Chapter 29

Promoting Urinary Elimination

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Chapter 29

Lesson 29.1

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Learning Objectives

Theory

1) Review the structure and functions of the urinary system.
2) Determine abnormal appearance of a urine specimen.
3) Describe three nursing measures to help patients urinate normally.

Clinical Practice

1) Assess a patient's urinary status.
2) Perform a urine dipstick test accurately.
3) Teach a patient how to obtain a "clean-catch" (midstream) specimen.
4) Assist patients with toileting.
5) Insert an indwelling catheter using sterile technique.

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Structure of the Urinary System

- Kidneys
  - Two bean-shaped organs 6 cm wide x 12 cm long
  - Located at level of L1 on either side of the spine
    - Each kidney contains approximately 1 million nephrons
- Nephrons
  - Inside each nephron is a glomerulus consisting of a cluster of capillaries surrounded by Bowman's capsule and a system of tubules
  - Nephrons are the working units of the kidney

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Structure of the Urinary System (cont'd)

- Ureters
  - Hollow tubes that carry urine from the kidneys to the bladder
  - Each ureter is 25 to 30 cm long
- Bladder
  - Hollow muscular organ located in lower pelvis that stores urine
- Urethra
  - Carries urine from bladder to meatus; flow controlled by urinary sphincter
  - Meatus—conducts urine to outside the body

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Figure 29-1: Structures of the urinary system

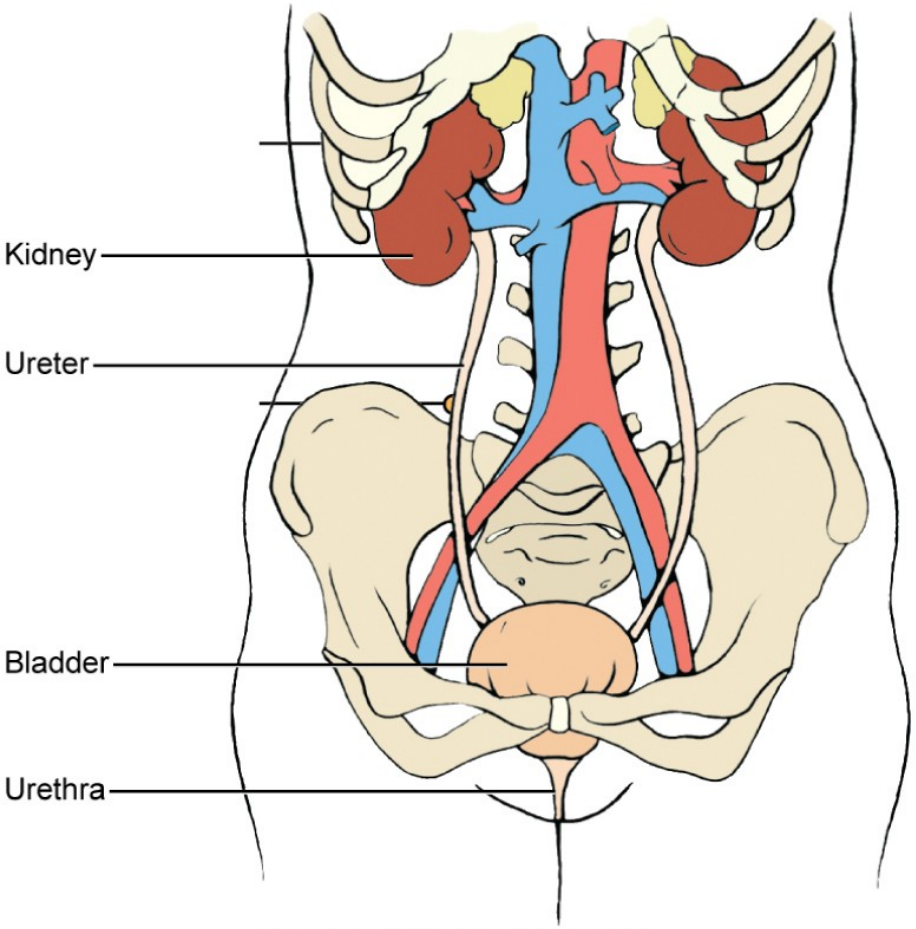

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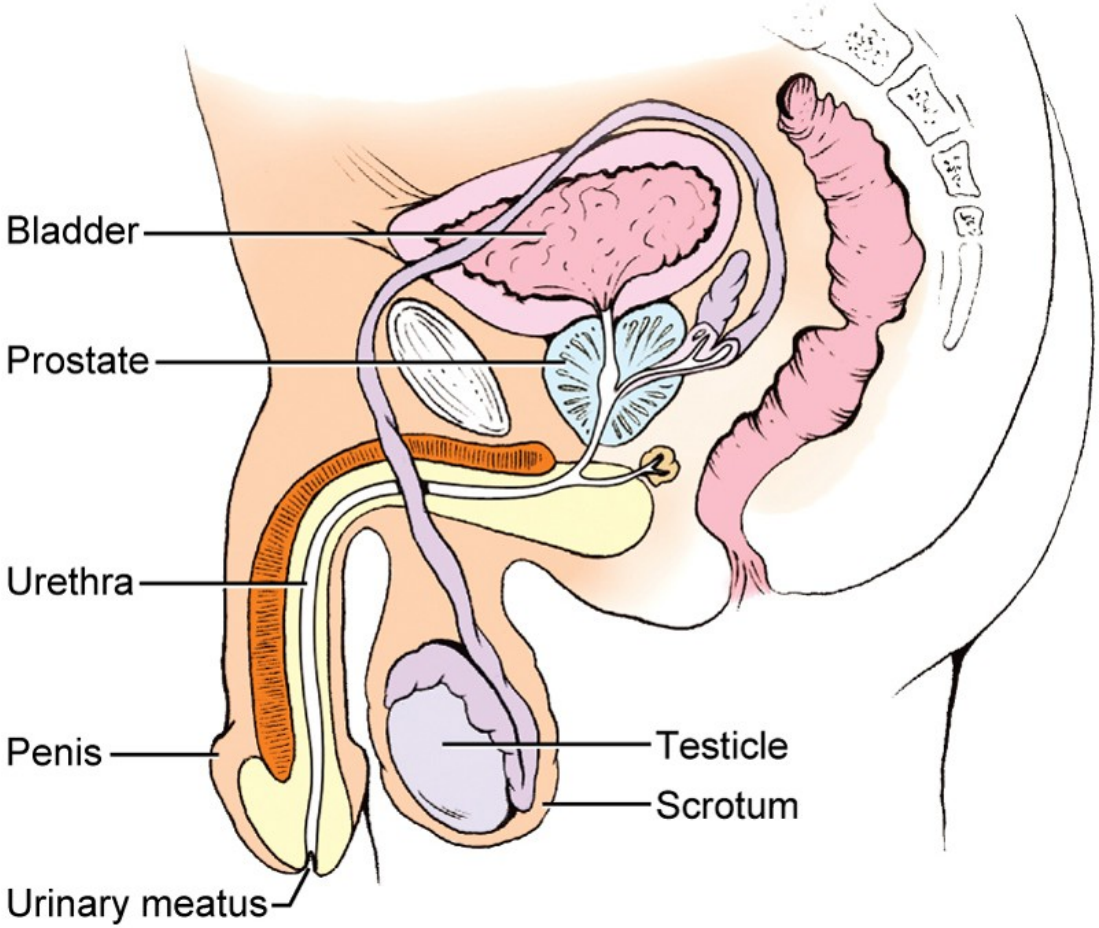
Figure 29-2: Tract of the male urethra



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Function of the Urinary System

- Kidneys
  - Filter blood through the nephrons
  - Metabolic waste and excess water are extracted
  - Regulate electrolytes by excreting excess amounts and help with acid-base balance retaining hydrogen ions and bicarbonate
  - Tubules secrete, excrete, or reabsorb electrolytes, water, and other substances

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Function of the Urinary System (cont'd)

- Kidneys manufacture approximately 1.5 L of urine in 24 hours
- Urine production related to various factors
- Ureters carry urine from kidneys to bladder
- Bladder stores urine and signals when it is full
- Bladder empties when 250 to 400 mL of urine is present (under voluntary control)

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Function of the Urinary System (cont'd)

- Bladder can contain 1000 to 1800 mL of urine
- Average urine output is 1000 to 1500 mL per day
- Urethra carries urine from bladder sphincter to the meatus
- Internal sphincter relaxes with micturition (urinating reflex)
- The external sphincter is under voluntary control
- At least 600 mL of urine must be excreted per day to remove waste products

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Factors Interfering with Urinary Elimination

- Blockage of the ureters
  - Stones
  - Tumors in the abdominal cavity
  - Trauma to the lower abdomen
  - Disruption of the bladder by tumor or trauma
  - Enlarged prostate
  - Trauma to the urethra
  - Infection of the urinary system
  - Neurologic damage

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Changes Occurring with Aging

- Decrease in the number of functioning nephrons
- Decrease in filtration rate
- Decreased bladder tone—nocturia
- Decreased bladder emptying, increased residual
- Enlargement of prostate—urethral obstruction
- Incontinence is not a normal part of aging

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Normal Urinary Elimination

- Infants void 5 to 40 times/day
- Preschool children may void every 2 hours
- Adults void 5 to 10 times per day
- Males void 300 to 500 mL
- Females void 250 mL
- Average output should be approximately 30 mL/hr

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Factors Affecting Normal Urination

- Neurologic and muscle development
- Alterations in spinal cord integrity
- Fluid volume intake
- Fluid loss in perspiration
- Vomiting
- Diarrhea
- ADH secreted by the pituitary

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Characteristics of Normal Urine

- Color
  - Straw-colored or amber
- Clarity
  - Transparent or only slightly cloudy
- Odor
  - Faintly like ammonia
- Specific gravity
  - Normal range is 1.010 to 1.030
- pH
  - Slightly acid, ranging from 5.5 to 7.0

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Alterations in Urinary Elimination Patterns

- Anuria
  - Less than 100 mL of urine output in 24 hours
- Dysuria
  - Painful or difficult urination; may be from infection or trauma
- Incontinence
  - Involuntary release of urine

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Alterations in Urinary Elimination Patterns (cont'd)

- Nocturia
  - When a person has to get up more than twice in the night to void
- Oliguria
  - Decreased urine output less than 400 mL in 24 hours
- Polyuria
  - Excessive urination (>1500 mL in 24 hours)

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Alterations in Urinary Elimination Patterns (cont'd)

- Cystitis
  - Inflammation of the bladder
  - May be caused by irritation of highly concentrated urine, pathogenic bacteria, injury, or instillation of an irritating substance
  - Symptoms: frequency, urgency, dysuria, burning, malaise, foul-smelling urine, slight temperature elevation

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Urinary Specimens

- Normal voided specimen
  - Send to the laboratory within 5 to 10 minutes
  - Urine standing more than 15 minutes changes characteristics
- Midstream (clean-catch) specimen
- Specimen from an indwelling catheter
- Sterile catheterized specimen
- 24-hour specimen
- Strained specimen

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Figure 29-3: Urine collection devices

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Abnormalities Found in Urine

- Glycosuria
  - Glucose in the urine
- Proteinuria
  - Protein in the urine
- Hematuria
  - Blood in the urine
- Pyuria
  - Pus in the urine
- Ketonuria
  - Ketones in the urine

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Assessment

- Patients should be assessed for:
  - Usual pattern of elimination
  - Incidences of incontinence, frequent urination
  - Burning on urination
  - Sense of urgency
  - Times of day for elimination
  - Total daily fluid intake

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Question 1

The urinary system is made up of which of the following structures?

1) Ureters, bladder, kidneys, urethra
2) Ureters, bladder, kidneys, prostate
3) Bladder, kidneys, urethra, urostomy
4) Urinometer, bladder, kidneys, urinary meatus

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Question 2

Erin's patient has been complaining of burning when she urinates. Her doctor ordered a urinalysis, which shows pyuria. These results indicate:

1) there is an increased amount of protein.
2) liver disease or an obstruction of the bile duct.
3) there is blood in the urine.
4) there is pus in the urine.

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Chapter 29

Lesson 29.2

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Learning Objectives

Theory

4) Compare and contrast the purposes and principles of indwelling and intermittent catheterization.

5) Summarize the rationale for using a continuous bladder irrigation system.

6) Analyze different methods of managing urinary incontinence.

Clinical Practice

5) Insert an indwelling catheter using sterile technique. (Continued)

6) Perform catheter care.

7) Teach a patient how to perform Kegel exercises.

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Types of Urinary Catheters/Specimens

- Catheter types
  - Robinson
  - Foley
  - Suprapubic
  - Coudé
  - Alcock
  - de Pezzer
  - Malecot
  - Condom
- Specimen types
  - Routine
  - Midstream
  - Indwelling catheter
  - Sterile
  - 24-hour
  - Strained
  - Inserting a catheter (see Skill 29-2)

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Figure 29-8: Common urinary catheters

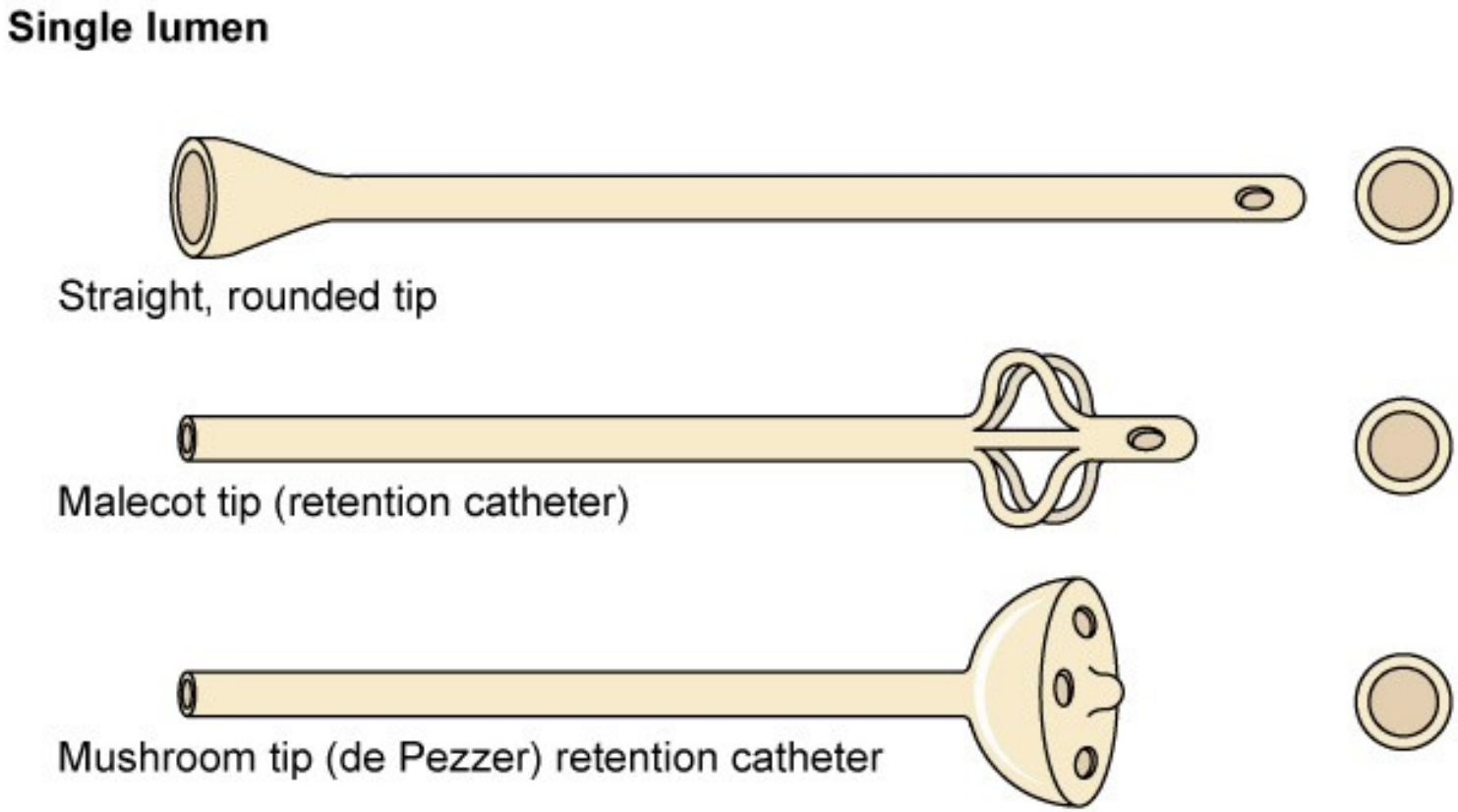

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Figure 29-8: Common urinary catheters (cont'd)

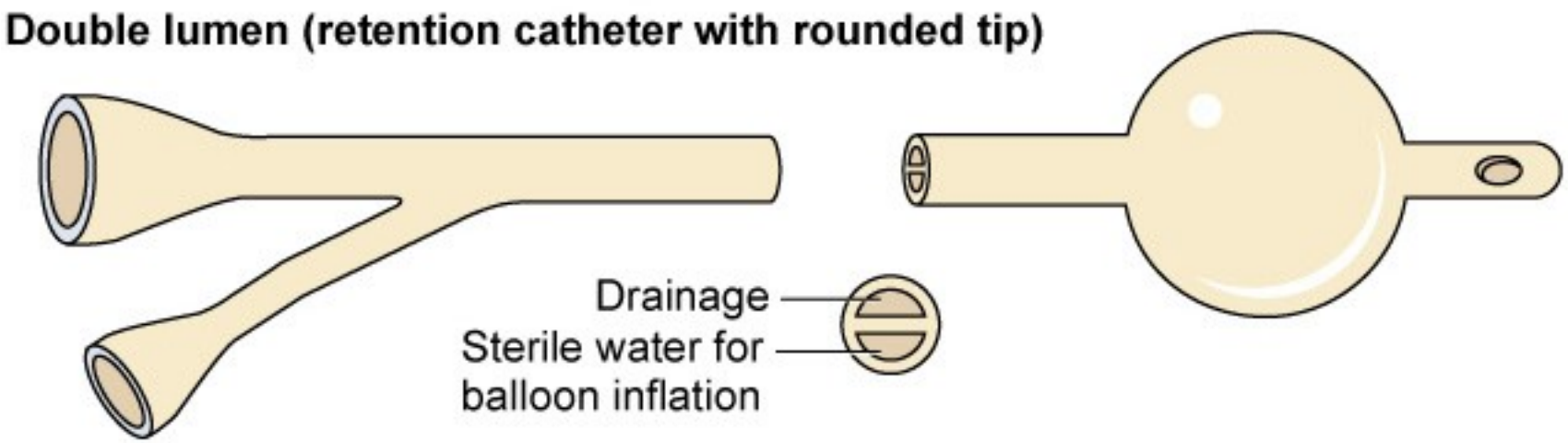

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Figure 29-8: Common urinary catheters (cont'd)

Triple lumen Alcock (retention catheter with Coudé tip)

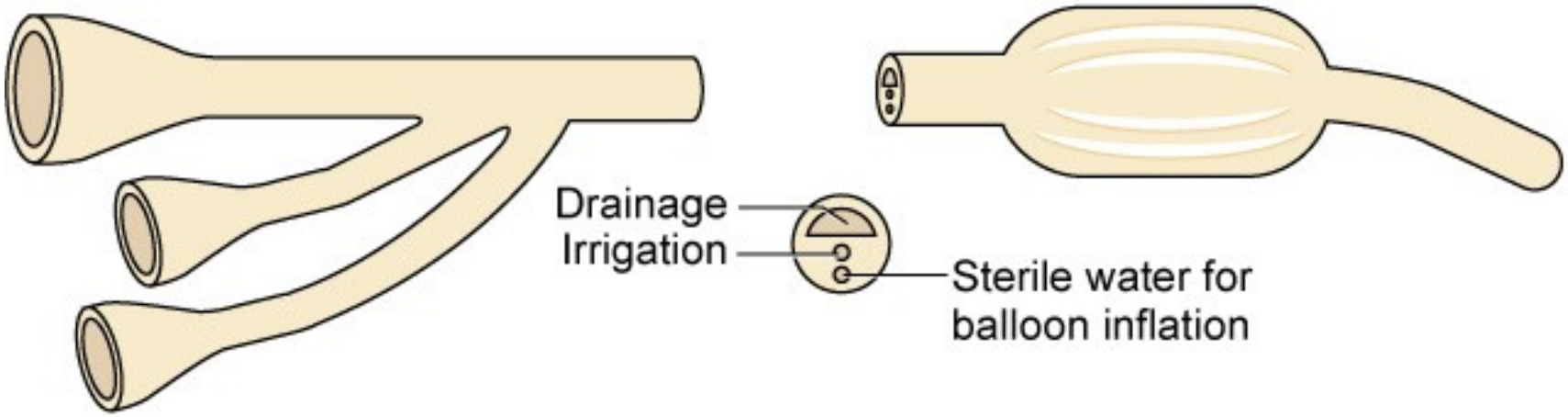

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Figure 29-9: Side-lying position for catheterization

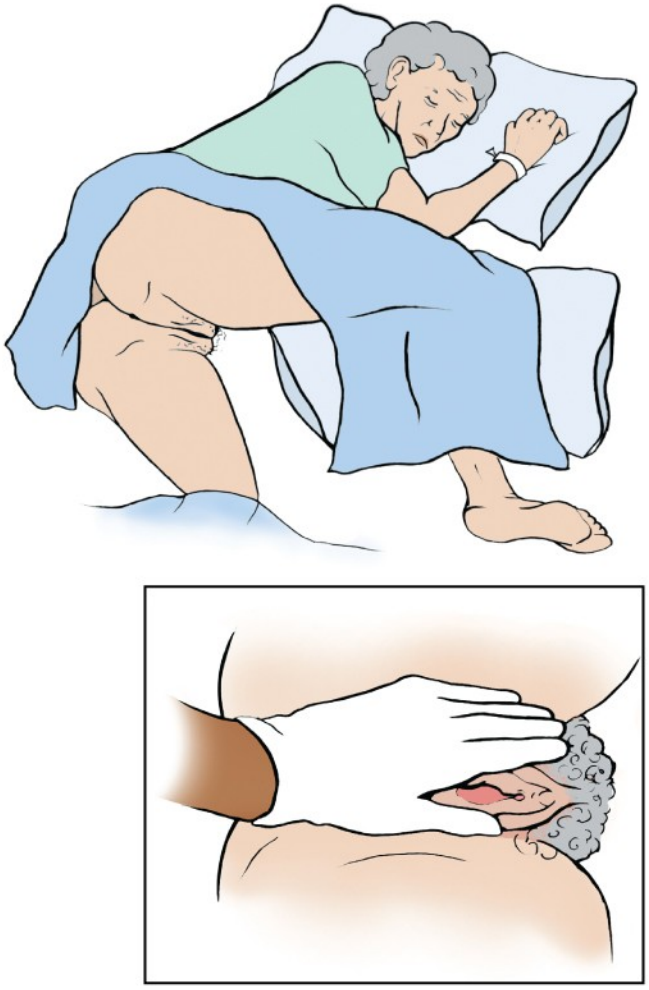

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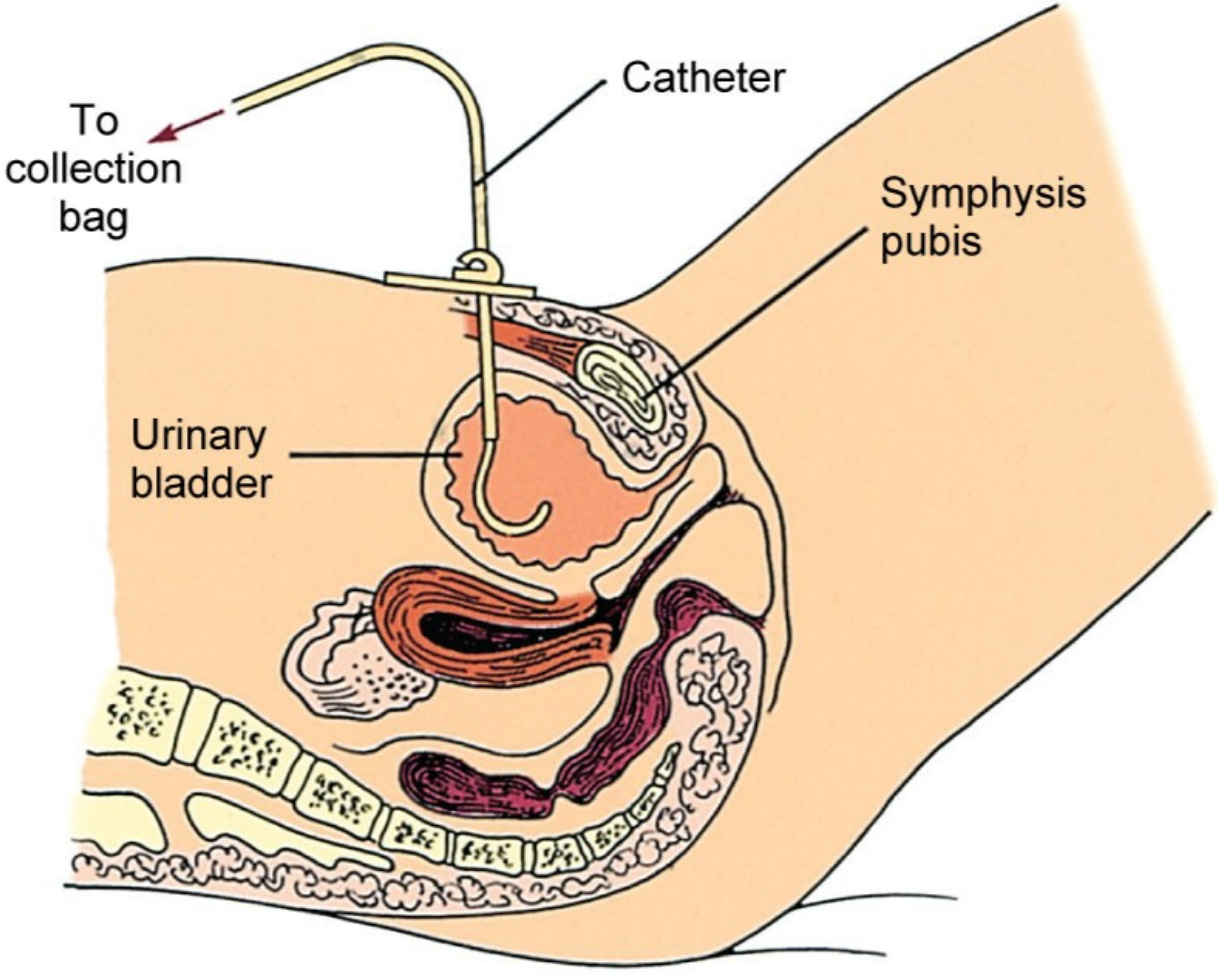
Figure 29-10: Suprapubic catheter



From Elkin, M.K., Perry, A.G., & Potter, P.A. (2007). *Nursing Interventions and Clinical Skills* (4th ed.). St. Louis: Mosby.

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Incontinence

- Loss of normal bladder control
- Body image disturbance, Increased risk for impaired skin integrity, Increased risk for infection
- May be temporary or permanent
- May be corrected by surgery
- May be helped by performing Kegel exercises

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Urinary Diversion

- Necessary when the bladder is removed or bypassed
- One or both ureters are implanted into:
  - The abdominal wall (urostomy)
  - The bowel
  - A pouch constructed from a piece of bowel
- Skin care depends on the type of diversion

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Documentation of Voiding

- Document:
  - When a patient is voiding normally (voiding sufficiently)
  - Whether there is a problem voiding (i.e., dysuria)
  - Whether the patient is continent
  - The amount of urine output
  - Any bladder irrigations
  - Presence of an indwelling catheter (or when it is removed)

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Question 3

Brenda is making rounds on her postoperative patient. She notices her patient's Foley has drained 90 mL in 3 hours. Which statement is correct?

1) This is a severe decrease in urine output.
2) This is an average amount of urine output.
3) This is a slightly above-average amount of urine output.
4) This is an excessive amount of urine for a postoperative patient.

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Question 4

Erin's patient will be going home with a catheter. All of the following are true regarding a Foley catheter *except*:

1) it is the most common type of indwelling catheter.
2) it has two lumens.
3) the balloon is inflated to 15 mL.
4) it may also be used for suprapubic drainage

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Question 5

Bruce's patient needs a condom catheter. This type of catheter is used when:

1) the patient cannot void.
2) a man or woman has bladder surgery.
3) a female is incontinent.
4) a male is incontinent.

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