***Case study***

# Zone 2 extensor tendon Gap reconstruction: A Case report


## Abstract

Post traumatic loss of segment of the tendon of extensor expansion Zone 2 level is common in crush injury of the hand. Extensor tendon zone 2 level forms the inherent part in the dynamics of extensor expansion mechanism. When a segmental loss occurs, usually the reconstruction of the tendon is done with autogenous Palmaris longus tendon. In this particular clinical scenario, we found juncturae tendinum between the middle and the ring finger could be used effectively for reconstruction of zone 2 extensor tendon, due to its structural similarity. The outcome following surgery was reasonable. Post operatively hyperbaric oxygen therapy was given to improve the survival of crushed tissue.



**Key words**: hyperbaric oxygen therapy, Juncturae tendinum, tendon reconstruction, Zone 2 extensor gap

## Introduction

Crush injury of the hand may result in partial or complete loss of extensor tendons. Extensor tendon being more superficial and delicate, the reconstruction of the loss of segment is a challenge for the hand surgeon. Zone 2 level of extensor expansion contain a thin tendon substance than rest of the zone demanding effective reconstruction in these regions.[1] In most of these injuries, the segmental loss may be involving only a single slip of lateral tendon. We present in this article, a clinical scenario where the reconstruction was done with Juncturae tendinum graft instead of Palmaris longus tendon. The reconstruction results in lesser morbidity and better structural similarity for effective reconstruction of zone 2 tendons.

## Case Report:

A 27-year-old male sustained injury to the right middle finger dorsal aspect at the level of shaft of middle phalanx when his hand stuck while cleaning the bike chain [Figure 1 A]. On clinical examination, patient had pain over the injured finger with difficulty in extension at distal interphalangeal joint. X-ray showed a fracture at the middle phalanx shaft level with undisplaced segments of bone [Figure 1 B]. Fracture was stabilised by 0.8 mm K-wire with immobilization of distal and proximal interphalangeal joints. Intraoperatively, there was a loss of segment of lateral slip of ulnar side of the extensor expansion at zone 2 level. Segmental loss of lateral slip component present at zone 2 level was assessed and measured whish was approximately 1cm [Figure 1 C]. A 2cm curvilinear incision was made on the dorsum of the hand in the distal half between the middle and ring finger extensor tendon and juncturae tendinum was identified. The segmental tendon loss was reconstructed with Juncturae tendinum tendon graft harvested from the hand [Figure 1 D, E]. The tendons were coapted with 5-0 prolene sutures by horizontal mattress technique and tension was maintained. Immobilisation of the hand was done in wrist extension at 30 degree with fingers in lumbrical position. Immobilzation was done for four weeks postoperatively. Six sessions of hyperbaric oxygen therapy was given post operatively. Functional outcome was adequate.

## Discussion

Crush injury of extensor tendons of hand are more common due to its superficial location.[2] Extensor expansion gap reconstruction require expertise management in assessing the loss and replacing it with 'like tissue' to enhance the functional outcome. Extensor tendon excursion is less when compared to the flexor aspect and so it is always better to reconstruct the extensor gap with possible tendon graft than suturing the tendon cut edges in tension.[1] Tendon reconstructions with Palmaris longus is a preferred method in case of segmental loss of extensor tendons.[3] In case of skin loss, various flap in terms of cross finger flap, adipofascial cross finger flap, hatchet flap, composite venous flaps, abdominal flap, groin flap or free tissue transfer could be utilized along with Palmaris longus tendon reconstruction.[4]

The functional deficit due to utilization of juncturae tendinum instead of Palmaris longus is very less. Even though the harvesting of palmaris longus does not result in significant functional deficit, there is no need of a voluminous palmaris longus sacrifice for zone 2 reconstruction of extensor tendon.[5] In our clinical scenario, slip of juncturae tendinum between the middle and ring finger was utilised to reconstruct the gap in the ulnar lateral slip of zone 2 extensor tendon. The outcome of reconstruction was satisfactory.

Hyperbaric oxygen therapy is administered in most of the crush injuries of hand as a departmental protocol. Hyperbaric oxygenation provides maximum preservation of injured tissue which appears to be crucial in functional outcome of hand injuries. Reduction of primary and secondary edema due to oxygenation certainly augments healing and better functional outcome in these types of injuries.

**Conclusion:**

Extensor tendon loss should be always preferred with tendon grafts for better functional outcome. Options for reconstruction should be prioritize with considering the minimal donor morbidity. Juncturae tendinum could be used as better spare parts for extensor tendon loss in the distal regions of hand.

**References**


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**Figure 1:**


Figure A: Crush injury Zone 2 level extensor aspect right middle finger

Figure B: X-ray film showing fracture at middle phalanx shaft level right middle finger

Figure C: Segmental loss of ulnar side of lateral slip tendon Zone 2 level

Figure D: Juncturae tendinum harvested from the hand between middle and ring finger - used as a tendon graft for reconstruction

Figure E: Reconstruction of extensor tendon with juncturae tendinum graft