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DYNAMIC REPAIR OF ACROMIO-CLAVICULAR DISLOCATION

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The acromio-clavicular (A-C) joint suffers injury very frequently especially amongst those involved in physical activity and those who are injured on the roads. This joint is of small dimensions and is very unstable; stability is maintained by the adjacent ligaments.

Our purpose is to present a physiological approach to the dynamic repair of the A-C joint dislocation.

CLINICAL MATERIAL

Twenty patients with an A-C dislocation were treated in our department during the years 1967–1973.

Sex incidence: 18 out of 20 patients were male.

Age distribution: This lesion generally occurred in young people, the majority occurring at between 18 and 25 years of age; the youngest patient being 17 and the oldest 66 years of age.

Side of dislocation: There was no significant difference. We had 12 left-sided injuries and 8 on the right; one patient had a bilateral dislocation.

Circumstance of injury: The great majority of these lesions occurred in young people as they are most exposed to trauma. Thus 13 were injured in road accidents and 7 during sporting activities.

Time of operation: 16 (80 per cent) of the cases were treated surgically within the first 2 weeks of injury. Four cases (20 per cent) presented for treatment at times ranging from 6–36 months after the initial trauma complaining of persistent shoulder pain and disability. These too were operated upon.

TREATMENT

The procedure of transposition of coracoid to clavicle was first described by Dewar & Barrington (1965) who presented only five cases.

A number of modifications to the original technique, which we believe to be of importance in achieving a good result, were instituted.

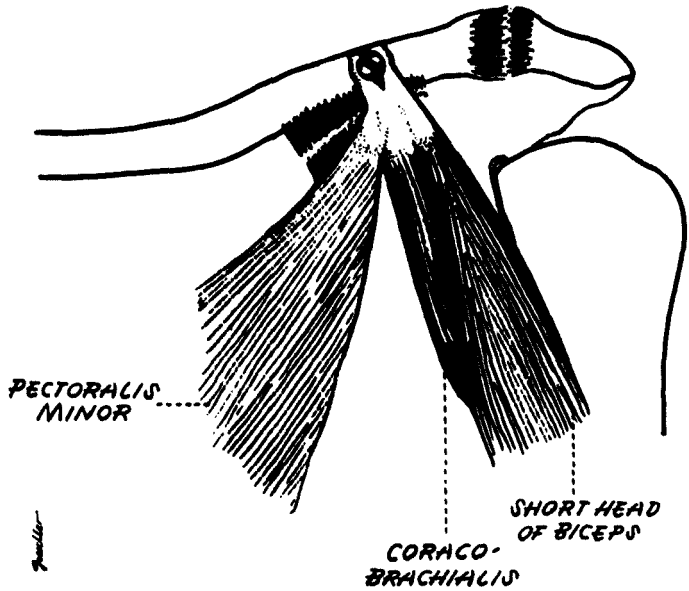

Figure 1. Technique of transfer of the tip of the coracoid process with the insertion of short head of biceps, coraco-brachialis and a third of pectoralis minor muscles to the clavicle, and repair of the A-C joint.

Surgical exposure through the deltopectoral groove was performed with the patient in the semi-sitting position. The deltoid was detached from the clavicle to expose the A-C joint. The terminal third of the coracoid process was resected together with the origin of the short head of biceps, the coraco-brachialis and a third of pectoralis minor and a screw inserted through the resected coracoid process which was transferred to the superior surface of the clavicle just above the coracoid process. This differs from the technique of Dewar & Barrington in that they insert the screw from below. In this way the active action of biceps and coraco-brachialis will bring down the clavicle and maintain it in its normal position.

At times we have found the torn capsule and ligaments of the A-C joint to be interposed between the acromion and the clavicle, thus interfering with the reduction (Figure 1).

In our series we exposed the A-C joint to make certain that the reduction was completed and where possible we repaired the joint capsule and the ligaments of the A-C joint. This step is an important modification of the original technique. Immobilization was with a Velpeau dressing for 4 weeks.

RESULTS

Twenty patients were reviewed between 1967 and 1973 with a minimal follow-up time of 1 year and a maximal of 6 years, the average being 3 years.

Evaluation of results was performed according to:

(a) Residual pain.
(b) Shoulder motion.
(c) Deformity.
(d) X-ray check.

(a) *Residual pain:* Four of the twenty patients complained of moderate pain during strong physical activity in the region of the clavicle to which the coracoid process was fixed. The screw was removed in these patients and the pain disappeared. In one of the patients the residual pain was severe and he developed a post-traumative arthrosis of the joint. Notwithstanding the operation, the dislocation of the A-C joint remained and an excision of the distal portion of the clavicle was performed, freeing him of the pain.

(b) *Shoulder motion:* Motion of the shoulder was evaluated according to abduction and elevation of the arm with free motion of the scapula. In one patient there was slight restriction of abduction, the poor result being due to a post-traumatic arthrosis. After resection of the distal end of the clavicle, shoulder mobility returned almost to normal.

(c) *Deformity:* The above-mentioned patient had a prominence of the distal end of the clavicle and a second patient also presented with a slight prominence because of subluxation of the A-C joint.

(d) *X-ray:* The X-rays revealed maintenance of the reduction in 18 out of 20 cases. One had a recurrent dislocation and another joint subluxation, but the latter was symptomless. The X-ray diagnosis was made with the patient in a standing position with a 2 kg weight held in each hand.

According to this evaluation 18 (90 per cent) gave excellent results, one was fair (5 per cent) with subluxation of the A-C joint but without pains or restriction of mobility. One poor result (5 per cent) presenting with pains and restricted mobility ended in subsequent resection of the distal end of the clavicle.

DISCUSSION

The multiplicity of operations and techniques in the treatment of A-C dislocation indicates the difficulties involved in perfecting a method of management in these injuries.

Disagreement exists as to whether conservative or operative treatment is preferable (Allman 1967).

Conservative management consists of:

(a) Adhesive dressing (Watson-Jones 1955),
(b) Braces, and
(c) Hanging-type cast.

Urist (1963) favours the conservative methods.

Lazcano et al. (1961) concluded that greater consideration should be given to closed methods in fresh injuries because of disappointment with their results following open reduction and fixation. They suggest that if disability remains, surgical treatment should be performed at a later date. On the other hand Jacobs & Wade (1966) advocate open reduction and internal fixation of the A-C joint in an acute and complete dislocation.

There are numerous methods of operative treatment. Basically they can be divided into four categories:

I. *A-C techniques*
   (a) Suture of the joint.
   (b) Transfixation by wires, screws or pins.
   (c) Ligament plasty with fascia or ligaments.

II. *Coraco-Clavicular techniques*
   (a) Metallic fixation by screwing (Bosworth 1941) or cerclage.
   (b) Plastic fixation by fascia or ligaments.
   (c) Muscle transfer of coracobiceps (Dewar & Barrington 1965).

III. *Mixed techniques*
   (a) Fixation of the A-C joint and suture of coraco-clavicular ligaments (Crenshaw 1963).
   (b) Fixation of the A-C joint and plasty of coraco-clavicular ligaments (Dupont et al. 1971).
   (c) Dynamic repair with transference of coraco-brachialis, short head of biceps and one third of pectoralis minor together with repair of the A-C joint.

IV. *Arthroplasty with excision of distal end of clavicle*

Each of the above-mentioned methods has its advantages which are highlighted by the various authors and the number of good and poor results are due not to the type of treatment or technique but to whether the pathology has been treated or not.

The lesions which influence the results and thus require correction are:

(a) damage to the meniscus of the A-C joint (injury requires excision).
(b) inverted intra-articular ligaments which need to be repaired.
(c) muscle tears require suturing.

Strict attention to these factors prevents post-traumatic arthrosis of the A-C joint, thus giving a mobile and pain-free joint.

In the A-C techniques there is the disadvantage that the fixation can be lost by breakdown of the suture or possible migration of the wires, or the ligamentous repair fails because of stretch and elongation with subluxation or recurrent dislocation occurring.

The coraco-clavicular techniques have the big disadvantage that they do not act over the region of the pathology and this results in degenerative changes.

Screw fixation gives rigid fixation which is unphysiological and limits the rotatory movement of the clavicle. Shoulder abduction then needs to be compensated by scapula movement.

The mixed technique using fascia and other ligaments has the same disadvantage of loss in strength by stretching. This is why we advocate a physiological approach to the repair of these traumatic lesions by fixing the clavicle dynamically, viz. coraco-biceps muscle transfer.

Resection of the distal end of the clavicle relieves the pain but does not prevent the change of position of the shoulder joint, with anterior dropping of the shoulder, resulting in fatigue.

SUMMARY

Twenty patients with complete acromio-clavicular dislocation treated between 1967 and 1973 were reviewed with a follow-up time of from 1–6 years, the average being 3 years.

They were treated by transposition of coraco-brachialis, short head of biceps and a third of pectoralis minor from their origin in the coracoid process to the clavicle together with repair of the acromio-clavicular joint.

The results were evaluated according to pain, motion, deformity and X-rays with 90 per cent excellent results, 5 per cent fair and 5 per cent poor.

Discussion of the other types of treatment is presented.

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