Flexor pollicis longus repair in a patient with Linburg-Comstock anomaly: A case report

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ABSTRACT

Background: We present a patient with this anomaly who sustained a saw cut injury to his hand resulting in severance of the FPL and bilateral digital nerves of the thumb.

Methods: A 36-year old male laborer who sustained a saw cut injury to his dominant right hand presented to the emergency department. The wound extended from the skin edge of the first web to the base of first metacarpal in the palm at Urbaniak zone 3. The FPL tendon and both digital nerves were cut. In the operating room, the wound was enlarged with Z incisions and a dissection deep into the wound was conducted. The cut end of the FPL tendon was found and secured using a different technique. Bilateral digital nerve repair was performed with interpositional grafting of the lateral antecubital cutaneous nerve bundles.

Results: At the end of the rehabilitation program, the thumb recovered full range of motion, and physical examination revealed synchronous flexion movement (synkinesis) of the thumb and index finger.

Conclusion: Flexor pollicis longus tendon lacerations are common in the clinical practice of hand surgeons. Making a separate proximal wrist incision is a very useful technique to reach a proximal tendon stump. Otherwise, aggressive maneuvers may cause additional damage to the tendons involved and result in unpredicted outcomes. The attempts to retrieve the tendon at the injury site resulted in failure and gave a tethering sensation to the surgeon who recalled the Linburg-Comstock anomaly.

Key words: Flexor pollicis longus laceration, Linburg-Comstock anomaly

Introduction

Anomalous connections between flexor pollicis longus (FPL) and flexor digitorum profundus (FDP) tendons may result in synchronous flexion movement of index finger and thumb. This anomaly was first described in 1979 by authors Linburg and Comstock, whose names have subsequently been used to describe the anomaly [1]. In this case, we present a patient with this anomaly who sustained a saw cut injury to his hand resulting in severance of the FPL and the bilateral digital nerves of the thumb. The attempts to retrieve the tendon to injury site resulted with failure and gave a tethering sensation to the surgeon who recalls the Linburg-Comstock anomaly.

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Case Report

A 36-year old male laborer who sustained a saw cut injury to his dominant right hand presented to the emergency department. The wound extended from the skin edge of the first web to the base of the first metacarpal in the palm at Urbaniak zone 3 (Figure 1). Physical examination revealed loss of active flexion at the IP joint and anesthesia at both digital nerve distributions, suggesting severance of the FPL tendon and both digital nerves. The capillary refilling time was adequate.

The patient was taken to the operating room and the surgery was performed under axillary block anesthesia and tourniquet control. After irrigation of the wound with saline under loop magnification, both digital nerve ends were explored and prepared for repair with meticulous dissection. In the next step, the distal stump of the FPL tendon was explored with ease, and catching the proximal cut end through the wound was attempted unsuccessfully; it was thought to be retracted proximally into the wrist level. Therefore, a separate incision at the wrist, between the radial artery and the flexor carpi radialis tendon was made, and the proximal stump of the FPL tendon was explored. The FPL tendon was left in situ in the sheath, and a small pediatric feeding tube was passed retrograde through the tendon sheath at wound level and taken out through the proximal incision. The tendon was tied to the tube, and the tube pulled distally to deliver the tendon stump into the wound. This attempt failed to retrieve the tendon end, and produced a tethering sensation. Next, although this is not recommended, the proximal tendon stump was pulled back to remove the tendon's cut end from wrist incision. However, the efforts to take the proximal stump out of the proximal incision also failed.
while anchoring sensation of the tendon was felt. During these maneuvers, we realized that pulling the proximal stump of the FPL tendon was causing flexion in the index finger. We did not perform any further maneuvers in order not to damage the tendon. Eventually, we enlarged the wound with Z incisions and carried out a dissection deep into the wound. The cut end of the FPL tendon was found and secured with a needle (Figure 2). The tendon repair was performed using a modified Kessler core suture with 4/0 PDS and a running epitendinous 6-0 nylon suture. Because the case was a saw cut injury, the digital nerve stumps beyond the cut ends were also damaged. Therefore, the degenerated nerve stumps were removed by cutting them into slices until healthy nerve fascicules appeared. The remaining gaps were reconstructed with interpositional grafting of the lateral antecubital cutaneous nerve bundles (Figures 3 and 4).

A dorsal splint was used to immobilize the wrist, and thumb metacarpophalangeal and interphalangeal joints at 45, 60 and 30 degrees, respectively. At postoperative period passive and active assisted rehabilitation program was applied for eight weeks. At the end of the rehabilitation program, the thumb recovered a full range of motion, and physical examination revealed synchronous flexion movement (synkinesis) of the thumb and index finger (Figures 5 and 6).

At postoperative 8th week, In order to demonstrate the interconnection between the flexor pollicis longus and the flexor digitorum profundus of the index finger, an MRI was performed in a 1.5 T MR system (GE). The patient was in a prone position with the arm above the head. The wrist was positioned in pronation with the fingers held in extension. Proper surface coils were used to minimize motion artifacts with optimal signal-to-noise ratios. Transverse and coronal plane fast spin-echo (FSE) sequences were performed. T1W images were taken with TR 580, TE 15, ETL 3, NEX 2, matrix 384 x 256 and 3 mm slice thickness. T2W fat-saturated images were performed with TR 3380,
TE 36, ETL8, NEX2, matrix 384 x 224 and 3 mm slice thickness. Transverse Fast spin echo T1W contiguous images showed a tendinous slip extending proximally from the flexor digitorum profundus of the index finger to the flexor pollicis longus distally (Figure 7).

**Discussion**

The interconnections between FPL and FDS of index fingers, which results in synkinesis of the thumb and index finger are not uncommon, and the prevalence may be in the range of 20% - 31% in the population [1, 2]. Anatomically, the connections were reported to be occurring at wrist or proximal forearm level, and running from FPL to FDP [3, 4]. In this case, the connection was at wrist level, but the direction was from FDP to FPL.

Most of the individuals who do not engage in jobs requiring fine motor hand movements may be unaware of their anomaly. The anomaly mainly affects musicians and may cause tenosynovitis due to repetitive movement of the fingers, and may be dangerous for security personnel who carry pistols because the simultaneous movement of the fingers may cause pulling of the trigger when trying to pull the hammer of the pistol [5, 6].

In FPL tendon lacerations located in zone III, according to Urbaniak, the proximal end frequently retracts back to the wrist level [7]. The proximal end can usually be found with exploration through the wound, and retrieved easily with atraumatic grasping of the tendon end in the sheath. If the tendon end cannot be found or retrieved easily, blind attempts to catch the tendon with a Kocher clamp as persistent grasping and probing should be avoided, and a separate incision at the wrist, between the radial artery and the flexor carpi radialis, should be made to locate the proximal stump of the tendon. At this stage, leaving the tendon in situ in its sheath is recommended instead of taking the tendon out of its sheath to find the cut end. This maneuver may injure peritendinous synovial tissue, and may cause adhesion during the healing period. The tendon can then be rethreaded through its proper route by inserting a carrier-like pediatric feeding tube, a suture passer, or a cerclage wire through the sheath from the distal end to the proximal wrist incision. The tendon is attached to the carrier, and pulling the carrier back to wound retrieves the tendon from proximal to distal. In our case, neither these technical maneuvers nor trying to pull the proximal end back out of proximal wrist incision failed to reach the tendon end. We encountered resistance that gave a sensation of the anchoring of the tendon. This situation reminded us of the Linburg-Comstock anomaly. Therefore, we enlarged the wound and performed a dissection of the thenar muscles to reach the tendon end. After reaching and securing the tendon end, the rest of the operation was uneventful.

Flexor pollicis longus tendon lacerations are common in the clinical practice of hand surgeons. Making a separate proximal wrist incision is a very useful technique to reach the proximal tendon stump. If, as in this case, the surgeon feels resistance during the maneuvers to reach the proximal stump, the tendon should not be subjected to forceful pulling, and one should remember the Linburg-Comstock anomaly. Otherwise, aggressive maneuvers may cause additional damage to the tendons involved and result in unpredicted outcomes.

**Conflict of interest statement**

The authors have no conflicts of interest to declare.

**References**

1. Linburg RM, Comstock BE. Anomalous tendon slips from the flexor pollicis longus to the flexor digitorum profundus. J Hand Surg Am 1979;4:79-83.
2. Rennie WR, Muller H. Linburg syndrome. Can J Surg 1998;41:306-8.
3. Lombardi RM, Wood MB, Linscheid RL. Symptomatic restrictive thumb-index flexor tenosynovitis: incidence of musculotendinous anomalies and results of treatment. J Hand Surg 1988;13:325–8.
4. Old O, Rajaratnam V, Allen G. Traumatic correction of Linburg-Comstock anomaly: a case report. Ann R Coll Surg Engl 2010; 92: W1-3.
5. Karalezli N, Karakose S, Haykir R, et al. Linburg-Comstock anomaly in musicians. J Plast Reconstr Aesthet Surg 2006;59:768-71.
6. Miller G, Peck F, Brain A, et al. Musculotendinous anomalies in musician and nonmusician hands. Plast Reconstr Surg 2003;112:1815-24.
7. Urbaniak JR. Repair of the flexor pollicis longus. Hand Clin 1985;1:69-76.