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Technical Note

Reconstruction of the distal biceps tendon using triceps graft: a technical note☆

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ABSTRACT

Rupture of the distal biceps brachii tendon typically occur in a contraction against resistance with the elbow in 90° of flexion. Chronic ruptures are uncommon and are complicated by tendon and muscle retraction and poor quality. Some reconstruction techniques have been described in the literature, with variations on the surgical exposures, type of graft (allo or autograft), graft donor site, and type of attachment to the radial tuberosity. The authors report the case of a patient presented a rupture of the distal biceps brachii tendon that took place five weeks earlier and, therefore, underwent reconstruction using autograft from the central strip of triceps tendon through double incision and fixation with anchors to the radial tuberosity. The use of the triceps brachii as autograft for reconstruction of chronic ruptures of the distal biceps had not yet been described in the literature. The authors have chosen to use it due to its biomechanical characteristics that qualify it as suitable for this procedure and because this is easier for collection, using the same operating field at the same joint, minimizing the negative effects of the donor area. After six months postoperatively, the patient has full movement arc and restoration of 96% of the flexion strength and 90% of the supination strength when compared with the contralateral limb. This procedure appears to be a good option for cases of chronic distal biceps rupture in older patients who have functional demand of supination.

Reconstrução do tendão distal do bíceps com enxerto do tríceps: nota técnica

Palavras-chave:
Cotovelo
Traumatismos dos tendões

RESUMO

Rupturas do tendão distal do bíceps braquial ocorrem tipicamente com uma contração contrarresistência com o cotovelo em 90° de flexão. Rupturas crônicas são lesões incomuns e são complicadas pela retração e pobre qualidade tendínea e muscular. Algumas

☆ Study conducted at the Hospital Ortopédico e Medicina Especializada (Home), Serviço de Cirurgia de Ombro e Cotovelo, Brasília, DF, Brazil.

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Procedimentos cirúrgicos reconstrutivos
Transplante autólogo
Reconstrução

técnicas de reconstrução têm sido descritas na literatura, com variações na *via* de acesso, no tipo de enxerto (alo ou autoenxertos), na área doadora do enxerto e no tipo de fixação à tuberosidade radial. Descrevemos o caso de um paciente que apresentava ruptura do tendão distal do bíceps braquial havia cinco semanas, foi submetido à reconstrução com autoenxerto da tira central do tendão tricipital através de dupla incisão e fixação com âncoras à tuberosidade radial. O uso do tríceps braquial como autoenxerto para reconstrução de rupturas crônicas do bíceps distal ainda não havia sido descrito na literatura. Os autores optaram por ele devido às características biomecânicas que o credenciam como adequado para esse procedimento e à facilidade de coleta com o mesmo campo cirúrgico na mesma articulação, que minimizam os efeitos negativos da área doadora. Após seis meses de pós-operatório, o paciente apresenta arco de movimento completo e restauração de 96% da força de flexão e 90% da força de supinação quando comparado com o membro contralateral. A técnica descrita parece ser uma boa opção para casos de ruptura crônica do bíceps distal para pacientes mais velhos e que apresentam demanda funcional de supinação.

Introduction

The biceps brachii is the primary supinator and secondary flexor of the forearm.[1] Ruptures of the distal tendon of the biceps are rare injuries that usually affect the dominant arm of middle-aged men. The injury typically occurs during resisted contraction, with the elbow at 90° of flexion.[2] Significant loss of flexion strength and more pronounced loss of supination strength are often associated with chronic ruptures.[2] Ruptures are considered chronic 4–6 weeks after the injury.[1] In these cases, the muscle-tendon unit retracts and there is formation of fibrosis, which hinders the radial tuberosity repair.[3–5] Several procedures have been described to treat chronic ruptures of the distal biceps tendon, including tenodesis in the brachial tendon and the use of tendon graft.[3]

The authors describe the surgical technique used in a patient who presented chronic retracted rupture of the distal tendon of the biceps brachii, which was reconstructed using double incision with grafting from the distal tendon of the brachial triceps.

Case report

Patient, 51 years, male, taxi driver, right-handed, attended to this service with history of sudden pain and deformity on the anterior aspect of the left arm when attending to lift weights at home five weeks before. He reported having pain and difficulties while driving, which impaired his professional activity.

He had no significant history of diseases or previous elbow pain. He did not practice any physical activities.

Upon physical examination, evident deformity was observed on the anterior aspect of the left arm, with bulging contour of the biceps muscle belly. He had pain at palpation and absence of the biceps tendon on the anterior aspect of the elbow, in addition to a great strength reduction during supination and pain during flexion. Neurological and vascular status was preserved.

Magnetic resonance imaging disclosed signs of complete rupture of the distal biceps tendons, with 4.4 cm retraction.

Surgical technique

The surgical treatment was selected due to the functional demand of the patient's professional activity (taxi driver), which relies heavily on the movements of the upper limbs.

The authors opted for a reconstruction of the distal biceps tendon through the double incision technique described by Boyd and Anderson[6] and modified by Morrey et al.[5] Tendon graft from the distal triceps was used; this technique has not been described in the literature, but the authors' literature research[7,8] indicated that this procedure would be useful in the present case of a middle-aged patient with high functional demand of the affected limb for his work activities and no sports demand.

The patient was placed on the operating table in the supine position, without tourniquet. A transverse incision of approximately 3 cm was made in the anterior cubital fold. The biceps tendon is easily captured when the skin is retracted proximally, separated from the deep tissues. The most distal portion of the degenerated tendon was resected; the tendon was repaired with Bunnell sutures using nonabsorbable No. 5 thread (Fig. 1).

Then, the radial tuberosity was palpated and a curved Kelly forceps was passed through the biceps tendon tunnel, between the ulna and the radius, and it was advanced until its tip could be palpated on the dorsal aspect of the proximal forearm. A second incision was made over the forceps. The tuberosity was exposed through muscle divulsion with the forearm in maximal pronation (Fig. 2). The radial tuberosity was scarified until bleeding was observed. Two bioabsorbable, double-loaded 2.9-mm anchors were positioned.

Then, the brachial triceps tendon graft was collected, without olecranon bone fragments, through a posterior longitudinal incision and subcutaneous dissection until the tendon was exposed. The authors chose to remove a strip from its middle portion, measuring 1 cm wide and 10 cm long, with