

Muscle-Tendon Unit Laceration

Most commonly involved: carpometacarpal and tarsometatarsal joints

Clinical presentation: open wound and non-weight bearing lameness

Chronic tendon lacerations: lameness exacerbated by exercise. If isolated deep digital flexor tendon laceration have hyperextension of one digit.

Imaging:

Rads: FB, Fx, swelling

US: localize site of injury, partial vs complete rupture

Medical Management:

Not indicated for tendon lacerations

Minor lacerations of muscle may be treated conservatively

Tendon healing

1. Slow
2. Depends on fibroblasts making collagen (need good blood supply for migration of cells)
 - a. Paratenon lined tendons can receive vascular buds and undifferentiated cells from paratenon and soft tissue. Better capacity for rapid healing and are called "vascular tendons" i.e. gastroc and triceps brachii insertions
 - b. Sheathed ("avascular" tendons i.e. digital flexor tendons depend on intrinsic blood supply for healing
3. Gap formation
 - a. Gap leads to scar
 - b. Surgical stabilization -> no gap -> apposed tendon ends heal without interposed scar tissue

General Principles of Tendon Repair

1. Surgical approach incision should not be made directly over the tendon to prevent extension of scar from tendon to incision wound during healing
 - a. Use incision parallel to tendon or curved incision
2. Avoid further tendon injury
 - a. Needles or Kirschner wires can be inserted through the body of the tendon away from tendon ends and allow manipulation of tendon during orientation and debridement, also for applying force to approximate the tendon ends that allow holding sutures to be inserted to maintain approximation
3. Approximation
 - a. Flex or extend adjacent joints to minimize tension over site
 - b. Select suture material that will maintain strength over long healing period , minimize damage to tendon and minimize reaction from tendon : monofilament synthetic long term absorbable or nonabsorbable material
 - c. Special suture patterns to resist pull out when tendon placed under tension (linear arrangement of collagen in normal tendon provides little holding strength for simple suture patterns -> pull out_) all modified excellent in maintaining apposition of tendon ends. BUT all are holding patterns and should not be used to draw tendon ends together.
 - i. Locking loop (Kessler) – allow tendon bundle to be grabbed, flat tendons
 - ii. Three loop pulley – increased resistance to pull out, round tendons
 - iii. Krackow: allow tendon bundles to be grabbed, flat tendons
 - d. Goal is end to end anastomosis
 - i. Exposed damaged tendon ends
 - ii. Insert needles or kirshner wires through the body of the healthy tendon perpendicular to the long axis above and below the injury to aid in manipulation /apposition
 - iii. Ends of tendon should be debrided to remove damaged and necrotic tissue, but don't remove an excessive amount of tissue
 - iv. Inset holding sutures with tendon ends held in apposition
 1. May need multiple 1-3 sutures depending on size of tendon
 - v. Inspect to ensure gap eliminated

vi. Place several horizontal mattress sutures of finer gauge suture material around circumference of anastomosis to provide final apposition and complete surgery.

e. Follow up

- i. Protect from strain for 3 weeks minimum post repair. immobilize post op for 3 weeks with rigid external coaptation or external fixation with joint positioned to relieve stress on the repaired tendon.
- ii. 3-4 weeks post allow some controlled load or strain to allow more rapid repair of tendon strength compared to longer immobilization. Remove splint and semi rigid immobilize for another 3 weeks with heavy padded bandage or half cast.
- iii. Immobilize joints from extension or flexion with bandages, casts, trans-articular screws or trans-articular external skeletal fixators.

1. T/F The surgical incision for your approach to tendon repair should be made directly over the tendon.
2. Rigid external coaptation/external fixation should be maintained for how long after repair?
3. What types of suture patterns should be used for tendon repair?

1. T/F The surgical incision for your approach to tendon repair should be made directly over the tendon.
 - a. FALSE
2. Rigid external coaptation/external fixation should be maintained for how long after repair?
 - a. 3 weeks
3. What types of suture patterns should be used for tendon repair?
 - a. locking loop
 - b. 3 loop pulley
 - c. Krackow