A METHOD OF TREATMENT OF ACROMIOCLAVICULAR DISLOCATION

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This is a preliminary report on a procedure advised for the treatment of certain cases of complete dislocation of the acromioclavicular joint. At present it is recommended for fresh dislocations in persons who have to perform heavy manual labour and in those who indulge in strenuous sporting and other vigorous recreational activities. It is further hoped that it may prove of value in late cases where residual disability is such that it interferes with the patient's normal pursuits.

The operation is essentially a combination of methods previously described. It consists of coracoclavicular lag-screw fixation combined with excision of the outer end of the clavicle under direct vision.[1,5,12] It falls into line with the operation described by Kennedy and Cameron,[9] in that the screw is left *in situ* and is not removed at a later stage. The significant difference from previously described coracoclavicular screwing procedures is that, instead of fixing the clavicle in its normal anatomical position in relation to the coracoid and the acromion, the clavicle is approximated as close as possible to the coracoid process, i.e. at a deeper level than normal with a view to 'de-functioning' it from its independent role in the shoulder mechanism, when its outer end is excised.

The aims of the operation are:

1. To restore stability and strength to the shoulder girdle.

2. To retain full synchronous shoulder movements.

3. To prevent late development of traumatic acromio-clavicular arthritis.

4. To obviate a second operation for removal of the screw.

TECHNIQUE

The operation is performed under endotracheal anaesthesia. A sandbag is placed behind the scapula to bring the coracoid into prominence. The head is turned to the opposite side and the table is tilted into the reverse Trendelenburg position.

A 'shoulder-strap' incision is made through the skin and subcutaneous tissues in line with the coracoid process or slightly lateral to it, from a point half-an-inch to one inch behind the clavicle to a point half-an-inch to one inch below the level of the coracoid.

The flaps are reflected medially and laterally to a degree adequate enough to expose the deep tissues overlying the coracoid tip and the acromioclavicular joint. The outer 2 inches of the clavicle and the superior aspect of the medial portion of the acromion process are stripped subperiosteally. The deltoid, between the clavicle and the coracoid tip, is split vertically. A large branch of the acromiothoracic artery is divided between ligatures and the upper surface of the coracoid process is now exposed. Where a few weeks have elapsed since the injury, calcification will be found in the torn conoid and trapezoid ligaments. In such cases the remnants of these ligaments should be excised.

Where the coraco-acromial ligament prevents good exposure of the coracoid process, it is divided. Next, the tissues between the outer end of the clavicle and the acromion, including the intra-articular disc, are excised. A Gigli saw is slipped under the outer end of the clavicle and positioned about ¾-inch from the distal end of the bone. The outer end of the clavicle is over-reduced, i.e. depressed below the level of the acromion and held in this position by the assistant until the lag screw is inserted. Levers are passed deep to the coracoid process to protect the underlying brachial plexus and vessels.

Two drill holes are now made through the clavicle into the underlying coracoid. The first hole is used to pass an awl into the coracoid to steady the coracoid on the underlying bone while the second drill hole is made and a lag screw inserted. In the case of the second drill hole the diameter of the drill used in the coracoid should be narrower than that used in the clavicle. A Bosworth lag screw of appropriate length is now introduced, but before it is completely seated the outer ¾-inch of the clavicle is excised, using the Gigli saw. The screw is further tightened until the clavicle is snugly bedded down on the coracoid, except for the intervening remnants of the conoid and trapezoid ligaments in fresh cases. The wound is closed in layers.

Postoperatively, a pressure dressing and a broad arm sling are applied, with uplift being exerted under the point of the elbow. The limb is then swathed to the side leaving the fingers free for exercise. Initially the swathing of the arm to the side was maintained for 4 weeks, but this has been relaxed somewhat in recent cases after a Bantu labourer removed the sling and swathe after a fortnight without any obvious untoward result.

ANALYSIS OF CASES

The procedure has been performed on 7 occasions. The first patient was operated on about 3 years ago; 2 patients underwent operation over a year ago, and 1 a little under a year ago. All the patients have been highly satisfied with their progress to date.

The patients selected for the procedure have all been active young adult males, with complete acromioclavicular dislocations. Three of them are rugby football players, 1 is an amateur wrestler, 1 is a hockey player, and the remaining 2 are Bantu labourers (Figs. 1A and B). Two of the patients underwent operation during the first week after injury, 2 during the second week, 2 during the third week, and 1 after 9 weeks.

In assessing the condition of the patients operated on more than 6 months ago, 1 of the 4 patients cannot be considered at this stage since litigation is pending, but it is hoped to include certain features of his case in a later report.

The patient operated on 3 years ago, an interprovincial rugby player, sustained his injury at this sport. His left acromioclavicular dislocation could not be held reduced by conservative means. In addition to being a rugby player, he is a keen tennis player and cricketer and was not prepared to accept any prominence of the outer end of his clavicle. After operation he returned to take part in all his sporting activities, including first-division rugby. When presented at a clinical meeting in February 1962, he demonstrated a full range of rhythmic shoulder movements and good cosmetic appearance, and claimed that the injured shoulder was stronger and functioned better than the normal one.

Another patient dislocated his right acromioclavicular joint in the wrestling ring. The dislocation could not be held reduced by the conventional Watson-Jones[18] method, but was held reduced when an Esmarch's bandage was

substituted for extension plaster. However, he could not tolerate this for more than a day.

Within 3 months of operation he was taking part in a full wrestling training programme, and within 6 months became the South African Police champion at his weight, and joint holder of the Western Province Amateur Championship with a South African champion. At the clinical meeting referred to above he also exhibited a good cosmetic appearance, full synchronous movements and normal strength.

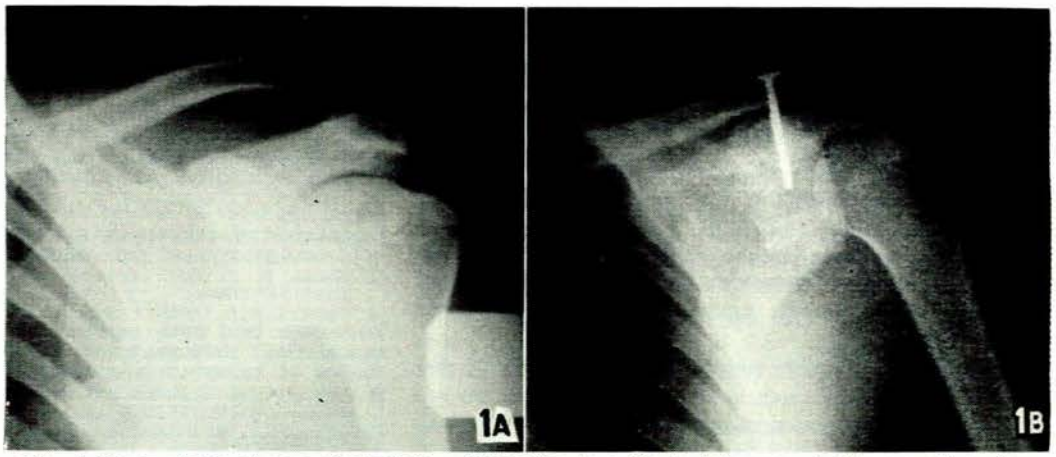

Fig. 1. X-ray plates of acromioclavicular dislocation in a Bantu labourer. *A*. Pre-operative view. *B*. Postoperative view.

The third patient of the group to be considered was not seen until 3 weeks after his injury. Complete dislocation had persisted despite conservative treatment. Operation had to be deferred a further 6 weeks owing to the presence of a pustular skin condition. An attempt was made to rehabilitate him without operation during this period, but this was unsuccessful. At operation extensive calcification of the conoid and trapezoid ligaments was found. Within 4 months of operation he wrote to me from his home claiming full function and requesting permission to play rugby.

DISCUSSION

I do not propose to discuss in detail aspects which have been adequately dealt with in the literature, but should like to attempt to explain my approach to the problem.

The majority of acromioclavicular dislocations can be reduced quite easily. That maintenance of reduction may be difficult is shown by the fact that at least 35 different non-operative methods of maintaining reduction have been described.[15,16] I have found that even with adequate protection of the ulnar nerve, few patients will tolerate the discomfort of several weeks' immobilization of the type described by Watson-Jones.[18] In my hands, and I gather this is not the exception, some degree of recurrence of deformity follows cessation of immobilization.

Until recently I was prepared to accept the rather prevalent view that, apart from the cosmetic blemish of an elevated outer end of the clavicle, no dysfunction followed even untreated acromioclavicular dislocation. However, in recent years I have frequently seen patients who complain of persistent weakness on lifting weights and performing certain movements. They also complain that the shoulder tires easily. The literature confirms my impression that, in a far smaller proportion of cases, appreciable disability does remain.[4,6,9] Van Jaarsveld,[17] who has spent a considerable time as medical officer in attendance at the Newlands Rugby Ground, reports that players with acromioclavicular-joint lesions are considerably handicapped on the rugby field.

There are 28 operative methods of treatment described,[15,16] and these can be most simply classified into the following groups:

1. Reconstruction of the acromioclavicular mechanism.[2,10,13]
2. Reconstruction of the coracoclavicular mechanism.[1,3,9]
3. Excision of the outer end of the clavicle.[5,12]
4. Combinations of groups 2 and 3.[10,11,14]

Acromioclavicular reconstruction by means of suture, fascial repair, wires, pins or screws, does lead to good anatomical results in some hands, but there is always the danger of stretching, breakage or migration of the material used. If screws, thick transfixion wire, or pins are used, a second operation has to be performed for removal. When the primary damage to the acromioclavicular joint itself, as seen at operation, is considered, the tendency to development of late traumatic arthritis from anatomical reposition at the joint can be appreciated.[10]

This applies equally to anatomical reposition following the restoration of the coracoclavicular mechanism by previously described methods. There is also the same risk of breakage of suture materials. If a lag screw is used and left *in situ*, clavicular rotation is interfered with, with consequent limitation of abduction.[7,8] What happens when screws are removed at a second operation will be indicated below.

Excision of the outer end of the clavicle merely renders less conspicuous the persistent upward displacement of the shortened outer end of the clavicle when the conoid and trapezoid ligaments are ruptured. I have found that the same complaints that follow conservative treatment, follow this procedure.

Successful procedures combining excision of the other end of the clavicle with direct repair, fascial suture, and suture replacement of the ligaments have been described, but I feel that lag-screw fixation is a more satisfactory method of achieving the aims as set out in the introduction.

When this series was commenced no reference to such a combined method previously being used was found.

Recently, however, Lazcano, Anzel and Kelly[10] reported a series of 5 cases from the Mayo Clinic. The screws were later removed, and in 4 of the 5 cases recurrence of dislocation ensued.

SUMMARY

An operation for the treatment of acromioclavicular dislocation has been described and discussed. It consists of excision of the outer end of the clavicle and fixation of the clavicle to the coracoid process with a Bosworth lag screw, in closer approximation than in the normal anatomical position. The early results have been most encouraging.

It is hoped, at a later stage, to issue a report on the long-term results.

I wish to express my thanks to Dr. A. Rosenberg for the photography.

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