SECTION

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Miscellaneous Conditions About the Shoulder

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The five articles in this section provide an overview of some common and uncommon conditions of the shoulder. The articles provide excellent information that both the general orthopaedic surgeon and the shoulder specialist will find interesting and clinically useful. The principles stressed in each review should be applied into practice.

In their article on the management of the diabetic stiff shoulder, Scarlat and Harryman provide an insightful review of the current understanding of diabetes mellitus and how it affects the shoulder and the treatment options currently available. The authors describe the two major types of stiffness: frozen shoulder (adhesive capsulitis) and posttraumatic stiffness. The region of the rotator interval is a key site of the fibrogenesis.

The authors also briefly review the differences between type 1 and type 2 diabetes and stress the importance of working with a primary care physician or a diabetes specialist to ensure that the patient's blood glucose is well controlled. When nonsurgical management fails, manipulation or surgical release of the capsule is recommended. In contrast to other reports, these authors advise manipulation as an option for those individuals whose symptoms have been present for 6 months or less; however, they clearly do not recommend manipulation for patients with long-standing, refractory, posttraumatic, or postoperative stiffness. Most experts agree that patients with long-standing stiffness or those with severely restricted motion are best treated surgically, with either open or preferably arthroscopic capsular release. Both open and arthroscopic releases are described.

In the second article in this section, Bennett and Allan present a detailed overview of the many surgical options available for treating the sequelae of obstetrical brachial plexus palsy. Obstetrical birth palsy occurs in up to 1 in 250 births as a result of traction and usually resolves without operative intervention. Surgery is typically reserved for the most severe cases.

Joint preservation is stressed, and joint mobilization is important once the diagnosis is made. MRI or CT can be helpful to assess joint congruity in patients with restricted motion.

The authors clearly outline the prerequisites for successful tendon transfer, particularly emphasizing the importance of a supple joint that is concentric and reduced. The choice of transfer must not interfere with existing function, and the donor muscle must have at least grade 4 of 5 strength, as one full grade loss in strength is to be expected postoperatively. The authors also include an excellent review of the biomechanical considerations of tendon transfers and how to optimize the biomechanics when performing tendon transfers in the shoulder.

The indications for and techniques of latissimus dorsi transfer, and combined latissimus dorsi / teres major transfers are described. This article is especially relevant because many of these techniques, which were initially developed for use in children, are now being used in adult reconstructive surgery to salvage irreparable rotator cuff tears, and this article provides an excellent foundation for understanding the principles of functional muscle transfers.

In the second part of this article, the authors describe tendon transfers about the elbow. The merits and limitations of the proximal transfer of the flexor pronator group (Steindler), the anterior transfer of the triceps (Carroll Hill), the bipolar pectoralis major transfer, and the bipolar latissimus transfer are described. Microvascular techniques, such as the free gracilis, and techniques to restore triceps function also are discussed. Obstetrical brachial

plexus palsy is a common problem with significant historic relevance. Many of the basic principles of tendon transfer were pioneered in the treatment of this condition. Obstetrical brachial plexus palsy obviously remains a complex and challenging clinical problem largely because of the myriad presentations and limited studies that compare different surgical techniques. The authors highlight the importance of outcomes studies to further define the best options for the specific nerve and muscle deficits.

In the third article in this section, Medvecky and Zuckerman review disorders of the sternoclavicular (SC) joint. Although infrequently injured, this joint can be quite difficult to treat because of its unique anatomy and its proximity to the mediastinum and great vessels. The authors provide an excellent review of the anatomy and biomechanics of this joint. Epidemiology, mechanisms of injury, and typical clinical presentation of patients with SC disorders are also described. Imaging typically includes chest radiographs, which allow side-to-side comparison, and special SC views such as the Hobbs view. Three-dimensional imaging studies (MRI and CT) are also helpful in assessing the direction and degree of injury.

SC joint disorders can be divided into traumatic, atraumatic, degenerative, inflammatory, and other miscellaneous types. Traumatic injuries include sprains, anterior dislocations, posterior dislocations, medial clavicular physeal injuries, chronic dislocations, and intra-articular disk injuries. A key point highlighted in the article is that the medial clavicular physis remains open until age 23 to 25. Because of the poor ligamentous supports, closed treatment of anterior dislocations often is ineffective. Posterior dislocations are often associated with significant compression of the trachea, esophagus, or great vessels, and a thoracic surgery consultation should be obtained before any attempts at reduction. The authors advise against closed reduction for dislocations older than 7 days because of potential retro-sternal adhesions. Atraumatic SC injuries include spontaneous anterior subluxation or posterior dislocation. Nonsurgical management is recommended for this category of injury unless thoracic compromise is suspected.

The SC joint can have degenerative osteoarthritis, which is usually treated nonsurgically. Excision of the medial clavicle can be performed in refractory cases. Inflammatory conditions include monoarticular noninfectious subacute arthritis, septic arthritis, and rheumatoid arthritis Treatment for this category is both medical and surgical.

The final disorder described is SC hyperostosis, which is characterized by hyperossification of the sternum, clavicle, ribs, and soft tissues. Patients often present with swelling, redness, and pain. This disorder is much more common in women. The etiology is unknown, although treatment with antibiotics has resulted in faster improvement in some series, which suggests an infectious cause.

The final two articles describe how to recognize and manage complications of shoulder surgery. Guttmann and associates provide a timely review of the complications of treatment of complete acromioclavicular joint (AC) dislocations. Because of the high failure rates with the Weaver Dunn techniques, new anatomic techniques to repair the injured coracoclavicular and AC ligaments have been suggested. The authors describe problems associated with nonsurgical treatment, specifically skin problems, osteolysis, and posttraumatic arthritis.

Neurologic symptoms also may develop in some patients as a result of a medialized scapula and

thoracic outlet compromise. In these situations, many patients opt for surgical repair or reconstruction. The article also describes the complications of the Weaver Dunn procedure, which relies on the coracoacromial ligament to reconstruct the coracoclavicular ligaments. Care must be taken when harvesting and preparing the coracoacromial ligament to avoid technical problems such as inadequate length and inappropriate tensioning. Regardless of the technique, the most common postoperative complication is loss of reduction, a problem that can be very difficult to treat. In certain instances, nonsurgical management may be the best option.

Another complication of AC joint surgery is failure of the hardware, particularly when coracoclavicular screws are used. Infection, implant migration, and other less common complications also have been reported. The authors do not discuss horizontal AC joint instability, but this condition, in which the clavicle moves posteriorly to abut on the spine of the scapula, can cause localized pain in this region. Preservation of the AC ligaments is thought to prevent this problem; however, when it occurs, ligament reconstruction may be the best treatment option.

The final article by Gill and associates is an exhaustive case-based review of the myriad complications of shoulder surgery. In the last decade, we have learned a lot about the causes of these complications, and fortunately many can now be completely avoided by careful patient selection and appropriate surgical technique. The article starts with a discussion of the complications of instability surgery. The most common are recurrent instability, stiffness, arthrosis, and hardware-related problems. The authors discuss neurovascular problems and rupture of the subscapularis. Fortunately, some of these problems have been obviated and others minimized by new techniques, particularly arthroscopic surgery.

The article then describes complications of rotator cuff surgery such as failure of healing or recurrent tear, infection, and stiffness. Again, as arthroscopic techniques improve, some of these complications have become less common. For example, stiffness and infection rates seem to be much lower with arthroscopic techniques, and deltoid detachment is virtually eliminated with arthroscopic rotator cuff repair. The problem of recurrent tears or failure of tendon healing remains a significant problem that requires further study.

Shoulder arthroplasty and its inherent complications are then described, including the problems associated with glenoid loosening. Clearly, we have made strides in this area, and with better cement techniques, better prosthetic designs, and better instrumentation, such as concentric reamers, glenoid components will have better longevity and durability. Instability after shoulder arthroplasty most commonly occurs anteriorly and has multiple causes. Improvements have been made with better and stronger techniques for subscapularis repair, such as the new lesser tuberosity osteotomy techniques that reduce the risk of rupture, and with better implant designs that allow more anatomic placement of the components, place less stress on the subscapularis repair, and run less risk of overstuffing the joint.

Similarly, other complications of shoulder arthroplasty, such as rotator cuff tears, which frequently occur from poor humeral placement or inappropriate implant design, can be prevented entirely with improved restoration of the anatomy. When rotator cuff tears do occur in the setting of a total shoulder arthroplasty, they can now be treated more effectively with either primary repair or new alternative implants such as the reverse shoulder arthroplasty. The

authors also describe complications of fracture surgery such as neurovascular injury, osteonecrosis, and tuberosity failure. Again, new surgical techniques, implants, and strategies are being developed to address each of these problems. The complications of arthrodesis and frozen shoulder are also discussed.

The authors conclude with a section on the complications of shoulder arthroscopy, particularly complications unique to this minimally invasive surgery. Fluid is a necessary component for arthroscopy, and its management is critical to avoid the problems associated with excessive extravasation of fluid, such as soft-tissue swelling and compartment syndrome. Minimizing fluid pressure and using cautery for hemostasis allow the arthroscopist to see clearly and work expeditiously and safely. Nerve injuries are historically among the most common complications of arthroscopic surgery and can be related to positioning, the type of anesthesia, or technique.

Complications, unfortunately, are inevitable in shoulder surgery. However, with careful attention to detail and better understanding of their causes, many can be avoided altogether. When complications do occur, the best course of action is early reognition, a frank, honest discussions with the patient, and appropriate treatment.

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