Flex Therapist CEUs

Running and the Effect of Footwear Insoles

Influence of custom-made and prefabricated insoles before and after an intense run

1. Each foot strike during running there is a rapid deceleration of the lower-limb that results in a shock wave that is transmitted from the foot to the head.

A. True
B. False

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2. On its way upwards to the head, a shock wave is partly absorbed by _____ in a process known as shock attenuation.

A. The ground
B. The running shoes
C. The musculoskeletal system
D. During shock attenuation, a shock wave is partly absorbed by the ground, the running shoes, and the musculoskeletal system

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3. Repeated exposure to shock accelerations, as experienced by long-distance runners, is believed to increase the incidence of injury as a result of:

A. The reduced ability of the musculoskeletal system to absorb these shock waves.
B. The faster breakdown of the running shoes.
C. The flattening of the feet making for worse strike positioning.
D. The training lasting too long and the runner becoming too fatigued to hold proper running form.

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4. Prefabricated cushioning insoles have been associated with all of the following, except:

A. Reduced plantar pressure
B. Reduced shock accelerations
C. Reduced pain
D. Reduced impact forces

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5. This study suggests that the use of custom-made insoles reduced the acceleration

rate at the tibia and head compared to prefabricated insoles.

A. True
B. False

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6. Compared to the other insoles, significant reductions in acceleration rate at the tibia and head were found for:

A. Custom-made insoles
B. Prefabricated insoles
C. Control insoles
D. No major differences were observed between the insoles

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7. In the present study, which of the following was altered when running with insoles compared to the control conditions?

A. The acceleration peaks on the tibia and head.
B. The acceleration magnitudes on the tibia and head.
C. Neither the acceleration peaks nor the acceleration magnitudes on the tibia and head were altered.
D. Both the acceleration peaks and the acceleration magnitudes on the tibia and head were altered.

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8. Repetitive, rapidly applied loads and slowly applied loads are equally associated with joint degeneration regardless of the load magnitudes.

A. True
B. False

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9. Taking into account that the acceleration rates may represent the cushioning performance of the structure and influence the risk of overuse running injuries, the use of prefabricated insoles as a protective mechanism against accelerations during running is supported.

A. True
B. False

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10. A significant difference between the custom-made and the control insoles was observed for which shock acceleration parameter?

A. Max tibia
B. Magnitude tibia
C. Tibia rate
D. No difference between the custom-made and the control insoles was observed for

any of the shock acceleration parameters

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11. Foot supination is considered a shock-absorbing mechanism.

A. True
B. False

Effects of a leaf spring structured midsole on joint mechanics and lower limb muscle forces in running

12. When using LEAF compared to FOAM in treadmill running, the _____ foot shift resulted in increased stride length and improved running economy.

A. Posterior
B. Anterior
C. Lateral
D. Medial

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13. The generation of energy is related to concentric muscle activity.

A. True
B. False

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14. Within lower limb muscles, _____ was identified to have the greatest impact on running economy.

A. The m. gastrocnemius medialis
B. The m. biceps femoris
C. The m. gluteus maximus
D. The m. rectus femoris

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15. The main finding was that the participants responded to the structured midsole design showing:

A. An increased anterior foot shift.
B. An increased energy absorption at the hip and energy generation at the ankle joint.
C. Increased lower limb muscle forces.
D. A trend toward a force increase for m. biceps femoris.

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16. There was a reduced lower limb muscle force for all of the following muscles, except for:

A. Gastrocnemius lateralis
B. Gastrocnemius medialis
C. Tibialis anterior
D. Soleus

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17. The participants responded to LEAF in overground running similarly as in treadmill running.

A. True
B. False

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18. The mechanical behavior of the midsole deformation during ground contact in treadmill and in overground running are similar.

A. True
B. False

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19. While running with LEAF, the reduction of hip joint energy was primarily found in the:

A. First half of the braking phase
B. Second half of the stance
C. Push-off phase
D. Propulsion phase

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20. During the _____ phase, the short forefoot leaf springs contact ground and no additional anterior foot shift can be observed.

A. Braking
B. Stance
C. Push-off
D. Propulsion

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21. Less energy is needed during the _____ phase to accelerate the center of mass for maintaining the constant running speed, therefore, the midsole design of LEAF appeared to successfully exploit the concept of minimizing energy loss during running.

A. Braking
B. Stance
C. Push-off

D. Propulsion

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22. The most significant reduction of muscle force comparing LEAF and FOAM occurred in the:

A. Gastrocnemius medialis
B. Gastrocnemius lateralis
C. Biceps femoris
D. Soleus

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23. During the _____ phase, the triceps surae muscle group is the largest contributor to forward acceleration of the center of mass.

A. Braking
B. Stance
C. Push-off
D. Propulsion

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24. The muscle force of the _____ was reduced by 11% when running with LEAF compared with FOAM.

A. Triceps surae group
B. Rectus femoris
C. Vastus lateralis
D. Vastus medialis

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25. There was no difference in oxygen consumption between LEAF and FOAM shoes in treadmill running.

A. True
B. False

Increased Vertical Impact Forces and Altered Running Mechanics with Softer Midsole Shoes

26. A stiffer limb would result in landing with higher impact forces, counteracting any influence of the shoe cushioning on impact absorption.

A. True
B. False

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27. Landing mechanics can be influenced by:

A. Lower extremity kinematics
B. The active forces of the muscles
C. The external forces applied to the body
D. Landing mechanics can be influenced by the lower extremity kinematics, the active forces of the muscles, and the external forces applied to the body

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28. Previous studies have demonstrated that all of the following influence landing mechanics, except for:

A. Age
B. Running surface
C. Sex
D. Footwear

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29. The results of the current study indicate that wearing _____ can result in increased vertical impact force peaks.

A. Soft midsole shoes
B. Medium midsole shoes
C. Hard midsole shoes
D. All shoe types resulted in increased vertical impact force peaks

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30. The apparent ankle joint stiffness increased as the shoe midsole hardness increased and the effects were systematic across sex and age groups.

A. True
B. False
