

A MODIFICATION OF NICOLA'S OPERATION IN RECURRENT DISLOCATION OF THE SHOULDER

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An extremely large number of surgical methods have been suggested for recurrent dislocation of the shoulder. According to *Watson-Jones* (1944) some 60 are on record and *Jakobsson* (1949) states that during this century the total number of operative methods suggested has exceeded the number of years which have elapsed. Judging by the abundant literature on the subject, the methods of *Eden-Hybbinette* and of *Bankart*, both of which produce good results in a high percentage of cases, have won most confidence. Despite the reliability of these two procedures they have not been able to oust other methods, many of which are still recommended by various workers in this field.

At the Orthopaedic Department, Hälsingborg, a modification of the Nicola method has been used since 1943. According to this modification, described in detail elsewhere (*Jerre* 1947), an incision is made from the acromioclavicular joint along the anterior margin of the deltoideus about 10 cm down the upper arm. The upper part of the cephalic vein is identified between the anterior border of the deltoideus and the pectoralis major. The space between these two muscles is divided by blunt dissection, the cephalic vein and the pectoralis major are pushed towards the median plane and the deltoideus laterally. The sulcus intertubercularis is located by rotation of the upper arm. The ligamentum transversum humeri, which covers this sulcus is divided, and the tendon of the caput longum bicipitis exposed. This tendon is dissected free far up the shoulder joint and a short distance down the upper arm. By strong outward rotation of the upper arm the tuberculum minus and the region medial to it are adjusted in the operative field. The subscapularis tendon, which is attached to the tuberculum minus and crista tuberculi minoris, is severed¹. A groove is gouged out immediately medial to the tuberculum minus. The dissected tendon of the caput longum bicipitis is shifted, without being divided, from its original position in the sulcus intertubercularis over the tuberculum

¹ See page 90.

minus down into the gouged groove, where it is fixed to the bone wall by a few silk and catgut sutures. The bone chips removed in the preparation of the groove are placed over the tendon to form a cover over the groove. The earlier divided tendon of the subscapularis is resutured. The deltoideus and pectoralis major are fastened together by a few catgut sutures, and after the skin has been sutured the arm is placed on an abduction splint with the upper arm at an angle of 30° before the frontal plane with both the upper arm and the lower arm in the horizontal plane. After 2-3 days' bed rest the patient is allowed to leave bed with the arm fixed to the abduction splint. Active movement is allowed about 14 days after the operation and, passive movement, massage and heat therapy may occasionally be instituted later.

This is certainly the same method as that referred to by *Camitz* in two publications. But his description of the method is not quite complete and (provided he refers to the same method as that described by the present writer) contains an obvious misprint. In 1943 *Camitz* wrote that he used a method: "which consists simply in the operative exposure of the joint, dissection of the long tendon of the biceps up to its origin at the tuberositas supraglenoidalis scapulae and so far down that the tendon can be drawn over the *tuberculum majus*² and fix it there in a groove at and under the tuberculum". In 1945 he again described his operative method and wrote: "The tendon of the long head of the biceps is dissected free right up to the tuberositas supraglenoidale scapulae. A groove is gouged *at the base of and under the tuberculum minus*³ so large that the biceps tendon can be placed into it. *Camitz* does not mention anything about the subscapularis tendon in either of these publications. In the opinion of the present writer this tendon is of great importance and is discussed in a later section.

During the years 1943 to 1954 thirty patients with recurrent dislocation of the shoulder were operated on by the method described above. In one of the patients the dislocation was bilateral.

Sex-distribution: Males 24, Females 6.

Average age at time of initial dislocation: 25.1 years.

Localization: Right shoulder 15. Left shoulder 16.

In the evaluation of the method the following case was excluded:

(Jn. No. 23311). At review 3 months after operation clinical and roentgenological examination revealed complete dislocation of the shoulder with the caput humeri located before the socket. Judging by the notes in the record sheet and by the information given by the patient, the dislocation had most probably existed since the operation, but, owing to a number of unfortunate circumstances, had escaped detection. After closed reduction under anesthesia, which was no easy matter, the

² Italicized by the present writer. *Camitz* surely means tuberculum minus.

³ Italicized by the present writer. *Camitz* surely means the same position of the groove as that described above by the present writer.

patient received the usual physical therapy. At review after a further 5 months, the position of the caput humeri in the cavitas glenoidalis was normal, but the range of rotation and abduction was severely limited. At review more than 4 years after the operation the patient stated that he had not had any recurrence or pain, but reported a certain stiffness and weakness of the joint. He also stated that he had not been able to do heavy land work until about 6 months after the operation and even now he was still handicapped a little by his shoulder. In this case, then, the less favourable result was due to faulty treatment and can hardly be ascribed to the operative method as such. Therefore this case was excluded. This left 30 operated shoulders.

All the patients were reviewed¹ with the exception of one who had died from an intercurrent disease 1 year and nine months after the operation. However, in this case the parents were able to give such detailed information that the case could be included. The average interval between the operation and the present clinical review was 5.0 years.

Of the 30 shoulders operated on, dislocation had recurred post-operatively 1 to 3 times in 4 patients and subluxation 4 times in one.

Case 2 (Jr. No. 34263). A foreman in heavy industry was operated on in February 1944, and the shoulder gave him no further trouble until August 1950 (6½ years after the operation) when maximal abduction of the arm—without trauma—caused a recurrence. He was unable to describe the rotational position of the arm at the time of the redislocation. The shoulder was reduced by a general practitioner. In 1953, while playing tennis, he noticed how the joint “almost but not completely slipped out of its socket again”. Since then his shoulder has given him no trouble.

Case 4 (Jr. No. 52319). An unskilled labourer, was operated on in December 1949 and his shoulder gave him no trouble until May 1953 (3½ years after the operation) when, while lifting himself between two large crates he felt a snap in the shoulder and severe pain. He stated that the shoulder had not been redislocated but “not far from it”. He experienced this again after a slight trauma in July 1954 and on two other occasions while sleeping in December 1954 and January 1955. Every time he felt intense pain radiating down the ulnar fingers for a day or so. The patient was reviewed by the writer personally in February 1955. It was observed that on one occasion 90° abduction and maximal outward rotation of the relaxed arm produced subluxation with certainty. The patient was reoperated on by another method in February 1955. The tendon of the subscapularis was of normal appearance. The tendon of the long head of the biceps still lay in the groove medial to the tuberculum minus, where it had been placed at the previous operation. It was covered completely with the tendon of the subscapularis. It was found to be intact and it glided in the sulcus intertubercularis with its normal smoothness. It lay well in the groove, because the latter was almost completely

¹ The receiving area of the orthopaedic department, Hålsingborg, is large and therefore owing to the long distances between the patients' homes and the hospital, the investigation was done partly on the basis of questionnaires.

covered by new-formed bone and in no phase of movement of the shoulder did it show any tendency to dislocation.

Case 17 (Jr. No. 43180). The patient was a turner who was operated on in November 1950. He felt well until the summer of 1953 (2½ years after the operation) when the shoulder was redislocated when he was playing on the beach. He sustained another recurrence while doing gymnastics in the autumn of 1954. On both occasions the joint slipped back into its normal position by itself. Since the last recurrence he had had mild pain when lifting heavy things and sometimes slight aching pain in the joint, especially when he happened to lie with the shoulder in an unusual position.

Case 23 (Jr. No. 65216). A plumber, operated on in February, 1953, was symptom-free until October 1954 (1½ years after the operation), when he experienced a relaxation without any known trauma. This occurred again in January 1955 likewise without any trauma. On both occasions the shoulder was reduced by a general practitioner. He underwent an operation by the present writer by another method in April 1955. It was then observed that the distal half of the subscapularis tendon had retracted so much that it could no longer be found. The proximal half was of normal appearance. The tendon of the long head of the biceps was situated medial to the tuberculum minus in the groove at the previous operation. This groove was, however, exceptionally short and corresponded in length only to the distal retracted half of the subscapularis tendon. The biceps tendon was of normal appearance and glided normally. Proximal to the groove the biceps tendon over the intact proximal half of the subscapularis tendon (which was thus not divided at the previous operation). At operation the writer tried to produce a redislocation of the biceps tendon by repeated strong abductions and outward rotation of the upper arm, but this failed. This does not, however, exclude the possibility that the two redislocations of the shoulder that had occurred after the first operation may nevertheless have been due to a lateral displacement of the biceps tendon on those occasions. This possibility should not be under-estimated, since the groove was so short and since the biceps tendon was not covered by the subscapularis tendon.

Case 24 (Jr. No. 65094). The patient was a student. He underwent operation on March 1953. He felt well until August 1954 (1½ years after the operation) when a relaxation occurred during sleep. The relaxation was reduced by a general practitioner. The shoulder redislocated on two later occasions without known trauma. Then the patient reduced the joint himself. Between the dislocations he had slight aching pain, especially when the weather changed.

These 5 cases were carefully investigated for any possible common pre-operative, clinical or roentgenological factor, which might be of importance in accounting for the failure of the operation. But these cases did not appear to differ in any particular way from the rest. Neither did these patients differ from the others regarding the strain placed on the shoulder by their occupations, hobbies, sport or the like after operation.

Of the remaining 25 patients, 2 reported a feeling of some insecurity

in the shoulder in certain positions. This was, however, so insignificant that it did not prevent one of them from doing gymnastics and the other, an army air pilot, reported that he was able to carry on with his work just as well as before the initial dislocation. Some patients reported occasional slight aching pain, particularly after strenuous physical exertion and with a change of the weather, but the aching pain was never more than very slight. In many of the patients examined personally by the writer outward rotation was slightly limited. But in none of these or those investigated by questionnaires was the limitation of the range of movement of the shoulder of practical importance. None were obliged to change their occupation and practically all said that they could manage their work just as well as before the initial dislocation.

The 30 cases had been operated on by 5 different surgeons.

Surgeon A	16 operations	— 3 recurrences	— 0 subluxation
Surgeon B	9 operations	— 0 recurrences	— 0 subluxation
Surgeon C	2 operations	— 0 recurrences	— 1 subluxation
Surgeon D	2 operations	— 1 recurrences	— 0 subluxation
Surgeon E	1 operations	— 0 recurrences	— 0 subluxation

In one respect the operative technique was not uniform, namely, in the subscapularis tendon. One of the surgeons (A) divided this tendon just at its attachment on the tuberculum minus and crista tuberculi minoris. After the groove had been gouged before the tuberculum minus and the tendon of the long head of the biceps had been placed into it, he fixed the divided subscapularis tendon to its original attachment with a pair of catgut sutures. This surgeon did not attach much importance to the subscapularis tendon for the results of the operation and therefore did not pay much attention to the resuturing of the tendon. Surgeon B placed three stay sutures through the subscapularis tendon and the underlying joint capsule in a row parallel to the tuberculum minus and crista tuberculi minoris about 1.5 cm. from it. Not until after this had been done did he cut across the subscapularis tendon about 1 cm. medial to the tuberculum minus and crista tuberculi minoris. After the long head of the biceps tendon had been placed into the newly made groove the subscapularis tendon was carefully resutured with about 1 cm. duplication. The purpose of this procedure was to secure a reliable healing of the subscapularis tendon and thereby surely prevent the re-dislocation of the tendon of the long head of the biceps into its original position. However, this results in an unintentional shortening of the subscapularis tendon by about 1 cm. That such shortening might be of great importance in the treatment of

recurrent dislocation was recently stressed by *Severin* (1954), and it is included as an important phase in the operative technique of *Matti* (1936) and *Putti Platt*, described by *Osmond Clarke* (1948).

The interval between the operation and the review was on the average 6.3 years for A's cases as against only 3.2 for B's. One might therefore a priori expect a larger number of recurrences in A's series, because as pointed out by *Watson-Jones*, for example, and as is also apparent from the present clinical review, dislocations are capable of occurring not only soon but also many years after operation. This material is admittedly too small to permit any valid conclusions about the importance of the technic concerning the subscapularis, but the results of the investigations may suggest a possible way of obtaining better results.

Review of the patients operated on by the above described modification of Nicola's method thus showed good results in 25 cases and recurrent dislocation or subluxation in 5 of 30 (16.7 per cent).

In recent years Nicola's operation for recurrent dislocation of the shoulder has been severely criticized. *Watson-Jones* reported recurrences in 5 (28 per cent) of 18 cases. In 4 of these cases the patients were submitted to an operation by another method and in all of them it was found that the cause of the relaxation was a rupture of the tendon of the long head of the biceps. Nicola's operation, which is much less formidable than Bankart's, for example, can, however, according to *Watson-Jones*, be used on patients who lead a sedentary life. This view is shared by *Jakobsson*, who found recurrences in 3 (38 per cent) of 8 cases. *Adams* (1948) who reported recurrences in 21 (36 per cent) of 59 cases, claims that Nicola's operation is seldom if ever indicated.

It is apparent that the results obtained in the present material were somewhat better than those described above and, theoretically, it must be an advantage not to divide the tendon of the long head of the biceps. That this tendon according to Nicola's method must first be divided and then re-sutured must be a disadvantage, as has also been stressed by *Janek* (1940), *Hubin* (1946) and by *Watson Jones*.

As far as the end results of treatment are concerned, those obtained by the modification of Nicola's method described in the foregoing compare unfavourably with those obtained by *Eden-Hybbinette's* and *Bankart's* methods. *Jakobsson* analysed the results reported by different surgeons and found relaxation in only 1.5 per cent of 200 cases treated by the *Eden-Hybbinette* method and in 2.2 per cent of 134 cases operated on by the method of *Bankart*. *Palmer* and *Widén* (1948) reported recurrences in 4 cases out of 60 (6.7 per cent) and *Jakobsson* none in 43 cases operated on by the *Eden-Hybbinette* method.

Both *Eden-Hybbinette's* and *Bankart's* methods are, however, extensive and technically difficult. *Watson Jones* states, for example, that *Nicola's* operation is a much less formidable undertaking than *Bankart's* operation and according to *Jakobsson* different authors have claimed that "*Eden-Hybbinette's* method is technically difficult; there is risk of infection through the intraarticular manipulations and above all arthrosis deformans is likely to develop after the intra-articular bonegrafting". In a surgical series of 39 cases operated on by the method of *Eden-Hybbinette Dahlgren* (1936) reported one case of death from pulmonary embolism, and *Jakobsson* reported postoperative complications in 4 cases of 43 namely; stiffness requiring mobilisation 2 months after operation in one case; pneumonia, empyema and ankylosis in one; pneumonia and stiffness which made mobilisation necessary in one case and, finally, septic arthritis with consequent ankylosis in one.

The above described modification of *Nicola's* operation is very simple and seldom requires more than 20 minutes. The operation is not of such a type reasonably liable to give later arthrosis deformans changes in the joint and no postoperative complications have occurred.

Whether a major and technically more difficult operation involving more risks but promising better prospects of permanent relief is indicated as initial treatment of recurrent dislocation of the shoulder joint in every single case, or whether it is advisable first to try a much slighter and technically much simpler and less risky operation and reserve the major intervention for a relatively small number of cases not given relief by the simpler minor operation, must be left to the discretion of the individual surgeon. In our opinion we are justified in using this simpler and less risky operation as a routine method in our Department, especially as it is hoped that since we now generally use the above mentioned duplication and shortening of the subscapularis tendon the frequency of recurrences will now diminish.

SUMMARY

A modification of *Nicola's* operation for recurrent dislocation of the shoulder joint is described.

In 30 operated cases recurrent post-operative dislocation or subluxation occurred in 5 (16.7 per cent).

Despite the relatively high frequency of recurrences the method is regarded as valuable because the operation is so small, so simple and so risk-free.

RESUME

Description d'une modification de l'opération par la méthode Nicola pour la dislocation récurrente de l'articulation de l'épaule.

Dans 30 cas opérés, il s'est produit une dislocation ou une subluxation récidivante post-opératoire chez 5 malades (16.7 %).

Malgré les nombreux cas de récurrence, cette méthode est considérée comme ayant de la valeur du fait que l'opération est limitée, simple et ne présente absolument aucun risque.

ZUSAMMENFASSUNG

Eine Modifikation der Operation nach Nicola für die habituelle Schulterverrenkung wird beschrieben.

Von 30 operierten Fällen zeigten 5 (16.7 %) eine wiederauftretende Luxation oder Subluxation.

Trotz der verhältnismässig grossen Häufigkeit von Rezidiven wird die Methode als eine wertvolle angesehen, da der Eingriff so klein, einfach und gefahrlos ist.

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