

INSOLE FOR RELIEF OF OVER-PRONATION AND KNEE JOINT STRESS

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application No. 61/605,664, filed March 1, 2012.

STATEMENT REGARDING FEDERALLY SPONSORED
RESEARCH OR DEVELOPMENT

[0002] Not applicable.

TECHNICAL FIELD

[0003] This invention relates to the field of replacement insoles for shoes.

BACKGROUND

[0004] Shoes, particularly athletic shoes, generally have an insole placed within the foot-receiving compartment when sold. The insole is positioned so that the user's foot will rest thereon while wearing the shoe. Generally, such insoles are removable and may be replaced with replacement insoles which may employ various features of benefit to the user or the particular needs of the user's feet.

[0005] In normal pronation (the inward roll of the foot while walking or running), a moderate degree. However, certain individuals have biomechanical characteristics which may cause over-pronation and excessive internal rotation of the leg. It has been reported that those who over-pronate also tend to exhibit misalignment of the patella (knee cap).

[0006] It has been reported that due to biomechanical considerations, including a naturally higher quadriceps angle or Q-angle, women may be more prone than men to exhibit misalignment of the patella, in particular with excessive foot pronation. Misalignment of the patella has been associated with the onset of Patello-Femoral Pain Syndrome (PFPS), one of the most common causes of knee pain, particularly in women.

[0007] One apparatus directed to addressing the issues discussed above was described and claimed in United States Patent 7,721,467, assigned to Spenco Medical Corporation.

SUMMARY OF THE INVENTION

[0008] The present invention provides an insole for placement in a shoe, comprising a top sheet extending essentially the full length of the insole, said top sheet having a toe end and a heel end. The insole further comprises a support base cushion extending essentially the full length of the insole and having a toe end and a heel end, said support base cushion having a top surface secured to said top sheet and a bottom surface, said support base cushion having a forefoot mid-cushion area extending from the toe end to a metatarsal area of the insole and adapted to receive a forefoot cushion, said support base cushion having a rearward area extending from the metatarsal area to the heel end and adapted to receive a heel cushion. The forefoot cushion has a top surface secured to said forefoot mid-cushion area of said support base cushion and a bottom surface. The heel cushion has a top surface secured to said bottom surface of support base cushion and a bottom surface, said heel cushion positioned generally under the heel area of the foot and having a lateral to medial surface extending upwardly around the heel end of said insole.

[0009] Also described herein a method of making an insole for use in a shoe, comprising providing a top sheet that extends essentially the full length of the insole, said top sheet having a toe end and a heel end. The method also comprises providing a support base cushion, having a top surface and a bottom surface and extending the full length of the insole and attaching said support base cushion to said top sheet along said top surface of support base cushion said support base cushion having a toe end and a heel end, said bottom surface of support base cushion having a forefoot mid-cushion area extending from the toe end to a metatarsal area on the insole and adapted to receive a forefoot cushion in the forefoot mid-cushion area, said support base cushion having a rearward area extending from the metatarsal area to the heel end and the bottom surface of the support base cushion in the rearward area adapted to receive a heel cushion. The method further comprises attaching said forefoot cushion, having a top surface and a bottom surface, to said support base cushion in the forefoot mid-cushion area of by securing said top surface of the forefoot cushion to said support base cushion, and attaching said heel cushion, having a top surface and a bottom surface, to said support base cushion by securing the top surface of said heel cushion to the bottom surface of said support base cushion, said heel cushion positioned generally under the heel area of the foot and having a lateral surface extending laterally around the lateral side of the heel end of said support base cushion.

[0009A] Also described herein is an insole for placement inside a shoe for use in reducing over-pronation associated misalignment of the patella (knee cap) and reducing knee joint stress of a user. The insole has a top sheet and a support base cushion. The support base cushion has a forefoot mid-cushion area that extends

from a toe end to a metatarsal area of the insole and an arch to heel area or rearward area that extends from a metatarsal area to a heel end of the insole. The insole has a forefoot cushion secured to the forefoot mid-cushion area. The insole also has a medial support cradle, a lateral support cradle, and a heel cushion all secured to the bottom of the support base cushion in the arch to heel area.

[0009B] The medial support cradle lies underneath the arch area of the foot and gives the insole a raised arch while also providing support to the arch of the user's foot. The medial support cradle also extends back around a lateral side of the heel to provide a semi-rigid support and structure to the heel cup of the insole. The medial support cradle reduces over-pronation and knee stresses.

[0010] The lateral support cradle is a separate cradle located along the side of the support base cushion of the insole to provide a semi-rigid support and structure to the side of the insole and below the metatarsal area. The lateral support cradle provides a side support for the foot to reduce stress on the knee.

[0011] The heel cushion has a portion below the heel area of the foot that contacts the inside bottom of the user's shoe in use and a portion that upwardly extends from the bottom of the insole along a lateral side portion of the heel end of the support base cushion. The structure of the heel cushion provides a "soft spot" in the key impact zone for heel strike by a user's foot, which is the posterior-lateral aspect of the heel, as well as a lateral side heel end support. The heel cushion acts in cooperation with the firmer medial support cradle to resist excessive pronation. The insoles are particularly suited to address over-pronation tendencies and knee stress issues exhibited by women.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] FIG. 1 is a perspective bottom view of an embodiment of the present invention designed for the right foot of a wearer.

[0013] FIG. 2 is a top view of the embodiment of the present invention.

[0014] FIG. 3 is a bottom view of the embodiment of the present invention.

[0015] FIG. 4 is the medial side view of an insole designed for the right foot of a wearer.

[0016] FIG. 5 is the lateral side view of an insole designed for the right foot of a wearer

[0017] FIG. 6 is the front side view of the insole illustrating the toe end.

[0018] FIG. 7 is the back side view of the insole illustrating the heel end.

[0019] FIG. 8 is a perspective exploded view of the insole.

[0020] FIG. 9 is a cross-sectional view of FIG. 2 along line 9-9.

DETAILED DESCRIPTION

[0021] An insole is disclosed to address the issue of over-pronation and patella misalignment encountered by human individuals, particularly women, in the walking or running process.

[0022] The insole disclosed is for insertion into a shoe inside bottom of the shoes of a user. It should be understood that normally, a human has a right foot and a left foot that are generally mirror images of one another, although each foot may have some differences due to injury, wear and genetics. Consequently, a pair of shoes generally has two shoes which are mirror images of one another; one accommodates the right foot and the other the left foot of the wearer. Insoles, which rest upon the shoe inside bottom, also generally come in pairs. One insole of the pair is adapted to fit inside a shoe for a left foot and the other is adapted to fit inside a shoe for the right foot. For purposes of illustration, only the right insole of the invention has been depicted and it should be understood that a left insole is the mirror image thereof.

[0023] Generally, the insole of the invention has a first top surface and a second bottom surface adapted to rest upon a user's shoe inside bottom, a toe end and a heel end and comprises (a) a top sheet extending essentially the full length of a complementary user's shoe inside bottom, having a toe end and a heel end and a foot-receiving top surface and an opposite bottom surface, (b) a support base

cushion extending essentially the full length of said shoe inside bottom, said support base cushion having a base cushion top surface and a base cushion bottom surface, said base cushion top surface secured to said opposite bottom surface of said top sheet, said support base having a first forefoot mid-cushion area that extends from a toe end to a metatarsal area of the insole and an arch to heel area or rearward area that extends from a metatarsal area to a heel end of the insole; (c) a forefoot cushion having a first forefoot cushion top surface secured to said forefoot mid-cushion area of said support base cushion bottom surface, and a second forefoot cushion bottom surface; (c) a medial support cradle secured to said base cushion bottom surface of said support base cushion; (d) a lateral support cradle secured to said base cushion bottom surface of said support base cushion; and (e) a heel cushion secured to said base cushion bottom surface of said support base cushion.

[0024] More particularly, the insole has a forefoot area and an arch to heel area. The arch to heel area can also be called the rearward area. On the second bottom surface of the insole, the arch to heel area further defines a medial support cradle attachment area, a lateral support cradle attachment area, and a heel cushion attachment area.

[0025] The forefoot mid-cushion area of the insole, from the foot-receiving top surface of the insole to the second bottom surface of the insole comprises a portion of the top sheet, a portion of the support base cushion, a forefoot mid-cushion layer, and the forefoot cushion. The forefoot mid-cushion area extends from said toe end to a metatarsal area and culminates in a forefoot area border.

[0026] The arch to heel area or rearward area comprises a portion of the top sheet, a portion of the support base cushion, a lateral support cradle, a medial support cradle and a heel cushion. The arch to heel area extends from a metatarsal area or adjacent said forefoot area border to said heel end.

[0027] A medial support cradle is secured to said medial support cradle attachment area of said arch to heel area of said support base cushion. The medial support cradle has a curvature which forms an arch support for a user's foot and a medial heel support cup portion. The medial support cradle has a rise apexing approximately 2.2 to $2.9\text{ cm} \pm 0.2\text{ cm}$ when measured from a support surface (shoe contact area in use) to the highest point of the medial arch. This rise is adapted to lie adjacent a user's arch when the insole is in use. The medial heel support cup portion extends rearward from the rise and wraps partially around the heel portion of the insole thereby forming a heel support cup on the medial side of the insole.

[0028] The lateral support cradle is secured to said support base cushion in said lateral support attachment area.

[0029] The lateral support cradle has a first shoe inside bottom contacting portion and a second side portion which extends upwardly from said first shoe inside bottom contacting portion, thereby creating a support for the side of a user's foot. The medial support cradle extends upwardly from said first shoe inside bottom contacting portion to a height of about 2.15 to 2.2 cm . The lateral support cradle extends from essentially adjacent said forefoot area border toward, but not to, said heel end. The lateral support cradle has a rear end adjacent said heel cushion attachment area of said support base cushion.

[0030] The first shoe inside bottom contacting portion of said lateral cradle has a top border which follows the shape of said forefoot cushion , providing a rounded area (which may be essentially semicircular in one embodiment) which will lie under the metatarsal portion of a user's foot in use. Preferably, the rounded area lies adjacent a metatarsal cushion which is preferably integral to said support base cushion. Such a metatarsal cushion can be made integral with said support base cushion by providing an indentation in the mold used to form said support base cushion. It appears as a raised area (or convex bump) when viewed from the top of the insole.

[0031] The indentation will be filled with polymer in the manufacturing process and an upwardly extending portion of the support base cushion will thus be formed. Alternatively, but less preferred, a separate metatarsal cushion may be secured to a portion of the base cushion top surface and then the two structures secured to said top layer.

[0032] The first shoe inside bottom contacting portion of said lateral support cradle gradually decreases in width as it extends from said rounded area toward said heel cushion attachment area. This allows the support base cushion to be exposed in the area between said medial and lateral support cradles to offer resiliency in the exposed area. The exposed area will directly contact the inside bottom of a user's shoe in use.

[0033] A heel cushion is secured to said support base cushion in said heel cushion attachment area. The heel cushion has a first inside shoe contacting portion and a second upwardly extending side portion. The structure of the heel cushion provides a "soft spot" in the key impact zone for heel strike by a user's foot,

which is the posterior-lateral aspect of the heel. The soft lateral border (i.e. the upwardly-extending side portion) is compressed on contact, attenuating the shock at heel strike and modulating ground reaction forces. Accordingly, it acts in cooperation with the firmer medial support cradle to resist excessive pronation. The soft bottom border of the heel cushion acts to cushion the area of the central heel. Preferably, the heel cushion first inside shoe contacting portion is shaped similar to the shape illustrated in FIG. 3. This shape provides the optimum soft spot in the key impact zone.

[0034] The width of the first inside shoe contacting portion is from about 37 mm to about 48 mm $\pm$ 0.50 mm from the smallest to the largest sized insoles. The length of the first inside shoe contacting surface from the frontmost edge to the rearmost edge is from about 38 mm to about 49 mm $\pm$ 0.50 mm. For an exemplary women's size 11-12, the preferred length is 49 mm and the width is 47.70 mm. The depth of the heel cushion from the first inside shoe contacting area extending upwardly toward the foot contacting surface ranges from about 3.0 to about 3.5 mm $\pm$ 0.50 mm. For an exemplary women's size 11-12, the preferred depth is 3.5 mm.

[0035] The heel cushion's second upwardly extending side portion forms the lateral portion of a heel support cup whereas the afore-described medial support cradle provides for the medial portion of a heel support cup and cushions and offers resilience to the lateral portion of a user's heel. The heel cushion's second upwardly extending side portion wraps around the lateral side of the insole to an area almost adjacent the second side portion of the lateral support cradle.

[0036] The support base cushion is preferably made from a cushioning material. Most preferably, it is made from polyurethane ("PU") and has a hardness of about 40 Asker C ± 3 .

[0037] The medial support cradle is made from a fairly rigid material such as thermoplastic polyurethanes (TPU). The desirable hardness is 64 Type D ± 3 . Other materials can be used as long as the properties are similar. The lateral support cradle is made from the same or similar material as used for the medial support cradle.

[0038] The medial and lateral support cradles preferably have a thickness ranging from .5 mm to 1.5 mm. The preferable thickness is 1 mm as it provides sufficient stability and support but also allows the cradle to bend with the insole.

[0039] The forefoot cushion is preferably made from a cushioning material. Most preferably, it is made from ethylene vinyl acetate ("EVA") and has a hardness of 21 Asker C ± 3 .

[0040] The heel cushion is preferably comprised of thermoplastic rubber gel ("TPR").

[0041] Other gels can be used, but it is preferred that the gel used have the characteristics described in the following paragraphs.

[0042] A Shore/Asker Hardness test provides a measure of hardness. In a most preferred embodiment, the heel cushion measures 30 Asker C ± 3 .

[0043] The Shore/Asker hardness is measured with a commercially available durometer. The material to be tested is placed on a hard flat surface. The Asker tester is equipped with a "C" scale and proper indenter type, typically a

hemispherical type. The Asker tester is placed on the material to be tested with no additional pressure. The needle deflects to provide the reading.

[0044] The top sheet is made of fabric sheet material in the shape of an insole or outline of a foot. The fabric will lie adjacent the foot in use and can be selected of any fabric which is capable of lamination with the support base cushion layer. A preferred sheet material is a polyester fabric, but other fabrics such as brushed nylon and others may be used. Optionally, a fabric that reduces friction between the material and the person's foot may be employed. The fabric can be of any desired color.

[0045] Most preferably, an antimicrobial fabric is used, such as antimicrobial polyester. The antimicrobial fabric is preferred so that odor-causing bacteria will be inhibited. Fabrics having these properties are commercially available. One suitable fabric utilizes silver technology for antimicrobial purposes and is obtainable through Thompson Research Associates (Toronto, Canada) in fabrics employing SILPURE™ technology. In a preferred embodiment, fabric sold under the trade designation Ultra-Fresh Silpure FBR-5 is utilized, which provides control of bacterial growth even after extensive launderings. Other fabrics can be employed which use other types of antimicrobial technology, preferably long lasting action.

[0046] The support base cushion, the heel cushion, and the medial and lateral cradles are preferably formed and secured to each other through a process of injection molding. Preferably, the molds used to make the insole have two-sided contour. This allows for quicker assembly so that the mold does not have to be changed during the injection molding process. The support base cushion is

molded on one side of the mold and the cradle and heel cushion is molded on the opposite side of the mold. Standard injection molding assembly-line processes are preferably utilized, but any molding process which results in the structure with the properties herein disclosed can be used are known in the art.

[0047] The total thickness and size of the insole can vary depending on the shoe size, the application, and whether the insole is a removable insole or a permanent insole. The length for a women's insole ranges from about 231 mm to 299 mm, the width near the toe area from 76 to 99 mm, the maximum thickness from about 24 to 30 mm, and the heel rise from about 16 to about 21.5 mm. In an exemplary woman's size 11-12 the length is approximately 298 mm and the width is approximately 69 mm near the heel and 98.4 mm near the metatarsal region. The height of the size 11-12 insole ranges from about 4 mm near the toes to 21.5 mm near the heel. The length and width of the insole will vary according to the shoe size for which the insole is intended, but the thickness in the same relative area will be similar to the exemplary insole.

[0048] FIGS. 1-9 exemplify the invention by showing an insole designed for the right foot of a wearer. One skilled in the art would be able to construct an insole appropriate for the right foot as the mirror image of the left insole.

[0049] FIG. 1 is a perspective bottom view of an embodiment of the present invention designed for the right foot of a wearer. An insole 1 has a first top surface and a second bottom surface adapted to rest upon a user's shoe inside bottom. The insole 1 further has a toe end 2, a heel end 3, a medial side 4 and a lateral side 5. A top sheet 6 (not shown in FIG. 1), extends essentially the full

length of a complementary user's shoe inside bottom and having a foot-receiving top surface and an opposite bottom surface, is secured to a support base cushion 9.

[0050] Support base cushion 9 extends essentially the full length of said shoe inside bottom and has a base cushion top surface and a base cushion bottom surface. The base cushion top surface is secured to the opposite bottom surface of the top sheet 6. The support base cushion 9 further defines a first forefoot mid-cushion area 20 and an arch to heel area 21. The areas are divided by forefoot border 22.

[0051] The forefoot mid-cushion area 20 comprises a forefoot recess that extends the entire forefoot mid-cushion area 20. The arch to heel area 21 comprises recesses approximate the lateral side 5, medial side 4 and heel end 3. The recess approximate the medial side 4 extends from about the edge of the forefoot mid-cushion area 20 rearward towards the heel end 3 and partially surrounding the lateral side of the heel end 3. The medial side recess also extends upwardly along the lateral side of the insole. The recess approximate the lateral side 5 extends from about the edge of the forefoot mid-cushion area 20 or metatarsal area rearward towards the heel end 3 and stops short of the heel end 3. The lateral side recess also extends laterally outward towards the side of the support base cushion and rearwardly to be adjacent to a heel end recess or a heel cushion 13. The recess approximate the heel end 3 lies under the heel area of the insole and extends out towards the rear lateral side of the insole and upwardly along the rear lateral side of the insole.

[0052] A forefoot cushion 10 has a first forefoot cushion top surface and a second forefoot cushion bottom surface. Said first forefoot top surface is secured to said

forefoot recess of said support base cushion bottom surface in the forefoot mid-cushion area 20. The second forefoot cushion bottom surface lies adjacent to the shoe inside bottom when in use.

[0053] A forefoot mid-cushion 9A can be seen to have a shape which is complementary to the shape of the forefoot cushion 10. This shape has a first metatarsal head cut-out incorporated into the support base. The forefoot cushion 10, comprised of a softer, preferably ethylene vinyl acetate material (EVA) fills in this space so that there is a soft spot beneath the first metatarsal head of a user's foot when the insole is in use to allow for improved hallux dorsiflexion (i.e., enhanced push off) during the propulsive phase of gait.

[0054] A medial support cradle 11 has a top surface and a bottom surface and the top surface is secured to the base cushion bottom surface of said support base cushion 9 in the recess approximate the medial side 4 of the insole. Medial support cradle 11 is complimentary to the shape of the medial side recess. Medial support cradle 11 further defines a medial heel support cup portion 11A and an arch support portion 11B. Medial heel support cup portion 11A provides support around the heel along the medial side of the insole. Arch support portion 11B is shaped to follow the contours of the arch area of the insole and foot.

[0055] A lateral support cradle 12 has a top surface and a bottom surface and the top surface is secured to the base cushion bottom surface of said support base cushion 9 in the recess approximate the lateral side 5 of the insole. Lateral support cradle 12 is complimentary to the shape of the lateral side recess. Lateral support cradle 12 further defines a first shoe inside contacting portion 12A and a second side portion 12B. First shoe inside contacting portion 12A resides along

the bottom of the insole 1 and contacts the shoe inside bottom. Second side portion 12B resides along the lateral side 5 of the insole 1 and tapers smaller from the rear edge of the lateral support cradle 12 to the front edge of the lateral support cradle 12.

[0056] A heel cushion 13 has a top surface and a bottom surface and the top surface is secured to the base cushion bottom surface of said support base cushion 9 in the recess approximate the heel end 3 of the insole. Heel cushion 13 is complimentary to the shape of the heel end recess. Heel cushion further defines a side portion 13B. Side portion 13B resides along the rear lateral side of the insole essentially between medial heel support cup portion 11A of medial support cradle 11 and second side portion 12B of lateral support cradle 12.

[0057] Optional vent holes 8 may be defined by the insole. Vent holes 8 extend the entire thickness of the insole 1 from the top sheet 6 through to the forefoot cushion 10.

[0058] FIG. 2 is a top view of an embodiment of the present invention designed for the right foot of a wearer. An insole 1 has a first top surface and a second bottom surface adapted to rest upon a user's shoe inside bottom. The insole 1 further has a toe end 2, a heel end 3, a medial side 4 and a lateral side 5. A top sheet 6 (not shown in FIG. 1), extends essentially the full length of a complementary user's shoe inside bottom and having a foot-receiving top surface and an opposite bottom surface, is secured to a support base cushion 9 (not shown in FIG. 2).

[0059] Top sheet 6 provides a surface for contact with the foot of a user (the foot may or may not be donning hosiery or socks). Support base cushion 9 further

comprises a metatarsal cushion 7 that may extend upwardly from support base cushion 9 underneath top sheet 6 under the metatarsal area of the foot. Optional vent holes 8 may be defined by the insole and extend from the top sheet down through to the bottom of the insole.

[0060] FIG. 3 is a view of the bottom (shoe side) of the insole of an embodiment of the present invention designed for the right foot of a wearer. An insole 1 has a first top surface and a second bottom surface adapted to rest upon a user's shoe inside bottom. The insole 1 further has a toe end 2, a heel end 3, a medial side 4 and a lateral side 5. A top sheet 6 (not shown in FIG. 3), extends essentially the full length of a complementary user's shoe inside bottom and having a foot-receiving top surface and an opposite bottom surface, is secured to a support base cushion 9.

[0061] Support base cushion 9 extends essentially the full length of said shoe inside bottom and has a base cushion top surface and a base cushion bottom surface. The base cushion top surface is secured to the opposite bottom surface of the top sheet 6. The support base cushion 9 further defines a first forefoot mid-cushion area 20 and an arch to heel area 21. The areas are divided by forefoot border 22.

[0062] The forefoot mid-cushion area 20 comprises a forefoot recess that extends the entire forefoot mid-cushion area 20. The arch to heel area 21 comprises recesses approximate the lateral side 5, medial side 4 and heel end 3. The recess approximate the medial side 4 extends from about the edge of the forefoot mid-cushion area 20 rearward towards the heel end 3 and partially surrounding the lateral side of the heel end 3. The medial side recess also extends upwardly along

the lateral side of the insole. The recess approximate the lateral side 5 extends from about the edge of the forefoot mid-cushion area 20 or metatarsal area rearward towards the heel end 3 and stops short of the heel end 3. The lateral side recess also extends laterally outward towards the side of the support base cushion and rearwardly to be adjacent to a heel end recess or a heel cushion 13. The recess approximate the heel end 3 lies under the heel area of the insole and extends out towards the rear lateral side of the insole and upwardly along the rear lateral side of the insole.

[0063] A forefoot cushion 10 has a first forefoot cushion top surface and a second forefoot cushion bottom surface. Said first forefoot top surface is secured to said forefoot recess of said support base cushion bottom surface in the forefoot mid-cushion area 20. The second forefoot cushion bottom surface lies adjacent to the shoe inside bottom when in use.

[0064] A medial support cradle 11 has a top surface and a bottom surface and the top surface is secured to the base cushion bottom surface of said support base cushion 9 in the recess approximate the medial side 4 of the insole. Medial support cradle 11 is complimentary to the shape of the medial side recess. Medial support cradle 11 further defines a medial heel support cup portion 11A and an arch support portion 11B. Medial heel support cup portion 11A provides support around the heel along the medial side of the insole. Arch support portion 11B is shaped to follow the contours of the arch area of the insole and foot.

[0065] A lateral support cradle 12 has a top surface and a bottom surface and the top surface is secured to the base cushion bottom surface of said support base cushion 9 in the recess approximate the lateral side 5 of the insole. Lateral

support cradle 12 is complimentary to the shape of the lateral side recess. Lateral support cradle 12 further defines a first shoe inside contacting portion 12A and a second side portion 12B. First shoe inside contacting portion 12A resides along the bottom of the insole 1 and contacts the shoe inside bottom. Second side portion 12B resides along the lateral side 5 of the insole 1 and tapers smaller from the rear edge of the lateral support cradle 12 to the front edge of the lateral support cradle 12.

[0066] A heel cushion 13 has a top surface and a bottom surface and the top surface is secured to the base cushion bottom surface of said support base cushion 9 in the recess approximate the heel end 3 of the insole. Heel cushion 13 is complimentary to the shape of the heel end recess. Heel cushion further defines a side portion 13B. Side portion 13B resides along the rear lateral side of the insole essentially between medial heel support cup portion 11A of medial support cradle 11 and second side portion 12B of lateral support cradle 12.

[0067] Optional vent holes 8 may be defined by the insole. Vent holes 8 extend the entire thickness of the insole 1 from the top sheet 6 through to the forefoot cushion 10.

[0068] FIG. 4 is the (medial) side view of an insole designed for the right foot of a wearer. An insole 1 has a first top surface and a second bottom surface adapted to rest upon a user's shoe inside bottom. The insole 1 further has a toe end 2, a heel end 3, a medial side 4 and a lateral side 5 (not shown in FIG. 4). A top sheet 6, extends essentially the full length of a complementary user's shoe inside bottom and having a foot-receiving top surface and an opposite bottom surface, is secured to a support base cushion 9.

[0069] In the view of FIG. 4, one can especially see the layers of the forefoot area. The layers include, from top to bottom, top sheet 6, a forefoot mid-cushion 9A (which may or may not be integral with said support base cushion 9) and a forefoot cushion 10.

[0070] Support base cushion 9 extends essentially the full length of said shoe inside bottom and has a base cushion top surface and a base cushion bottom surface. The base cushion top surface is secured to the opposite bottom surface of the top sheet 6. The support base cushion 9 further defines a first forefoot mid-cushion area 20 and an arch to heel area 21.

[0071] Support base cushion 9 further comprises a metatarsal cushion 7 that may extend upwardly from support base cushion 9 underneath top sheet 6 under the metatarsal area of the foot. The thickness (the height extended above the top surface of support base cushion 9) of the metatarsal cushion 7 is preferably 1.5 mm to 3.5 mm. The preferred thickness is 2.00 mm.

[0072] The forefoot mid-cushion area 20 comprises a forefoot recess that extends the entire forefoot mid-cushion area 20. The arch to heel area 21 comprises recesses approximate the lateral side 5, medial side 4 and heel end 3. The recess approximate the medial side 4 extends from about the edge of the forefoot mid-cushion area 20 rearward towards the heel end 3 and partially surrounding the lateral side of the heel end 3. The medial side recess also extends upwardly along the lateral side of the insole.

[0073] A forefoot cushion 10 has a first forefoot cushion top surface and a second forefoot cushion bottom surface. Said first forefoot top surface is secured to said forefoot recess of said support base cushion bottom surface in the forefoot mid-

cushion area 20. The second forefoot cushion bottom surface lies adjacent to the shoe inside bottom when in use.

[0074] The forefoot mid-cushion 9A can be seen to have a shape which is complementary to the shape of the forefoot cushion 10. This shape has a first metatarsal head cut-out incorporated into the support base. The forefoot cushion 10, comprised of a softer, preferably ethylene vinyl acetate material (EVA) fills in this space so that there is a soft spot beneath the first metatarsal head of a user's foot when the insole is in use to allow for improved hallux dorsiflexion (i.e., enhanced push off) during the propulsive phase of gait.

[0075] A medial support cradle 11 has a top surface and a bottom surface and the top surface is secured to the base cushion bottom surface of said support base cushion 9 in the recess approximate the medial side 4 of the insole. Medial support cradle 11 is complimentary to the shape of the medial side recess. Medial support cradle 11 further defines a medial heel support cup portion 11A and an arch support portion 11B. Medial heel support cup portion 11A provides support around the heel along the medial side of the insole. Arch support portion 11B is shaped to follow the contours of the arch area of the insole and foot. Medial support cradle 11 has a rise of 2.2 to 2.9 cm $\pm$ 0.2 cm when measured from a support surface or contact area. This rise is coincident with the arch area of a user's foot in use and provides support for the arch area.

[0076] FIG. 5 is the (lateral) side view of an insole designed for the right foot of a wearer. An insole 1 has a first top surface and a second bottom surface adapted to rest upon a user's shoe inside bottom. The insole 1 further has a toe end 2, a heel end 3, a medial side 4 (not shown in FIG. 5) and a lateral side 5. A top sheet 6,

extends essentially the full length of a complementary user's shoe inside bottom and having a foot-receiving top surface and an opposite bottom surface, is secured to a support base cushion 9.

[0077] In the view of FIG. 5, one can especially see the layers of the forefoot area. The layers include, from top to bottom, top sheet 6, a forefoot mid-cushion 9A (which may or may not be integral with said support base cushion 9) and a forefoot cushion 10.

[0078] Support base cushion 9 extends essentially the full length of said shoe inside bottom and has a base cushion top surface and a base cushion bottom surface. The base cushion top surface is secured to the opposite bottom surface of the top sheet 6. The support base cushion 9 further defines a first forefoot mid-cushion area 20 and an arch to heel area 21.

[0079] Support base cushion 9 further comprises a metatarsal cushion 7 that may extend upwardly from support base cushion 9 underneath top sheet 6 under the metatarsal area of the foot. The thickness (the height extended above the top surface of support base cushion 9) of the metatarsal cushion 7 is preferably 1.5 mm to 3.5 mm. The preferred thickness is 2.00 mm.

[0080] The forefoot mid-cushion area 20 comprises a forefoot recess that extends the entire forefoot mid-cushion area 20. The arch to heel area 21 comprises recesses approximate the lateral side 5, medial side 4 and heel end 3. The recess approximate the lateral side 5 extends from about the edge of the forefoot mid-cushion area 20 or metatarsal area rearward towards the heel end 3 and stops short of the heel end 3. The lateral side recess also extends laterally outward towards the side of the support base cushion and rearwardly to be adjacent to a heel end

recess or a heel cushion 13. The recess approximate the heel end 3 lies under the heel area of the insole and extends out towards the rear lateral side of the insole and upwardly along the rear lateral side of the insole.

[0081] A forefoot cushion 10 has a first forefoot cushion top surface and a second forefoot cushion bottom surface. Said first forefoot top surface is secured to said forefoot recess of said support base cushion bottom surface in the forefoot mid-cushion area 20. The second forefoot cushion bottom surface lies adjacent to the shoe inside bottom when in use.

[0082] The forefoot mid-cushion 9A can be seen to have a shape which is complementary to the shape of the forefoot cushion 10. This shape has a first metatarsal head cut-out incorporated into the support base. The forefoot cushion 10, comprised of a softer, preferably ethylene vinyl acetate material (EVA) fills in this space so that there is a soft spot beneath the first metatarsal head of a user's foot when the insole is in use to allow for improved hallux dorsiflexion (i.e., enhanced push off) during the propulsive phase of gait.

[0083] A lateral support cradle 12 has a top surface and a bottom surface and the top surface is secured to the base cushion bottom surface of said support base cushion 9 in the recess approximate the lateral side 5 of the insole. Lateral support cradle 12 is complimentary to the shape of the lateral side recess. Lateral support cradle 12 further defines a first shoe inside contacting portion 12A and a second side portion 12B. First shoe inside contacting portion 12A resides along the bottom of the insole 1 and contacts the shoe inside bottom. Second side portion 12B resides along the lateral side 5 of the insole 1 and tapers smaller from

the rear edge of the lateral support cradle 12 to the front edge of the lateral support cradle 12.

[0084] A heel cushion 13 has a top surface and a bottom surface and the top surface is secured to the base cushion bottom surface of said support base cushion 9 in the recess approximate the heel end 3 of the insole. Heel cushion 13 is complimentary to the shape of the heel end recess. Heel cushion further defines a side portion 13B. Side portion 13B resides along the rear lateral side of the insole essentially between medial heel support cup portion 11A of medial support cradle 11 and second side portion 12B of lateral support cradle 12.

[0085] FIG. 6 is the front side view of the insole of an embodiment of the present invention designed for the right foot of a wearer, illustrating the toe end. An insole 1 has a first top surface and a second bottom surface adapted to rest upon a user's shoe inside bottom. The insole 1 further has a toe end 2, a heel end 3, a medial side 4 and a lateral side 5. A top sheet 6 extends essentially the full length of a complementary user's shoe inside bottom and, having a foot-receiving top surface and an opposite bottom surface, is secured to a support base cushion 9.

[0086] In the view of FIG. 6, one can especially see the layers of the forefoot area. The layers include, from top to bottom, top sheet 6, a forefoot mid-cushion 9A (which is integral with said support base cushion 9) and a forefoot cushion 10.

[0087] Support base cushion 9 extends essentially the full length of said shoe inside bottom and has a base cushion top surface and a base cushion bottom surface. The base cushion top surface is secured to the opposite bottom surface of the top sheet 6.

[0088] Support base cushion 9 further comprises a metatarsal cushion 7 that may extend upwardly from support base cushion 9 underneath top sheet 6 under the metatarsal area of the foot. The thickness (the height extended above the top surface of support base cushion 9) of the metatarsal cushion 7 is preferably 1.5 mm to 3.5 mm. The preferred thickness is 2.00 mm.

[0089] A forefoot cushion 10 has a first forefoot cushion top surface and a second forefoot cushion bottom surface. Said first forefoot top surface is secured to said forefoot recess of said support base cushion bottom surface in the forefoot mid-cushion area 20. The second forefoot cushion bottom surface lies adjacent to the shoe inside bottom when in use.

[0090] The forefoot mid-cushion 9A can be seen to have a shape which is complementary to the shape of the forefoot cushion 10. This shape has a first metatarsal head cut-out incorporated into the support base. The forefoot cushion 10, comprised of a softer, preferably ethylene vinyl acetate material (EVA) fills in this space so that there is a soft spot beneath the first metatarsal head of a user's foot when the insole is in use to allow for improved hallux dorsiflexion (i.e., enhanced push off) during the propulsive phase of gait.

[0091] FIG. 7 is the back side view of the insole of an embodiment of the present invention designed for the right foot of a wearer, illustrating the heel end. An insole 1 has a first top surface and a second bottom surface adapted to rest upon a user's shoe inside bottom. The insole 1 further has a toe end 2, a heel end 3, a medial side 4 and a lateral side 5. A top sheet 6, extends essentially the full length of a complementary user's shoe inside bottom and having a foot-receiving top surface and an opposite bottom surface, is secured to a support base cushion 9.

[0092] Support base cushion 9 extends essentially the full length of said shoe inside bottom and has a base cushion top surface and a base cushion bottom surface. The base cushion top surface is secured to the opposite bottom surface of the top sheet 6.

[0093] The support base cushion 9 comprises recesses approximate the lateral side 5, medial side 4 and heel end 3. The recess approximate the medial side 4 extends from about the edge of the forefoot mid-cushion area 20 rearward towards the heel end 3 and partially surrounding the lateral side of the heel end 3. The medial side recess also extends upwardly along the lateral side of the insole. The recess approximate the lateral side 5 extends from about the edge of the forefoot mid-cushion area 20 or metatarsal area rearward towards the heel end 3 and stops short of the heel end 3. The lateral side recess also extends laterally outward towards the side of the support base cushion and rearwardly to be adjacent to a heel end recess or a heel cushion 13. The recess approximate the heel end 3 lies under the heel area of the insole and extends out towards the rear lateral side of the insole and upwardly along the rear lateral side of the insole.

[0094] A medial support cradle 11 has a top surface and a bottom surface and the top surface is secured to the base cushion bottom surface of said support base cushion 9 in the recess approximate the medial side 4 of the insole. Medial support cradle 11 is complimentary to the shape of the medial side recess. Medial support cradle 11 further defines a medial heel support cup portion 11A and an arch support portion 11B. Medial heel support cup portion 11A provides support around the heel along the medial side of the insole. Arch support portion 11B is shaped to follow the contours of the arch area of the insole and foot.

[0095] A lateral support cradle 12 has a top surface and a bottom surface and the top surface is secured to the base cushion bottom surface of said support base cushion 9 in the recess approximate the lateral side 5 of the insole. Lateral support cradle 12 is complimentary to the shape of the lateral side recess. Lateral support cradle 12 further defines a first shoe inside contacting portion 12A and a second side portion 12B. First shoe inside contacting portion 12A resides along the bottom of the insole 1 and contacts the shoe inside bottom. Second side portion 12B resides along the lateral side 5 of the insole 1 and tapers smaller from the rear edge of the lateral support cradle 12 to the front edge of the lateral support cradle 12.

[0096] A heel cushion 13 has a top surface and a bottom surface and the top surface is secured to the base cushion bottom surface of said support base cushion 9 in the recess approximate the heel end 3 of the insole. Heel cushion 13 is complimentary to the shape of the heel end recess. Heel cushion further defines a side portion 13B. Side portion 13B resides along the rear lateral side of the insole essentially between medial heel support cup portion 11A of medial support cradle 11 and second side portion 12B of lateral support cradle 12.

[0097] FIG. 8 is a perspective exploded view of the insole illustrating the structure of the individual components of an embodiment of the present invention designed for the right foot of a wearer. An insole 1 has a first top surface and a second bottom surface adapted to rest upon a user's shoe inside bottom. The insole 1 further has a toe end 2, a heel end 3, a medial side 4 and a lateral side 5. A top sheet 6 extends essentially the full length of a complementary user's shoe inside bottom and, having a foot-receiving top surface and an opposite bottom surface, is secured to a support base cushion 9.

[0098] Support base cushion 9 extends essentially the full length of said shoe inside bottom and has a base cushion top surface and a base cushion bottom surface. The base cushion top surface is secured to the opposite bottom surface of the top sheet 6. The support base cushion 9 further defines a first forefoot mid-cushion area 20 and an arch to heel area 21. The areas are divided by forefoot border 22.

[0099] Support base cushion 9 further comprises a metatarsal cushion 7 that may extend upwardly from support base cushion 9 underneath top sheet 6 under the metatarsal area of the foot. The thickness (the height extended above the top surface of support base cushion 9) of the metatarsal cushion 7 is preferably 1.5 mm to 3.5 mm. The preferred thickness is 2.00 mm

[00100] The forefoot mid-cushion area 20 comprises a forefoot recess that extends the entire forefoot mid-cushion area 20. The arch to heel area 21 comprises recesses approximate the lateral side 5, medial side 4 and heel end 3. The recess approximate the medial side 4 extends from about the edge of the forefoot mid-cushion area 20 rearward towards the heel end 3 and partially surrounding the lateral side of the heel end 3. The medial side recess also extends upwardly along the lateral side of the insole. The recess approximate the lateral side 5 extends from about the edge of the forefoot mid-cushion area 20 or metatarsal area rearward towards the heel end 3 and stops short of the heel end 3. The lateral side recess also extends laterally outward towards the side of the support base cushion and rearwardly to be adjacent to a heel end recess or a heel cushion 13. The recess approximate the heel end 3 lies under the heel area of the insole and extends out towards the rear lateral side of the insole and upwardly along the rear lateral side of the insole.

[00101] A forefoot cushion 10 has a first forefoot cushion top surface and a second forefoot cushion bottom surface. Said first forefoot top surface is secured to said forefoot recess of said support base cushion bottom surface in the forefoot mid-cushion area 20. The second forefoot cushion bottom surface lies adjacent to the shoe inside bottom when in use.

[00102] The forefoot mid-cushion 9A can be seen to have a shape which is complementary to the shape of the forefoot cushion 10. This shape has a first metatarsal head cut-out incorporated into the support base. The forefoot cushion 10, comprised of a softer, preferably ethylene vinyl acetate material (EVA) fills in this space so that there is a soft spot beneath the first metatarsal head of a user's foot when the insole is in use to allow for improved hallux dorsiflexion (i.e., enhanced push off) during the propulsive phase of gait.

[00103] A medial support cradle 11 has a top surface and a bottom surface and the top surface is secured to the base cushion bottom surface of said support base cushion 9 in the recess approximate the medial side 4 of the insole. Medial support cradle 11 is complimentary to the shape of the medial side recess. Medial support cradle 11 further defines a medial heel support cup portion 11A and an arch support portion 11B. Medial heel support cup portion 11A provides support around the heel along the medial side of the insole. Arch support portion 11B is shaped to follow the contours of the arch area of the insole and foot.

[00104] A lateral support cradle 12 has a top surface and a bottom surface and the top surface is secured to the base cushion bottom surface of said support base cushion 9 in the recess approximate the lateral side 5 of the insole. Lateral support cradle 12 is complimentary to the shape of the lateral side recess. Lateral

support cradle 12 further defines a first shoe inside contacting portion 12A and a second side portion 12B. First shoe inside contacting portion 12A resides along the bottom of the insole 1 and contacts the shoe inside bottom. Second side portion 12B resides along the lateral side 5 of the insole 1 and tapers smaller from the rear edge of the lateral support cradle 12 to the front edge of the lateral support cradle 12.

[00105] A heel cushion 13 has a top surface and a bottom surface and the top surface is secured to the base cushion bottom surface of said support base cushion 9 in the recess approximate the heel end 3 of the insole. Heel cushion 13 is complimentary to the shape of the heel end recess. Heel cushion further defines a side portion 13B. Side portion 13B resides along the rear lateral side of the insole essentially between medial heel support cup portion 11A of medial support cradle 11 and second side portion 12B of lateral support cradle 12.

[00106] Optional vent holes 8 may be defined by the insole. Vent holes 8 extend the entire thickness of the insole 1 from the top sheet 6 through to the forefoot cushion 10.

[00107] FIG. 9 is a cross sectional view of the insole of FIG. 2 along line 9-9. An insole 1 has a first top surface and a second bottom surface adapted to rest upon a user's shoe inside bottom. The insole 1 further has a toe end 2, a heel end 3, a medial side 4 (not shown in FIG. 9) and a lateral side 5 (not shown in FIG. 9). A top sheet 6 extends essentially the full length of a complementary user's shoe inside bottom and, having a foot-receiving top surface and an opposite bottom surface, is secured to a support base cushion 9.

[00108] Support base cushion 9 extends essentially the full length of said shoe inside bottom and has a base cushion top surface and a base cushion bottom surface. The base cushion top surface is secured to the opposite bottom surface of the top sheet 6. The support base cushion 9 further defines a first forefoot mid-cushion area 20 and an arch to heel area 21. The areas are divided by forefoot border 22.

[00109] Support base cushion 9 further comprises a metatarsal cushion 7 that may extend upwardly from support base cushion 9 underneath top sheet 6 under the metatarsal area of the foot. Metatarsal cushion 7 can be seen as an outwardly extending portion of support base cushion 9. The thickness (the height extended above the top surface of support base cushion 9) of the metatarsal cushion 7 is preferably 1.5 mm to 3.5 mm. The preferred thickness is 2.00 mm.

[00110] The forefoot mid-cushion area 20 comprises a forefoot recess that extends the entire forefoot mid-cushion area 20. The arch to heel area 21 comprises recesses approximate the lateral side 5, medial side 4 and heel end 3. FIG. 9 illustrates a section of the lateral side recess and heel end recess. The recess approximate the lateral side 5 extends from about the edge of the forefoot mid-cushion area 20 or metatarsal area rearward towards the heel end 3 and stops short of the heel end 3. The lateral side recess also extends laterally outward towards the side of the support base cushion and rearwardly to be adjacent to a heel end recess or a heel cushion 13. The recess approximate the heel end 3 lies under the heel area of the insole and extends out towards the rear lateral side of the insole and upwardly along the rear lateral side of the insole.

[00111] A forefoot cushion 10 has a first forefoot cushion top surface and a second forefoot cushion bottom surface. Said first forefoot top surface is secured to said forefoot recess of said support base cushion bottom surface in the forefoot mid-cushion area 20. The second forefoot cushion bottom surface lies adjacent to the shoe inside bottom when in use.

[00112] The forefoot mid-cushion 9A can be seen to have a shape which is complementary to the shape of the forefoot cushion 10. This shape has a first metatarsal head cut-out incorporated into the support base. The forefoot cushion 10, comprised of a softer, preferably ethylene vinyl acetate material (EVA) fills in this space so that there is a soft spot beneath the first metatarsal head of a user's foot when the insole is in use to allow for improved hallux dorsiflexion (i.e., enhanced push off) during the propulsive phase of gait.

[00113] A lateral support cradle 12 has a top surface and a bottom surface and the top surface is secured to the base cushion bottom surface of said support base cushion 9 in the recess approximate the lateral side 5 of the insole. Lateral support cradle 12 is complimentary to the shape of the lateral side recess. Lateral support cradle 12 further defines a first shoe inside contacting portion 12A and a second side portion 12B (not visible in FIG. 9). First shoe inside contacting portion 12A resides along the bottom of the insole 1 and contacts the shoe inside bottom. Second side portion 12B resides along the lateral side 5 of the insole 1 and tapers smaller from the rear edge of the lateral support cradle 12 to the front edge of the lateral support cradle 12.

[00114] A heel cushion 13 has a top surface and a bottom surface and the top surface is secured to the base cushion bottom surface of said support base

cushion 9 in the recess approximate the heel end 3 of the insole. Heel cushion 13 is complimentary to the shape of the heel end recess.

[00115] Optional vent holes 8 may be defined by the insole. Vent holes 8 extend the entire thickness of the insole 1 from the top sheet 6 through to the forefoot cushion 10.

[00116] The medial and lateral support cradles that curve around and onto the sides of the insole and the upwardly extending portion of heel pad 13B combine to form the support for the raised heel edge of the heel end of the insole. The raised heel edge form a heel cup.

[00117] The heel cup extends upwardly and at an angle less than 90 degrees from the foot contacting surface of the insole. The medial heel cup height should be sufficient, preferably at least 21.5 mm from said foot contacting surface, to provide for improved pronation control.

[00118] The EVA beneath the forefoot provides enough pressure reduction under the metatarsal heads. The PU base is of sufficient hardness to add more "arch support", and enhance the effect of the first metatarsal head cut out. If the material surrounding the first metatarsal head cut out is slightly harder, the forefoot will be more supported allowing the first metatarsal head to drop "deeper" into the first metatarsal head soft spot.

WE CLAIM:

1. An insole for placement in a shoe, comprising:

a top sheet extending essentially the full length of the insole, said top sheet having a toe end and a heel end;

a support base cushion extending essentially the full length of the insole and having a toe end and a heel end, said support base cushion having a top surface secured to said top sheet and a bottom surface, said support base cushion having a forefoot mid-cushion area extending from the toe end to a metatarsal area of the insole and adapted to receive a forefoot cushion, said support base cushion having a rearward area extending from the metatarsal area to the heel end and adapted to receive a heel cushion;

said forefoot cushion having a top surface secured to said forefoot mid-cushion area of said support base cushion and a bottom surface; and

said heel cushion having a top surface secured to said bottom surface of support base cushion and a bottom surface, said heel cushion positioned generally under the heel

area of the foot and having a lateral to medial surface extending upwardly around the heel end of said insole.

2. The insole of Claim 1, further comprising a medial support cradle having a bottom surface and a top surface secured to said bottom surface of support base cushion, said medial support cradle positioned under an arch area of a foot and extending rearward toward the heel end of the support base cushion.

3. The insole of Claim 1 or Claim 2, further comprising a lateral support cradle having a bottom surface and a top surface secured to said bottom surface of support base cushion, said lateral support cradle positioned under a metatarsal area of a foot and extending out toward the lateral side of the insole and then rearward and upward along the lateral side until adjacent said heel cushion.

4. The insole of any one of Claims 1 to 3, further comprising a forefoot mid-cushion secured between said support base cushion and the forefoot cushion in the forefoot mid-cushion area.

5. The insole of any preceding Claim, wherein said top sheet is a polyester fabric.

6. The insole of any preceding Claim, wherein said support base cushion is a polyurethane (PU) material.

7. The insole of Claim 6, wherein said polyurethane (PU) material has a hardness value around 40 Asker C ± 3 .

8. The insole of any preceding Claim, wherein said medial support cradle and lateral support cradle are a thermoplastic polyurethane (TPU) material.

9. The insole of Claim 8, wherein said thermoplastic polyurethane (TPU) material has a hardness value around 64 Type D ± 3 .

10. The insole of any preceding Claim, wherein said heel cushion is a thermoplastic rubber gel (TPR) material.

11. The insole of Claim 10, wherein said thermoplastic rubber gel (TPR) material has a hardness value around 30 Asker C ± 3 .

12. The insole of any preceding Claim, wherein said forefoot cushion is an ethylene vinyl acetate (EVA) material.

13. The insole of Claim 12, wherein said ethylene vinyl acetate (EVA) material has a hardness value around 21 Asker C ± 3 .

14. A method of making an insole for use in a shoe, comprising the steps:

providing a top sheet that extends essentially the full length of the insole, said top sheet having a toe end and a heel end;

providing a support base cushion, having a top surface and a bottom surface and extending the full length of the insole;

attaching said support base cushion to said top sheet along said top surface of support base cushion said support base cushion having a toe end and a heel end, said bottom surface of support base cushion having a forefoot mid-cushion area extending from the toe end to a metatarsal area on the insole and adapted to receive a forefoot cushion in the forefoot mid-cushion area, said support base cushion having a rearward area extending from the metatarsal area to the heel end and the bottom surface of the support base cushion in the rearward area adapted to receive a heel cushion;

attaching said forefoot cushion, having a top surface and a bottom surface, to said support base cushion in the forefoot mid-cushion area of by securing said top surface of the forefoot cushion to said support base cushion;

attaching said heel cushion, having a top surface and a bottom surface, to said support base cushion by securing the top surface of said heel cushion to the bottom surface of said support base cushion, said heel cushion positioned generally under the heel area of the foot and having a lateral surface extending laterally around the lateral side of the heel end of said support base cushion.

15. The method of Claim 14, further comprising attaching a medial support cradle, having a top surface and a bottom surface, to said support base cushion by securing the top surface of said medial support cradle to the bottom surface of said support base cushion, said medial support cradle positioned under an arch area of a foot

and extending rearwardly toward the heel area of the support base cushion and extending partially around the lateral side of the support base cushion at the heel end.

16. The method of Claim 14 or Claim 15, further comprising attaching a lateral support cradle, having a top surface and a bottom surface, to said support base cushion by securing the top surface of said lateral support cradle to the bottom surface of said support base cushion, said lateral support cradle positioned under a metatarsal area of the insole and extending outwardly toward the lateral side of the support base cushion and then extending rearwardly to be adjacent said heel cushion;

17. The method of any one of Claims 14 to 16, further comprising the step of securing a forefoot mid-cushion between said support base cushion and said forefoot cushion in the forefoot mid-cushion area.

18. The method of any one of Claims 14 to 17, wherein said top sheet is a polyester fabric.

19. The method of any one of Claims 14 to 18, wherein said support base cushion is a polyurethane (PU) material.

20. The method of Claim 19, wherein said polyurethane (PU) material has a hardness value around 40 Asker C ± 3 .

21. The method of any one of Claims 14 to 20, wherein said medial support cradle and lateral support cradle are a thermoplastic polyurethane (TPU) material.

22. The method of Claim 21, wherein said thermoplastic polyurethane (TPU) material has a hardness value around 64 Type D ± 3 .

23. The method of any one of Claims 14 to 22, wherein said heel cushion is a thermoplastic rubber gel (TPR) material.

24. The method of Claim 23, wherein said thermoplastic rubber gel (TPR) material has a hardness value around 30 Asker C ± 3 .

25. The method of any one of Claims 14 to 25, wherein said forefoot cushion is an ethylene vinyl acetate (EVA) material.

26. The method of Claim 25, wherein said ethylene vinyl acetate (EVA) material has a hardness value around 21 Asker C ± 3 .

27. The insole of Claim 1, wherein said top sheet is a polyester fabric.
28. The insole of Claim 23, wherein said support base cushion is a polyurethane (PU) material.
29. The insole of Claim 28, wherein said polyurethane (PU) material has a hardness value around 40 Asker C ± 3 .
30. The insole of Claim 23, wherein said medial support cradle and lateral support cradle are a thermoplastic polyurethane (TPU) material.
31. The insole of Claim 30, wherein said thermoplastic polyurethane (TPU) material has a hardness value around 64 Type D ± 3 .

32. The insole of Claim 23, wherein said heel cushion is a thermoplastic rubber gel (TPR) material.

33. The insole of Claim 32, wherein said thermoplastic rubber gel (TPR) material has a hardness value around 30 Asker C ± 3 .

34. The insole of Claim 25, wherein said forefoot cushion is an ethylene vinyl acetate (EVA) material.

35. The insole of Claim 34, wherein said ethylene vinyl acetate (EVA) material has a hardness value around 21 Asker C ± 3 .