

## ANTERIOR AND POSTERIOR RECURRENT DISLOCATION OF THE SHOULDER<sup>1</sup>

### *The Putti-Platt Operation*

*By*

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I agree with Sjövall (20) that Blumensaat's system of terminology for patellar dislocations should also be used for the classification of different kinds of dislocation in the shoulder joint. In other words, distinction should be made between fresh, recurrent and permanent dislocations and the permanent dislocations should be divided into the habitual and constant varieties. The recurrent group includes the dislocations which recur at varying intervals of time. The habitual group includes the ones which always appear on certain movements. Most cases of so-called habitual dislocation of the shoulder would be called recurrent with this method of classification. The nomenclature is not based on the kind of anatomic injury in the joint. The terms "recurrent" and "habitual" only describe the way the redislocation occurs.

Innumerable suggestions have been made for the surgical treatment of recurrent and habitual anterior dislocation of the shoulder. Disregarding small and often insignificant variations in technic, the methods fall into the following groups:

- 1) Simple capsulorrhaphy.
- 2) Tenosuspension (Henderson (10), Nicola (16, 17)).
- 3) Musculosuspension (Clairmont-Ehrlich).
- 4) Use of the coracoid process to support the humeral head anteriorly (Oudard).

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5) Methods inducing the development of a mass of fibrous tissue at the anterior margin of the glenoid cavity and the restriction of outward rotation (Eden (5, 6), Hybbinette (12), Bankart (3), Putti-Platt (18)).

To judge from the extensive literature on the first four of these methods, while it may be possible to get good results with them, the chances of recurrence are so great that they should be abandoned. It is not surprising that simple capsulorrhaphy or tenosuspension does not give enduring results. Even if the primary outcome is satisfactory, the tissues in the capsule and constructed ligament eventually give way. Oudard's method has fallen out of favor in most places. The same is true of the Clairmont-Ehrlich method, because of the great risk of degeneration in the grafted sling of muscle (Watson-Jones (21), Matti (15), Henderson (10)). Furthermore, it is an unnecessarily complicated operation.

The Eden-Hybbinette method with the construction of a block of bone at the anterior margin of the glenoid cavity has the best reputation of these methods, at least in Sweden. Jakobsson (13) found a recurrence rate of 1.5 per cent in 200 cases collected from the literature. When the 60 cases published by Palmer & Widén (19) and the 42 cases published by Jakobsson are added, the rate becomes 2.5 per cent in 300 cases. It should be mentioned, however, that Palmer & Widén include those occurring after renewed injury, and that two of Jakobsson's cases, suffering from ankylosis of the shoulder after operation, are excluded. What is interesting, particularly from a theoretical point of view, is that several cases operated upon by the Eden-Hybbinette method have not had a recurrence despite the fact that the bone graft was absorbed. It is apparently true, as has been maintained, that it does not make much difference from the point of view of redislocation exactly where the bone graft is placed. Its main purpose is to induce the formation of a block of scar tissue and thereby the re-insertion of the important glenohumeral ligaments (13). According to Jakobsson, the Eden-Hybbinette method has the disadvantage that, if the grafted bone projects too far forward over the edge of the glenoid cavity, it can lead to osteo-arthritis.

Three features are common to the methods of the fifth group:

- a) Extensive exposure of the region at the anterior margin of the glenoid cavity, which generally reveals injuries to the labrum.
- b) Measures to encourage the development of a mass of fibrous tissue at the anterior rim of the cavity, e.g., re-attachment of the labrum with sutures, pegging with different kinds of metal nails or staples, insertion of a bone graft against the neck of the scapula,

excision of the labrum and re-attachment of the capsule to the rim of the joint cavity, rawing the front of the neck of the scapula and "double-breasting" the capsule, suturing it to the labrum. c) Measures permanently restricting outward rotation in the shoulder joint (shortening of the subscapular tendon or moving its insertion farther outward on the humerus). A great many varieties of surgical technic are described. The main types are the methods of Eden (5, 6) and Hybbinette (12), Bankart (3), Matti (15), Magnuson (4), Watson-Jones (21) and Putti and Platt (18), all of which seem to give equally good results.

The first number of the British edition of the *Journal of Bone and Joint Surgery* in 1948 contained a detailed description of the Putti-Platt operation by Osmond-Carke (18), who pointed out its relative simplicity. Adams (1), discussing the results of the method in the same number of the journal, said that it was just as reliable as the Bankart method. Since not enough cases treated with the Putti-Platt method have been published to enable statistical analysis, I shall now report our experience with the method.

We have used the Putti-Platt method for every case of recurrent dislocation of the shoulder since the autumn of 1948. The method consists of stable capsulorrhaphy and shortening of the subscapular tendon. The technical details can be learned from Osmond-Clarke's article (18). According to Palmer and Widén (19), the "essential lesion" is a compression fracture in the head of the humerus which, on outward rotation of the arm, makes the head fasten on the anterior margin of the joint cavity, forcing it out of the joint. Even if this does not apply to every case of recurrent dislocation of the shoulder, it is a recognized fact that extreme outward rotation favors the occurrence of the dislocation. The shortening of the subscapular tendon is done partly to give more support to the head of the humerus ventrally and partly to hinder the final phase of normal outward rotation. It is extremely important, however, not to overdo the hindrance, otherwise the capacity of elevation will also be restricted. At the end of the operation, therefore, a check must be made ensuring that the arm can be rotated outward to at least the neutral mid-position.

I have now re-examined and analyzed our first sixteen cases, operated upon from October 1948 to October 1951. The composition of the series is seen from the accompanying table. The age at operation varied between 12 and 47 years. In 14 cases the first dislocation was caused by a trauma. One of the two other patients suffered from habitual subluxation only and was able to subluxate several joints at will. The other patient without any history of trauma was a twelve

year old girl who had had six complete dislocations during the three months prior to operation, none of which could be spontaneously reduced.

Operation disclosed a wide capsule with a large pocket anteriorly in one case, separation of the capsule from the labrum in one case, loosening of the labrum from the margin of the cavity or a concentric rupture in the labrum in 13 cases and in the sixteenth case, the one of subluxation, nothing abnormal in the joint.

*Sixteen Cases of Anterior Shoulder Dislocation Operated on by the Putti-Platt Method.*

Sex	Preoperative Condition	Results of operation
Male 6	Habitual subluxation 1	Unimproved 1
Female 10		
Side	Recurrent dislocation 15	Improved. Mild fatigue and pain on exertion 2
Right 6		Improved. Feeling of instability in extreme phases of movement, but good strength & working capacity 3
Left 10		Symptom-free, even on vigorous work & sport 10
		Redislocation 0

The results are seen in the table. In one case, the one in which the patient was able to sublunate several joints at will, the trouble recurred six months after the operation and the case must be designated as unimproved. None of the other 15 patients have had a recurrence, despite the fact that many of them are engaged in vigorous occupations; one plays badminton, one plays soccer and does the most of his team's throw-ins, one fell off a motor cycle six months after the operation and slid about twenty metres on the elbow of the operated arm. Two of the patients complain of slight fatigue and pain in the shoulder on exertion. Neither of them show any muscular atrophy. One of them is a compensation case and the other has a hypochondric asthenic temperament. Three persons report a feeling of instability on extreme movements, but their arms are strong and reliable and can be used just as much as before their first dislocation. Perhaps these cases will not show such favourable results in the long run.

A defect in elevation of 30 degrees was noted in one case, of 20

degrees in another and of 10 degrees or less in three cases. The other eleven cases showed no deficiency of this kind. The operation strives to procure a reduction in the range of outward rotation. In no case did it cause so much reduction that the patient was inconvenienced. As a rule he or she was unaware of the limitation in motion. It is most noticeable when the arm is held close to the body. As soon as it leaves the body, the limitation in rotation in the humeroscapular joint can be compensated to a large extent by scapular movements. This explains why it causes so little trouble. The Putti-Platt method has been objected to because it causes this limitation in outward rotation. However, we have just seen that a moderate limitation is of no functional importance. Furthermore, a similar limitation in rotation occurs after most operations using anterior arthrotomy, though it is often not noticed. Jakobsson (13) reported that only 14 out of 42 patients operated on with the Eden-Hybbinette method exhibited a normal range of outward rotation afterward.

Four of my patients were re-examined six months to a year after operation, 7, one to two years after, 2, two to three years after and 3 of them more than three years after. Another six months have now passed since this clinical follow-up study and, apart from the case of subluxation, no recurrence has yet been reported, though the patients were told to get in touch with the hospital at once if the shoulder gave them any trouble.

*To summarize the results of these 16 cases operated upon with the Putti-Platt method, one of habitual anterior subluxation is unimproved and the 15 of recurrent anterior dislocation have not had any recurrence.*

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There is also an extensive amount of literature on recurrent and habitual posterior dislocation of the shoulder, though not as much as on anterior dislocation. The same method of classification is suitable for the different forms of posterior dislocation. Accordingly, it is useful to distinguish between recurrent dislocation on various occasions and habitual dislocation always occurring on certain movements.

Recurrent and habitual posterior dislocation in the shoulder are probably not so uncommon as has been believed. Fevre & Mialaret (8) found 3 posterior dislocations in every hundred recurrent dislocations. They are often not correctly diagnosed, especially if it is a case of subluxation. As regards Sweden, Asplund (2), Sjövall (20) and Ekman (7) each described one case and Fried (9) reported five cases.

I shall now contribute two cases and discuss the methods that have been used for operating upon the defect.

Several surgeons have employed an inverted Eden-Hybbinette method, constructing a block of bone at the posterior margin of the cavity (Zahn (22), Asplund (2), Hindenach (11), Fried (9)). Sjövall (20) and Ekman (7) used the Clairmont-Ehrlich method for anterior dislocation. Kaplan (14) tried an inverted Clairmont-Ehrlich method in one case. The same objection can be made to the bony block method as in the case of anterior dislocation: the block of scar tissue induced by the grafting can be created in a simpler way and without the risk of future osteo-arthritis. I have already mentioned the danger of muscular degeneration incurred by the Clairmont-Ehrlich method of operation. Henderson (10) reported that posterior capsulorrhaphy had good results in three cases. However, this method is open to the same objection as in the case of anterior dislocation.

In the autumn of 1951 we received a case of habitual posterior subluxation in the shoulder (case 1). Because of the good results obtained from the Putti-Platt method for anterior dislocation, I decided to try an inverted form of this method. The aim was to produce a firm fibrous buttress at the posterior margin of the glenoid cavity and to limit the range of inward rotation by shortening the tendon. As the subluxation occurred downward, the tendon of the infraspinatus muscle was chosen for this purpose.

The operation is simple. The skin is incised along the spine of the scapula and curved at the posterior tip of the acromion down on the posterior aspect of the upper arm. The origin of the deltoid muscle is loosened from the spine of the scapula, beginning medially and out toward the acromion. The posterior section of the deltoid muscle is reflected and by blunt dissection between the infraspinatus and teres minor muscles one arrives directly, without any injury to the nerves or vessels of the muscles, at the posterior part of the capsule. The infraspinatus tendon is obliquely divided and the underlying capsule divided parallel with the labrum a little way from it. A good view is then obtained of the posterior section of the joint. The capsule is "double-breasted" and the infraspinatus tendon sewn out on the humerus in complete correspondence with the same step in the ordinary Putti-Platt operation.

Later on I read that De Palma (4) used a similar method in three cases with satisfactory results. The only difference was that he moved out the insertion of the infraspinatus and the teres minor muscle as well, resulting in still greater limitation of inward rotation.

In April 1952, I used the same procedure for another case of habitual posterior dislocation of the shoulder (case 2). The two patients are now free from symptoms, six months and one year, respectively, after operation, despite the fact that re-examination of case 2 did not reveal an unequivocal reduction in inward rotation. Apparently the block of scar tissue and the stronger infraspinatus effect were sufficient for a cure<sup>1</sup>.

#### CASE REPORTS

*Case 1.*—A girl aged 16 had suffered for two years from painful snapping in her right shoulder. No trauma was recalled.

Examination showed that every time the right arm was lifted forward and outward, the head of the humerus was sublaxed backward, before or as the arm passed the horizontal plane. The sublaxation caused a distinct snap and pain in the joint. Lowering the arm reduced the dislocation.

On Oct. 31, 1951, the operation, consisting of posterior arthrotomy, "double-breasting" the capsule and shortening the infraspinatus tendon, was performed. The glenoid labrum was degenerated, showing several longitudinal fissures and the cranial portion up toward the supraspinatus tendon was entirely detached.

On re-examination a year later the patient was free of symptoms, and it was no longer possible to provoke the sublaxation<sup>1</sup>. Apart from slight limitation in inward rotation, she had a full range of motion.

*Case 2.*—A boy of 16 was hit by a tram on Sept. 4, 1951, and injured his right shoulder. He could not recall the exact mechanism of the injury. Afterward he suffered from instability and pain in the shoulder on exertion. He noted that the shoulder snapped when his arm was inwardly rotated and elevated.

Examination revealed that inward rotation of the semi-abducted and elevated arm caused the head of the humerus to sublaxate backward. Spontaneous reduction took place when the arm was lowered. Both the sublaxation and reduction caused pain.

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<sup>1</sup> Fourteen months after the operation, the patient described in case 1 was admitted to the hospital for habitual posterior sublaxation of the other (left) shoulder. She could then induce slight snapping of the right shoulder at will. However, it caused her no discomfort and she asked to have the other shoulder operated upon in the same manner.

On April 2, 1952, the operation, consisting of posterior arthrotomy, "double-breasting" the capsule and shortening the infraspinatus tendon, was carried out. The labrum was found to be partially detached.

On re-examination six months later the patient was free of symptoms. It was no longer possible to provoke the subluxation and he had a full range of motion.

#### SUMMARY

The two most effective measures for the treatment of recurrent anterior dislocation of the shoulder are the construction of a firm fibrous buttress at the anterior margin of the glenoid cavity and the braking of outward rotation in the shoulder joint. The various methods based on these principles are probably equally good. The author reports 16 cases, one of habitual subluxation and 15 of recurrent dislocation, operated upon by the Putti-Platt method. In his experience, the method is to be recommended.

Two cases of habitual posterior subluxation of the shoulder responded well to treatment with an inverted Putti-Platt method, the technic of which is described.

#### RESUME

Les deux mesures les plus efficaces pour le traitement de la dislocation antérieure récurrente de l'épaule sont la construction d'un ferme arc-boutant fibreux sur le bord antérieur de la cavité glénoïdale et l'empêchement de la rotation extérieure de l'articulation de l'épaule. Les différentes méthodes basées sur ces principes sont probablement toutes aussi bonnes. L'auteur rapporte 16 cas, l'un de subluxation habituelle et 15 de dislocation récurrente, opérés d'après la méthode Putti-Platt. D'après son expérience, cette méthode doit être recommandée.

Deux cas de subluxation habituelle postérieure de l'épaule ont réagi favorablement au traitement par la méthode Putti-Platt inversée, dont la technique est décrite.

#### ZUSAMMENFASSUNG

Die beiden wirkungsvollsten Massnahmen zur Behandlung der vorderen rezidivierenden Schulterverrenkung sind die Schaffung eines festen fibrösen Widerhaltes am vorderen Rande der Fossa glenoidalis

und die Einschränkung der Auswärtsdrehung im Schultergelenk. Die verschiedenen Operationsmethoden, die auf diesem Prinzip begründet sind können wahrscheinlich als gleichwertig angesehen werden. Der Verfasser berichtet 16 Fälle, einen Fall von habitueller Subluxation und 15 von Verrenkungsrezidiv, die nach Putti-Platt operiert wurden. Gemäss seiner Erfahrung kann die Methode empfohlen werden.

Zwei Fälle von habitueller subluxatio posterior zeigten ein gutes Ergebnis nach Behandlung mit einer umgekehrten Putti-Platt Methode, deren Technik beschrieben wird.

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