

EVIDENCE SUMMARY

Thumb UCL Repair

Overview

- Acute surgical repair of the torn ulnar collateral ligament can achieve good subjective and objective functional results [2].
- The technique of thumb ulnar collateral ligament repair using suture anchors and suture tape augmentation preserves native ligament proprioception [1].
- The technique of thumb ulnar collateral ligament repair using suture anchors and suture tape augmentation provides additional stability during early healing phases [1].

Anatomy & Pathophysiology

THUMB ANATOMY & FUNCTION

- The thumb has a more proximal and lateral position than the other digits, allowing movement inward and outward from the palm [4].
- The thumb ray is the shortest of the five rays of the hand and is clearly separated from the fingers [4].
- The web space of the thumb is the largest and deepest of the hand's web spaces [4].
- The thumb is described as the master digit of the hand, representing the dominant element that gives value to all other digits [9].
- The thumb metacarpal is independent and articulates with the trapezium [9].
- The thumb ray has considerable mobility and independence, which is greater than that of the fifth ray and the other fingers [9].
- The thumb possesses two phalanges, whereas the other digits have three [4].

VASCULAR ANATOMY

- The “princeps pollicis” artery is the terminal branch of the radial artery that crosses the first intermetacarpal space and runs along the ulnar side of the first metacarpal bone [10].

- In the classical layout, the princeps pollicis emerges onto the subcutaneous palmar tissue at the level of the cutaneous flexion crease of the metacarpophalangeal joint [10].
- At the metacarpophalangeal joint level, the princeps pollicis divides into two terminal rami known as the collateral palmar arteries of the thumb [10].
- The collateral palmar arteries run along the digital tunnel symmetrically and are of equal caliber [10].
- The collateral palmar arteries head distally to finally unite in the pulp arcade [10].
- Only 15% of anatomical dissections of the thumb's palmar arteries fall into the classical "typical" category [10].
- In the second segment of the thumb (between metacarpophalangeal and interphalangeal creases), the main artery is the ulnar collateral artery [10].
- The ulnar collateral artery is more often easier to dissect than the radial collateral artery and its size enables a more reliable microanastomosis [10].
- A subtendinous anastomosis situated at the level of the neck of the first phalanx acts as a moderator between the two collateral arteries [10].
- In cases where the palmar ulnar collateral artery is absent, the dorsal artery takes its place by means of a branch through the subtendinous arcade [10].
- In the pulp segment, the two arteries are of similar size and run through the thick fatty subcutaneous padding [10].
- The dorsal arteries of the thumb originate from the palmar arteries (princeps, commissural, or anastomoses of the superficial arcade) at the level of the first metacarpal [10].
- The ulnar dorso-collateral artery generally stems from the "princeps pollicis" onto the medial border of the neck of the first metacarpal [10].

CUTANEOUS ANATOMY

- The palmar surface of the hand forms a cutaneous unit extending from the distal transverse crease of the wrist up to the transverse crease at the base of the digits [5].
- The oppositional crease of the thumb constitutes the oblique axis of the hand and subdivides the palmar integument into two separate zones [5].
- The skin of the radial portion of the palm covers the thenar eminence and is relatively well vascularized and mobile [5].
- The skin of the ulnar and distal portion of the palm covers the hypothenar eminence where the skin has poor mobility [5].
- The central triangular part of the palm has fixed, poorly vascularized skin that covers almost directly the superficial palmar aponeurosis [5].
- The integument of the palmar face of the thumb is subdivided into phalangeal units separated by two digital flexion folds [5].
- When a digit is completely flexed, the integument of adjacent phalanges comes into contact in the zones of the flexion creases, establishing areas of cutaneous contact in the form of a diamond [5].

- The sides of the diamond-shaped cutaneous contact zones do not undergo variations in length during movements of flexion and extension [5].
- Incisions made along the lines of the diamond-shaped cutaneous contact zones present a minimal chance of retraction [5].
- The palmar surface of the thumb web is flat and precipitously interrupted, with skin densely adherent to the commissural skeleton [5].
- The commissural skeleton of the thumb web is formed by the distal transverse ligament, which is by far the deepest and the most mobile [5].
- The necessary skin to cover the thumb distal to the metacarpophalangeal joint is about 9 cm wide and 8 cm long [8].
- Skin loss of the thumb and first metacarpal requires a graft or flap of 13 cm wide and 12 cm long [8].

SURGICAL APPROACH CONSIDERATIONS

- Distal palmar incisions are transverse, while proximal palm incisions tend to be more longitudinal with the distal end curving radially [11].
- Incisions in the more proximal palm should parallel the thenar crease [11].
- The most important structure in the thenar area is the recurrent branch (motor) of the median nerve, which should be exposed and protected if its exact location is in doubt [11].
- Anatomic studies show that there is no single longitudinal incision in the proximal palm that completely avoids the palmar cutaneous branches of the median and ulnar nerves [11].
- Midlateral incisions suitable for fingers are also suitable for the thumb, with the radial side being more accessible [11].
- A radial midlateral incision on the thumb can be extended by curving its proximal end at the midmetacarpal area and creating a flap on the palmar surface [11].
- Care should be taken to avoid the dorsal branch of the superficial radial nerve to the radial side of the thumb during midlateral incisions [11].

PATHOPHYSIOLOGY & REPAIR OUTCOMES

Investigations

- Clinical evaluation of the injured or dysfunctional hand and wrist requires combining patient history with a careful physical examination to pinpoint or narrow the scope of possible pathologic processes [3].
- Diagnostic tests such as imaging and serum laboratory studies are useful in determining pathology but can be expensive, time consuming, and often nonspecific [3].
- A careful physical examination is essential to direct care and future testing if indicated [3].

Treatment

- Thumb UCL repair using suture anchors and suture tape augmentation preserves native ligament proprioception [1].
- Thumb UCL repair using suture anchors and suture tape augmentation provides additional stability during early healing phases [1].
- Acute surgical repair of the torn ulnar collateral ligament can achieve good subjective functional results [2].
- Acute surgical repair of the torn ulnar collateral ligament can achieve good objective functional results [2].

Complications

- Suture anchor and suture tape augmentation preserves native ligament proprioception [1].
- Suture anchor and suture tape augmentation provides additional stability during early healing phases [1].

Recovery

- Suture anchor and suture tape augmentation techniques preserve native ligament proprioception [1].
- Suture anchor and suture tape augmentation techniques provide additional stability during early healing phases [1].

Key Evidence

- [L5] The technique preserves native ligament proprioception while providing additional stability during early healing phases. [1] ([10.1016/j.eats.2025.103957](https://doi.org/10.1016/j.eats.2025.103957))
- [L4] Acute surgical repair of the torn ulnar collateral ligament can achieve good subjective and objective functional results. [2] ([10.1016/0020-1383\(94\)90179-1](https://doi.org/10.1016/0020-1383(94)90179-1))

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