

Acellular Dermal Matrices for Tendon Sheath Reconstruction: A Novel Method for Pulley Reconstruction & Adhesion Prevention

JoAnna Nguyen MD, Caroline Yao MD and David Kulber MD

Keck School of Medicine, University of Southern California, Los Angeles, California, USA

Background

Tendon and pulley reconstruction after tenolysis is a complex task often complicated by adhesion formation and delayed range of motion. Various autologous and synthetic materials have been described for pulley and sheath reconstruction with limited success. This case series describes a novel method of using acellular dermal matrices for flexor tendon sheath and pulley reconstruction after tenolysis with the goal of preventing adhesion formation and allowing earlier range of motion.

Methods

From 2012 to 2014, a total of 10 zone 2 pulleys in four consecutive patients were reconstructed using acellular dermal matrix (Flex HD, Ethicon, Musculoskeletal Tissue Foundation).

Results

Patient characteristics and adjunctive procedures are summarized in Table 1. Case 3 is illustrated in Figures 1 a-c. Follow up ranged from 5 to 12 months. Overall, no infections or foreign body reactions occurred in this series.

Table 1: Patient Characteristics

| Case # | Age | Sex | Chronicity | Mechanism of Injury | Findings | Pulleys Reconstructed | Adjunctive Procedures |
|--------|-----|-----|------------|---------------------|---|------------------------|--|
| 1 | 44 | M | Chronic | Crush | Obliteration of RF* A2, A4 and SF# A2, A4 pulleys Extensive scarring Flexion contracture | RF A2, A4 SF A2, A4 | Tenolysis |
| 2 | 20 | F | Chronic | Crush | Obliteration of MF, RF A2 pulleys Extensive scarring | MF^ A2 RF A2 | Tenolysis Intrinsic release |
| 3 | 20 | M | Acute | Laceration | Laceration of thumb A2, A4 pulleys Scarring of flexor tendons Radial digital nerve laceration FPL laceration | Thumb A2, A4 | Tenolysis Radial digital nerve repair FPL repair |
| 4 | 39 | F | Chronic | Jersey finger | Obliteration of RF A2, A4 pulleys Extensive scarring Flexion contracture | RF A2, A4 | Tenolysis A1 Tenovagotomy PIP capsulotomy |

*ring finger, # small finger, ^middle finger

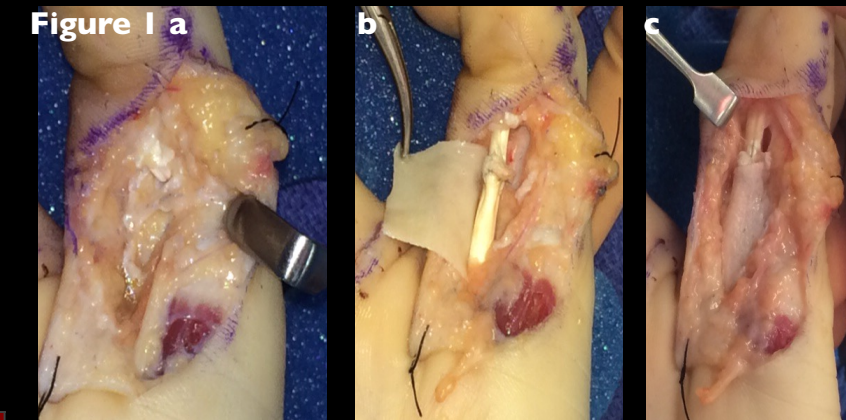


Figure 1 a: Extensive scarring of flexor tendons of the right thumb with laceration of A2 and A4 pulleys b,c: Flex HD is anchored sub-periosteally to reconstruct the A2 and A4 pulleys

Conclusion

In theory, the use of acellular dermal matrices in tendon sheath and pulley reconstruction allows for biologic incorporation and decreased adhesion formation. These advantages allow for earlier range of motion and better functional outcomes without donor site morbidity. Our case series demonstrates that acellular dermal matrices are a viable option for tendon sheath and pulley reconstruction after tenolysis and perhaps may also be of benefit in the acute setting of Zone 2 flexor tendon injuries.