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Descriptions of the Invention

Portable, Inflatable and Self-Adjusting Cushion for Upper and Lower Back Support

(2) BACKGROUND TO THE INVENTION

This portable, inflatable and self-adjusting cushion for upper and lower back support, not only can it be used while seating, it can also be used to provide lumbar support while carrying a big or small back-pack or even for 3-5 minutes of back-stretching to relieve lower back tiredness. For the sake of convenience, the description of this invention will relate to providing a self-adjusting support to upper back but also the lumbar region even during a relaxed lean-backward sitting posture with no compromise for the spine to be in an improper alignment while the invention is not limited thereto.

In today's society, at one point of time or another, it is common that an individual may experience spasm of pain from mild to severe degree for neck, shoulders, arms, hands, lower back, thighs, buttocks and even feet. These can be attributed to prolonged incorrect sitting postures, lack of sufficient and appropriate exercises and poorly designed seats and others factors. Therefore, it has been known that with the usage of neck cushion or lumbar support cushion, together with proper seating posture, to some extent such discomfort can be prevented and relieved. On the contrary, to our surprise we may discover that sometimes even with the usage of lumbar support cushion, a user may still experience discomfort, fatigue or even pain at the lumbar region.

Though a person should be maintaining a proper sitting posture at all times with the pulling of head backwards, ears in line with shoulders, chin tuck-in and with an arched lumbar region to prevent any development of lower back pain, we often do not see many adopt this proper sitting posture. We may be able to understand why if we make an effort to understand that a typical person daily activities comprise of an average of 8 hours of sleep, 8 hours of working and 8 hours of miscellaneous activities (such as long hours of sitting on chair to watch television programs, concerts, dinning, traveling home on car/bus/train or in front of the computer). It is important to take note that sitting activity occupies about 67% of a typical daily activity (equivalent to about 16 hours or more). Thus, it may be tiring to maintain a correct and proper sitting posture without a lumbar support throughout the whole day, though it is not impossible.

In many occasions, a person will slack and slouch when they are seated. Under such circumstances, the user sitting position ends up in a tilted angel of about 60-70 degrees and the user spinal cord will look like an "L" shaped adjacent to the seat. Without using a lumbar support, such habitual improper sitting posture will eventually cause damage to the lumbar vertebral region resulting in fatigue and pain. However, even with the usage of existing conventional portable and inflatable or non-inflatable lumbar support, the user's lumbar region does not receive the appropriate level of contoured lumbar support at all and thus putting pressure on the lumbar region. The user will ultimately feel tired and discomfort as his lumbar region has not been adequately supported when he ignorantly thought it did.

The conventional portable and non-inflatable lumbar cushion are usually made of either soft or expandable material such as wool or foam, to provide the shape and support. These fixed shaped form-made cushions sometimes are heavy and not suitable to be strapped around the user's waist during usage. They are usually placed behind the user's back and lean against the backrest of the seat. This could provide good support given that the user themselves maintain a proper sit up straight posture with an arch-shaped lumbar region.

On the other hand, many of the portable and inflatable lumbar cushions are not aptly shaped to fit and fill the lumbar region to provide support adequately. The side of the inflatable lumbar cushion, which is in contact with the user's back, is usually straight and flat. Due to their configuration of having vertically fixed depth and smaller in sizes, these inflatable lumbar cushions are not able to automatically adjust to provide contoured lumbar support should the user slack or relax in his sitting position.



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Therefore, to be exact, one of the contributing factors for experiencing discomfort even with the usage of a lumbar support is the major problem of the previously invented portable, inflatable or non-inflatable cushion. Their limited capability to automatically adjust is their sure inadequacy to provide a self-adjusting and improved degree of contoured lumbar support especially when the user sits or leans backward to the backrest of a seat.

The object of this invention is therefore, not only to provide the user the desired level of support for upper back and lower back under normal circumstances of a proper sitting posture, its main objective is to provide a self-adjusting experience with an improved degree of contoured lumbar support even when the user takes up a relaxed posture such as leaning backward (due to impossibility to maintain an arched sitting posture throughout the whole period of sitting) on the self-adjusting lumbar support cushion. This experience is achieved without any compromise for the spine to be in an improper alignment.

(3) FIELD OF THE INVENTION

This invention relates to not only to provide the user the desired level of support for upper back and lower back under normal circumstances of a proper sitting postures, its main objective is to provide a self-adjusting experience with an improved degree of contoured lumbar support even when the user does not adopt a proper sitting posture or takes up a relaxed posture such as leaning backward on the self-adjusting lumbar support cushion. It is able to provide a true sense of adequate lumbar support should the user laziness slips in during long hours of sitting or sitting slanted on the backrest sofa in any environment without any compromise for the spine to be in a improper alignment.

Given that a user does not sit up straight and maintain a properly arched lumbar region, normally he will be in a slouched and slanted sitting position against the backrest of a seat. The slouching position will put on more pressure on the lumbar region should the user's head bend forward.

In a situation where user does not use a support device for his lower back, he can definitely maintain a proper arched shaped lumbar region by intentionally arching his lower back outwards from the seat backrest.

However, in general, it is tiring and difficult to maintain diligently such an ideal posture for a reasonable period of time in a slouch sitting position.

As indicated in Background of Invention, even with the usage of existing conventional of portable and inflatable or non-inflatable lumbar support, the user's lumbar region does not receive the appropriate level of contoured lumbar support at all and thus putting pressure on the lumbar region. The user will eventually feel tired as his lumbar region has not been adequately supported when they ignorantly thought it did.

With the usage of this invention of portable, inflatable and self-adjusting cushion for upper and lower back support, a qualitative support will be provided when user leans backward on the inflated self-adjusting lumbar support cushion. The air in the support device will automatically be expelled downwards and fill the lower regions of the inflated cushion. This will cause the lower regions, which are configured at the height of the lumbar, to bulge and fill up the lumbar region of user to provide the required contoured lumbar support.

The 3 horizontal and parallel rectangular slip sheets are attached within the sealed inflatable support device. All the 3 different slip-sheets, have different depths, are of a fixed depth will be extended to its optimal depth. The depth has been configured in such a manner that it will not be too deep such that the cushion will be over bulged to cause any discomfort to the user's lumbar region. Therefore, depending on user's desired degree of comfort, the users can manually adjust to the satisfactory level of firmness by blowing or pumping more air into the air valve or release air slowly by un-plucking the safety air valve at the side of the self-adjusting lumbar cushion.

(4) BRIEF DESCRIPTION OF THE DRAWING

The invention is now described, by way of example, with reference to the accompanying drawings.

In the drawings, Figure 2 to Figure 8 will be referencing to Figure 1.

Figure 1: shows cross-sectional overhead 3 dimensional frontal view of the Self-Adjusting Cushion

Figure 2: shows overhead 3 dimensional exterior frontal view of the Self-Adjusting Cushion.

Figure 3: shows a 2 dimensional side view of the Self-Adjusting Cushion, with respect to P2 in Figure 1

Figure 4: shows a overhead 3 dimensional front view of Self-Adjusting Cushion

Figure 5: shows cross-sectional overhead 3 dimensional Rear view of the Self Adjusting Cushion

Figure 6: shows overhead 3 dimensional exterior Rear view of the Self Adjusting Cushion

Figure 7: shows a proper sitting position supported by Self-Adjusting Cushion

Figure 8: shows how the Self-Adjusting Cushion can support the lumbar region of a user even in a lean-backward sitting posture.

(5) DETAILED DESCRIPTION OF THE DRAWINGS

Figure 1: shows cross-sectional overhead 3 dimensional frontal view of the Portable, Inflatable and Self-Adjusting Cushion for Upper and Lower Back 10. It contains an overview of the all the components that made up the portable, inflatable and self-adjusting cushion for upper and lower back support 10.

There are altogether 9 components that made up the support device as illustrated in Figure 1.

The height and width and depth of this support device will be defined with reference to Figure 1.

Height of cushion is represented by FD or AC.

Width of cushion is represented by AF or CD.

Depth of cushion is represented by radius of P2 or P3.

Part 1, P1 :The centre piece of the cushion. For ease of reference of front and back, we shall refer the side which is on the curved side as P1 Front, (P1 Front is represented by CBAFGD) the other side as P1 Rear (P1 Back is represented by AHCDEF)

Part 2, P2: A semi-oval shaped piece (represented by DEFGD) , with radius about 2-3 inches

Part 3, P3: A semi-oval shaped piece (represented by CHABC) ,with radius about 2-3 inches

Part 4, P4: A safety air valve (with a cap)attached to the side of P2.

Part 5, P5: Adjustable elastics strap with buckle attached to the side of P2

Part 6, P6: Adjustable elastics strap with buckle attached to the side P3

Part 7, P7: Part 7 is a rectangular slip-sheet (represented by IJKL) with one length of P7 attached to P1 Front while the other length of P7 is attached to P1 Rear. The rectangular shaped slip sheet has a length about 50% of the total width of the cushion while its breadth is about 2-3" and is at height about 75% of the total height of the cushion. The breadth of this rectangular slip-sheet can also be considered as the depth of the cushion. Since it is an inflatable cushion, it is usually made with some elastic material like Poly Vinyl Chloride, PVC. P7 functions to limit the bulging of the inflated cushion when it is over-inflated. This is to reduce the degree of discomfort at the upper back of the user.

Part 8, P8: Part 8 is a rectangular slip-sheet (represented by MNOP) with one length of P8 attached to P1 Front while the other length of P8 is attached to P1 Rear. P8 has the same length as P7 but with a wider breadth. Its breadth is 1.5 times of the radius of the semi-oval shape P2 or P3 and its height is at about 40% of the total height of the cushion. The breadth of P8 is such that when the support device is fully inflated, it will not only be filling the lumbar region of a user to provide the contoured support but also urging the user to sit in such a manner that the user achieves an arched-shape lumbar region to relieve pressure on this region.

Part 9, P9: Part 8 is a rectangular slip-sheet (represented by QRST) with one length of P9 attached to P1 Front while the other length of P9 is attached to P1 Rear. It has same length and breadth of Part 7. This piece will hold the cushion in such a way that it will not be over protruding due to over-inflation and causing discomfort at the pelvic region of the user. P9 is at height about 20% of the total height of the cushion. It also provides a curved appearance for the semi-oval shaped support device and support for the pelvic region.

The Portable, Inflatable and Self-Adjusting Cushion for Upper and Lower Back Support 10, is designed and configured in such a manner that when it is fully inflated, it produces a semi-oval shaped cushion. The P1 Rear will be placed against any seat backrest during usage while the curved side of the semi-oval shaped cushion, which is P1 Front, will be in contact with the back of the user to provide the required and desired level of contoured lumbar support.

P7, P8, P9 are horizontal and parallel to one another.

Region 1, R1: It is an open compartment, which is formed between the top part of P1 and AF

Region 2, R2: It is an open compartment, which is formed between P7 and P8

Region 2, R3: It is an open compartment, which is formed between P8 and P9.

XX arrow indicates the Front View. YY arrow indicates Right View. ZZ arrow indicates Rear View and WW arrow indicates Left View.

The Portable, Inflatable and Self-Adjusting Cushion for Upper and Lower Back Support 10 will be compressed at R1 by the user when he leans backward on the cushion. The volume of air of different regions within the cushion will be automatically adjusted. Some air will be expelled and flow downwards to the lower region 2 and region 3 and thus causing P1 front and P1 Rear to bulge outwards. As P1 Front which is on the curve side of P2 and P3, it will naturally bugle more than the straighten side of P2 and P3. Therefore, the back of the user, which in contact with the curve side of P2 and P3, will feel the slight push of the cushion and to arch his back outwards. Thus in this manner, the user back is able to receive the true sense of contoured and adequate support for his lumbar region with no compromise for an improper spine alignment.

When fully inflated at reasonable firmness of cushion, the support device 10 is about 3 inches deep. Depending on individual preferences of firmness for lumbar support, user may choose to manually pump in more air via P5 or release air from P5. Therefore, user will experience different degrees of bulge at the lumbar region as an initial softer cushion will bugle more than a harder cushion when the user leans backwards on the Self-Adjusting Cushion 10.

Figure 1 will be used as the figure to accompany the abstract when published.

Figure 2 is with reference to Figure 1, shows overhead 3 dimensional exterior frontal view of the Self-Adjusting Cushion 10. As this Self-Adjusting Cushion 10 will be made with inflatable material such as Poly Vinyl Chloride(PVC), when inflated, the total depth of the Self-Adjusting Cushion 10 could extend beyond the radius of Part 2 and Part 3 and thus over-bulging may cause great discomfort to user's lumbar region. However, in our invention hereto, the maximum depth of the cushion will be regulated and limited by the depth of P7, P8 and P9 while P8 has the largest depth among the 3 slip sheets.

There are 3 obvious and clear lines on the outer front appearance of the Self-Adjusting Cushion 10.

They are:

L7 is the line due to the attachment of P7 on P1 Front.

L8 is the line due to the attachment of P8 on P1 Front.

L9 is the line due to the attachment of P9 on P1 Front.

L7, L8 and L9 have length about 50% of the total breadth of the Self-Adjusting Cushion 10.

Arrow WW is left view, arrow XX is Front view, arrow YY is right view, arrow ZZ is rear view.

Figure 3 is with reference to Figure 1, shows a 2 dimensional side view of the Self-Adjusting Cushion 10, the right side with respect to P2 in Figure 1

P2 is the semi-oval shaped piece represented by FGDF.

P7 has a breadth about 2-3" which is at a height of about 75% of the total height of the cushion.

P8 has a breadth about 1.5 times of the radius of the semi-oval shape P2 or P3. It is at height about 40% of the total height of the cushion.

P9 has a breadth about 2-3" which is at a height of about 20% of the total height of the cushion.

Figure 4 is with reference to Figure 1, shows a overhead 3 dimensional front view of Self-Adjusting Cushion 10.

Arrow WW is left view, arrow XX is Front view, arrow YY is right view, arrow ZZ is rear view.

Figure 5: shows cross-sectional overhead 3 dimensional Rear view of the Self Adjusting Cushion 10. This is a similar view as Figure 1 except that it is being viewed from the P1 Rear.

Arrow WW is left view, arrow XX is Front view, arrow YY is right view, arrow ZZ is rear view.

Figure 6: shows overhead 3 dimensional exterior Rear view of the Self-Adjusting Cushion 10.

Arrow WW is left view, arrow XX is Front view, arrow YY is right view, arrow ZZ is rear view.

There are 3 obvious and clear lines on the rear appearance of the Self-Adjusting Cushion 10 when viewed from the rear as shown by arrow ZZ.

They are:

L10 is the line due to the attachment of P7 on P1 Rear.

L11 is the line due to the attachment of P8 on P1 Rear.

L12 is the line due to the attachment of P9 on P1 Rear.

L10, L11 and L12 have length about 50% of the total breadth of the Self-Adjusting Cushion 10.

Arrow WW is left view, arrow XX is Front view, arrow YY is right view, arrow ZZ is rear view.

In order to be better grasp the beauty of this invention, it is also recommended to understand what is a proper sitting posture should be adopted to ensure a proper spine alignment from neck to pelvic region. This is clearly illustrated in Figure 7. The Self-Adjusting Cushion 10 original shape is FGDEF.

A proper sitting posture should be with shoulder pulling backwards against the Self-Adjusting Cushion 10. Ears in line with shoulders , chin tuck-in and maintain an arched lumbar region against the Self-Adjusting Cushion 10.

Figure 8: shows how the Self-Adjusting Cushion 10 will be shaped to fill the lumbar region of a user even when the user adopts a lean-backward sitting posture. In contrast to the sitting position in Figure 7, when laziness slips in and user takes a slouch position, with the usage of this invention, there is no room for an improper spine alignment as there will be adequate lumbar support provided with the self-adjusting phenomena happening during the leaning action. FGDEF was the original shape of the Self-Adjusting Cushion and become WXDW when the user leans backward on the cushion.

The Self-Adjusting Cushion 10 when not in use, it can be easily folded into a small and compact size for easy storage. As it can be made with light PVC material, it is light to be carried to anywhere for lumbar support.

Although an exemplary embodiment of the present invention has been shown and described, it will be apparent to anyone with ordinary skills of art can make modification or changes such as

increase the number of horizontal compressed slip sheets to this invention described herein may be made, none of which will depart from the spirit or scope of this invention. All such changes, modification and alteration therefore should be seen as part of the present invention. For example, changing the width of P7, P8 or P9 or add more slip sheets within the sealed cushion or adjusting the heights of P7, P8, P9.

CLAIMS

I claim: 1. Portable, Inflatable and Self-Adjusting Cushion for Upper and Lower Back Support is a sealed support device. It not only provides the user with the desired level of support for upper back and lower back under normal circumstances of a proper sitting postures, its main objective is to provide a self-adjusting experience with an improved degree of contoured lumbar support even when the user does not adopt a proper sitting posture or takes up a relaxed posture such as leaning backward on the self-adjusting lumbar support cushion. It is characterized with the following: (the abbreviations to be used in the claim section should be referenced to Figure 1 and the detail drawing descriptions)

(a) a centre piece of Part 1 together with Part 2 and Part 3 (Part 1,2,3 as shown in Figure 1) to make up a sealed structure

(b) 2 sheets of semi-oval shaped P2 and P3 that gives the shape of the support device for contoured lumbar support

(c) One safety air valve, P5, attached to the side of Part 2, allows the mean for manual inflation of blowing or pumping air into the support device or manual deflation of the support device by unplucking the cap of the air valve to adjust the degree of firmness of the sealed support device

(d) 2 adjustable and elastic straps with buckles attached to the side of P2 and P3 respectively, to allow the support device to be attachable to any different sizes of body or seat structure

(e) 3 rectangular sheets of P7, P8 and P9 as shown in Figure 1, are of the same length but varying depth, attaching and holding P1 Front and P1 Rear (as shown in Figure 1).

2. The self-adjusting support device as claimed in claim 1 wherein the centre piece, P1 Front and P1 Rear, can be fabricated with suitable flexible plastic materials such as Polyvinyl Chloride (PVC) or rubberized nylon or canvas to make up the sealed support device.

3. The self-adjusting support device as claimed in claim 1 wherein the 2 sheets of the semi-oval shaped components P2 and P3, are the pieces that provide the shape when it is inflated to fill the lumbar region of user when the curved side of the support device is in contact or attached to the back of the user.

4. The self-adjusting support device as claimed in claim 2 wherein when the support device is inflated, though the hollow of a human being back may vary, it still can provide optimal comfort and support to the lumbar region of the user though the radius of P2 and P3 are about 2-3 inches.

5. The self-adjusting support device as claimed in claim 1 wherein the rectangular slip-sheets Part 7, P8, P9 with both its length attached to P1 Front and P1 Rear, can be fabricated with suitable flexible plastic materials such as Polyvinyl Chloride (PVC) or rubberized nylon or canvas. They are concealed within the sealed support device. The rectangular sheets of Part 7, P8, P9 are of the same length except with different breadths (of depth) of the support device.

6. The self-adjusting support device as claimed in claim 5 wherein P7, P8, P9 are attached horizontally and are parallel to each other in the sealed support device.

7. The self-adjusting support device as claimed in claim 6 wherein the top end of the sealed support device and P7 form an open compartment of air, R1, when inflated.

8. The self-adjusting support device as claimed in claim 1 wherein Part 7 and Part 8 will form an open compartment of air, R2, when inflated.

9. The self-adjusting support device as claimed in claim 1 wherein Part 8 and Part 9 will form an open compartment of air, R3, when inflated.

10. The self-adjusting support device as claimed in claim 5 wherein the length of P7, P8, P9 are of only 50% of the total width of the support device and are positioned in the centre of the width

of P1Front and P1 Rear, the air are free to flow within the sealed support device at any point of time when the support device is compressed at any particular point of the support device.

11. The self-adjusting support device as claimed in claim 10 wherein P7 is at a height about 75% of the total height of the cushion. This breadth P7 is about 2-3 inches.
12. The self-adjusting support device as claimed in claim 1 wherein the rectangular sheet, P7 purposes is to hold P1 Front and P1 Rear and further enhance the shape of a semi-oval shaped structure when it is inflated.
13. The self-adjusting support device as claimed in claim 1 wherein P7 additional purposes is to prevent the self-adjusting support device from being over-inflated when more than desired volume of air is blown or pumped into the sealed support cushion.
14. The self-adjusting support device as claimed in claim 10 wherein when the support device is not inflated to its optimal firmness, P7 will be flabby and will not be fully extended to its maximum depth.
15. The self-adjusting support device as claimed in claim 1 wherein the rectangular sheet, P8 purposes is to hold P1 Front and P1 Rear and further enhance the shape of a semi-oval shaped structure. P8 can be fabricated with suitable flexible plastic materials such as Polyvinyl Chloride (PVC) or rubberized nylon or canvas.
16. The self-adjusting support device as claimed in claim 1 wherein P8 additional purpose is to prevent the self-adjusting support device at R2 from being over-inflated when a more than desired volume of air is blown or pumped into the sealed structure.
17. The self-adjusting support device as claimed in claim 16 wherein when the support device is not inflated to its optimal firmness, P8 will be flabby and will not be fully extended to its maximum depth.
18. The self-adjusting support device as claimed in claim 15 wherein P8 is designed and configured in such a manner that it is at a height about 40% of the total height of the support device.
19. The self-adjusting support device as claimed in claim 15 wherein the breadth of P8 is 1.5 times of the radius of the semi-oval shaped pieces of P2 and P3.
20. The self-adjusting support device as claimed in claim 15 wherein when the user leans backwards on the self-adjusting support device, R1 will be compressed and forces air to flow downwards to R2 and R3.
21. The self-adjusting support device as claimed in claim 20 wherein P8 will be extended to its optimal breadth or depth and prevent P1 Front from being over-extended and R2 from over protruding. At the same time, the bulging R2 will push P1 Front outwards and thereby pushing the user's lumbar region into an arched position as shown in Figure 8.
22. The self-adjusting support device as claimed in claim 20 wherein the state of R2 to bugle to its optimal breadth to provide an optimal contoured support to the lumbar region, is attributed to the fact that P8 is configured and designed to be 1.5 times of the radius of P2 and P3.
23. The self-adjusting support device as claimed in claim 20 wherein the experience of contoured lumbar support is self-adjusting when the user adjusts his sitting position from a sit up straight lumbar arched posture to a leaning backwards position against the backrest of any seat structure.

24. The self-adjusting support device as claimed in claim 1 wherein the rectangular sheet, Part 9, purposes is to hold P1 Front and P1 Rear in such a manner to enhance the shape of a semi-oval shaped structure. Part 9 can be fabricated with suitable flexible plastic materials such as Polyvinyl Chloride (PVC) or rubberized nylon or canvas.
25. The self-adjusting support device as claimed in claim 24 wherein P9 the other purpose is to prevent the self-adjusting support device from being over-inflated and bulged at R3 when a more than desired volume of air is blown or pumped into the sealed structure.
26. The self-adjusting support device as claimed in claim 24 wherein when the support device is not inflated to its optimal firmness, P9 can be flabby and will not be fully extended to its maximum depth.
27. The self-adjusting support device as claimed in claim 24 wherein P9 is designed and configured in such a manner that it is at a height about 20% of the total height of the support device.
28. The self-adjusting support device as claimed in claim 24 wherein the breadth of P9 is the same as the radius of the semi-oval shaped pieces of P2 and P3.
29. The self-adjusting support device as claimed in claim 8 wherein when the user leans backwards on the self-adjusting support device, the air from R1 will be compressed and flown downwards to R2, R3
30. The self-adjusting support device as claimed in claim 8 and Claim 29, wherein R2 will bulge and protrude outwards pressing against the user back.
31. The self-adjusting support device as claimed in claim 9 and claim 29 wherein the R3, will bulge and protrude outwards pressing against the user back.
32. The self-adjusting support device as claimed in claim 29 wherein P9 will be extended to its optimal breadth or depth and prevent P1 Front from being over-bulged. At the same time, the bulging R3 will push P1 Front outwards.
33. The self-adjusting support device as claimed in claim 32 wherein the state of R3 to bugle to its optimal breadth to provide an optimal contoured support to the lumbar region, is attributed to the fact that P9 is configured and designed to be 2-3 inches so as not to cause discomfort at the pelvic region.