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Recurrent dislocation of the shoulder

The Alvik modification of the Eden-Hybinette operation

We re-examined 31 patients treated with Alvik's modification of the Eden-Hybbinette operation for recurrent anterior dislocation of the shoulder joint after 5 (2–14) years. Two patients had been re-operated because of instability. Muscular strength and joint motion were only insignificantly affected. Only one patient did not rate the results as good.
The rate of recurrences was comparable to other methods, but the frequency of reoperations was low, as no complications occurred from fixation of the bone block.

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In the Eden-Hybbinette operation (Eden 1918, Hybbinette 1932), an iliac crest bone graft is inserted intra-articularly under the remains of the glenoid labrum and the periosteum with a part extending outside the capsule and without any additional fixation. Alvik (1951) modified this technique by reconstruction of the anterior lip of the glenoid by means of a well-fixed bone graft placed in a preformed wedge-shaped groove in the neck of the scapula.

We wanted to present our results and to pass on our experience with this method; no other results of this procedure have been published since Said & Medbø (1970).

Patients and methods

During the period 1970 to 1982, 33 patients (8 females and 25 males) were treated by Alvik's modification of the Eden-Hybbinette procedure. The median age was 24 (17–66) years. In 19 cases the left shoulder and in 14 cases the right shoulder was affected. Twenty-one of the dislocations occurred on the non-dominant side.

Three patients suffered from severely disabling subluxations, and 30 patients had experienced at least three anterior dislocations. In all cases the diagnosis was verified by radiographs or examination in general anaesthesia. Twenty-five primary dislocations or subluxations were caused by major traumas, and six dislocations were "spontaneous".

Two patients, both sailors, were lost to follow-up, but no redislocations had occurred after 5 and 12 months, respectively.

At a median follow-up of 5 (2–14) years, 28 of the 31 patients were examined by the authors. Three patients answered a questionnaire by telephone.

Muscle strength was registered in kiloponds for flexion, extension, inward rotation and outward rotation, using a strain-gauge-dynamometer. The shoulder was held in neutral position and the elbow joint at a right angle. The results are given as the quotient of strength between the operated and the non-operated shoulder.

The operation was performed as described by Said & Medbø (1970) (Figure 1 and 2). Through an anterior approach the deltoid muscle was divided 1 cm lateral to the deltoideopectoral groove. The biceps and coracobrachialis were retracted medially and the subscapularis tendon was transected 1 cm from its insertion. By use of an osteotome, a 2-cm-long, 1.5-cm-deep and 0.2–0.5-cm-wide groove was made through the capsule into the anterior aspect of the scapular neck 0.5 cm from the glenoid edge. An iliac crest bone graft measuring 2.5 × 2.5 cm was jammed into the groove with its cortical side and the convex crest facing laterally, thus expanding the gleniod cavity anteriorly by about 1 cm (Figure 1). The-

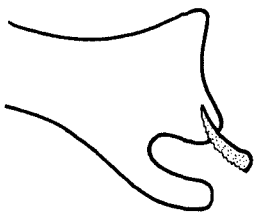

Figure 1. The placement of an iliac crest bone graft on the anterior aspect of the scapular neck in Alvik's modification. The bone graft includes one cortical side as well as half of the iliac crest.

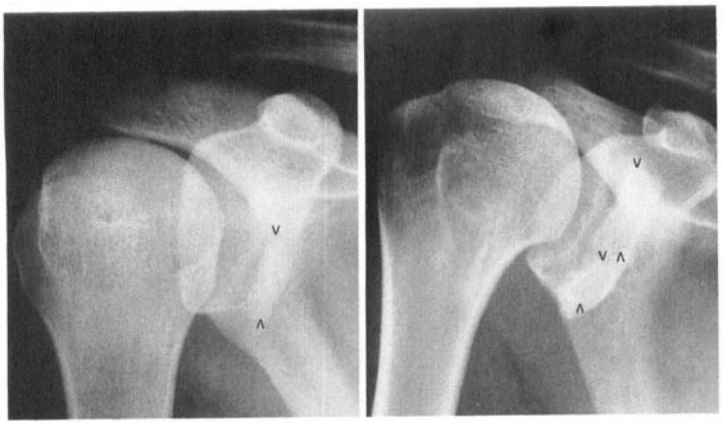

Figure 2. Left. Postoperative radiograph with bone graft visible just in front of the glenoid.
Figure 3. Radiograph 11 years after reoperation. Both the primary, too low situated and the second higher placed bone grafts are clearly visible.

subscapularis tendon and the capsule were tightened and sutured and the wound closed. Postoperatively, the arm was protected in a Velpeau bandage for 6 weeks, followed by 2–3 weeks of restricted outward rotation.

Results

At the radiographic follow-up of 29 patients, no grafts were dislocated, 19 grafts were slightly reduced in size and in one case the bone graft was totally resolved. All but two bone grafts (see below) were situated within 0.5 cm of the glenoid rim.

Subluxations occurred in two patients: in one patients on a few occasions playing soccer (goal-keeper), while the other patient suffered from disabling subluxations. Radiographs showed the bone graft in this case to be situated rather low and too far from the glenoid rim.

One of our first patients was reoperated after 2 years because of spontaneous redislocation. The bone graft was found to be situated much too low and probably too far from the glenoid rim. After insertion of a new bone graft cranial to the first one, there were no further recurrences (Figure 3).

One patient redislocated after a violent pull causing abduction and outward-rotation of the arm in an occupational accident. He was reoperated abroad and was interviewed only by telephone. Another patient experienced one single redislocation caused by very violent backward twisting of the arm during acrobatic parachuting. Two years later there had been no further dislocations and the patient works and parachutes without restrictions.

The patients' own assessements of the results were good in 30 cases. The patient with disabling subluxations was the only one who was dissatisfied, although he found the shoulder improved. Two patients complained of mild intermittent pain, slight reduction of strength, and in one case reduced mobility of the shoulder joint.

None of the patients had any tenderness or pain on movement. All patients could reach the back of their neck, but four patients were un-

Table 1. Postoperative difference in shoulder joint motion (degrees) between the operated and non-operated side

Direction	Median	Range	No. > 10° reduction
Flexion	0	−35–+20	5
Extension	0	−10–+20	0
Abduction	2.5	−20– +5	4
Inward rotation	0	−25– 0	2
Outward rotation	10	−50– +5	11

Table 2. Ratio of strength between operated and non-operated shoulder

Direction	Median	Range	No. > 20% reduction
Flexion	0.95	0.71–1.25	5
Extension	1.02	0.65–1.19	1
Inward rotation	1.00	0.50–1.25	3
Outward rotation	0.93	0.27–1.47	5

able to elevate the arm to a fully vertical position. A combined inward-rotation-extension was assessed as the difference between the spinal processes reached by the operated and the healthy arm. The median difference was only 1 (–2 to 10) spinal process.

The mobility of the glenohumeral joint was assessed with a fixed scapula according to "Joint Motion" (1965). Outward rotation was reduced by a median 10 degrees. The reduction in all other directions was negligible (Table 1).

Mild local muscular atrophy without relation to strength was observed around the scar in eight shoulders. Moderate variations were observed in muscular strength, with no differences between the dominant and the non-dominant side. Median reductions of 5 and 7 per cent in flexion and outward-rotation, respectively, were found. The median strength in extension and inward-rotation was not reduced (Table 2).

Apart from one case of superficial wound infection no operative complications occurred. None of the patients had any discomfort from the donor area at the iliac crest.

Discussion

The Bankart operation aims at eliminating the so-called Bankart lesion. According to Hovelius et al. (1979), the mean reduction of outward rotation was 16 degrees; however, Rowe et al. (1978) have presented a large series of patients, 69 per cent of whom had regained normal outward rotation. All patients not operated by Rowe or in his presence were excluded from that series. Furthermore, it was not indicated whether joint motion was assessed with a free or a fixed scapula. The rate of recurrence after the Bankart operation was up to 10 per cent in long-term studies (Morrey & Janes 1976).

Hovelius et al. (1979) have presented 36 percent recurrences in patients younger than 26 years after a modified Putti-Platt operation, making his method unacceptable, especially for young patients.

During the last decade the Bristow-Latarjet (or modified Bristow) Procedure has gained widespread popularity. The main principle of bone block transfer is the same as in the Alvik modification of the Eden-Hybbinette operation. The fixation of the coracoid by means of a screw, however, has led to several problems. High incidences of non-union, loosening and fracture of the screw requiring reoperation have been reported. There have been few redislocations (0–6 per cent), but the total number of reoperations caused by redislocations or complications reached about 10 per cent (May 1970, Nielsen & Nielsen 1982, Hovelius et al. 1983). The major problems with the original Eden-Hybbinette operation are loosening and resorption of the bone block, as well as secondary osteoarthritis (Øster 1969, Lindholm 1974).

In our series, displacement of the bone graft was prevented by the solid fixation of the bone block. Total resorption of the graft, seen in one case only, was not associated with redislocations or subluxations.

Strength assessements have only been performed in a few series. We observed reduction of strength in only a few cases. These findings compare favourably with the results after the Bristow-Latarjet operation (Hovelius et al. 1983).

One case of spontaneous redislocation and one case of subluxation were caused by improper positioning of the bone block, before we had gained adequate experience. The two other redislocations were both caused by violent traumas after more than 8 years of normal shoulder function. We do not consider them as failures.

Said & Medbø (1970) reported no recurrences in their series of 21 patients. An average reduction of outward-rotation of 12 degrees was found. Bodey & Denham (1983) have published a method very similar to Alvik's modification. The only difference was a partial coracoid osteotomia to gain access to the scapular neck where the capsule and the subscapularis were left unsutured. In a long-term follow-up of 16 patients no recurrences were found. Joint motion was similar to that in the present series.

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