



AOPT > SIG

ACADEMY OF ORTHOPAEDIC PHYSICAL THERAPY, APTA

FOOT & ANKLE



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Foot & Ankle SIG News & Updates

- Check out our FA SIG Infographics and podcasts!
<https://www.orthopt.org/content/special-interest-groups/foot-ankle>
- The leadership team at FASIG has been working towards completion of the **Description of Fellowship Practice** for the PT foot and ankle specialist. The technical report and DFP are undergoing the final touches in preparation for submission to ABPTRFE.
- Are you social media savvy? Want to help spread the foot and ankle PT educational content and news? FASIG is opening up a new **Social Media Chair** position! Please let us know if you're interested!
- We will be running a **Student Membership Contest!** Stay tuned for details in the near future.
- Lastly, please keep an eye on your email for a virtual membership meeting in July. As always, if you have ideas on the development and communication of information to enhance foot and ankle physical therapy please reach out to FASIG leadership.



Member Spotlight

Featuring Dr. Sarah Johnson, PT, DPT, OCS, COMT

Where are you originally from?

I grew up in Virginia but went to undergrad & PT school at East Carolina University (ECU) in Greenville, NC.

Where do you currently work?

At ECU I am a Clinical Professor, the Director of Clinical Education, and continue to practice at the university's outpatient orthopedic clinic.

What sparked your interest in foot and ankle?

I grew up running cross-country and track in addition to swimming and started training for marathons/triathlons during PT school. I enjoy working with runners, which is what sparked my interest in foot and ankle, along with being a well-rounded clinician.

What is your current research interest?

I work with injured runners looking at form change maintenance, long term follow-up, and most enjoy working with those with interesting or less-common injuries such as bilateral hamstring tenotomies or a gluteus medius tear.

How did you become involved in research/academics?

As a clinician, I found that I really enjoyed working with students when I was a clinical instructor. When I heard there was a clinical faculty position open at ECU I applied immediately. As I began working with my colleagues, I grew more interested in research to find clinically relevant answers to questions we had. One of my favorite parts about having a job that includes time in clinic, research, and academia is the amount of variety it provides.

What is the most common running injury you see?

Most common would be a variety of knee pain, which almost always correlates to their running pattern. Low back pain, SI joint and hip pathologies are also surprisingly common. Finally, I find that foot and ankle issues tend to be more mechanical in nature rather than just tendonitis or plantar fasciitis, which then causes issues up the chain. One of my best recommendations for new clinicians to gain experience with these running-specific pathologies is to get involved in the running community by offering free screens at running stores, utilizing APTA resources, and remembering not to let a single article or case study bias you.

What is one thing you would like to see change in treatment of runners?

I think we need to watch more runners run during our evaluations and treatment. We must also remember to treat each patient as an individual rather than treating all pathologies (such as IT band syndrome) the same way.

What is something that excites you about the future of running PT?

Running is only getting more and more popular. Seeing that students are consistently showing interest in our running special topics class, and the field in general, makes me most excited for the future the field.

What other activities/hobbies do you enjoy outside of physical therapy?

Spending time with my family, staying involved with our church, and training for triathlons.

- Jessica Glauber, SPT, East Carolina University

FA SIG Updates

Member Spotlight –
Dr. Sarah Johnson, PT,
DPT, OCS, COMT

Running and Foot
and Ankle Physical
Therapy

Citation Blast – Running

Foot and Ankle - Running

Running is a dynamic form of gait that offers many advantages relative to other types of exercise; it doesn't require special training or equipment and can be performed nearly anywhere. However, this accessibility does come with its drawbacks, and despite our familiarity of this form of locomotion, running injuries are staggeringly common. Around half of those who run regularly get injured each year, with most of those injuries being attributed to overuse.¹

The distal structures of the lower extremity face considerable challenges while running. Throughout stance phase, the Achilles tendon is loaded with a force up to double that of walking.² Despite being the strongest tendon in the body, this magnitude of stress over time can strain and ultimately damage the Achilles tendon particularly in overuse scenarios, often leading to degenerative changes.³ Achilles tendinopathy seems to be more common in shorter-distance runners, with sudden changes in training intensity or volume contributing to development.⁴ This injury manifests as Achilles tendon pain with activity, tenderness to palpation, and sometimes nodular swelling at the source of injury.⁹

Other ankle plantar flexors are similarly prone to injury with overuse. During running, on contact with the ground, the foot absorbs shock by rapidly pronating. This action is stabilized primarily by the tibialis posterior muscle. Peroneal tendinopathy can present as pain to the lateral aspect of the ankle and tenderness to palpation while posterior tibial tendinopathy can present as pain to the medial aspect of the ankle, inferior to the medial malleolus.^{6,7} It is important to note that dysfunction of either tendon may place the surrounding structures at risk for injury; peroneal tendon dysfunction has been shown to predispose lateral ankle sprains, and posterior tibial tendon dysfunction increases the risk of damage to the spring ligament, which may require surgical intervention.^{8,9}

Exercise-based rehabilitation is the most effective physical therapy plan for treatment of tendinopathies activity modification and progressive loading as staple components.^{2,5-6} Regarding Achilles tendinopathy specifically, the clinical practice guidelines from the American Physical Therapy Association asserts the highest grade of evidence toward the particular effectiveness of tendon loading for decreasing pain and improving function, while also addressing tendon remodeling.⁹ Orthotic insoles can also be used for lower leg tendinopathies to support the arch and reduce the demands of stabilizing ankle musculature.^{5,6,9}

The bones of the foot also need to withstand the forces of running and are similarly susceptible to injury. According to Wolf's Law, bones are constantly remodeling to accommodate the magnitude and directions of the forces they experience.

Problems arise when accelerated bony remodeling is unable to keep up with a repetitive load, as seen with abrupt changes in activity level, and eventually can lead to bone stress injuries.¹⁰ These bone stress injuries are most common in the highly loaded bones of the lower extremity, particularly the tibia, fibula, and metatarsals, and generally present as progressively worsening pain with weightbearing over the area of the affected bone and localized bone tenderness. Treatment normally begins with a period of activity restriction/modification to allow the bone to properly remodel. Physical therapy would next be aimed at identifying and correcting strength, mobility, and motor control deficits of the hip, knee, ankle, and foot.¹⁰

Although the incidence and prevalence of injury in runners is high, literature reinforces the effectiveness of conservative treatment for many of the related conditions. Therefore, runners should be cognizant of major changes to their running intensity, and try to incorporate targeted strengthening into their exercise routines to promote more optimal movement patterns and help prevent future injury.

-Tyler Arl, SPT, Rosalind Franklin University

References

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Citation Blast – Running

Wang IL, Graham RB, Bourdon EJP, Chen YM, Gu CY, Wang LI. Biomechanical Analysis of Running Foot Strike in Shoes of Different Mass. J Sports Sci Med. 2020 Feb 24;19(1):130-137. PMID: 32132836; PMCID: PMC7039018.

This study attempts to isolate the impact of shoe mass on biomechanical changes during running. Running shoes are available in lightweight, minimal, or traditional cushioned types; the shoe masses tested ranged from 175g to 415g. Study findings indicate that peak vertical ground reaction force increased with shoe mass. However, the strike index, initial contact angles of lower extremity joints, and peak moment of ankle during stance phase did not change with the changes in mass. Activation of semitendinosus, lateral gastrocnemius, and soleus muscles was higher with heavier shoes during the push-off phase. The lighter shoes may contribute to gastrocnemius muscle fatigue during braking phase, and heavier shoes may contribute to semitendinosus and triceps surae muscle fatigue during push-off phase. To reduce the risk of injuries, runners should allow sufficient time to adapt to changes in shoe mass prior to extended periods of exercises.

Mousavi SH, Hijmans JM, Rajabi R, Diercks R, Zwerver J, van der Worp H. Kinematic risk factors for lower limb tendinopathy in distance runners: A systematic review and meta-analysis. Gait Posture. 2019 Mar;69:13-24. doi: 10.1016/j.gaitpost.2019.01.011. Epub 2019 Jan 11. PMID: 30658311.

This systematic review and meta-analysis considered 28 studies to assess evidence for kinematic risk factors for lower limb tendinopathy in runners. The study indicated moderate evidence of rearfoot eversion at heel strike, but strong evidence of no differences in peak rearfoot eversion or peak ankle dorsiflexion in Achilles Tendinopathy. Note that peak rearfoot eversion was reported in all the studies. There was limited evidence for no differences in peak rearfoot eversion in runners with plantar fasciopathy (2 studies) but very limited evidence for higher peak rearfoot eversion for posterior tibial tendon dysfunction (1 study) and patellar tendinopathy (1 study). There was also very limited evidence for higher peak hip adduction in patellar tendinopathy (1 study).

Xu Y, Yuan P, Wang R, Wang D, Liu J, Zhou H. Effects of Foot Strike Techniques on Running Biomechanics: A Systematic Review and Meta-analysis. Sports Health. 2021 Jan/Feb;13(1):71-77. doi: 10.1177/1941738120934715. Epub 2020 Aug 19. PMID: 32813597; PMCID: PMC7734358.

The study assesses the impact of foot strike techniques on injuries occurring during distance running. Rearfoot strikes lead to increased biomechanical loads on overall ground impact as well as knee and patellofemoral joints. On the other hand, forefoot strike technique results in higher load on ankle joint and Achilles tendon. Clinicians can use this information to assess the impact on biomechanical loads due to different foot strike techniques.

Corrigan P, Hornsby S, Pohlig RT, Willy RW, Cortes DH, Silbernagel KG. Tendon loading in runners with Achilles tendinopathy: Relations to pain, structure, and function during return-to-sport. Scand J Med Sci Sports. 2022 Aug;32(8):1201-1212. doi: 10.1111/sms.14178. Epub 2022 May 22. PMID: 35488734; PMCID: PMC9972464.

The study focuses on runners with Achilles tendinopathy during return to sport (RTS) by comparing their pain, tendon structure, and function between limbs as well as Achilles tendon loads during running. The most symptomatic limb had significantly worse pain, larger tendon cross-sectional area, and worse jump performance. Additionally, decreased countermovement jump height was correlated with different Achilles tendon loading behaviors during running. This information can assist in clinical decision-making during RTS.

Warden SJ, Edwards WB, Willy RW. Optimal Load for Managing Low-Risk Tibial and Metatarsal Bone Stress Injuries in Runners: The Science Behind the Clinical Reasoning. J Orthop Sports Phys Ther. 2021 Jul;51(7):322-330. doi: 10.2519/jospt.2021.9982. Epub 2021 May 7. PMID: 33962529.

The clinical question of what the optimal load is to manage low-risk tibial and metatarsal bone stress injuries in athletes and have them safely return to running is asked in this commentary. It emphasizes that knowledge of the healing process and presenting symptoms need to be considered for loading appropriately. The commentary outlines 6 key principles which include managing load, considering healing supplements, maintaining fitness, addressing muscle function, recommencing and progressing running, and reducing risk of subsequent injury.

- Adwaita Bhagwat, SPT, University of Delaware