Independent Leg Bag Emptying Technique for Cervical Five Quadriplegic Clients

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Since it is necessary for leg bags to be emptied several times daily, independence in urinary drainage is essential if a quadriplegic person is to be left unattended for more than a few hours. This goal is often overlooked, however, in an initial rehabilitation program.

Conventional approaches to leg bag emptying involve lifting the leg onto a toilet seat or leaning down to empty the bag into a urinal. Both methods present insurmountable difficulties for most cervical five (C5) quadriplegic persons. Ford and Duckworth (1) suggested either unzipping the pant leg to expose the bag or pulling the pant leg up (no specific technique for this was suggested). Even though these methods do not involve leaning down or lifting a leg, it appears from their photographs that they are best suited for persons with C6 function or better. For the large number of quadriplegic persons of C5 or C5-6 level, options are limited primarily to emptying the bag onto the ground through the use of an electronic clamp or an elaborate mechanical clamp (2).

Wrist extension in many of these individuals is either absent or trace, and trunk mobility and balance are poor. Manual leg bag devices in current rehabilitation literature are primarily aimed at C6 individuals with good wrist extension, trunk mobility, and balance. Those found in the literature deal with clamp modifications only and do not offer an overall technique for leg bag emptying (3-5). Therefore, a leg bag emptying technique was developed and clinically tested on C5 quadriplegic persons living in a transitional residence for the physically disabled. This article describes the technique and the equipment needed and gives instructions for both.

The devices used with this technique are simple to make and operate, and the parts are either very durable or easily replaceable. Three pieces of equipment are needed:

1. A specially designed top strap that eliminates the need for a difficult-to-manage bottom strap.

2. A reacher that is used to pull up the pant leg, lift the bag onto the toilet, open the clamp to drain, and

3. A specially designed top strap that eliminates the need for a difficult-to-manage bottom strap.

Figure 1 Option 1—Single wide-top strap

Figure 2 Option 2—Double-top strap (lateral view)

Figure 3 Option 2—Double-top strap (medial view)
then lift the bag onto the lap for closure. (This eliminates the need to lean down to reach the bottom of the bag.)

3. A plastic T-shaped base, which firmly anchors the clamp to the bottom of the leg bag for easy opening and closing. (Without the base, the clamp tends to twist or fall off the tubing.)

Fabrication

Option #1—Single wide-top strap. This option is frequently used because of the simplicity of construction, the availability of materials, and the ease of positioning the bag slightly higher for quadriplegics with short legs, short pants, or both (Figure 1).

1. Cut a strap of 2-inch (5 cm) wide heavy duty elastic 3 inches (7.5 cm) longer than the circumference of the thigh just above the knee.

2. Fasten the strap on the inside or top of the knee with 3-inch (7.5 cm) overlap of 2-inch (5 cm) wide Velcro.

3. Hang the leg bag onto the two ⅜-inch (2 cm) buttons, which are sewn on the outside of the strap so that the bag hangs almost vertically at the knee. The elastic beneath the buttons may be reinforced for extra strength.

Option #2—Double-top strap. The double-top strap offers maximum stability of the leg bag for active quadriplegics, especially for those who are able to transfer independently (Figures 2 and 3).

1. Cut two straps of 1-inch (2.5 cm) wide cotton webbing. One strap is cut 3 inches (7.5 cm) longer than the circumference of the leg just above the knee. The other is cut 3 inches (7.5 cm) longer than the circumference below the knee.

2. For each strap, cut 3-inch (7.5 cm) pieces of both loop and hook 1-inch (2.5 cm) wide Velcro and sew on to the ends of the webbing.

3. With the client seated in wheelchair, fasten the two straps into position on the leg above and below the knee with the closure on the inside/front of the leg.

4. Cut two additional 5-inch (12.5 cm) pieces of webbing that will connect the original straps at approximately 30° from vertical on the medial and lateral sides of the knee. These flexible side straps are hinge-like so that the proper bag position is maintained even when the leg is straightened.

5. Carefully mark the intersection...
tion of all straps; trim extra material off the side straps and sew all straps together.

6. Sew a ¾-inch (2-cm) button on the bottom strap, approximately 1 inch (2.5 cm) behind the lateral (vertical) strap.

7. Leg bag attachment: Fasten the top strap in position; put the button through the back slit of the leg bag; pass the bottom strap through the front slit, and fasten together the ends of the bottom strap.

Reacher. A commercially available dressing stick/reacher can be used for this technique (6) but a reacher that provides a more secure grip on the pants leg can easily be constructed from a coat hook and dowel. A reinforcing piece of splinting plastic (7) prevents the hook from loosening. The end of the hook is coated with silicone glue and allowed to dry.

The shaft of the reacher is cut as short as possible, depending on the individual's balance and reach, to maximize control. A universal cuff is then tacked or glued onto the reacher, positioned so that the hook is at the optimum angle for pulling on both the inseam and the outside seam of the pant leg. A foam buildup (8) can be substituted for a cuff when the reacher is used with a tendoanesis splint (Figure 4).

Clamp and Base. A T-shaped piece of Kydex (9) splinting plastic serves as the clamp base. Two pairs of holes are drilled approximately 3-½ inches (8 cm) apart on the base (the space between slits on the bag) and two ¾-inch (2-cm) buttons are sewn on. Allow plenty of slack thread for easy buttoning of the bag onto the base. It is occasionally necessary to drill an additional hole in the clamp base for a loop to aid in lifting the bag onto the toilet. (Extra loop not pictured.)

A hole is drilled through the handle of a Deluxe Lever Catheter Clamp (10). A heavy shoe lace is threaded through this hole and knotted to form a loop. This adapted handle can be snapped off of a wornout clamp and onto the body of a new clamp when a replacement is necessary, thereby eliminating re-drilling. The adapted clamp is attached to the plastic base with strapping tape or wire as riveting prevents re-use of the base when the clamp wears out. A layer of silicone glue may be applied to the back side of the base (excluding taped areas) to provide a durable nonslip surface. As the clamp begins to wear out, thicker walled tubing may be substituted for the light weight tubing used initially (Figure 5).

Method
Figures 1-7 demonstrate the leg bag emptying equipment and technique. Because of limited active range of motion, the C5 quadriplegic model requires a specially angled bent metal rod handle for a reacher.

1. The pant leg is lifted either by:
   (a) alternately pulling on the inseam and outer seam of the pants; when material is wedged firmly enough to stay up on one side, reaching for the other seam; or,
   (b) lifting gently from the bottom cuff (see Figure 6).

2. The reacher is inserted into loop to open clamp after bag is lifted by reacher onto toilet. If more complete drainage is desired, the end of the bottom tube may be cut at an angle. (Some quadriplegics with good balance use the reacher only for lifting the pant leg, and then finish the process with their hand (see Figure 7).)

3. The bag is lifted onto lap. (Some clients use towels on their lap to absorb final drops of urine.)

4. The clamp is closed with fingers or palm of hand. Replace bag on leg and push down pants leg.

Conclusion
Eighteen of 21 C5 through C6 quadriplegic graduates of the transitional residence surveyed at follow up are independent in emptying the leg bag as a result of this technique or modifications of it. The three exceptions were discharged from the facility before the technique was refined. All current C5 - C6 residents have become independent.

Acknowledgments
Appreciation is expressed to Sheila Combie, OTR, who assisted Lynne Williams in developing the leg bag device, and to the Board of Directors of Courage Center for providing a writing grant.

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