


Complications of Flexor Tendon Repair

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Complications of Flexor Tendon Repair



Complications of Flexor Tendon Repair

How do we best get there?

- What are the best surgical techniques?
- What are the best rehab protocols?
- What pitfalls are we trying to avoid?




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Complications of Flexor Tendon Repair



Nearly anything can go wrong, but most things are predictable and therefore avoidable.

Wound healing issues/infection	Scar contracture
Flexor tendon adhesions	Joint contracture (PIP)
Tendon rupture	Triggering
Pulley Rupture (bow stringing)	Quadrigia




Complications of Flexor Tendon Repair

- Preoperative education of the patient is critical!
- Set expectations:
 - The surgery
 - Early postop course
 - Duration of rehab
 - Need for formal therapy
 - Necessity for compliance
 - Impact on work/sport
 - Risks of complications and what that might mean for them
- Spending the time preop will pay off postop!


Complications of Flexor Tendon Repair

Plan your scar, incorporating the traumatic laceration

Minimize risk of scar contracture (no longitudinal scars without Z-plasties!)

Take care with small flaps to avoid necrosis



Complications of Flexor Tendon Repair

Scar contracture


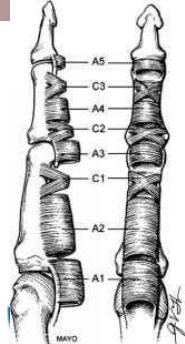


Complications of Flexor Tendon Repair

Dissection to the flexor sheath

Protect the A2 and A4 pulleys and work around them



Can lose up to 1/2 and still be competent

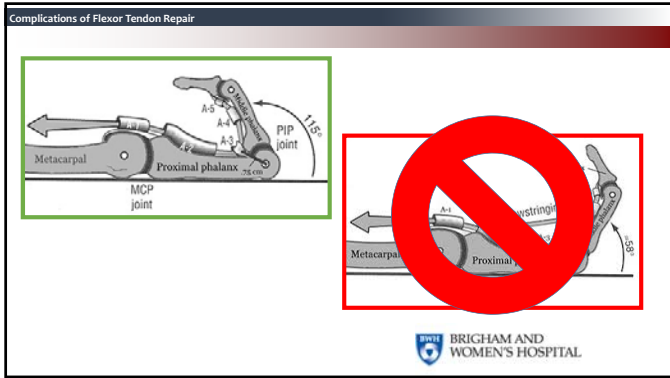


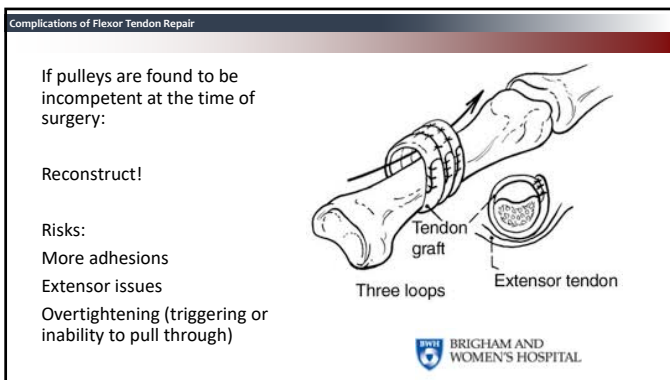
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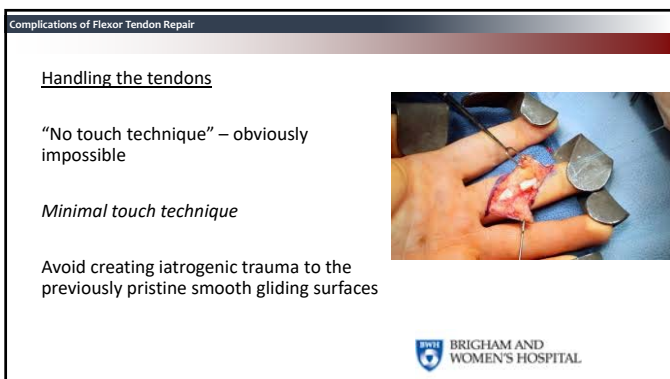
Bowstringing

Unrecognized or untreated significant traumatic A2,4 pulley injury or iatrogenic injury during efforts to expose, retrieve, and repair the tendon










Complications of Flexor Tendon Repair


- If you need to manipulate the tendon with instrument, touch the raw cut surface (will be inside the repair)
- Single 25G needle can "hold tendon" for you
- Appropriate suture placement the first time (not multiple passes)
- Once suture is placed hold onto that instead of the tendon
- Minimize trauma within the sheath (may be best to open more proximally to find the stump rather than "fish for it")



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Flexor Tendon Adhesions



Limited active ROM > passive ROM

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Flexor Tendon Adhesions





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Flexor Tendon Adhesions – what to do?


- Don't overstuff the sheath
 - Maybe repair only one slip of FDS or only FDP
 - Dilate the pulley?
 - Don't bunch the repair
 - Epitendinous suture to smooth edges
- Early motion protocols to work on differential glide
- Up to 20% require tenolysis




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If tenolysis:

- Try to assess for adhesion vs rupture preop via u/s
- Prepare for 2 stage reconstruction....just in case
- Can lead to later rupture (the adhesions may be most of what is "holding on")
- Make sure the soft tissues are ready (matured scar, resolved edema) – usually 3-4 months
- Maximize PROM preop
- Make sure patient is ready for the rehab
- Bier block – assess AROM intraop



Complications of Flexor Tendon Repair



Complications of Flexor Tendon Repair

Flexor tendon repair

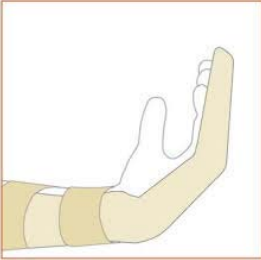

- At least 4 strand core repair with nonabsorbable suture
- Epitendinous in zone 2
- No gapping but minimal bunching
- Make sure the repair will glide under the pulley (?actively)




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Flexor tendon rehab



- Usually start 3-4 days postop (need to arrange this preop!)
- Dorsal block splint
- Early motion protocol –modified Duran
- Edema control

Complications of Flexor Tendon Repair

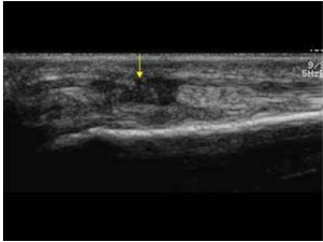
Flexor tendon rupture

- 4-5%
- If FDS only, may cause adhesions and dysfunction of FDP but may not require further intervention
- FDP only with intact functioning FDS, may be best to accept FDS finger +/- fuse DIP prn
- If no competent flexor, repair vs reconstruct


Complications of Flexor Tendon Repair

To evaluate for rupture - Ultrasound



Dynamic and includes attempted active motion


Very dependent on the examiner!!



Complications of Flexor Tendon Repair

After a previously repaired tendon ruptures:

- One Stage Repair
 - 1. Minimal scarring
 - 2. Pliable joints
 - 3. Adequate retinacular pulley system
 - 4. Typically not Zone 2
 - 5. Usually very soon after the rupture happens
 - Sometimes can re-repair
- Two Stage Repair
 - 1. Severe adhesions or scarred tendon bed
 - 2. Contractures
 - 3. Disruption of pulley system
 - 4. Missed injuries
 - 5. Injuries not suitable for primary repair (gross contamination)



Complications of Flexor Tendon Repair

Flexor tendon reconstruction

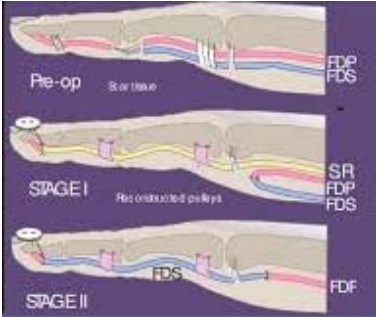
First stage:

- Excision of tendons in digit
- Insertion of silicone rod
- Ensure pulleys are adequate / reconstruct
- Rehab!!

Second stage: (3-4months)

- Pull tendon graft through the new sheath and secure
 - Palmaris, FDS, plantaris, toe extensor

Might need tenolysis





The diagram shows three stages of flexor tendon reconstruction.
Pre-op: Shows the 'Scar tissue' and the 'FDP' and 'FDS' tendons.
STAGE I: Shows 'Reconstructed pulleys' and the 'SR' (silicone rod) with 'FDP' and 'FDS' tendons.
STAGE II: Shows the final reconstruction with 'FDS' and 'FDP' tendons.

Complications of Flexor Tendon Repair

Joint Contracture (PIP)

May be in combination with adhesions

Unrecognized extensor injury

Complications of Flexor Tendon Repair

Kleinert protocol



If patient is not compliant, may lead to significant flexion contractures




Complications of Flexor Tendon Repair

Contracture treatment

- Splinting
 - Dynamic
 - Night extension
 - Casting – flexors can't glide
- AA/PROM
- Surgery:
 - Release sheath contracture between A2,4
 - Tenolysis
 - Release check reins, accessory collaterals, collaterals, VP
 - Manipulate
 - Change the arc but often don't "normalize" the motion

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Triggering

Most often nonoperative care






Complications of Flexor Tendon Repair

Quadrigrig

Due to link between FDP of long/ring/small, if one is repaired too tightly or adhesions, the others lack full flexion (lag)

Don't overshorten (1cm max)
Careful technique

Complications of Flexor Tendon Repair

Meta-analysis -29 studies

- Reoperation rate 6%
- Rupture 4%
- Adhesions 4%

• Type of core suture/epitendinous does not affect rupture rate

• Epitendinous suture decreased reoperation rate by **84%**

• Adhesion formation with modified Kessler is **57%** lower

