

Injury and Section of Flexors in Zone II

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ABSTRACT

Flexor tendon repair is a challenging task in hand surgery, with numerous studies and publications on the subject. The incidence of flexor tendon injuries in India is estimated to be around 14/100,000-person years. The fingers are characterized by five zones: Zone I, Zone II, Zone III, Zone IV, and Zone V. Reparation of these zones involves flap extension, suturing, and band repair. However, tendon repair is fraught with complications, with the most catastrophic outcome being rupture. Tendon adhesions are a common consequence of the healing process and can be limited with atraumatic surgical techniques, robust repair, and early mobilization strategies. Ultrasound imaging is helpful in determining the continuity of the flexor tendon. Tenolysis surgery may be necessary if treatment is unsuccessful, but is generally recommended after three to six months.

KEYWORDS: Flexor tendon repair, Zones of Verdan, Surgery

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INTRODUCTION

Regaining good digital function after a laceration and repair of the flexor tendon in the digit continues to be one of the most difficult challenges in the field of hand surgery. During the first issue of Hand Clinics, the topic of flexor tendon restoration was exclusively covered. The American and European editions of the Journal of Hand Surgery have produced at least 135 full-length papers on this subject in just the last five years alone. These publications cover a wide range of topics. Despite this, there are still a great deal of debates, and the methods of surgery and treatment are continuously undergoing development. In order to get better results, it is vital to ensure that a good knowledge of these

injuries at the histology and biomechanical levels is present. At this time, there is a paucity of information addressing the frequency of flexor tendon injuries in an Indian setting. This incidence is estimated to be about 14/100,000-person years in a research conducted in the United States of America, although a study conducted in a population in Finland puts the rate at 7/100,000-person years. The number of flexor tendon injuries observed in a juvenile population (defined as those under the age of 16) was 31 out of a total of 391 hand injuries.

Flexor tendon zones and regions

The zones of flexor tendons were characterized by Verdan in accordance with the places in which they situated themselves.

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The fingers have traditionally been characterized as having five different zones. They are as described below:

Zone I contains the region that is distal to the point where the flexor digitorum superficialis tendon inserts. Here, the FDP is the only party present. Further subdivision of this zone into three subzones has been carried out by Moiemmen and Elliot.

Zone II is present inside the flexor sheath and extends from the point where the flexor digitorum superficialis tendon is inserted distally to the point where the A1 pulley is located proximally. The FDS and the FDP are both included inside this zone, which has been split by Tang into four subzones. This zone is located within the boundaries of the digital flexor sheath.

Zone III extends from the distal border of the flexor retinaculum to the distal edge of the A1 pulley and then proximally. From the FDP tendons that are located in this zone, the lumbricals originate.

Within the carpal tunnel, under the flexor retinaculum, it is referred to as Zone IV. In this particular location, the median nerve and all of the digital flexors are located in close proximity to one another.

Proximal to the flexor retinaculum is the location of Zone V. Injuries to the muscles at the level of the forearm are included in this category as well. This zone has been further segmented by Sabapathy and Elliot in order to customize the management more specifically to the unique location.

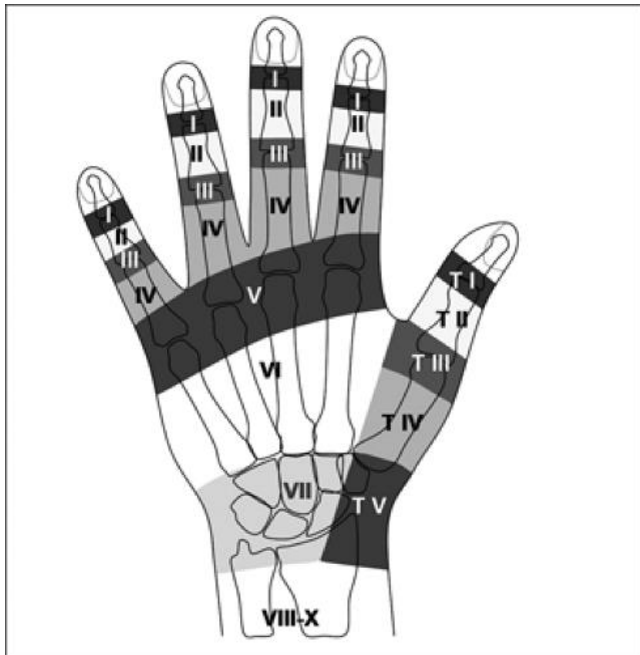


Figure 1. Verdan zones

Reparation of zone II injury



Figure 2. Repair of deep and superficial flexor tendon in zone two, with flap extension.



Figure 3. Repair and suturing in flexor zone II on the 4th finger of the right hand.



Figure 4. Repair of deep flexor tendon in zone II 3rd finger of right hand.



Figure 6. Surgery completed with repair of superficial and deep flexor tendons in zone II. 5th finger of the right hand.



Figure 5. Flexor tendon repair in zone two with band repair.

Complications

Flexor tendon repair is fraught with problems, despite the fact that it is performed in accordance with the precise repair method and rehabilitation regimen that was discussed before. The rupture of the repaired tendons is the most catastrophic of all of these potential outcomes. In the majority of the series that have been recorded, the proportion of rupture is less than 10%. This number varies.

Because the repair site is at its most vulnerable between the ages of six and twelve days, the majority of ruptures occur within the first two weeks of the repair. These kinds of occurrences are often brought to the attention of the patient or the therapist when they are able to detect a decrease in the flexion power or a sudden "popping." In situations like these, it is vital to conduct an investigation as soon as possible, followed by the repair of the torn tendon.

Tendon adhesions, which are the second most common consequence, are a natural part of the healing process and are often the outcome of the extrinsic way of healing. It is not possible to completely eliminate them, but they may be limited with the use of atraumatic surgical techniques, the avoidance of gapping at the repair site through the use of robust repair, and the implementation of an early mobilization strategy. One of the most common clinical manifestations of tendon adhesion is restricted active mobility in conjunction with comprehensive passive movement. When it comes to determining whether or not the flexor tendon is continuous,

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ultrasound imaging is of great assistance. When it comes to physiotherapy, the first line of treatment. It is recommended that an active pull-through exercise be performed with the wrist in a flexed position.

FOLLOW-UP AND CONCLUSION

Every step of the treatment plan is meticulously adhered to, and the progress is carefully tracked. If the treatment is unsuccessful, tenolysis surgery may be necessary. As a general rule, it is not recommended until after three months, and ideally after six months, since delaying the procedure decreases the likelihood of the tendon rupturing during the tenolysis process. It is also important to note that the other significant consequences include joint contractures, quadriga effect, and lumbrical plus deformity.

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