the knee, and localized swelling. Knee osteoarthritis pain is usually worse following activity, especially overuse of the affected knee. Stiffness can worsen after prolonged periods of resting. As knee osteoarthritis progresses, symptoms generally become more severe.

[6] Currently, osteoarthritis cannot be cured. Most treatments available today invoice medications that may help manage the symptoms. Acetaminophen can help manage and relieve pain. Some patients obtain better pain relief when using nonsteroidal anti-inflammatory drugs (NSAIDs) or Celebrex, the one remaining COX-2 selective inhibitor. There are also opioid analgesic medications available for patients who need stronger pain relief.

[7] Aside from medications, other treatments include: local intraarticular injections of steroids or viscosupplements, exercise / physical therapy, weight loss if overweight, topical creams, knee brace or support, heat and cold treatments, glucosamine and chondroitin sulfate, and as a last resort- surgery.

SUMMARY

[8] In one example, the present disclosure provides a method for treating a subject afflicted with a lower limb joint pathology comprising the steps of: (a) securing a device to a subject's foot, whereby the device comprises a foot securing mean, a support member operably attached to the securing mean, and a moveable anterior protuberance and a moveable posterior protuberance; (b) calibrating the posterior protuberance and the anterior protuberance to a balanced position, the balanced position being a position whereby the device provides a reduced and/or minimum inversion or a reduced and/or minimum eversion to the subject's foot during the stance phases; and (c) fixing the posterior protuberance and the anterior protuberance to the support member in the balanced position; thereby treating a subject afflicted with lower limb joint pathology.

[008a] In one aspect, the present disclosure refers to a device for treating a subject afflicted with a lower limb joint pathology comprising a foot securing mean, a support member attached to said securing mean, a moveable anterior protuberance and a moveable posterior protuberance, positioned on the support member and a longitudinal straight centreline (216) connecting middles of short sides of a rectangle which delimits a contour of the support member, whereby said device provides a reduced inversion or a reduced eversion during the stance phases, wherein said anterior protuberance and said posterior protuberance have a diameter of 50 to 150 mm; and
wherein at least one protuberance comprises
(i) a peak surface (219; 221) positioned at the center of a ground engaging area (902) of the protuberance; and
(ii) a bore (904) disposed off-centre in relation to the peak surface and sized and fitted to accommodate a fastener configured to fix the protuberance to the support member in a desired position; and
wherein bases of the anterior protuberance and the posterior protuberance are positioned on the centerline of the support member and peaks of the anterior protuberance and the posterior protuberance are positioned on opposite sides of the centerline of the support member, wherein the device supports a foot of a subject only by two protuberances when the two protuberances are placed on a ground surface.

[008b] In another aspect, the present disclosure refers to a set of footwear (10) components comprising: a pair of support members, wherein each support member (12) having an upper surface (14) attachable to a foot and a lower surface (24) configured to hold two bulbous protuberances (22) in a position-adjustable manner in an anterior area and a posterior area thereof, wherein the two bulbous protuberances are adjustable to a balanced position where the footwear provides a reduced inversion or a reduced eversion to a subject's foot during stance phases; wherein said protuberances (22): (a) have a diameter of 50 to 150 mm; (b) a shore hardness of 30 to 90 Sh A; (c) are ground engaging; (d) are positioned offset from the centreline (28) of said support member (12); and (e) are positioned on opposite sides of the latitudinal midline (30); and wherein at least one protuberance comprises
(i) a peak surface (219; 221) positioned at the center of a ground engaging area (902) of the protuberance; and
(ii) a bore (904) disposed off-centre in relation to the peak surface and sized and fitted to accommodate a fastener (38) configured to fix the protuberance to the support member in a desired position; and
wherein bases of the anterior protuberance and the posterior protuberance are positioned on the centerline of the support member and peaks of the anterior protuberance and the posterior protuberance are positioned on opposite sides of the centerline of the support member, wherein the device supports a foot of a subject only by two protuberances when the two protuberances are placed on a ground surface.

[9]In one example, the present disclosure provides a method for treating a subject afflicted with knee osteoarthritis comprising the steps of: (a) securing a device to a subject's foot, whereby the device comprises a foot securing mean, a support member operably attached to the securing mean, and a moveable anterior protuberance and a moveable posterior protuberance; (b) calibrating the posterior protuberance and the anterior protuberance to a balanced position, the balanced position being a position whereby the device provides controlled inversion or controlled eversion to the subject's foot during the stance phases; and (c) fixing the posterior protuberance and the anterior protuberance to the support member in the balanced position; thereby treating a subject afflicted with knee osteoarthritis.

[10] In another example, the present disclosure further provides a method for treating a subject afflicted with lower limb musculoskeletal pain comprising the steps of: (a) securing a device to the subject's foot, whereby the device comprises a foot securing mean, a support member operably attached to the securing mean, and a moveable anterior protuberance and a moveable posterior protuberance; (b) calibrating the posterior protuberance and the anterior protuberance to a balanced position, the balanced position comprises: a position whereby the device provides a reduced and/or minimum inversion or a reduced and/or minimum eversion to the subject's foot during the stance phases and a minimal lower limb musculoskeletal related pain position; and (c) fixing the posterior protuberance and the anterior protuberance to the support member in the balanced position.

[11] In another example, the present disclosure further provides a method for treating a subject afflicted with knee pain comprising the steps of: (a) securing a device to the subject's foot, whereby the device comprises a foot securing mean, a support member operably attached to the securing mean, and a moveable anterior protuberance and a moveable

CLAIMS

What is claimed is:

1. A device for treating a subject afflicted with a lower limb joint pathology comprising a foot securing mean, a support member attached to said securing mean, a moveable anterior protuberance and a moveable posterior protuberance, positioned on the support member and a longitudinal straight centreline (216) connecting middles of short sides of a rectangle which delimits a contour of the support member, whereby said device provides a reduced inversion or a reduced eversion during the stance phases, wherein said anterior protuberance and said posterior protuberance have a diameter of 50 to 150 mm; and
   wherein at least one protuberance comprises
   (i) a peak surface (219; 221) positioned at the center of a ground engaging area (902) of the protuberance; and
   (ii) a bore (904) disposed off-centre in relation to the peak surface and sized and fitted to accommodate a fastener configured to fix the protuberance to the support member in a desired position; and
   wherein bases of the anterior protuberance and the posterior protuberance are positioned on the centerline of the support member and peaks of the anterior protuberance and the posterior protuberance are positioned on opposite sides of the centerline of the support member, wherein the device supports a foot of a subject only by two protuberances when the two protuberances are placed on a ground surface.
2. The device of claim 1, wherein the balanced position is further affected by:
   (a) the resilience of the anterior protuberance, the posterior protuberance, or a combination thereof; or
   (b) the hardness of the anterior protuberance, the posterior protuberance, or a combination thereof; or
   (c) the elasticity of the anterior protuberance, the posterior protuberance, or a combination thereof; or
   (d) any combination of (a), (b), and (c); or

(e) the height of the anterior protuberance, the posterior protuberance, or a combination thereof; or

(f) the convexity of the anterior protuberance, the posterior protuberance, or a combination thereof; or

(g) the weight of the anterior protuberance, the posterior protuberance, or a combination thereof; or

(h) and a combination of (e), (f), and (g).

3. The device of anyone of claim 1 and 2, whereby said calibrated further comprises adjusted: (a) resilience of said anterior protuberance, said posterior protuberance, or a combination thereof; (b) hardness of said anterior protuberance, said posterior protuberance, or a combination thereof; (c) elasticity of said anterior protuberance, said posterior protuberance, or a combination thereof; (d) or any combination of (a), (b), and (c).
4. The device of anyone of claim 1 to 2, whereby said calibrated further comprises adjusted (a) height of said anterior protuberance, said posterior protuberance, or a combination thereof; (b) convexity of said anterior protuberance, said posterior protuberance, or a combination thereof; (c) weight of said anterior protuberance, said posterior protuberance, or a combination thereof (d) and a combination of (a), (b), and (c).
5. The device of anyone of claims 1 to 4, whereby said balanced position is further affected by balancing timing of heel rise.
6. The device of anyone of claims 1 to 5, whereby said balanced position further comprises toe balanced position.
7. The device of anyone of claims 1 to 6, whereby said balanced position further comprises a position whereby minimal valgus, varus, dorsal or plantar torque about the ankle is exerted by said device on said subject's foot.
8. The device of claim 1, whereby said lower limb joint pathology is lower limb osteoarthritis or knee osteoarthritis.
9. The device of anyone of claims 1 to 8, whereby said posterior protuberance is a bulbous protuberance, said anterior protuberance is a bulbous protuberance, or

both said posterior protuberance and said anterior protuberance are bulbous protuberances.

10. The device of anyone of claims 1 to 9, whereby said posterior protuberance and said anterior protuberance are moveably mounted to said support member.
11. The device of anyone of claims 1 to 10, whereby said posterior protuberance is movable within a calcaneus support portion of said support member and said anterior protuberance is movable within phalanges or metatarsals support portion of said support member.
12. The device of anyone of claims 1 to 11, whereby the bases of said anterior protuberance and said posterior protuberance are positioned on the centerline and wherein the peaks of said anterior protuberance and said posterior protuberance are positioned on opposite sides of said centerline.
13. The device of anyone of claims 1 to 12, wherein said anterior protuberance and said posterior protuberance: are movable within an area of 1 to 18 cm^2, have a shore hardness of between 30 to 90 Sh A, or both.
14. A set of footwear (10) components comprising: a pair of support members, wherein each support member (12) having an upper surface (14) attachable to a foot and a lower surface (24) configured to hold two bulbous protuberances (22) in a position-adjustable manner in an anterior area and a posterior area thereof, wherein the two bulbous protuberances are adjustable to a balanced position where the footwear provides a reduced inversion or a reduced eversion to a subject's foot during stance phases; wherein said protuberances (22): (a) have a diameter of 50 to 150 mm; (b) a shore hardness of 30 to 90 Sh A; (c) are ground engaging; (d) are positioned offset from the centreline (28) of said support member (12); and (e) are positioned on opposite sides of the latitudinal midline (30); and

    wherein at least one protuberance comprises

    (i) a peak surface (219; 221) positioned at the center of a ground engaging area (902) of the protuberance; and

    (ii) a bore (904) disposed off-centre in relation to the peak surface and sized and fitted to accommodate a fastener (38) configured to fix the protuberance to the support member in a desired position; and

wherein bases of the anterior protuberance and the posterior protuberance are positioned on the centerline of the support member and peaks of the anterior protuberance and the posterior protuberance are positioned on opposite sides of the centerline of the support member, wherein the device supports a foot of a subject only by two protuberances when the two protuberances are placed on a ground surface.

15. The set of footwear components according to claim 14, wherein the bulbous protuberances (22) are height-adjustable in relation to the lower surface of the support member.
16. The set of footwear components according to anyone of claims 14 and 15, further comprising: spacer(s) for adjusting height of the bulbous protuberances, said spacer(s) being configured to be inserted between the support member and the bulbous protuberance attached thereto.
17. The set of footwear components according to claim 16, wherein the spacer(s) are a plurality of spacers of different weights.
18. The set of footwear components according to anyone of claims 14 to 17, for treating a lower limb joint pathology, a lower limb musculoskeletal pain or a combination thereof.
19. The set of footwear components according to anyone of claims 14 to 18, for treating osteoarthritis or knee osteoarthritis.
20. The device of claim 1, wherein the protuberance is rotatable about its own or other axis such that the peak or the ground engaging surface of a protuberance is positioned offset from the centreline and the centreline still crosses the protuberance.
21. The device of any one of claims 1 and 13, wherein the support member comprises at least one rail, and the protuberance is connected to the rail by a fastener via the bore and is movable at least along the rail.
22. The device of any one of claims 1 and 13, wherein the device comprises one or more effective areas (406; 407; 504; 505; 710; 720; 610; 620) with respect to the support member within which positioning of the peak surface of a protuberance facilitates treatment regardless of sizing of the footwear.

23. The device of claim 21, wherein the protuberance is attached to the rail and rotatable about its own or other axis such that the peak or the ground engaging surface of a protuberances is positioned within at least a portion of an effective area while the protuberance is connected to the rail.