[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.

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 medial support cradle, a lateral support cradle and a heel cushion;~~

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

~~said medial support cradle having a top surface and a bottom surface, said top surface being secured to said support base cushion and said medial support cradle being positioned under an arch area of a foot and extending rearward toward the heel end and partially surrounding the lateral side of the heel end of the support base cushion;~~

~~said lateral support cradle having a top surface and a bottom surface, said top surface being secured to said support base cushion and said lateral support cradle positioned under a metatarsal area of a foot and extending laterally outward~~

~~toward the side of the support base cushion and extending rearwardly to be adjacent to said heel cushion; and~~

~~said heel cushion having a top surface and a bottom surface, said top surface secured to said support base cushion and said heel cushion positioned generally near the heel end and having a lateral surface extending laterally upwardly around the side of the heel end of said support base cushion.~~

~~2. The insole of Claim 1, further comprising a forefoot mid-cushion secured between said support base cushion and the forefoot cushion in the forefoot mid-cushion area.~~

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.

~~3.~~5. The insole of any preceding Claim ~~1~~, wherein said top sheet is a polyester fabric.

~~4.~~6. The insole of any preceding Claim ~~1~~, wherein said support base cushion is a polyurethane (PU) material.

~~5.~~7. The insole of Claim 46, wherein said polyurethane (PU) material has a hardness value around 40 Asker C ±3.

~~6.~~8. The insole of any preceding Claim ~~1~~, wherein said medial support cradle and lateral support cradle are a thermoplastic polyurethane (TPU) material.

~~7.~~9. The insole of Claim ~~6~~8, wherein said thermoplastic polyurethane (TPU) material has a hardness value around 64 Type D ±3.

~~8.~~10. The insole of any preceding Claim ~~1~~, wherein said heel cushion is a thermoplastic rubber gel (TPR) material.

~~9.~~11. The insole of Claim ~~8~~10, wherein said thermoplastic rubber gel (TPR) material has a hardness value around 30 Asker C ±3.

~~10.~~12. The insole of any preceding Claim ~~1~~, wherein said forefoot cushion is an ethylene vinyl acetate (EVA) material.

~~11.~~13. The insole of Claim ~~10~~12, wherein said ethylene vinyl acetate (EVA) material has a hardness value around 21 Asker C ±3.

~~12.~~14. A method of making an insole for use in a shoe, comprising the steps:

providing a top sheet that ~~is~~ 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 ~~medial support cradle, a lateral support cradle and 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 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;~~

~~attaching said 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; 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.

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;

~~13.~~17. The method of ~~Claim 12~~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.

~~1.~~18. The method of any one of ~~Claim 12~~Claims 14 to 17, wherein said top sheet is a polyester fabric.

~~2.~~19. The method of ~~Claim 12~~any one of Claims 14 to 18, wherein said support base cushion is a polyurethane (PU) material.

~~3.~~20. The method of Claim ~~15~~19, wherein said polyurethane (PU) material has a hardness value around 40 Asker C ±3.

~~4.~~21. The method of ~~Claim 12~~any one of Claims 14 to 20, wherein said medial support cradle and lateral support cradle are a thermoplastic polyurethane (TPU) material.

~~5.~~22. The method of Claim ~~17~~21, wherein said thermoplastic polyurethane (TPU) material has a hardness value around 64 Type D ±3.

~~6.~~23. The method of ~~Claim 12~~any one of Claims 14 to 22, wherein said heel cushion is a thermoplastic rubber gel (TPR) material.

~~7.~~24. The method of Claim ~~19~~23, wherein said thermoplastic rubber gel (TPR) material has a hardness value around 30 Asker C ±3.

~~8.~~25. The method of any one of Claims 14 to 25~~Claim 12~~, wherein said forefoot cushion is an ethylene vinyl acetate (EVA) material.

~~9.~~1. The method of Claim ~~21~~25, wherein said ethylene vinyl acetate (EVA) material has a hardness value around 21 Asker C ±3.

~~10. 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.~~

~~11. The insole of Claim 23, 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.~~

~~12. The insole of Claim 23, 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.~~

~~13. The insole of Claim 23, further comprising a forefoot mid-cushion secured between said support base cushion and the forefoot cushion in the forefoot mid-cushion area.~~

~~14.~~26. The insole of ~~Claim 23~~Claim 1, wherein said top sheet is a polyester fabric.

~~15.~~27. The insole of Claim 23, wherein said support base cushion is a polyurethane (PU) material.

~~16.~~28. The insole of Claim 28, wherein said polyurethane (PU) material has a hardness value around 40 Asker C ±3.

~~17.~~29. The insole of Claim 23, wherein said medial support cradle and lateral support cradle are a thermoplastic polyurethane (TPU) material.

~~18.~~30. The insole of Claim 30, wherein said thermoplastic polyurethane (TPU) material has a hardness value around 64 Type D ±3.

~~19.~~31. The insole of Claim 23, wherein said heel cushion is a thermoplastic rubber gel (TPR) material.

~~20.~~32. The insole of Claim 32, wherein said thermoplastic rubber gel (TPR) material has a hardness value around 30 Asker C ±3.

~~21.~~33. The insole of Claim 25, wherein said forefoot cushion is an ethylene vinyl acetate (EVA) material.

~~22.~~34. The insole of Claim 34, wherein said ethylene vinyl acetate (EVA) material has a hardness value around 21 Asker C ±3.