DELAYED FLEXOR TENDON INJURIES: A REVIEW AND VIDEO CASE STUDY OF A FIVE AND A HALF WEEK OLD FLEXOR POLLICIS LONGUS TRANSECTION

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Introduction

A primary tendon repair is the standard of practice for acute injuries, where acute is generally considered up to 2 or 3 weeks post-injury. Beyond this, a primary repair is often not possible and tendon reconstruction using a tendon graft or tendon transfer is required.

Research question: How late is too late for a primary repair?

Methods and Materials

This video illustrates the reconstruction of a 5.5 week old flexor pollicis longus (FPL) laceration, using the wide awake technique. Pre-operative marking and 60 cc of 0.5 % buffered lidocaine with 1:200,000 epinephrine was injected for repair, as well as for palmaris tendon graft and long finger flexor digitorum superficialis (FDS) tendon transfer as back up plans, in the event that a primary repair was not possible. The decision would be made intra-operatively, based on the status of the cut FPL tendon and the active tendon excursion in the comfortable tourniquet free awake patient.

A review of current literature was performed to determine the possible options and their respective outcomes for delayed flexor tendon injuries.

Results

Case Presentation

Intraoperatively, we found that the proximal FPL tendon had retracted well proximal to the zone of injury. However, a 3 cm pseudotendon was discovered within the proximal flexor sheath. It was adherent to the proximal tendon stump. The presence of the pseudotendon allowed atraumatic retrieval and advancement of the proximal tendon stump into the operative field, without any proximal incisions. A primary repair was performed.

The thumb was immobilized for 4 weeks post-operatively and ended up with a good clinical result in spite of some bowstringing.

Literature Review

Animal Models

Tang et al. cut and repaired the flexor digitorum profundus (FDP) tendons of chickens at various times between 1 and 20 days post-injury (3). Immediate repairs had the best tendon function, with progressively worse function the longer the delay. Conclusion: late repairs (3 weeks post-injury) can be performed, but yield worse function.

Gelberman et al. repaired digital flexor tendons at 6, 7 and 21 days post-transsection, in canines (2). Immediate repairs had far greater excursion than either delayed group (7 and 21 days). There was no difference between repairs at 7 vs. 21 days. The tensile strength properties were the same for all groups. Conclusion: early repair maximizes gliding ability.

Human Studies (Adult)

McFarlane et al. treated 100 consecutive delayed zone II flexor tendon injuries, using either a delayed primary repair (n=38) or tendon graft (n=64). There was a wide range of delays, 0-3 months (n=54), 3-6 months (n=22), and >6 months (n=24).

Regression analysis: No significant effect of delayed primary repair vs. graft injury. However, injury severity and number of tendons was significant. Patient age > 35 years had a negative effect on outcome.

Episkar et al. repaired 49 consecutive tendons, at 2 - 14 weeks post-injury (4). Early repairs (<4 weeks) had greater total active movement (TAM) and less extensor deficit (9% vs 38%).

Human Studies (Pediatric)

Linday et al. repaired zone II flexor injuries in children ages 2 - 14 years (5). Immediate repairs (n=14) had 70% good results (TAM > 180 degrees), whereas delayed repairs 3 - 8 weeks, (n=16) had 50% good results.

Berndsson et al. performed immediate (< 21 days, n = 36) and delayed (21 days to 1 year, n = 13) repairs of zone II flexor injuries, in children ages 1 - 16 years (6). The timing of repairs was not significant. However, age directly correlated with outcome, older children regained more TAM.

Discussion

A primary tendon repair was possible and was performed in this case. If the proximal end of the tendon had been too short for primary repair but had good excursion, we could have harvested a palmaris longus tendon graft and inset it with appropriate tension, based on our awake patient’s active movement intraoperatively. If the proximal tendon had demonstrated very poor excursion, we also had the possibility of a long finger FDS tendon transfer to FPL. Again, we would have been able to test the tension of the transfer with active movement intraoperatively.

We propose that in most delayed flexor tendon lacerations, this method of injecting local anesthesia in a wide awake patient is applicable. It provides the option to perform any of tendon repair, graft, or transfer depending on the intraoperative active tendon length and excursion, as well as the ability to set the optimal tension of whichever reconstruction is chosen.

In our experience, delayed primary repairs of flexor tendons can be done up to 6 weeks post-injury, so long as there is adequate excursion, viable tendon stumps, and not excess tension to approximate the two sides. If a patient has missed this window of opportunity for a primary repair, they would require a tendon reconstruction, using either a tendon graft or tendon transfer. Based on the reviewed studies, pediatric patients may be more forgiving to achieve acceptable results with longer delays.

References