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Orthopaedics, Sports & Spine

Plantar Fasciitis in Athletic Populations: Treatment Considerations

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“Plantar fasciitis sucks. It feels like you have needles underneath your foot while you’re playing. That’s what it feels like, so you can imagine. You need to jump, you need to run, you need to do a lot of things while you’re playing basketball, so you don’t want needles underneath your foot, right?”

-----Joakim Noah, Chicago Bulls center during the 2013 NBA playoffs

“Most pro basketball players have very big feet with low arches and tight calf muscles and hamstrings. They jump higher with this anatomy, but they are more prone to plantar fascia injuries.”

-----Steven Subotnick, past podiatrist Golden State Warriors

Manufacturing Workers Risk Factors

- Study among manufacturing workers (Werner et al 2010)
- PF Relatively common in this setting
- Risk Factors
 - Forefoot Pronation
 - High MT pressure on gait analysis
 - Increased time standing on hard surfaces
 - Increased time spent walking
 - Increased times getting in and out of the vehicle
 - Mid range tenure at the plant (4-7 years)



Continued Work Place Prevalence

- Possible association with athletic population?
- Suggestions
 - Shoe Orthoses with medial longitudinal arch and MT pad
 - Cushioned mats to stand on
 - Rotation of shoes during the work week (decreased risk by 72%)
 - Increased supervisor support showed a trend toward the reduction of prevalence

Stretching and Strengthening

- **Specific PF stretching vs Achilles related stretching**
(Digiovanni 2006)
 - 92% (sixty-one) of the sixty-six patients (PF stretching group) reported total satisfaction or satisfaction with minor reservations. Fifty-one patients (77%) reported no limitation in recreational activities, and sixty-two (94%) reported a decrease in pain
- **Orthotic and Specific PF stretching (Drake 2011)**
 - 15 patients, 12 weeks of study
 - In treating PF, a TCFO used for 2 weeks, followed by a stretching program, provided preliminary evidence that first-step heel pain and foot and ankle function improve in the short term and up to 12 weeks.



Strength training/ BMI

- Strength training results in better outcomes over stretching (Rathleff 2014)
 - At 12 months, the FFI was 22 points in the strength group and 16 points in the stretch group.
 - A simple progressive exercise protocol, performed every second day, resulted in superior self-reported outcome after 3 months compared with plantar-specific stretching.
 - High-load strength training may aid in a quicker reduction in pain and improvements in function.
- Higher BMI results in higher incidence of plantar fasciitis (van Leeuwen 2016)
 - Out of 12 variables studied, only high BMI correlated with a diagnosis of plantar fasciopathy
 - This result seen more in non-athletic vs. athletic populations



Peak forces

- The peak forces recorded in gymnasts' landing ranged from 8.2 to 11.6 times the body weight.
- Maximum forces in jumping from 0.45 m, which ranged from 5.0 to 7.0 times the body weight, were accurately predicted by the model.



Considerations for orthotics/ treatment

- Increased pes planus showed a high correlation with LE injuries in a military population (Levy 2006)
- Exercise-related leg pain was common among this group of female athletes, suggesting that there are certain factors, including foot pronation, sport, and a history of this condition, that are associated with an increased risk of exercise related leg pain (Reinking 2006)
- No associations were noted between ERLP history or seasonal occurrence and age, high school year, years of high school running, sex, BMI, **foot type**, or training distance. The only risk factor identified for ERLP season occurrence was ERLP history. (Reinking 2010)

When do we add an orthotic to the Rx plan....



LeBron James

Minimalist shoe: Considerations (Johnson 2016)

- A 10.6% increase in abductor hallucis cross-sectional area occurred in the minimalist shoe group compared to the control group. There was no significant change in any of the other muscles examined.
- 8 of the minimalist shoe group runners, and 1 control runner developed bone marrow edema. Those who developed bone marrow edema, primarily women, had significantly smaller size in all assessed muscles.
- Size of intrinsic foot muscles appears to be important in safely transitioning to minimalist shoe running.
- Perhaps intrinsic foot muscle strengthening may benefit runners wanting to transition to minimalist shoes.



Treatment considerations

- Extracorporeal Shockwave Therapy (ESWT) (Corey et al 2018)
- Accupuncture (Karagounis et al 2011)
 - Used in combination with stretching and strengthening
- Platelet Rich Plasma (PRP) (Tiwari et al 2013)



Manual Therapy

- Manual Tx > Therex/ EP agents in treating PF (Cleland 2009)
 - Modalities (US/ ionto)/ stretch and strengthen vs. MTH/ stretch and strengthen
 - 4 week and 6 month pain results favor MTH group
- Manual Tx/ Stretching vs Stretching alone (Renan-Ordine 2011)
 - This study provides evidence that the addition of TrP manual therapies to a self-stretching protocol resulted in superior short-term outcomes as compared to a self-stretching program alone in the treatment of patients with plantar heel pain.

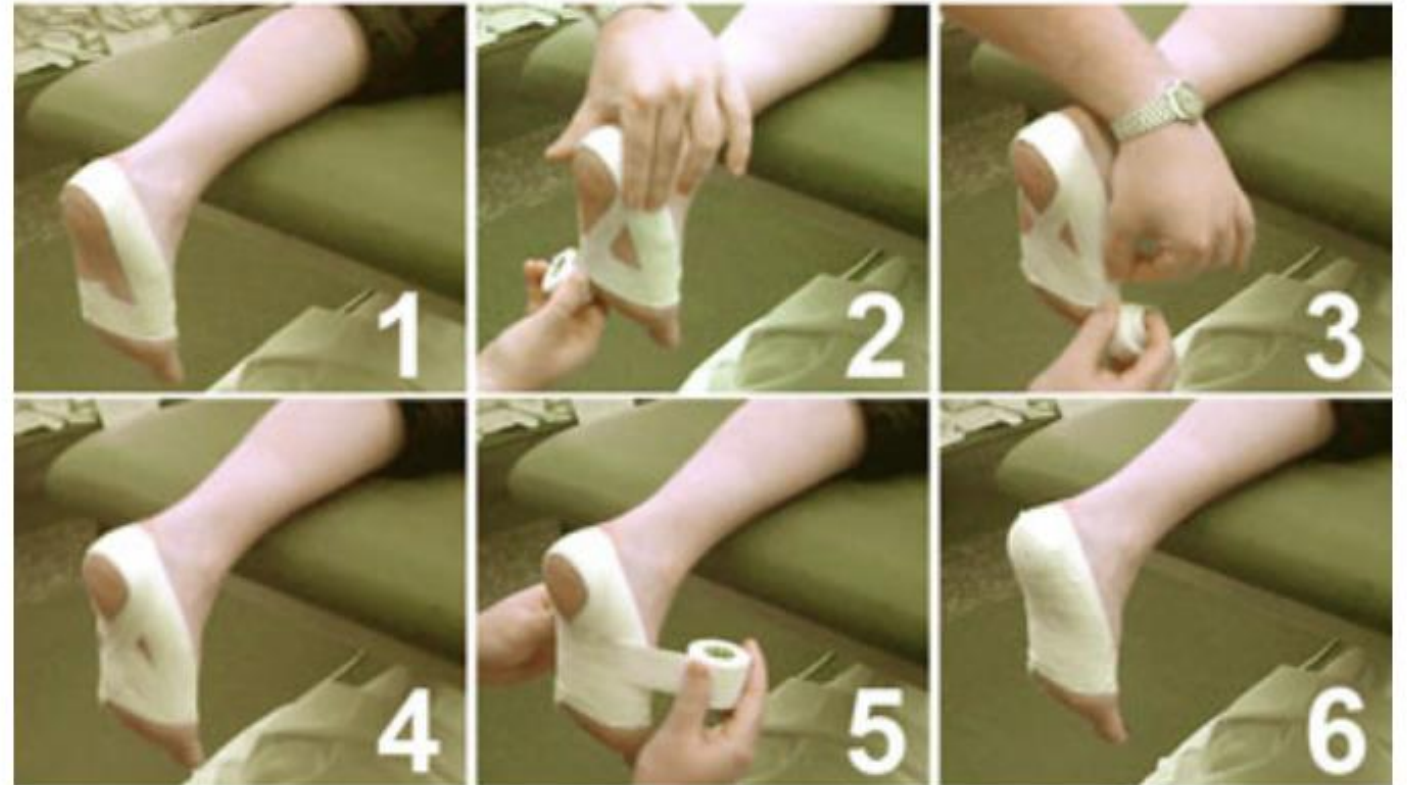
Dry Needling

- Showed increased effectiveness over corticosteroid injection at the origin of plantar fascia at the calcaneus (Uygur et al 2018)
- Lower VAS scores at the 3mo, 6mo, 1yr mark in dry needling vs steroid injection group in plantar fasciitis patients (Ratsegar et al 2017)
- Sham dry needling vs real dry needling (Cotchett et al Aug 2014)
 - At the primary end point of 6 weeks, statistically significant differences in first-step pain (measured on a VAS) and foot pain (measured on the FHSQ) were found in favor of real dry needling



Taping

- **Low-dye taping** reduces excessive pronation by fixing the subtalar joint axis, which corrects the aforementioned associated problems of plantar fasciitis (Park 2015)
- More of a short term solution (Verbruggen 2018)



...But is there anything else we can do
to treat this condition?

THINK



Case Study

- 51 yo M
- Presenting with plantar heel pain B
- He has stopped working as a restaurant manager due, in part, to pain
- First doctor (podiatrist) visit was 8/6/19 and he had three subsequent visits
- Pain pre-dated his first doctor visit by 6 months
- PMH includes HTN, Diabetes Type II; BMI 36.9
- Xray: posterior calcaneal spur seen on L

Case Study

- Podiatry Course of treatment/ recommendations
 - Rest/ Ice/ Gastroc stretches
 - Orthotics, obtained after 10/8 appt. (Orange Superfeet)
 - Injection L 8/6/19, R 10/8/19 with pain improvement
 - 12/10/19 pain returned (6-7/10) and had B plantar heel injections again

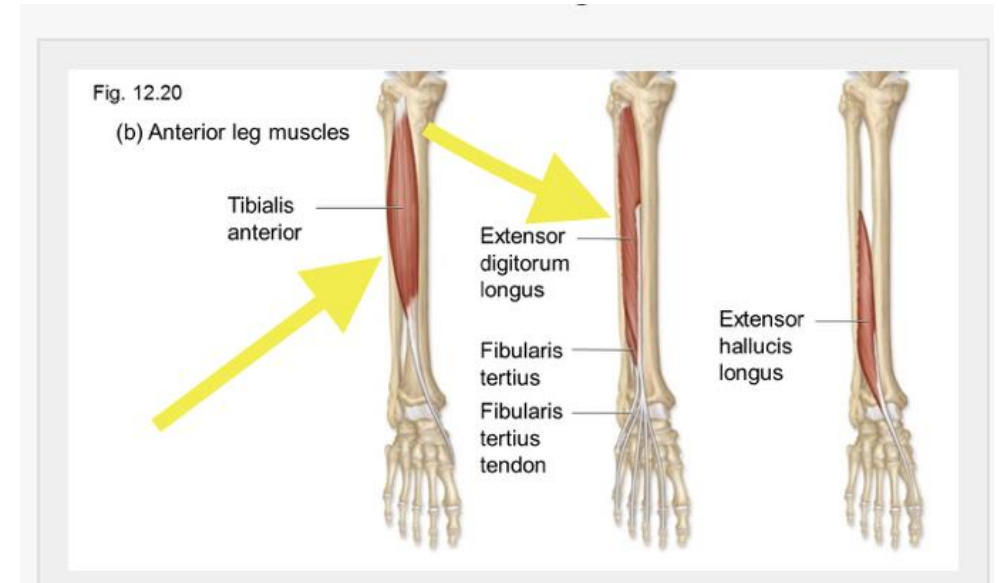
Case Study

- Physical Therapy evaluation (1/2/20)
 - Highest pain reports 10/10 and pain at rest 1/10
 - Pain increases with standing > 1 hour and going for walks
 - DF Left 4 degrees, Right 5 degrees; all other motions WNL
 - MMT B foot/ ankle 4 to 5/5
 - Ambulation: over pronation B, increased femur IR B
 - **TTP: Plantar fascia, Tibialis anterior, Extensor Digitorum Longus**
 - **Resting position of toes B in extension**

So...how can I help this guy?

Case Study

- PT course of treatment (6 sessions 1x/ week)
 - Initiated on 1/2
 - Moist heat B legs
 - 4 sessions of TPDN to the TA/ EDL B
 - 6 sessions of STM to TA and EDL/ 4 sessions to plantar fascia B
 - HEP consists of gastroc/ soleus stretching, TA/ EDL stretching, ice bottle massage
 - Initiated on 1/8
 - Bike
 - Toe curls with theraband
 - Toe stretching into extension
 - Initiated on 1/30
 - Heel Raises with eccentric lowering



Case Study

- PT Treatment outcomes
 - Patient rated pain 1-2/10 with most activities
 - Patient reports ability to ambulate 2 miles with pain 0-1/10
 - Minimal to no tenderness to palpation over TA/ EDL/ plantar fascia
 - Toes B rest on the floor in a neutral position
 - DF ROM B unchanged from initial evaluation
 - Doctor's note states: "doing extremely well...and having no sign of pain or tenderness...and has been extremely happy with his improvement."

...more study is needed but this shows some positive signs for this type of intervention for plantar fasciitis.

Thank you!

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