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MOBILE EXTREMITY RESTRAINT

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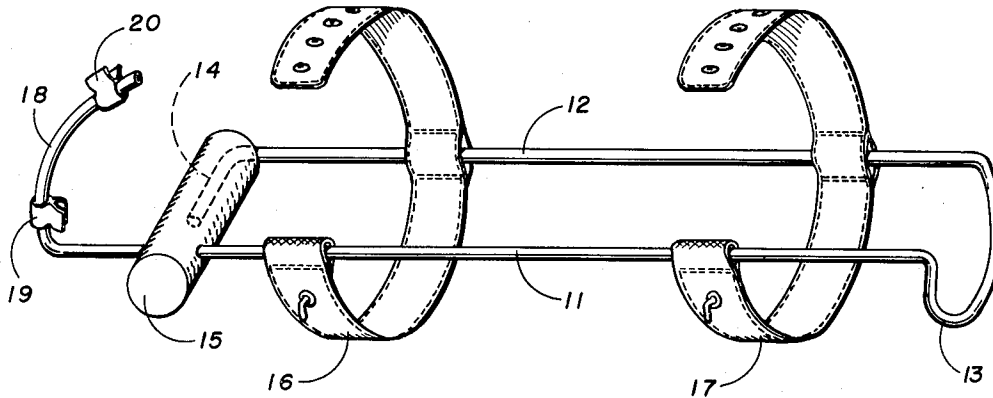


Fig 1

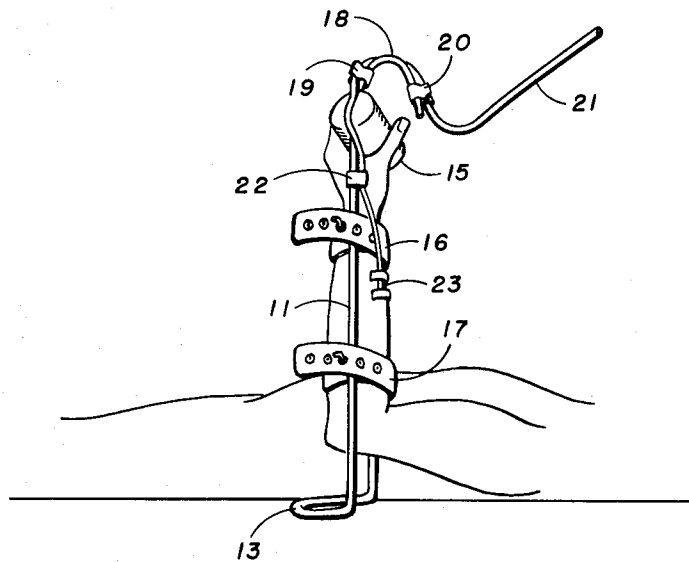


Fig 2

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MOBILE EXTREMITY RESTRAINT

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5 Claims. (Cl. 128—214)

This invention relates in general to surgical devices and more specifically to a surgical extremity restraint useful in administering intravenous fluids.

Briefly, intravenous infusion requires a source of prescribed fluid, a needle for insertion into one of the patient's veins, and a tube connecting the fluid source to the needle. The tip of the needle must be substantially immobilized and centered relative to the vein channel so as not to repeatedly strike or press against the intima or vein lining. If the needle tip is allowed to vibrate against or repeatedly prick the intima, traumatic damage results which, although slight, automatically sets off that series of biochemical reactions which causes blood coagulation. Extension of such clotting action along the vessel toward the heart presents a real danger from clot fragments which might be carried toward the heart and lungs and seriously damage those organs.

Also, if the needle tip is allowed to press against the vein lining for a sufficient period of time, pressure necrosis of the intima results, leading to scar tissue which can serve as a focal point for possible infection, i. e., phlebitis.

In some cases it is possible to merely tape the needle in position. However, relatively few patients can be relied upon to make certain that a needle so held remains in place through an extended therapy period. Thus, where a vein in an extremity is used some form of restraining device is deemed advisable.

The most popular restraint now in use comprises a padded board which, when bound on an arm or leg, extends across the joints so as to make it impossible for the patient to flex the extremity at any joint other than the body joint. If the padded board is used on the arm, neither the wrist or elbow joint can be flexed, and if it is used on a leg neither the ankle nor the knee joint can be flexed.

To accomplish such a result while immobilizing the needle relative to the vein channel, it is often necessary to place pressure binding directly over the needle position, setting up the possibility of resulting pressure necrosis of the intima. Even if this be avoided, it is obvious that muscular action in the extremity, which is largely responsible for venous blood flow back to the heart, must be substantially prevented. Usually pain results due to stasis of venous blood, causing the patient, in order to gain relief, to attempt undesirable movement of the extremity against the restraint and thus defeat its purpose.

An object of this invention is to devise a restraint for administering intravenous fluids into the veins of a patient's extremity which facilitates controlled mobilization of the extremity without placing strain on the intravenous needle.

A further object of this invention is to provide an extremity restraint for administering intravenous fluids which will allow the patient to use normal muscle action and thereby facilitate venous return.

Still another object of this invention is to provide an

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extremity restraint for administering intravenous fluids which minimizes the possibility of traumatic vein damage and the possibility of blood clots forming in the intravenous needle.

Basically, my invention comprises a light supporting frame formed to provide a rigid support on two sides of a portion of the patient's extremity. The outward end of the restraint is provided with a soft resilient hand grip or terminating pad. An antenna-like rod is provided which is rigidly attached at one of its ends to a side member of the restraint, leaving the other end free. Intravenous tube clamping means are then provided along the antenna-shaped restraint rod in addition to means for binding the restraint firmly across one joint of the patient's extremity.

For a better understanding of this invention, together with other and further objects, advantages, and capabilities thereof, reference is made to the following disclosure and the appended claims in connection with the accompanying drawings, in which:

Fig. 1 shows a specific embodiment of the restraint per se, and

Fig. 2 shows the restraint bound in position on the arm of a patient.

As can be seen in Fig. 1 specific embodiment of my invention, I provide an extremity restraint comprising a unitary rod which may be hollow or of solid metal, formed to provide parallel side rod portions 11 and 12. The inward end of the restraint comprises a U-shaped cradle rod portion 13 which is bent downwardly out of the plane of the parallel side rod portions to connect the inward ends of the side rod portions in spaced relationship. The forward or outward end of the restraint comprises a laterally bent rod portion 14 which may or may not be connected to side rod portion 11, and which acts as a core for a hand grip or terminating pad, which is preferably constructed from a suitable resilient material capable of being sterilized without serious damage.

Means comprising binding belts 16 and 17 are provided for attaching the restraint to the patient's arm or leg as the case may be. Clips 19 and 20 shown on the strain relief rod 18 are provided to facilitate attachment of the intravenous tube to the remainder of the unit.

In Fig. 2 the restraint of Fig. 1 is shown in position on the arm of a patient. The various components are identified by the same notation as used in identifying the components in Fig. 1. As can be seen, though the restraint may extend across the patient's elbow joint it is only bound to the patient in the forearm region.

The positioning is similar when the restraint is used on a leg in that the binding allows the knee to be flexed. The patient may flex his arm at will to provide the desired muscular action which not only relieves the patient from pain and discomfort but actually provides the venous pumping action totally absent when using the prior art complete immobilization type of restraint. The intravenous tube 21 is brought from the source of intravenous fluid, not shown, down to the strain relief antenna rod 18 where it is firmly clipped in place by clips 19 and 20. Other means for attaching the tube to antenna rod 18 will occur to those skilled in the art. An additional tube clip 22 may be provided as shown on side rod portion 11.

Once the intravenous needle 23 is secured to the patient's skin, by a small piece of tape, it is almost impossible for the patient to remove or vibrate the needle through arm movement. Strain relief antenna 18 stops any such strain, tension or vibration from being passed on to the needle, and the point of the needle remains in position relative to the vein channel.

My mobile restraint, by allowing the patient controlled freedom of movement in all except the wrist or ankle

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joints, gives the patient opportunity for natural movement of the extremity muscles with resultant venous pumping action. The natural movement allowed minimizes pain, internal vein damage and clotting. All of this adds up to shorter and safer term therapy.

While there has been shown and described what is at present considered the preferred embodiment of the present invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention as defined by the appended claims.

I claim:

1. An extremity restraint for use in administering intravenous fluid, comprising the combination of two substantially parallel side members adapted for binding to a patient's extremity, a substantially U-shaped cradle member extending downwardly out of the plane of the side members and transverse thereto for holding the inward ends of the side members in spaced relationship, a substantially cylindrical resilient terminating pad extending between the outside ends of the side members, a strain relief member having one end attached to a side member, and a free end extending upwardly out of the plane of the side members, and intravenous tube attachment means spaced along the strain relief member.

2. An arm restraint for use in administering intravenous fluids comprising the combination of a unitary rod formed to provide two parallel side rod portions and a connecting U-shaped cradle portion, said cradle portion lying in a plane substantially normal to the plane of the side rod portions, one end of said rod being bent upwardly out of the plane of the side rod portion to form a strain relief rod and the other end of said rod being bent inwardly and laterally to form a hand grip core in the plane of the side rod portions, a substantially cylindrical resilient hand grip centered on said laterally bent rod portion connecting the side rod portions in spaced relationship, and intravenous tube attachment means spaced along the strain relief rod.

3. An arm restraint for use in administering intravenous fluids, comprising the combination of two straight

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parallel side rods adapted for binding to a patient's extremity, a U-shaped cradle rod extending downwardly out of the plane of the side rods and transverse thereto for holding the inward ends of the side rod in spaced relationship, a substantially cylindrical resilient hand grip extending between the outside ends of the side rods, a strain relief rod having one end attached to a side rod and a free end extending upwardly out of the plane of the side rods, and intravenous tube attachment means spaced along the strain relief rod.

4. An arm restraint for use in administering intravenous fluids comprising the combination of a unitary member bent to form two parallel side member portions and a connecting U-shaped cradle portion, said cradle portion lying in a plane substantially normal to the plane of the side member portions, one end of said unitary member being bent upwardly out of the plane of the side member portions to form a strain relief member and the other end of the unitary member being bent inwardly and laterally to form a hand grip core in the plane of the side member portions, a substantially cylindrical resilient hand grip centered on said core, and intravenous tube attachment means spaced along the strain relief member.

5. An extremity restraint for use in administering intravenous fluid, comprising the combination of two substantially parallel side members adapted for binding to a patient's extremity, a transverse member connecting the inward ends of the side members in spaced relationship, a resilient terminating pad extending between the outside ends of the side members, a strain relief member having one end attached to a side member and a free end extending upwardly out the plane of the side members adapted for attachment of an intravenous tube.

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