SURGICAL PROCEDURES IN GENERAL PRACTICE

This is one of a series of articles contributed by invitation

INJURIES IN THE REGION OF THE SHOULDER-JOINT

II. BONE AND JOINT INJURIES

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One of the most important principles of the treatment of all fractures applies with particular force to fractures and dislocations of the shoulder: joints which do not need to be immobilized must be actively mobilized from the first day. If immobilization is not essential, mobilization is imperative. A fracture of the clavicle should not cause more than a few weeks' incapacity. But many healthy men have been incapacitated for a year or even incapacitated permanently by simple fractures of the clavicle treated with Sayre's strapping, which bound the fingers and hand flat against the chest wall. In other cases abduction frames have been used with a palmar splint so situated that the patient could not flex the fingers normally. With the tendency to oedema which exists immobility of the fingers for only two or three weeks may cause such a degree of adhesion formation that the patient is fortunate if he recovers in a year. The stiffness of the fingers is not only serious in itself, but it adds greatly to the difficulty in restoring shoulder movement where some stiffness may have been inevitable. The only stiff shoulders which are really difficult to treat are those associated with severe stiffness of the other joints of the limb. If the elbow, wrist, and fingers are normal the patient has an incentive to use the limb, and this functional activity rapidly restores movement to the shoulder. But if every joint, including the fingers, is as stiff as a board, it never occurs to the patient to use the limb at all; he gives up the impossible task, and the difficulties are greatly increased. The first principle, therefore, in the treatment of fractures of the clavicle and neck of the humerus, and of dislocations of the shoulder and acromio-clavicular joints, is that the patient must actively move the fingers, thumb, wrist, and radio-ulnar joints throughout their full range many times every day.

Fractures of the Clavicle

Fractures of the clavicle occur most commonly in the middle third following a fall on the outstretched hand. The inner fragment is displaced upwards by the sternomastoid, and the outer fragment is displaced downwards and forwards by the weight of the limb. The fragments can only be realigned by pulling the whole shoulder girdle, and with it the outer fragment, upwards and backwards and outwards. Scores of methods of immobilization have been described, and this in itself suggests that none of them is really perfect. Fortunately, however, these fractures almost invariably unite firmly in a few weeks, and the thickening which may result from imperfect reduction is usually absorbed and disappears in a few months. On the other hand, over-zealous attempts to maintain anatomical reduction by immobilization of the shoulder for many weeks may cause far more serious trouble from adhesion formation round the shoulder-joint.

Method of Treatment.—The figure-of-8 bandage method is simple, and if carefully used will give excellent cosmetic and functional results. The patient sits on the front of a stool, the operator standing behind with one foot on the stool and his knee between the patient's shoulder-blades. A large pad of wool is placed in front of each shoulder extending into the axilla. Several long bandages five or six inches wide are now applied in the form of a figure-of-8, passing in front of the shoulders under the axillae and crossing between the shoulder-blades. With each turn of the bandage the shoulder girdles are pulled backwards and upwards as strongly as possible without compressing the axillary vessels (Fig. 1). The bandages may be stitched together to prevent slipping, and it is advisable to reapply them every second or third day for the first fortnight. The tension of the figure-of-8 bandage prevents the outer fragment from displacing forwards, and the weight of the arm acts as a lever over the axillary pad, distracting the outer fragment away from the mid-line and correcting the overriding. For the first two weeks the shoulder is elevated by a triangular sling tied over the opposite side, but after that time it is left free for exercises. The finger-, wrist-, and elbow-joints must be exercised frequently from the first day. The figure-of-8 bandage may be discarded after three weeks when there is clinical evidence of union; there is no necessity to wait for radiographic evidence, which is much more delayed.

COMMUNUTED FRACTURES

Occasionally the fracture is comminuted and a small fragment may be tilted out of position so that a subcutaneous spur develops. These fragments may be replaced by direct pressure after the main fracture has been reduced by the figure-of-8 bandage. Even if these attempts fail operative reduction should still not be contemplated. The sharpest of spurs usually absorbs and becomes rounded, and if any symptoms do remain it is very much more simple to remove the spur after union of the fracture than to attempt open reduction. The only indication for operation in recent fractures is the exceedingly rare complication of compression of the brachial plexus or subclavian vessels by displaced fragments.

Dislocation of the Acromio-clavicular Joint

If the ligaments of the acromio-clavicular joint are torn the weight of the arm displaces the shoulder girdle and acromion downwards below the level of the outer end of the clavicle. If the injury is confined to the ligaments between the acromion and the clavicle subluxation of the joint results, but if there is also a tear of the ligaments between the coracoid and the clavicle still more serious displacement develops. The dislocation is very easily reduced by elevating the whole arm and shoulder girdle, but it is just as easily redisplaced by the unsupported weight of the limb.

Immobilization by Strapping.—The limb must be kept elevated by strapping which encircles the clavicle above and the elbow below. A small pad of wool is placed in the axilla, and the wrist is slung from the neck by

a collar and a cuff with the elbow at a right angle. A pad of adhesive felt is placed below the elbow to protect the bony prominence of the olecranon and the ulnar nerve, with a second pad over the outer end of the clavicle. These two points are now pulled together by strips of brown strapping four or five feet long applied as tightly as possible (Fig. 2a). While the strapping is being applied the humerus is pushed upwards to elevate the scapula and the acromion, and the clavicle is pulled downwards. The strapping is easily stretched by the weight of the limb, so that five or six layers should be used, one on top of the other. It is a common mistake to apply the strapping over the top of the humerus and the shoulder-joint itself instead of over the clavicle and supraclavicular triangle (Fig. 2b). In these circumstances the surgeon is attempting the impossible task of compressing the humerus in its longitudinal axis. If the

uninjured the muscle is felt contracting even although the shoulder is not actually moved.

Method of Reduction.—The head of the humerus is held in its inwardly displaced and inwardly rotated position by the tension of the subscapularis. To reduce the dislocation this muscle must be slowly and gradually stretched. The patient lies on a couch and the surgeon stands at his side. For a dislocation of the right shoulder the surgeon takes the elbow in his right hand and the wrist in his left. Strong smooth traction is applied to the humerus by pulling with the right hand. The arm is now very slowly and gently externally rotated by moving the wrist outwards until the normal limit of 90 degrees external rotation is reached. The limb being kept in full external rotation the elbow is brought forward in front of the chest. Finally the limb is internally rotated and the hand brought over to the opposite shoulder. The manipu-

FIG. 1.—Figure-of-8 bandage with large axillary pads for fracture of clavicle. The outer fragment is pulled back by the bandage, distracted away from the mid-line by the leverage of the weight of the arm over the axillary pad, and elevated by a triangular sling.

FIG. 2 (a and b).—(a) Correct and (b) incorrect method of strapping acromioclavicular subluxation and dislocation. The strapping must pass over the clavicle and not over the top of the shoulder. It must be tightened on alternate days and retained for three to five weeks.

strapping is applied in the right place, and if the method is used conscientiously, excellent results may always be obtained and operative measures are unnecessary. It is, however, essential to tighten the strapping every second or third day by applying additional strips on top of the original and to continue the fixation for at least three weeks in subluxation of the joint, and for at least five weeks when the joint is completely dislocated.

Dislocation of the Shoulder-joint

Since the head of the humerus does not occupy its normal position immediately below the acromion process there is loss of the normal rotund outline of the shoulder. The acromion is unduly prominent and there is a hollow beneath it. This hollowing may not be obvious on inspection owing to the marked swelling, but it is quite evident on palpation when the shoulder is compared with the normal side. All movements of the shoulder are limited and painful, and there is particular difficulty in putting the elbow to the side owing to the locking of the head of the humerus in its inwardly displaced position.

The limb must be carefully examined for nerve injuries. The deltoid muscle is often paralysed by injuries to the circumflex nerve, the posterior cord, or the outer trunk of the plexus. The examiner palpates the muscle belly with one hand and instructs the patient to attempt abduction movement against the resistance of his other hand over the patient's elbow. If the nerve supply is

lation is performed so smoothly that the head of the humerus glides into position, and often the surgeon does not know at which stage the dislocation was reduced. There is no necessity to elicit any click or sudden jerk. Frequently such a click does not indicate successful reduction, but is due to movement from one dislocated position to another. It is essential that the accuracy of reduction should be confirmed not only clinically but also by radiographic examination.

After-treatment.—A small pad of wool is placed in the axilla well powdered with talcum, and a wisp of wool is similarly placed in the fold of the elbow to prevent intertrigo dermatitis. The wrist is slung from the neck by a collar and a cuff and the whole limb is bandaged to the trunk to prevent external rotation movement of the shoulder. The fingers, hand, and wrist must not be covered, and these joints are constantly exercised. All bandages and slings may be discarded in three weeks, and the patient regains movement at the elbow-joint and shoulder-joint by his own exercise. If the shoulder is immobilized for a shorter period there is a danger of recurrent dislocation, necessitating operative treatment.

Dislocation with Fracture of the Tuberosity.—Radiographs may show that a large fragment of the great tuberosity has been torn off at the time of the dislocation (Fig. 3). As a rule the fragment is in perfect position when the dislocation is reduced. An axillary pad somewhat larger than usual may be applied, but an abduction

frame is not necessary. Active movement of the shoulder is begun in three to four weeks, exactly as if there was no fracture.

Dislocation with Avulsion of the Supraspinatus.—In a proportion of cases the supraspinatus tendon has been avulsed from the tuberosity. The complication is rarely recognized until several weeks have elapsed. After the bandage and strapping have been discarded it is found that passive abduction is recovering more rapidly than active abduction. A greater range of passive than of active abduction in the presence of a normally contracting

must be employed to fix the trunk part of the frame and to hold it up, the turns of the bandage being hitched under every hook screw and bar and passed over both shoulders.

Stiffness and Myositis Ossificans due to Passive Stretching.—In the after-treatment of shoulder dislocations passive stretching by masseuses and manipulation under anaesthesia by surgeons must be rigidly avoided. There is no more certain means of converting temporary into permanent stiffness than by permitting passive stretching. It is now well recognized that myositis ossificans after dislocation of the elbow is due to passive stretching and that

FIG. 3 (a, b, c).—(a) Dislocation of shoulder. (b) Dislocation with fracture of great tuberosity. (c) Dislocation with avulsion of supraspinatus.

FIG. 4.—Three types of fracture of neck of humerus: (a) contusion crack fracture; (b) adduction fracture; (c) abduction fracture.

deltoid is clear evidence of rupture of the supraspinatus tendon. This complication was fully discussed in the preceding article (*Journal*, July 2, p. 30).

Dislocation with Paralysis of the Deltoid.—If there has been an injury to the circumflex nerve or one of the cords of the brachial plexus the paralysed deltoid muscle must be relaxed by abducting the shoulder in a frame. If the patient's arm is firmly bandaged to the frame but the trunk part is loose and can slide down, there is a danger that the joint may be re-dislocated. For this reason some surgeons defer the application of a frame for two or three weeks, but if it is skilfully applied it is safe to use it even earlier. At least seven or eight six-inch bandages

this practice delays the recovery of elbow movement. The only pathological difference between dislocations of the elbow and dislocations of the shoulder is that the elbow is usually dislocated in children, in whom the periosteum is loosely attached, whereas the shoulder is usually dislocated in adults, in whom the periosteum is firmly attached. For this reason elevation of the periosteum and "myositis ossificans" are more often seen in the elbows of children than in the shoulders of adults. The myositis ossificans is merely one evidence of the harm done to the child's elbow by passive stretching. The passive stretching is just as harmful to the adult's shoulder, even although there is no outward and visible sign:

Movement must be recovered by the patient's own exercise. Attempts to accelerate recovery by stretching the joint or by manipulating it under anaesthesia will have exactly the opposite effect to that which was intended.

Fracture of the Neck of the Humerus

Three types of fracture must be distinguished: (1) contusion crack fractures, (2) adduction fractures, and (3) abduction fractures (Fig. 4).

Contusion Crack Fractures.—The injury follows a fall on the outer aspect of the shoulder, and the crack across the neck of the humerus is often associated with a comminuted fracture of the tuberosity. Complete immobilization is not necessary. The limb should be supported in a sling for two or three weeks, throughout which time the finger-, wrist-, and elbow-joints are exercised. As soon as the swelling and bruising of the shoulder have begun to subside active exercises are practised.

Adduction Fractures.—These occur equally commonly in adults and in children, and the fragments are impacted in such a way that the shaft is adducted on the head. If the displacement is not corrected abduction movement is permanently limited by a degree corresponding with the degree of angulation. In elderly patients this is unimportant, and the impaction should not be broken down by manipulation. Treatment is carried out exactly as for contusion crack fractures. In younger patients the displacement is reduced by traction on the limb in the abducted position so that the adduction angulation is corrected. The limb is immobilized on a frame in right-angled abduction for four to five weeks.

Abduction Fractures.—It is a serious mistake to believe that every fracture of the upper end of the humerus should be treated in abduction. Although an abduction frame is harmless or even advisable in adduction fractures it is the wrong treatment in most abduction fractures. The shaft is already abducted on the head and an abduction frame will perpetuate or increase this displacement. As a rule the displacement is not of serious degree and does not require manipulative reduction. The limb is supported in a sling in the adducted position by the side of the trunk. Movements of the finger, wrist, and elbow are begun at once and shoulder exercises are instituted in two or three weeks.

Very rarely the degree of abduction displacement at the time of injury is so extreme that the shaft is driven inwards beneath the head and completely detached from it. There is now no apposition between the fractured surfaces, and the loose head is completely externally rotated and abducted by the unopposed pull of the muscles inserted into the tuberosity. It may be possible to reduce the displacement by angulating the fragments on each other, adducting the shaft across the chest, and pushing the upper end outwards by a hand in the axilla until the fractured surfaces engage. The arm is then brought to the side and immobilized in that position for four weeks before active shoulder movements are begun.

If the manipulation fails to secure engagement of the fractured surfaces the proximal fragment remains fully abducted and externally rotated. It is now essential to abduct and externally rotate the distal fragment, but recurrence of the original displacement must be prevented by maintaining constant traction. An abduction fracture must never be treated in the abducted position unless continuous traction is applied and a special frame is employed. Skin traction by adhesive strapping is all that is necessary. Skeletal traction by olecranon pins should not be used. The traction must be of sufficient degree to prevent inward

displacement of the shaft below the head. If this is not prevented the fragments will unite in this position, and it will be impossible to bring the arm down to the side. Frequent checking by radiographs is therefore necessary. The frame is jointed so that elbow movements may be practised, and the forearm, wrist, and finger-joints must be regularly exercised.

PREVENTION OF TUBERCULOSIS

NATIONAL CONFERENCE IN LONDON

The twenty-fourth annual conference of the National Association for the Prevention of Tuberculosis was held last week at the British Medical Association House in London and was largely attended by delegates from local authorities and other public bodies. The subjects of discussion included the organization of anti-tuberculosis activities in rural areas, the discovery and protection of contacts, the control of tuberculosis in tropical and sub-tropical regions (to which delegates from India and Tanganyika contributed), and the mental aspects of tuberculosis. The conference was preceded by the annual meeting of one hundred affiliated care committees, at which many suggestions were made for the employment of former tuberculous patients.

The conference, of which the Marchioness of Titchfield was president, was opened by the Minister of Health, Dr. WALTER ELLIOT, who quoted some statistics showing the great improvement which had taken place in the tuberculosis death rate since the middle of the nineteenth century. The rate had now fallen to about one-fifth of what it was then. He also spoke of the multiplication of facilities for prevention and treatment. In 1911 there were only some 5,000 or 6,000 beds in England and Wales available for tuberculosis cases; to-day there were nearly 31,000, and nearly 150,000 persons were examined for the first time in English dispensaries last year. The problem of rural housing, to which he was giving personal attention, was of great importance in tuberculosis prevention, and the legislation passed last year for the provision of new houses and reconditioning of soundly built old cottages could be regarded as a notable contribution in this field.

Tuberculosis in the Rural Areas

The first subject of discussion was the rural areas, where, said Dr. G. LISSANT COX, in opening, all the facilities for modern treatment, isolation of infective cases with unsatisfactory home conditions, education and preventive measures, examination of contacts, and so on, ought to be available just as much as in the towns, even though admittedly the tuberculosis incidence and mortality are lower in the country. He stressed as of first importance co-operation between the family doctor and the tuberculosis officer. It was possible to measure, in England at any rate, the different degrees of this co-operation, not by notification of cases, but by the number of persons sent to the official doctor or consultant before notification for an opinion as to diagnosis. In his own county (Lancashire) 92 per cent. of all new cases were so dealt with. Dr. Lissant Cox discussed the organization of the dispensary and the institution unit in rural localities.

Dr. A. M. FRASER also stressed the importance of the general practitioner, but questioned whether the general practitioner, as he was turned out to-day, was as well informed as he might be in these respects. Post-graduate training was of the utmost importance, and facilities should be available to all doctors at certain intervals. It seemed a pity that in the organization of postgraduate schemes for insurance practitioners local authorities were not given an opportunity to hold a stake, so that the schemes could have been made more comprehensive and include an intensive study of tuberculosis.