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## Flexor pollicis longus zone 2 tendon repair under WALANT with ultrasound assistance

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### ABSTRACT

A feature of the flexor pollicis longus tendon injury is the frequency of palmar retraction so that a wrist approach is needed for retrieval of the proximal stump. We are reporting on our first outpatient zone T2 flexor pollicis longus tendon repair under WALANT with ultrasound guidance. In the event of zone T2 flexor pollicis rupture, ultrasound location of tendon extremities is used to plan surgical WALANT strategy and to guide the injection of lidocaine with epinephrine whilst limiting the injected volume to what is strictly necessary.

### Introduction

The various authors of the WALANT technique [1,2], have pointed out its benefits. It enables intraoperative testing during tendon repair. However, it does require pre-operative planning of the space to be anaesthetised by the injection of lidocaine with epinephrine. We report on an outpatient zone T2 tendon repair following a section of the flexor pollicis longus for which the surgeon's use of ultrasound [3,4], helped to plan for WALANT tendon repair and reduce the quantity of anaesthetics to be injected.

### Case report

A 26 year-old police officer, non-smoker, consulted for the loss of interphalangeal (IP) flexion of the left thumb. Clinical examination revealed an oblique 5 mm wound on the palm in zone T2. The IP joint was flexible but there was a deficit of the active IP flexion. There was no hemipulpar sensory deficit. Distal IP active flexion of the index finger was preserved. The surgeon used procedure room ultrasound at the practice (Fig. 1a.) to confirm tendon rupture with a small distal stump and a proximal stump proximal the A1 (one) annular pulley. The WALANT anaesthesia technique was used, by injection into the dedicated area of 12 ml of a preparation comprising 10 ml lidocaine 1%, epinephrine 1:200,000, 10 ml NaCl, 1 ml 8.4% bicarbonate (Fig. 1b, c). The proximal stump was retrieved above the A1 pulley tunnelled into the pulley with a passing tendon (Video). A bulky 4/0 Premilene longitudinal 6-strand looped strong suture was used. Intraoperative testing confirmed the absence of suture tension, verified by complete extension of the interphalangeal joint. There was no conflict between the suture area and the annular A1 pulley (Video). Healing quality was compatible with immediate splint-protected rehabilitation. The splint was worn around the clock for 30 days. Post-operative medical supervision, including ultrasound inspection by the surgeon and was an opportunity to educate patients on the need for mobilisation of

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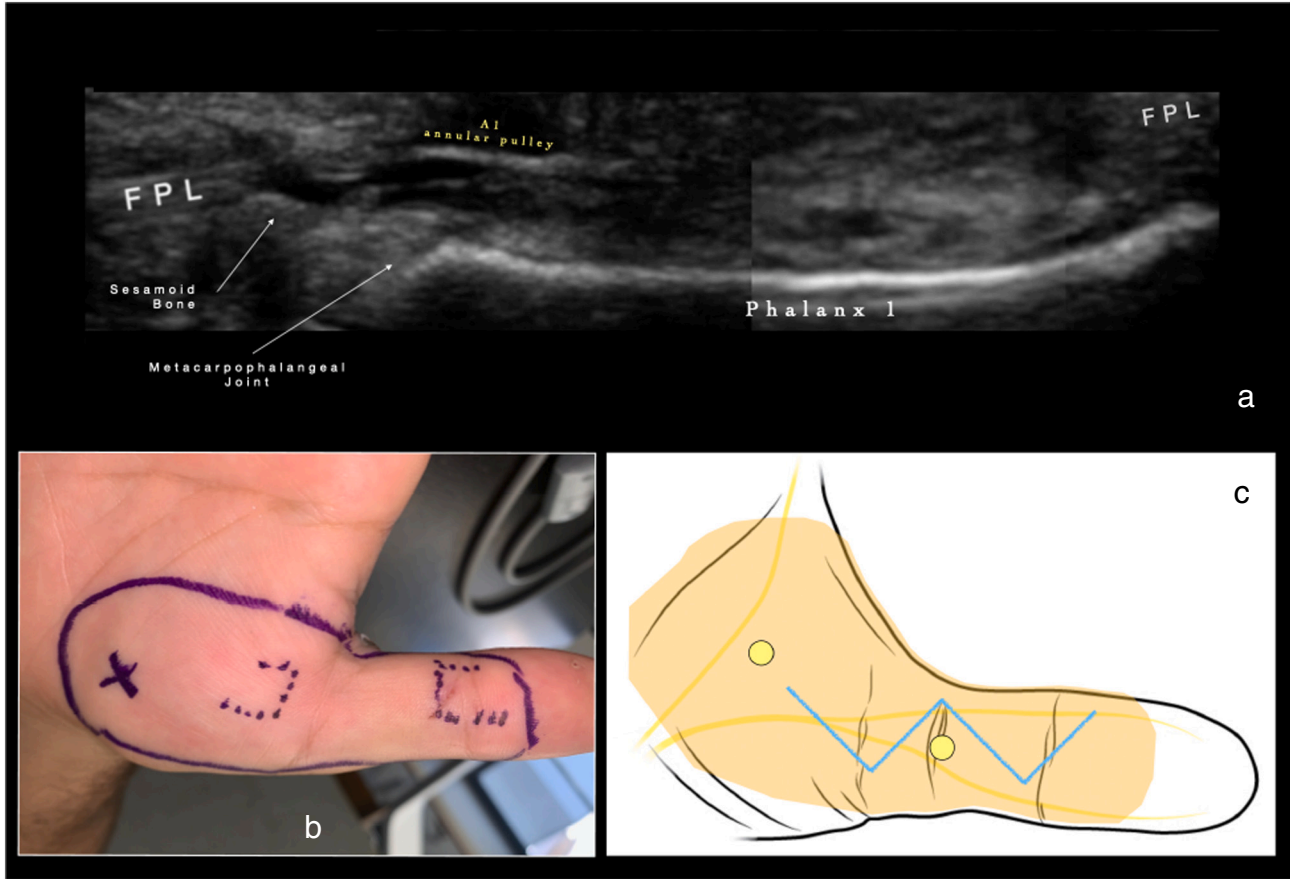


Fig. 1. a. Ultrasound assessment of the flexor pollicis longus dilacerations  
b. Skin marking of tendon stump area  
c. WALANT and skin incision areas.

the repaired tendon to prevent tendon adhesions (video).

## Discussion

Flexor pollicis longus rupture is uncommon [5]. A number of authors have evidenced the usefulness of the WALANT technique in tendon repair [1,2].

Active intraoperative patient mobilisation can test the solidity of tendon repair and confirm tendon suture quality without applying tension. It demonstrates that the minimal tendon shortening occurring when bulky suture technique is used is of little consequence as long as active extension is achieved [1].

A further advantage of the technique is that it confirms the need for pulley repair in the event of bowstringing with incomplete flexion [1].

Injury to the flexor pollicis longus features some distinctive characteristics [6,7].

Doyle [8] has demonstrated the role of annular A1 and cruciform pulleys in maintaining thumb flexion. Loss of active flexion occurs when the two pulleys are severed. At least one of the two pulleys must be preserved.

Ultrasonography at the surgeon's practice [3] is used to quantify the length of the distal stump and to specify the site of forthcoming tendon suture. In our reported case (see Fig. 1), the cruciform pulley could be vented whilst preserving an annular A1 pulley.

Another feature of the flexor pollicis longus tendon is the frequency of palmar retraction so that a wrist approach is needed for retrieval of the proximal stump [6].

The literature [2,3] only infrequently emphasises the value of preoperative identification of tendon injury. The ultrasound scan carried out at the practice was all the more necessary as the indication to use the WALANT technique had been made, and it was important to make adequate preparations (Fig. 1b).

In the presence of palmar retraction, lidocaine with epinephrine should be injected above the wrist. It is important to keep in mind.

Furthermore, the action of lidocaine with epinephrine requires a waiting period of 30 min to limit bleeding [1]. Plans must be made for injection at the wrist when retrieval of the proximal stump is to be done at wrist level.

In the event of tendon rupture of the flexor pollicis longus in zone 2 with WALANT, proximal wrist tendon retrieval must be anticipated when injecting for local anaesthesia. The ultrasound scan carried out by the surgeon [3] at the practice allowed us to verify that the wrist surgical approach would not be necessary. We were therefore able to limit the lidocaine+epinephrine dosage.

In the presence of zone T2 flexor pollicis longus rupture, tendon extremity ultrasound exploration is used to formulate WALANT surgical strategy and to keep the lidocaine with epinephrine injection dosage down to what is strictly necessary.

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.tcr.2021.100446>.

## Declaration of competing interest

We state that any financial and personal relationships with other people or organizations that could inappropriately influence our work is none.

## References

- [1] D. Lalonde, Latest advances in wide awake hand surgery, *Hand Clin.* 35 (1) (2019 Feb) 1–6.
- [2] A.F. Sadek, Flexor digitorum profundus with or without flexor digitorum superficialis tendon repair in acute zone 2B injuries, *J Hand Surg Eur* 45 (10) (2020) 1034–1044.
- [3] E. Vögelin, Ultrasonography: the third eye of hand surgeons, *J Hand Surg Eur* 45 (3) (2020) 219–225.
- [4] Reissner L, Zechmann-Mueller N, Jan Klein H., Calcagni M, Giesen T. Sonographic study of repair, gapping and tendon bowstringing after primary flexor digitorum profundus repair in zone 2. *J Hand Surg Eur* 2018 Vol.4 3(5) 480–486.
- [5] J. Nunley, L. Scott levin, D. Devito, R.D. Goldner, Urbaniak, Direct end to end repair of flexor pollicis longus tendon lacerations, *J Hand Surg Am* 17A (1992) 118–121.
- [6] Z.J. Pan, J. Qin, X. Zhou, J. Chen, Robust thumb flexor tendon repairs with a six-starnd M-tang method, pulley venting, and early active motion, *J. Hand Surg. Eur.* Vol. 42 (9) (2017 Nov) 909–914.
- [7] T. Giesen, M. Sirotakova, A. Copsey, D. Elliot, Flexor pollicis longus primary repair: further experience with the Tang technique and controlled active mobilization, *J Hand Surg Eur* 34 (6) (2009 Dec) 758–761 (*J Hand Surg*).
- [8] J. Doyle, W.F. Blythe, Anatomy of the flexor tendon sheath and pulleys of the thumb, *J Hand Surg am* March 2 (2) (1977) 149–151.