Avulsion of subscapularis muscle tendon leading to recurrent anterior dislocation of the shoulder

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Fifteen patients, ten males and five females, were identified as having recurrent anterior dislocation of the shoulder after trauma due to avulsion of the subscapularis muscle tendon from its humeral attachment. The usual mechanism of injury was traumatic hyperextension or external rotation of the abducted arm. The right arm was involved in 12 patients and the left arm in only three patients.

The presenting symptoms were pain and weakness of the affected shoulder. Physical examination showed reduction of the passive range of joint movement and tenderness on the anterior aspect at the shoulder at the level of the intertubercular groove and a reduced range of internal rotation of the shoulder. The diagnosis was suspected from the history, physical examination and radiographs and was finally confirmed by surgical exploration.

The ages of the patients ranged from 20 to 46 years (mean 33 years). The dislocation was found to be due to a complete tear of the subscapularis tendon (12 patients) and partial tears in three patients, without fracture of the lesser tuberosity in any of the patients.
The repair consisted of mobilisation of the subscapularis muscle and its reinsertion into an osseous trough created in the humerus. The shoulder was splinted for six weeks in a *Velpeau* bandage before mobilisation and physiotherapy. In two patients the subscapularis tendon was frayed and could not take sutures and therefore an allograft of tendo Achilles was used.

The patients have been followed up for an average of three years postoperatively. All have acceptable functional results but a reduced range of external rotation.

Introduction

In 1834, Smith reported a case in which he found a tear of the subscapularis tendon from the lessor tuberosity with anterior dislocation of the shoulder while all the other muscles were intact[1]. Among the rotator cuff tears, isolated subscapularis tendon tears are rare[2,3] and tend to occur in young active individuals. They usually give a history of trauma and present with pain followed by functional disability. The dislocation is easily reduced by the patient or medical personnel but keeps recurring thereafter either spontaneously, after minor trauma, or any activity involved abduction and external rotation. The actual tear is difficult to diagnose clinically[4] and needs further confirmatory procedures by ultrasound, computerised tomographic scanning, magnetic resonance imaging or arthroscopy, if these facilities are available. In our circumstances we depend mainly on history and physical examination and confirm the diagnosis by surgical exploration.

Patients and methods

A series of 15 consecutive patients, seen and treated by the author between 1988 and 1993 is reported.

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The history, physical findings, radiographs and the operations done were analyzed.

OPERATIVE TECHNIQUE

Under general anaesthesia, an incision was made along the deltoid groove from the clavicle distally for about 10cm. the pectoralis major, the deltoid, the coracobrachialis and biceps were retracted thereby exposing the subscapularis muscle. The subscapularis muscle was found to be torn from its attachment to the humerus and retracted medially (Fig 1 a & b). The capsule of the shoulder joint was then exposed and movements done to verify its strength. The glenoid was palpated to rule out glenoid tears, while the humeral head was palpated to rule out a Hill-Sachs lesion. The biceps tendon was freed from its bicipital groove and retracted medially.

A sharp osteotome or oscillating saw was used to cut a groove in the humerus about 1cm lateral to the bicipital groove 4cm long and 1cm deep. An oblique tunnel was made about 1cm lateral to this groove so as to connect with the groove. The torn retracted subscapularis tendon was then freed and drawn under the biceps tendon into the groove. Here it was fixed to the bone with mattress sutures which were passed through the tunnel created in the bone, over the bridge of the bone and again fixed to the tendon and tied (Fig 2). During the last step the humerus was kept in internal rotation so that the subscapularis tendon firmly reinforced the capsule of the shoulder joint in this area. If the capsule was loose this was also shortened as in the Putti-Platt operation[6]. In two patients, a tendon allograft from the tendo Achilles was applied because the subscapularis tendon was frayed and could not stretch enough or take sutures.

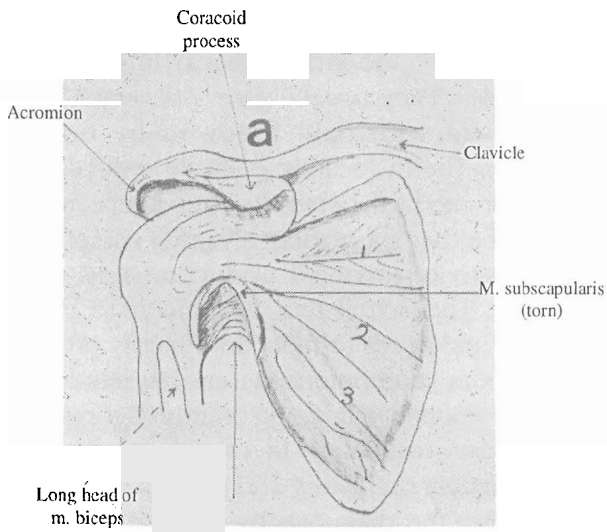

FIG 1, a & b *Operative findings showing tears of the subscapularis muscle tendon*

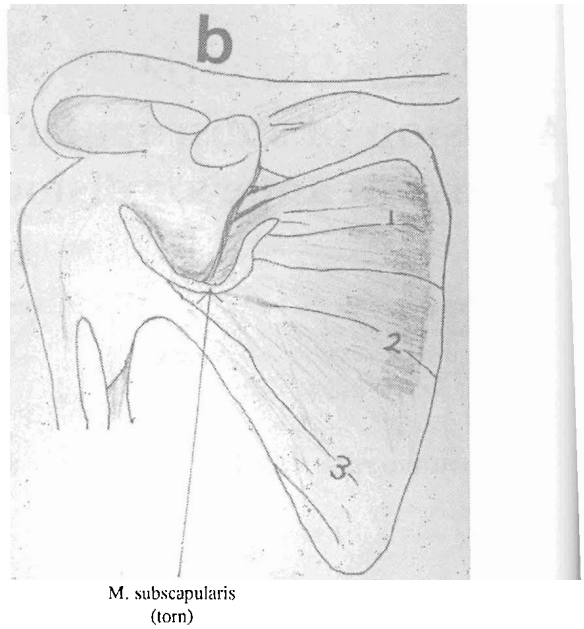

FIG 1b *Operative findings showing tears of the subscapularis muscle tendon*

The arm was splinted with a *Velpeau* bandage for six weeks. Exercises to strengthen the internal rotator muscles were started at six weeks.

Results

The patient's ages ranged from 20 to 46 years (mean 33 years). There were ten men and five women

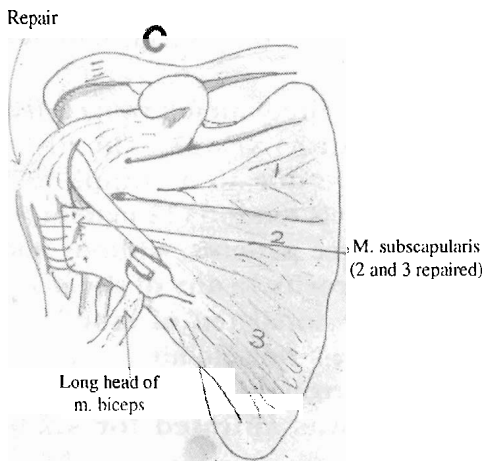

FIG 2 *The completed repair*

(M:F;2:1). The right arm was affected in 12 patients and the left in three. At operation, 13 patients had complete tears while two had partial tears involving the bigger portion of the upper side of the subscapularis tendon.

The causes of the injuries were sports, road traffic accidents and grand mal epilepsy (Table I)

Two patients had surgical complications. One developed osteomyelitis of the humerus and in the other the operation was a failure in that it failed to prevent recurrent dislocation. The overall function

TABLE I *Causes of subscapularis tendon tears*

Cause	*Patients*
Sports	11
Volleyball	3
Football	3
Rugby	2
Lawn tennis	3
Road traffic accidents	2
Grand mal epilepsy	2
TOTAL	15

was acceptable with no recurrence in fourteen patients but all had a reduced range of external rotation.

Discussion

Apparently subscapularis tendon tears are not a common cause of anterior dislocation of the shoulder. I have seen only 15 patients with this condition during a period of six years. This is further supported by the fact that this is not seen during Putti-Platt operations[6] which are commonly performed in our hospitals in Kenya[5]. Published data also report that among rotator cuff tears subscapularis tendon tears are rare[2,3]. This series shows subscapularis tendon tears mainly occur in young athletic individuals (six patients: 67%.) All of them gave a history of trauma especially when the arm was abducted and externally rotated. Similar reports have been published by others[7,8].

Subscapularis tendon tears are usually difficult to diagnose by clinical examination alone[4] and definitive diagnosis needs further confirmation by investigations such as ultrasound[9], computerised tomography (CT) scanning[10], magnetic resonance imaging[11,12] and arthroscopy[4], where such facilities are available. We depended mainly on the history, careful physical examination, plain radiographs (to rule out Hill-Sach's lesions) and confirmed the diagnosis by surgical exploration. At exploration, other causes of recurrent dislocation are looked for by examination of the capsule for undue laxity and palpation of the humeral head of the upper anterior quadrant to rule out a Hill-Sach's lesion. This typical defect of the articular surface of the humeral head at the upper outer quadrant is commonly seen in cases of recurrent anterior dislocation of the shoulder[5]. We also palpate the labrum glenoidale to rule out a Bankart's lesion[13].

The failure of our treatment in one patient in whom the dislocation recurred, suggests that it is advisable to shorten the capsule as is done in the Putti-Platt operation[6] or to suture the capsule to the glenoid rim as is done in Bankart's operation[13] in addition to the repair of the subscapularis tendon.

The patient who developed sepsis had immunosuppression. We suggest that patients going for bony surgery should be screened for immune status after informed consent and counselling.

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