REHABILITATION MANUAL 10

CLEAN, INTERMITTENT CATHETERIZATION

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NATIONAL REHABILITATION CENTER
FOR THE DISABLED
JAPAN

(WHO COLLABORATING CENTRE)

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2. To undertake assessment of existing technology which facilitates the independence of people with disabilities, and to disseminate such information on technology through education and training.
3. To undertake studies of community-based rehabilitation, primary health care, and other social support mechanisms for people with disabilities.
4. To undertake research and development of new equipment and devices in rehabilitation and daily life of people with disabilities.
5. To develop and prepare manuals for education and training of rehabilitation professionals.
6. To support organization of conferences and/or seminars on rehabilitation of people with disabilities.

National Rehabilitation Center for the Disabled
WHO Collaborating Centre for the Disability Prevention and Rehabilitation

Rehabilitation Manual 10
Clean, Intermittent Catheterization
November 30, 2001

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PREFACE

This manual is intended to be used in the training of self-care skills to overcome the voiding dysfunction of patients or disabled persons with detrusor hyperreflexia and incontinence, and also as a guidebook for health-care professionals working with them.

Self-care of voiding dysfunction is one of basic skills that should be acquired during medical rehabilitation. We have learnt the importance of self-care of voiding dysfunction for vocational rehabilitation and following social activities from experience of many persons with spinal cord injury.

We have practiced medical rehabilitation of persons with spinal cord injury using techniques written in this manual for two decades. As Mr. R. Goldenson insists, the most basic rehabilitation is self-rehabilitation, for what persons with disabilities learn to do for themselves is more important than what others do for them. Rehabilitation is not something that is done to the patient, but something done with the patient. Following those assertions, this manual is prepared.

The editor wishes to express appreciation to the contributors preparing the manual based on their clinical experiences, and Mr.Yumi Fujita for clearcut and plain illustrations. We hope that this manual will contribute to promote independence of persons with voiding dysfyunction and to improve their quality of life.

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1. Purpose of clean, intermittent self-catheterization

1.1. The maintenance of life

Voiding dysfunction can result from neurogenic disorders, adverse drug reactions and/or decreased mobility.

If a person could not void, urinary retention and consequently renal insufficiency would occur, resulting in the inability to excrete water, salts and urea by a complex high pressure filtration process that separates those substances out of the blood plasma in the kidney. Urine is produced by the nephrons. This urine is then pushed down the ureter and into the urinary bladder by peristaltic action. The bladder is able to stretch and hold around 400 ml of urine in adults. When it contains nearly 150 ml, most persons will feel the desire to urinate. Urination is the release of urine from the bladder and occurs when the bladder contracts and the sphincters open.

Due to dysfunction of the bladder and/or the sphincters, urinary retention might take place. Urine in the bladder is usually prevented from being pushed back up the ureters by valves located at the point of entry to the bladder. There is a reflux of urine up the kidney in cases of long standing urinary retention, bringing about damage to the kidneys and subsequently renal insufficiency. Bladder inflammation due to bacterial infection facilitates the progress of these events.

In case of renal insufficiency, plasma proteins are lost from the blood and the osmotic pressure of the blood drops, producing water that stays in the tissues, that is also known as edema. Eventually, cardiac arrest will be brought about by the increase of potassium ions in the blood plasma.

Accordingly, diseases and disorders of the urinary system can be serious, ending in a person's death. Maintenance of renal function through urine storage and emptying is indispensable to keep the physiological function of the human body.

1.2. The importance of voiding at regular intervals

To prevent infection of the bladder, it is important to empty the bladder or urinate at regular intervals.

Blood circulation of the bladder wall increases after the bladder emptying, keeping it in a healthy condition. When there is urinary retention and the bladder is continuously stretched, the bladder becomes undernourished due to diminished blood flow caused by constriction of capillary vessels and becomes more susceptible to bacterial invasion. These processes will increase the risk of cystitis or infection of the bladder.

It is recommended that a person should urinate five or six times a day.

When a person can not empty the bladder completely and there remains residual urine in the bladder, referred to as postvoid residual (PVR), bacteria proliferate continuously in the urine and the cystitis does not improve.

Moreover, an increase of fibrous tissue in the bladder wall might take place after prolonged stretch of the bladder by urinary retention, which will result in a contracted bladder.

1.3. The amelioration of pollakisuria and urinary incontinence

When a person can urinate voluntarily and there is still a considerable amount of PVR, for instance, above 100ml, emptying the bladder by clean, intermittent self-catheterization (CIC) will improve both functional capacity of the bladder and urinary incontinence.

Also anticholinergic agents, whose primary action is to block acetylcholine receptors and suppress uninhibited contractions of the bladder, may be useful at improving urinary incontinence.

1.4. Improving Quality of Life

CIC improves the quality of life (QOL) of persons with voiding dysfunctions.

Before the study of sterile intermittent catheterization to manage persons with urinary retention and/or incontinence (Guttmann et al. 1966/67), it was recommended the timed voiding be combined with increasing intravesical pressure either manually (Crede maneuver) or through increased intraabdominal pressure (Valsalva voiding). Also, for persons with weak uninhibited bladder contractions, suprapubic bladder tapping was used to trigger a contraction. In spite of the above maneuvers, there remains PVR, often leading to pollakisuria and urinary incontinence.

Transurethral sphincterotomy was performed for male patients who could not urinate and had recurrent urinary tract infections due to detrusor sphincter dyssynergia (DSD). After the surgical procedure, they had to wear a leg bag for urine storage. Other alternatives were the use of indwelling catheter or vesicostomy.

The major drawbacks of above mentioned procedures are patients embarrassment, partial limitation of activities of daily living and restricted participation in social activities. Thus, there is need to develop a bladder management program that will allow persons with bladder dysfunctions to be reintegrated most easily back into the community.

1.5. Emergence of clean, intermittent self-catheterization

Based on experiences of 14 patients with urinary dysfunction caused by neurogenic and atonic bladders, Lapides et al. (1972) reported that CIC helped eradicate urinary infection and maintain a sterile urine for long periods.

At that time, the use of intermittent, strictly aseptic, urethral catheterization had already been recommended by Guttmann et al. (1966/67), and was performed on patients with voiding dysfunction solely by physicians and/or nurses. Lapides et al. (1972) insisted that sterile urine could be obtained or maintained without the use of a sterile catheterization technique by physicians or nurses. CIC was easy to perform compared to sterile intermittent catheterization. Accordingly, persons with voiding dysfunction were more likely to catheterize themselves which prevented bladder overdistention.

Orikasa et al. (1976) revealed a good result of CIC clinical trials in Hokkaido district in Japan. Marynard et al. (1987), based on five years follow-up of patients on CIC, reported low morbidity and high patient acceptance. Presently, many physicians recommend CIC to their patients with voiding dysfunctions.

2. Indications for clean, intermittent self-catheterization

CIC is indicated for persons with voiding dysfunctions showing urinary incontinence, retention and/or PVR.

Etiologies and pathophysiologies of voiding dysfunctions, arising from dysfunctions of the bladder and/or the sphincter, are not the same.

Ordinarily we give guidance on CIC to persons with neurogenic bladder due to traumatic spinal cord injury.

Routinely encountered patho-etiologies of CIC candidates are as follows:

(1) Brain lesions: cerebrovascular diseases, intracranial neoplasms, traumatic brain injuries,multiple sclerosis and Parkinson disease.

(2) Spinal cord lesions: traumatic spinal cord injuries, transverse myelitis, multiple sclerosis, spinal cord tumors, myelodysplasia and spinal canal stenosis.

(3) Peripheral nerve lesions: diabetic neuropathy, Guillain-Barre syndrome and pelvic surgeries (e.g., rectal and uterine cancers).

(4) Obstruction of the bladder outlet in male: prostatic hypertrophy.

II. Method of Clean, Intermittent Self-Catheterization for the Male

There are two methods of intermittent self-catheterization, sterile and clean techniques.

In the sterile technique, the person with voiding dysfunction should put on sterile gloves, and handle tools and supplies such as tampons with sterilized forceps or tweezers. This technique is recommended in the hospital setting, where a high rate of significant bacteriuria is observed in cases of CIC despite antibiotic prophylaxis (Anderson, 1980).

The clean technique works well in the outpatient setting (Linsenmeyer et al., 1993), for instance, at home. As suggested by Lapides et al. (1972), a clean and not an aseptic technique should suffice since any bacteria introduced by the catheter will cease to exist by the resistance of the bladder.

1. Self-catheterization by clean technique

Self-catheterization can be done on the bed or toilet stool. Timed voiding by CIC is most important at home and/or your job site, even if there is no facility for washing hands. Without CIC, urine will reflux to the kidney, there will be urinary tract infection and/or incontinence will take place due to increased intravesical pressure and/or overdistention of the bladder.

2. The organs of urinary excretion

Figure 2-1 shows the organs related to urinary excretion in the male.

The urethra is the exit tube from the urinary bladder to the exterior of the body, running down the penis. The male urethra is about 23 cm long. The prostate gland surrounds the upper part of the urethra, and if there is swelling of the prostate, also known as prostatic hypertrophy, it could close the exit tube for the passage of urine from the bladder. In later life, this sometimes happens and brings about the urinary retention.

The external urethral sphincter is located just distal to the prostate and runs up to the base of bladder, steadily compressing the urethra. This sphincter is under voluntary control.

The bladder is a hollow container with muscular walls located in the anterior part of the pelvic cavity. It is joined to the kidneys by the ureters.

About 1 ml/min of urine passes to the bladder from the kidneys and it remains there until it is voided. Normally, when the bladder contains around 150 ml of urine, one feels the initial desire to urinate. When there are more than 400 ml of urine in the bladder, there is an urgency to void.

Urination occurs when the sphincters and the urethra are relaxed and the muscular walls of the bladder contract, forcing the urine out. It is necessary to void before the amount of urine in the bladder is more than 400 ml.

3. The posture of CIC

The person takes a long-leg sitting position with moderate abduction of the both hip joints.

When inserting a catheter into the urethral opening, keep the penis in a position with the glans penis turned up (Figure 2-2).

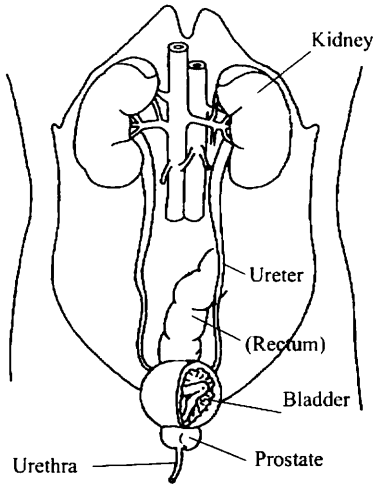


Figure 2-1. The organs of urinary excretion in male

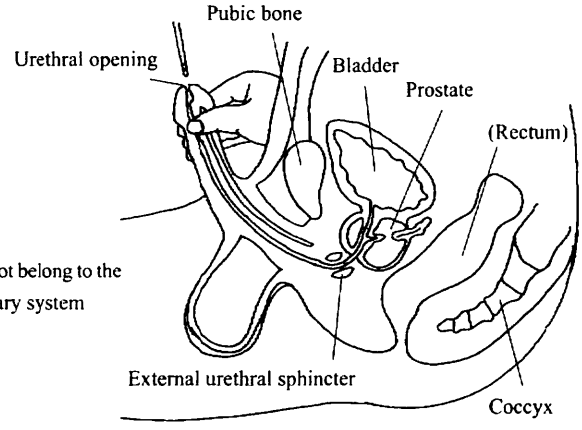


Figure 2-2. Positions of the trunk and the penis during self-catheterization

4. Steps in performing CIC

4.1. Prepare tools and supplies for CIC

Before starting CIC, the followings should be prepared (Figure 2-3):

- Disposable Nelaton s catheter or a reusable one such as Self-Cathe®(specially prepared catheter for CIC) of size French (Fr.) 12 or 14 Fr. (diameter: 1 Fr. = 1/3 mm).

  A portable type catheter is stored in a case. You should fill the case with a disinfectant and put the cap on it.

  When you use a disposable type, you should cover the catheter with a sterile lubricant such as glycerol and/or xylocaine jelly.
- Urinal.
- Hi Lady®(cleaning cotton sheet containing 0.02% gluconic chlorhexidine, and is commercially available).

  You can also use cotton sheets soaked in 0.02 % gluconic chlorhexidine or 0.02% benzalkonium chloride.
- Soap.

In the early stage of CIC training it is necessary to measure the volume of urine and check its nature such as color, smell, transparency and blood clots. It is recommended to prepare a volumetric cup. Keep a chart for voiding record, that is, the frequency-volume chart.

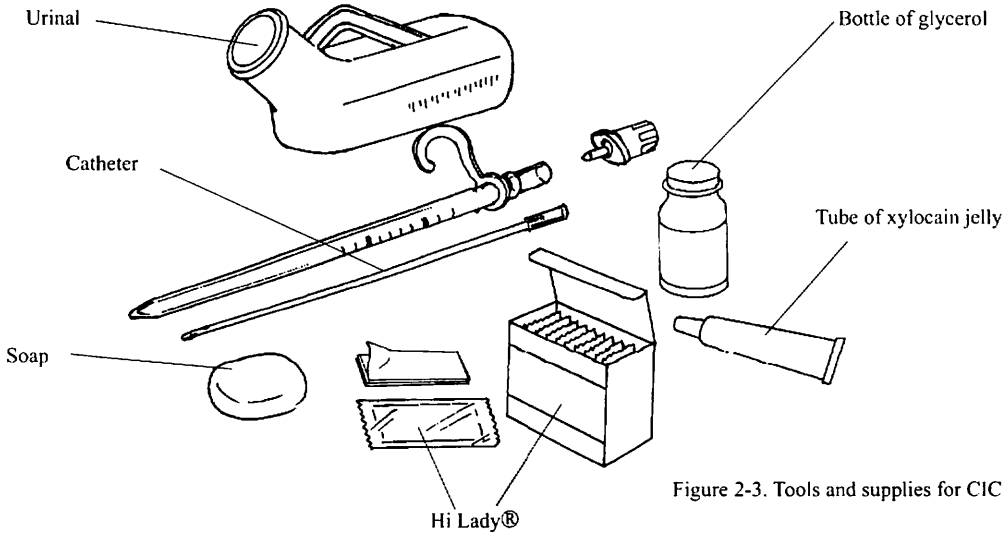


Figure 2-3. Tools and supplies for CIC

4.2. Cut your nails and wash your hands

Routinely cut your nails (Figure 2-4). If not, you might develop black edged nails with pathogenic bacteria.

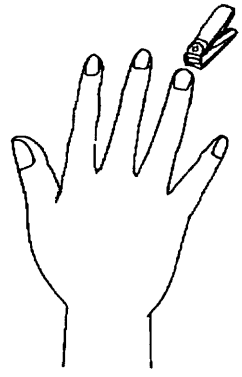


Figure 2-4. Cut nails

Before starting CIC, wash your hands well with soap and water (Figure 2-5).

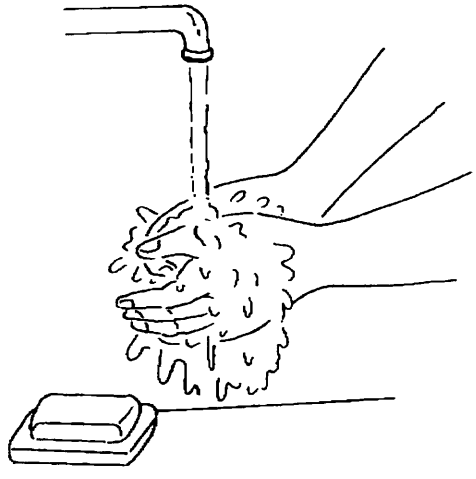


Figure 2-5. Wash hands

4.3. Pull up the shirt, pull down the pants and draw out the penis

On the bed, you should keep the necessary tools and supplies around you before CIC.

Long-leg sitting with slightly flexed knees is convenient for keeping the stability of sitting balance. Put a urinal between both legs (Figure 2-6).

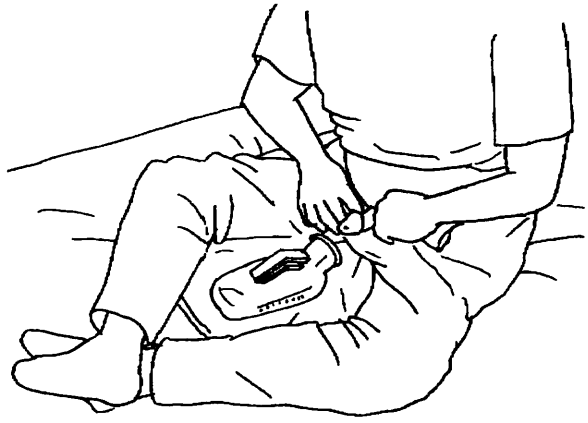


Figure 2-6. Draw out the penis

4.4. Rub hands well with Hi Lady®

A set of Hi Lady® consists of two cotton sheets. One is used for rubbing both hands, and the other for the glans penis.

First, rub mainly the thumb, the index finger and the palm of the hand which holds the glans penis. Then, using the same sheet, rub the other hand (Figure 2-7).

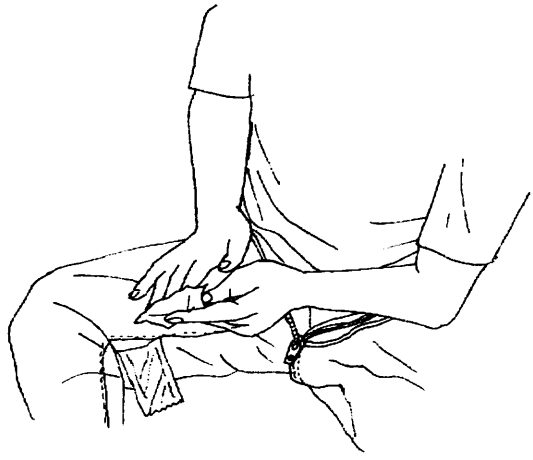


Figure 2-7. Rub hands with Hi Lady®

Rub the interdigital web spaces of the hand which holds the catheter (Figure 2-8).

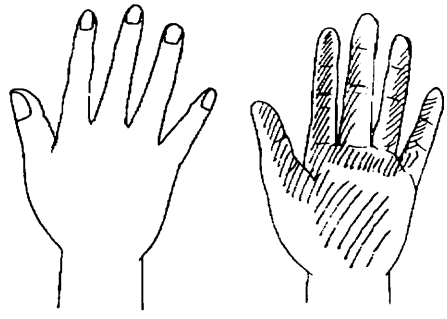


Figure 2-8. Rub interdigital webs

4.5. Wipe the glans penis

After pulling back the foreskin, wipe the urethral opening several times with the other sheet of Hi Lady®(Figure 2-9). Instead of Hi Lady®, you may also use a sterile cotton soaked in 0.02 % gluconic chlorhexidine or 0.02% benzalkonium chloride.

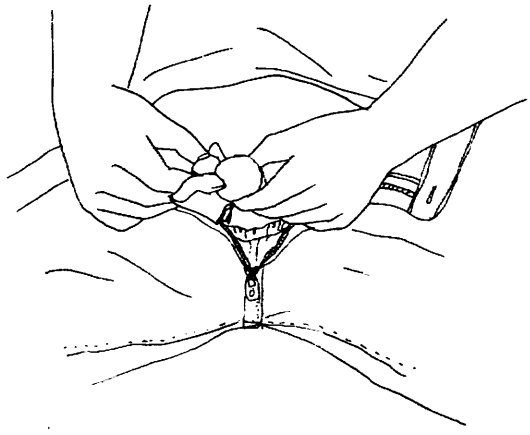


Figure 2-9. Wipe the glans penis

4.6. The right way of holding a catheter

Hold the catheter with the thumb and the index finger at around 7 cm from the distal end of catheter.

There is a cap at the proximal end of catheter. It is recommnded to bend and hold the catheter near its proximal end between the ring and little fingers (Figure 2-10).

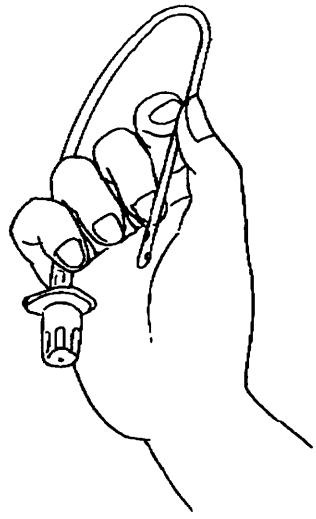


Figure 2-10. How to hold a catheter ?

4.7. Cover the catheter with sterile lubricant when using a disposable one

The lubricant should be applied between the distal end of catheter and up to a point 5 cm away from the distal end (Figure 2-11).

When you use glycerol kept in a bottle, you can put the distal end of catheter into the bottle.

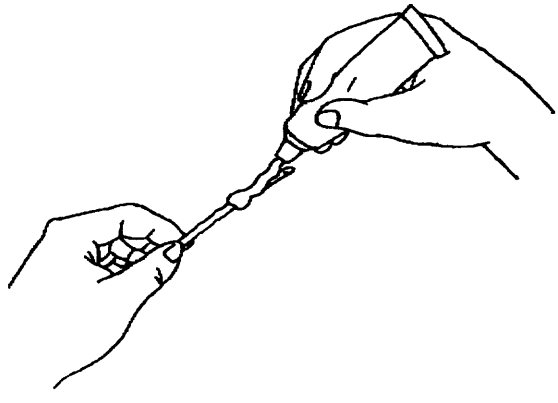


Figure 2-11. Cover the catheter with sterile lubricant

4.8. Gently put the catheter into the urethral opening

Hold the base of glans penis and pull up the penis straight, making the angle between the penis and the floor at nearly 70 degrees.

Then, insert about 6 to 7cm of the catheter into the urethral opening (Figure 1-12). Twist it as necessary but do not force it in.

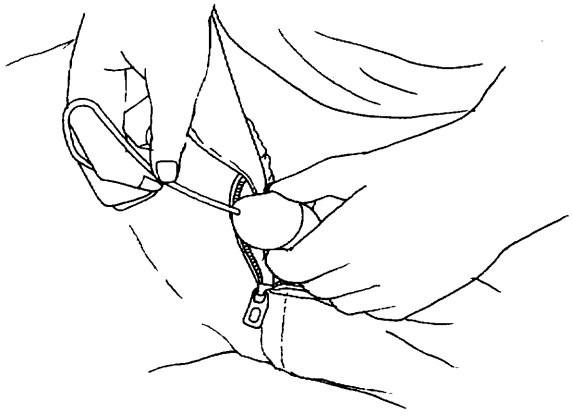


Figure 2-12. Insert the catheter into the urethral opening

4.9. Push the catheter in until urine starts coming out

Push the catheter more and more into the urethra at a length of about 5 cm each time.

When the inserted catheter is around 15 to 20 cm in length, you will feel a slight resistance due to the external sphincter.

Take off the cap, when you are using Self-Cathe®. Then, push in the catheter a bit more forcefully. Once the urine starts coming out.

— push in about 3 cm more (Figure 2-13).

After urine stops coming out, move the catheter fore and aft about 1 cm and check the PVR.

During this procedure, try *Credé* and/or *Valsalva* maneuvers.

At first you may make the bed sheet dirty with urine dripping from the catheter, it is better to cover the bed sheet with towels or napkins.

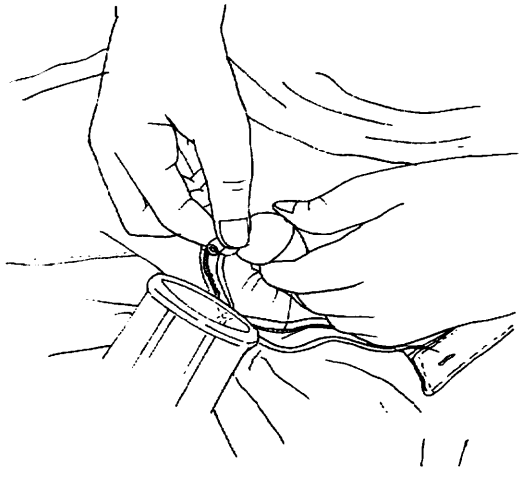


Figure 2-13. Urine starts coming out

- *Credé maneuver: hold both hands flat against the belly, just below the navel. Repeat a firm downward stroke toward the bladder several times, and then press with both hands placed directly over the bladder to manually remove all urine.*
- *Valsalva maneuver: increase the intrathoracic pressure with forcible exhalation against the closed glottis. Strain as if you are defecating.*

4.10. Drawing out the catheter

Hold the proximal end of catheter, and pull out straight (Figure 2-14).

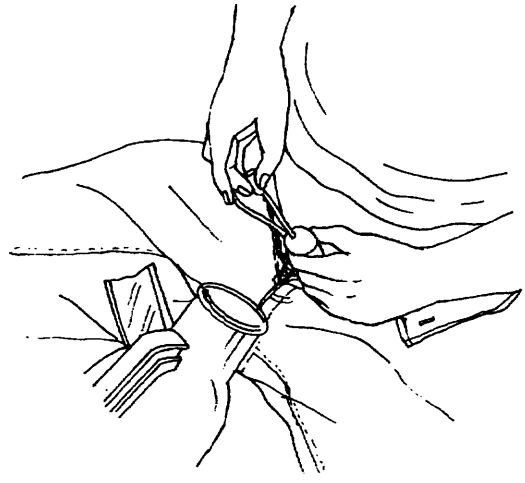


Figure 2-14. Pull out the catheter

Fold the used catheter on itself, and put it into the urinal (Figure 2-15).

Then, put back your upper and lower garments.

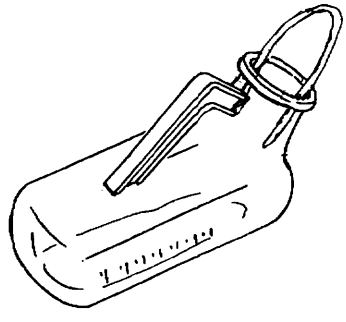


Figure 2-15. Put the used catheter into the urinal

4.11. Wash the used catheter with water

Hold the proximal end of the used catheter and put it under tap water, washing both its inside and outside (Figure 2-16).

Return it into the case filled with antiseptic solution. Make sure that the inside of the catheter is filled with the antiseptic solution.

Lastly close the cap.

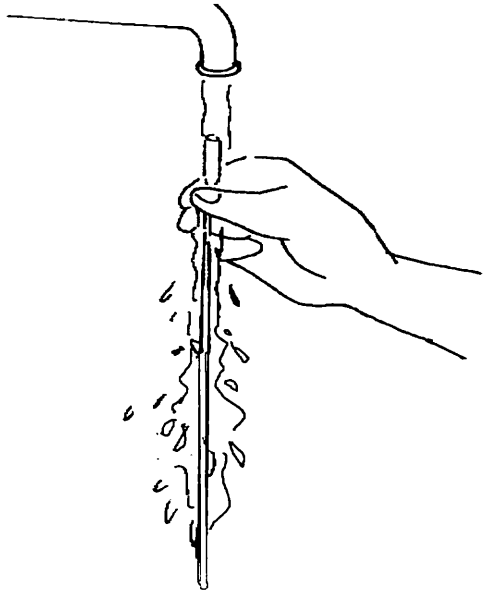


Figure 2-16. Wash the used catheter

4.12. How to keep catheter

You can put the portable type catheter, kept in the case such as Self-Cathe®, inside your bedside drawer or bag. You may use plastic cases such as Tupperware®, instead of the original case.

5. Other comments

5.1. Observe your urine

As instructed by your physician, you should record the volume of water intake per day, the time of CIC and the volume and the nature of urine. The frequency-volume chart is useful for this purpose (Figure 2-17). The above mentioned data should be written in each time zone on the chart.

You can get the chart at a urologist s clinic.

Although the items to be recorded in each time zone depend upon symptoms and/or signs, the following should be written in every zone:

- The time of CIC with the volume of urine.
- The time and the volume of water intake.
- The time and the volume of incontinence.
- Medications taken.
- As for the urine, note for color, smell, transparency, floating or suspended materials, and blood clots.

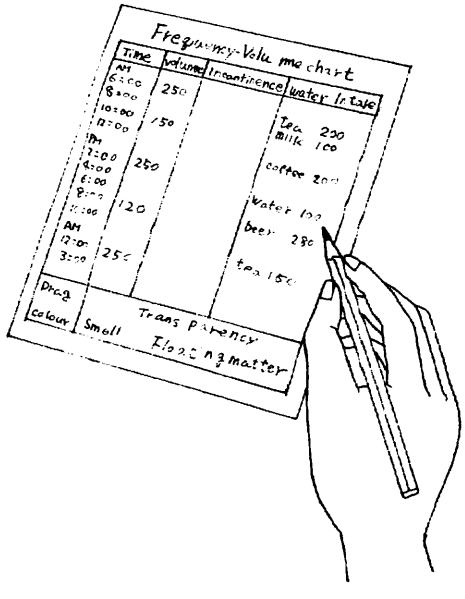


Figure 2-17. Frequency-volume chart

5.2. How to do CIC on a toilet stool

When you perform CIC on a toilet stool, sit in a reclined position on the stool. Keeping a wide space in front makes it easy to do CIC (Figure 2-18).

Keep the penis straight when voiding. Holding the proximal end of catheter, flex it to the direction of the bowl (Figure 2-19).

Figure 2-18. Position for CIC on a toilet stool

Figure 2-19. Urine comes out

5.3. For persons with paretic hands due to spinal cord injury (C6)

—How should the catheter be held ?

Persons with functional level of C6 show a muscular strength of grade 3 on the wrist extensor muscles on manual muscle testing, that is, they can extend the wrist against gravity.

Extending the wrist joint, one can hold a catheter between the thumb and the index finger (Figure 2-20).

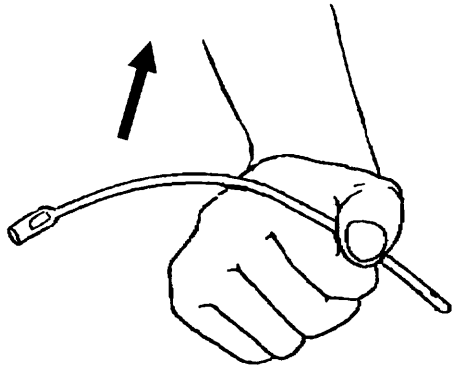


Figure 2-20. Hold a catheter between the thumb and the index finger

5.4. Use of intermittent balloon catheter

Intermittent balloon catheter is convenient for persons in need of CIC at midnight.

When a person is on a trip and can not perform CIC for many hours, he uses this type of catheter.

See Chapter V for details of the catheter.

III. Method of Clean, Intermittent Self-Catheterization for the Female

There are two methods of intermittent self-catheterizations, sterile and clean techniques.

In the sterile technique, the person with voiding dysfunction should put on sterile gloves, and handle tools and supplies such as tampons with sterilized forceps or tweezers. This technique is recommended in the hospital setting, where a high rate of significant bacteriuria is observed in cases of CIC despite antibiotic prophylaxis (Anderson, 1980).

The clean technique works well in the outpatient setting (Linsenmeyer et al., 1993), for instance, at home. As suggested by Lapides et al. (1972), a clean and not an aseptic technique should suffice since any bacteria introduced by the catheter will cease to exist due to the resistance of the bladder.

1. Self-catheterization by clean technique

Self-catheterization can be done on the bed or on a toilet stool. The technique is mainly used with the person on the bed but can also be applied while seated on the toilet stool. Initially, it is necessary to use a mirror every time to identify the urethral opening. Once well accustomed, you can manage CIC without a mirror.

Timed voiding by CIC is most important at home and/or your job site, even if there is no facility for washing hands. Without CIC, urine will reflux to the kidney, there will be urinary tract infection and/or incontinence will be taking place due to increased intravesical pressure and/or overdistention of the bladder.

2. The organs of urinary excretion

Figure 3-1 shows the organs related to urinary excretion in the female.

The urethra is the exit tube from the urinary bladder to the exterior of the body. The urethra is short in the female (4 cm) compared to that in the male (23 cm). Females are more likely to get bladder infections because of the short passageway.

The upper two-thirds of the urethra are encircled by the external sphincter. This sphincter is under voluntary control.

The bladder is a hollow container with muscular walls located in the anterior part of the pelvic cavity. It is joined to the kidneys by the ureters. In the pelvic cavity, the bladder is located anterior to the uterus. Behind the uterus is the rectum.

About 1 ml/min of urine passes to the bladder from the kidneys and it remains there until it is voided. Normally, when the bladder contains around 150 ml of urine, one feels the initial desire to urinate. When there are more than 400 ml of urine in the bladder, there is an urgency to void.

Urination occurs when the sphincter and the urethra are relaxed and the muscular walls of the bladder contract, forcing the urine out. It is necessary to void before the amount of urine in the bladder is more than 400 ml.

3. The posture of CIC

The person should take a long-leg sitting position with posterior pelvic tilt and round-back posture on the bed (Figure 3-2). Doing so, it becomes easy to identify the urethral opening. A lumbar support is convenient apparatus to keep this posture (Figure 3-3).

Pull up the vulva with your index and and middle or ring fingers, so you can easily look at the urethral opening.

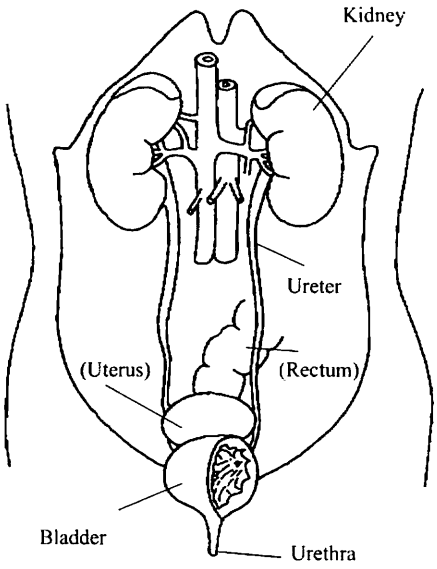


Figure 3-1. The organs of urinary excretion in female

( ):not belong to the urinary system

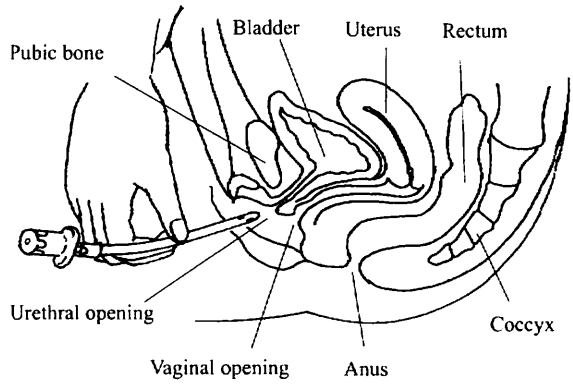


Figure 3-2. Position of the trunk and the urethral opening during self-catheterization

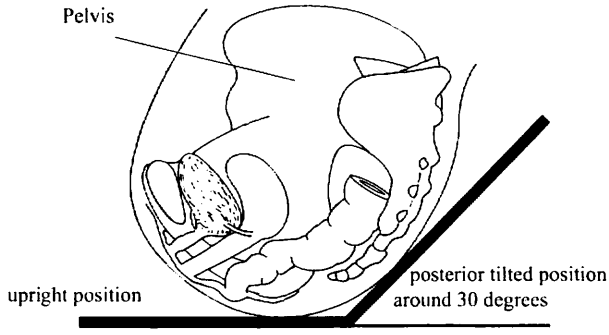


Figure 3-3. Use of lumbar support to keep posteror pelvic tilt

4. Steps in performing CIC

4.1. Prepare tools and supplies for CIC

Before starting CIC, the followings should be prepared (Figure 3-4).

- Disposable Nelaton's catheter or a reusable one such as Self-Cathe®(specially prepared catheter for CIC) of size 12 or 14 French (Fr.) (diameter: 1 Fr. = 1/3 mm).

  A portable type catheter is stored in a case. You should fill the case with disinfectant and put the cap on it.

  When you use a disposable type, you should cover the catheter with a sterile lubricant such as glycerol and xylocaine jelly.
- Urinal. A small basin such as kidney basin or plastic box, for instance, Tupperware®, is available.
- Hi Lady®(clean cotton sheet containing 0.02 % gluconic chlorhexidine. and is commercially available).

You can also use cotton sheets soaked in 0.02 % gluconic chlorhexidine or 0.02% benzalkonium chloride.

- Soap.
- Mirror with holder.

In the early stage of CIC training it is necessary to measure the volume of urine and check its nature such as color, smell, transparency and blood clots. It is recommended to prepare a volumetric cup. Keep a chart to record voiding, that is, the frequency-volume chart.

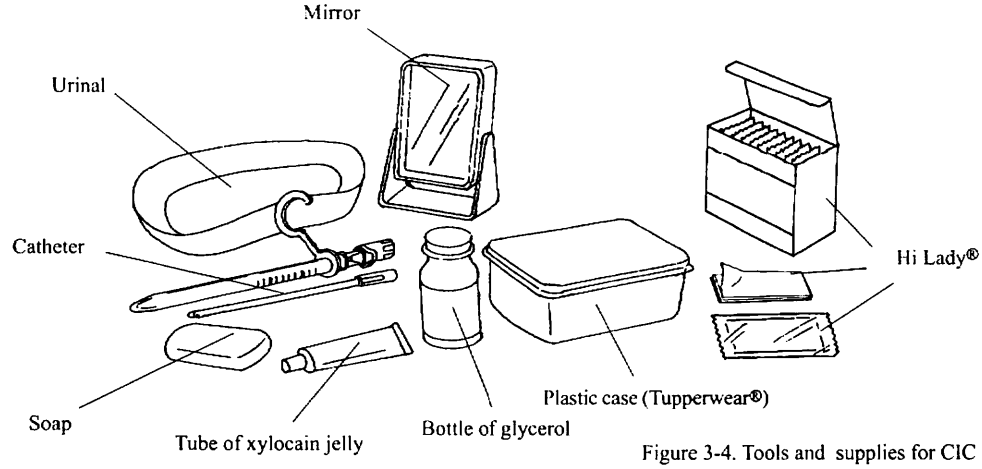


Figure 3-4. Tools and supplies for CIC

4.2. Cut your nails and wash your hands

Routinely cut your nails (Figure 3-5). If not, you may develop black edged nails with pathogenic bacteria.

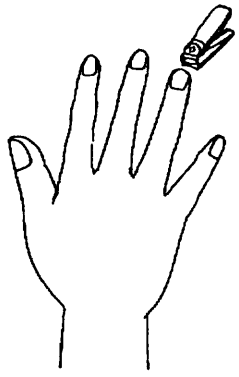


Figure 3-5. Cut nails

Before starting CIC, wash your hands well with soap and water (Figure 3-6).

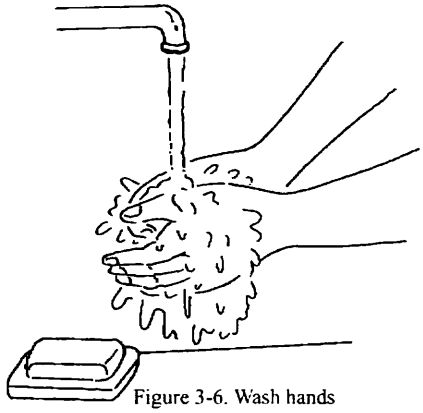


Figure 3-6. Wash hands

4.3. Pull up the shirt, and remove the skirt and/or pants

You should keep necessary tools and supplies on the bed around you before proceeding with CIC.

Long-leg sitting with slightly flexed knees is convenient for keeping the stability of sitting balance. Put a urinal between the legs.

Set the mirror in front of you, so you can easily see the vulva (Figure 3-7).

Once well accustomed, you can manage CIC without the mirror.

Figure 3-7. Set the mirror

4.4. Rub hands well with Hi Lady®

Prepare two sets of Hi Lady®. A set of Hi Lady® consists of two cotton sheets. One sheet is used for rubbing both hands, and the other is for the vulva.

Rub mainly the thumb, the index finger and the palm of both hands with one set of Hi Lady® (Figure 3-8).

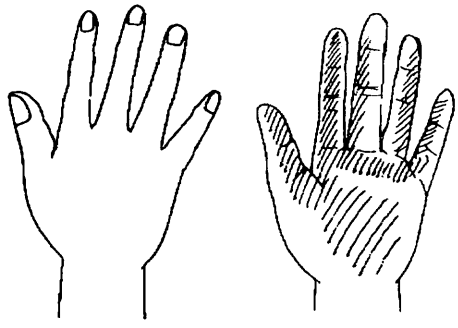


Figure 3-8. Rub hands with Hi Lady®

Rub the interdigital web space of the hand which holds the catheter (Figure 3-9).

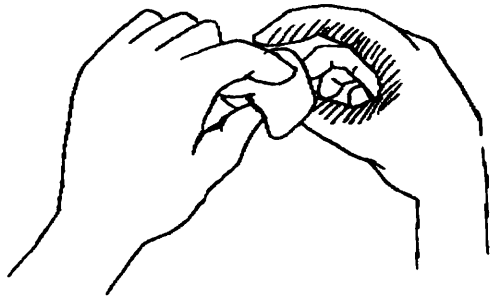


Figure 3-9. Rub interdigital webs

4.5. How to find the urethral opening

Figure 3-10 shows the different parts of the vulva.

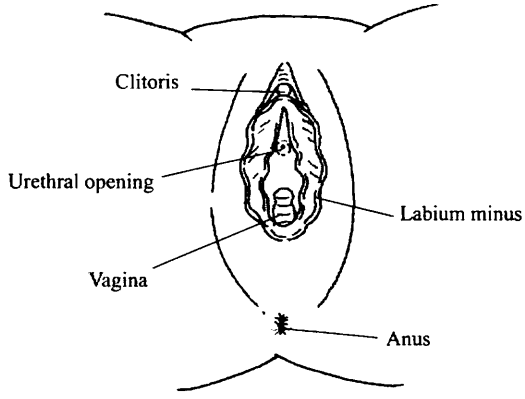


Figure 3-10. The overview of vulva

Open the vaginal lips with your index and middle or ring finger, and pull them up (Figure 3-11). This way, it is easier to see the urethral opening.

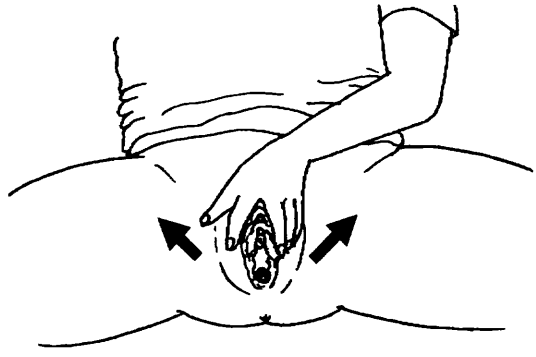


Figure 3-11. Open the vaginal lips

4.6. Wipe the urethral opening

Wipe the vulva several times with the other set of Hi Lady®.

Instead of Hi Lady® you may use a sterile cotton soaked in 0.02 % gluconic chlorhexidine or 0.02% benzalkonium chloride.

The following steps are recommended (Figure 3-12):

(1) Divide a set of Hi Lady® into two sheets.

(2) First, wipe the urethral opening upward with one sheet.

(3) Using the other sheet, wipe the small vaginal lips upward.

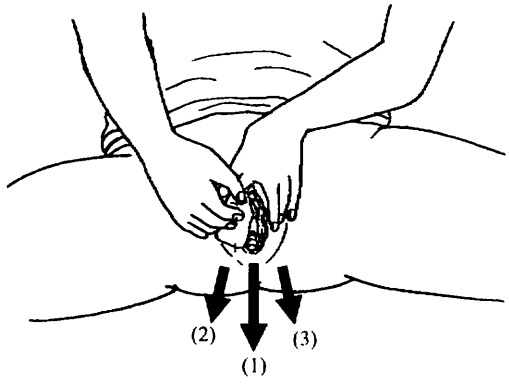


Figure 3-12. Wipe the urethral opening

4.7. Cover the catheter with sterile lubricant when using a disposable one

The lubricant should be applied between the distal end of catheter and a point 5 cm from the distal end (Figure 3-13).

If you are using glycerol kept in a bottle, you can put the distal end of catheter into the bottle.

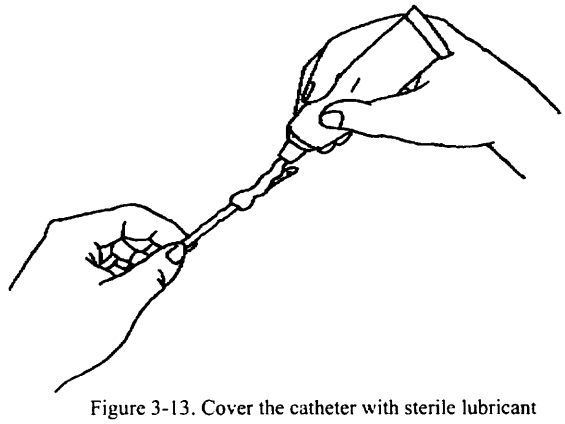


Figure 3-13. Cover the catheter with sterile lubricant

4.8. Gently put the catheter into the urethral opening

Beforehand, set the urinal near the vulva.

Hold the catheter with the thumb, the index and the middle fingers of the preferred hand in the same way as holding a pencil, at about 7 cm from the distal end of catheter (Figure 3-14).

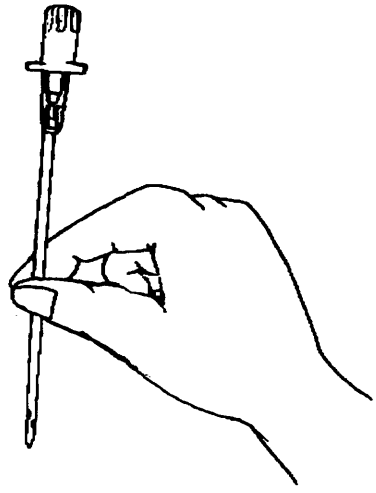


Figure 3-14. How to hold a catheter ?

Insert about 4 to 5 cm of the catheter into the urethral opening. Twist it as necessary but do not force it in (Figure 3-15). Then, change the holding hand from the preferred to the non-preferred one.

Using the preferred hand, take off the cap of catheter.

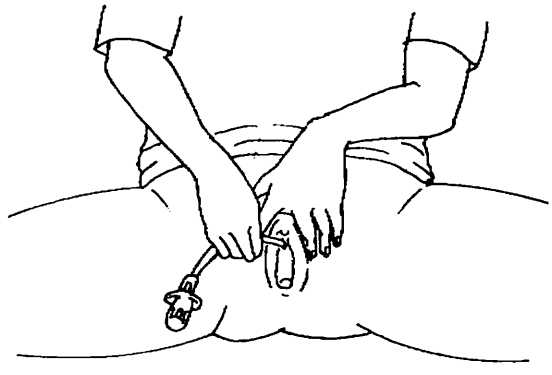


Figure 3-15. Inset the catheter into the urethral opening

4.9. Push the catheter in until urine starts coming out

Drain the urine into the urinal (Figure 3-16).

After the urine stops coming out, move the catheter fore and aft about 1 cm each and check PVR.

During this procedure, try *Credé* and/or *Valsalva* maneuvers.

At first you may make the bed sheet dirty with urine dripping from the catheter. It is better to cover the bed sheet with towels or napkins.

Figure 3-16. Receive urine into the urinal

- *Credé maneuver: hold both hands flat against the belly, just below the navel. Apply a firm downward stroke toward the bladder several times, and then press with both hands placed directly over the bladder to manually remove all urine.*
- *Valsalva maneuver: increase the intrathoracic pressure with forcible exhalation against the closed glottis. Strain as if you are defecating.*

4.10. Drawing out the catheter

Keeping the catheter at a level, pull it straight out (Figure 3-17).

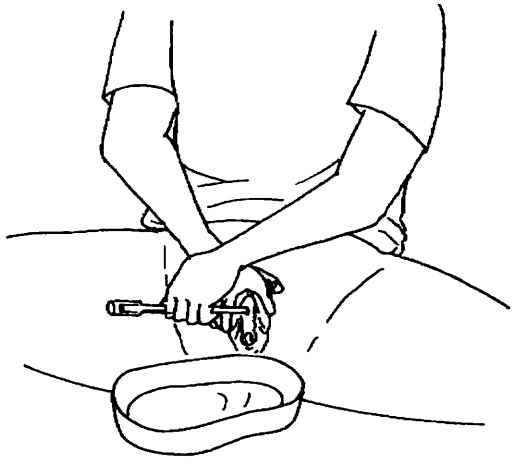


Figure 3-17. Pull out the catheter

4.11. Wash the used catheter with water

Hold the proximal end of the used catheter and put it under tap water, washing both its inside and outside (Figure 3-18).

Return it into the case filled with antiseptic solution. Make sure that the inside of the catheter is filled with the antiseptic solution.

Lastly, close the cap.

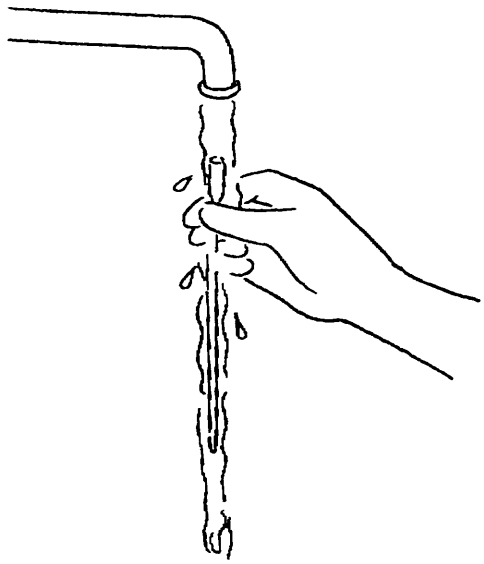


Figure 3-18. Wash the used catheter

4.12. How to keep the catheter

You can put the portable type catheter which is kept in the case such as Self-Cathe®, inside your bedside drawer, handbag or basket. You may use a plastic case such as Tupperware®, instead of the original case.

5. Other comments

5.1. Observe your urine

As instructed by your physician, you should record the volume of water intake per day, the time of CIC and the volume and the nature of urine. The frequency-volume chart is useful for this purpose (Figure 3-19). The above mentioned data should be written in each time zone on the chart.

You can get the chart at a urologist s clinic.

Although the items to be recorded in each time zone depend upon symptoms and/or signs, the following should be written in every zones.

- The time of CIC with the volume of urine.
- The time and the volume of water intake.
- The time and the volume of incontinence.
- Medications taken.
- As for the urine, check for color, smell, transparency, floating or suspended materials, and blood clots.

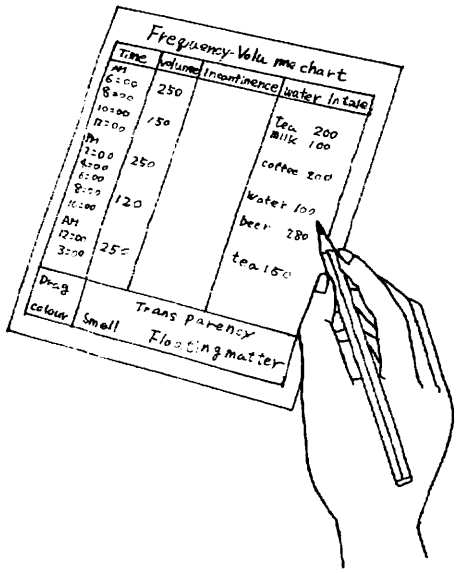


Figure 3-19. Frequency-volume chart

5.2. How to do CIC on a toilet stool

When you perform CIC on a toilet stool, sit with the back reclined. Keeping a wide space in front makes it easy to do CIC (Figure 3-20).

Holding the proximal end of catheter, flex it to the direction of bowl (Figure 3-21).

Figure 3-20. Position for CIC on a toilet stool

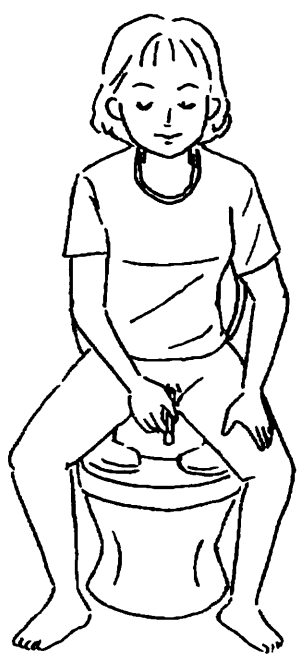


Figure 3-21. Urine comes out

5.3. For persons with paretic hands due to spinal cord injury (C6) —How should the catheter be held ?

Persons with functional level of C6 show a muscular strength of grade 3 on the wrist extensor muscles on manual muscle testing, that is, they can extend the wrist against gravity.

Extending the wrist joint, you can hold a catheter between the thumb and the index finger (Figure 3-22).

Although training is necessary for use, a metal catheter is easy to insert into the urethral opening (see Chapter V).

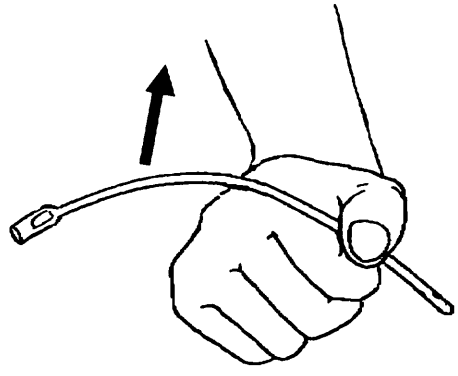


Figure 3-22. Hold a catheter between the thumb and the index finger

5.4. Use of intermittent balloon catheter

The intermittent balloon catheter is convenient for persons who need to do CIC at midnight. When a person is on a trip and can not perform CIC for many hours, she also uses this catheter. See Chaper V for details of the catheter.

IV. Complications of Clean, Intermittent Self-Catheterization

1. Hematuria

Hematuria is the discharge of blood in the urine. The urine may be slightly blood tinged, grossly bloody or dark brown in color. You can sometimes see blood clots in the urine.

The hematuria due to slight injury of the urethra or the bladder caused by catheterization is mostly light colored. Usually the hematuria will clear up within one or two days. If it does not, visit a urologist's clinic.

2. Acute cystitis

Transient bacteriuria is often observed in persons performing CIC, but acute cystitis is unusual. Clinical symptoms and signs of acute cystitis are dysuria, frequency and urgency of urination, incontinence, turbidity of urine, and in some cases hematuria.

Continuation of CIC will usually bring about improvement of symptoms.

Broad spectrum antibiotics are prescribed for the treatment of cystitis. The use of prophylactic antibiotics is controversial (Linsenmeyer et al. 1993).

3. Acute pyelonephritis

Chills and high fever with turbidity of the urine indicate involvement of the entire urinary tract, including the kidneys. Consult your physician as early as possible.

4. Bladder stones due to pubic hair

Pubic hair may be carried into the bladder during CIC. The hair could become the nucleus of a bladder stone.

In case of long-standing urinary turbidity, chronic cystitis is suspected.

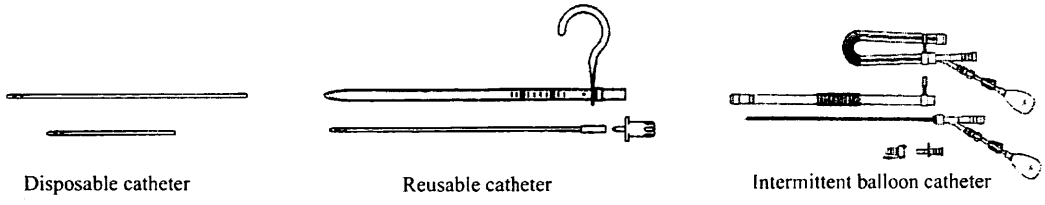
Yearly cystoscopy or ultrasonic investigation, X-ray examination is recommended to rule out bladder stones.

V. Tools and Supplies

1. Catheters for CIC

1.1. Catheters are arbitrarily classified into the three groups (Figure 5-1)

- Disposable catheter
- Reusable catheter
- Intermittent balloon catheter: may be counted as one of the reusable catheters



Disposable catheter | Reusable catheter | Intermittent balloon catheter

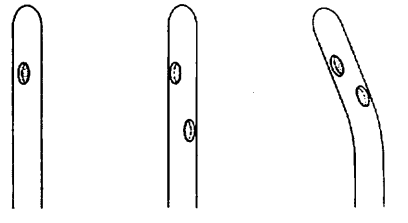
Figure 5-1. Various kinds of catheter

1.2. Catheters are prepared from polyvinyl chloride (PVC), polyurethane, silicone rubber or metal

- Catheters made of PVC or polyurethane belong to the disposable type.
- Those of silicone rubber or metal belong to the reusable type and are usually used with anti-septic solution.

1.3. Length of catheters

- 28 - 35 cm for male adults.
- 13 - 16 cm for female adults.
- 13 - 26 cm for children.



Round tipped catheter | Elbowed catheter

Figure 5-2. Form of catheter tip

1.4. Diameter of catheters

- 12 or 14 Fr. for adults.
- 8 or 9 Fr. for children.

1 Fr. = 1/3 mm : 12 Fr. = 4 mm, and 14 Fr. = 4.7 mm.

The diameter of catheters ranges from Fr. 8 to 26.

1.5. Form of catheter tip

Routinely used catheters are round tipped. Elbowed catheter or prostatic catheter bent at an angle near the beak is used for persons with prostate hypertrophy.

Catheters may have one or two openings. There are catheters with many openings(Figure 5-2).

1.6. Others

- Metal catheters are easy to handle for persons with paretic hands, especially for the insertion of catheter into the urethral opening.
- Several catheters made of silicone rubber are equipped with a mandrin, a metal guide for a flexible catheter. Silicone rubber is softer than PVC.

2. Intermittent balloon catheter

Two separate lumina are incorporated within the round shaft of the catheter for the drainage of urine and the inflation of bag (Figure 5-3).

After inserting the catheter into the bladder, open the clamp and push the reservoir, pushing out the water into the balloon (Figure 5-4). Then, close the clamp, so that the catheter is held in the urethra for the purpose of draining urine from the bladder.

Release the clamp, returning the water from the balloon into the reservoir, in order to remove the catheter.

The care of the intermittent balloon catheter, similar to cases using an indwelling catheter, is necessary when using the catheter for a long period of time.

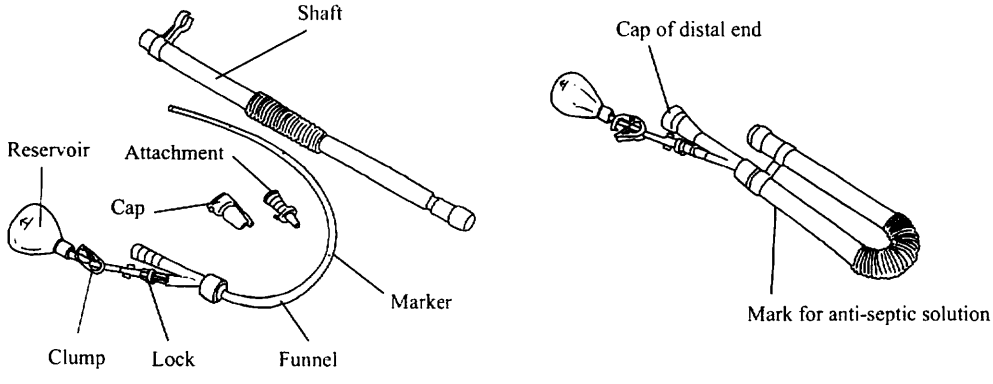


Figure 5-3. Intermittent balloon catheter

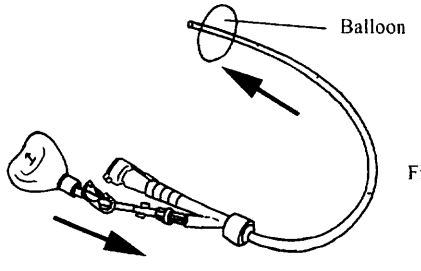


Figure 5-4. pushing out the water into the balloon

3. Antiseptic solution

3.1. What antiseptic solution is used ?

A mixture of antiseptic solution (benzalkonium chloride) and lubricant (glycerol) is used for disinfection of the catheter and its case. The antiseptic solution consists of 0.02% benzalkonium chloride.

3.2. How to make the antiseptic solution

Add 1 ml of 10% benzalkonium to 500 ml of 50% glycerol, using a syringe or an injector. Both 10% benzalkonium and 50% glycerol are commercially available.

3.3. Change the antiseptic solution at least once a week

Long standing antiseptic solutions may be polluted by bacteria. The use of polluted solution will cause cystitis and/or urethritis.

3.4. Lubricant for disposable catheter

Disinfected glycerol sealed in a bottle and/or xylocaine jelly in a tube are commercially available for the disposable catheter.

4. On the reusable catheter

Change the reusable catheter made of silicone rubber once a month.

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