# COMMON SURGICAL PROCEDURES ABOUT THE SHOULDER JOINT

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**Summary**

*Details of surgery to the shoulder joint, relating to the rotator cuff and acromioclavicular joint, repair of recurrent dislocation of the shoulder joint and stabilisation of a destroyed or functionless joint, are described. Indications for rehabilitation are given.*

In this article it is my intention to explain to the therapist some of the common surgical procedures that are currently performed with a special reference to the type of post-operative physiotherapy that is needed.

Before understanding the surgical procedures, a thorough knowledge of the anatomy is essential — this has been dealt with in a separate article by: Ioné Sellars on pages 4-6 of this issue.

From the surgical point of view there are three types of operative procedures:

- Operations relating to the rotator cuff and its association with the acromioclavicular joint.
- Operations relating to recurrent dislocations of the shoulder and its repair.
- Operations to stabilise a destroyed or functionless joint.

No mention will be made of the more unusual or esoteric operations, for instance, repair of recurrent posterior dislocations of the shoulder or to arthroplasty of the shoulder, the latter tending still to be in the experimental or early developmental stage.

## OPERATIONS RELATED TO THE ROTATOR CUFF SYNDROME

Removal of the calcification from the bursa or the supraspinatus tendon can be performed by either needling or a surgical approach, remembering beforehand that conservative treatment of this particular lesion in about 90% of cases will give a satisfactory result and it is only the small percentage which remains with persistent symptoms that need surgery.

### Needling

This is indicated for calcification of the rotator cuff tendons. The needling procedure must be done under sterile conditions and the patient's shoulder must be properly draped and cleansed. The skin and the deep structures are anaesthetised with a local anaesthetic, such as Procaine. The needle is directed to enter the calcifying area and grating and crepitation can be felt upon reaching it. This can be verified if the deposit is then forcefully injected with Procaine in the syringe and then sucked back when a few white particles float into the fluid syringed. If this has been achieved a larger needle can be inserted in a parallel direction and, by repeated injection and aspirations, some, or most of the calcium deposits can be removed. With local anaesthesia, there is very little pain experienced during this procedure. It is usual to follow this wash-out with 1 ml. of a long-acting Cortisone preparation.

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**Opsomming**

*Besonderhede van chirurgie van die skouergewrig, met verwysing na die rotator kraag en akromioklavikulêre gewrig, herstel van herhaalde ontwrigting van die skouergewrig en stabilisasie van 'n vernietigde of funksielose gewrig, word beskryf. Aanduidings vir rehabilitasie word gegee.*

### Surgery

A direct anterior vertical approach into and through the deltoid muscle onto the supraspinatus tendon insertion will allow the calcified mass to be visualised and then curretted and irrigated. It is a more sure method than needling but needs a general anaesthetic instead of a local for needling and therefore has an increased morbidity.

### Decompression of the Subacromial Bursa

This can be achieved by either anterior or partial acromionectomy. The anterior acromionectomy was described by Neer (1972) and involves an incision the anterior aspect of the subacromial bursa by making a saber cut across the top of the acromion and down the anterior aspect of the deltoid muscle for about 5 cms. The deltoid is then dissected carefully off the acromion on its anterior aspect, the subacromial bursa opened, and then an inspection can be made of the supraspinatus and infraspinatus tendons at their insertions onto the humerus. The compression force over the subacromial bursa consisting of the coraco-acromial ligament and the anterior aspect of acromion is removed. A good decompression can be obtained and should give lasting relief of this chronic condition.

The author also finds that partial acromionectomy of a larger degree than that described by Neer (1972) gives long-lasting results for those who wish to be active in the over-head sports, such as tennis and badminton. In partial acromionectomy, the anterior half of the acromion is removed including the lateral portion of the acromio-clavicular joint. The deltoid in both these operations is repaired and meticulously sutured to the tissues that remain. Time must be allowed for the muscle to heal in order to get a firm attachment to its origin.

### Repair of Ruptures of the Supra- and Infraspinatus Tendons

If the rupture is small and situated in the supraspinatus tendon area this can be repaired with the same approach as described above by Neer for decompression of the subacromial bursa. However, if the damage to the rotator cuff is in its superior aspect it cannot be visualised adequately through the anterior approach. Then the approach of Kessel (1977) should be used in which an incision is made posteriorly over the supraspinatus fossa across the border of the acromion and 4 cm down into the deltoid muscle. The dissection is carried deeper, the trapezius muscle and deltoid are stripped off the acromion process, which is now laid bare and can be divided with an osteotome or Gigli saw and held apart. Full visualisation of the supraspinatus tendon is then possible; if it is ruptured, it can be repaired from this approach comparatively easily by suturing the ruptured

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tendon back to its insertion. If, however, the rupture is of long-standing and there is a maximal shortening of the muscle so that it is impossible to reattach the muscle to the upper portion of the greater tuberosity of the humerus, then careful thought must be given to a more difficult and complicated operation described by Debeyre *et al* (1965) who have exposed the whole of the supraspinatus muscle belly preserving its nerve and blood supply as it comes through the scapular notch and advancing the muscle, en bloc, towards its insertion on the humerus where it can be reinserted and the muscle belly reattaches to the bony portion of the supraspinatus fossa.

**Excision of the Outer End of the Clavicle**

This is useful for osteoarthritis of the acromio-clavicular joint. Pain at the upper excursion of the painful arc syndrome is often associated with osteoarthritis of the acromio-clavicular joint. This can be relieved by removing the outer 1 cm. of the clavicle, thus creating a pseudo-arthroplasty of the acromio-clavicular joint.

**Post-operative Care**

In all these operations the deltoid muscle has been partially divided or detached from its origin to the clavicle and the acromion process. Consequently in the early stage, movements which will tend to detach the sutured deltoid muscle should be avoided and only early pendulum exercises are to be encouraged. When the deltoid muscle has become firmly reattached at about three weeks post-operatively, then full active flexion and abduction exercises can be started; these must be done with caution and range of movement built up slowly over a period of three to four weeks. The patient must also attend for instruction in home physiotherapy. At about six weeks, full shoulder exercises are encouraged, including overhead abduction with the use of the opposite arm as a counter-weight via an overhead pulley. Once a full range of function has been attained, then power can be worked upon to restore it to its full state.

## OPERATIONS FOR RECURRENT DISLOCATION OF THE SHOULDER JOINT

The underlying pathology of this condition was beautifully recorded by Bankart, (1923;1938) who described the detachment of the anterior capsule and the labrum glenoid from the rim of the glenoid, leaving a defect into which the head of the humerus can prolapse, especially the movement of external rotation or in extension combined with abduction. Repeated dislocation leads to the enlargement of this capsular defect and the head of the humerus becomes indented on its posterior aspect. This defect can be seen radiologically and is known as the Hill-Sacks *(Hill and Sacks, 1940) lesion.*

Correction of recurrent dislocations of the shoulder, therefore, aims at either:

- repairing the defect of the capsule or
- plicating the capsule with reefing of the subscapular muscle to restrict excessive external rotation.

Most of the operations for repair of recurrent anterior disloations of the shoulder are performed through the same approach. This approach is anterior to the shoulder joint, based on the deltopectoral groove which is developed, the cephalic vein being retracted and the plane deepened to expose the origin of coraco-brachialis and short head of biceps arising from the coracoid process. If wide exposure of the shoulder joint is required, then the tip of the coracoid process may be osteotomised and retracted inferiorly together with these two muscles, exposing the subscapularis muscle at its attachment to the lesser tuberosity of the humerus. The tendinous portion is divided in a saggital fashion together with the capsule, thus exposing the shoulder joint for inspection and noting the typical pathology.

**The Bankart Procedure. (Rowe 1963; 1978)**

This involves the suturing of the typical lesion, comprising the glenoid labrum and the capsule, back onto the glenoid bone by the drilling of holes into the glenoid bone for sound fixation of the capsule to reconstitute the normal anatomy. While this eliminates the exact pathology, it is technically difficult to perform and needs considerable experience and skill to be done satisfactorily. Because of the difficulty of repair, other operations have been devised which are more simple.

**The Du Toit (1956) Procedure**

Here, a staple is used to hold the elongated expanded capsule of the shoulder joint back onto the neck of the scapula. In this approach the subscapularis muscle is split in the line of its fibres to expose the defect, the capsule of the joint is reefed and the position is held with a Du Toit staple inserted with a special introducer.

**Bristow Procedure**

For those shoulders that have a tendency to recurrent dislocation with the underlying pathology of epilepsy, a more radical procedure may be performed as described by Bristow, whose operation was recorded by Helfet in 1958. In this procedure, the tip of the coracoid process, with its attachment of the coraco-brachialis and the short head of biceps muscles, is pre-drilled and then osteotomised and, with a screw just entering the pre-drilled hole of the coracoid process together with its muscular attachments, are inserted through the split subscapularis muscle and the screw is driven home into the neck of the glenoid.

**Operations for Plicating and Limiting External Rotation of the Shoulder Joint**

*The Putti-Platt procedure,* so-called by Osmond Clarke (1948) who wrote up the operation and attributed it to these two well-known surgeons who never, in fact, recorded the procedure. The significant feature of this procedure is the reefing of the subscapularis muscle so that, in fact, it is double-breasted upon itself, thus limiting excessive external rotation of the humerus and therefore eliminating the tendency for anterior dislocation of the shoulder joint.

Magnuson & Stack (1943) achieve the same effect of limiting external rotation of the humerus by detaching and re-insertioning of the subscapularis muscle laterally across the bicipital groove, embedding it into the humeral bone by means of a metallic staple, or boat nail.

**Post-operative Care**

The limb is immobilised with a Velco dressing and a sling to prohibit external rotation. In two to three weeks the sling is removed during the day but is worn at night for three further weeks. Then rehabilitation exercises are begun. At six weeks abduction of the shoulder to 90° is allowed and at 8-12 weeks, the motion of the joint should be maximum except that abduction and external rotation may be somewhat limited; the latter being desirable.

## STABILISATION OF THE SHOULDER JOINT

This procedure is called for when there is persistent pain in a partially or completely destroyed joint due either to

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chronic infection, such as tuberculosis or rheumatoid arthritis or when there is gross instability as a result of paralysis of the muscles supporting and controlling movements of the shoulder joint, as seen in poliomyelitis or disruption of an irreparable brachial plexus.

**Arthrodesis of the Shoulder**

This will stabilise the joint and the trapezius muscle with its accessory nerve supply provides motor power for the stiffened joint, allowing a useful range of function of the shoulder girdle at the scapulo-thoracic region.

The position in which the shoulder should be arthrodesed is open to considerable debate but the most commonly recognised position is that with the arm abducted at the glenoid by 50°, flexed on the glenoid by 15 - 25° and externally rotated at the glenoid by 25°. This allows the hand to reach the mouth when the elbow is flexed. Arthrodeses of the shoulder are either extra-articular or intra-articular, the latter often combined with internal fixation.

*The extra-articular arthrodesis* as described by Watson-Jones (1933) is a technique denuding the acromion process and splitting the greater tuberosity with the arm abducted, the acromion process is fractured and inserted into the "V"-shape slot created by the osteotomy of the greater tuberosity of the humerus. The arm is then held in its corrected position by applying a shoulder plaster of Paris spica for three months.

In the technique of Brittain (1942), the extra-articular arthrodesis is achieved by a long strut of tibia placed posteriorly between the shaft of the humerus and the lateral border of the scapula. Post-operatively the shoulder is immobilized in a spica for three months.

*Intra-articular arthrodesis of the shoulder joint* is probably best performed by a method described by Gill (1931), who makes a dorso-lateral semi-circular incision across the shoulder joint, exposing and denuding the inferior and superior surface of the acromion, leaving the periosteum intact proximally. After denuding head of the humerus and glenoid of articular cartilage, the humeral head is then split longitudinally forming a cleft into which the denuded acromion process fits when the arm is abducted. This can then be reinforced by the insertion of two or more long metal cancellous screws through the neck of the scapula, which adds internal fixation of the arthrodesis. Post-operatively the arm has to be kept in the correct position by the use of an abduction shoulder spica for three months.

**After-care**

The shoulder spica is retained for a 12-week period. When clinical and radiological union is established, exercises can be started, always remembering that when the shoulder spica is removed it should be bivalved in the first instance so that the arm can be lifted out of its abduction position and early exercise commenced for at least a week before removing the spica as a whole. If this is not done the patient experiences excessive pain. Thereafter mobilisation of the remains of the shoulder girdle function must be obtained by gentle exercises over a period of three months.

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## THE PEGGY MANN MEMORIAL FUND

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The Committee of the above Fund would like to thank all those who contributed to its foundation. The amount is approximately £1 000. This sum has been invested, and the interest from which will collect in a Deposit Account in the above Fund. Every four years the interest will be used to fund either a former student of the School of Physiotherapy of Queen Margaret College/Royal Infirmary, Edinburgh, or any present or former member of the Staff of the Physiotherapy Department of the Royal Infirmary, Edinburgh. This interest will give financial assistance to the successful applicant or applicants to further their knowledge and practical skills by attending Courses and Conferences outwith those held by the Edinburgh Branch of Physiotherapy. Recipients of the award will give a lecture to the Edinburgh Branch in the following year. This will be entitled "The Peggy Mann Memorial Lecture".

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