Injection Therapy for Insertional Plantar Fasciitis

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Relevant to the content of this presentation, Dr. Mahoney and Ms. Ranum have nothing to disclose.
Objectives

At the conclusion of this presentation, the participant will be able to:

▫ Describe current best evidence for the proper administration and usage of corticosteroids injections for plantar fasciitis
▫ Compare/contrast the efficacy of novel injection treatments for plantar fasciitis
Sorry to disappoint!!!

For any soft tissue injection, no single study identifies:

- The most efficacious steroid to use
- The correct concentration of steroid to administer for clinical efficacy
- The correct interval of time between injections
- The annual limit of injections
Best steroid to use?

- Acetates are more potent (longer duration of action) than phosphates when administered intra-articularly due to increased insolubility \[^{11}\] [Level IV]
- Phosphates are more potent when administered orally and IV \[^{19}\] [Level V]
Best steroid to use?

There may be a geographical preference [Level III]:

- **West**-Kenalog® (triamcinolone acetonide)
- **East**-Depo-Medrol® (methylprednisolone acetate)
- **Midwest**-Aristospan® (triamcinolone hexacetonide)
Efficacy Evidence

• Steroid is better than placebo at 6 and 12 weeks ⁴ [Level II]
• Steroid had successful therapeutic response after 3 months ⁵ [Level II]
• Steroid resulted in significant reduction in pain up to 25.3 months after injection ⁶ [Level II]
• Lower visual analog scales and higher tenderness thresholds at 3 weeks and 3 months ⁷ [Level II]
• Significant pain relief did not continue beyond 4 weeks ⁸ [Level I]
• VAS scores decreased at 2 weeks, 2 months, one year compared to pre-injection level ⁹ [Level II]
• VAS scores decreased at 1 month and further at 6 months ¹⁰ [Level II]
What is correct dosage?

Experienced clinical opinion is the principal rationale for injection practices; little rationale is based on formal scientific evidence ² [Level III]

- **Example: Trigger finger injections**
  - 5 mgs of methylprednisolone was determined to be the effective dose in the literature
    - 32% of respondents used this dose
    - 28% used twice the dose
    - 9% used at least 3 times the dose
Dosage: Are DPM’s using too much?

- **0.5 to 3 mgs (.2 to .75 cc) for soft tissue:** dexamethasone phosphate (4 mg/cc) ³
  [Level V]
- **2 to 10 mgs (.05 to .25 cc) for soft tissue:** triamcinolone acetonide (40 mg/cc) ³
  [Level V]
With or without local anesthetic?

• Mixture does not increase efficacy
• Benefits \(^{12}\) [UpToDate]
  ▫ Less tendency to cause soft tissue atrophy
  ▫ Decrease post-injection flare
  ▫ Immediate relief suggests proper placement of injection (?)

• Risks
  ▫ Lidocaine parabens can decrease bioavailability of acetate steroids \(^{1}\) [Level III]
  ▫ Increase risk of infection using multi-dose vials
Medial or Plantar Injection?

Medial

- 3 hour uptake was uniformly more medial and posterior than the situation of heel tenderness. This may mean that the best injection approach is the medial heel border at a point posterior to the heel tenderness. 

13 [Level IV]
Ultrasound-guided or Palpation?

- Equal amount of pain relief, decrease in fascial thickness, and hypoechogenicity in both groups at 2 weeks, 2 months, and 1 year
  - Recurrence rate higher in palpation group [Level II]
  - Ultrasound had lower VAS scores and higher tenderness thresholds [Level II]
- No difference in improvements in fascial thickness, fat pad thickness and VAS [Level II]
- No difference in VAS scores at 6 and 12 weeks [Level II]
Frequency of Injection

- Based solely on intra-articular habits
- From 4 injections per lifetime in any joint with DJD to 12 injections per year in any joint with RA $^{12}$ [UpToDate]
Side Effects

- Post-Injection Flare
- Fascial Rupture
- Fat Pad Atrophy
- Neurotoxicity
Side Effect: Post-Injection Flare

• Occurs in 2 to 4% of patients \(^{19}\) [Level V]
• Caused by insoluble (long-acting) agents
  ▫ Methylprednisolone (Depo-Medrol®) and triamcinolone acetonide (Kenalog®) cause it the least among long-acting agents
• Phosphate preparations (e.g. dexamethasone) might be more appropriate
Side Effect: Plantar Fascial Rupture

- Incidence varies from 2.4% \(^{14}\) [Level IV] to 5.7% \(^{15}\) [Level III]
  - DynaMed 2014 lists this as Level 2 (mid-level) evidence
Side Effect: Fat Pad Atrophy

- Atrophy of skin and subQ tissues occurs approximately 1% of the time $^{19}$ [Level V]
- Less soluble agents increase risk of soft tissue atrophy $^{3}$ [Level V]
- In a survey $^{16}$[Level III], 11% used dexamethasone, 35% used triamcinolone acetonide for DeQuervain’s tenosynovitis.
Side Effect: Neurotoxicity(?)

- Intrafascicular injection of steroid into rat sciatic nerve caused varying degrees of neurotoxicity \(^{17}\) [Level V]
  - Dexamethasone - minimal
  - Triamcinolone acetonide - moderate
  - Methylprednisolone - moderate
  - Triamcinolone hexacetonide - severe
Additional Injection Therapies

- Corticosteroid Injection with Peppering Technique
- Autologous Blood Injections
- Platelet Rich Plasma Injections
- Botulinum Toxin Injections
- Ultrasound Guided Dextrose Prolotherapy

All injection therapies require further research
Corticosteroid Injection with Peppering Technique

- Peppering: Inserting, injecting, withdrawing without emerging from the skin, slightly redirecting, and reinserting.
- Area is peppered with small injections
- Prospective randomized trial with 100 pts \(2^0\) [Level II]
  - A: Autologous Blood Injection
  - B: Peppering with Local Anesthetic
  - C: Corticosteroid Injection
  - D: Peppering with Corticosteroid (peppered 40-50 times)
- Results: Improvement in all groups, Group C and D had excellent results – Group D had superior results (p<0.05)
Autologous Blood Injection

- Blood drawn from patient and injected into site of pain
  - attempt to cause a physiological response that will ease pain and increase function
- Not better than corticosteroid injection \(^{20}\) [Level II]
- Triamcinolone injection may be more effective for pain relief than autologous blood injection \(^{21}\) [Level II]
Platelet Rich Plasma Injection

• Blood drawn from patient, spin blood down to produce a layer of platelet rich plasma, and injected into the site of pain
  ▫ Less local inflammation
  ▫ Requires larger blood draw

• PRP no more effective than placebo for Achilles tendinopathy ²² [Level II]
Botulinum Toxin Injection

- Regularly used to paralyze muscles and paralyze or deaden sensory nerves and thereby relieve pain
- Short term improvement in pain and overall foot function \(^{23}\) [Level II]
- At 6 months, botulinum toxin had significantly better results than corticosteroid injections \(^{24}\) [Level II]
Ultrasound Guided Dextrose Prolotherapy

• 80% reported a good to excellent outcome \(^{25}\) [Level IV]
References


12. UpToDate 2014