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RECURRENT OR HABITUAL DISLOCATION OF THE SHOULDER *

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Dislocations occur more frequently in the shoulder joint than in any other joint in the body. Reduction is, as a rule, readily accomplished, but if delayed beyond a few hours, is not easy. If deferred for days, it is quite difficult, and a delay of more than a week may mean that all attempts at reduction will fail. If the dislocation is associated with a fracture of the surgical neck of the humerus, unless reduction is accomplished by an open operation, the patient usually comes to a resection of the head of the bone later.

Habitual dislocations of the shoulder joint occur in cases in which reduction has been accomplished and the convalescence completed without incident, so that there is no cause for anxiety. The habit of easy dislocation is a sequela that cannot be foretold. A shoulder joint may be said to be subject to habitual or recurrent dislocations when they occur irregularly as the result of some trivial voluntary manipulation or effort on the part of the patient.

The shoulder joint is a true ball-and-socket joint. The depth of the socket is so slight and the amount of the head of the bone in actual contact with the glenoid fossa so small that it is a wonder dislocations of the shoulder are not much more common. The socket is formed by the glenoid fossa of the scapula and its cartilaginous rim. The capsule itself is quite lax, the shoulder owing its stability to the muscular arrangement. It is reinforced at certain points by the insertion of muscles into and through it, to the bone beneath. When the shoulder girdle is paralyzed and the muscle tone gone, as in anterior poliomyelitis, or trauma to the brachial plexus, we see the lax dislocated shoulder which cannot be kept in place. The long head of the biceps originates from the upper margin of the glenoid fossa, and crosses the cavity of the shoulder joint anteriorly, surrounded by synovium (Fig. 1). Its action in this situation serves to strengthen the joint and prevent dislocations through this part of the capsule. Over the whole is the strong fan-shaped deltoid, which by its action tends to hold the head of the humerus in the glenoid fossa. The supraspinatus, infraspinatus and teres minor inserted into the greater tuberosity of the humerus thicken and strengthen the capsule above and behind and by their action tend to hold the head of the humerus in place

(Fig. 2). Into the lesser tuberosity of the humerus the subscapularis tendon is inserted in front and into the inner side of the bicipital groove, serving to strengthen the anterior part of the capsule (Fig. 3). At the lower margin of the glenoid fossa arises a part of the triceps, in no way reinforcing the capsule, and between this point below and the point of insertion of the subscapularis above, there is no muscular insertion on the anterior portion of the capsule. This area is the weak part of the capsule, being the place in which dislocations usually occur (Fig. 4).

Definite evidence of the pathologic condition is lacking. The limited opportunity for examination of the entire field at the time of operation accounts for much of the difference of opinion. In 1880, Joessel¹ gave it as his opinion that the dislocation was the result of a tear in the capsule at the attachment of the supraspinatus and infraspinatus and the teres minor. Such a rent, he contended, would allow the arm to drop down and luxate through the lax portion of the capsule between the insertion of the subscapularis above and the origin of the triceps below, without necessarily tearing this lax portion. Thomas does not agree with this view, asserting that, in his opinion, the rent usually occurs in the anterior inferior portion and that there is no damage to the capsule in the region of the greater tuberosity. In none of the cases in this series has there been any evidence of rupture of the supraspinatus and infraspinatus tendons and damage to the capsule. It might be supposed that a rupture of these tendons would tend to detach some of the periosteal cells from the greater tuberosity, and that the callus thus formed would cast shadows on the plate; but the roentgenograms in every case in this series were negative. Also the curative value of a capsulorrhaphy of the anterior inferior portion of the capsule would further substantiate the theory that this is the point of exit for the dislocating head. Other authorities, such as Loebker, suggest some abnormality or defect in the head of the humerus, but their proof for such a condition is not very convincing.

There is always a history of a traumatic dislocation. The second dislocation may occur a few weeks or few months after the first, and those that follow gradually become more frequent. The motion producing luxation is one with the arm in abduction and a little forward. The position causes the greater part of the humeral head to be pressed against the weak part of the capsule, and at the same time relaxes the biceps tendon as it runs in the bicipital groove. The dislocations may occur so often that the patient or his friends under his direction may make the reduction.

* From the Mayo Clinic.

* Read before the Southeastern Medical Society of Iowa, Fairfield, Iowa, Oct. 18, 1917.

1. Joessel, J. G.: Ueber die Recidive der Humerusluxationen, Deutsch. Ztschr. f. Chir., 1880, **13**, 167-184.

The number of dislocations and the degree of disability vary in individual cases. One patient in the series had experienced more than a hundred dislocations. As might be expected, dislocations are more common

by merely incising the capsule at the anterior inferior angle and overlapping it, by the process of capsulorrhaphy, the dislocations are prevented. Gerster³ in 1883 was the first to do this. Bardenheuer did the same in 1886, and Ricard in 1892. More recently, Thomas⁴ has reported cases in which cure has been effected by capsulorrhaphy. Young has outlined a method, basing his operation on the fulcrum action of the pectoralis major and the latissimus dorsi. The operation consists in the severing of the lower portions of these muscles at the point at which they are inserted into the lips of the bicipital groove.

To expose the capsule of the joint for capsulorrhaphy, an incision is made which runs along the anterior fold of the axilla while the arm is held in abduction. The pectoralis major muscle is strongly retracted, and the dissection is carried down to the capsule below the tendon of the subscapularis. An incision is made into the capsule, and three or four mattress sutures of No. 2 chromic catgut doubled are inserted (Fig. 5). It will be found that the overlapping of the capsule may be secured readily by rotating the arm. The sutures are placed in the weak, lax part of the capsule at the inferior anterior portion. The wound is closed, the arm

is held strapped to the side of the body for two weeks, and abduction to a right angle is not permitted for six weeks.

The plastic operation of Young is accomplished by an incision which starts a little farther out on the axillary fold and extends a little farther down onto

Fig. 1.—Anterior view, showing muscular arrangement about the shoulder.

in the male than in the female, the proportion in this group being seven males to one female. They are found in the young and the middle aged, and are by no means unknown in the aged. Epileptics are subject to them. The disability due to the uncertainty and irregularity of the attacks may be so extreme that the patients are unable to earn a livelihood. It is generally stated that recurring dislocations are caused by insufficient fixation following the original luxation. This is probably true, but the fact remains that when the ordinary dislocation is reduced and the patient is allowed to go about his usual duties in a few days, subsequent dislocations rarely occur. To safeguard our patients against this disagreeable sequela, the arm should be carried in a sling for ten days, and abduction of the shoulder absolutely prohibited for one month following the accident.

As braces and appliances are cumbersome, and seldom successful in the treatment, there remain only surgical measures. In the past, extreme measures have been undertaken to relieve the condition.

Resection of the head of the humerus has been done by some surgeons, notably Cramer, Kuester, Kraske, Popke, Volkmann, Schueller, Staffer, Mueller and Francke. Such a procedure is mentioned only to be condemned. Albert² prevented the recurrences in his cases by producing a bony ankylosis; and while this seems somewhat extreme, it might readily be advised if milder measures failed. An ankylosis of the shoulder joint produced with the humerus at a right angle to the body gives a very useful arm, as has been shown in cases of infantile paralysis in which such operation has been performed because of paralysis of the deltoid. The scapular vertebral muscles acting on the scapula are used to abduct the arm. It has been found that,

Fig. 2.—Posterior view of shoulder, showing insertion of supraspinatus, infraspinatus and teres minor muscles.

the humerus over the bicipital groove. The tendon of the pectoralis major is brought into view and the

2. Albert, E.: Arthrodesis bei einer habituellen Luxation des Schultergelenkes, Internat. klin. Rundschau, Vienna, 1888, 2, 281-283.

3. Gerster, A. G.: Fracture of the Humerus and Scapula, Complicated with Severe Injury of the Entire Brachial Plexus Followed by Paralysis, Med. News, Philadelphia, 1884, 44, 421.

4. Thomas, T. T.: Habitual or Recurrent Anterior Dislocation of the Shoulder, I, Etiology and Pathology, Am. Jour. Med. Sc., 1909, 137, 229-246; II, Treatment, ibid., pp. 367-377.

lower half severed. The latissimus dorsi on the opposite side of the biceps tendon is exposed and the

Fig. 3.—Anterior view of scapula, showing insertion of subscapularis and teres major muscles.

inferior half of it is divided. The arm is then placed in a plaster-of-Paris spica, and is held at a right angle to the body for from ten days to two weeks.

The question confronting the surgeon is which operation to choose in order to secure the relief desired. From a study of this group of only eight cases, I am unable to answer the question. The principles underlying the operations are dissimilar, and I know of no way of determining beforehand which procedure offers the best chance for cure. It is possible that if the capsule is strengthened, it will withstand the fulcrum action claimed by Young. On the other hand, the weakened capsule may withstand attempts at dislocation when the fulcrum is weakened, if the operator will lengthen part of the tendons of the pectoralis major and the latissimus dorsi.

Eight patients, of whom seven were men and one a woman, have been operated on in the Mayo Clinic for recurrent dislocation of the shoulder joint. One operation, performed July, 1917, is too recent to report, although the patient is well up to the time of writing (October, 1917).

Five of the remaining seven patients may be called cured. There is one in whom the operation was noted as a failure though really only a partial failure, for whereas, previous to the operation, the patient had experienced twelve or more dislocations a year, in the last year and a half he has had only

two. In one other case, the treatment is apparently a distinct failure after a capsulorrhaphy and a lengthening of the tendons of the latissimus dorsi and the pectoralis major. If the patient in this case returns, I shall advise an arthrodesis of the head of the humerus and the glenoid fossa with the arm at a right angle.

REPORT OF CASES

CASE 1 (66183).—W. C., a man, laborer, aged 24, came to the clinic for examination, April, 1912. Six years previously he had dislocated his shoulder, and the dislocation had not been reduced for thirty-six hours. After that there had been multiple dislocations, not prevented by apparatus. Capsulorrhaphy was performed, April, 1912, and there were no dislocations until November, 1913. January, 1914, the Young operation was performed. The man has since had dislocations, and the case must be called a failure.

CASE 2 (87419).—H. W., a man, laborer, aged 25, came for examination, July, 1913. Five years before, his left shoulder had been dislocated in a runaway accident. Later he had had seven dislocations, and was incapacitated for a month after each. There had been an interval of two years between the last two dislocations, the latest one occurring, June, 1913. Capsulorrhaphy was performed, July, 1913, and in a communication from the patient, August, 1917, he said he had had no further trouble and was doing everything he wished to do with his arm. The case may be classified as a cure.

CASE 3 (90312).—L. L., a man, clerk, aged 19, was first examined, August, 1913. Eighteen months previously, the shoulder had been dislocated while he was playing hockey. During the eighteen months the dislocation occurred probably a dozen times, the last time while he was swimming. Capsulorrhaphy was performed, August, 1913, and in a communication from his mother, September, 1917, it was stated that the arm feels somewhat weak but that no dislocations have occurred. The case may be called a cure.

CASE 4 (107485).—M. G., a man, merchant, aged 41, was examined, June, 1914. Nineteen years before, he had fallen and dislocated his right shoulder. It was reduced immediately. There were several dislocations during the next four

Fig. 4.—Frontal section through right shoulder joint, viewed from behind.

years, and then he caught a cold which seemed to settle in the right shoulder. For four months there was a soreness which prevented his lifting the right arm to the head. After that, he had numerous dislocations, and ten years previous to the examination he fell, and in catching himself, dislocated the left shoulder. The left shoulder has not been dislocated, however, for two years, and we consider the dislocation

merely the result of an ordinary trauma. The right shoulder, however, had been out of joint repeatedly, the last dislocation being three weeks before the examination. Capsulorrhaphy was performed, June, 1914, and in a communication, August, 1917, the patient asserts that he has had no further trouble, and that he gets along nicely.

CASE 5 (118613).—R. V. A., a man, bookkeeper, aged 33, was examined, November, 1914. After a dislocation of the left shoulder, seven years previously, he had had recurring dislocations, at least twelve a year. He sometimes threw the shoulder out of joint in reaching for a book or anything on a shelf. November, 1914, capsulorrhaphy was performed. The patient was not troubled until May, 1915, when he had a peculiar feeling that his shoulder was going to slip out. He now reports that during the last year, two and one-half years after operation, the shoulder has slipped out twice. This case should not be put down as a distinct failure, since the shoulder is really improved, and the function is markedly improved. As the patient intends to return for observation, I have recommended that the Young operation be performed to see if it will stop the trouble.

CASE 6 (123803).—S. F. L., a man, lawyer, aged 25, was examined, February, 1915. Eight years previously, he had dislocated his shoulder playing football. The next time, it was dislocated while he was swimming, the third time, while he was playing baseball, and it had even slipped out while he was sleeping. At the time of the examination, he was wearing a band around the body to hold the arm to his side. He had worn it steadily for a year and a half, thus averting dislocations. The condition had completely incapacitated him for any participation in athletics. Capsulorrhaphy was performed, February, 1915, and in a letter from him dated August, 1917, from an officers' training camp, he says he has been able to do his bit in such strenuous tests as digging trenches, bayonet exercises and trench storming, without suffering the slightest inconvenience or trouble from the shoulder.

CASE 7 (156847).—J. C. S., a man, merchant, aged 30, was examined, April, 1916. Ten years before he had dislocated his shoulder. The dislocation remained for two days, and then reduced itself, which would lead one to believe it must have been a subglenoid dislocation. The shoulder has been dislocated many times since, and he has had to take gas, ether or chloroform about ten times. April, 1916, the Young operation was performed. In a letter dated August, 1917, the patient declares that he has had no further trouble, and that this shoulder seems to be as strong as the other one.

CASE 8 (200995).—H. J., a woman, nurse, aged 33, was examined, July, 1917. On Thanksgiving day, 1915, she fell and dislocated her shoulder. It was reduced about an hour later, and was held to the side for ten days. The next dislocation occurred Christmas day, 1916, to be followed by four dislocations. Capsulorrhaphy was performed, July, 1917, and up to the time of writing, October, 1917, there have been no further dislocations.

CONCLUSIONS

1. Recurrent dislocations of the shoulder may be cured by operation, capsulorrhaphy being the operation of choice.
2. Capsulorrhaphy has been found to be sufficient in the majority of cases.
3. Resection of the head of the humerus is not permissible for the condition.
4. Arthrodesis or ankylosing of the head of the bone to the scapula with the arm at a right angle would be an extreme measure, but permissible.

PARALYSIS OF RECURRENT LARYNGEAL NERVE ASSOCIATED WITH MITRAL STENOSIS

REPORT OF A CASE

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Paralysis of the left recurrent laryngeal nerve is usually associated with aneurysm and dilatations of the aortic arch. It is only since Ortner's original report¹ in 1897 that we have learned that recurrent paralysis may be associated with and apparently caused by cardiac enlargement. In a recent statistical survey of recurrent nerve paralysis² embracing 116 cases of this type only four were reported as being due to mitral stenosis, all involving the left recurrent laryngeal nerve. In a series of 360 cases of unilateral laryngeal paralysis, quoted in the same article, only ten cases were

due to an enlargement of the heart in mitral stenosis. The other causes of left recurrent paralysis are associated with mediastinal enlargements and in patent ductus arteriosus, the nerve being incarcerated with the aorta and ductus. Pericardial and mediastinal adhesions compressing the nerve have also been shown to be an etiologic factor.

Paralysis of this type due to mitral stenosis is of rare occurrence, and up to 1916, only eleven cases had been reported with necropsy confirmation. There have been, however, a large number of clinically reported cases with a recurrent paralysis associated with mitral stenosis in which the cardiac condition

Fig. 5.—Capsule, showing overlapping (capsulorrhaphy), with four doubled chromic catgut sutures in place.

1. Ortner: Recurrenslähmung bei mitral Stenose, Wien. klin. Wchnschr., Aug. 19, 1897.
2. Recurrent Nerve Paralysis, in Thomson, St. Clair: Diseases of the Throat.