Myofascial Dysfunction in Posterior Tibialis Tendonitis and Trigger Finger: Diagnosis and Treatment Illustrated Through Case Reports

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Myofascial Dysfunction

**Educational Objectives**

1. To identify clinical manifestations of myofascial dysfunction based on Travell and Simon’s original writing and scientific studies.

2. To review the clinical presentation of posterior tibialis tendinopathy and trigger finger as illustrated through case reports.

3. To introduce myofascial treatment method for posterior tibialis tendinopathy and trigger finger.
Myofascial Dysfunction

“MYO”

muscle

“FASCIAL”

connective tissue

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Myofascial Dysfunction

**PHYSICAL SIGNS**

- Spot tenderness
- Jump sign
- Pain recognition
- Palpable band
- Referred pain
- Twitch response
- Loss ROM
- Weakness

Gerwin RD et al (1997) *Pain*

Njoo KH et al (1994) *Pain*

Nice DA et al (1992) *Arch PM&R*
Myofascial Dysfunction

**PHYSICAL SIGNS**

- Weakness

*FIGURE 1.* Length-tension curve (L-T curve) for frog muscle at various sarcomere lengths. (From Gowitzke BA, Milner M: A Scientific Basis of Human Movement. 2nd ed. Baltimore, Williams & Wilkins, 1988, p 168; with permission.)
PostTib Myopain: Case 1

History:

- K.M., 41 y.o. attorney w/ 2.5 yr. h/o L medial arch pain and tenderness aggrav. by jogging
- DPM Dx’ed “tendinitis”. Rx’ed w/ shoe orthotics, 3 cortisone inj., NSAID’s, Air-cast immobilization, no jogging for 2 yrs.
- No h/o LBP
PostTib Myopain: Case 1

Physical Examination:

- Marked tenderness L navicular tuberosity
- Passive DF/eversion w/ pain posterior to med. malleolus
- Bilateral pes planus
- Marked tenderness PT motor point
PostTib Myopain: Case 1

**Diagnosis:**

- Posterior tibialis tendinitis
- Insertional periostitis (at the navicular tuberosity)
PostTib Myopain: Case 1

Treatment Course:
- Wk. 1-3: TPI and stretching instruction
- Wk. 5: ¼ mile walk/jog x’s 15 mins., TPI and stretching
- Wk. 7: 1/2 mile walk/jog x’s 15 mins., myofascial massage and stretching
PostTib Myopain: Case 1

Treatment Course:

- Wk. 12: jogging 3 miles TIW-QIW, no insertional tenderness, TPI and stretching instruction
- 1yr. later, flare-up Rx’ed w/ 2 sessions TPI’s and exercise instruction
- 2 yrs. later, telephone follow-up: no pain, jogging 2-3 miles TIW-QIW
PostTib Myopain: Case 2

History:

- H.D., 36 y.o. investment analyst w/ 2.5 mo. h/o L mid-foot pain and tenderness, resulting from a 6 ft. fall landing on L foot
- ER MD: neg. foot x-ray, Dx’ed “sprain”
- OS: neg. foot x-ray, possible Lisfranc Fx
- Ankle/Foot OS: foot MRI scan, Rx’ed ankle/foot immobilizer, NSAID’s
PostTib Myopain: Case 2

Physical Examination:

- Antalgic gait w/o heel-to-toe
- Marked tenderness and mild edema L medial and dorsal mid foot
- Diminished ADF w/ knee flex’ed
- Marked tenderness PT motor point
PostTib Myopain: Case 2

L Foot MRI scan:

- 2 mos. s/p trauma
- T1 hypointensity at base of MT 2&3, mid and lat. cuneiforms, cuboid and plantar aspect of navicula
- Hyperinensity on inversion recovery sequence in above areas
PostTib Myopain: Case 2

Diagnosis:

Posterior tibialis tendinitis
diffuse insertional periostitis
PostTib Myopain: Case 2

Treatment Course:

- 11 sessions PT over 3.5 mos.
- TPI and therapeutic stretching instruction
  - Wks. 1, 3 (walking w/o immobilizer, bicycling in gym), 5, 6 (isometric/Theraband strengthening & BAPS), 8, 11, 14, 17 (jogging in gym), 20, 24
PostTib Myopain: Case 2

Treatment Course:

- **Cost of care**
  
  10 TPIs @ $100
  
  11 PT @ $ 60
  
  Total cost = $1,660

- 6 mo. telephone follow-up: no pain, total return of prior function including jogging
PostTib Myopain: Case 3

History:

- A.B., 15 y.o. HS student w/ 9 mo. h/o L medial mid-foot pain: acute onset severe pain lasting 2 days w/o prior trauma, falls, or change in activity
- Pain recurred several times over next 4 mos. OS: x-rays neg. ER MD: x-rays neg., rx’ed w/ soft cast, ibuprofen. OS: L foot/ankle MRI neg. Dx’ed “plantar fasciitis”.
- Rheumatologist x’s2: neg. blood tests, “plantar f.”
- Foot OS: Rx’ed w/ CAM walker x’s 2 mos.
- Pain prolonged standing, can’t hop or jump
PostTib Myopain: Case 3

Physical Examination:
- Normal gait w/ forefoot valgus
- Unable to L hop
- Marked tenderness of L navicular tuberosity
- Diminished ADF w/ knee flex’ed
- Marked tenderness PT motor point
PostTib Myopain: Case 3

**Diagnosis:**

- Posterior tibialis tendinitis
- Insertional periostitis (at the navicular tuberosity)
PostTib Myopain: Case 3

Treatment Course:

- 8 sessions PT over 3 mos.
- 3 MD office visits w/ L PT myofascial massage and therapeutic stretching instruction
- Able to play basketball 3.5 mos. after initial OV
- 8 mo. post last OV: F/U exam-no pain, full function, hopping w/o difficulty
PostTib Myopain: Case 4

**History:**

- C.DeT., 65 y.o. art gallery owner w/ 9 mo. h/o progressively worsening R medial ankle pain: started after walking on wet, slippery pebbles w/ slight twist of R ankle w/o swelling or limping
- Pain gradually worsened w/ limping and medial ankle swelling
- Foot OS: Ankle MRI scan. Rx’ed w/ AFO-metal uprights x’s 2 mos. and ankle strapping w/o change
- PT BIW x’s 3 mos. w/o change
- Advised to have surgery w/ tendon/ligament graft
PostTib Myopain: Case 4

History:

- Sharp, stabbing medial ankle pain standing and walking
- Medial ankle swelling and deformity
- Walking w/ pain and limping, limited to 5-6 blocks
- Cannot reciprocate stairs
PostTib Myopain: Case 4

Physical Examination:
- Mild R antalgic gait w/o heel-to-toe progression
- Mild forefoot valgus
- Marked tenderness post to R medial malleolus
- “Too-many toes” sign
- Can’t single limb toe rise
- Diminished ADF w/ knee flex’ed
- Marked tenderness PT motor point
- R ankle PF/inversion strength 4/5
PostTib Myopain: Case 4

R Ankle MRI scan:

- Bone marrow edema of distal medial and post malleoli
- Distal PT tendon hypertrophy c/w severe tendinopathy
- PT tenosynovitis
PostTib Myopain: Case 4

Diagnosis:

Posterior tibialis tendonopathy w/ partial tear
PostTib Myopain: Case 4

Treatment Course:

- TPI to R PT and stretching w/ towel asst and then standing 2-position calf stretches on Wk. 1,3 and 4
- PT 1 session to date
- Pt. walking >20 blocks w/o limping and reciprocates; can partially single toe-rise
PostTib:

Anatomy
Origin
PostTib: Anatomy Insertions
PostTib:

Anatomy

Insertions
PostTib:

Anatomy

Trigger Point
PostTib: Anatomy Trigger Point

Deep peroneal nerve and anterior tibial vessels

Extensor hallucis longus

Extensor digitorum longus and peroneus tertius

Superficial peroneal nerve

Peroneus brevis

Peroneus longus

Fibula

Flexor hallucis longus

Peroneal vessels

Intermuscular septum

Soleus

Gastrocnemius aponeurosis

Plantaris tendon

Tibial nerve and posterior tibial vessels

Flexor digitorum longus

Tibialis posterior

Tibialis anterior

Interosseous membrane

Tibia
### PostTib: Kinesiology

<table>
<thead>
<tr>
<th>WB/Stance phase</th>
<th>PT EMG activity</th>
<th>Ankle/Talar Motion</th>
<th>Subtalar Motion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heel-Strike to Flat-Foot</td>
<td>silent</td>
<td>PF</td>
<td>pronation/eversion</td>
</tr>
<tr>
<td>Flat-Foot to Heel-Off</td>
<td>active, (eccentric)</td>
<td>DF</td>
<td>supination/inversion</td>
</tr>
<tr>
<td>Heel-Off to Toe-Off</td>
<td>active, (concentric)</td>
<td>PF</td>
<td>supination/inversion</td>
</tr>
</tbody>
</table>
PostTib Myopain: Clinical Manifestations

History/Symptoms:
- medial mid-/hindfoot pain, tenderness, edema
- onset insidious w/o prior trauma, falls
- training errors: running on uneven surface, xs jumping after layoff or landing on hard surface
- pain on forceful toe-off or decr. power on push-off
- c/o ankle rolls-in or loss of arch
- aggravated by prolonged walking/standing.
- pain occ. can extend to distal leg/medial tibia
PostTib Myopain: Clinical Manifestations

Physical Examination/Signs:

- tenderness post. to med. malleolus and insertion of PT tendon navicular tuberosity
- diminished ADF w/ knee flex’ed
- marked tenderness PT motor point
- decr. PT strength to MMT and functional maneuvers (hopping, single limb heel rise)
PostTib:

Trigger Point Palpation
PostTib Myopain: Clinical Manifestations

Physical Examination/Signs:

- pain w/ resisted PF/inversion or passive DF/eversion (tenosynovitis)
- loss of medial arch, flatfoot deformity (planovalgus)
- in standing: heel valgus w/ forefoot abduction (“too many toes” sign)
- positive “PT stretch” sign
PostTib:

Manual Stretch Sign

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PostTib:
Standing Stretch sign
Medial Foot Pain

### Differential Diagnosis

- Partial PT tendon tear
- Ligament laxity of medial ankle (deltoid)
- Tarsal coalition
- Lisfranc Fx/dislocation
- Painful accessory navicular
- *Posterior Tibialis insertional tendinitis/ periostitis*
PostTib Myopain: Treatment

Orthopedic recommended treatment

- 4 wks. immobilization w/ SLC or cast/brace
- NSAID’s
- activity limitation
- later- plastic molded AFO, medial longitudinal arch support (shoe orthotic)
- avoid cortisone inj. b/o risk weakening tendon
- surgical debridement of tendon
## PostTib Tendon Dysfunction

<table>
<thead>
<tr>
<th>Stage</th>
<th>Characteristics</th>
<th>Non-Op Treatments</th>
<th>Operative Treatments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenosynovitis</td>
<td>Acute medial pain/edema, can heel-rise</td>
<td>NSAID’s, 6-8 wk. immobilize then ankle stirrup brace</td>
<td>Tenosynovectomy</td>
</tr>
<tr>
<td>Rupture Stage I</td>
<td>medial pain/edema, hindfoot flexible, can heel-rise</td>
<td>shoe orthotics, hinged AFO, medial heel/sole wedge</td>
<td>Tendon debridement, FDL tendon transfer &amp; calcaneal osteotomy</td>
</tr>
<tr>
<td>Stage II</td>
<td>valgus heel, lateral pain, can’t heel-rise, hindfoot flexible</td>
<td>shoe orthotics, hinged AFO, medial wedge</td>
<td>Tendon debridement, FDL tendon transfer &amp; calcaneal osteotomy</td>
</tr>
<tr>
<td>Stage III</td>
<td>valgus heel, lateral pain, can’t heel-rise, hindfoot rigid</td>
<td>rigid AFO</td>
<td>Triple arthrodesis</td>
</tr>
</tbody>
</table>
PostTib Myopain: Treatment

Rehabilitation

- myofascial treatment, i.e. dry needling or ischemic compression
- physical therapy: modalities (for deep tissue treatment) i.e. interferential electrical stimulation, ultrasound, myofascial massage, therapeutic stretching
- therapeutic stretching home program
PostTib:

Standing

Stretch

(AP view)
PostTib Stretch
PostTib Myopain: Treatment

Rehabilitation

- Travell & Simons and Rachlin & Rachlin “do not recommend injection of the PT muscle esp. from behind... probing for the TP w/ the needle ...danger of encountering a nerve or an artery”
PostTib Myofascial Dysfunction

- Tenosynovitis
- Tendon degeneration
- T. partial tear/thickening
- T. tear/rupture
- Flatfoot (flexible) deformity

- Hindfoot/midfoot DJD
- T. avulsion
- T. dislocation
- Tarsal tunnel syndr.
- Shin splints/ deep compartment syndr.
PostTib Myopain

Conclusions:

- PT myofascial treatment was effective in relieving medial mid-foot pain and restoring these pts. to full athletic function
- Dry needling of the PT trigger point is a 100% safe procedure that can be used in PT Myopain
- Rehabilitation of the PT using myofascial Rx’s can be considered when orthopedic Rx’s fail
Trigger Finger

- Common known as finger flexor stenosing tenosynovitis
- Painful, jerky restricted movement, occ contracure
- Involves frequently thumb, 3rd or 4th fingers
- Lump forms on tendon of FDS and catches on A1 pulley at base of MCP joint
Trigger Finger : Case 1

History:

- C.S., 57 y.o. R-handed saleswoman w/ 2 yr. h/o R 4th finger recurrent locking, clicking and painful snapping
- Hand orthopedist Dx’ed “trigger finger”
- Rx’ed w/ cortisone injection x’s 3 w/ relief for 1 yr., 3 mos. and no improvement
- Finger splinted for 6 wks. w/o improvement
- Advised to have surgery
Trigger Finger : Case 1

Physical Examination:

- R elbow ext -10°
- Fist- R 4th finger 4 FBS from hypothenar eminence
- Palpable, tender nodule at volar R 4th MCP
- Pain and snapping/click w/ active 4th finger flex/ext
- Positive interosseous 4th finger stretch sign
- R 3rd dorsal interosseous trigger point tenderness
Interosseous Stretch Sign

- MCP joint is progressively extended
- Stretch sensation should be sensed in area of volar MCP jt
- Positive sign if sensed in dorsal MCP or IP jts
Trigger Finger: Case 1

**Treatment:**
- TP dry needling QW x’s 3 wks., QOW x’s 3, Q3W x’s 3 and Q4W x’s 2
- PT QW x’s 3 mos. w/ HPs, interferential stim, myofascial massage and stretching to R 3rd DI and R supinator/pronator
- Home stretching program: interosseous progressive stretch and supinator/pronator forearm stretches
Trigger Finger : Case 1

Results:

- 6 mos. after initial exam- positive stretch sign w/ all 3 jt stretch, flexion 1.25 FBS from hypothenar and 3rd DI TP tenderness

- 4 yr. F/U- FROM w/ neg. interosseous stretch sign and no trigger finger complaints
Trigger Finger : Case 2

History:

- C.S., 52 y.o. L-handed insurance salesman and sailing enthusiast w/ 1 mo. h/o L 4\textsuperscript{th} finger w/ c/o’s persistent clicking and painful snapping
- Had similar episode 3 yrs prior Dx’ed by orthopedist “trigger finger” and Rx’ed w/ cortisone injection w/ relief for 3 yrs.
Trigger Finger: Case 2

Physical Examination:
- Full elbow ROM
- Mild decrease in L wrist DF
- Palpable, tender nodule at volar L 4\textsuperscript{th} MCP
- Pain and snapping/click w/ active 4\textsuperscript{th} finger flex/ext
- Positive interosseous 4\textsuperscript{th} finger stretch sign
- L 3\textsuperscript{rd} dorsal interosseous trigger point tenderness
Trigger Finger : Case 2

Treatment:

- TP dry needling QW x’s 2
- F/U visits 2 mos. and 4 mos. later w/ myofascial massage and stretching to L 3rd DI and L supinator/pronator
- Home stretching program: interosseous progressive stretch and supinator/pronator forearm stretches
- 1.5 yr. F/U: trigger finger resolved
Trigger Finger : Case 3

History:

- Y.B., 61 y.o. R-handed secretary w/ 8 mos. h/o R 3rd finger locking, clicking and painful snapping
- Locking in a.m. and must manually open
Trigger Finger : Case 3

Physical Examination:

- Full elbow ROM
- Mild decrease in R wrist PF and DF
- R 3\textsuperscript{rd} finger -30\textdegree ext at PIP joint
- Palpable, bulbous, tender nodule at volar R 3\textsuperscript{rd} MCP
- Snapping and locking w/ active 4\textsuperscript{th} finger flex/ext
- Cannot make full fist, 3\textsuperscript{rd} finger 0.5 FBS from thenar
- Positive interosseous 4\textsuperscript{th} finger stretch sign
- L 3\textsuperscript{rd} dorsal interosseous trigger point tenderness
Trigger Finger: Case 3

Treatment:

- TP dry needling QW x’s 4 wks., QOW x’s 2
- Home stretching program: interosseous progressive stretch and supinator/pronator forearm stretches
- F/U: 4 mos. No locking or snapping but still has finger stiffness
Trigger Finger: Treatment

Orthopedic recommended treatment

- NSAID’s
- Limit activity to avoid repetitive stress
- Corticosteroid injection into flexor sheath
- PT/OT: iontophoresis w/ corticosteroids, U/S, deep friction massage to nodule/tendon
- Splinting of MCP joint in extension
- Surgical debridement of tendon
Trigger Finger: Treatment

Rehabilitation

- myofascial treatment, i.e. dry needling or ischemic compression to interosseii (and supinator)
- physical therapy: modalities (for deep tissue treatment) i.e. interferential electrical stimulation, ultrasound, myofascial massage, therapeutic stretching to interosseii and supinator/pronator
- therapeutic stretching home program
Interosseous Stretch 1-Joint

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Interosseous Stretch 2-Joint
Interosseous Stretch 3-Joint