

"A seating arrangement"

Field of the Invention

This invention relates to a seating arrangement. More particularly, the invention relates to components for a seating arrangement and to a seating arrangement including
5 such components.

Background to the Invention

The act of sitting forms a major part of many people's daily activities. Surprisingly, significant amounts of bodily damage can occur due to incorrect seating
10 postures.

Further, with persons having spinal problems, an unsuitable chair or seat can severely aggravate those problems.

Almost all parts of a chair, if such parts result in an incorrect posture, can have adverse consequences for persons making regular use of the chairs, particularly in a
15 work environment where people are often seated for a major portion of their working day.

Summary of the Invention

According to a first aspect of the invention, there is provided a stabilising
20 arrangement for a chair, the stabilising arrangement including a pair of opposed bolsters laterally arranged relative to at least one of a seat of the chair which supports a person's buttocks and a backrest of the chair and the bolsters being adjustable to bear laterally against a pelvic region of the person to impart lateral to medial stability to the pelvic region.

25 The stabilising arrangement may be formed as part of one of the seat and the backrest.

Each bolster may be adjustably mounted relative to one of its associated side of the seat and associated side of the backrest. Instead, each bolster may be mounted by a mounting means on one of the seat and the backrest, the adjustability of the bolster
30 being provided by a resilient flexibility of the mounting means. Thus, the mounting means may comprise at least one mounting bracket of a resiliently flexible material. The at least one mounting bracket may be of spring steel.

At least a part of each bolster may be arranged beneath and form a part of an armrest arranged on each side of the chair. Thus, each armrest may be a split armrest,
35 the part constituting a lower member of the armrest. The lower member of each

armrest may be laterally adjustable relative to an upper member of the armrest. The upper member of each armrest may be fixed or independently adjustable.

According to a second aspect of the invention, there is provided a backrest for a seating arrangement, the backrest including:

- 5 a support structure for supporting a person's spine; and
- a projection extending from an operatively lower edge of the support structure for bearing against a sacral region of the person's spine.

As indicated above, the projection is intended for supporting the sacral region of the spine of the person. As a result, the projection may be substantially centrally
10 arranged along a longitudinal axis of the backrest and is dimensioned to fit between ilium bones of the person's pelvis. The projection may be in the form of a substantially trapezoidal-shaped wedge.

The support structure may include a lumbar support region, in the form of a portion or bulge, on an operatively front surface of the support structure. The lumbar
15 support region may be arranged immediately above the operatively lower edge of the support structure to bear, in use, against the person's spine in a region between the person's third lumbar vertebra (L_3) to a sacrum of the spine to facilitate correct thoracic spine kyphosis and to facilitate greater support to lumbar lordosis.

The support structure may taper inwardly towards an operatively top edge so
20 that a width of an operatively upper region of the support structure fits between scapulae of the person.

According to a third aspect of the invention, there is provided a component for a seating arrangement, the component including a body member of a resiliently flexible material which, in use, supports a person's buttocks, the body member including a
25 cutaway rear portion, the cutaway rear portion being dimensioned so that ischial tuberosities of the person overhang the cutaway portion, in use.

The component may constitute one of a seat of a chair and an accessory, such as a cushion, to be placed on an existing chair.

The cutaway rear portion of the body member may be arcuate or concave to
30 form a lip over which the person's buttocks extend, in use. If desired, the cutaway portion may contain a filling of a resiliently flexible material that is softer than a material of the remainder of the body member.

An operatively front, or leading, edge of the body member has a centrally arranged raised formation or nodule which, together with side edges of the body
35 member, define a pair of channels that diverge from the rear portion to the leading edge of the body member. This provides a means by which the person's legs are splayed

slightly to place the person's hip capsule in a more relaxed position and more evenly distribute pressure along the length of the person's thigh.

According to a fourth aspect of the invention, there is provided a component for a seating arrangement, the component including a body member of a resiliently flexible material which, in use, supports a person's buttocks, the body member including a centrally arranged raised formation or nodule at an operatively front region which, together with side edges of the body member, define a pair of channels that diverge from a rear portion of the body member to the leading front region of the body member.

According to a fifth aspect of the invention, there is provided a seating arrangement which includes:

a frame;

a component, as described above, mounted on the frame in a substantially horizontal, operative position; and

a backrest, also as described above, mounted on the frame to project upwardly from the component.

Relative positions of the component, or seat, and the backrest may be such that, between the rear edge of the seat and the lower edge of the backrest, a gap is defined for accommodating the pelvic region of the person seated on the seat. This gap may be defined by an indent in the foam. Further, the gap may contain a foam that is of a softer consistency than the foam of a remainder of the seat.

The component may be adjustably mounted on the frame. The seat may be adjustable for tilt and substantially horizontal displacement on the frame. Similarly, the backrest may be adjustably mounted on the frame. The backrest may be adjustable for tilt and substantially vertical displacement relative to the seat.

The frame may comprise an assembly which supports the seat and the backrest, the assembly being adjustably mounted relative to the remainder of the frame to facilitate height adjustment of the assembly relative to a substrate supporting the seating arrangement.

The seating arrangement may include at least one armrest. Preferably, the seating arrangement includes a pair of laterally spaced armrests. One armrest may be provided on each side of the backrest and may be mounted on the backrest.

In a preferred embodiment of the invention, each armrest may be adjustably mounted relative to the backrest. The armrests may be adjustable for lateral displacement as well as for vertical displacement relative to the backrest.

Each armrest may be mounted on the backrest so that, in a preferred orientation of the armrests relative to the backrest, the at least one armrest bears against the pelvic region of the person.

Each armrest may have a length which facilitates its abutment against a desk, in
5 use with the remainder of the seating arrangement being suitably orientated to provide correct seating posture for the person seated in the seating arrangement.

Additionally, the armrests may be arranged and dimensioned so that a person seated in the seating arrangement need not abduct his or her elbows outwardly from the body to rest on the armrest. Rather the armrests are so positioned that the elbows hang
10 naturally down at a side of the person's body. It is believed that this arrangement aids in fatigue relief of neck, shoulder and arm muscles.

According to a sixth aspect of the invention, there is provided a chair which includes:

- a seating arrangement, as described above; and
- 15 at least one armrest positioned relative to the backrest.

Preferably, the chair includes a pair of laterally spaced armrests. The armrests may be adjustably mounted on the backrest. In particular, the armrests may be adjustable for adjusting lateral displacement of the armrests with respect to each other.

20 **Brief Description of the Drawings**

The invention is now described by way of example with reference to the accompanying drawings in which:-

Figure 1 shows a schematic, side view of a seating arrangement, in accordance with an aspect of the invention;

25 Figure 2 shows a schematic, exploded plan view of the seating arrangement;

Figure 3 shows a schematic, exploded front view of part of the seating arrangement;

Figure 4 shows a schematic, three dimensional view of part of the seating arrangement;

30 Figure 5 shows a schematic, side view of a person seated on the seating arrangement;

Figure 6 shows a rear view of the person seated on the seating arrangement;

Figure 7 shows part of a person's spinal column and the effect thereon of a part of the seating arrangement;

35 Figure 8 shows a schematic, three dimensional view of a part of a seating arrangement in accordance with a second embodiment of the invention;

Figure 9 shows a schematic, exploded front view of the seating arrangement of Figure 8;

Figure 10 shows a schematic three dimensional view of a part of a seating arrangement in accordance with a third embodiment of the invention; and

5 Figure 11 shows a schematic, exploded front view of the seating arrangement of Figure 10.

Detailed Description of the Drawings

In the drawings, reference numeral 10 generally designates a seat, in the form of
10 a chair, in accordance with an aspect of the invention. The chair 10 includes a frame 12 which supports a seat 14, in accordance with a further aspect of the invention. The frame 12 further supports a backrest 16 in accordance with yet a further aspect of the invention.

For ease of explanation, the chair 10 will be described with reference to its use
15 as an office chair. However, it will be appreciated by persons of ordinary skill in the art that other types of chairs, including motor vehicle chairs or seats, could incorporate the various aspects of the invention.

The frame 12 of the chair 10 includes an assembly 18 having a part 20 supporting the seat 14. The assembly 18 is mounted on a wheeled structure 21 for
20 facilitating movement of the chair 10, in use. The frame 12 further includes a part 22 carrying the backrest 16.

As illustrated in Figures 2 to 4 of the drawings, the chair 10 includes a pair of laterally spaced armrests 26.

The seat 14 is in the form of a cushion of a resiliently flexible material.

25 Importantly, an operatively rear region of the seat 14 has a cutaway portion as indicated at 28. The cutaway portion 28 tapers from a top to a bottom of the seat 14 to provide a tail 30. More importantly, the cutaway portion 28 is arcuate or concave to form a lip 32 over which ischial tuberosities 34 (Figure 5) of a pelvis 36 of a person 38 seated on the chair hang.

30 The lip 32 encourages better pelvic and spinal posture by inhibiting sliding forward by the person 38 on the seat 14 which could cause a slumped, posterior pelvic rotation and reverse or flat lumbar lordosis which is the opposite of the recommended curvature and is commonly termed "slumped sitting posture".

The ischial tuberosities 34 engage the lip 32 slightly and therefore inhibit sliding
35 forward by the person 38 which encourages a more neutral pelvic posture. The cutaway portion 28 also encourages posterior rotation of the ilium bones 64 of the

pelvis 36 relative to the sacrum 42 of the person's spinal column 44. This position provides a stable arrangement for the sacro-iliac joints of the person's pelvis 36

The buttocks 40 of the person 38 therefore have a semi-suspended state when the person 38 is seated on the chair 10 which decreases the amount of pressure on soft tissue of the buttocks 40 and reduces the likelihood of the person 38 slumping into a posture in which weight is directly borne by the coccyx of the sacrum 42 of the person's spinal column 44 or by soft-tissue of the buttocks 40. This facilitates vascular circulation through the pelvis 36 of the person 38, encourages improved lower limb vascular circulation and should assist in reducing pain in the buttocks arising from prolonged pressure.

While the seat 14 has been illustrated as having an unfilled cutaway portion 28, it will be appreciated that the cutaway portion 28 could contain a filling, for example, of a foam material that is substantially softer than a foam material of a remainder of the seat 14.

An operatively front region 46 of the seat 14 has a raised nose or nodule formation 48. As illustrated more clearly in Figures 2 and 4 of the drawings, this creates, together with side edges 52 of the seat 14, a pair of channels 50 which diverge from the rear of the seat 14 to the front region 46.

The nose 48 allows the person 38 to "perch" on the seat 14 and encourages hips of the person 38 to rotate externally and slightly to abduct which is a more comfortable and neutral hip posture. This also encourages a more neutral lumbo-pelvic curvature.

As indicated by arrows 54 and 56 (Figure 1), the seat 14 is mounted on the part 20 of the frame 12 for horizontal adjustment and tilt adjustment, respectively.

The backrest 16 includes a support structure 58 for supporting the spinal column 44 of the person 38. The backrest 16 defines a lower edge 60 that, in use, clears iliac crests 64.1 (Figure 5) of the person's pelvis 36. A projection 62 in the form of a sacral wedge 62 extends downwardly from a central part of the lower edge 60.

The wedge 62, which is substantially trapezoidal in shape, is sufficiently small in width to fit between ilium bones 64 of the pelvis 36 of the person 38. The wedge 62 encourages sacral nutation, a position of stability relative to posterior ilial rotation and a position that provides an improved orientation for articulation with lumbar vertebra L5.

The backrest 16 has a lumbar rest in the form of a bulbous portion 66 projecting from a front 68 of the backrest 16. The bulbous portion 66 cooperates with the wedge 62 to facilitate correct lumbar lordosis and the correct relationship between the sacrum 42 and lumbar vertebrae 70 (Figure 7) of the spinal column 44.

The wedge 62 complements the seat 14 by applying support to the pelvis 36 which aids in creating the correct support for the pelvis 36. More particularly, the seat 14 inhibits backward pelvic tilt and the wedge 62 inhibits counternutating of the sacrum 42 to encourage a neutral pelvic posture.

5 The arrangement is also such that a gap 72 is created between the lower edge 60 of the backrest 16 and the lip 32 of the seat 14. With this arrangement, the buttocks 40 of the person 38 do not bear against any part of the chair 10.

 The bulbous portion 66 is, in effect, a forward extension of the wedge 62 and acts on the spinal column 44 in a region between the sacrum 42 and the third lumbar
10 vertebra 74 as shown in Figure 7 of the drawings. The bulbous portion 66 is positioned so that its region of maximum protrusion lies below the third lumbar vertebra 74, in use. The bulbous portion 66 spreads laterally and tapers inwardly in a lateral direction so that any pressure on iliac crests 64.1 of the ilium bones 64 of the pelvis 36 is minimised. The bulbous portion 66 serves to improve both lumbar spine lordosis and
15 thoracic spine kyphosis.

 The bulbous portion 66 of the backrest 16 applies its greatest support to the bottom part of the lumbar lordosis of the spinal column 44. Together with the seat 14 and the wedge 62, this enables the person 38 to position himself or herself with a neutral pelvic position and improved lordosis of the lumbar spine.

20 The support structure 58 of the backrest 16 tapers inwardly to a top 76. As shown in Figure 6 of the drawings, the width of the top 76 of the backrest 16 is such that it fits between scapulae 78 of the person 38. This allows freedom of movement of the person's shoulders 80 and inhibits a forward-leaning moment.

 As indicated by arrows 82 and 84 (Figure 1), the backrest 16 is mounted on the
25 frame 12 for vertical adjustment and tilt adjustment, respectively.

 The armrests 26 are supported on the backrest 16. In one embodiment of the invention, illustrated in Figures 1 to 6 of the drawings, the armrests 26 are laterally displaceable with respect to each other as indicated by arrows 86.

 The armrests 26 are of a padded material. The padded part of the armrests 26
30 fits snugly to lateral parts of the backrest 16. Due to the lateral displacement of the armrests 26 relative to each other, as indicated by the arrows 86, the armrests 26 are positioned at a distance from a midline of the backrest 16 of the chair such that the person does not have to side flex/lean on the armrests 26. As indicated in Figure 6 of the drawings, the armrests are positioned to lie directly below the shoulders 80 of the
35 person 38 so that the arms of the person 38 hang downwardly and are not splayed outwardly.

The armrests 26 serve a further function in that, being laterally adjustable, they fit firmly against the body of the person 38. The armrests 26 have an inner wall 88 to apply pressure to the pelvis 36. This aids lateral to medial stability of the pelvis 36 and encourages a neutral seating posture which enables the person to sit for longer periods.

5 Also, as described above, the armrests 26 are close enough to the body of the person 38 to stop the problem of leaning across to the armrests thereby reducing an out-of-neutral trunk posture.

The armrests 26 also have a front edge which terminates well short of the leading edge 46 of the seat 14. This allows the armrests 26 to abut an edge of the desk
10 or to fit below a desk height to allow the person's arms to be correctly supported for keyboard/mouse posture.

It is also to be noted that the armrests 26 are vertically adjustable relative to the backrest 16 as indicated by arrows 90.

Referring to Figures 8 and 9 of the drawings, a second embodiment of the chair
15 10 is described. With reference to the previous drawings, like reference numerals refer to like parts unless otherwise specified.

In this embodiment of the invention, the chair 10 includes a stabilising arrangement in the form of stabilisers 100 arranged on each side of the seat 14.

Each stabiliser 100 is constituted by two components. A first component 102 is
20 a bolster adjustably mounted on the seat 14 at a rear of each side edge 52 of the seat 14. As indicated by arrows 104, each bolster 102 is pivotally mounted on the seat 14 to be pivotally adjustable in use to engage and stabilise the person's pelvis 36 to encourage a neutral seating posture. This is augmented by the second component of each stabiliser 100.

25 In this embodiment, each armrest 26 is a split armrest having an upper member 106 and a lower member 108. The upper member 106 of each armrest 26 is fixed to its associated side of the backrest 16 or is independently displaceable relative to the lower member 108. The lower member 108 of each armrest 26 constitutes the second component of each stabiliser 100 and is laterally displaceable relative to the upper
30 member 108 as indicated by arrows 110 to facilitate lateral stabilisation of the person's pelvis 36.

It will be appreciated that, in variations of this embodiment, each stabiliser 100 could comprise either of the components 102 and 108 alone, instead of both components 102 and 106.

Referring now to Figures 10 and 11 of the drawings, yet a further embodiment of the chair 10 is described. Once again, with reference to the previous drawings, like reference numerals refer to like parts unless otherwise specified.

In this embodiment of the invention, each bolster 102 is attached by a mounting
5 means in the form of a pair of spaced mounting brackets 112 to the seat. More particularly each bracket is fixed to a rigid backing member 114, such as a plywood backing member, of each bolster 102 and a rigid backing member 116, which, once again, may be a plywood backing member, of the seat 14. Each bracket 112 is made of
10 spring steel so that, when the bolsters 102 are urged outwardly as a result of a person sitting between the bolsters 102, the brackets 112 spring bias the bolsters 102 to impart lateral to medial pressure to the person's pelvis 36 to encourage a correct, stable position of the pelvis 36.

It is an advantage of the invention that a chair 10 is provided which encourages correct seating posture for a person. The arrangement of the seat 14 reduces the
15 tendency of a person seated on the chair to slump or to slide forward. It also reduces posterior pelvic rotation.

The backrest 16 of the chair 10 encourages a neutral lumbo-pelvic position which enables a user to sit in a correct posture for longer periods of time. The support of the sacrum encourages correct spinal posture and the ilium bones of the pelvis are
20 allowed to rotate into a position which is more stable with respect to the sacrum. Further, the use of the bulbous portion 66 encourages correct lumbar lordosis and thoracic kyphosis and encourages more efficient use of the respiratory muscles.

A further advantage of the chair 10 is that the armrests function to improve lumbo-pelvic stability. Because a person's gluteal muscles are unable to activate
25 effectively when the person is seated, the lateral stabilisers 100 and or armrests 26 serve to artificially "close" the person's sacro-iliac joints of the pelvis 36 thereby providing a benefit that the pelvis 36 is stable. Therefore, this lumbo-pelvic stability is provided by lateral stability imparted by the stabilisers 100 and/or the armrests 26 as well as the seat/backrest relationship that facilitates correct sacral, ilial and spinal
30 postures. Further, the armrests 26 aid in key entry/mouse use per posture.

It is yet a further advantage of the invention that the arrangement of the lip 32 on the seat 14 and the provision of the wedge 62 and the bulbous portion 66 of the backrest 16 facilitates a certain amount of sacral nutation and neutral pelvic posture.

The seat 14 further provides better positioning of ischial tuberosities by way of
35 complementary force distribution or support for the spine, sacrum, ilium and femurs

than other chairs of which the applicant is aware. This allows for a greater trunk-hip angle with pelvic support for a more neutral posture.

It will be appreciated by persons skilled in the art that numerous variations and/or modifications may be made to the invention as shown in the specific
5 embodiments without departing from the spirit or scope of the invention as broadly described. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive.

CLAIMS:

1. A stabilising arrangement for a chair, the stabilising arrangement including a pair of opposed bolsters laterally arranged relative to at least one of a seat of the chair which supports a person's buttocks and a backrest of the chair and the bolsters being
5 adjustable to bear laterally against a pelvic region of the person to impart lateral to medial stability to the pelvic region.
2. The stabilising arrangement of claim 1 which is formed as part of one of the seat
10 and the backrest.
3. The stabilising arrangement of claim 2 in which each bolster is adjustably mounted relative to one of its associated side of the seat and associated side of the backrest.
- 15 4. The stabilising arrangement of claim 2 in which each bolster is mounted by a mounting means on one of the seat and the backrest, the adjustability of the bolster being provided by a resilient flexibility of the mounting means.
5. The stabilising arrangement of claim 4 in which the mounting means comprises
20 at least one mounting bracket of a resiliently flexible material.
6. The stabilising arrangement of claim 5 in which the at least one mounting bracket is of spring steel.
- 25 7. The stabilising arrangement of claim 1 or claim 2 in which at least a part of each bolster is arranged beneath and forms a part of an armrest arranged on each side of the chair.
8. The stabilising arrangement of claim 7 in which each armrest is a split armrest,
30 the part constituting a lower member of the armrest.
9. The stabilising arrangement of claim 8 in which the lower member of each armrest is laterally adjustable relative to an upper member of the armrest.
- 35 10. A backrest for a seating arrangement, the backrest including:
a support structure for supporting a person's spine; and

a projection extending from an operatively lower edge of the support structure for bearing against a sacral region of the person's spine.

11. The backrest of claim 10 in which the projection is substantially centrally
5 arranged along a longitudinal axis of the backrest and is dimensioned to fit between ilium bones of the person's pelvis.

12. The backrest of claim 10 or claim 11 in which the projection is in the form of a substantially trapezoidal-shaped wedge.
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13. The backrest of any one of claims 10 to 12 in which the support structure includes a lumbar support region on an operatively front surface of the support structure.

14. The backrest of claim 13 in which the lumbar support region is arranged above
15 the operatively lower edge of the support structure to bear, in use, against the person's spine in a region between the person's third lumbar vertebra (L_3) to a sacrum of the spine.

15. The backrest of any one of claims 10 to 14 in which the support structure tapers
20 inwardly towards an operatively top edge so that a width of an operatively upper region of the support structure fits between scapulae of the person.

16. A component for a seating arrangement, the component including a body
25 member of a resiliently flexible material which, in use, supports a person's buttocks, the body member including a cutaway rear portion, the cutaway rear portion being dimensioned so that ischial tuberosities of the person overhang the cutaway portion, in use.

17. The component of claim 16 which constitutes one of a seat of a chair and an
30 accessory to be placed on an existing chair.

18. The component of claim 16 or claim 17 in which the cutaway rear portion of the
body member is arcuate to form a lip over which the person's buttocks extend, in use.
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19. The component of any one of claims 16 to 18 in which the cutaway portion contains a filling of a resiliently flexible material that is softer than a material of the remainder of the body member.
- 5 20. The component of any one of claims 16 to 19 in which an operatively front edge of the body member has a centrally arranged raised formation which, together with side edges of the body member, define a pair of channels that diverge from the rear portion to the leading edge of the body member.
- 10 21. A component for a seating arrangement, the component including a body member of a resiliently flexible material which, in use, supports a person's buttocks, the body member including a centrally arranged raised formation at an operatively front region which, together with side edges of the body member, define a pair of channels that diverge from a rear portion of the body member to the leading front region of the
- 15 body member.
22. A seating arrangement which includes:
a frame;
a component, as claimed in any one of claims 16 to 21 mounted on the frame in
- 20 a substantially horizontal, operative position; and
a backrest, as claimed in any one of claims 10 to 15 mounted on the frame to project upwardly from the component.
23. The seating arrangement of claim 22 in which relative positions of the
- 25 component and the backrest is such that, between the rear edge of the seat and the lower edge of the backrest, a gap is defined for accommodating the pelvic region of the person seated on the seat.
24. The seating arrangement of claim 22 or claim 23 in which the component is
- 30 adjustably mounted on the frame.
25. The seating arrangement of any one of claims 22 to 24 in which the backrest is adjustably mounted on the frame.
- 35 26. The seating arrangement of any one of claims 22 to 25 in which the frame comprises an assembly which supports the seat and the backrest, the assembly being

adjustably mounted relative to the remainder of the frame to facilitate height adjustment of the assembly relative to a substrate supporting the seating arrangement.

27. The seating arrangement of any one of claims 22 to 26 which includes at least
5 one armrest.

28. The seating arrangement of claim 27 in which the at least one armrest is adjustably mounted relative to the backrest.

10 29. The seating arrangement of claim 28 in which the at least one armrest is mounted on the backrest so that, in a preferred orientation of the armrests relative to the backrest, the at least one armrest bears against the pelvic region of the person.

30. The seating arrangement of any one of claims 27 to 29 in which the at least one
15 armrest has a length which facilitates its abutment against a desk, in use.

31. A chair which includes:
a seating arrangement, as claimed in claim 22; and
at least one armrest positioned relative to the backrest.

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32. The chair of claim 31 which includes a pair of laterally spaced armrests.

33. The chair of claim 32 in which the armrests are adjustably mounted on the backrest.

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