ORTHOEDIC LEG SUPPORT

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ABSTRACT
The specification describes an orthopedic leg supporting appliance which can be supported on a bed. The appliance comprises several supports for the lower and upper part of a leg of a patient and these parts are arranged to be capable of being articulated in relation to each other.

10 Claims, 4 Drawing Figures
ORTHOPEDIC LEG SUPPORT

BACKGROUND OF THE INVENTION

1. Field to which invention relates

The present invention relates to an orthopedic leg support comprising a part for supporting the upper part of the leg and a part, which is capable of being pivoted in relation to the first part, for supporting the lower part of the leg.

2. The Prior Art

Orthopedic leg supports are known of a type which are suspended from a frame arranged over the bed. Their substantial advantage is that they allow a movement of the three large joints of the leg and thus allow a functional treatment of the leg so as to prevent a stiffening of the joints and atrophy of the muscles. At the same time they keep the blood and lymph circulation going. The manipulation of such orthopedic exercising leg supports is, however, difficult. The frame mentioned above the bed must be fixed in a place and several ropes must be fixed at a number of positions on the frame or placed over pulleys and loaded with weights. Furthermore the orthopedic leg support must be suspended at a number of positions on the ropes. The amount of time and trouble required to rig such a support is substantial so that in the case of the present day shortage of nursing personnel the use of orthopedic leg supports scarcely ever occurs despite that favorable action.

SUMMARY OF THE INVENTION

One object of the invention is to provide an orthopedic leg support or splint which also makes possible a movement of the three large leg joints but is, however, simple in construction and operation.

In accordance with one aspect, the invention provides in the context of an orthopedic leg support of the above-mentioned type, that the support for the upper part of the leg is attached near its top end on a frame which can be arranged underneath the leg on the bed surface by means of a joint, which can be moved downwards against a counter-weight substantially in the pivoting direction of the upper part of the leg. Furthermore there is the feature that the lower leg part support is carried near its bottom end in a sliding manner on a guide means arranged longitudinally and substantially horizontally on the frame, and that further on the lower leg part support a force acts for adding the lower leg part support in relation to the upper leg support.

Such an orthopedic leg support or splint makes it possible to dispense with the time-consuming assembly of the prior art construction. It is simply placed on the upper surface of the bed under the leg and both in this position and when being stored takes up little room. It can also be used by general practitioners and even be used by the patient in his house.

In accordance with a preferred form of the invention the above-mentioned joint consists of two individual joints arranged at the right and to the left of the support for the upper part of the leg and which are arranged on a telescoping spring means which is firmly fixed to the frame and is aligned substantially in the pivoting direction of the upper part of the leg. The guide means comprises two rods arranged to the left and to the right of the lower leg support and the bearing means for the lower leg support consists of two sleeves which can be slid on it and can be swung in relation to the support of the lower leg part. An abutment or support for the foot is mounted on two rubber straps which are substantially parallel to the support for the lower leg part and are attached near the knee on two holding means arranged to the right and to the left of the leg on the upper leg part support or the lower leg part support. For adding of the lower leg support in relation to the upper leg support a rubber strap is connected with the frame on the one hand and the lower leg support on the other.

Further features which can serve for providing for an advantageous further development of the invention are to be found in the following description of an embodiment of the invention and in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGS. 1, 2 and 3 of the accompanying drawings show an orthopedic leg support in accordance with the invention in three different positions of movement;

FIG. 4 is an enlarged fragmentary elevation of spring part 10 with a portion broken away.

DESCRIPTION OF THE PREFERRED EMBODIMENT

On an elongated base plate 1, at one end a second plate 3 is attached, whose other end is supported by two legs 6, connected by a cross-piece 5, on the base plate 1.

At one end of the plate 3 two mutually parallel spring including parts 10 are secured in place see FIG. 4. They are provided with oblique supports 8 and 9. Their telescoping rods 11, which are prevented from falling out by screws 11' mounted in lateral projections 12, are connected at their free ends by an arcuate part 13 in order to provide a stiffening action.

At the end of the telescoping rods 11, two beams 15 are mounted in joints 14 and between them a plastics material shell 16, which is curved on one side, is arranged. The beams 15 are extendable, the parts which can be extended are denoted by reference numeral 17. The beams 15 are connected by a joint 18 with two further parts 19 forming a letter U. Between them a further plastics material shell 20 is arranged. The plastics material shells 16 and 20 are covered with a continuous cushion 21. Near the end of the beams 19, the latter have a pin 22 passing through them transversely, on which on the outer sides of the beams 19 two sleeves 23 are arranged in a pivoting manner. The sleeves 23 are mounted on two parallel guide rods 24 so that they can slide though they can be locked by means of fixing screws 35. The rods 24 are held on posts 25, 26 mounted on the plate 3.

The pin 22 has a rubber belt 27 attached to it which is attached at its other end underneath the oblique support 9 on the plate 3. On the extending parts 17 of the beams 15 two holding means 29 are attached above a joint 18. In the holding means rubber belts 31, which hold an abutment 30 for the foot, are connected by means of hooks 32.

The plates 1 and 3, the legs 6, the beams 15 and 19, the sleeves 23 and the posts 25 and 26 are preferably made of white plastics material.

The leg 36 of a patient undergoing treatment and lying on his back, lies on the cushion 21 and the foot
presses against the abutment 30 so that the rubber straps 31 are placed under tension. The weight of the leg is taken up by the spring rods 10 and as regards the force components occurring in a direction parallel to the guide rods 24, is held by the rubber belt 27. If the patient moves the upper leg part or shin downwards, the telescoping rods 11 are moved further inwards. By means of the guide rods 24, the lowering of the leg is necessarily coupled with a stretching operation, during which the sleeves 23 are displaced on the guide rods 24 and the rubber belt 27 is further stressed. If the leg is adducted and raised, the orthopedic leg support follows the movement owing to the forces provided by the spring rods 10 and the rubber belts 27.

FIG. 1 shows an inbetween position.

FIG. 2 shows a position in which the upper leg part is adducted until it is in the vertical highest position.

FIG. 3 shows the stretched out lowermost position of the leg.

In order to ensure that during its movements the upper leg part does not as far as possible slide on the leg support, the spring rods 10 in the inbetween position shown in FIG. 1 are approximately perpendicular to the upper leg part, that is to say at an angle of about 45° to the horizontal; an arrangement which would be ideal as regards the geometrical relationships would provide for an accurate pair of spring rods with the hip joint as a center point. The guiding rails 24 are shown in the drawings to raise slightly towards the bottom end of the bed. However, they are substantially horizontal.

The rubber straps 31 serve for providing resistance to the movement of the foot in order to be able to exercise it. In order to fix the knee joint in any desired position, the sleeves 23 are fixed by means of a gripping screw 35 on the guide rods 24.

The extending parts 17 of the beams 15 make it possible to adapt the support in accordance with the invention to various different lengths of the upper part of the leg.

The orthopedic exercising leg support in accordance with the invention is particularly for the subsequent treatment of breaks and pinned joints of the upper and lower leg parts. Its use extends to heel breaks, light breaksages of the head of the tibia, operations on the knee and hip joints, and also conditions in which bending and the extension of the knee and foot joints are impaired.

I claim:

1. In an orthopedic-leg support appliance comprising first and second supports for supporting the upper and lower part of the leg, respectively, and including means pivotally connecting them in relation to each other, comprising a frame adapted to be arranged on the surface of a bed, a joint connecting the upper leg part support adjacent an upper end portion of the support with the frame, the joint including means permitting it to be moved downwards substantially in the pivoting direction of the upper leg part, said means including means providing a counter-force resisting such downward movement of the joint; guide means carrying the lower leg part support near its lower end in a sliding manner for substantially longitudinal horizontal movement, the guide means being arranged on the frame; and means for providing force acting on the lower leg part support for adducting the lower leg part support in relation to the upper leg part support.

2. An appliance in accordance with claim 1 further comprising an abutment for the foot of the leg, which can moved parallel to the lower leg part support, and means operatively connected to said abutment for providing force for acting upon the abutment whereby the force is directed towards the sole of the foot.

3. An appliance in accordance with claim 2 comprising two elastic straps substantially parallel to the lower leg part support and carrying the abutment, and holding means to which the straps are attached at a position adjacent a rear portion of the lower leg support adjacent to the knee, to the right and left of the leg on the upper leg part support.

4. An appliance in accordance with claim 1 comprising two joint sections making up the joint, and a telescoping spring means attached rigidly to the frame and aligned with the pivoting direction of the upper leg part, the joint sections being mounted on the telescoping spring means.

5. An appliance in accordance with claim 1 in which the support for the upper part of the leg includes means permitting it to be extended.

6. An appliance in accordance with claim 4 in which the guide means comprises rods arranged on the right-hand and the left-hand of the lower leg part support and a support means for the lower leg part support comprises two sleeves which can be slid on the rods and can be swung in relation to the lower leg part support.

7. An appliance in accordance with claim 5 in which the frame consists substantially of two elongated plates which form between them an acute angle which wider at one end towards a foot end of the bed.

8. An appliance in accordance with claim 7 comprising an elastic strap which serves for adducting the lower leg part support in relation to the upper leg part support and connects the lower leg part support and the frame.

9. An appliance in accordance with claim 8 comprising means for locking the leg supports in different positions.

10. An appliance in accordance with claim 9 in which the upper leg part support and the lower leg part support comprise plastic beams, plastic shells disposed between the beams, and form a cushion.