ANATOMICALLY-CORRECT SUPPORT SYSTEMS AND METHODS FOR A RECLINING PERSON

Inventor: Mark Vincent Riccabona, San Francisco, CA (US)

Applied No.: 13/350,494

Filed: Jan. 13, 2012

Publication Classification

Int. Cl. A47C 20/00 (2006.01)

U.S. Cl. .................................................. 5/636; 5/648

ABSTRACT

The present invention provides a neutral spine support system that includes a lower body bolster, an upper body supporter and an optional coverall. The lower body bolster includes a raised leg supporter, a leg spacer and a pelvic supporter, while the upper body supporter includes a back support, a neck rest, a head cradle, a right head support and a left head support. The raised leg supporter supports the legs in a raised-knee position, and includes cutouts to reduce direct knee pressure. The pelvic supporter supports the user’s pelvic region and rotates the sacrum base upwards while avoiding direct sacrum pressure. The back support keeps the user’s upper and middle spine in an open and neutral position.
ANATOMICALLY-CORRECT SUPPORT SYSTEMS AND METHODS FOR A RECLINING PERSON

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is related to and claims the priority of Provisional Application No. 61/483,182, filed on May 6, 2011, which application is incorporated herein in its entirety by this reference.

[0002] This application also is related to and claims the priority of U.S. Provisional Patent Application No. 61/432,680, filed Jan. 14, 2011, also incorporated herein in its entirety by this reference.

BACKGROUND

[0003] The present invention relates to systems and methods for appropriately supporting a reclining user in anatomically-correct neutral-spine positions that ensures restful sleep.

[0004] Many of us are not getting the proper number of hours of restful sleep needed to stay healthy. Sleep is a vital component of a long, healthy lifestyle. Studies have shown that most of us need a minimum of seven hours of sleep, with eight hours being optimal.

[0005] Inferior sleep positions result in back and neck pain and also poor quality of sleep. Our bodies comprise a multitude of complex curves, including our spines. However, despite other advances in sciences including healthcare, our beds and our pillows are generally flat. Lying on a conventional soft flat mattress creates an improper spine angle, causing our muscles to stay tight throughout the night by pulling our spine out of its natural curvature. Not surprisingly, many of us toss and turn at bedtime trying to find a comfortable restful sleep position.

[0006] In addition, most of us have poor postures and slouch during our waking hours. This is compounded by too many hours in a seated position. By the end of each day, most of our spines have been misaligned and the result is strained back muscles and ligaments.

[0007] Many attempts at providing a comfortable sleep support system have failed. For example, U.S. Pat. No. 5,878,453 attempts to alleviate lower back pain by placing an under knee pillow 10 to hold an individual's knee in flexion (see Abstract and FIGS. 3, 4). It is undesirable to support the underside of the knees when the individual is in the face-up position without supporting the pelvic region because it puts pressure on the sciatic nerves and surrounding musculature. It also undesirable to support the inside of the knees when the user is lying on the side as shown in FIG. 5 because pressure on the medial collateral ligament and trigger points to surrounding musculature located on the insides of the knees causes discomfort. In addition, locating the pillow under the inside of the upper knee creates a fulcrum on the upper leg and puts pressure on the upper hip joint.

[0008] In U.S. Pat. No. 5,201,761, a pillow for reversing the lordotic curve of a patient by acting on the base of the spine is disclosed having a second wedge 15 that is higher at the foot end and lower at the head end of the patient to place the pelvis into a posterior pelvic tilt by placing pressure in the cavity at the base of the back on the vertebrae of the spine (see Abstract and Col. 3, lines 18-35). However, applying direct pressure on the sacrum (tail bone) of the patient is counterproductive because direct pressure on the sacrum can compress the sacral and/or sciatic nerves, causing discomfort and potential nerve damage over time. Further, wedging the middle of the pelvis causes the pelvis to open outwards, rotates the legs outwards (feet pointing away from each other) and increases the level of user discomfort.

[0009] An attempt at relaxing the lumbar area of the spine is disclosed in U.S. Pat. No. 4,796,315. As shown in FIG. 5, a lumbar cushion 10 is placed under the lumbar region of the spine there by rotating the tailbone clockwise, i.e., with the tip of the sacrum and pelvis rotating towards the ground. This undesirable rotation has the effect of straightening the legs which causes discomfort. This rotation can also result in the undesirable shortening of the back muscles.

[0010] It is therefore apparent that an urgent need exists for a greatly improved neutral-spine support system. This improved rollable support system enables the user to enjoy restful sleep by providing a continuous range of anatomically-correct comfortable reclining positions that alleviates and corrects the user’s poor posture.

SUMMARY

[0011] To achieve the foregoing and in accordance with the present invention, body support systems and methods are provided. In particular, the system and methods for appropriately supporting a reclining user in anatomically-correct neutral-spine positions that ensures restful sleep.

[0012] In one embodiment, a support system includes a rollable lower body bolster, an upper body supporter, and an optional coverall. The lower body bolster includes a raised leg supporter, a leg spacer and a pelvic supporter, while the upper body supporter includes a back support, a neck rest, a head cradle, a right head support and a left head support.

[0013] The raised leg supporter supports the legs of the reclining user in a raised-knee position, and includes cutouts to reduce pressure on undersides of the user’s knees. The leg spacer extends upwards from the leg supporter while in a neutral position, and comfortably separates the legs by supporting the user’s thighs while avoiding direct pressure on sides of the knees. The pelvic supporter is adjacent to the leg supporter, and supports the user’s pelvic region by supporting gluteus maximus muscles and rotating the sacrum base upwards while avoiding direct pressure on the sacrum.

[0014] The back support keeps the user’s upper and middle spine in an open and neutral position. The head cradle and neck rest supports the user in a face-up position. Conversely, the left and right head supports are used by the user in the respective left side and right side lying positions.

[0015] Note that the various features of the present invention described above may be practiced alone or in combination. These and other features of the present invention will be described in more detail below in the detailed description of the invention and in conjunction with the following figures.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] In order that the present invention may be more clearly ascertained, some embodiments will now be described, by way of example, with reference to the accompanying drawings, in which:

[0017] FIGS. 1A-1C illustrate a neutral spine support system in accordance with one embodiment of the present invention;
FIGS. 2A-2D illustrate a lower body bolster for the support system of FIG. 1A;

FIGS. 3A-3B illustrate an exemplary upper body bolster for the support system of FIG. 1A;

FIG. 4 is a side view of the bolster of FIG. 2A with optional ballast;

FIGS. 5A-5D illustrate an alternate lower body bolster for another embodiment of a neutral spine support system in accordance with the present invention; and

FIGS. 6A-6B illustrate another exemplary upper body bolster with an extended back support.

DETAILED DESCRIPTION

The present invention will now be described in detail with reference to several embodiments thereof as illustrated in the accompanying drawings. In the following description, numerous specific details are set forth in order to provide a thorough understanding of embodiments of the present invention. It will be apparent, however, to one skilled in the art, that embodiments may be practiced without some or all of these specific details. In other instances, well known process steps and/or structures have not been described in detail in order to not unnecessarily obscure the present invention. The features and advantages of embodiments may be better understood with reference to the drawings and discussions that follow.

The present invention relates to systems and methods for appropriately supporting a reclining user in an anatomically-correct neutral-spine position that ensures restful sleep.

To facilitate discussion, FIGS. 1A-1C illustrate an exemplary support system 100 for a reclining user 110, which includes an upper body bolster 120, a rolloutable lower body bolster 180 with a calf extension 160, and a coverall 190. Note that while the components of system 100 complement each other well, they can be used independently of each other depending on user preferences.

Referring first to FIG. 1A, user 110 is reclined in a face-up anatomically-correct position, with the head, neck and the upper and middle back supported by bolster 120, while the pelvic area including lower back and the legs are supported by bolster 180. FIG. 1B illustrates user 110 lying sideways in an anatomically-correct position while remaining comfortably supported by bolster 120 and bolster 180.

FIG. 1C shows the reclining support system 100 with the addition of an optional coverall 190 covering snugly user 110.

FIGS. 2A, 2B and 2C are perspective, front and side views, respectively, illustrating one embodiment of rolloutable lower body bolster 180 in greater detail. Bolster 180 includes a raised leg supporter 220 which has two knee cutouts 222, 224 for comfortably supporting the right and left leg of user 110, respectively in a raised-knee position, while reducing direct pressure on the undersides of the knees.

A leg spacer 240 is coupled to and rises upwards from the middle of leg supporter 220 and is configured to comfortably support and separate the thighs of user 110. Spacer 240 has two cutouts 242, 244 for supporting the left side of user's right thigh and for supporting the right side of user's left thigh, respectively. Hence, spacer 240 is shaped to secure the user's legs to bolster 180 so the legs do not fall out during use.

In some embodiments, for ease of manufacturing, supporter 220 and spacer 240 are molded together as a single structure from a suitable material such as natural (e.g., latex) foam and synthetic (e.g., polyethylene) foams, including close-cell foams, open-cell foams, memory foams and combinations thereof.

Alternatively, as illustrated by dotted-lines in FIGS. 2B and 2C, supporter 220 and spacer 240 can be molded separately and coupled to each other using for example a mortise and tenon joint, i.e., knee spacer 240 has a tenon which fits into a corresponding mortise of knee supporter 220. Such a combined structure permits supporter 220 and spacer 240 to be easily constructed from materials with differing compositions and/or differing densities. Leg spacer 240 can also be user detachable to become a part of a compact package so as to facilitate transportation and shipping.

FIG. 2D is a cross-section view showing the right side view of user 110 illustrating how neutral-spine support for user 110 is accomplished by bolster 180. Bolster 180 also includes a curved pelvic supporter 260 adjacent to raised leg supporter 220 and configured to properly support the pelvic region of user 110. Pelvis supporter 260 is configured to gently rotate the tip of the sacrum (tail bone) upward thereby stretching and relaxing the lower back muscles, while reducing direct pressure on the sacrum.

With pelvic supporter 260 providing a proper tailbone angle and leg supporter 220 providing the proper knee angle to user 110, the resulting pelvic rotation elongates the back muscles thereby promoting the relaxation necessary for a restful sleep. Hence, by properly flexing the pelvis and shortening the anterior musculature just enough to align the spine in a stable anatomically-correct position, support system 100 allows the user 110 to correct and reshape the spine while sleeping.

Referring again to FIG. 2B, in accordance to an important aspect of the present invention, a substantial portion of the base of bolster 180 includes a hull 268 shaped to enable the reclining user 110 to effortlessly roll together with bolster 180 in either a clockwise direction or in an anti-clockwise direction from the neutral face up position, and ending up in a side body laying position. This reliable feature of hull 268 advantageously enables user 110 to maintain proper spine alignment while laying on one side of the body, with the ears remaining substantially in-line with the shoulder, the shoulder substantially in-line with the hip, thereby avoiding the undesirable unhealthy slouching fetal position. As a result, there is no unnecessary strain and tension in the hips and lower back of user 110.

In some embodiments, the curvature or contour of the hull 268 can be conveniently configured in the field (e.g., user adjustable) by for example either adding hull insert(s) or removing hull layer(s) (not shown). Hull inserts can be attached by methods known to one skilled in the arts such as adhesives or Velcro™.

Conversely, to accommodate users who prefer to sleep primarily in a face-up position, the curvature of the hull 268 can be very gentle to permit very limited rolling. Accordingly, hull 268 of bolster 180 can be also substantially flat and stable to discourage rolling.

It is also possible to better secure bolster 180 to user 110 by adding one or more optional straps (not shown) configured to wrap bolster 180 around the pelvic region and/or the legs of user 110. Specially configured shorts/pants with Velcro™ can also be worn by user 110 for coupling with Velcro™ on the corresponding surface(s) of bolster 180. In
addition, as shown in FIG. 1C, a fitted coverall 190 can also be incorporated into system 100 to better secure user 110 and/or to provide heat retention.

[0037] FIGS. 3A and 3B are perspective and top views, respectively, of upper body supporter 120 which includes a back support 322, a right head support 323, a left head support 324, a neck rest 327 and a head cradle 328. In this embodiment, head supports 323, 324 are topped by optional face rests 325, 326. Right face rest 325 and left face rest 326 can be made from the similar or different material as right head support 323 and 324 respectively. For example, head supports 323, 324 can be made from inexpensive firmer foam while face rests 325, 326 can be made from more expensive but more conformable memory foam.

[0038] When user 110 is in a face-up position, the back of the user’s head is resting on head cradle 328 while the user’s neck is supported by neck rest 327. The user’s upper spine is supported by back support 322.

[0039] In accordance to another aspect of the present invention, back support 322 is shaped to ensure that the vertebrae in upper and middle spine of user 110 is supported and aligned in the anatomically-correct arched position by providing the optimal support into the apex of the kyphotic curve to guide the user’s upper and middle back, and neck back into a neutral spinal position. In other words, back support 322 puts pressure on middle back to gently allow the shoulders to relax in an open position, thereby facilitating breathing and also promotes muscle relaxation in the upper chest and upper back. As a result, the user’s back is open and the head is tilted slightly upwards into the head cradle 328, in a manner similar to opening of the airway in first responder CPR training. Opening the airway advantageously improves breathing and reduces snoring and alleviates some of the symptoms associated with sleep apnea.

[0040] Referring again to FIGS. 3A and 3B, when user 110 is laying on the right side of the body, the user’s right face is resting comfortably on right face rest 325, with the head, neck and upper spine substantially parallel to each other. Conversely, when user 110 is lying on the left side of the body, the user’s left face is resting comfortable on left face rest 326. This anatomically-correct rollability feature of upper body supporter 120 ensures the proper spinal alignment as defined by the relative positioning of the head, neck, shoulder and hip of user 110 described above.

[0041] Many modifications and additions to the support system 100 are possible. As shown in FIGS. 1A-1C and 2D, in some embodiments, bolster 180 also includes an optional cuff extension (ottoman) 160 to provide addition lower leg support thereby increasing user comfort and also stability of bolster 180 during use. In addition, the sides of leg supporter 220 and/or pelvis supporter 260 can be further extended to better secure and support the outside of the thighs and/or hips of user 110, thereby ensuring that support system 100 and user 110 remain coupled together.

[0042] Depending on the rigidity of the materials for constructing bolster 180, structural reinforcement for bolster 180 is also possible. For example, a substantially vertical rigid or semi-rigid insert (not shown) can be incorporated inside spacer 240, extending from the top of spacer 240 to the bottom of bolster hull 168.

[0043] Other modifications to support 100 are also possible. For example, in some embodiments, the ease of rollability can be made adjustable by incorporating optional ballast 488, which enable the center of gravity of the bolster 180 to be adjusted as shown in FIG. 4. Ballast 488 enables the center of gravity of bolster 180 to be adjusted higher or lower relative to the rolling axis of bolster 180. For example the center of gravity of bolster 180 can be adjusted lower than the rolling axis for users who prefer to sleep predominantly on the user’s back. Conversely, the center of gravity of bolster 180 can be adjusted higher than the rolling axis for users who prefer to sleep predominantly on the sides of user’s body. Examples of ballast 488 include a fluid stored in a pouch, and one or more solid weights in a hollow tube, and combinations thereof.

[0045] Advantages of ballast 488 includes the ability to adjust compensate for the user’s own center of gravity with respect to rollability. For example, it is possible to adjust ballast 488 such that the combined center of gravity of the user 110 and bolster 180 is substantially close to the axis of rotation, i.e., neutral, so that rolling to and fro between face-up side-body positions becomes effortless.

[0046] Modifications to support system 100 can also include incorporating passive ventilation channels to promote ventilation, cooling and/or heating. It is also possible to include active heating or cooling capabilities such as heat pads or tubing for circulating a warming/cooling fluid. Massage options such as vibrators can also be incorporated into system 100.

[0047] FIGS. 5A-5C are perspective, front and side views. FIGS. 5A, 5B and 5C are perspective, front and side views, respectively, illustrating an exemplary alternate embodiment of a lower body bolster 580 in greater detail. Bolster 580 includes a raised leg supporter 520 which has two knee cut-outs 522, 524 for comfortably supporting the right and left leg of user 110, respectively in a raised-knee position, while reducing direct pressure on the undersides of the user’s knees. In this embodiment, bolster 580 has a substantially flat bottom 550 to enhance stability during use.

[0048] FIG. 5D is a cross-section view showing the right side view of user 110 illustrating how neutral-spine support for user 110 is accomplished by bolster 580. Bolster 580 includes a curved pelvic supporter 560 adjacent to raised leg supporter 220 and configured to properly support the pelvic region of user 110. Pelvis supporter 560 is configured to gently rotate the tip of the sacrum (tail bone) upward thereby stretching and relaxing the lower back muscles, while reducing direct pressure on the sacrum.

[0049] Booster 580 further includes a lower back supporter 590 which firmly supports the user’s lower back and reinforces the anatomically-correct posture for restful sleep.

[0050] Pelvic supporter 560 and lower back supporter 590 in combination provide a proper tailbone angle, while leg supporter 520 providing the proper knee angle to user 110. The resulting pelvic rotation elongates the back muscles thereby promoting the relaxation necessary for a restful sleep. Hence, by properly flexing the pelvis and shortening the anterior musculature just enough to align the spine in a stable anatomically-correct position, the user 110 is able to correct and reshape her/his spine while sleeping.

[0051] To accommodate side laying positions, in this embodiment, when user 110 is laying on her/his side, bolster 580 includes substantially flat tops 582, 584 and 586 configured to firmly and gently support an inner thigh of the upper leg of the user 110.

[0052] Modifications to booster 580 are possible. For example, the edges of tops 582, 584, 586 may be radiused to
enhance comfort while supporting the legs of user 110. In addition, the leg supporter 520 may be made from layers of form with different firmness, e.g., a firmer stiffer lower layer towards bottom 550, combined with a softer more pliable upper layer toward tops 582, 584, 586.

[0053] Referring now to the top view of FIG. 6A, and also to FIG. 6B which is the corresponding cross-sectional view 613-613, an alternate embodiment of upper body supporter 620 suitable for use with either bolster 180 or bolster 580 is shown. Upper body supporter 620 includes an extended back support 622 that can be extended all the way to lower back supporter 590. As shown in the cross-sectional view of FIG. 6B, back support 622 can include a convex profile configured to provide superior back support for user 110 in the raised-knee position.

[0054] Modifications to upper body supporter 620 are also possible. For example, a coupler such as a Velcro strap (not shown) may be used to secure end 629 of extended back support 622 to the lower back supporter 590 of bolster 580.

[0055] In sum, the present invention provides novel systems and methods for maintaining anatomically-correct neutral-spine postures while users are comfortably resting in a range of reclined positions, thereby ensuring restful sleep necessary for good health.

[0056] While this invention has been described in terms of several embodiments, there are alterations, modifications, permutations, and substitute equivalents, which fall within the scope of this invention. It is therefore intended that the following appended claims be interpreted as including all such alterations, modifications, permutations, and substitute equivalents as fall within the true spirit and scope of the present invention.

What is claimed is:
1. A lower body bolster useful in association with a reclining user, the bolster comprising:
   a raised leg supporter configured to support a pair of legs of a reclining user in a substantially raised-knee position, and wherein the leg supporter includes cutouts configured to reduce pressure on undersides of knees of the user;
   a leg spacer rising substantially upwards from the raised leg supporter while in a neutral position, and wherein the leg spacer configured to comfortably separate the legs by supporting thighs of the user while reducing pressure on sides of the knees; and
   a pelvic supporter adjacent to the raised leg supporter, and wherein the pelvic supporter is configured to support a pelvic region of the reclining user by substantially supporting glutaeus maximus muscles of the user and rotating a sacrum base of the user upwards while reducing pressure on the sacrum.
2. The bolster of claim 1 wherein the bolster includes a hull shaped to enable the reclining user to roll together with the bolster in both a clockwise direction and in an anti-clockwise direction from the neutral position.
3. The bolster of claim 2 wherein contour of the hull is configurable.
4. The bolster of claim 2 wherein the clockwise and anti-clockwise directions range from approximately 90 clockwise and 90 anti-clockwise, respectively, from the neutral direction.
5. The bolster of claim 1 further comprising a calf extension adjacent to the raised knee supporter, and wherein the calf extension is configured to support a pair of calves of the reclining user.
6. The bolster of claim 2 further comprising ballast configured to change a center of gravity of the rollable bolster relative to an axis of rotation of the bolster.
7. The bolster of claim 6 wherein the center of gravity of the bolster is adjustable.
8. The bolster of claim 1 further comprising a structural reinforcement configured to stiffen the leg spacer.
9. The bolster of claim 1 further comprising at least one ventilating channel.
10. The bolster of claim 1 further comprising at least one of a cooling channel and a heating channel.
11. A method for providing a neutral-spine position for a reclining user, the method comprising:
   supporting a pair of legs of a reclining user in a substantially raised-knee position while reducing pressure on undersides of knees of the user;
   separating the legs by supporting a pair of thighs of the user while reducing pressure on sides of the knees;
   supporting a pelvic region of the reclining user by substantially supporting glutaeus maximus muscles of the user and rotating a sacrum base of the user upwards while reducing pressure on the sacrum; and
   wherein the reclining user is able to roll in both a clockwise direction and in an anti-clockwise direction from a neutral position while remaining supported.
12. A neutral-spine support system useful in association with a reclining user, the support system comprising:
   a lower body bolster which includes:
   a raised leg supporter configured to support a pair of legs of a reclining user in a substantially raised-knee position while reducing pressure on undersides of knees of the user;
   a leg spacer rising substantially upwards from the raised leg supporter while in a neutral position, and wherein the leg spacer is configured to comfortably separate the pair of legs by supporting thighs of the user while reducing pressure on sides of the knees; and
   a pelvic supporter adjacent to the raised leg supporter, and wherein the pelvic supporter is configured to support a pelvic region of the reclining user by substantially supporting glutaeus maximus muscles of the user and rotating a sacrum base of the user upwards while reducing pressure on the sacrum; and
   an upper body supporter which includes:
   a back support configured to support an upper and middle back of the user in the neutral position;
   a neck rest configured to support a neck of the user in a face-up position;
   a head cradle configured to support a head of the user when in the face-up position;
   a right head support configured to support a right face of the head when the user is lying on a right side; and
   a left head support configured to support a left face of the head when the user is lying on a left side.
13. The support system of claim 12 wherein the bolster includes a hull shaped to enable the reclining user to roll together with the support system in both a clockwise direction and in an anti-clockwise direction from the neutral position.
14. The support system of claim 12 further comprising a calf extension adjacent to the raised knee supporter, and wherein the calf extension is configured to support a pair of calves of the user.

15. The support system of claim 12 further comprising a overall configured to secure the user to the support system.

16. The support system of claim 13 wherein contour of the hull is configurable.

17. A lower body bolster useful in association with a reclining user, the bolster comprising:
   a raised leg supporter configured to support a pair of legs of a reclining user in a substantially raised-knee position, wherein the leg supporter includes cutouts configured to reduce pressure on undersides of knees of the user, and wherein the leg supporter also includes at least one substantially flat top configured to support an upper leg of the user when the user is in a substantially side-lying position; and
   a pelvic supporter and a lower back supporter, wherein pelvic supporter is adjacent to the raised leg supporter and the lower back supporter is adjacent to the pelvic supporter, and wherein the pelvic supporter and the lower back supporter are configured to support a pelvic region of the reclining user by substantially supporting gluteus maximus muscles of the user and rotating a sacrum base of the user upwards while reducing pressure on the sacrum.

* * * * *