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Neglected radial collateral ligament rupture: a rare case report

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Abstract

Introduction: The leading causes of RCL rupture at the index metacarpophalangeal (MCP) joint are sudden, local mechanical events that significantly negatively impact the MCP joint's stability. 10–40% of collateral ligament injuries at the thumb metacarpophalangeal joint involve the radial collateral ligament (RCL). Here, we present an incredibly unusual example of chronic RCL damage.

Patient Concern: The right hand's thumb experiences pain and weakness when attempting to hold something. Swelling is not present in complaints. The patient reported having an accident two years prior. The right hand's thumb reportedly feels bloated and is shifting.

Diagnosis: The patient was identified as having a ruptured radial collateral ligament on the basis of a physical examination, X-ray, ultrasonic scan, and magnetic resonance imaging. The diagnosis was ultimately supported by intraoperative results.

Intervention: Patient was underwent ligament reconstruction using a Palmaris Longus tendon graft.

Conclusion: The free tendon graft using the Palmaris Longus appears to be a suitable, safe, and technically feasible procedure for the surgical treatment of chronic instability of the thumb metacarpophalangeal joint following radial hyperadduction trauma and complete rupture or desertion of the radial collateral ligament, according to favorable results.

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Introduction

Normal hand gripping and pinching heavily involve the thumb's metacarpophalangeal (MCP) joint. The main structures that sustain this joint against varus and valgus stress are the radial collateral ligaments (RCL) and ulnar collateral ligaments (UCL). 10–40% of thumb metacarpophalangeal joint collateral ligament injuries are radial collateral ligament (RCL) injuries1. The forceful and abrupt adduction of the MCP joint causes acute injury. Static and dynamic instability may ensue from a complete interruption of the RCL. A painful deformity that eventually results in articular degeneration might be caused by the instability. In chronic conditions, patients may report of ongoing pain with specific tasks that call for a force on the radial side, such closing a door, after the initial swelling and pain diminish. Due to the UCL's continued health, these patients could complain of thumb instability or may have a rotational deformity. The thumb may rotate toward pronation in this circumstance [1,2].

RCL injuries typically manifest during athletic action when the thumb is struck by a ball or player or following a fall onto the radial aspect of the thumb and hand. Having a relevant history of trauma or recurrent strain, discomfort and swelling at the MCP joint may present as a complaint. Patients with persistent injuries typically report past difficulties gripping a pen, grasping things, unscrewing jar lids, turning a key, or turning a doorknob [3]. Bruising, swelling, and pain at the metacarpophalangeal joint may be seen upon clinical examination. Examining the damaged thumb's range of motion (ROM) and checking for radial instability in both full extension (accessory col-lateral ligament) and 30° of flexion are necessary (proper collateral ligament).

Ligamentous damage to the thumb's metacarpophalangeal joint is frequent and, if untreated, is associated with a considerable instability of the joint. The radial counterpart stabilises the joint during pinching and depressing actions, such as pushing a button. There is no chance of a significant dislocation of the stumps since the forces are not always as great. Therefore, primary repair or immobilisation can be used to treat radial collateral ligament injuries that occur suddenly and do not involve the bone. However, some instances of this latter ligament's acute rupture might lead to chronic radial instability. Instability and subsequent metacarpophalangeal joint deformity can be avoided by performing a sufficient secondary repair of the radial collateral ligament [4].

The treatment of chronic collateral ligament injury of the MCP joints of the hand has led to the introduction of a number of reconstructive operations. These reconstructive methods fall under the categories of dynamic control of joint instability and

static control of joint instability. The abductor advancement and capsular reefing are used in the dynamic procedure. Even while performing dynamic reconstruction is theoretically simpler, it offers less stability than the static approach. The static approach, which involves reconstructing the collateral ligament with tendon grafting, is therefore more frequently used [5].

Case Report

A 30-year-old lady who complained of soreness in her right thumb arrived in April 2022. When attempting to hold something, the right hand's thumb experiences pain and weakness. Swelling is not present in complaints. The patient reported having an accident two years prior. Right hand's thumb reportedly feels bloated and is shifting. The patient reported taking him to the doctor and having a cast applied four months after the injury. The patient then instructed that they go see the masseuse.

Physical assessment by the Look inspection confirmed no apparent abnormality and that the swelling had subsided. The Feel examination revealed paresthesia, tenderness (+), crepitation (-), a palpable radialis, and CRT 2". (-). Upon inspection, the MCP thumb and finger radial joints were unstable in the 30 degree flexion position.

Figure.1 X-ray

On radiographic examination, the results showed that the bones were in good alignment, that there were no fracture lines, soft tissue edoema, or metacarpophalangeal position migration to the ulna, and that there were no stener lesions.

According to the examination's findings, the patient had a ruptured radial collateral ligament. Using a Palmaris Longus tendon graft, the patient underwent ligament restoration.

Figure 2

Figure 3

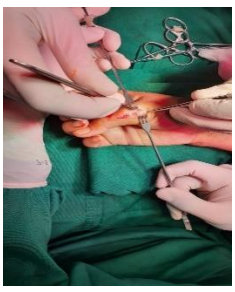

Figure 4

Figure 5

Figure 6

Figure 7

The patient had a free tendon graft using the palmaris longus tendon to treat the capsuloligamentous complex (figure 2,3). A tourniquet is used during the procedure, which lasts around an hour and is carried done under plexus block or general anaesthesia. Collateral ligament reconstruction starts with a midlateral incision that is made down to the adductor pollicis aponeurosis, taking care not to injure the sensory branches of the radial nerve. The ligamentous and dorsal structures are split transversely, releasing the aponeurosis. The remaining ligament is then removed from the dorsal capsule edge to the volar plate edge (Figure 4). Large enough to fit the palmaris longus tendon, burr holes and interconnected subcortical tunnels are created. Next, using a figure-eight design, the tendon graft is advanced into the proximal tunnel, over the joint, and into the distal tunnel (Figure 5). To enable pulling back into the distal tunnel and tightening with the joint in the straight position, the distal end of the graft is sutured to the distal section with one stitch (Figure 6). The remaining graft end, which is long enough to cover the whole repair, is flared out to create a thin, smooth membrane. This serves as a covering for the freshly formed ligament and joint. Running or interrupted sutures of 6/0 prolene are used to secure this "neo-capsule" to the margin of the dorsal capsule and the edge of the volar plate. With interrupted sutures, the adductor pollicis aponeurosis is restored, and the skin is then stitched shut. In order to help fixation once it is closed and prevent excessive movement from damaging the tendon graft, wire is placed (figure 7).

Discussion

A 30-year-old lady who was involved in the case arrived complaining of pain in her right hand's thumb. Right hand weakness when trying to grab something and pain in the thumb. Swelling does not accompany complaints. Patient reported having an accident two years ago. Right hand thumb is reportedly enlarged and moving toward the ulna. According to the patient, a cast was applied four months after the accident and he was taken to the doctor. The patient then requested to be taken to a masseuse. One of the primary complaints of a collateral ligament injury is discomfort and edoema at the MCP joint with a relevant history of trauma or recurrent strain. Patients with persistent injuries commonly describe past difficulties turning a key or doorknob, holding a pen, grasping objects, or unscrewing jar lids. Bruising, swelling, and soreness at the MCP joint may be seen on a clinical examination, and a torn ligament that has retracted back to its bony attachment has a tendency to feel like a distinct mass in some cases. Patients with recent injuries complain of joint discomfort, edoema, and stiffness. The radial metacarpal condyle may

protrude excessively dorsoradially at the patient's MCP joint in cases of persistent RCL injuries. When doing tasks like gripping an object, taking off a jar lid, turning a key, writing with a pen, or turning a doorknob, patients may experience discomfort and weakness. These activities may cause pain and weakness due to chronic instability [5].

Physical examination by Look confirmed that the edoema had subsided and that there was no obvious abnormality. There were tenderness (+), crepitation (-), a palpable radialis, CRT 2", and paresthesia on the Feel examination (-). Range Of Motion MCP thumb finger radial instability in 30 degrees of flexion upon evaluation. RCL injuries are treated according to the standard ligament injury system. There is an incomplete ligament tear in grade 1. Despite the ligament's tenderness upon palpation, a physical examination reveals no instability. Grade 2 tears are likewise incomplete rips, but the pain and swelling are more noticeable, and a physical examination reveals some asymmetric joint laxity—even if it falls short of the complete tear threshold. The ligament is completely torn in grade 3 rips, and patients experience discomfort, edoema, and instability [2].

Radial Collateral Ligament was determined to be the patient's condition based on the examination results. The patient had tendon graft ligament restoration due to their chronic arthritis. A palmar subluxation greater than 3 mm, instability greater than 30° or 15° greater than the opposite MCP joint, or chronic pain despite nonsurgical treatment with splinting and non-steroidal anti-inflammatory medicines are indications for surgical correction. Depending on how the RCL appears in the chronic condition, either a repair or a reconstruction may be carried out. According to this study, compared to 69% of instances with chronic UCL injury, 33% of cases with chronic RCL injury required ligament replacement using a tendon graft. Direct repair can be used to address chronic injuries2. Two categories of reconstruction exist: static versus dynamic reconstruction and local tissue reconstruction versus free tendon transplantation from a distal site. The figure-eight design, the parallel configuration, the triangle configuration with a proximal apex, and the triangular configuration with a distal apex are the most often employed configurations for static graft reconstruction. The palmaris longus is most frequently employed in the first three of these forms, which use a free tendon. Strandell, who used free graft to pass through bone tunnels and then suture the graft to itself, described the figure-eight design. Osterman et al. adapted the procedure to produce a parallel configuration by suturing the graft to the volar plate, noting that this technique resulted in hyperextension laxity. In 1993. A single metacarpal tunnel and a figure-eight shape tunnel in the proximal phalanx are used to transfer a free tendon graft from dorsal to volar. A more recent version involves suturing the interference knot to the periosteum through a radial incision with the option of further reinforcing the fix with a bone anchor6. Originally, the free ends of the tendon were knotted together to form an interference knot. With regard to the surgical treatment of chronic instability of the thumb metacarpophalangeal joint following radial hyperadduction trauma and total rupture or deinsertion of the radial collateral ligament, favourable results indicate that the free tendon graft using Palmaris Longus is an appropriate, safe, and technically feasible procedure.

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