Running Special Interest Group

Newsletter
December 2018

Running SIG Chair: Scott Greenberg, PT, DPT, SCS

this issue

APTA CSM 2019!!

CSM 2019 is just around the corner!! Check out some GREAT running programming!

"Welcome to the Resistance: Prescriptive Resistance Training for Runners." Thursday, January 24, 2019. Presenters: Josh Barabas, Brittney Barrie, and Derek Miles.

"Return to Running: From the Clinic to the Track." Thursday, January 24, 2019. Presenters: Donald Goss, Erin Miller, and Jamie Morris.

"Clinical Application of Running Biomechanics: How to Put Research Into Practice." Friday, January 25, 2019. Presenters: Kevin Gard and Robert Maschi.

"Science Meets Practice: Running vs. Sports Performance Training in Pregnant & Postpartum Females." Saturday, January 26, 2019. Presenters: Carol Ferkovic Mack, Christine Morgan, Meghan Rohde.

"Pelvic Floor Implications for the Running Athlete." Saturday, January 26, 2019. Presenters: Christine Agresta and Amanda Olson.

AASPT Teammates Social Event is Friday, January 25, 2019 at 7:30-10pm. Marriott Liberty Salon LM.. This is a GREAT way to network , meet AASPT leaders, and have fun!

Finally, if you are going to CSM do not forget to attend our annual Running SIG business meeting on Saturday, January 26, 2019 from 1:00-1:50pm. Interested in presenting at CSM in 2020? Attend the meeting!

Not registered? Do so TODAY! To register for CSM please go to: http://www.apta.org/CSM/Registration/

Team Concept Conference 2018: Conference Summary

The AASPT just completed another successful Team Concept Conference in Las Vegas. It was great to see and hear so many of the leaders in the field of sports physical therapy share their knowledge and experiences with those in attendance. Although this conference had a strong emphasis on the tactical athlete, those interested in running medicine still experienced some great content put forth by Bryan Heiderscheit, Stacey Pagorek and Mitch Rauh on "Return to Running Screens" . We had some continued interest in our Running Mentorship program and had the opportunity to speak with so many young professionals who share the same passion for running medicine.

Mark your calendars for TCC next year. It is sure to be another great professional experience!

Follow AASPT & The Running SIG on Twitter!

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The maximal running shoe

By Carey Rothschild, PT, DPT, OCS, SCS, CSCS

Running footwear has been a hot topic in the sport of running as a potential influencer of athlete performance and injury prevention. Shoe construction has evolved over the years through additive features offering cushioning and stabilization. Such features aim to provide increased shock attenuation and motion control for the runner. These additive elements at the midsole result in a heel-toe drop, or the net difference between the height of the heel and the height of the forefoot of the shoe. Traditional running shoes often have a heel-toe drop of greater than 10mm.[1] Despite the proposed benefit of these midsole features, literature suggests that they may actually contribute to increased joint loading forces and alterations in footstrike pattern.[2] Furthermore, no conclusive evidence to date supports traditional shoe prescription for injury prevention.[3]

A minimalist footwear movement arose in 2009, resulting in a variety of footwear minimalist in nature and void of midsole cushioning and stabilizing features features. A minimalist shoe is generally characterized by the following: low weight, increased flexibility, reduced heel-toe drop, low stack height, and void of motion control/stability devices.[4] Although running barefoot or in a minimalist shoe has been shown to decrease ground contact time and reduce impact forces and loading rate through a non-rearfoot strike pattern[2], the popularity of minimalist footwear has significantly declined. Currently, no research conclusively supports that adopting a forefoot strike pattern decreases the risk of running-related injury, improves running performance, nor reduces impact peaks or alters the loading response.[6] Despite proposed benefits of promoting a more natural gait pattern with reduced impact loading forces, the minimalist shoe has yet to prove itself as a shoe offering runners protection from injury.

More recently, a highly cushioned "maximal" running shoe has found its place amongst the plethora of running shoes on the market. The maximal running shoe has no clear academic definition but typically offers increased midsole cushioning[1] and features a flat midsole with a low heel-toe drop.[7] A company called Hoka One One initially introduced the maximal shoe in 2010; now over 20 varieties are available to consumers.[1] A proposed benefit of the oversized midsole cushioning is to provide superb shock absorption and lower impact loading, potentially reducing injury risk.[7] Furthermore, the low heel-toe drop may influence runners in adopting more of a forefoot strike pattern and subsequent reduction in joint loading rates. Anecdotally, runners wearing a maximal shoe have reported a reduction in running related-pains and injury.[1]

Several recent studies have investigated the effects of a maximal shoe on biomechanics during running. Based on presumed influence of a maximal shoe, researchers initially hypothesized that a maximal shoe would reduce impact peak and loading rate, lead to a non-rearfoot strike, shorten stride length and contact time, and increase cadence. Since running-related injury may be associated with increased impact forces and loading rates, knowledge of how a maximal shoe influences these variables is warranted.

Law and colleagues[2] specifically investigated the influence of varying levels of midsole thickness on running biomechanics in fifteen recreational male runners. Six shod conditions of varying midsole thicknesses ranging from 1mm to 29mm in a standard test shoe prototype were examined. Significant interactions between midsole thickness and vertical loading rates, footstrike angle, contact time, cadence and stride length were found. Notably, shoes with thinner midsole (1-and 5-mm) showed a significant increase in vertical loading rate and shorter contact time when compared to shoes with increased midsole thickness (25- and 29-mm). This may be due in part to the subject's maintenance of a rearfoot strike pattern. Running in shoes with greater midsole thickness did not result in a remarkable change in footstrike pattern, cadence, or stride length. Interestingly, the greatest midsole thickness (29mm) did not lower vertical loading rate, while the 25mm-thickness did; hence, a midsole thickness of 25mm may be the maximum needed to see benefit for reducing loading rate.

Fifteen female recreational heelstrike runners participated in a study by Pollard et al.[1] that investigated the influence of maximal running shoes on biomechanics before and after a 5K run. Participants wore a neutral shoe for one testing session and a maximal running shoe for the other testing session. The order of shoe wearing was randomized between the two sessions and separated by a 7-10 day time period. Before and after running the 5K, increased impact forces and loading rates were observed when wearing a maximal shoe compared to a traditional neutral shoe. This may due in part to the maintenance of a heelstrike pattern and the need to modify lower extremity stiffness to account for softer midsole of the shoe. As increased loading rate may be associated with running-related injury, caution is warranted to rearfoot strikers who are new to running in a maximal shoe type.

Chan and colleagues[7] examined the effects of traditional running shoes and maximal shoes on impact loading during level ground and downhill running in twenty-seven distance runners. The authors concluded that additional cushioning in the maximal shoe did not reduce external impact loading on level ground and could even lead to an increase in impact loading during downhill running. Finally, Sinclair et al[8] investigated the effects of maximal footwear on patellofemoral kinetics during running. Peak patellofemoral forces and pressure were found to be significantly higher in conventional and maximal shoes when compared to minimalist shoes. Hence, maximal shoes cannot be recommended to reduce susceptibility to patellofemoral disorders.

Running footwear has also been shown to influence a runner's performance. Running performance is often examined through analysis of running economy. Running economy refers to the steady-state rate of oxygen consumption (VO_2) when running at a specific speed.[9] Evidence suggests that running economy is reduced when running on softer surfaces and in shoes with greater mass.[10] Since maximal shoes are softer in the midsole and typically weigh more that a traditional running shoe, it is likely that running economy may be adversely affected when wearing a maximal shoe. It has been suggested that there is a one percent decrease in running economy for every 100g of added shoe mass.[11]

Mercer and colleagues[10] investigated the effects of maximal shoes on running economy in ten recreational runners. Specifically, a maximal shoe with a heel-toe drop of 7.3 mm, 289 g weight (for pair), and stack (heel) height of 42.3 mm was compared to a neutral cushioned shoe with a heel-toe drop of 11.0 mm, 326 g weight (pair), and heel height of 35.1mm. Partici-

The maximal running shoe (Continued)

By Carey Rothschild, PT, DPT, OCS, SCS, CSCS

ran in the two shoe models at three speeds for part one of the procedure and then ran in both shoe models on a level treadmill and at a 6% incline for part two. Steady-state rate of oxygen consumption (VO_2) was measured with open-circuit spirometry and relative perceived exertion (RPE) was assessed on Borg's 6–20 point scale. Interestingly, the type of shoe worn during running did not influence VO_2. The maximal shoe did not negatively influence the physiologic measure of running economy when compared to traditional shoe of comparable mass. However, results should be interpreted with caution as this study had a small sample size and only tested one model of shoe.

Conclusive evidence about whether or not a maximal may positively influence running biomechanics, running performance, and injury reduction has yet to be determined. It appears that a maximal shoe with its substantially larger midsole does not provide any additional benefit in reducing vertical impact peak and loading rate that are often related to increase risk of running-related injury. Maximal shoes do not lead to a non-rearfoot strike, shorten stride length and contact time, or increase cadence, factors that have been shown to potentially reduce impact forces. Runners considering a switch to a maximal shoe should do so with caution and over a considerable transition time period to prevent injury. Physical therapists should provide education on the best available evidence for footwear along with recommendations for appropriate training practices and strengthening exercises, and utilize gait retraining in the treatment of runners.

References

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Journal Club

To participate in the journal club you need to go to SPTS.org. Log-in. Once you log-in you will need to make sure that you have added the Running SIG to your profile as a group member. Once you do that click under SPTS members to get to the SPTS Forums. You will see the latest posts from Running SIG members. This will serve as our place to discuss all things running, including recent journal articles. You don't have to wait—start a discussion now! Need help with a patient? Post HIPAA-compliant content & see who can provide you some advice. The forum is there for our benefit. Please use it regularly to stay connected to your fellow SIG members!

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