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Case Report

Modified Kessler technique for extensor tendon reconstruction: a case report

Jose M. H. Rodriguez[1]*, Victor M. O. Valerio[2], Jessica C. R. Villa[2], Irvin H. Sanchez[1], Melissa R. Mora[1], Felix A. D. Martinez[3], Edgar A. F. Garcia[4], Gadiel E. P. Morales[5]

[1]Hospital General de México "Dr. Eduardo Liceaga", Ciudad de Mexico, Mexico
[2]Hospital General Zacatecas, ISSSTE N.26, Mexico
[3]Hospital Regional de Alta Especialidad ISSSTE, Torreon, Coahuila, Mexico
[4]Hospital Nuevo Gómez Palacio, Durango, México
[5]Hospital General de Lerdo, Gomez Palacio, Durango, México

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***Correspondence:**
Dr. Jose M. H. Rodriguez,
E-mail: dr.bresssurgeon@gmail.com

ABSTRACT

Tendon injuries in the upper extremities are among the most prevalent types of traumatic injuries that are seen in emergency rooms. Due to the fact that the mechanism of the extensor is distinct from the mechanism used by the flexor system, it can be difficult to execute surgery to correct the issue. Discovering the optimal equilibrium between tendon mobility, sliding, and joint stability is the single most significant factor in determining one's level of competitiveness.

Keywords: Extensor tendon, Extensor laceration, Extensor injuries, Hand injuries

INTRODUCTION

Extensor tendon injuries are some of the most common traumatic hand injuries, even though these injuries happen a lot, scholars have historically paid less attention to them than to injuries that affect the flexor tendon.[1] Injuries to these structures, ranging from minor cuts to complex crush avulsions, can lead to issues that affect your ability to move your fingers like mallet finger, boutonnière deformity, or loss of digital extension.

Wounds must be carefully examined for size, location, and any other injuries that may have happened. There are nine zones in the extensor mechanism that help us describe these injuries.[2]

The goal of surgery is to restore continuity and keep the full inactive range of motion. The modified Kessler suture is a defined method for treating these injuries.

Forearm anatomy

The forearm extensor mechanism, situated within the posterior compartment and innervated by the radial nerve, comprises a complex arrangement of superficial and deep musculature that originates predominantly from the lateral epicondyle of the humerus and functions to generate extension at the wrist, digits, and thumb, with its tendons traversing six distinct dorsal compartments beneath the extensor retinaculum to insert upon the metacarpals and phalanges.[3] The superficial layer, encompassing the brachioradialis along with the extensor carpi radialis longus (ECRL), extensor carpi radialis brevis (ECRB), extensor digitorum communis (EDC), extensor digiti minimi (EDM), extensor carpi ulnaris (ECU), and anconeus, works in concert with the deep layer, which consists of the supinator, abductor pollicis longus (APL), extensor pollicis brevis (EPB), extensor pollicis longus (EPL), and extensor indicis (EI), to facilitate coordinated movement.[4] Functionally, the ECRL, ECRB, and ECU serve as the primary wrist extensors, with the ECU also

providing ulnar stabilization during power grip, while the EDC, EDM, and EI are responsible for digital extension—the latter two enabling independent extension of the little and index fingers, respectively—and the APL, EPB, and EPL form the anatomical snuffbox to execute the specialized motions of thumb abduction and extension.[5] This intricate system operates under critical biomechanical principles, notably the requirement for antecedent wrist extension to establish sufficient tension for digital extension—a concept known as tenodesis—whereby disruption of the radial nerve results in the characteristic clinical finding of wrist drop, whereas isolated compression of the posterior interosseous branch (PIN) may spare the brachioradialis and wrist extensors while compromising thumb and finger extension, underscoring the functional compartmentalization within this anatomically and clinically significant region.[6]

Verdan clasification

Verdan classification widely recognized. Its understanding enables the clinician to precisely identify the damage is crucial for communication among specialists and because the severity of the injury dictates the clinical presentation, the repair method, and the rehabilitation strategy.[7] Any damage to the terminal tendon above the DIP falls into zone I. Injuries in zone II happen over the middle phalanx. The PIP joint is hurt in zone III. The proximal phalanx is in zone IV. The MCP joint is in zone V. The metacarpals are in zone VI. The carpus and extensor retinaculum are both in zone VII. Zone VIII includes the distal portion of the forearm. Zone IX is the rest of the forearm.[8] The surgical and rehabilitative technique is directly related to the zone that was hurt. To reach the ultimate aim of restoring function and preventing disability in patients with these common injuries, it is necessary to master this classification.[9]

The thumb has a different classification scheme since it has one less phalanx. The interphalangeal joint is in TI, while the proximal phalanx is in TII. The MCP joint is in TIII, and the metacarpal is in TIV. Lastly, the carpus is part of the TV.

CASE REPORT

We present the case of a 28-years-old patient, right hand writer, without any medical history, and completely healthy referred to our plastic and reconstructive surgery department with posttraumatic accidental injury at home, on the dorsum of the right hand with no active bleeding. Frank tendon exposure is observed. Therefore, immediate repair and reconstruction are indicated using mono-filament suture and modified Kessler technique. Following tendon repair with 4-0 non-absorbable monofilament suture, the wound was closed and a palmar splint was applied in intrinsic-plus position for four weeks. After the skin sutures were removed, the patient underwent three months of rehabilitation, during which they showed satisfactory progress and experienced no complications.

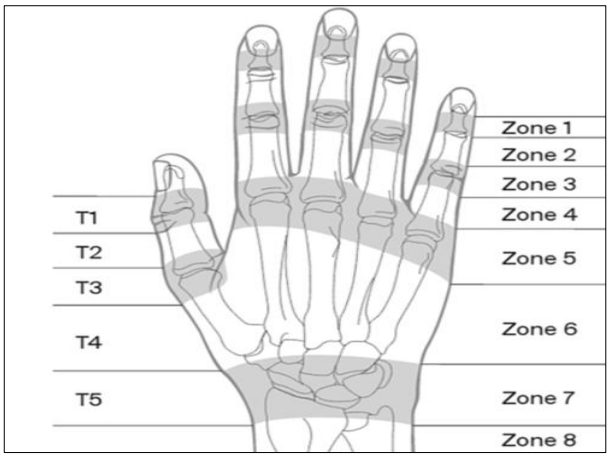

Figure 1: Tendon injury classification.

Figure 2: Extensor tendon injury in zone 6.

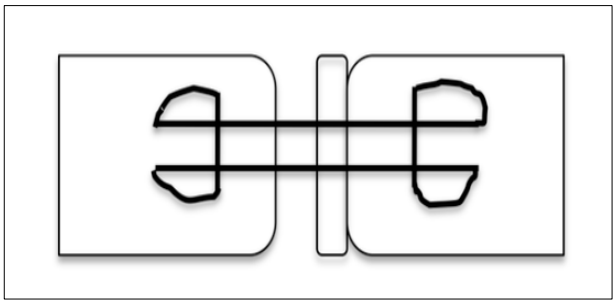

Figure 3: Modified Kessler technique.

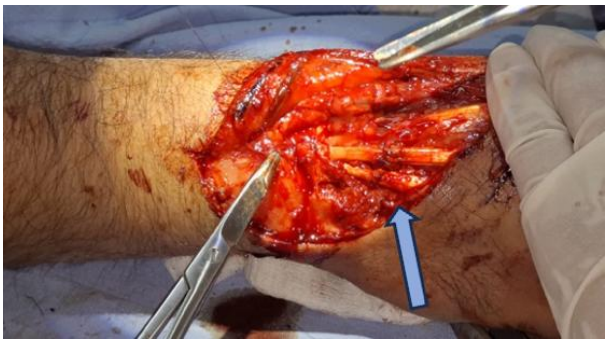

Figure 4: Tendon repair with modified Kessler technique.

Figure 5: Closed wound after repair.

DISCUSSION

Contrary to popular belief, extensor tendon reconstruction is not easier than flexor tendon reconstruction. Without adequate treatment, they can induce stiffness, function loss, and irreversible deformity.[10] Flexors and extensors differ greatly, oval extensor tendons increase their risk of breaking or splitting because they are situated beneath the skin on the back of the hand, they lack a protective layer that would aid them in sliding or feeding, and move long-chain joints.[11]

The modified Kessler approach continues to be an indispensable item in the arsenal of hand surgeons. Original Kessler grasping stitch was developed for the purpose of mending tendons to construct a core suture that would pull the tendon ends together while maintaining vascularity and minimizing gapping.[12] This technique makes it possible to achieve constant coaptation of tendon ends while maintaining excellent biomechanical properties, and it is simple for surgeons of varying levels of expertise to learn exactly how to utilize it. It is recommended use non-absorbable monofilament sutures with a size ranging from 3-0 to 5-0, depending on the location of the damage.[13]

CONCLUSION

To manage an extensor tendon injury, you must be proficient with the zonal anatomy and biomechanical characteristics of the dorsal apparatus. Traditional repairs using simple interrupted or mattress sutures are still a viable option for thin, flat tendons, but larger diameter tendons are now being repaired with stronger core suture constructs. Modified Kessler, when combined with accurate epitendinous running suture, provides a repair that is strong and gap resistant and allows early mobilization.

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Ethical approval: Not required

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