

HAND MOVEMENT LIMITER FOR PSYCHIATRIC PATIENTS AND LIMITING METHOD THEREFOR

Field of the Invention

5 The present invention belongs to the technical field of medical instruments, and in particular to a hand movement limiter for psychiatric patients and a limiting method therefor.

Background to the Invention

10 Currently, during the intravenous infusion treatment for psychiatric patients, prolonged treatment duration often triggers manic behaviors, which fail to achieve the desired therapeutic effect. Generally, when intravenous infusion is performed, it is often necessary to use a protective belt to fix the patient on a bed, and perform intravenous infusion. Since the patient's hands are still movable, the phenomenon of needle dislodgement often occurs,
15 and medical personnel need to keep care to perform smoothly, which brings inconvenience to medical work and still has the risk of needle dislodgement.

The published patent with publication number of CN202311590050.5 provides a hand restraint device for intravenous infusion of psychiatric patients, and proposes a design that "includes an adapter ring and a plurality of curved rods arranged in an array around the
20 adapter ring. The curved rods are rotatably engaged with the adapter ring. Each curved rod has a sliding groove that does not extend to the bending point, and the depth of the sliding groove decreases progressively. The device also includes a ring sleeve that encircles all curved rods. In this invention, after the patient's hand passes through the channel formed by all curved rods, the grip is pulled, causing the sliding block to move from the deep end to
25 the shallow end of the sliding groove. This movement makes all first rods converge toward the center to prevent reverse withdrawal of the patient's wrist. Additionally, a spring is installed in the sliding groove, which is connected to the sliding block and used to pull the ring sleeve back to its original position. When all first rods converge to prevent wrist reverse withdrawal, the spring pulls the ring sleeve in the opposite direction. The grip is

clamped in the thenar space of the hand and the interdigital space between the little finger and ring finger, thereby restricting hand flipping and back-and-forth movement."

5 However, when the existing device is used, two hands of the patient need to be fixed at the same time to avoid breakaway. Since the armrests of hospital chairs are of different sizes and shapes, the traditional device is difficult to flexibly adjust to adapt to different chair structures, resulting in unstable fixation or difficult installation. Moreover, the single strap is easy to loosen due to the struggle of the patient, which lacks a secondary reinforcement mechanism, and there is a risk of breakaway. Meanwhile, the hard restraint device is easy to cause compression injury to the patient's wrists, and long-term use may aggravate
10 anxiety.

Statement of Invention

An objective of the present invention is to provide a hand movement limiter for psychiatric patients to solve the problems raised in the above background.

15 In order to achieve the above objective, the present invention provides the following technical solutions. A hand movement limiter for psychiatric patients includes a first connecting plate and a second connecting plate. One end of the first connecting plate is arranged with a first extension plate, one end of the second connecting plate is arranged with a second extension plate, and a spacing between the first connecting plate and the
20 second connecting plate is adjusted by an adjusting assembly, the adjusting assembly includes a limiting block fixedly connected to a bottom of the first extension plate, and the second extension plate is disposed with a cavity for sliding connection of the limiting block; a rotating rod penetrates through and is rotatably connected to a side of the cavity away from the second connecting plate, and a driving bevel gear is fixedly connected to the
25 rotating rod; and a driven bevel gear is meshed and connected to the driving bevel gear, a first threaded rod is fixedly connected to the driven bevel gear, and the limiting block is connected to the first threaded rod in a threaded way.

In a further preferred example of this technical solutions: the first connecting plate and the second connecting plate are fixed on a chair by a fixing assembly, the fixing assembly

includes grooves disposed at bottoms of the first connecting plate and the second connecting plate, and sliding plates are slidably connected in the grooves; square grooves are disposed on the sliding plates, and adjusting plates are slidably connected in the square grooves; sliding grooves are disposed on two sides of the adjusting plates, and sliding blocks are slidably connected in the sliding grooves; bolts are fixedly connected to the sliding blocks, and nuts are connected to the bolts in a threaded way; and vertical plates are fixedly connected to ends of the first connecting plate and the second connecting plate, and through grooves are disposed on two sides of the vertical plates.

In a further preferred example of this technical solutions: tops of the first connecting plate and the second connecting plate are arranged with limiting assemblies for limiting hands, the limiting assemblies include binding ropes fixedly connected to the first connecting plate and the second connecting plate, and upper surfaces of the binding ropes are arranged with fixing blocks; upper surfaces of ends of the binding ropes away from the first connecting plate and the second connecting plate are arranged with Velcro loop surfaces, and sides of tops of the first connecting plate and the second connecting plate are fixedly connected to Velcro hook surfaces; and insertion holes are disposed in middles of the Velcro hook surfaces, and the binding ropes penetrate through the insertion holes.

In a further preferred example of this technical solutions: the binding ropes are fixed by pressing assemblies, the pressing assemblies include fixing plates fixedly connected to the tops of the first connecting plate and the second connecting plate, the fixing plates are arranged with two groups, and each group of the fixing plates is arranged with two and symmetrically arranged fixing plates; and mounting grooves are disposed on opposite surfaces of the fixing plates, a second threaded rod is rotatably connected to one of the mounting grooves in each group, a pressing plate is connected to the second threaded rods in a threaded way, and the pressing plate is slidably connected to the mounting grooves.

In a further preferred example of this technical solutions: soft pads are arranged on the tops of the first connecting plate and the second connecting plate, and support pads are arranged at ends of the soft pads.

In a further preferred example of this technical solutions: the first extension plate is located at a top of one side of the first connecting plate, the second extension plate is located at a bottom of one side of the second connecting plate, and the first extension plate is located above the second extension plate; the first connecting plate and the second connecting plate have the same size, the first extension plate and the second extension plate have the same size, and the first connecting plate and the second connecting plate are symmetrically arranged; and the cavity is located above the second extension plate, the rotating rod is located on a side close to the first connecting plate, and the driven bevel gear and the first threaded rod are rotatably connected in the cavity.

10 In a further preferred example of this technical solutions: the sliding plates and the vertical plates are arranged in parallel, the bolts penetrate through the through grooves, the vertical plates are horizontal to outer sides of the first connecting plate and the second connecting plate, diameters of the nuts are greater than widths of the through grooves, and the nuts are located on outer sides of the vertical plates.

15 In a further preferred example of this technical solutions: the Velcro loop surfaces are adhered to the fixing blocks, the material of the binding ropes is nylon, and the Velcro hook surfaces are located directly above the vertical plates.

In a further preferred example of this technical solutions: the fixing plates are located at inner sides of the Velcro hook surfaces, the pressing plated are located in middles of the folded binding ropes, a distance between a group of fixing plates is consistent with a length of the Velcro hook surface, and a height of the fixing plate is the same as a height of the Velcro hook surface.

An objective of the present invention is to provide a limiting method for the hand movement limiter for psychiatric patients to solve the problems raised in the above background.

25 In order to achieve the above objective, the present invention provides the following technical solutions. Firstly, when a patient is receiving intravenous infusion, a distance between the first connecting plate and the second connecting plate is adjusted according to positions of two armrests of a seat where the patient is seated, positions of the sliding plates and the adjusting plates are adjusted, and the sliding plates, the vertical plates and

the adjusting plates are all attached to the armrests, and fixed by the bolts; two arms of the patient are placed on the soft pads to cause palms of hands to hold the support pads, the binding ropes are used to press the arms and pass through the insertion holes, and the Velcro loop surfaces are attached to the fixing blocks; and finally, the second threaded rods are rotated to push the pressing plates press the binding ropes to prevent the patient from breaking free, and the intravenous infusion is performed to the patient.

Compared with the prior art, the present disclosure has the following advantageous effects.

1. In the present invention, by arranging the adjusting assembly, the distance between the first connecting plate and the second connecting plate is adjusted according to the positions of the armrests on two sides of different models of seats; by pushing the adjusting plates to slide in the square grooves and the bolts to slide in the through grooves, the sliding plates, the adjusting plates and the vertical plates are all attached to the armrests and fixed by the nuts; and the device can be fixed to the seat, and can still be fixed when the armrests of the seat have different sizes, improving the versatility of the device.

2. In the present invention, the arms of the patient are placed on the soft pads and the support pads, improving the comfort of placing the arms during intravenous infusion. The binding ropes pass through the insertion holes, the fixing blocks are adhered to the Velcro loop surfaces to fix the arms, preventing the movement of the patient's arms, and resulting in needle phlebitis or dislodgement during intravenous infusion. Meanwhile, the second threaded rods are rotated to drive the pressing plates to press against the fixing blocks, the fixing effect of the binding ropes can be further improved, and the limitation of the arms of the patient is enhanced.

Brief Description of the Drawings

FIG. 1 is a schematic structural diagram I of a hand movement limiter for psychiatric patients according to the present invention;

FIG. 2 is an explosive structural view of the hand movement limiter for psychiatric patients according to the present invention;

FIG. 3 is a partial explosive structural view I of the hand movement limiter for psychiatric patients according to the present invention;

FIG. 4 is a schematic structural diagram II of the hand movement limiter for psychiatric patients according to the present invention;

5 FIG. 5 is a partial explosive structural view III of the hand movement limiter for psychiatric patients according to the present invention; and

FIG. 6 is an enlarged view at A in FIG. 2 of the hand movement limiter for psychiatric patients according to the present invention.

Reference numerals and denotations thereof: 101-first connecting plate; 102-second
 10 connecting plate; 103-first extension plate; 104-second extension plate; 201-limiting block; 202-cavity; 203-rotating rod; 204-driving bevel gear; 205-driven bevel gear; 206-first threaded rod; 301-groove; 302-sliding plate; 303-square groove; 304-adjusting plate; 305-sliding groove; 306-sliding block; 307-bolt; 308-nut; 309-vertical plate; 310-through groove; 401-binding rope; 402-fixing block; 403-Velcro loop surface; 404-Velcro hook
 15 surface; 405-insertion hole; 501-fixing plate; 502-mounting groove; 503-second threaded rod; 504-pressing plate; 601-soft pad; and 602-support pad.

Detailed Description

Technical solutions in the examples of the present invention will be described clearly and
 20 completely in the following with reference to the accompanying drawings in the examples of the present invention. Obviously, all the described examples are only some, rather than all examples of the present invention. Based on the examples in the present invention, all other examples obtained by those ordinary skilled in the art without creative efforts belong to the scope of protection of the present invention.

25 Example 1

Referring to FIGS. 1-6, the present invention provides a hand movement limiter for psychiatric patients, including a first connecting plate 101 and a second connecting plate. One end of the first connecting plate 101 is arranged with a first extension plate 103, one

end of the second connecting plate 102 is arranged with a second extension plate 104, and a spacing between the first connecting plate 101 and the second connecting plate 102 is adjusted by an adjusting assembly, the adjusting assembly includes a limiting block 201 fixedly connected to a bottom of the first extension plate 103, and the second extension plate 104 is disposed with a cavity 202 for sliding connection of the limiting block 201; a rotating rod 203 penetrates through and is rotatably connected to a side of the cavity 202 away from the second connecting plate 102, and a driving bevel gear 204 is fixedly connected to the rotating rod 203; and a driven bevel gear 205 is meshed and connected to the driving bevel gear 204, a first threaded rod 206 is fixedly connected to the driven bevel gear 205, and the limiting block 201 is connected to the first threaded rod 206 in a threaded way. A head of the rotating rod 203 is located on a side away from the patient's body, a top of the first extension plate 103 is horizontal with a top of the first connecting plate 101 and horizontal with a top of the second connecting plate 102, and a bottom of the second extension plate 104 is horizontal with a bottom of the second connecting plate 102 and horizontal with a bottom of the first connecting plate 101.

In this example, specifically: the first connecting plate 101 and the second connecting plate 102 are fixed on a chair by a fixing assembly, the fixing assembly includes grooves 301 disposed at bottoms of the first connecting plate 101 and the second connecting plate 102, and sliding plates 302 are slidably connected in the grooves 301; square grooves 303 are disposed on the sliding plates 302, and adjusting plates 304 are slidably connected in the square grooves 303; sliding grooves 305 are disposed on two sides of the adjusting plates 304, and sliding blocks 306 are slidably connected in the sliding grooves 305; bolts 307 are fixedly connected to the sliding blocks 306, and nuts 308 are connected to the bolts 307 in a threaded way; and vertical plates 309 are fixedly connected to ends of the first connecting plate 101 and the second connecting plate 102, and through grooves 310 are disposed on two sides of the vertical plates 309. The adjusting plates 304 slide up and down in the square grooves 303, the sliding blocks 306 slide in the sliding grooves 305, the vertical plate 309 are not penetrated at bottoms of the through grooves 310, and when the nuts 308 are tightened to adhere to the vertical plates 309, positions of the sliding plates 302 and the adjusting plates 304 can be fixed.

In this example, specifically: tops of the first connecting plate 101 and the second connecting plate 102 are arranged with limiting assemblies for limiting hands, the limiting assemblies include binding ropes 401 fixedly connected to the first connecting plate 101 and the second connecting plate 102, and upper surfaces of the binding ropes 401 are arranged with fixing blocks 402; upper surfaces of ends of the binding ropes 401 away from the first connecting plate 101 and the second connecting plate 102 are arranged with Velcro loop surfaces 403, and sides of tops of the first connecting plate 101 and the second connecting plate 102 are fixedly connected to Velcro hook surfaces 404; and insertion holes 405 are disposed in middles of the Velcro hook surfaces 404, and the binding ropes 401 penetrate through the insertion holes 405. Tops of the Velcro hook surfaces 404 are arc-shaped, which can reduce injuries when colliding with medical personnel or psychological patients.

In this example, specifically: the binding ropes 401 are fixed by pressing assemblies, the pressing assemblies include fixing plates 501 fixedly connected to the tops of the first connecting plate 101 and the second connecting plate 102, the fixing plates 501 are arranged with two groups, and each group of the fixing plates 501 is arranged with two and symmetrically arranged fixing plates; and mounting grooves 502 are disposed on opposite surfaces of the fixing plates 501, a second threaded rod 503 is rotatably connected to one of the mounting grooves 502 in each group, a pressing plate 504 is connected to the second threaded rods 503 in a threaded way, and the pressing plate 504 is slidably connected to the mounting grooves 502. The pressing plates 504 press the binding ropes 401 to prevent the psychiatric patient from breaking loose, and the fixing plates 501 mounted with the second threaded rods 503 are located on a side away from the patient's body, which is convenient for medical personnel to operate.

In this example, specifically: soft pads 601 are arranged on the tops of the first connecting plate 101 and the second connecting plate 102, and support pads 602 are arranged at ends of the soft pads 601. The support pads 602 are located on sides of the soft pads 601 away from the patient's body, the soft pads 601 and the support pads 602 are made of latex material, the support pads 602 can support wrists of the patient to improve the comfort of placing the arms during intravenous infusion, and the soft pads 601 are located

in middles of the binding ropes 401 and the fixing plates 501.

In this example, specifically: the first extension plate 103 is located at a top of one side of the first connecting plate 101, the second extension plate 104 is located at a bottom of one side of the second connecting plate 102, and the first extension plate 103 is located above the second extension plate 104; the first connecting plate 101 and the second connecting plate 102 have the same size, the first extension plate 103 and the second extension plate 104 have the same size, and the first connecting plate 101 and the second connecting plate 102 are symmetrically arranged; and the cavity 202 is located above the second extension plate 104, the rotating rod 203 is located on a side close to the first connecting plate 101, and the driven bevel gear 205 and the first threaded rod 206 are rotatably connected in the cavity 202.

In this example, specifically: the sliding plates 302 and the vertical plates 309 are arranged in parallel, the bolts 307 penetrate through the through grooves 310, the vertical plates 309 are horizontal to outer sides of the first connecting plate 101 and the second connecting plate 102, diameters of the nuts 308 are greater than widths of the through grooves 310, and the nuts 308 are located on outer sides of the vertical plates 309.

In this example, specifically: the Velcro loop surfaces 403 are adhered to the fixing blocks 402, the material of the binding ropes 401 is nylon, and the Velcro hook surfaces 404 are located directly above the vertical plates 309.

In this example, specifically: the fixing plates 501 are located at inner sides of the Velcro hook surfaces 404, the pressing plated 504 are located in middles of the folded binding ropes 401, a distance between a group of fixing plates 501 is consistent with a length of the Velcro hook surface 404, and a height of the fixing plate 501 is the same as a height of the Velcro hook surface 404.

Example 2

Referring to FIGS. 1-6, the present invention provides a limiting method for the hand movement limiter for psychiatric patients, including the following steps. Firstly, when a patient is receiving intravenous infusion, a distance between the first connecting plate 101 and the second connecting plate 102 is adjusted according to positions of two armrests of

a seat where the patient is seated, positions of the sliding plates 302 and the adjusting plates 304 are adjusted, and the sliding plates 302, the vertical plates 309 and the adjusting plates 304 are all attached to the armrests, and fixed by the bolts 307; two arms of the patient are placed on the soft pads 601 to cause palms of hands to hold the support pads 602, the binding ropes 401 are used to press the arms and pass through the insertion holes 405, and the Velcro loop surfaces 403 are attached to the fixing blocks 402; and finally, the second threaded rods 503 are rotated to push the pressing plates 504 press the binding ropes 401 to prevent the patient from breaking free, and the intravenous infusion is performed to the patient, thereby avoiding the injury to patients caused by the falling of the needle.

Working principles or structural principles are as follows. Firstly, the medical personnel rotates the rotating rod 203 to drive the driving bevel gear 204 to rotate, and the driven bevel gear 205 drives the first threaded rod 206 to rotate, thereby driving the limiting block 201 to slide in the cavity 202 to adjust the position between the first connecting plate 101 and the second connecting plate 102. At this time, the vertical plates 309 on two sides are attached to outsides of seat handles, the first connecting plate 101 and the second connecting plate 102 are mounted, and the bottoms of the first connecting plate 101 and the second connecting plate 102 adhere to tops of the handles. The sliding plates 302 are pushed to move in the grooves 301 towards the vertical plates 309, and are attached to inner sides of the handles. At this time, the sliding blocks 306 drive the bolts 307 to move in the sliding grooves 305. Finally, the adjusting plates 304 are pushed to slide upwards in the square grooves 303, and at this time, the bolts 307 slide in the through grooves 310 until the adjusting plates 304 are also attached to the bottoms of the handles. The nuts 308 are tightened on the bolts 307, the nuts 308 are attached to the vertical plates 309, and the sliding plates 302 and the square grooves 303 can be fixed. That is, the first connecting plate 101 and the second connecting plate 102 are fixedly mounted on the armrests of the seat, the medical personnel places the patient's arms on the soft pads 601 on the first connecting plate 101 and the second connecting plate 102, and places the palms on the support pads 602. The binding ropes 401 are attached to upper sides of the arms, pass through the insertion holes 405 and penetrates upwards, and the Velcro loop surfaces 403

are adhered to the fixing blocks 402 to limit the arms of the patient. Finally, the second threaded rods 503 are manually rotated to push the pressure plates 504 to slide downward in the mounting grooves 502 on the fixing plates 501, and the pressure plates 504 press the binding ropes 401 to enhance the limiting effect on the binding ropes 401.

5 It is obvious to those skilled in the art that the present invention is not limited to the details of the above illustrative examples, and the present invention may be realized in other specific forms without departing from the spirit or essential characteristics thereof. Therefore, the examples are to be considered in all respects as illustrative and not restrictive, the scope of the present invention is limited by the appended claims rather than
10 the above description, and all changes that come within the meaning and range of equivalents of the claims are intended to be embraced by the present invention. Any reference signs in the claim are not to be construed as limiting the claim concerned.

In addition, it is to be understood that while the present specification has been described in terms of embodiments, not every embodiment includes a single technical solution, and that
15 such narrative style of the specification is only for clarity. Those skilled in the art are to take the specification as a whole, and the technical solutions in each example can also be combined appropriately to form other embodiments that can be understood by those skilled in the art.