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*CASE REPORT*

# Chronic rupture of the pectoralis major muscle : Report of two cases

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**Rupture of the pectoralis major muscle is relatively rare. The authors present two cases of chronic rupture in which direct suturing was not possible ; reconstruction was possible using a bone-patellar tendon autograft. They conclude that this surgical technique may be useful in some cases of chronic ruptures of the pectoralis major muscle in which direct tendon suturing is impossible.**

## INTRODUCTION

Rupture of the pectoralis major muscle is relatively rare. In most reported cases of surgical treatment, the latter was applied to acute ruptures and direct suturing of the tendon was performed (*2-7, 9, 14*). We report two cases of chronic rupture which were seen several months after rupture ; direct suturing was not possible and reconstruction was made using a bone-patellar tendon autograft.

## CASE 1

A 20-year-old male reported shoulder pain and functional impairment after strenuous internal rotation of the right arm during weightlifting exercises. Partial rupture of the pectoralis major muscle was diagnosed, and treated by immobilisation and analgesics for three weeks. The patient subsequently underwent physiotherapy for two months. Nine months later, he was referred to our unit complaining of moderate pain and weakness in the left shoulder, which was preventing him from working or engaging in sporting activities. On examination, the patient displayed deltopectoral deformity and weakness on abduction of the left shoulder, with pain on resisted abduction. Ultrasonography and NMR imaging revealed a rupture of the pectoralis major and retraction of the muscle belly (fig 1). Surgery was performed ten months after the original injury was sustained : an incision was made along the deltopectoral interval, and complete rupture of the musculotendinous junction was observed, together with fibrosis and considerable retraction of the muscle belly ; direct suture was not possible. The arm was placed at 50-60º abduction, and a bone-patellar tendon autograft procured from the left knee was performed (fig 2, 3) ; the patellar tendon was sutured to the musculotendinous junction and the bone fragment was inserted into the humerus by means of a 4.5-mm cortical screw with a washer (fig 4). The arm was immobilised for four weeks, and the patient subsequently underwent physiotherapy for two and a half months. Six months later, he was able to resume

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*Fig. 1.* — T1-weighted coronal image of the anterior thoracic region. Rupture at the insertion of the left pectoralis major muscle with muscle retraction and atrophy.

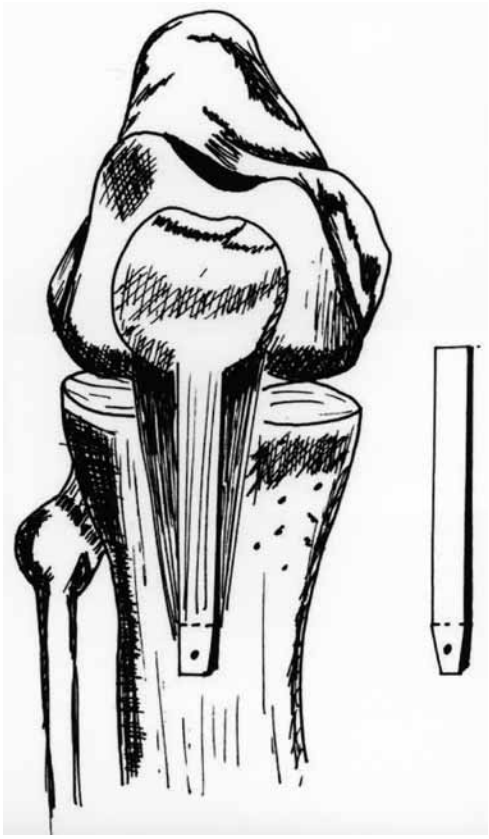

*Fig. 2.* — Diagram showing the portion of patellar tendon used as an autograft for reconstructing the ruptured muscle.

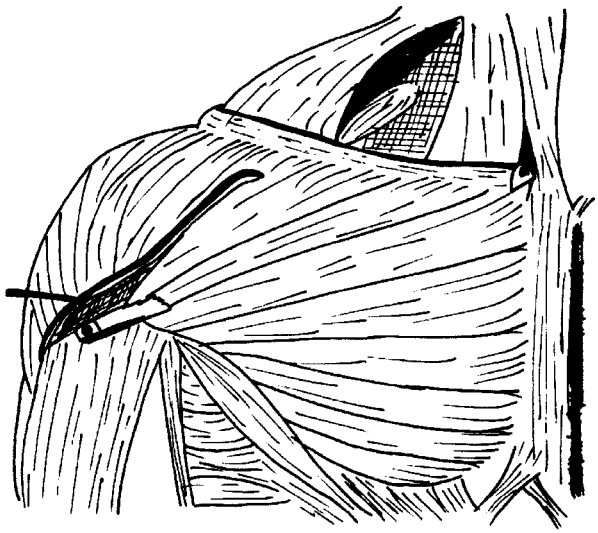

*Fig. 3.* — Diagram showing placement of the bone-patellar tendon graft used for lengthening and reinserting the pectoralis major muscle.

*Fig. 4.* — Postoperative AP radiograph, showing humeral attachement of the autologous graft.

sporting activities. At follow-up one year later, the patient scored well according to the McEntire functional classification (table I) and the cosmetic results was satisfactory (fig 5).

Table I. — McEntire functional clasification

| Results | Joint range | Pain/Muscle deficit |
|---|---|---|
| Excellent | Normal | None |
| Good | Normal | Mild |
| Fair | Diminished | Moderate/Marked weakness |
| Poor | Significantly diminished | Severe pain and loss of strength |

## CASE 2

A 20-year-old male reported shoulder pain and functional impairment after strenuous internal rotation and flexion of the left arm during weightlifting exercises. Partial rupture of the pectoralis major muscle was diagnosed. The arm was immobilised for four weeks and the patient was treated wth NSAIDs, subsequently undergoing physiotherapy for two months. Ten months later, he was referred to our unit complaining of severe pain in the left shoulder when working or engaging in sporting activities. On examination, the patient displayed moderate deformity of the anterior region of the right shoulder ; resisted abduction of the arm caused pain. NMR imaging led to a diagnosis of rupture of the pectoralis major tendon. Surgery was performed twelve months after the injury : findings were similar to those reported for Case 1, and a similar bone-patellar tendon autograft was performed, with bone reinsertion onto the humerus. The arm was immobilised for four weeks, and the patient underwent physiotherapy for three months. Three months later, the patient presented a hypertrophic scar which required two corticosteroid infiltrations. Six months later he was able to progressively resume sporting activities. At follow-up one year later, the patient scored well in McEntire's functional scale, despite mild pain on extreme movements of the shoulder ; the cosmetic result is unsatisfactory owing to the hypertrophic scar.

## DISCUSSION

Rupture of the pectoralis major is rare, perhaps due to the anatomy of this muscle, which contains two components : sternoclavicular and costoclavicular. In 2000 Schepsis *et al* (*9*) reviewed the literature and reported 141 cases, to which isolated cases should be added (*7*).

***Fig. 5.*** — Cosmetic results one year after surgery

It is an injury typically encountered in sportsmen ; no cases have been reported involving women. Mean patient age is around 35, and the injury is commonly sustained following strenuous use of the arms, in most cases during some type of weigth lifting activity (*9, 10*) as in our two cases.

The injury is generally prompted by strenuous abduction and internal rotation (*4, 9, 10*), although in the cases reported here, internal rotation was associated with a certain degree of flexion, a typical movement in weightlifting. Other mechanisms, including direct injury and spontaneous rupture, are less common : in a retrospective study of 56 cases, McEntire (*4*) reported only nine cases of direct injury and three cases of spontaneous rupture, with the latter being most common in the elderly (*7*).

Although the pectoralis major may rupture at one of three levels (proximally, within the muscle body and distally), distal rupture is the most widely encountered (*5, 9, 10*), and may involve the musculotendinous junction, the tendon itself or the tendon insertion (*12*).

Acute rupture causes major functional deficit of the shoulder, sometimes with severe pain and bruising in the deltopectoral region (*7, 8*). On examination, abduction and internal rotation are very limited or impossible ; this was the case with both patients reported here.

Although the diagnosis is usually based on clinical findings, simple radiography may be of use in cases with tendon detachment from the humerus where a bone fragment is also detached (*12*). Although the injury may be demonstrated by ultrasound scan, MR imaging provides more information, including whether the rupture is partial or complete, its location and, in chronic ruptures such as those reported here, whether there is retraction of the muscle belly.

Treatment depends on patient age, and on the type, location and progress of the injury. Conservative treatment is generally recommended for injuries within the muscle belly and for partial ruptures in distal locations in patients not engaged in strenuous physical activity (*11*). Surgical treatment of recent injuries to the tendon or the musculotendinous junction involves direct suturing and, in cases of distal detachment, re-attachment by means of either drilling holes in the bone or using screws if there has been avulsion of a bone fragment (*12*). This latter treatment is also proposed for chronic cases, although we would disagree with those authors who report that repair of injuries sustained over 2-4- months prior to surgery is easy in all cases (*9*). We have found in our patients that chronic ruptures of the pectoralis major muscle are far from easy to suture, compared to the Achilles or supraspinatus tendon, the difficulty being due to peritendinous fibrosis, retraction and muscle atrophy ; for this reason, in those cases the surgeon is obliged to resort to sliding techniques as recommended by Alho (*1*), or reinforcement via lengthening using a tendon autograft. The technique employed in the two cases reported here enables satisfactory proximal suturing at the musculotendinous junction and efficient attachment of patellar bone to the humerus.

Treatment of chronic ruptures generally yields poorer results than that of acute ruptures (*4, 10*), although some authors (*3, 9, 12, 13*) have reported good or excellent results in surgical repair of chronic ruptures. Good results were obtained here according to the McEntire scale (*4*) ; patients displayed complete shoulder mobility, good muscle strength and mild discomfort ; both patients were able to resume sporting activities. Despite these results, injuries of this nature require early diagnosis and treatment, since early suture yields the best results and avoids the onset of muscle atrophy which is sometimes difficult to overcome.

In conclusion, we consider that this surgical technique can be useful in some cases of chronic ruptures of the pectoralis major muscle in which direct tendon suturing is impossible, as in the two cases described.

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