

# Bone-ligament transfer of coracoacromial ligament for acromioclavicular dislocation

## A new fixation method used in 6 cases

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We treated 6 grade III acromioclavicular injuries with a new fixation method using a bone-ligament transfer of the coracoacromial ligament into a clavicular

tunnel. After an average of 16 months, function and cosmesis were excellent in all patients.

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Repair of a grade III dislocated acromioclavicular joint (Tossy et al. 1963) has been accomplished by a variety of methods, including transfer of a ligament and the use of screws and wires (Bosworth 1941, Urist 1946, Neviaser 1952, Weaver and Dunn 1972, Hessmann et al. 1995). The coracoacromial ligament has been used in various ways to restore the position of the clavicle (Weaver and Dunn 1972, Kawabe et al. 1984, Shoji et al. 1986). We present the outcome of a new method of bone-ligament transfer of the coracoacromial ligament for treatment of grade III acromioclavicular dislocation.

## Patients and methods

We treated 6 patients for a chronic Tossy grade III dislocation with the use of a new method consisting of bone ligament transfer of the coracoacromial liga-

ment (Table). The mean age was 31 years, the mean follow-up period was 16 months.

All shoulders were painful during motion but no signs of acromioclavicular joint arthrosis were seen. Complete dislocation of the clavicle was verified by clinical and radiographic examinations. The operation was performed more than 3 months after injury, because closed treatment failed. The operation was done in a beach chair position. The anterior part of the acromion was exposed. In all cases, disruption of the coracoclavicular and acromioclavicular ligaments was confirmed at surgery. In only one case was it necessary to remove the joint disc because it was totally ruptured. The coracoacromial ligament (Figure 1) and a bone block were prepared with a chisel. At the position of origin of the ruptured coracoclavicular ligaments, a 6-mm diameter tunnel through the lateral end of the clavicle was drilled towards the coracoid process. The bone block (12 mm × 6 mm × 6 mm) was

6 cases of chronic Tossy III dislocation and results of bone-ligament transfer

| A | B | C  | D | E  | F          | G  | H         | I    | J       | K      | L   | M                 |
|---|---|----|---|----|------------|----|-----------|------|---------|--------|-----|-------------------|
| 1 | F | 18 | R | 6  | Handball   | 24 | excellent | none | neg     | none   | yes | good              |
| 2 | M | 51 | R | 16 | Cycling    | 21 | excellent | none | neg/pos | slight | yes | fair <sup>a</sup> |
| 3 | M | 22 | R | 6  | Cycling    | 16 | excellent | none | neg     | none   | yes | good              |
| 4 | M | 43 | R | 4  | Equestrian | 13 | excellent | none | neg     | none   | yes | good              |
| 5 | M | 24 | R | 3  | Football   | 11 | excellent | none | neg     | none   | yes | good              |
| 6 | M | 26 | L | 12 | Biking     | 10 | excellent | none | neg     | none   | yes | good              |

A Case

B Sex

C Age, years

D Side

E Interval trauma/surg., months

F Type of sports trauma

G Follow-up, months

H Mobility, elevation

I Pain during motion

J AC test, horizontal

K Deformity, radiographic

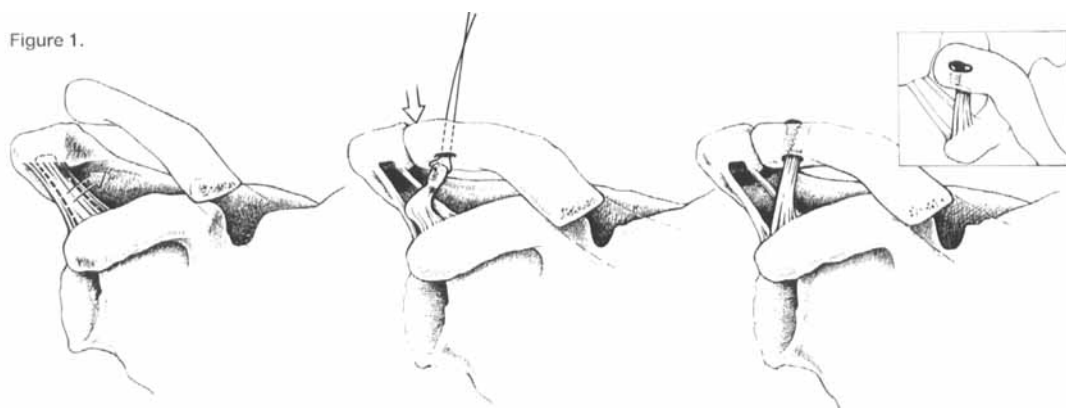
L Sports, regular

M Outcome. R+P Score.

Clinical results according to the classification of Rosenorn and Pedersen (1974).

<sup>a</sup> Longest interval between trauma and surgery.

Figure 1.

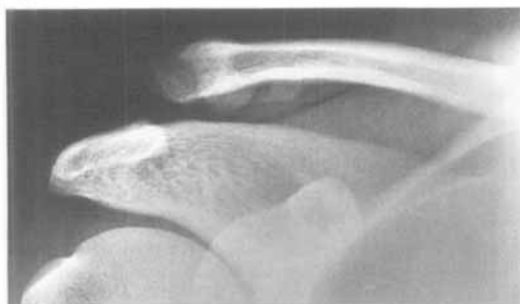


The CA ligament transplant together with a bone block is separated from the acromion.

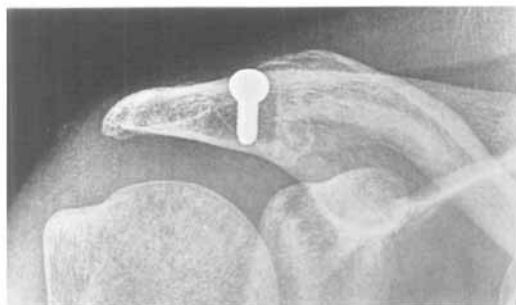
By means of the suture, the bone block is pulled through the clavicular tunnel.

The bone block is positioned in the clavicular tunnel and secured by an interference screw.

Figure 2. Case 1.



Preoperatively.



Immediately postoperatively.



At follow-up after 2 years. Total reposition of the complete dislocated joint. The minimal ossification caused no clinical symptoms.

pulled into the clavicular tunnel with a suture and was secured by placement of an interference screw (4.5 mm × 18 mm) from the cranial direction. The shoulder joint was fixed with a sling for 14 days. Isometric exercises were begun on the first postoperative day; 2 weeks postoperatively 90° of abduction was encouraged. Full range of motion was allowed 6 weeks postoperatively. The screw was routinely removed under local anesthesia 8 weeks after surgery.

## Results

All dislocations were restored completely and, at the time of the follow-up after a median of 16 (10–24) months, all patients had pain-free shoulder motion (Table). No patient developed a tendency towards subluxation of the shoulder joint. Cosmetically, a symmetrical appearance of the shoulder girdle without bony prominence was achieved in each case.

Follow-up stress radiographs showed no further dislocation of the acromioclavicular joint in 5 cases (Figure 2). In the case with a removed discus, slight subluxation of 1.5 mm was still present postoperatively on radiographic examination. A minor focal calcification in the area of reconstruction was seen in 2 cases. No arthrosis of the acromioclavicular joint was detected. All patients returned to their preinjury activities.

## Discussion

The coracoacromial ligament transfer is particularly indicated for preservation of strength and full range of motion of the shoulder. The outcome after grade III

dislocations has been described by several authors: Karlsson et al. (1986) noted 94% good results in his series, Weaver and Dunn (1972) reported 11 good results in 15 cases. The bone block transfer into a vertical clavicular tunnel temporarily fixed with a screw guarantees a stable fixation similar to the well established use of patella block tendon transfer in anterior cruciate ligament replacement, so that no other temporary splintage with screw or wire is necessary (Kawabe et al. 1984). Bosworth's method (1941) of supportive fixation induced calcification. Urist (1946) reported ossification in approximately half of his patients; some detachment of the periosteum by supportive fixation may be involved. Because of motion occurring at the acromioclavicular joint in association with shoulder motion, reconstruction should not aim at rigid fixation. Shoji et al. (1986) supplemented the coracoacromial ligament fixation with resection of the lateral end of the clavicle. However, we believe that such resection has negative consequences (Eskola et al. 1996).

In our series, reposition could be performed without resection of the lateral clavicle. Since the ingrowth of the bone block into a clavicular tunnel does not exceed 6 mm in diameter, stress fracture of the clavicle should not occur. Moreover, a bone block of this size does not appear to be a risk for a fracture or osteophyte formation at the acromion. The direction of the transferred coracoacromial ligament from the processus coracoideus to the insertion of the coracoclavicular ligaments will be nearly the same as that of the coracoclavicular ligaments. Restoration of the normal anatomic position of the clavicle with a mobile acromioclavicular joint resulted in asymptomatic shoulder function in all patients of our series.

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