



# AOPT SIG

ACADEMY OF ORTHOPAEDIC PHYSICAL THERAPY, APTA

## FOOT & ANKLE



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## Foot & Ankle SIG News & Updates

- We hope you enjoyed CSM 2020 and made it home safely!
- Congratulations to Stephen Reischl on receiving the FA SIG lifetime achievement award. Steve was pivotal in establishing the SIG, and continues to advance foot and ankle care through his practice and support of research and trainees.
- We are continuing to move forward with developing a Fellowship in Foot and Ankle. A full update was given at the SIG membership meeting at CSM, but keep your eyes out for upcoming surveys to provide your input in defining the direction of this fellowship.
- The FA SIG continues to build bridges with foot and ankle surgeons and other healthcare professionals through our cooperation with the American Orthopaedic Foot & Ankle Society (AOFAS). Save the date for the **AOFAS annual meeting; September 9-12** in San Antonio, TX. Stay tuned for updates on programming and speakers. Reach out to Jeff Houck if you are interested in presenting or being more involved at the AOFAS annual meeting in the future.
- Webinar titled, "Non-operative management of sports injuries," **March 18 8:00-9:00 pm EST**. <https://www.aofas.org/education/online-learning/webinars>
- FA SIG welcomes the addition of individuals who would like to join our leadership – specifically we are looking for a Research Chair. If you are interested or would like more information, please contact Chris Neville at ([nevillec@upstate.edu](mailto:nevillec@upstate.edu)). Time commitment is approximately 1 conference call a month and engagement in FA SIG initiatives totaling about 1-2 hours per month.
- FA SIG welcomes our new leadership members. Thank you, Ed Jones, for joining the nominating committee and Megan Peach as our new Practice Chair!
- Three of our four student team members are preparing to graduate this spring! We are looking for DPT students interested in the foot and ankle to join the team. Time commitment is about 1 hour a month. Please have interested students reach out to Jen Zellers at ([jzellers@wustl.edu](mailto:jzellers@wustl.edu)).



## Member Spotlight

### Featuring Karin Grävare Silbernagel, PT, ATC, PhD

#### Where are you originally from?

I am from Gothenburg Sweden.

#### What type of setting do you work in?

I work in academia, where I teach, perform research, and treat and consult on patients in our physical therapy clinic.

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Karin Silbernagel, PT,  
ATC, PhD

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#### What sparked your interest in the foot and ankle?

When I went to PT school, the foot and ankle always came last and there never seemed to be enough time to cover it thoroughly. I wanted to learn more. The complexity of the foot and ankle is also intriguing to me.

#### What is your current research interest?

I perform tendon research. We currently have clinical trials involving patients with Achilles tendinopathy, Achilles tendon rupture, and patellar tendinopathy.

#### How did you become involved in research/academics?

The tendon was considered an inert “rope” and was really never discussed or taught when I was in PT school. When I started working clinically, it seemed every patient had tendinitis. I wanted to learn more about how to treat tendon injuries and therefore pursued my PhD.

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

Crossfit!

- Madi Engel, SPT

## Foot and Ankle in Sports Medicine

A conversation about the foot and ankle in sports medicine would not be complete without discussing rehabilitation following ankle sprain injuries. It is reported that approximately 11,000 ankle sprain injuries occur per year in U.S collegiate athletes and about 40% of all traumatic ankle injuries occur during sport.<sup>1,2</sup> Among ankle sprain injuries in athletes, injury surveillance data from the NCAA showed lateral ankle sprains (LAS) to be the most common.<sup>3</sup> A lateral ankle sprain results from high-velocity movements of ankle inversion, internal rotation, and plantarflexion.<sup>4</sup> It has been shown that approximately 40% of individuals with lateral ankle sprain will develop Chronic Ankle Instability (CAI) that is characterized by recurrent sprains and episodes of the ankle “giving way” for greater than 1 year following the initial sprain.<sup>5</sup>

An important consideration following ankle sprain is the impact on gait mechanics. Compared to healthy individuals, individuals following LAS demonstrate impairments in gait including: diminished gait velocity, step length, time in single limb support, and greater plantarflexion.<sup>4</sup> A cross-sectional study by Fraser, et al. (2019) examined three-dimensional kinematics of the foot during gait in recreationally-active individuals consisting of an ankle-sprain, chronic-instability, and healthy groups. The findings of the study demonstrated increased rearfoot inversion in the ankle-sprain and chronic-instability groups compared to the control group during gait. These findings suggest the importance of interventions to minimize rearfoot inversion and increase rearfoot eversion for individuals following LAS and CAI. The study highlighted interventions such as bracing or taping of the rearfoot to limit inversion and neuromotor strategies such as stretching, strengthening, balance training, and joint mobilization of the rearfoot and midfoot.<sup>4</sup>

A single-blinded randomized controlled trial by Ardakani and colleagues evaluated the biomechanical effects of hop-stabilization training in collegiate basketball players with CAI.<sup>1</sup> The 6-week training program consisted of 18 sessions with increased training volume throughout the program. Pre- and post-test measurements were assessed utilizing a force plate to determine kinetic and kinematic values during a single leg jump. The results of the study demonstrated improvements in self-reported function, increased ankle dorsiflexion, and decreased ground-reaction forces during a jump as well as reduced ankle inversion, plantarflexion, and knee valgus. The researchers point to the need to gradually progress patients by varying environmental and task-related factors, emphasizing sport-specific tasks. It is important that clinicians develop purposeful and specific interventions for their patients, aiming to better equip the patient for return to sport.<sup>1</sup>

An evidenced-based clinical guideline was developed by Vuurberg, et al. (2018) on the diagnosis, treatment, and prevention of ankle sprains.<sup>2</sup> The article indicated the use of functional support (ankle brace) for 4-6 weeks following injury is superior to immobilization. Exercise therapy programs that are initiated early following ankle injury have been shown to reduce the prevalence of recurring ankle injury and functional ankle instability. Level 1 evidence demonstrates the efficacy of ankle joint mobilizations in short-term increase in ankle dorsiflexion ROM and reduction in pain. The combination of manual and exercise therapy demonstrated improved outcomes compared to exercise therapy alone. With return to work or sport, it is recommended that phase rehabilitation of work and sport specific tasks is incorporated into the rehabilitation program.<sup>2</sup>

Hopefully, this article review gives the reader insight into the prevalence of ankle sprain injuries in athletics and rehabilitation recommendations. It cannot be understated the importance of utilizing multiple bodies of evidence and clinical reasoning when treating and evaluating an individual with ankle sprain injury. As with any injury, there are many factors that play a role in the individual's rehabilitation, but ultimately a program that is specific and functional to the athlete will promote successful return to sport.

- Josh Holland, SPT

### References:

1. Ardakani MK, Wikstrom EA, Minoonejad H, Rajabi R, Sharifnezhad A. Hop-stabilization training and landing biomechanics in athletes with chronic ankle instability: A randomized controlled trial. *Journal of Athletic Training*. 2019; 54(12):1296-1303.
2. Vuurberg G et al. Diagnosis, treatment and prevention of ankle sprains: Update of an evidence-based clinical guideline. *Br J Sports Med*. 2018; 52: 956.
3. Chen ET, McInnis KC, Borg-Stein J. Ankle sprains: Evaluation, rehabilitation, and prevention. *ACSM*. 2019; 18(6): 217-223.
4. Fraser JJ, Hart JM, Saliba SF, Park JS, Trumpert M, Hertel J. Multisegmented ankle-foot kinematics during gait initiation in ankle sprains and chronic ankle instability. *J Clin Biomech*. 2019; 68: 80-88.
5. Miklovic TM, Donovan L, Protzuk OA, Kang MS, Feger MA. Acute lateral ankle sprain to chronic ankle instability: a pathway of dysfunction. *Physician Sportsmed*. 2018; 46(1): 116-122

*“It cannot be understated the importance of utilizing multiple bodies of evidence and clinical reasoning when treating and evaluating an individual with ankle sprain injury.”*

## Citation Blast – Physical Therapy Foot & Ankle Considerations with Running

Running is one of the most popular fitness activities, however many injuries are related to running activities. Additionally, there are many controversial popular beliefs that people hold that are rooted on the internet, in popular magazines, and the literature regarding topics such as shoe type, foot strike patterns, and pronation. This citation blast sought out recent literature regarding these polarizing topics in order to provide therapists with information to assist with high quality care for rehabilitation for runners.

1. Anderson LM, Bonanno DR, Hart HF, Barton CJ. What are the Benefits and Risks Associated with Changing Foot Strike Pattern During Running? A Systematic Review and Meta-analysis of Injury, Running Economy, and Biomechanics [published online ahead of print, 2019 Dec 10]. *Sports Med*. 2019;10.1007/s40279-019-01238-y. doi:10.1007/s40279-019-01238-y

This 2019 systematic review and meta-analysis sought to synthesize the effects of foot strike pattern during running in relation to injury and running economy. They found a lack of evidence to support improvements in running economy when transitioning from a rearfoot strike to a non-rearfoot strike pattern. Additionally there was a lack of evidence to determine a relationship between strike pattern and injury risk. The authors concluded that changing strike pattern in non-injured runners is not recommended.

2. Knapik, et. al. Injury-Reduction Effectiveness of Prescribing Running Shoes on the Basis of Foot Arch Height: Summary of Military Investigations. *JOSPT*, 44: 10, 2014

This secondary analysis of three randomized controlled trials examined if prescribing running shoes based on foot arch height influenced injury risk. The studies included evaluated recruits in the armed forces during basic training for the US Army (2168 men, 951 women), Air Force (1955 men, 718 women), and Marine Corps (840 men, 571 women). The participants were randomized into an experimental or control group and assigned a motion-control, stability, or cushioned shoe to match their plantar shape (low, medium, or high foot arch) respectively. The control group received the stability shoe regardless of foot height. The authors concluded that selecting running shoes based on arch height had little influence on injury risk.

3. Lyght M, Nockerts M, Kernozek TW, Ragan R. Effects of Foot Strike and Step Frequency on Achilles Tendon Stress During Running. *J Appl Biomech*. 2016;32(4):365–372. doi:10.1123/jab.2015-0183

This 2016 within subject design study examined the effects of foot strike and step frequency on Achilles tendon stress during running. A rearfoot strike pattern had significantly lower Achilles tendon stress compared with forefoot strike pattern. Additionally, a change in cadence to +5% was reported to have decreased Achilles tendon loading regardless of strike pattern.

4. MalisouxL, ChambonN, UrhausenA, TheisenD. Influence of the Heel-to-Toe Drop of Standard Cushioned Running Shoes on Injury Risk in Leisure-Time Runners: A Randomized Controlled Trial With 6-Month Follow-up. *Am J Sports Med*. 2016;44:2933-2940

This randomized controlled trial examined the effects of heel-to-toe drop in standard running shoes on injury risk. 553 leisure-time runners were observed for six months in a shoe with either a 10mm, 6mm, or 0mm heel-to-toe drop. It was concluded that injury risk was no different among the shoes overall. However when stratifying into groups based on running experience, regular runners (>6 months of previous weekly training) may benefit from a higher-drop shoe for increased injury prevention, though further research is necessary.

5. Nielsen et. al. Foot pronation is not associated with increased injury risk in novice runners wearing a neutral shoe: a 1-year prospective cohort study. *British Journal of Sports Med* (2014)

This observational prospective study looked at 927 novice runners and categorized into baseline foot posture groups (highly supinated, supinated, neutral, pronated, and highly pronated). Each participant started running in a neutral shoe and tracked running distance each session. Results revealed that pronators had a significantly lower number of injuries when normalizing data to injuries/1000 km of running when compared to neutrals. The authors conclude that contradictory to popular belief, pronation is not associated with an increased risk of injury among novice runners in a neutral running shoe.

6. Ryan MB, Valiant GA, McDonald K, Taunton JE. The effect of three different levels of footwear stability on pain outcomes in women runners: a randomised control trial. *Br J Sports Med*. 2011;45(9):715–721. doi:10.1136/bjism.2009.069849

This randomized controlled trial evaluated 81 female runners that were categorized into three different foot posture types (neutral, pronated, and highly pronated). Participants in each category were randomly assigned a neutral, stability, or motion control running shoe and completed a 13 week half marathon training program with pre and post-testing performed. Outcome measures included missed training days due to pain and visual analogue scales for pain during rest, activities of daily living, and running. Stability shoes had the least amount of missed days and may be the best option for neutral runners. The authors concluded that motion control shoes for neutral or pronated feet may provide unnecessary injury risk. The study suggests that prescribing in-shoe pronation control may be potentially injurious and are not recommended.

- Zach Klemmer, SPT