

NURSING CIRCULATING COLD COMPRESS DEVICE FOR PAIN RELIEF

Field of the Invention

The present invention relates to the technical field of medical nursing, in particular to a nursing
5 circulating cold compress device for pain relief.

Background to the Invention

In medical care, for some patients with trauma, cold compresses can be used to alleviate the
patient's pain. Through applying cold compresses to contract blood vessels, restricting blood
10 flow and reducing local blood circulation, it can reduce swelling and inhibiting inflammation. The
prior cold compress device can be externally connected to a corresponding refrigerator, thus to
achieve circulating cooling.

Prior art 1 (Chinese Patent Publication No. 202320874434.9, published on 2023-07-28)
discloses a circulating cold compress device, comprising an housing and a refrigerator body,
15 wherein a cold compress chamber is arranged within the housing, one side of which passes
through and connects to a delivery pipe; one end of the delivery pipe is communicated with the
refrigerator body, and one end of the refrigerator body is communicated with the return pipe; both
sides of the housing are fixedly connected with a fixed plate, and a rotating shaft is fixedly
connected to the inner side of the fixed plate; and the surface of the rotating shaft is rotatably
20 connected to a connecting block, and one side of the connecting block is fixedly connected to a
bandage. Through setting of bandages, buckles and snap ring, the circulating cold compress
device connects the bandage to the housing via a connecting block. The area on the patient
body requiring cold compress is placed on the housing, the buckles are adjusted to an
appropriate position, and then the buckles and snap rings are connected to secure the bandage.
25 This configuration facilitates the fixation of the patient's injured area to the device, thereby
adapting to patients with different body shapes; Prior art 2 (Chinese Patent Publication No.
CN202411099020.9, published on 2024-11-08) discloses an orthopedic nursing circulating cold
compress device for pain relief, comprising a main body and a rotating frame, wherein the

rotating frame is rotatably connected to the top of the main body, and the top of the rotating frame is fixedly connected to two electric push rods; and the output ends of the two electric push rods are fixedly connected to a connecting frame, and further comprising an adjustment mechanism, which is arranged on the top of the connecting frame. The application enables both
5 ends of the connecting bar to rotate synchronously inside the sliding frame and on the outer wall of the extension frame. The connecting sleeve frame rotates on the outer wall of the adjustment frame via the connecting rotary frame, thereby enabling the patient to control joint movement during prolonged cold compress. The device of the present invention replaces the traditional cold
10 compress device that has a sealed space inside the leg placement area, increasing the patient's leg movement range. This prevents joint stiffness, muscle atrophy, slowed blood circulation, and joint pain that may occur due to prolonged joint immobility during prolonged cold compress, thereby avoiding increasing the patient's pain.

Although the prior circulating cold compress device can realize circulating cold compress treatment to patients, the cold compress position remains fixed after the device is mounted. To
15 enhance the pain relief effect for patients during cold compress treatment, kneading of the cold compress position may be accompanied, which requires manual operation by the nursing staff, resulting in low convenience of use.

Statement of Invention

20 The present invention aims to provide a nursing circulating cold compress device for pain relief, to solve the problems raised in the above the background art. Although the prior circulating cold compress device can provide circulating cold compress treatment to patients, the cold compress position remains fixed after the device is mounted. To enhance the pain relief effect for patients during cold compress treatment, kneading of the cold compress position may be accompanied,
25 which requires manual operation by the nursing staff, resulting in low convenience of use.

To realize the above objectives, the present invention offers the following technical solutions: a nursing circulating cold compress device for pain relief, comprising a connecting base, wherein the connecting base is arranged with a binding mechanism externally to bind the connecting base onto surface of the patient's limbs; the lower surface of the connecting base presents an

open-shaped structure and is attached with an adhesive pad; a cold compress block is formed in the middle of the connecting base, and two sets of transmission hoses are connected above the cold compress block; above the transmission hoses, a delivery channel is connected, and the delivery channel is formed within the connecting base; an external circulation pipe is connected above the delivery channel, and the external circulation pipe is connected to a refrigeration plant, to cool the coolant and then transmit it circularly. The cold compress block is fixed with a movable plate on its upper side, and the upper end of the movable plate is located within the connecting base, forming a horizontal sliding structure with the connecting base; and the outer side of the movable plate is provided with a reciprocating driving mechanism to control the movement of the movable plate and simulate kneading.

To further optimize the technical solution, the binding mechanism comprises a connecting sleeve and a bandage;

The connecting sleeve is formed on the outer side of the connecting base;

The bandage is mounted on both the left and right sides of the connecting sleeve, and a clamping member is formed below the bandage.

To further optimize the technical solution, a circular sliding groove is formed on the outer side of the connecting base, and sliding connection is formed between the connecting sleeve and the sliding groove.

To further optimize the technical solution, the cold compress block comprises an insulated chamber and a heat-conducting plate, wherein the heat-conducting plate is fixed below the insulated chamber, the heat-conducting plate is opposite to the patient's skin surface, and the lower surface of the heat-conducting plate is applied with a flexible adhesive.

To further optimize the technical solution, the reciprocating driving mechanism comprises a first spring, an extrusion wheel, a mounting shaft, and a transmission mechanism;

The first spring is arranged on the left side of the movable plate to provide thrust to the movable plate;

The extrusion wheel is arranged on the right side of the movable plate, and is attached with the movable plate, and the surface of the extrusion wheel is made of polytetrafluoroethylene

materials;

The mounting shaft is fixedly connected to the extrusion wheel, the vertical centre line of the mounting shaft is staggeredly arranged with that of the extrusion wheel, and a rotary connection is formed between the mounting shaft and the connecting base;

- 5 The transmission mechanism is connected with the mounting shaft, to control the rotation of the mounting shaft.

To further optimize the technical solution, the transmission mechanism is driven by the fluid power within the delivery channel, thereby driving the mounting shaft to rotate.

- 10 To further optimize the technical solution, the transmission mechanism comprises a mounting plate, a rotating blade, a rotating shaft, a driving belt, a movable shaft and a variable speed mechanism;

The mounting plate is mounted within the delivery channel;

The rotating blade is arranged below the mounting plate;

- 15 The rotating shaft is fixedly connected to the rotating blade, and a rotary connection is formed between the rotating shaft and the mounting plate;

The driving belt is arranged on the outer side of the rotating shaft;

The movable shaft is rotatably mounted within the connecting base, and the movable shaft is connected to the rotating shaft via the driving belt;

- 20 The variable speed mechanism is arranged above the movable shaft, and the movable shaft is connected to the mounting shaft via the variable speed mechanism.

To further optimize the technical solution, the variable speed mechanism comprises a transmission shaft, a first gear and a second gear;

The transmission shaft is arranged above the movable shaft, and a rotary connection is formed between the transmission shaft and the connecting base;

- 25 The first gear is fixed on the surface of the movable shaft;

The second gear is fixed on the surface of the mounting shaft, a meshing connection is formed

between the second gear and the first gear, and the diameter of the second gear is larger than that of the first gear.

To further optimize the technical solution, a transmission control mechanism is formed between the transmission shaft and the movable shaft to control rotation of the transmission shaft.

- 5 To further optimize the technical solution, the transmission control mechanism comprises a transmission block, a second spring, a docking slot, a top bar, and a control head;

The transmission block is arranged above the movable shaft, and forms an up-down sliding structure with the movable shaft;

- 10 A second spring is fixed below the transmission block, thereby providing an upward thrust to the transmission block;

The docking slot is formed below the transmission shaft, and a concave-convex fitting structure is formed between the docking slot and the transmission block;

- 15 The top bar is arranged above the transmission block, and a rolling ball is arranged below the top bar; and the upper end of the top bar passes through the transmission shaft and forms a nested connection with the transmission shaft;

The control head is arranged above the top bar, and a threaded connection is formed between the control head and the connecting base.

Compared with the prior art, the present invention offers the following beneficial effects:

- 20 (1) This device applies cold compresses to the patients via the cold compress block, which is movable to simulate kneading, thereby relieving pain in the cold compress site and increasing the functionality of the device.

- 25 (2) The connecting base is bound and fixed via a bandage, to maintain a stable connection with the patient, thereby facilitating mounting of the device. The connecting base rotates within the connecting sleeve, to adjust the subsequent kneading direction, thereby improving the kneading effect and the subsequent kneading direction.

(3) The movable plate is driven to move through the eccentric rotation of the extrusion wheel, to cooperate with the first spring to drive the cold compress block for reciprocating motion,

thereby realizing a kneading effect. Additionally, the power of the extrusion wheel is reduced through the meshing transmission of the first gear and the second gear, thereby improving the rotational stability.

5 (4) The rotating blade is driven to rotate through flow of liquid within the delivery channel, to provide power for movement of the cold compress block. The mobile power of the cold compress block can be cut off and controlled, to maintain stable cold compress, thereby adapting to different usage needs.

10 (5) The rotational power is transmitted through the connection between the transmission block and the docking slot. The transmission block is pushed in conjunction with the top bar, to disconnect the transmission block from the docking slot, thereby disconnecting the power transmission between the movable shaft and the transmission shaft, stopping the cold compress block from moving.

Brief Description of the Drawings

- 15 Figure 1 is a perspective view of the structure of the present invention;
Figure 2 is a upward view of the structure of the present invention;
Figure 3 is a perspective view of the structure of the connecting sleeve of the present invention;
Figure 4 is a perspective view of the structure of the connecting base of the present invention;
Figure 5 is a main sectional view of the structure of the connecting base of the present invention;
20 Figure 6 is a main sectional view of the structure of the cold compress block of the present invention;
Figure 7 is a top view of the structure of the first gear of the present invention;
Figure 8 is a top view of the structure of the extrusion wheel of the present invention;
Figure 9 is a upward view of the structure of transmission shaft of the present invention;
25 Figure 10 is a main sectional view of the structure of the transmission shaft of the present invention.

In the drawings, 1. Connecting base; 2. Connecting sleeve; 3. Sliding groove; 4. Bandage; 5. Adhesive pad; 6. Cold compress block; 601. Insulated chamber; 602. Heat-conducting plate; 7. Flexible adhesive; 8. Transmission hose; 9. Delivery channel; 10. External circulation pipe; 11. Mounting shaft; 15. Mounting plate; 16. Rotating blade; 17. Rotating shaft; 18. Driving belt; 19. Movable shaft; 20. Transmission shaft; 21. First gear; 22. Second gear; 23. Transmission block; 24. Second spring; 25. Docking slot; 26. Top bar; 27. Control head.

Detailed Description

The technical solutions of the embodiments of the present invention will be clearly and completely described below in conjunction with the accompanying drawings of the embodiments of the present invention. Obviously, the described embodiments are only part of the embodiments of the present invention, rather than all the embodiments. Based on the embodiments of the present invention, all other embodiments obtained by those skilled in the art without creative efforts shall fall within the scope of protection of the present invention.

Referring to Figures 1-10, the present invention offers the following technical solutions: a nursing circulating cold compress device for pain relief, comprising a connecting base 1;

Embodiment 1: the present invention offers the following technical solutions: disclosing that the connecting base 1 is arranged with a binding mechanism externally, to bind the connecting base 1 onto surface of the patient's limbs; the lower surface of the connecting base 1 presents an open-shaped structure and is attached with an adhesive pad 5; in the middle of the connecting base 1, a cold compress block 6 is formed, and two sets of transmission hoses 8 are connected above the cold compress block 6; above the transmission hoses 8, a delivery channel 9 is connected, and the delivery channel 9 is formed within the connecting base 1; an external circulation pipe 10 is connected above the delivery channel 9, and the external circulation pipe 10 is connected to a refrigeration plant, to cool the coolant and then transmit it circularly. The cold compress block 6 is fixed with a movable plate 11 on its upper side, and the upper end of the movable plate 11 is located within the connecting base 1 to form a horizontal sliding structure with the connecting base 1; and the outer side of the movable plate 11 is provided with a reciprocating driving mechanism to control the movement of the movable plate 11 and simulate

kneading.

When in use, the external circulation pipe 10 is connected to an external refrigerator or other refrigeration equipment to circularly transmit the cold compress liquid. The connecting base 1 is mounted via the binding mechanism, to maintain a connection with the patient. The cold compress liquid circulates and enters the cold compress block 6, to provide cold compress effect for the patient. Subsequently, the movement of the cold compress block 6 can provide a kneading massage treatment for the patient, thereby improving the pain relief effect.

Embodiment 2: on the basis of embodiment 1, a binding mechanism is disclosed, comprising a connecting sleeve 2 and a bandage 4, wherein the connecting sleeve 2 is arranged on the outer side of the connecting base 1, the bandage 4 is mounted on both the left and right sides of the connecting sleeve 2, and a clamping member is formed below the bandage 4. A circular sliding groove 3 is formed on the outer side of the connecting base 1 and a sliding connection is formed between the connecting sleeve 2 and the sliding groove 3. The cold compress block 6 comprises an insulated chamber 601 and a heat-conducting plate 602, wherein the heat-conducting plate 602 is fixed below the insulated chamber 601, the heat-conducting plate 602 is opposite to the patient's skin surface, and the lower surface of the heat-conducting plate 602 is applied with a flexible adhesive 7.

Through sliding connection between the connecting sleeve 2 and the connecting base 1, the connecting base 1 can be rotatably adjusted, allowing for the adjustment of the massage direction of the cold compress block 6 within the connection base 1, thereby improving the functionality and flexibility of the device. Combined with the setting of the heat-conducting plate 602, the overall heat-conducting effect of the cold compress block 6 is improved.

Embodiment 3: on the basis of embodiment 1, a reciprocating driving mechanism is disclosed, comprising a first spring 12, an extrusion wheel 13, a mounting shaft 14 and a transmission mechanism. Wherein, the first spring 12 is arranged on the left side of the movable plate 11 to provide thrust to the movable plate 11, the extrusion wheel 13 is arranged on the right side of the movable plate 11 and attached with the movable plate 11, and the surface of the extrusion wheel 13 is made of polytetrafluoroethylene materials, the mounting shaft 14 is fixedly connected to the extrusion wheel 13, the vertical centre line of the mounting shaft 14 is staggeredly arranged with

that of the extrusion wheel 13, and a rotary connection is formed between the mounting shaft 14 and the connecting base 1; the transmission mechanism is connected with the mounting shaft 14 to control the rotation of the mounting shaft 14, the transmission mechanism is driven by the fluid power within the delivery channel 9, thereby driving the mounting shaft 14 to rotate; the

5 transmission mechanism comprises a mounting plate 15, a rotating blade 16, a rotating shaft 17, a driving belt 18, a movable shaft 19 and a variable speed mechanism, wherein the mounting plate 15 is mounted within the delivery channel 9, the rotating blade 16 is arranged below the mounting plate 15, the rotating shaft 17 is fixedly connected to the rotating blade 16, and a rotary connection is formed between the rotating shaft 14 and the mounting plate 1, the driving belt 18

10 is arranged on the outer side of the rotating shaft 17, the movable shaft 19 is rotatably mounted within the connecting base 1, and the movable shaft 19 is connected to the rotating shaft 17 via the driving belt 18, the variable speed mechanism is arranged above the movable shaft 19, and the movable shaft 19 is connected to the mounting shaft 14 via the variable speed mechanism; the variable speed mechanism comprises a transmission shaft 20, a first gear 21 and a second

15 gear 22, wherein the transmission shaft 20 is arranged above the movable shaft 19, and a rotary connection is formed between the transmission shaft 20 and the connecting base 1, the first gear 21 is fixed on the surface of the movable shaft 19, the second gear 22 is fixed on the surface of the mounting shaft 14, a meshing connection is formed between the second gear 22 and the first gear 21, and the diameter of the second gear 22 is larger than that of the first gear 21, and a

20 transmission control mechanism is formed between the transmission shaft 20 and the movable shaft 19, to control rotation of the transmission shaft 20; the transmission control mechanism comprises a transmission block 23, a second spring 24, a docking slot 25, a top bar 26, and a control head 27, wherein the transmission block 23 is arranged above the movable shaft 19, forming an up-down sliding structure with the movable shaft 19. A second spring 24 is fixed

25 below the transmission block 23, thereby providing an upward thrust for the transmission block 23, the docking slot 25 is formed below the transmission shaft 20, and a concave-convex fitting structure is formed between the docking slot 25 and the transmission block 23; the top bar 26 is arranged above the transmission block 23, and a rolling ball is arranged below the top bar 26, and the upper end of the top bar 26 passes through the transmission shaft 20 and forms a

30 nested connection with the transmission shaft 20, and the control head 27 is arranged above the top bar 26, and a threaded connection is formed between the control head 27 and the connecting

base 1.

When in use, the flow of liquid within the delivery channel 9 drives the rotating blade 16 to rotate, thereby driving the rotating shaft 17 to rotate. The rotating shaft 17 drives the movable shaft 19 to rotate via the driving belt 18. The movable shaft 19 drives the transmission shaft 20 to rotate
5 through the connection between the transmission block 23 and the docking slot 25. The transmission shaft 20 drives the mounting shaft 14 to rotate through the meshing between the first gear 21 and the second gear 22. The mounting shaft 14 drives the extrusion wheel 13 to rotate, and in conjunction with the first spring 12, the movable plate 11 drives the cold compress
10 block 6 for reciprocating motion, achieving a kneading massage effect. When kneading massage is not required, the control head 27 is rotated to drive the top bar 26 to move through the threaded connection with the connecting base 1. The top bar 26 extrudes the transmission block 23 downward, pushing the transmission block 23 out of the docking slot 25, thereby
disconnecting the transmission block 23 from the docking slot 25 and stopping the rotation of the transmission shaft 20.

15 Any contents not described in detail in this specification shall belong to the prior art commonly known to those skilled in the art.

Although the present invention has been described in detail with reference to the above embodiments, it should be understood by those skilled in the art that various modifications may be made to the technical solutions disclosed in the above embodiments, or equivalent
20 substitutions may be made to some technical features thereof. Any modifications, equivalent substitutions, or improvements made within the spirit and principle of the present invention shall fall within the scope of the protection of the present invention.