LUMBAR EXERCISE DEVICE

FIELD

The present invention generally relates to a device for facilitating exercises. More particularly, it relates to a lumbar exercise device.

BACKGROUND

Musculoskeletal disorders (MSD) are injuries or disorders of the muscles, nerves, tendons, joints, cartilage, and spinal discs. Lower-back pain (LBP) is one of the most common musculoskeletal disorders (MSDs) experienced by the human body. Prolonged immobility in a desk bound job and/or sitting in a slouched or hunched over position can put strain on the spine and discs, which is the fluid-filled cushions that protect the vertebrae from rubbing together. This will lead to muscle stiffness in the neck and/or shoulder, shortened chest muscles and/or back pain.

Many people try to alleviate LBP by doing back exercises. However, some back exercises may aggravate the back pain by creating a large amount of stress and strain on the spine or lower back. In addition, not all back exercises are capable of exercising all lumbar vertebrae L1-L5.

Therefore, there is a need to have a device for facilitating exercises of all lumbar vertebrae while protecting the spine from getting injured during the exercise.

SUMMARY

According to an example of the present disclosure, there is provided a lumbar exercise device as claimed in the independent claim. Some optional features are defined in the dependent claims.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1a is a rear perspective view of an exercise device according to an example of the present disclosure.
FIG. 1b is a front perspective view of the exercise device.
FIG. 1c is a top view of the exercise device.
FIG. 2a is a front view of an exercise device according to an example of the present disclosure.
FIG. 2b is a right side cross-sectional view of the exercise device in Fig. 2a.
FIG. 2c is a left side cross-sectional view of the exercise device in Fig. 2a.
FIG. 3 illustrates the exercise device of Fig. 1a or Fig. 2a in use when a person is lying down with the back contacting an external surface.
FIG. 4 illustrates the exercise device of Fig. 1a or Fig. 2a in use when a person has curled up with the back off an external surface.

DETAILED DESCRIPTION

An example of the present disclosure provides a device and method for facilitating lumbar exercises and providing support to a user's lumbar region. Other desirable features and characteristics will become apparent from the subsequent detailed description and the

appended claims, taken in conjunction with the accompanying drawings of the present disclosure.

Fig. 1a shows a rear perspective view of a device 100 in accordance with one example of the present disclosure. The device 100 includes a seat 105 for receiving a user's pelvis. The inner surface 108 of the seat 105 includes a recess. The recess of the seat 105 is configured to receive and generally conform to the user's pelvis. For example, the recess may provide an arcuate surface. The recess, in the present example, has a concave surface. Specifically, the recess of the present example has an inner concave surface of a hemisphere for receiving the user's pelvis. In one example, a cushion or cushioning feature may be provided in the recess. The seat 105 has an outer surface 110 disposed on the opposite side of the inner surface 108 that is arcuate, and configured for tilting, rocking and/or rotating motions on an external surface (not shown). The external surface may be hard ground, or soft surface of a sleeping mattress, a foamed mat, and the like. The outer surface 110, in the present example, has a convex surface. In the present example, the outer surface 110 comprises a spherical cap of the device 100 to contact the external surface during exercise. The spherical cap enables tilting, rocking and/or rotating motions on or over the external surface.

In the present disclosure, the terms "spherical cap", also known as spherical dome, refers to a portion of a sphere cut off by a plane. It is also a spherical segment that is bounded by a single plane cutting the sphere. The spherical cap can be a hemisphere if the plane passes through the centre of the sphere such that the height of the spherical cap is equal to the radius of the sphere.

Fig. 1b shows a front perspective view of the device 100 when the device 100 is tilted at an angle relative to the position in Fig. 1a.

The device 100 includes at least one lateral portion, flanking the seat 105. The lateral portion may extend from the seat 105 and partially surround the seat 105 on the sides of the device 100. The sides of the device correspond to the user's left and right side of the body when the user is sitting in the recess. In the example, as shown in Fig. 1a, there are two lateral portions 120a and 120b extending from opposing sides of the seat 105. The lateral portions 120a and 120b, for example, may be separate members located close to each other, adjacent to each other or members integrated with each other. In the present example, the lateral portions 120a and 120b are integral with each other, as shown in the aerial top view of the device 100 in Fig. 1c. The lateral portions 120a and 120b may be configured to extend from the seat 105 to provide a guide for the user to place his/her pelvis in the recess of the seat 105. They may also prevent a user seated in the device 100 from falling out of the device when the user is performing exercises using the device 100. The lateral portions 120a and 120b may also extend from the seat 105 at different positions flanking the seat 105, or extend more than what is shown in Fig. 1a to 1c, for instance, to provide arm rests, or to provide more support.

In the present example, as shown in Fig. 1c, the adjacent or connecting sides of the lateral portions 120a and 120b form a first supporting member 130. A peripheral portion of the seat 105 on the opposite side of the first supporting member 130 forms a second supporting member 140. In the present example, the device 100 is symmetrical about a line of symmetry 150 extending across a mid-point of the first supporting member 130 and a mid-point of the second supporting member 140.

The contour of the first supporting member 130 may be configured to be broader and flatter than that of the second supporting member 140. In the example as shown in Fig. 1c, the contour of the second supporting member 140 is rounder and narrower than that of the first supporting member 130. Both the first and second supporting member 130 and 140 may be used interchangeably for contacting the lumbar region and the rear of the thighs of the user. For the purpose of discussion, when in use, the supporting member contacting the lumbar

region of the user is referred to as the back supporting member, and the supporting member contacting the rear of the thighs of the user is referred to as the thigh supporting member.

In the present example, it can be seen from the figures that the back supporting member and the thigh supporting member are extensions of the seat 105, and one of the back supporting member and the thigh supporting member is extended further away from the external surface (e.g. ground) and from a vertical axis perpendicular to the external surface compared to the other one of the back supporting member and the thigh supporting member when the lumbar exercise device is resting on the external surface without any load on the device 100. In the top view of the device 100 in Fig. 1c, this vertical axis is perpendicular to the line 150, projecting upwards away from the device 100 and is not shown in Fig. 1c.

Both the first and second supporting members may be adapted for contacting different lumbar vertebrae L1 to L5 of the user when in use, depending on the position the user disposes his/her pelvis in the seat 105 and the type of lumbar exercise he/she performs using the device. In one configuration of the use of the device 100, all the lumbar vertebrae L1 to L5 are supported by the back supporting member and a portion of the recess. In conventional exercise equipment, typically only L2 to L4 are supported.

As mentioned above, the first or second supporting member, 130 or 140, may be selected as the back supporting member to contact the lumbar region of the user. The selection may depend on the gender and age of the user. For example, studies have shown that in general, females over 50 tend to have flatter backs due to disc degeneration and diminishing lumbar curvature compared to males in the same age group. A female user over 50 may choose to sit in the seat 105 or perform lumbar exercises in the seat 105 with the broader first supporting member 130 contacting her lumbar region for a better support. On the other hand, a male user or a user from a younger age group may choose to sit in the seat 105 or perform lumbar exercises in the seat 105 with the narrower second supporting member 140 contacting his/her lumbar region. Furthermore, the selection may also depend on the type of lumbar exercise to be performed on the device.

In the present example, the seat 105 and the lateral portions 120a and 120b, and the first supporting member 130 and the second supporting member 140, are integrated and formed in a single piece of material. Specifically, this single piece of material is a segment of a hemispherical material. The radius of the hemispherical material may be constant, and may be in the range of about +/- 50 mm around a radius value of 240mm. For example, the radius of the hemispherical material may be in the range of 237mm to 240mm.

During the manufacturing of the device 100, the device 100 can be cut out and/or trimmed from the piece of hemispherical material to form the features with irregular shapes i.e. the lateral portions 120a and 120b, and the first supporting member 130 and the second supporting member 140. Alternatively, one or more moulds with the desired shape can be used to form the device 100 through injection moulding.

In another example, the integral piece may be formed with an arcuate shape with varying radius. However, the base of the device 100 should still be hemispherical to enable tilting, rocking and/or rotating motions on the external surface that the device 100 will be placed on. This hemispherical base may have the radius range as specified above for the hemispherical material.

Fig. 2a shows a side view of a device 200 viewed in accordance with one example disposed on an external surface (not shown), when no load is exerted on the device 200. The device 200 is similar to the device 100 described earlier. The external surface may be hard ground, or soft surface of a sleeping mattress, a foamed mat, and the like. In accordance with the example, the device includes a seat 205 for receiving a user's pelvis. The inner surface 208

of the seat 205 includes a recess. The recess of the seat 205 is configured to receive and generally conform to the user's pelvis. The recess, in the present example, has a concave surface. Specifically, the recess of the present example has an inner concave surface of a hemisphere for receiving the user's pelvis. The seat 205 has an outer surface 210 disposed on the opposite side of the inner surface 208 that is arcuate, and configured for tilting, rocking and/or rotating motions on an external surface (not shown). The external surface may be hard ground, or soft surface of a sleeping mattress, a foamed mat, and the like. The outer surface 210, in the present example, has a convex surface. In the present example, the outer surface 210 comprises a spherical cap of the device 200 to contact the external surface during exercise. The spherical cap enables tilting, rocking and/or rotating motions on the external surface.

The device 200 includes at least one lateral portion, flanking the seat 205. The lateral portion may extend from the seat 205 and partially surround the seat 205 on the sides of the device 200. The sides of the device correspond to the user's left and right side of the body when the user is sitting in the recess. In the example, as shown in Fig. 2a, there are two lateral portions 220a and 220b extending from opposing sides of the seat 205. The lateral portions 220a and 220b, for example, may be separate members located close to each other, adjacent to each other or members integrated with each other. In the present example, the lateral portions 220a and 220b are integral with each other. The lateral portions 220a and 220b may be configured to extend from the seat 205 to provide a guide for the user to place his/her pelvis in the recess of the seat 205. They may also prevent a user seated in the device 200 from falling out of the device when the user is performing exercises using the device 200. The lateral portions 220a and 220b may also extend from the seat 205 at different positions flanking the seat 205, or extend more than what is shown in Fig. 2a to 2c, for instance, to provide arm rests, or to provide more support.

The lateral portions, for example, may be adjacent to each other. In the present example, the lateral portions are integrated with each other at least on one side of each lateral portion to form a first supporting member 230. A peripheral portion of the seat 205 on the opposite side of the first supporting member 230 forms a second supporting member 240. In the present example, the contour of the first supporting member 230 is configured to be broader and flatter than that of the second supporting member 240. Both the first and second supporting member 230 and 240 may be adapted for contacting the lumbar region and the rear of the thighs of the user. In addition, both supporting members may be adapted for contacting different lumbar vertebrae L1 to L5 of the user when in use, depending on the position the user disposes his/her pelvis in the seat 205 and the type of lumbar exercise he/she performs using the device 200.

In one example, as shown in Fig. 2a, the seat 205 and lateral portions 220a and 220b flanking the seat 205 are parts of an integral single piece of material, which is a segment of a hemispherical material having an origin O. The radius of the hemispherical shape of the hemispherical material measured with respect to the origin O, may be a constant r, and may be in the range of about +/-50mm around a radius value of 240mm. For example, the radius of the hemispherical material may be in the range of 237mm to 240mm. In another example, the device 200 may have varying radii. However, a base of the device 200 should still be hemispherical to enable tilting, rocking and/or rotating motions on the external surface that the device 200 will be placed on. This hemispherical base may have the radius range as specified above for the hemispherical material.

In the present example, with reference to Fig. 2a, S_L and S_R sections of the device 200 are symmetrical about a plane AA passing through the origin O of the hemispherical shape of the device 200 and the centre of gravity C of the device. Each section S_L or S_R is a symmetrical half of the device 200. The plane AA also passes through the mid-points of the contours of the first and second supporting members 230 and 240. The line passing through the mid-points of the contours of the first and second supporting members 230 and 240 and intersecting the

plane AA is the line of symmetry of the device 200. The device 200 is configured to have a centre of gravity C close to the external surface to ensure the stability of the user when the device 200 is in use. For example, the distance D_C between the centre of gravity C of the device and the external surface may be 40mm. Fig. 2b shows the resting position of the device 200 on the external surface. Fig. 2b also shows a horizontal line 250 at height H_S, wherein all the parts of the device 200 below this line 250 constitutes the spherical cap or base of the device 200.

In accordance to the example shown in Fig. 2a, the width W of the device 200 is 460mm. Other width W of the device, for example 420mm, is also possible. For example, the width W of the device 200 may be in the range of 400mm to 500mm. The width W_{SP} of the seat 205 (also referred to as the "seat pan") is 400mm in Fig. 2a. Width W_{SP} of the seat pan in the range of 205mm to 450mm is possible based on ergonomic design guidelines such as ANSI/HFES 100-2007 and BSR/HFES 100-2002. The seat pan width may be set such that it does not exceed 450mm in order to optimize the spherical gravitational motion when the device 200 is in use. The maximum widths, D_L and D_R, of both lateral portions 220a and 220b extending from opposite sides of the seat 205 may be the same, and may be in the range of 15mm to 40mm. In the example shown in Fig. 2a, D_L and D_R are 30mm.

Fig. 2b and Fig. 2c show cross-sectional views of the S_R and S_L sections of the device 200 viewed from the plane AA respectively. As shown in Fig. 2b, the height H_S of the edge of the first supporting member 230 is 60mm. Other heights of the edge of the first supporting member are also possible. For example, the height H_S may be in the range of 40mm to 80mm. The vertical distance H_L between the edge of the second lateral portion 220b and the edge of the first supporting member 230 may be 120mm. Other vertical distance H_L may also be possible. For example, the vertical distance H_L may be in the range of 80mm to 150mm. In addition, the overall height H_D of the edge of the second lateral portion 220a from the external surface may be 180mm. Other overall height H_D may also be possible. For example, the overall height H_D may be in the range of 120mm to 230mm.

As shown in Fig. 2b, the horizontal distance L_{C1} between the edge of the first supporting member 230 and the centre of gravity C is 157mm. Other horizontal distance L_{C1} may also be possible. For example, the horizontal distance L_{C1} may be in the range of 135mm to 180mm. The horizontal distance L_{C2} between the edge of the second supporting member 240 and the centre of gravity C may be 228 mm. Other horizontal distance L_{C2} may also be useful. For example, the horizontal distance L_{C2} may be in the range of 210mm to 240mm. In addition, the overall horizontal distance L_D between the edges of the first and second supporting members 230 and 240 may be 385mm. Other overall horizontal distance L_D may also be useful. For example, the overall horizontal distance L_D may be in the range of 345mm to 420mm.

Fig. 2c shows the cross-sectional view of the S_L section of the device 200 viewed from the plane AA, which is the reverse side view of Fig. 2b. The thickness T_D of the device 200 may be 8mm. Other thicknesses T_D may also be possible. For example, T_D may be in the range of 8mm to 12mm. In one example, T_D may be uniform throughout the whole device. In other examples, T_D may vary depending on the material used and the portions of the device. Specifically, thicker portions are required to ensure the rigidity of the device and some portions may even have holes with zero thickness if such portions are not material to the rigidity of the device. For example, it may be thickest in the region about the point of contact between the outer surface 210 of the seat and the external surface when the device is not in a weight bearing position. For example, the thickness may gradually decrease from the seat to the lateral portions. The device may also be meshed or have perforations in parts of the device as long as sufficient rigidity is present.

The device may be made of a material that is rigid, strong and resilient enough to resist the forces it will experience in use. In a preferred example, the more rigid the device is, the better it is. For example, the device may be made of Polypropylene (PP) and/or Acrylonitrile butadiene styrene (ABS). The shape and material of the device may withstand a combined strength of about 150kg (330Ibs), for instance, 50kg to 160kg, with negligible material fatigue and deformation. Preferably, the device may withstand a user weighing in the range of about 50kg to 120kg with a height measurement of about 150cm to 200cm.

Furthermore, with reference to Figures 2b and 2c, one of the back supporting member and the thigh supporting member may be extended to a height (e.g. on or about the height, H_D), relative to the external surface, that is higher than a height (e.g. H_S) of the other one of the back supporting member and the thigh supporting member when the device is resting on the external surface without any load on the device. With reference to Figures 2b and 2c, one of the back supporting member and the thigh supporting member may also be extended to a length (e.g. L_{C2}), from a vertical axis perpendicular to the external surface and which may be intersecting the centre of gravity, C, of the device, that is longer than a length (e.g. L_{C1}) of the other one of the back supporting member and the thigh supporting member when the device is resting on the external surface without any load on the device.

Refer now to Fig. 3 which shows an exemplary implementation of the device 200. Fig. 3 shows a side view of a user 460 lying on her back with her pelvis placed in the recessed seat of the device 200 which is disposed on an external surface 470. The external surface may be a hard surface such as the floor, or a soft surface such as a rubberized Yoga mat, a non-friction resistant cloth, or a smooth cotton mattress surface. External surfaces of similar nature may also be useful.

The back supporting member may be the broader first supporting member 230, or the narrower second supporting member 240, depending on the age and gender of the user as well as the type of lumbar exercise to be performed. In Fig. 3, the first supporting member 230 is used as the back supporting member. The edge of the back supporting member may contact about the lumbar region of the user. The edge of the thigh supporting member (the second supporting member 240) may contact about the rear of the user's thighs, as shown in Fig. 3.

The device may be used in various exercises to exercise the lumbar region when the user is in the lying position. In one exemplary exercise, the user lies on her back with her shoulders being parallel to the external surface 470. The user's hands may be placed on her forehead or chest in a relaxed and comfortable position. The user's pelvis may be comfortably disposed in the recessed seat of the device. The edge of the back supporting member of the device may contact about the lumbar region. Due to the arcuate shape of the device, there may be a gap between the lumbar curve and the inner surface of the seat, thereby keeping the vertebrae floating in the air. User's knees may be bent with both ankles placed as close as possible to the device 200. The user may then twist her hips to the left and right with the device providing a dynamic support for the user's lumbar region and pelvis. The spherical cap of the device 200 may rotate and/or roll over the external surface 470 during the twisting exercise. The curvature of the outer surface 210 of the device may be used as the guide for the twisting exercise. When the human torso twists, it may exert forces onto the left or right side of the device. The device may react and secure the lumbar region and guide the spine's rotating angle, thereby maintaining the natural inward relaxed curve of the upper back. The user may perform the twisting exercise around 10 times each time in a controlled, slow and fluid manner. This may be a warm-up exercise to release tension in the lumbar spine region before proceeding to other exercises. The target area for the exercise may be lumbar L2 and L3.

In another exemplary exercise using the device, which may be an extended exercise from the first exemplary exercise, the user may twist her hips to the left and right while lifting one of her feet off the external surface 470. The user may twist her hips to the extent that her knees touch the external surface 470 before twisting back to the original lying position. During the exercise, the device may provide a dynamic support for the user's lumbar region and pelvis while rotating and/or rolling the spherical cap of the device over the external surface 470. Again, the curvature of the outer surface of the device may be used as a guide for the twisting exercise. Similarly, the user may perform the twisting exercise around 10 times each time in a controlled, slow and fluid manner. During this exercise, the use of the device facilitates stretching the user's lumbar and addressing the tightness of the lumbar region, thereby strengthening the core muscles of the user. The target area for the exercise may be lumbar L2, L3 and L4.

In yet another exemplary exercise using the device, the user may lift her knees close to her chest while lifting both feet and ankles off the external surface 470 throughout the exercise. The user may twist her hips to the left and right in a slow and fluid manner with both knees and ankles pushed together. During the exercise, the device may provide a dynamic support for the user's lumbar region and pelvis while rotating and/or rolling the spherical cap of the device over the external surface 470. Again, the curvature of the outer surface of the device may be used as the guide for the twisting exercise. This may be a more intense exercise compared to the aforementioned exercises. During this exercise, the entire lumbar region works together to regain mobility and agility. Cracks and sounds of the lumbar region while executing this exercise may be indications of the lumbar joints being treated. The exercise utilizing the device may be beneficial in fat-burning on the sides of the user's abdomen (commonly known as "Love handles"). Notably, the target area for the exercise may be all lumbar vertebrae L1-L5. The back supporting member and a portion of the recess of the device support the lumbar vertebrae L1 to L5 of the user's lumbar region.

In the above exemplary twisting exercises using the device, it may be recommended that the user carries out the exercises in a slow and controlled manner in order to achieve better results and ensure greater safety. For example, the duration of each twisting step and the interval between two twisting steps may be not shorter than 1 second. This may allow the device to induce its inversion technique. Fast and furious motions to contract the lumbar may result in injury. For each of the above exemplary exercises, at least 20 twisting steps (or 10 twisting steps for each side) may be performed each time for better results.

Refer now to Fig. 4 which shows another exemplary implementation of the device 200. Fig. 4 shows a side view of a user 560 doing a curl-up (sit-up) exercise with her pelvis placed in the recessed seat of the device 200 which is disposed on an external surface 570. The external surface 570 may be hard ground, a mat such as a rubberized Yoga mat, a non-friction resistant cloth, or a smooth cotton mattress surface. External surfaces of similar nature may also be useful.

The user 560 may start off the exercise in the lying position with knees bent and feet flat on the external surface 570 similar to the aforementioned exercises. The user's hands may be placed beside her torso or over her chest. With the user's pelvis comfortably disposed in the recessed seat of the device, the edge of the back supporting member of the device may contact about the lumbar region while keeping the lumbar vertebrae free from direct pressure or surface impact due to the arcuate shape of the device. The user may then slowly raise her head, neck and back as she exhales and squeezes her abdominal muscles. The device may slowly rotate forward with its first supporting member 230 providing dynamic support on or about the lumbar region as the user slowly raise her body up. The device may be capable of pressure distribution without triggering muscle spasm or fatigue to the lumbar region during the curl-up exercise. The arcuate shape of the device may also resist the user's curl-up motion

as it is being executed because more effort is required by the user to balance and pivot the device on the ground. The user then inhales and slowly lower herself to the external surface 570 as the device rotates back to its original position. This exercise utilizing the device may effectively trim the excess fat accumulated in the user's lower abdomen in a fluid and controlled manner. The target area for the exercise may be lumbar L2-L4.

In yet another exemplary exercise utilizing the device 200, the user performs another type of curl-up (sit-up) exercise. As the user slowly raises her head, neck and back, she extends her arms and legs fully while relying on her abdominal muscles to lift her chest upwards. The device may slowly rotate forward with its first supporting member 230 providing dynamic support on about the lumbar region as the user slowly raise her body up. The arcuate shape of the device may also resist the user's curl-up motion as it is being executed because more effort is required by the user to balance and pivot the device on the ground. This exercise utilizing the device may be more intensive than the aforementioned curl-up exercise and more effective in trimming the user's lower abdomen. The target area for the exercise may be lumbar L2-L4. In addition, the exercise utilizing the device may be effective in relieving constipations if it is performed twice a day with a minimum of 10 curls ups on each sessions.

Advantageously, the device 100 and 200 as described can be used on both hard and soft surfaces. The intensity of the lumbar exercises when using the device on a soft external surface, such as a bed surface, may be about 30% less as compared to a hard external surface. It provides flexibility especially for elderly persons above 60 years old who may need less intensive lumbar exercises. The user can easily migrate to hard surfaces once they have mastered the exercise using the device on soft surfaces.

In addition, the device may be used to assist a person who has trouble getting up from the bed on his own, such as an elderly person. Firstly, ensure that the person is lying sideways and curled up in a foetal position. Next, an assistant may slip the device beneath the pelvis of the person, with the outer surface of one side (S_L or S_R) of the device contacting the bed. The assistant may then hold on to one of the lateral portions of the device with one hand and lift the elderly's back (upper spine) up with the other hand, slowly guiding the elderly into a sitting position by rotating the device with the arcuate outer surface.

The device may provide dynamic support to the lumbar region and pelvis of the user when the lumbar exercises are performed. On one hand, it protects the spine from getting injured by redistributing pressure and preventing muscle spasm or fatigue during exercises. On the other hand, it facilitates stretching the user's lumbar and addresses the tightness of the lumbar region. By using the device, the target area for the exercise may be extended to all lumbar vertebrae L1-L5. The device may advantageously alleviate lower back pain and reposition the lumbar vertebrae to their correct positions.

Examples of the present disclosure may have the following features. The reference numerals of the elements in the Figures resembling the features stated are provided to indicate that they are examples of such features.

A lumbar exercise device (e.g. 100 or 200) comprising:

a seat (e.g. 105 or 205) having a recess for resting a user's pelvis;

wherein the seat has an outer surface (e.g. 110 or 210) disposed on an opposite side of the recess, and the outer surface of the seat comprises a spherical cap for contacting an external surface (e.g. 470 or 570) during exercise.

The seat may be symmetrical in shape in a top view looking into the recess of the device, and each symmetrical half (e.g. S_L or S_R) of the seat comprises a lateral portion extending from

the seat such that a pair of the lateral portions (e.g. 120a and 120b, and 220a and 220b) act as a guide for the user to sit the pelvis in the recess.

The seat may comprise a back supporting member (e.g. 130, 140, 230 or 240) for supporting the user's lumbar region when the user is seated in the recess.

The back supporting member and a portion of the recess may be configured for supporting the lumbar vertebrae L1 to L5 of the user's lumbar region.

The seat may comprise a thigh supporting member (e.g. 130, 140, 230 or 240) for supporting the user's thighs when the user is seated in the recess, and the thigh supporting member is disposed at an end opposite to the back supporting member.

The back supporting member and the thigh supporting member may be extensions of the seat, and one of the back supporting member and the thigh supporting member is extended further away from the external surface and from a vertical axis perpendicular to the external surface compared to the other one of the back supporting member and the thigh supporting member when the lumbar exercise device is resting on the external surface without any load on the lumbar exercise device.

The pair of lateral portions, the back supporting member, the thigh supporting member and the seat may be integrated and formed in a single piece of material.

The device may be made of a single piece of material.

The material may be polypropylene (PP).

The material may be Acrylonitrile Butadiene Styrene (ABS).

The material may have a hardness to withstand combined strength of 50kg to 160kg with negligible material fatigue and deformation.

The single piece of material may be a segment of a hemispherical material.

The lateral portions may be integral with each other to form one of the back supporting member and the thigh supporting member.

The device may be configured to assist the user with the pelvis seated in the recess into a sitting position from a lying position by a force directed to lift the user's back and to roll the spherical cap over the external surface.

In the specification and claims, unless the context clearly indicates otherwise, the term "comprising" has the non-exclusive meaning of the word, in the sense of "including at least" rather than the exclusive meaning in the sense of "consisting only of". The same applies with corresponding grammatical changes to other forms of the word such as "comprise", "comprises" and so on.

While the invention has been described in the present disclosure in connection with a number of examples and implementations, the invention is not so limited but covers various obvious modifications and equivalent arrangements, which fall within the purview of the appended claims. Although features of the invention are expressed in certain combinations among the claims, it is contemplated that these features can be arranged in any combination and order.

CLAIMS

1. A lumbar exercise device comprising:
a seat having a recess for resting a user's pelvis;
wherein the seat has an outer surface disposed on an opposite side of the recess, and the outer surface of the seat comprises a spherical cap for contacting an external surface during exercise.

2. The lumbar exercise device as claimed in claim 1, wherein the seat is symmetrical in shape in a top view looking into the recess of the device, and each symmetrical half of the seat comprises a lateral portion extending from the seat such that a pair of the lateral portions act as a guide for the user to sit the pelvis in the recess.

3. The lumbar exercise device as claimed in claim 1 or 2, wherein the seat comprises a back supporting member for supporting the user's lumbar region when the user is seated in the recess.

4. The lumbar exercise device as claimed in claim 3, wherein the back supporting member and a portion of the recess are configured for supporting the lumbar vertebrae L1 to L5 of the user's lumbar region.

5. The lumbar exercise device as claimed in claim 3 or 4, wherein the seat comprises a thigh supporting member for supporting the user's thighs when the user is seated in the recess, and the thigh supporting member is disposed at an end opposite to the back supporting member.

6. The lumbar exercise device as claimed in any one of the claims 3 to 5, wherein the back supporting member and the thigh supporting member are extensions of the seat, and one of the back supporting member and the thigh supporting member is extended further away from the external surface and from a vertical axis perpendicular to the external surface compared to the other one of the back supporting member and the thigh supporting member when the lumbar exercise device is resting on the external surface without any load on the lumbar exercise device.

7. The lumbar exercise device as claimed in claim 5 or 6, wherein the pair of lateral portions, the back supporting member, the thigh supporting member and the seat are integrated and formed in a single piece of material.

8. The lumbar exercise device as claimed in any one of claims 1 to 7, wherein the device is made of a single piece of material.

9. The lumbar exercise device as claimed in claim 8, wherein the material is polypropylene (PP).

10. The lumbar exercise device as claimed in claim 8, wherein the material is Acrylonitrile Butadiene Styrene (ABS).

11. The lumbar exercise device as claimed in any one of the claims 8 to 10, wherein the material has a hardness to withstand combined strength of 50kg to 160kg with negligible material fatigue and deformation.

12. The lumbar exercise device as claimed in any one of the claims 8 to 11, wherein the single piece of material is a segment of a hemispherical material.

13. The lumbar exercise device as claimed in any one of the claims 2 to 12, wherein the lateral portions are integral with each other to form one of the back supporting member and the thigh supporting member.

14. The lumbar exercise device as claimed in any one of the preceding claims, wherein the device is configured to assist the user with the pelvis seated in the recess into a sitting position from a lying position by a force directed to lift the user’s back and to roll the spherical cap over the external surface.