

SHOE INSOLE

FIELD OF INVENTION

[0001] This invention relates to a shoe insole that enhances cushioning, facilitates shock absorption and overall reduces fatigue to the foot.

BACKGROUND OF INVENTION

[0002] Currently in the market, conventional shoes are subject to large amount of body load during walking, standing or doing other activities. For people who need to walk or stand for prolonged periods of time, in particular those who need to wear leather shoes or high-heeled shoes, the pressure will lead to fatigue and pain to the heel bone. These discomfort may affect normal walking gait and standing, or even cause bone spurs or fat pad inflammation.

[0003] On the other hand, some youths, in particular boys aged between 7 and 15 are active in sports that require running and jumping movements. These ballistic movements increase weight bear and can lead to excessive tensile stress (pulling) exert on their heels. However, their immature bones are still growing particularly the growth plates or otherwise known as epiphyseal plates. Chronic tensile stress from calf muscle that is attached to the growth plate of their heel bone will risk inflammation and pain at the insertion, eventually may cause a bone disorder known as Sever's Disease (calcaneal apophysitis).

[0004] Most shoe insoles in the market provide limited arch cushioning capability at the foot during walking, standing or doing other activities especially if wearers have low to flat arch. These existing shoe insoles are unable to improve on how the arch sustains the force exerted thereon, and unable to alleviate the arch and heel discomfort.

[0005] Therefore, an ergonomic shoe insole that effectively reduces shock to the wearer during standing, walking or activity, alleviates foot ache, heel pain and also prevents Sever's Disease is desired.

SUMMARY OF INVENTION

[0006] In the light of the foregoing background, it is an object of the present invention to provide an alternate shoe insole, comprising a top piece and a bottom piece. The top piece and bottom piece are made of fluid-sealing material and the edges of the pieces are sealed to form a sealed chamber. A fluid is filled inside the sealed chamber and a heel portion of the shoe insole is thicker than a half sole portion of the shoe insole.

[0007] In one embodiment, the thickness of the half sole portion of the shoe insole is at least 2mm, and the thickness of the heel portion of the shoe insole is at least 4mm. In a preferred embodiment, the half sole portion of the shoe insole has a thickness of 2mm, and the heel portion of the shoe insole has a thickness of 4mm. In another preferred embodiment, the half sole portion of the shoe insole has a thickness of 4mm, and the heel portion of the shoe insole has a thickness between 6mm to 8mm.

[0008] In another embodiment, a toe portion of the bottom piece comprises at least a set of sealed pressure line that follows a size of a shoe of a wearer.

[0009] In another embodiment, the half sole portion of the bottom piece comprises at least one pressure line or at least one pressure point, to allow the shoe insole to flex more easily and control the flow of the fluid inside the shoe insole.

[0010] In another embodiment, an arch portion of the bottom piece comprises at least one pressure line, such that the shoe insole is lighter and the flow of the fluid inside the shoe insole can be controlled.

[0011] In another embodiment, the fluid is a gel-like fluid. In a further embodiment, the fluid comprises a material selected from a group consisting of magnetic material and

negative ion material. In a further embodiment, the negative ion material is ceramic negative ion material.

[0012] In another embodiment, the top piece is made of air-permeable material, and the toe portion of the bottom piece has at least one ventilation hole.

BRIEF DESCRIPTION OF FIGURES

[0013] The function and advantages of the present invention can be further understood with reference to the remaining part of the specification and drawings. In some situations, sub-markings are placed after a certain reference number to indicate one of multiple similar components. Every of the similar components are referred to when a certain reference number is referred to without indicating any existing sub-markings.

[0014] Fig. 1 shows a bottom piece of a shoe insole according to an embodiment of the present invention.

[0015] Fig. 2 is shows a top piece of the shoe insole of Fig. 1 according to the same embodiment of the present invention.

[0016] Fig. 3 is a cross-sectional diagram of the shoe insole of Fig. 1 along the line A-A according to the same embodiment of the present invention.

[0017] Fig. 4 shows the flow of the filling fluid of a shoe insole during heel land stage to foot flat stage, according to the same embodiment of the present invention.

[0018] Fig. 5 shows the flow of the filling fluid of a shoe insole at foot flat stage, according to another embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0019] The present invention is further described in combination with the drawings.

[0020] Referring to Figs. 1 to 3, the first embodiment of the present invention is a shoe insole comprising a bottom piece 10 and a top piece 20. The edges of the pieces are sealed, forming a sealed chamber 30. The shoe insole also comprises a half sole portion 21 and a heel portion 23. In a further embodiment, the half sole portion 21 of the shoe insole has a thickness no less than 2mm, and the heel portion 23 of the shoe insole has a thickness no less than 4mm. In a preferred embodiment, the half sole portion 21 has a thickness of 2mm, and the heel portion 23 has a thickness of 4mm. In another preferred embodiment, the half sole portion 21 has a thickness of 4mm, and the heel portion 23 has a thickness of 6mm to 8mm. Preferably, the thickness from the heel portion 23 to the half sole portion 21 is reduced uniformly.

[0021] In an embodiment, a filling hole 14 is provided on the bottom piece 10, where a fluid can be filled into the sealed chamber 30 therethrough. The filling hole 14 can be sealed after filling of the fluid. In a further embodiment, the sealing can be but not limited to hot sealing.

[0022] In another embodiment, a pressure line 11 is provided on a toe portion 24 of the bottom piece. The pressure line 11 is set according to the size of the shoe of the wearer. Users can cut the shoe insole along the pressure line to fit the size of the shoe. In a further embodiment, there can be more than one pressure line 11 provided on the toe portion 24.

[0023] In yet another embodiment, at least one pressure line (not shown) or at least one pressure point 15 is provided on the half sole portion 21 of the bottom piece 10, such that the shoe insole can be more flexible during walking, and the strength of the bottom piece can also be increased. In another embodiment, at least one pressure line 16 is provided on an arch portion 22 of the bottom piece, such that the weight of the shoe insole can be reduced without affecting the performance of the shoe insole. Pressure line / pressure point 15 and pressure line 16 can keep the filling fluid flowing while controlling the flow of the fluid, avoiding a large volume of fluid flowing to either the half sole portion or the heel portion of the shoe insole during use, which would otherwise cause a large amount of pressure to exert on or even lead to burst at the corresponding portions of the shoe insole.

[0024] In an embodiment, the fluid filled in the sealed chamber 30 can be but not limited to a gel-like material and glycerin. In a further embodiment, a magnetic material or a negative ion material can be added to the filling fluid. An example of the additional material can be but not limited to ceramic negative ion material which can provide magnetotherapy and comfortable wearing experience to the user.

[0025] In an embodiment, at least one ventilation hole 12 is provided at the toe portion 24 of the bottom piece 10. In a further embodiment, the top piece 20 is made of a waterproof and/or air-permeable material, for example but not limited to leather or fabrics. In a further embodiment, the bottom piece 10 is made of a material for example but not limited to ethylene-vinyl acetate, polyurethane or polymeric material.

[0026] Fig. 4 illustrates the flow of the fluid inside the shoe insole according to an embodiment of the present invention. At the initial contact phase of the walking gait cycle, the ankle rolls from outward to inward (pronation) position for shock absorption before the ankle re-supinate at toe off. However hyper-pronation can over-strain the soft tissues of the foot and lead to injury. One method to reduce hyper-pronation is to activate “Windlass Mechanism” effectively. Windlass Mechanism is a biomechanical leverage system of the foot whereby the 1st to 5th metatarsophalangeal joints (MTPJ) bends upward to shorten plantar aponeurosis (connective elastic tissue) underneath the foot and raise the arch height to lock the ankle bone for toe off. So the space at the filling hole 14 facilitates MTPJs to sink to initiate the lever system faster so that the duration of the ankle rolling inward (pronating) is reduced to avoid over stretching plantar aponeurosis and Achilles tendon. Thus the faster windlass mechanism is activated the less tensile strain on the soft tissues.

[0027] Fig. 5 illustrates the flow of the fluid inside the shoe insole according to another embodiment of the present invention. The pressure line 16 of the shoe insole is a decoupled diagonal tooling where the heel's weight flushes the filling liquid antero-medially guided by the wider channel. This filtration effect will create a build-up of the filling liquid at the arch segment to slow the rate of arch flattening (over pronation) before the filling liquid is flushed out and back through the smaller canal at heel off, in a circulation system. Unlike dual-density ethylene-vinyl acetate (EVA) foam, this method is softer and more comfortable for the general population.

[0028] In use of the shoe insole of the present invention, the pressure exerted on the bottom of the foot is distributed over the entire insole. As the surface area increases and the pressure acts uniformly on the bottom of the foot, the insole can effectively absorb shock, reduce fatigue to the bottom of the foot, and prevent damage to the wearer caused thereby. Prolonged use of the shoe insole of the present invention can improve balance to the user, train different muscle groups and also alleviate pain at the waist or leg of the user. For users having injuries or bone-related disorders, such as those suffering from bone spurs or calcaneal apophysitis, the shoe insole of the present invention can also reduce pain and discomfort to the user.

[0029] During walking, the heel of the user first touches the ground, followed by the midfoot and the toes before the heel lifts off when leaving the ground. As such, the fluid filled in the shoe insole of the present invention first flows to the front of the shoe insole from the back of the shoe insole, then flows from the front to the back of the shoe insole, thus massaging the bottom of the foot in the process which would improve blood circulation and the health of the user.

[0030] The effect of the shoe insole of the present invention can be extended to the ankle, knee, hip and/or the corresponding muscles, allowing the body weight to shift forward and to pass the center axis during exercise. This allows the user to start from an idle state to a moving state faster, substantially reducing calf tightness and preventing muscle fatigue, and also reducing pressure exerted on the knees.

[0031] The exemplary embodiments of the present invention are thus fully described. Although the description referred to particular embodiments, it will be clear to one skilled in the art that the present invention may be practiced with variation of these specific details. Hence this invention should not be construed as limited to the embodiments set forth herein.

What is claimed is:

1. A shoe insole comprising a top piece and a bottom piece, wherein said top piece and said bottom piece are made of a fluid-sealing material, said edges of said pieces are sealed to form a sealed chamber, said sealed chamber is filled with a fluid, and a heel portion of said shoe insole is thicker than a half sole portion of said shoe insole.
2. The shoe insole according to claim 1, wherein the thickness of said half sole portion is at least 2mm, and the thickness of said heel portion is at least 4mm.
3. The shoe insole according to claim 2, wherein said thickness of said half sole portion is 2mm, and said thickness of said heel portion is 4mm.
4. The shoe insole according to claim 2, wherein said thickness of said half sole portion is 4mm, and said thickness of said heel portion is 6mm to 8mm.
5. The shoe insole according to claim 1, wherein a toe portion of said bottom piece comprises at least one set of pressure line according to a size of a shoe of a wearer.
6. The shoe insole according to claim 1, wherein a sole portion of said bottom piece comprises at least one pressure line and/or at least one pressure point.
7. The shoe insole according to claim 1, wherein an arch portion of said bottom piece comprises at least one pressure line.
8. The shoe insole according to claim 1, wherein said fluid is a gel-like fluid.
9. The shoe insole according to claim 1, wherein said fluid further comprises a material selected from a group consisting of magnetic material and negative ion material.
10. The shoe insole according to claim 9, wherein said negative ion material is a ceramic negative ion material.
11. The shoe insole according to claim 1, wherein said top piece is made of an air-permeable material, and a toe portion of said bottom piece comprises at least one ventilation hole.
12. A shoe insole comprising a top piece and a bottom piece, wherein said top piece and said bottom piece are made of a fluid-sealing material, said edges of said pieces are sealed to form a sealed chamber, said sealed chamber is filled with a fluid; the thickness of a half sole portion of said shoe insole is 2mm, the thickness of a heel portion of said shoe insole is 4mm; a toe portion of said bottom piece comprises at

least one set of pressure line according to a size of a shoe of a wearer; a sole portion of said bottom piece comprises at least one pressure line and/or at least one pressure point; an arch portion of said bottom piece comprises at least one pressure line; said fluid is a gel-like fluid.

13. The shoe insole according to claim 12, wherein said fluid further comprises a material selected from a group consisting of magnetic material and a negative ion material.