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Extensor tendon reconstruction for Zone I injuries using a distally based tendon flap

Dear Editor,

Repair and reconstruction techniques for extensor tendons have received less attention in the literature than for flexor tendons, despite the higher susceptibility for extensor tendons to get injured in superficial lacerations to the dorsum of the hand and digits. The appropriate management of open injuries with loss of tendon substance is controversial. The restoration of tendon continuity is challenging, and fusion is often the procedure of choice. However, some reconstructive techniques have been described (Lee and Kim, 2018; Savvidou and Thirkannad, 2011). Savvidou and Thirkannad (2011) used half of each lateral band in the finger to reconstruct a new terminal slip. We describe a procedure which, we believe, is technically easier than the one published earlier by these authors.

Four patients with open injuries at the distal interphalangeal (DIP) joint level with concomitant extensor tendon substance loss were operated on from 2019 to 2021. Three were male and one female. The average age was 42 years. The mechanisms of injury were collision with glass in three cases and crush injury in one. After the debridement of the traumatized tissue, the mean extensor tendon gap was 5 mm (range 3–7). Patient characteristics are provided in Supplementary Table S1.

In all cases, a distally based tendon flap using the triangular ligament and a thin strip of the lateral bands was used to overcome the tendon gap imitating the method described by Snow (1973) in Zone 3 lacerations and similar to the technique reported by Lee and Kim (2018) (Figure 1). The flap was sutured to the remaining stump of the terminal tendon with 4-0 non-absorbable sutures and the repair was protected by pinning the DIP joint in a slightly hyperextended position with a 1.2 mm Kirschner (K-)wire (Figure 2). In two cases a dorsal advancement-rotation flap was necessary to cover the skin defect.

The K-wire was removed at 4 weeks and supervised active and passive range of movement was initiated. An aluminium splint was recommended during the night for a further 4 weeks. Three patients were operated under digital block and one under axillary block. All operations were performed as outpatient procedures. The minimum follow-up was 12 months (range 12–36).

During the follow-up, there were no skin problems or K-wire related infections. All patients resumed their previous activities within 3 months. At final follow-up, the mean range of motion at the DIP joint was 36° and the mean extension lag was 6.5°. The pulp-to-palm distance was 0 mm in all cases. The visual analogue scale for pain was 0 at rest, 0 in daily-life activities and 1.6 in physical demanding activities. The Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire was fulfilled by all patients at final follow-up, with a reported score of 2.3 (Table S1).

Cadaver studies have shown that the extensor tendon excursion in the digits is very limited ranging

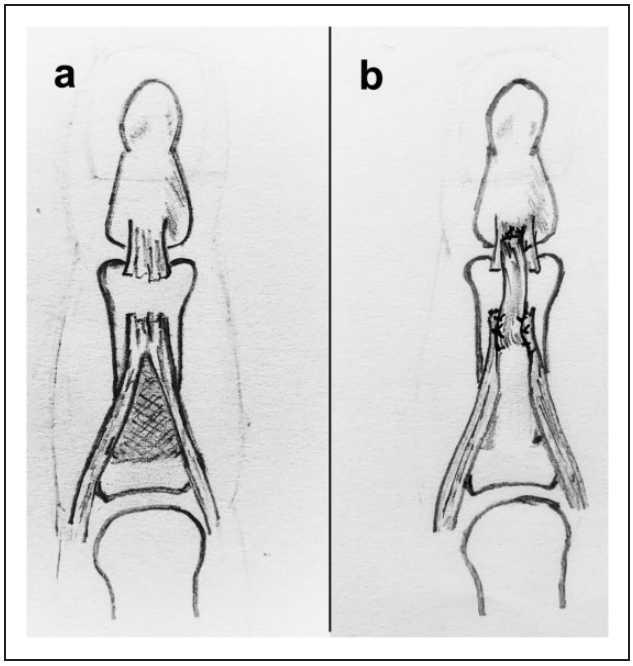

Figure 1. Schematic drawing showing the surgical technique (a) pre-surgery demonstrating tendon gap and (b) Distally based tendon flap using the triangular ligament and a thin strip of the lateral bands to bridge the gap.

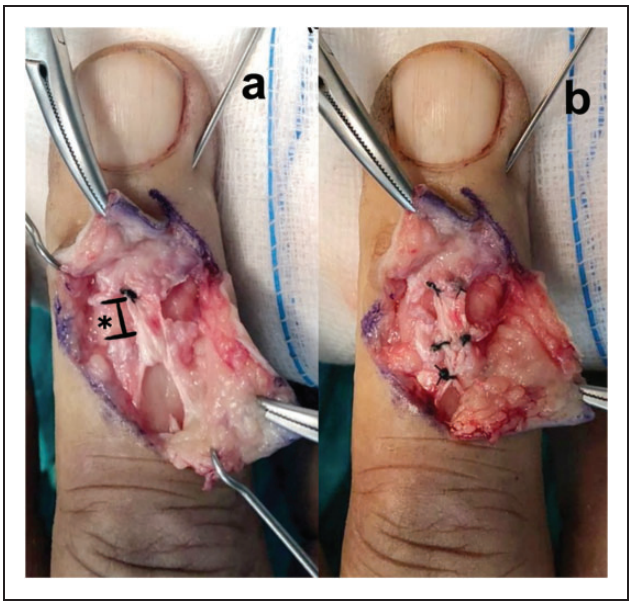

Figure 2. (a) Operative image showing a 5 mm tendon gap (black asterisk) bridged by the distally based flap and (b) Tendon flap in its final situation, note the three proximal sutures working as anti-tear stiches.

between 1 and 2 mm at the DIP joint level. This leaves little margin for error during tenorrhaphy or reconstruction as terminal tendon lengthening or shortening will influence postoperative outcomes (Schweitzer and Rayan, 2004). The reconstruction of the terminal tendon in acute trauma cases with tendon loss is challenging. Those injuries typically require immediate soft tissue coverage, and extensor tendon grafting or reconstruction using a free tendon graft requires either a multistage procedure or harvesting grafts from other uninjured areas adding to the morbidity.

Although what we describe is not an entirely a new technique, it is a new application to Zone 1 injuries of a distally based tendon flap, similar to the flap described by Snow (1973) in zone 3 lacerations. This distally based tendon flap technique provides an easy and quick solution to overcome the gap in the terminal tendon with the use of locally available tissue to reconstruct the tendon, allows preservation of joint mobility and permits immediate skin coverage where necessary. In our case series, the arc of motion was acceptable, the final functional result was good and there were no complications, although there were too few cases to draw further conclusions.

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Supplemental material Supplemental material for this article is available online.

References

Lee CH, Kim CH. A lateral band flap for a open mallet finger with skin and tendon loss: a case report. J Hand Surg Eur. 2018, 43: 994–5.

Savvidou C, Thirkannad S. Hemilateral band technique for reconstructing gap defects in the terminal slip of the extensor tendon. Tech Hand Up Extrem Surg. 2011, 15: 177–81.

Schweitzer TP, Rayan GM. The terminal tendon of the digital extensor mechanism: part II, kinematic study. J Hand Surg Am. 2004, 29: 903–8.

Snow JW. Use of a retrograde tendon flap in repairing a severed extensor in the PIP joint area. Plast Reconstr Surg. 1973, 51: 555–8.

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