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Clinical case

Reconstruction of closed rupture of thumb flexor tendon pulleys with a single free palmaris longus tendon graft: A case report and review of literature

Reconstruction d'une rupture fermée des poulies du pouce par autogreffe unique au tendon long palmaire : à propos d'un cas et revue de la littérature

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Abstract

Closed rupture of thumb flexor tendon pulleys is extremely rare. Several techniques have already been described for finger pulley reconstruction. Various techniques based on prior anatomic and biomedical studies have been proposed for thumb pulley reconstruction, in which one or two of the three pulleys are replaced. In the present study, we describe an original technique using a single, free palmaris longus (PL) autograft for thumb pulley reconstruction.

Keywords: Thumb; Pulley; Rupture; Reconstruction

Résumé

Les ruptures fermées des poulies de l'appareil fléchisseur du pouce sont extrêmement rares. Plusieurs techniques ont été décrites pour la reconstruction des poulies des doigts longs. Basées sur différentes études anatomiques et biomécaniques préalables, plusieurs techniques ont été proposées pour la reconstruction des poulies du pouce. Une ou deux des trois poulies peuvent être reconstruites. Nous rapportons une technique originale utilisant une greffe unique au tendon long palmaire pour la reconstruction des poulies du pouce.

Mots clés : Pouce ; Poulies ; Rupture ; Reconstruction

1. Introduction

Closed rupture of the flexor tendon pulleys is an uncommon lesion, which occurs mainly as a consequence of rock climbing injury. Whereas the longer fingers, especially the ring finger, are most often involved [1], only a small number of studies have dealt with flexor tendon pulley injuries of the thumb. Some surgeons support that two of the three pulleys have to be broken, before the functional consequences of a loss of thumb flexion can be clinically observed [2]. Earlier studies from various authors recommend double pulley reconstruction using two different grafts [3]. However, some anatomical studies have reported a plasty restoration technique using only one pulley. [4].

In the present study, we report on the case of an A1 and oblique thumb pulleys reconstruction, using a single free palmaris longus (PL) autograft, involving fixation on remnants of the initial pulley. The following case report provides a description of our reconstruction technique.

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2. Case report

We report on the case of a 48-year-old woman who consulted for a loss of interphalangeal (IP) flexion in her right thumb, which occurred approximately two years following an initial inflammatory tenosynovitis. The patient was right-handed, and had no significant medical or surgical history. She suffered from pain in the path of her flexor pollicis longus (FPL) tendon, which rapidly became associated with trigger thumb symptoms. Sonographic exploration revealed typical FPL tenosynovitis characteristics, with irregular alterations. A rheumatologist provided medical treatment including a local corticosteroid injection. Four months later, the patient referred with a painless loss of active flexion of the IP joint. She did not suffer from any trauma of the thumb during the intervening period. Moreover, this patient did not participate in rock climbing activities.

Clinical examination revealed a reduction in the IP and metacarpophalangeal (MCP) range of flexion, associated with an obvious subcutaneous bowstringing effect (Fig. 1). She had kept the full passive range of flexion of her thumb. No neurological, vascular or cutaneous complications were found. Standard x-rays eliminated the possibility of a fracture or an evolving tumor process. An MRI revealed complete rupture of the A1 and oblique tendon pulleys, confirmed by a significant increase of bone-tendon interval, and a radiological bowstringing effect (Fig. 2).

The surgical procedure was carried out under local anesthesia. An Esmarch bandage was used to exsanguinate the upper limb, and a tourniquet was inflated. An anterior Brunner's approach allowed exposing the FPL tendon, located directly under the skin, and presenting with a sclerotic appearance. Exploration revealed substantial fibrosis enclosing the tendon and hiding primitive pulley remnants. The fibrosis was removed (Fig. 3) and the palmar digital nerves were isolated to prevent iatrogenic injuries during positioning of the transplant around the thumb proximal phalange. The PL tendon was harvested thanks to three centimetric incisions on the palmar aspect of the wrist and forearm. The graft was passed around the proximal phalanx, to form an annular pulley to replace the oblique pulley. The graft was crossed, initially on the dorsal surface of the proximal phalanx deep to the extensor pollicis longus tendon, and then a second time in front of the FPL. The PL graft was finally attached to remnants of the A1 pulley using PDS free sutures (Figs. 4 and 5).

Active rehabilitation began immediately after the procedure and was associated with the wearing of a static splint for a period of eight weeks. At the time of the last review, six months after the procedure, the patient reported total skin healing, disappearance of the bowstringing effect and complete functional recovery in thumb flexion with a Kapandji Opposition Index measured at 10/10. Since the surgery, the patient did not present other clinical signs for a systemic inflammatory disease. An isolated tenosynovitis seems the most likely diagnosis.

Fig. 1. Clinical pre-operative findings with a bowstringing phenomenon.

Fig. 2. MRI pre-operative findings with A1 and oblique pulley disruptions.

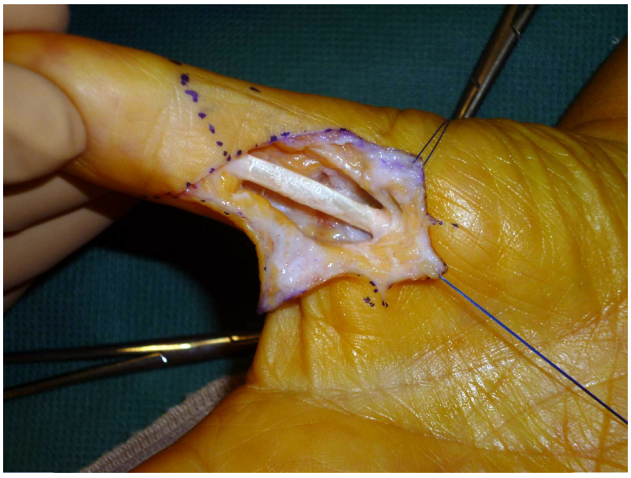

Fig. 3. Per-operative findings after fibrosis removal.