DEVICE FOR REHABILITATION TRAINING OF CEREBRAL INFARCTION

Field of the Invention

The invention relates to the technical field of rehabilitation for cerebral infarction, and specifically to a device for rehabilitation training of cerebral infarction.

Background to the Invention

Cerebral infarction refers to acute occlusion of cerebral blood vessels caused by various reasons, leading to local necrosis of brain tissue. After treatment during the acute phase, such patients, in addition to continuing medication, require active rehabilitation training to promote recovery. However, existing rehabilitation training devices for cerebral infarction still have certain defects in use, for example:

During operation, the overall structure of current devices is simple, generally exercising the arm by pulling elastic members, but such elastic members possess rebound properties during stretching, and when the patient's arm suddenly loses strength, potential safety hazards arise.

To overcome the above defects, prior art 1 (Chinese patent application number 201821687304.X, filed on 17 October 2018) discloses a cerebral infarction rehabilitation instrument comprising a case, within which a vacuum chamber, a miniature vacuum pump and a rocker are arranged; a push plate and a push rod are provided inside the vacuum chamber, one end of the push rod being fixedly connected to the front side of the push plate and the other end extending out of the front end of the vacuum chamber, the push rod being sleeved with a compression spring, one end of the spring being fixedly connected to the front end of the vacuum chamber and the other end fixedly connected to the portion of the push rod extending out of the chamber; the suction port of the miniature vacuum pump is connected by pipeline to the rear end of the vacuum chamber, the space between the rear side of the push plate and the rear end of the chamber forming a vacuum cavity, the rear end of the chamber being provided with a vent hole and a sealing plate, the sealing plate comprising a sealing sheet and an adjusting plate, the sealing sheet being located

outside the chamber, the adjusting plate being located inside the vacuum cavity, the adjusting plate being connected to the push plate by a connecting wire, and the sealing sheet and the adjusting plate being fixedly connected by a connecting rod passing through the vent hole.

Furthermore, prior art 2 (Chinese patent application number 202022587692.8, filed on 11 November 2020) discloses an upper limb rehabilitation training aid for patients with cerebral infarction, comprising a base, a support frame fixedly connected to the top of the base, a top plate fixedly connected to the top of the support frame, a fixing frame fixedly connected to the top of the top plate, a sliding plate slidably connected to the top inside the fixing frame, a first spring provided between the left side of the sliding plate and the left inner wall of the fixing frame, a moving plate slidably connected to the right side of the sliding plate, and a first U-shaped groove fixedly connected to the bottom of the moving plate; through unidirectional rotation of a rotating gear, the gear can roll rightwards on a straight tooth plate but cannot roll leftwards, thereby enabling the moving plate to move rightwards but not leftwards, preventing safety hazards when the patient's arm suddenly loses strength and enhancing safety.

Furthermore, prior art 3 (Chinese patent application number 201821564943.7, filed on 26 September 2018) discloses a rehabilitation trainer for patients with cerebral infarction, relating to the technical field of rehabilitation training, specifically a rehabilitation trainer for such patients, comprising a base and a seat, one end of the base being fixedly connected to a first rod, the top of the first rod being movably connected to a fixing ring, a T-shaped frame being inserted inside the first rod, both ends of the top of the T-shaped frame being provided with elastic bands, the other ends of the elastic bands being fixedly connected to handles, and one end of the base near the first rod being movably connected to a second rod, the top of the second rod being movably connected to an elastic ring; by inserting the T-shaped frame inside the first rod, both ends of the top of the T-shaped frame are provided with elastic bands, the other ends of the elastic bands being fixedly connected to handles, enabling effective movement of the patient's arms; by fixedly connecting one end of the base to the first rod, the top of the first rod being movably connected to the fixing ring, and the T-shaped frame being inserted inside the first rod, the height can be adjusted

according to the patient's stature.

Existing technologies, although capable of improving overall safety, still have limitations during operation, as exercise is performed through rockers or pull rods with fixed overall structures, making it inconvenient to adjust according to required training intensity; this not only prevents patients from carrying out personalised exercise based on their own ability, but also fails to meet the needs of different patients, thereby affecting the rehabilitation process, and further cannot adjust training schemes in time according to changes in patient ability, which may lead to slow rehabilitation progress, prolonged recovery time, and reduced rehabilitation effectiveness.

In view of the above problems, there is an urgent need for innovative design based on existing cerebral infarction rehabilitation training devices, and therefore we propose a device for rehabilitation training of cerebral infarction that can effectively solve the aforesaid issues.

Statement of Invention

The purpose of the invention is to provide a device for rehabilitation training of cerebral infarction, so as to solve the problems raised in the background art whereby current market devices exercise through rockers or pull rods with fixed overall structures, making it inconvenient to adjust according to required training intensity, preventing patients from carrying out personalised exercise based on their own ability, failing to meet the needs of different patients and thereby affecting the rehabilitation process, and further being unable to adjust training schemes in time according to changes in patient ability, which may lead to slow rehabilitation progress, prolonged recovery time and reduced rehabilitation effectiveness.

To achieve the above purpose, the invention provides the following technical solution: a device for rehabilitation training of cerebral infarction comprising a supporting base, a first supporting plate mounted on the base, a cushion arranged on the first supporting plate, and a backrest connected to the cushion;

A first training assembly is mounted on the supporting base, the first training assembly including a second supporting plate mounted on the base, a guide wheel installed beneath

the second supporting plate, a connecting rope attached to the guide wheel, one end of the rope being connected to a handheld member and the other end to a rotating shaft arranged inside the base, a torsion spring provided outside the shaft, a screw rod mounted at the shaft end and extending through the base, a counterweight block threaded on the screw rod, and a protective cover provided outside the screw rod and mounted at the side end of the base, wherein the first training assembly adjusts weight through the counterweight block.

Preferably, a rotating rod is mounted outside the rotating shaft, the rotating rod being annular, and a first magnetic block is provided at the end of the rotating rod, the first magnetic block and a second magnetic block being magnetically repulsive.

Preferably, a massage assembly is mounted at the side end of the second magnetic block, the massage assembly comprising a telescopic rod mounted at the side end of the second magnetic block, the telescopic rod extending through a limiting seat arranged at the back of the backrest, a first spring provided outside the telescopic rod, a pressing ball mounted at the end of the telescopic rod, and the telescopic rod extending and connecting inside the backrest.

Preferably, a driving assembly is arranged inside the supporting base, the driving assembly comprising a motor mounted inside the base, the output end of the motor being connected to a threaded rod, a moving block provided outside the threaded rod, and a vertical rod mounted on the moving block.

Preferably, a clamping block is provided at the side end of the vertical rod, the clamping block being adapted to a clamping groove, the clamping groove being formed at the side end of a pedal, and the pedal being connected to the supporting base through a rotating seat.

Preferably, an auxiliary assembly is provided at the bottom of the pedal, the auxiliary assembly comprising an inner rod mounted at the bottom of the pedal, the bottom of the inner rod being mounted inside a sleeve, a supporting rod being arranged inside the sleeve, and a second spring being provided outside the supporting rod.

Preferably, a pressing member is provided at the bottom of the moving block, the pressing

member being movable to contact a first airbag, the first airbag being in communication with a second airbag, the second airbag being mounted inside the cushion, a pressing block being provided on the second airbag, and the pressing block extending through and connecting to the surface of the cushion.

Preferably, a third training assembly is provided on the first supporting plate, the third training assembly comprising a storage box mounted on the first supporting plate, the storage box being located on both sides of the cushion, and a handheld seat being connected to the storage box through a rotating shaft.

Preferably, an arc-shaped groove is formed on the handheld seat, a third airbag is provided beneath the handheld seat, the third airbag being in communication with a fourth airbag, the fourth airbag being located inside the storage box.

Compared with the prior art, the beneficial effects of the invention are as follows: the device for rehabilitation training of cerebral infarction achieves pulling through cooperation of the connecting rope and guide wheel of the first training assembly, the overall structural safety performance being relatively high, so that users can add counterweight blocks to the screw rod according to their own condition and adjust training schemes according to changes in patient ability, thereby greatly improving overall rehabilitation effectiveness, specifically:

(1) The first training assembly adjusts weight through the counterweight block, the overall operation being simple and the structural safety performance high, reducing the problem of poor rehabilitation effect caused by inability to adjust according to personal condition, and enabling adjustment of training schemes according to patient ability;

(2) The telescopic rod of the massage assembly moves inside the limiting seat, facilitating the pressing ball at the rod end to press the backrest, so that the user’s back is acted upon by the pressing ball, enabling relaxation of back muscles during training and improving rehabilitation effectiveness;

(3) The moving block on the threaded rod of the driving assembly drives the vertical rod to move laterally, causing the clamping block at the side end of the vertical rod to disengage from the clamping groove, facilitating rotation of the pedal through the rotating seat, and enabling leg rehabilitation training through cooperation of the rotating seat and auxiliary

assembly;

(4) Air inside the first airbag is conveyed to the second airbag, causing the pressing block to massage the user's legs and hips, thereby enabling whole-body training and relaxation, not only improving overall training effectiveness but also reducing training time;

(5) The third training assembly rotates the handheld seat through the rotating shaft, and cooperation of the third and fourth airbags facilitates rehabilitation training of the user's hands, improving overall rehabilitation effectiveness and enhancing practicality.

Brief Description of the Drawings

Figure 1 is a schematic diagram of the overall structure of the invention;

Figure 2 is a schematic diagram of the side view structure of the invention;

Figure 3 is a schematic diagram of the sectional structure inside the supporting base of the invention;

Figure 4 is an enlarged schematic diagram of portion A in Figure 3 of the invention;

Figure 5 is a schematic diagram of the connection structure between the rotating seat and the pedal of the invention;

Figure 6 is a schematic diagram of the internal structure of the cushion of the invention;

Figure 7 is an enlarged schematic diagram of portion A in Figure 6 of the invention;

Figure 8 is a schematic diagram of the top view structure of the invention;

Figure 9 is a schematic diagram of the structure of the handheld seat and the arc-shaped groove of the invention;

Figure 10 is a schematic diagram of the internal structure of the storage box of the invention.

In the drawings: 1 - Supporting base; 2 - First supporting plate; 3 - Cushion; 4 - Backrest; 5 - Second supporting plate; 6 - Handheld member; 7 - Connecting rope; 8 - Guide wheel; 9 - Rotating shaft; 10 - Torsion spring; 11 - Screw rod; 12 - Counterweight block; 13 -

Protective cover; 14 - Rotating rod; 15 - First magnetic block; 16 - Second magnetic block; 17 - Telescopic rod; 18 - Limiting seat; 19 - First spring; 20 - Pressing ball; 21 - Motor; 22 - Threaded rod; 23 - Moving block; 24 - Vertical rod; 25 - Clamping block; 26 - Clamping groove; 27 - Pedal; 28 - Rotating seat; 29 - Inner rod; 30 - Sleeve; 31 - Second spring; 32 - Supporting rod; 33 - Pressing member; 34 - First airbag; 35 - Second airbag; 36 - Pressing block; 37 - Storage box; 38 - Rotating shaft; 39 - Handheld seat; 40 - Arc-shaped groove; 41 - Third airbag; 42 - Fourth airbag.

Detailed Description

The following will clearly and completely describe the technical solutions of the embodiments of the invention in conjunction with the accompanying drawings. It is evident that the described embodiments are only part of the embodiments of the invention and not all of them. Based on the embodiments of the invention, all other embodiments obtained by those skilled in the art without creative work fall within the scope of protection of the invention.

Embodiment 1

In this embodiment, in order to improve the overall training effect, weight adjustment is carried out through the counterweight block 12, the purpose being to reduce the problem of poor rehabilitation effect caused by inability to adjust according to personal condition. As shown in Figures 1 to 3, the technical solution comprises a supporting base 1, a first supporting plate 2 mounted on the base 1, a cushion 3 arranged on the first supporting plate 2, and a backrest 4 connected to the cushion 3. A first training assembly is mounted on the supporting base 1, the first training assembly including a second supporting plate 5 mounted on the base 1, a guide wheel 8 installed beneath the second supporting plate 5, a connecting rope 7 attached to the guide wheel 8, one end of the rope 7 being connected to a handheld member 6 and the other end to a rotating shaft 9 arranged inside the base 1, a torsion spring 10 provided outside the shaft 9, a screw rod 11 mounted at the shaft 9 end and extending through the base 1, a counterweight block 12 threaded on the screw rod 11, and a protective cover 13 provided outside the screw rod 11 and mounted at the side end of the base 1, wherein the first training assembly adjusts weight through the counterweight

block 12. After moving the supporting base 1 to the required position, the user sits on the cushion 3 of the first supporting plate 2, with the back resting against the backrest 4, and holds the handheld member 6 beneath the second supporting plate 5, pulling through cooperation of the connecting rope 7 and guide wheel 8. Since the connecting rope 7 is connected through the rotating shaft 9, the shaft 9 rotates, and the torsion spring 10 outside the shaft 9 generates an opposite force. At this time, the user can perform training operations by lifting and lowering the handheld member 6. The overall operation is simple and convenient, and the structural safety performance of the overall arrangement is high. When the rotating shaft 9 rotates, its screw rods 11 at both ends rotate, so the user can add counterweight blocks 12 to the screw rods 11 according to personal condition. As the screw rods 11 are provided with protective covers 13 outside, overall safety is improved, reducing the problem of poor rehabilitation effect caused by inability to adjust according to personal condition, and enabling adjustment of training schemes according to changes in patient ability, thereby greatly improving overall rehabilitation effectiveness.

Embodiment 2

In this embodiment, in order to improve overall safety, a massage assembly is provided, the purpose being to reduce safety hazards caused by excessive tension of back muscles. As shown in Figures 2 to 7, a rotating rod 14 is mounted outside the rotating shaft 9, the rotating rod 14 being annular, and a first magnetic block 15 is provided at the end of the rotating rod 14, the first magnetic block 15 and a second magnetic block 16 being magnetically repulsive. A massage assembly is mounted at the side end of the second magnetic block 16, the massage assembly comprising a telescopic rod 17 mounted at the side end of the second magnetic block 16, the telescopic rod 17 extending through a limiting seat 18 arranged at the back of the backrest 4, a first spring 19 being provided outside the telescopic rod 17, a pressing ball 20 being mounted at the end of the telescopic rod 17, and the telescopic rod 17 extending and connecting inside the backrest 4. A driving assembly is arranged inside the supporting base 1, the driving assembly comprising a motor 21 mounted inside the base 1, the output end of the motor 21 being connected to a threaded rod 22, a moving block 23 being provided outside the threaded rod 22, and a vertical rod 24 being mounted on the moving block 23. A clamping block 25 is provided at

the side end of the vertical rod 24, the clamping block 25 being adapted to a clamping groove 26, the clamping groove 26 being formed at the side end of a pedal 27, the pedal 27 being connected to the supporting base 1 through a rotating seat 28. An auxiliary assembly is provided at the bottom of the pedal 27, the auxiliary assembly comprising an inner rod 29 mounted at the bottom of the pedal 27, the bottom of the inner rod 29 being mounted inside a sleeve 30, a supporting rod 32 being arranged inside the sleeve 30, and a second spring 31 being provided outside the supporting rod 32. When the rotating shaft 9 rotates, the rotating rod 14 outside it rotates, and since the end of the rotating rod 14 is provided with the first magnetic block 15, when the first magnetic block 15 rotates and contacts the second magnetic block 16, repulsion is generated between the first magnetic block 15 and the second magnetic block 16, thereby causing the telescopic rod 17 to move inside the limiting seat 18, facilitating the pressing ball 20 at the end of the telescopic rod 17 to press the backrest 4, so that the user’s back is acted upon by the pressing ball 20, enabling relaxation of back muscles during training, improving rehabilitation effectiveness, and reducing safety hazards caused by tense back muscles. Furthermore, since the telescopic rod 17 is provided with the first spring 19 outside, when the first magnetic block 15 continues to rotate away from the surface of the second magnetic block 16, the telescopic rod 17 is restored to position through cooperation with the first spring 19, thereby improving practicality. By switching on the motor 21, the output end of the motor 21 drives the threaded rod 22 to rotate, facilitating the moving block 23 on the threaded rod 22 to drive the vertical rod 24 to move laterally, causing the clamping block 25 at the side end of the vertical rod 24 to disengage from the clamping groove 26, thereby enabling the pedal 27 to rotate through the rotating seat 28. At this time, the user places the feet on the pedal 27 and performs rotation operations through cooperation of the rotating seat 28, thereby carrying out rehabilitation training. As the inner rod 29 at the bottom of the pedal 27 moves inside the sleeve 30 and cooperates with the second spring 31 on the supporting rod 32, overall stability is greatly improved, facilitating leg rehabilitation training, enhancing practicality, and reducing the problem of insufficient training intensity caused by overly simple structures.

Embodiment 3

In this embodiment, in order to improve overall practicality, a third training assembly is provided, the purpose being to reduce the problem of low overall training practicality caused by a single structure. As shown in Figures 6 and 8 to 10, a pressing member 33 is provided at the bottom of the moving block 23, the pressing member 33 being movable to contact a first airbag 34, the first airbag 34 being in communication with a second airbag 35, the second airbag 35 being mounted inside the cushion 3, a pressing block 36 being provided on the second airbag 35, and the pressing block 36 extending through and connecting to the surface of the cushion 3. A third training assembly is provided on the first supporting plate 2, the third training assembly comprising a storage box 37 mounted on the first supporting plate 2, the storage box 37 being located on both sides of the cushion 3, and a handheld seat 39 being connected to the storage box 37 through a rotating shaft 38. An arc-shaped groove 40 is formed on the handheld seat 39, a third airbag 41 is provided beneath the handheld seat 39, the third airbag 41 being in communication with a fourth airbag 42, the fourth airbag 42 being located inside the storage box 37. When the moving block 23 moves, the pressing member 33 at its bottom presses the first airbag 34, facilitating air inside the first airbag 34 to be conveyed into the second airbag 35. After the second airbag 35 inside the cushion 3 is inflated, it expands upwards, causing the pressing block 36 to move upwards, thereby massaging the user’s legs and hips, enabling whole-body training and relaxation, not only improving overall training effectiveness but also reducing training time. The user may place the palm on the storage box 37, with the fingers positioned inside the arc-shaped groove 40 of the handheld seat 39, and rotate the handheld seat 39 through the rotating shaft 38, thereby performing finger rehabilitation training. Since a third airbag 41 is provided beneath the handheld seat 39, when the handheld seat 39 rotates, gas inside the third airbag 41 is conveyed into the fourth airbag 42, and when external force on the handheld seat 39 decreases, gas inside the fourth airbag 42 is conveyed back into the third airbag 41, thereby facilitating hand rehabilitation training, improving overall rehabilitation effectiveness, and enhancing practicality.

Although the invention has been described in detail with reference to the foregoing embodiments, those skilled in the art may still modify the technical solutions described in the foregoing embodiments or make equivalent substitutions of some technical features. Any modifications, equivalent substitutions or improvements made within the spirit and

principle of the invention shall fall within the scope of protection of the invention.