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(54) **INJURY-PREVENTING COMPRESSION SHOE**

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(57)

ABSTRACT

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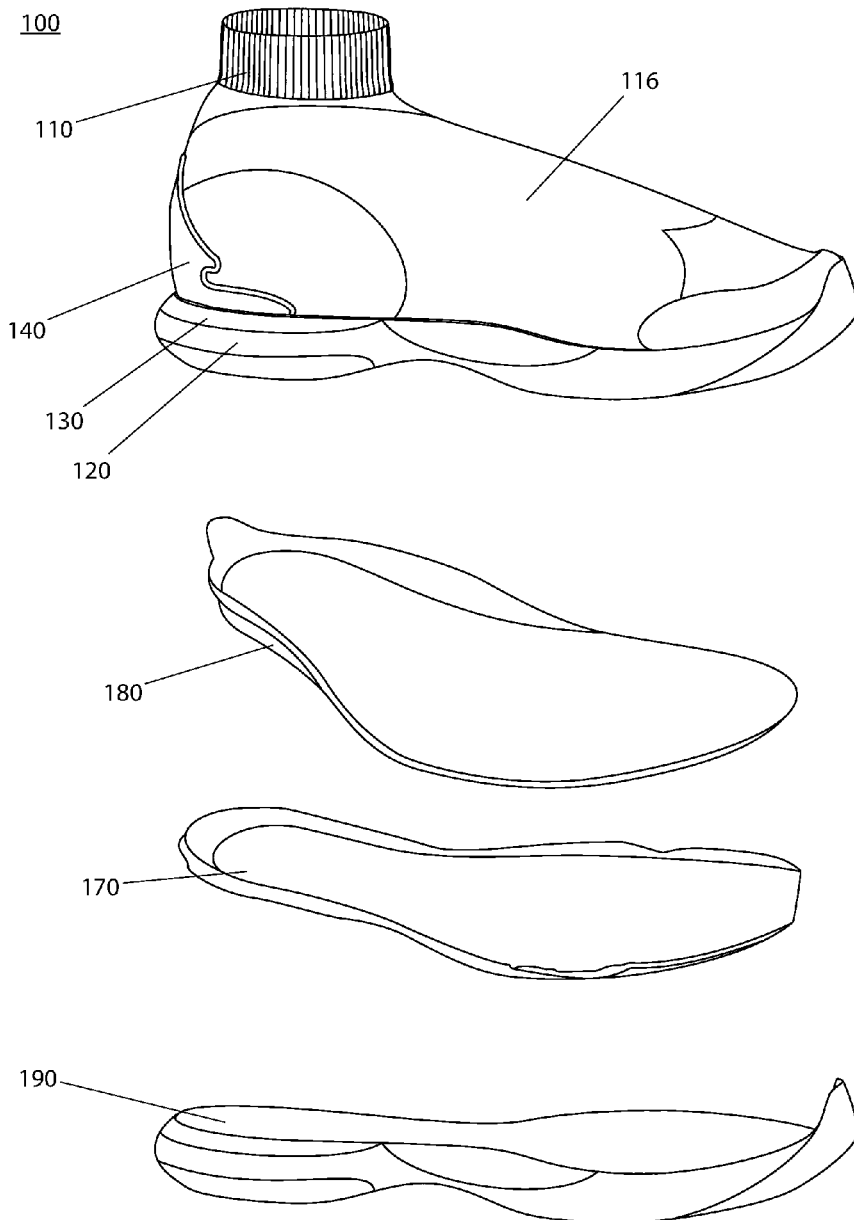
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An injury-preventing compression shoe is disclosed. The injury-preventing compression shoe includes an upper sock portion attached to a lower sole portion. The upper sock portion includes a compressible, breathable sock-shaped sleeve. The shoe also includes a heel backing support, a carbon fiber midsole orthotic piece, and a foam edging attached around the sole portion to prevent foot deviation over the edges of the sole portion. The injury-preventing compression shoe is useful for reducing sports related injuries while improving performance.

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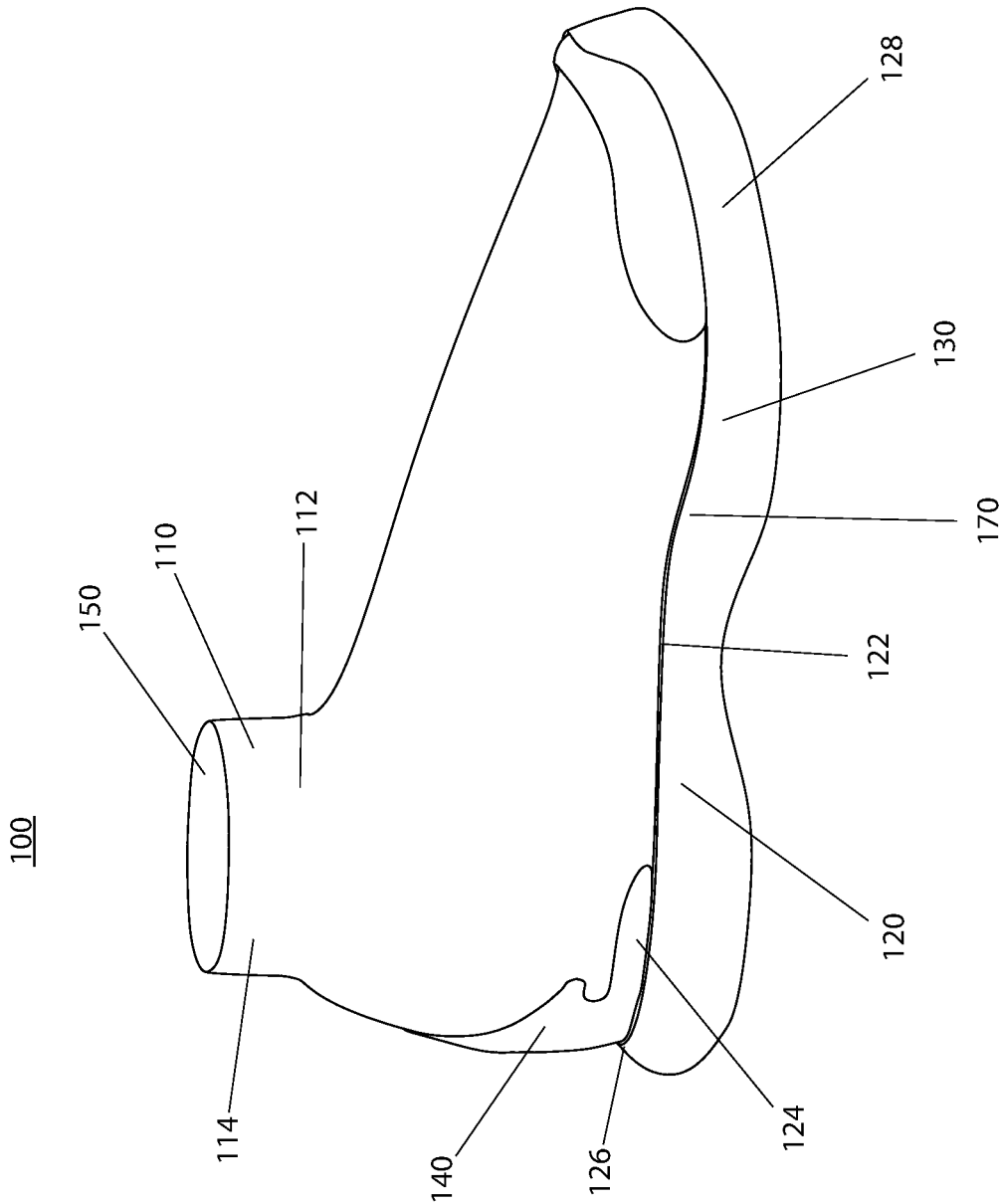


FIG. 1

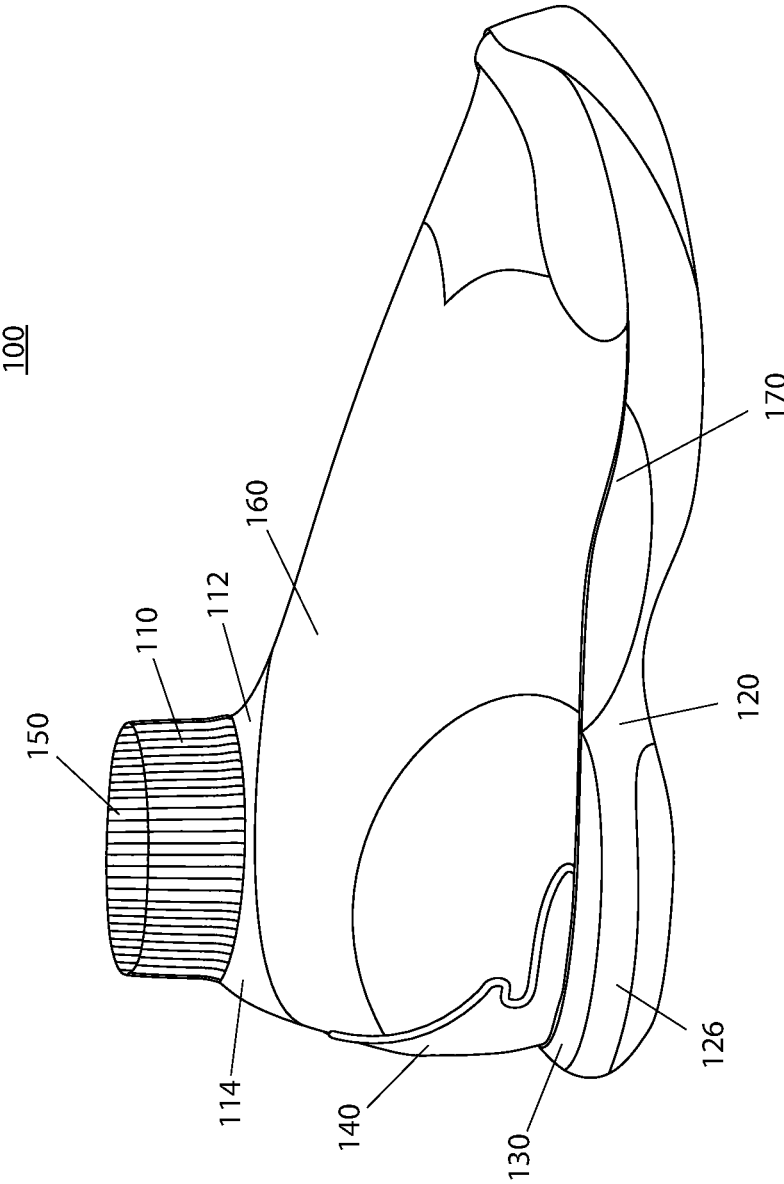


FIG. 2

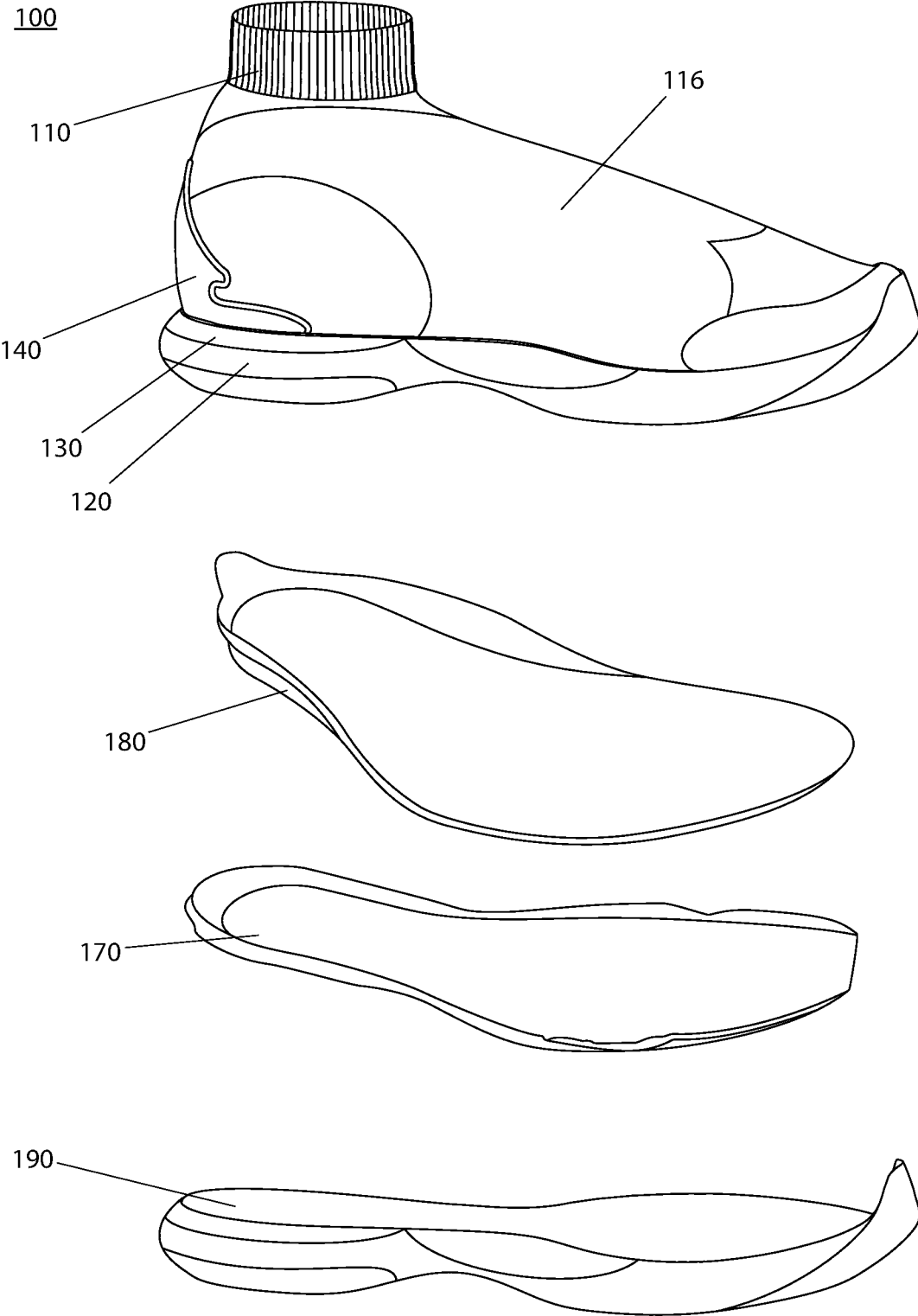


FIG. 3

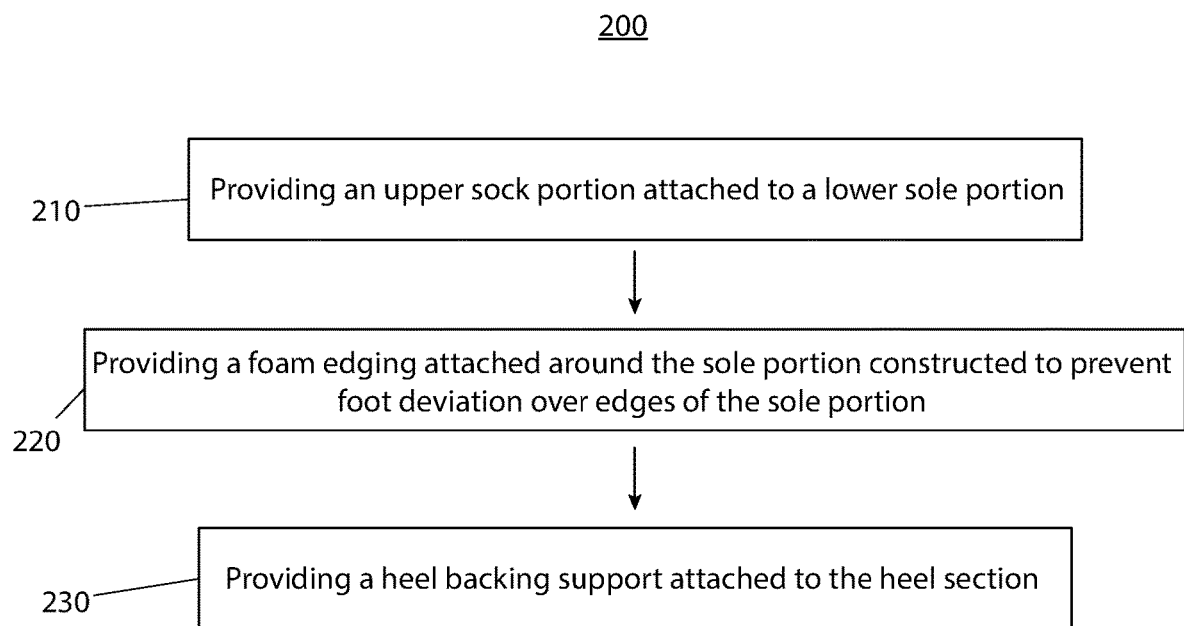


FIG. 4

INJURY-PREVENTING COMPRESSION SHOE

FIELD OF THE INVENTION

[0001] This invention relates generally to footwear. More particularly, it relates to a compression shoe with injury-preventing features.

BACKGROUND

[0002] Footwear refers to garments worn on the feet, which originally served the purpose of protection against adversities of the environment, usually regarding ground textures and temperature. Footwear in the manner of shoes therefore primarily serve the purpose to ease the locomotion and prevent injuries.

[0003] There are many different types of footwear available for uses related to specific types of activity, such as running, hiking, working, etc. For example, there are numerous types of footwear associated with physical activities, in particular outdoor activities involving walking, jogging or running in a variety of different terrains, where the footwear is provided with different features to provide comfort to a user while engaging in such activities. One of the most popular types of footwear includes athletic shoes. Some athletic shoes are designed strictly for improving comfort and performance while engaging in an athletic activity, whereas others blend both performance and style.

[0004] Comfort and stability features associated with footwear for running and jogging (which is typically associated with providing adequate support for relatively flat and/or even surfaces such as paved roads or walkways) can be different in comparison to features associated with footwear for hiking in more rugged terrain (for example, paths that are not paved or are typically associated with uneven surfaces). The function of a running shoe is, on the one hand, to help the act of running so that the runner progresses as economically as possible and, on the other hand, to protect the feet against stresses from running. In order to achieve these functions, various sports shoes have been developed, whose sole is formed to be flexible to reduce the stresses to the foot and to make the running more effective.

[0005] The feet are critical components for all people, but having and maintaining healthy feet is especially critical for athletes and people who are recreationally active. There are many different types of foot/leg injuries that people may sustain. Some injuries are acute and may occur from a direct blow, a penetrating injury, a fall, or perhaps from twisting jamming or bending their foot/leg abnormally. Examples of acute foot injuries include contusions, puncture wounds, ligament injuries, ruptured tendons, sprains, pulled muscles, broken bones, and/or dislocations.

[0006] There are also many injuries that occur from overuse as opposed to sudden or acute circumstances. Most overuse injuries tend to occur when too much stress is placed on a joint or other tissue in the feet/legs, often by overdoing a particular movement or activity. Examples of overuse injuries that often occur to feet include retrocalcaneal bursitis, Achilles tendinitis or tendinosis, stress fractures, planar fasciitis, and/or metatarsalgia.

[0007] Treatments for foot injuries can vary greatly in terms of time required, level of discomfort, costs, and methods used. As a result, footwear designers have invested significant amounts of time and resources into creating new

footwear technology. To help prevent such injuries, athletic shoe manufacturers have created specialty insoles, customizable cushions, heel/toe supports, enhanced exterior protection layers, and accessories for improving the fit of a shoe, just to name a few.

[0008] In light of the foregoing, it would be desirable to devise an improved footwear item that includes multiple foot support designs for decreasing foot injuries while providing enhanced performance for the user. Other advantages will become apparent in the disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The preferred embodiments of the invention will hereinafter be described in conjunction with the appended drawings provided to illustrate and not to limit the invention, where like designations denote like elements, and in which:

[0010] FIG. 1 is an illustrated view of an injury-preventing compression shoe according to an embodiment of the present invention;

[0011] FIG. 2 is a side view of an injury-preventing compression shoe shown in FIG. 1 according to an embodiment of the present invention;

[0012] FIG. 3 is an exploded view of an injury-preventing compression shoe as shown in FIG. 1 according to an embodiment of the present invention; and,

[0013] FIG. 4 is a flow diagram illustrating a method of providing an injury-preventing compression shoe according to an embodiment of the present invention.

[0014] Like reference numerals refer to like parts throughout the several views of the drawings.

DETAILED DESCRIPTION

[0015] The phrases “in one embodiment,” “in various embodiments,” “in some embodiments,” and the like are used repeatedly. Such phrases do not necessarily refer to the same embodiment. The terms “comprising,” “having,” and “including” are synonymous, unless the context dictates otherwise. Such terms do not generally signify a closed list.

[0016] “Above,” “adhesive,” “affixing,” “any,” “around,” “both,” “bottom,” “by,” “comprising,” “consistent,” “customized,” “enclosing,” “friction,” “in,” “labeled,” “lower,” “magnetic,” “marked,” “new,” “nominal,” “not,” “of,” “other,” “outside,” “outwardly,” “particular,” “permanently,” “preventing,” “raised,” “respectively,” “reversibly,” “round,” “square,” “substantial,” “supporting,” “surrounded,” “surrounding,” “threaded,” “to,” “top,” “using,” “wherein,” “with,” or other such descriptors herein are used in their normal yes-or-no sense, not as terms of degree, unless context dictates otherwise.

[0017] Reference is now made in detail to the description of the embodiments as illustrated in the drawings. While embodiments are described in connection with the drawings and related descriptions, there is no intent to limit the scope to the embodiments disclosed herein. On the contrary, the intent is to cover all alternatives, modifications and equivalents. In alternate embodiments, additional devices, or combinations of illustrated devices, may be added to, or combined, without limiting the scope to the embodiments disclosed herein.

[0018] In general, the invention of this disclosure may relate to an athletic shoe that includes a compression layer around the ankle, orthotic midsole, and flexible carbon fiber technology in functional combination. The shoe may include

prefabricated orthotics constructed from carbon fiber and configured to provide postural steadiness while helping to reduce low back pain. The carbon fiber may have a heel cup at least 6-9 mm in depth. Additionally, the carbon fiber plate may require a longitudinal and transverse arch to replicate and support normal foot mechanics. The carbon fiber may have a convex design and may be flat at the heel and distal toe areas, thereby creating a slight arch configuration. When weight is placed on the midsole, the carbon fiber plate may flatten to absorb compression and then return to the original configuration once the weight is offloaded. This carbon fiber portion may be useful to assist a person by propelling them forward and/or assist with jumping movements. The shoe may include a lower portion foam coupled to the compression layer and/or the outsole. The outsole and foam may be configured to follow the same shape as the carbon fiber midsole portion. The shoe construction may be lightweight and incorporate energy storing or conserving properties which may help to improve performance and reduce injuries. The compression layer may include a laceless design. The compression layer may also be configured from Spandex Nylon™ or other suitable materials. Further still, the compression layer may apply at least 15-30 Mmhg of compression force. The sole of the shoe may be rubber. The sole may also include a tread pattern.

[0019] Referring to FIG. 1, an illustrated view of an injury-preventing compression shoe 100 according to an embodiment of the present invention is presented. The injury-preventing compression shoe 100 may include an upper sock portion 110 attached to a lower sole portion 120, a foam edging 130, and a heel backing support 140. The upper sock portion 110 may be configured as a compressible, breathable sock-shaped sleeve 112 having a length 114. The length 114 may measure between a standard ankle length sock and a crew length sock. The upper sock portion 110 may be configured from a Spandex Nylon™ 150 material. The upper sock portion 110 may also be reinforced between a foot transverse arch region to a talocalcral joint region.

[0020] The lower sole portion 120 may be configured in a shoe-sole shape having a convex raised center section 122 along with depressed heel 124 and toe sections 128. In a preferred embodiment, the lower sole portion 120 may be constructed from carbon fiber 170. The depressed heel section 124 and convex raised center section 122 may be thicker in width than the toe section 128. Further, the lower sole portion 120 may also include a bottom shoe foam layer 126. The bottom shoe foam layer may extend from the heel section 124 to the toe section 128. In addition, the shoe 100 may include a foam edging 130. The foam edging 130 may be attached around the lower sole portion 120 and configured to prevent foot deviation over the edges of the lower sole portion 120. The heel backing support 140 may be attached to the heel section of the shoe 100 and configured to provide heel support when the shoe 100 is worn.

[0021] Referring now to FIG. 2, a side view of an injury-preventing compression shoe 100 shown in FIG. 1, according to an embodiment of the present invention, is presented. As before in FIG. 1, the injury-preventing compression shoe 100 may include an upper sock portion 110, a lower sole portion 120, a foam edging 130, and a heel backing support 140. The upper sock portion 110 may be configured as a compressible, breathable sock-shaped sleeve 112 constructed from a Spandex Nylon™ 150 material having a length 114 between that of an ankle sock length and a crew

sock length. The lower sole portion 120 may be constructed from carbon fiber 170 and may also include a bottom shoe foam layer 126. Additionally, the injury-preventing compression shoe 100 may include a cross-over reinforcement structure 160. The cross-over reinforcement structure 160 may be configured between the foot transverse arch region to the talocalcral joint region.

[0022] Referring next to FIG. 3, an exploded view of an injury-preventing compression shoe 100 as shown in FIG. 1 according to an embodiment of the present invention. The shoe 100 may include an upper sock portion 110, a lower sole portion 120, a foam edging 130, and a heel backing support 140. The upper sock portion 110 may include a laceless top portion 116, wherein the shoe 100 does not require laces to keep the shoe 100 on the user's foot. The injury-preventing compression shoe 100 may also include a foam insert 180. The foam insert 180 may comprise a thin foam portion having a compressible heel pocket. In addition, the shoe 100 may include a carbon fiber 170 midsole. As before, the carbon fiber 170 midsole may replicate and support normal foot mechanics. The carbon fiber 170 may also be configured with a convex design and a flat heel and distal toe areas. Finally, the injury-preventing compression shoe 100 may include a rubber outsole 190. The rubber outsole 190 may be configured from a laminated silicone rubber foam material.

[0023] Referring finally to FIG. 4, a flow diagram illustrating a method of providing an injury-preventing compression shoe 200, according to an embodiment of the present invention, is presented. In particular, the method of providing an injury-preventing compression shoe 200 may include one or more components or features of the injury-preventing compression shoe 100 as described above. As illustrated, the method of providing an injury-preventing compression shoe 200 may include the steps of: step one 210, providing an upper sock portion attached to a lower sole portion, the upper sock portion comprising a compressible, breathable sock-shaped sleeve having a length between an ankle length and a crew length, the sock portion reinforced between a foot transverse arch region to a talocalcral joint region; step two 220, providing a foam edging attached around the sole portion constructed to prevent foot deviation over edges of the sole portion; and, step three 230, providing a heel backing support attached to the heel section, the backing support constructed to provide heel support when the shoe is worn. In a preferred embodiment, the sole portion is constructed from carbon fiber.

[0024] In the numbered clauses below, specific combinations of aspects and embodiments are articulated in a shorthand form such that (1) according to respective embodiments, for each instance in which a "component" or other such identifiers appear to be introduced (with "a" or "an," e.g.) more than once in a given chain of clauses, such designations may either identify the same entity or distinct entities; and (2) what might be called "dependent" clauses below may or may not incorporate, in respective embodiments, the features of "independent" clauses to which they refer or other features described above.

[0025] Those skilled in the art will appreciate that the foregoing specific exemplary processes and/or devices and/or technologies are representative of more general processes and/or devices and/or technologies taught elsewhere herein, such as in the claims filed herewith and/or elsewhere in the present application.

[0026] The features described with respect to one embodiment may be applied to other embodiments or combined with or interchanged with the features of other embodiments, as appropriate, without departing from the scope of the present invention.

[0027] Other embodiments of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. It is intended that the specification and examples be considered as exemplary only, with a true scope and spirit of the invention being indicated by the following claims.

What is claimed is:

1. An injury-preventing compression shoe comprising: an upper sock portion attached to a lower sole portion; the upper sock portion comprising a compressible, breathable sock-shaped sleeve having a length between an ankle length and a crew length, the sock portion reinforced between a foot transverse arch region to a talocalcral joint region; the sole portion having a shoe-sole shape with a convex raised center section and depressed heel and toe sections, the heel and center sections being thicker than the toe section; the sole portion having an attached bottom shoe foam layer running from the heel section to the toe section;
- a foam edging attached around the sole portion constructed to prevent foot deviation over edges of the sole portion;
- a heel backing support attached to the heel section, the backing support constructed to provide heel support when the shoe is worn.
2. The injury-preventing compression shoe of claim 1 wherein, the sole portion is constructed from carbon fiber.
3. The injury-preventing compression shoe of claim 1 wherein, the sock portion is a Spandex Nylon™.
4. The injury-preventing compression shoe of claim 1 wherein, the sock portion is reinforced by a cross-over reinforcement structure between a foot transverse arch region to a talocalcral joint region.
5. The injury-preventing compression shoe of claim 1 wherein, the sock portion provides moisture wicking.
6. The injury-preventing compression shoe of claim 1 wherein, the shoe is laceless.
7. The injury-preventing compression shoe of claim 1 wherein, the heel section is at least 6-9 mm deep.
8. An injury-preventing compression shoe comprising: an upper sock portion attached to a lower sole portion; the upper sock portion comprising a compressible, breathable sock-shaped sleeve having a length between an ankle length and a crew length, the sock portion reinforced between a foot transverse arch region to a talocalcral joint region; the sole portion having a shoe-sole shape with a convex raised center section and depressed heel and toe sections, the heel and center sections being thicker than the

- toe section; the sole portion having an attached bottom shoe foam layer running from the heel section to the toe section;
- a foam edging attached around the sole portion constructed to prevent foot deviation over edges of the sole portion;
 - a heel backing support attached to the heel section, the backing support constructed to provide heel support when the shoe is worn; wherein, the sole portion is constructed from carbon fiber.
 9. The injury-preventing compression shoe of claim 8 wherein, the sock portion is a Spandex Nylon™.
 10. The injury-preventing compression shoe of claim 8 wherein, the sock portion is reinforced by a cross-over reinforcement structure between a foot transverse arch region to a talocalcral joint region.
 11. The injury-preventing compression shoe of claim 8 wherein, the sock portion provides moisture wicking.
 12. The injury-preventing compression shoe of claim 8 wherein, the shoe is laceless.
 13. The injury-preventing compression shoe of claim 8 wherein, the heel section is at least 6-9 mm deep.
 14. A method of providing an injury-preventing compression shoe comprising: providing an upper sock portion attached to a lower sole portion; the upper sock portion comprising a compressible, breathable sock-shaped sleeve having a length between an ankle length and a crew length, the sock portion reinforced between a foot transverse arch region to a talocalcral joint region; the sole portion having a shoe-sole shape with a convex raised center section and depressed heel and toe sections, the heel and center sections being thicker than the toe section; the sole portion having an attached bottom shoe foam layer running from the heel section to the toe section;
 - providing a foam edging attached around the sole portion constructed to prevent foot deviation over edges of the sole portion;
 - providing a heel backing support attached to the heel section, the backing support constructed to provide heel support when the shoe is worn; wherein, the sole portion is constructed from carbon fiber.
 15. The method of claim 8 wherein, the sock portion is a Spandex Nylon™.
 16. The method of claim 8 wherein, the sock portion is reinforced by a cross-over reinforcement structure between a foot transverse arch region to a talocalcral joint region.
 17. The method of claim 8 wherein, the sock portion provides moisture wicking.
 18. The method of claim 8 wherein, the shoe is laceless.
 19. The method of claim 8 wherein, the heel section is at least 6-9 mm deep.

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