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Original Article

Surgical treatment of pectoralis major muscle rupture with adjustable cortical button☆

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ABSTRACT

Objective: To assess the tendon reconstruction technique for total rupture of the pectoralis major muscle using an adjustable cortical button.
Methods: Prospective study of 27 male patients with a mean age of 29.9 (SD = 5.3 years) and follow-up of 2.3 years. The procedure consisted of autologous grafts taken from the semitendinosus and gracilis tendons and an adjustable cortical button. Patients were evaluated functionally by the Bak criteria.
Results: The surgical treatment of pectoralis major muscle tendon reconstruction was performed in the early stages (three weeks) in six patients (22.2%) and in 21 patients (77.8%), in the late stages. Patients operated with the adjustable cortical button technique obtained 96.3% excellent or good results, with only 3.7% having poor results (Bak criteria). Of the total, 85.2% were injured while performing bench press exercises and 14.8%, during the practice of Brazilian jiu-jitsu or wrestling. All weight-lifting athletes had history of anabolic steroid use.
Conclusion: The early or delayed reconstruction of ruptured pectoralis major muscle tendons with considerable muscle retraction, using an adjustable cortical button and autologous knee flexor grafts, showed a high rate of good results.

☆ Study conducted at the Centro de Traumato-Ortopedia do Esporte, Departamento de Ortopedia e Traumatologia, Universidade Federal de São Paulo, São Paulo, SP, Brazil.

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Tratamento cirúrgico da ruptura do tendão do músculo peitoral maior com botão cortical ajustável

Palavras-chave:
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RESUMO

Objetivo: Avaliar a técnica de reconstrução do tendão do músculo peitoral maior com ruptura total com o uso do botão cortical ajustável.

Métodos: Estudo prospectivo de 27 pacientes do sexo masculino com média de 29,9 anos (DP = 5,3 anos) e acompanhamento de 2,3 anos. A técnica cirúrgica usada representa o uso de enxerto autólogo do tendão semitendineo e grácil e botão cortical ajustável. Os pacientes foram avaliados funcionalmente pelo critério de Bak.

Resultados: O tratamento cirúrgico de reconstrução do tendão do músculo peitoral maior foi feito na fase precoce (três semanas) em seis pacientes (22,2%) e na fase tardia em 21 (77,8%). Os pacientes operados com a técnica de botão cortical ajustável obtiveram 96,3% de excelentes ou bons resultados contra apenas 3,7% de resultados ruins (critério de Bak). Do total, 85,2% sofreram lesão no exercício do supino e 14,8% eram praticantes de jiu-jitsu ou luta. Todos os atletas de levantamento de peso tinham história de uso de esteroide anabolizante.

Conclusão: A reconstrução do tendão do músculo peitoral maior rompido, com grande retração muscular (tardia ou precoce) com o uso do botão cortical com ajuste e enxerto autólogo de flexores do joelho representa uma boa opção de tratamento.

Introduction

Pectoralis major muscle (PMM) tendon injuries and their treatment have been addressed in several Brazilian[1–9] and international[10–30] publications over the last 20 years. The loss of strength (mainly of adduction of the humerus) and the esthetic sequelae have led several patients to seek surgical treatment for acute or chronic conditions.[1,3,5,24] The ready identification of the tears leading to medial PMM retraction, especially of its sternocostal portion,[3,24] can have a significant positive functional or esthetic impact. Most of the acute injuries can be treated by repairing the tear near the humerus. Some acute injuries, especially in weight-lifting athletes and in chronic users of anabolic steroids, present a complex muscular tear with greater retraction, and the efficient repair of such injuries is difficult. In these cases, reconstruction of the PMM tendon is indicated. PMM tendon injuries are defined by Shepsis et al.[24] as chronic after three weeks; however, in the authors' experience, especially after three months, in athletes and practitioners of upper limb physical activity, the PMM requires reconstruction with the use of flexor tendons[2,3,5,23] or other types of graft, such as calcaneal tendon allograft.[26] Chronic cases present significant muscular retraction and characteristic clinical signs, such as the S sign (Fig. 1A and B).[5] Some acute cases, especially in weight-lifting athletes using anabolic steroids, have complex PMM tears with significant acute retraction.[3] In these patients with large PMM hypertrophy, it is very important to consider the possibility of using a graft for PMM reinsertion. This study is aimed at presenting the evolution of a surgical technique used in the last 18 years for treatment of this injury and to review the specific literature.

Material and methods

This study was approved by the Ethics Committee of this institution under CEP No. 1.527/11; all patients signed the informed consent form.

This prospective study included 27 patients, all males, mean age of 29.9 years (SD = 5.3 years), surgically treated for PMM injury and followed-up at this institution since 2006, with a mean follow-up of 2.3 years (Table 1).

The technique used has been described in a previous study; the difference is the adjustment of tension applied on the cortical button after fixation to the humeral cortex.[2,3,5]

The patient is placed in a beach chair position, with a slope of approximately 45 degrees in order to facilitate the removal of the semitendinosus graft. The semitendinosus and gracilis grafts are removed in the conventional manner. The grafts are prepared on the surgical table by removing only the muscular part, without suturing the ends. The sutures are made after passing the graft through the pectoralis major muscle.

The shoulder incision is then made through an axillary route, and the muscle is sought for subcutaneously. Dissection of the deep layers of the axillary or medial regions must be avoided. After identification of the medially retracted stump, it is necessary to release the PMM from adjacent tissues and local fibrosis, using a finger or a rhomboid instrument, to achieve mobility of the injured muscle tissue. Now the semitendinosus and gracilis tendons are passed through the muscle, more or less 3 cm from the lateral border of the torn muscle.[2,3,5] After the U-shaped progress of the tendons (grafts; Fig. 2A), non-absorbable sutures are placed at the vertices of the U in the anterior and posterior part of the muscle, in order to prevent graft slipping. After simple suturing of the vertices,