperative care is fine, but about one-half of the patients will eventually require operative treatment. Overall, contemporary surgery, unlike earlier surgical reports, will produce consistently good results for small to large tears. Extra-large tears with advanced muscle atrophy remain a challenge for repair.

Anterior acromioplasty was an essential part of rotator cuff repair but contemporary wisdom suggests it is not necessary when the acromion is not deformed or extended with osteophytes. Division and excision of abnormally hypertrophic subacromial bursa scar seems to be quite helpful. Similar to acromioplasty, distal clavicle excision is much less frequently performed currently in conjunction with rotator cuff repair. It is reserved for those with specifically symptomatic osteoarthritis or osteolysis or in the presence of deformity encroaching on the supraspinatus outlet. We have not appreciated much need for long head of biceps tenotomy or tenodesis unless the pathologic changes are profound and symptoms are clearly focused along the bicipital groove. This has been an unlikely situation in the patients we have cared for with rotator cuff tearing.

Complications of rotator cuff repair are infrequent, except for failure of tendon healing with continuing symptoms. Repeat attempts at repair have been marginally effective, especially in the face of mild to medium glenohumeral arthritis, upward humeral subluxation, or loss of active arm elevation.

From a technical standpoint, the pattern of rotator cuff tearing is important to recognize (transverse, longitudinal, triangular or trapezoidal) because it directs the repair technique. We have typically performed limited trimming of the torn tendon edges, exposure of corticocancellous bone at the normal tendon insertion on the greater tuberosity avoiding gouging a trough, creation of bone tunnels, and the use of simple sutures with equal tension as they are tied. Seldom (<5% of cases) are grafts or transfers used to supplement a repair.

Shoulder instability

Glenohumeral joint dislocation is relatively common and distinguishes the shoulder joint from most other joints. On one hand, for young men who experience acute dislocations during athletics, it is unusual, without surgical treatment, for these individuals not to go on to recurrent instability. On the other hand, considering the entire community population, the chance of recurrent dislocation is much lower in those who are middle aged or older or even younger individuals who do not return to competitive athletics. So, there are many situations where decision making for treatment can be complex. Anterior-inferior instability with recurrent dislocations or recurrent symptomatic subluxations is the common problem, and it is generated by trauma. There are a number of other patients, though, who are referred to a shoulder specialist who do not have trauma but have symptomatic instability in another direction, in multiple directions, or have a voluntary component to their instability. These latter groups of patients can be confusing relative to precision of diagnosis and treatment.

Advanced imaging has helped the understanding of shoulder instability. After time we felt that we must have demonstration of a structural abnormality concordant with the instability to offer a surgical technique aimed toward correcting instability. We thus refined examination under anesthesia to include not only humeral head translation at 0° of rotation but also at 40° and 80° of external rotation in the anterior and anterior-inferior directions and 40° and 80° of internal rotation in the posterior and posterior-inferior directions. This supplemented by diagnostic arthroscopy really enhanced the ability to first understand whether passive instability exists and, second, to identify any structural lesions associated with abnormal humeral head translation. In the absence of abnormal humeral head translation and without visible structural tearing, we came to feel that conservative, nonoperative treatment of the symptoms was more appropriate than performing any procedure. This approach has served our patients well over time.

The other thing we discovered in reviewing several hundreds of patients with anterior instability repairs was that obtaining stability was not the only goal for the patients. They also wished to regain movement, to be relatively pain free, and to have a high level of shoulder function for daily activities and recreational activities too. To achieve all of these goals, we modified our approach to anterior shoulder repair to include repair of the Bankart lesion and adjustment of anterior capsular tension with suturing performed with the arm in neutral flexion-extension, 20° of external rotation, and 20° of abduction.

After the operation, patients remained in an immobilizer for 3 weeks and in a sling for an additional 3 weeks. They started assisted movement in elevation to 120° and external rotation to 20° from 3 to 6 weeks, assisted motion in elevation to 140° and 40° of external rotation from 6 to 10 weeks, and at 10 weeks began stretching to regain nearly normal motion. Strengthening was delayed, with isometrics at 6 weeks and elastic strap strengthening at 10 weeks. With this approach and long-term follow-up, our patients, perhaps luckily, never needed further surgery to correct instability and were pleased with their pain relief, motion, and functional returns.

As in rotator cuff surgery, surgical treatment for instability has largely been directed toward arthroscopic methods. The evolution of these arthroscopic techniques has been prolonged and is continuing in a positive sense to approach and, hopefully in the near future, surpass the outcomes with refined open techniques.

Glenohumeral arthritis

A joint registry was started in the late 1970s to facilitate the clinical follow-up of shoulder arthroplasty patients. It created