

Syrian Private University

Medical Faculty

**The Urinary
System**

Medical Terminology

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Lecture 9

Objectives

After studying this chapter, you will be able to:

- **Name the parts of the urinary system and discuss the function of each part**
- **Define combining forms used in building words that relate to the urinary system**
- **Identify the meaning of related abbreviations**
- **Name the common diagnoses, clinical procedures, and laboratory tests used in treating disorders of the urinary system**

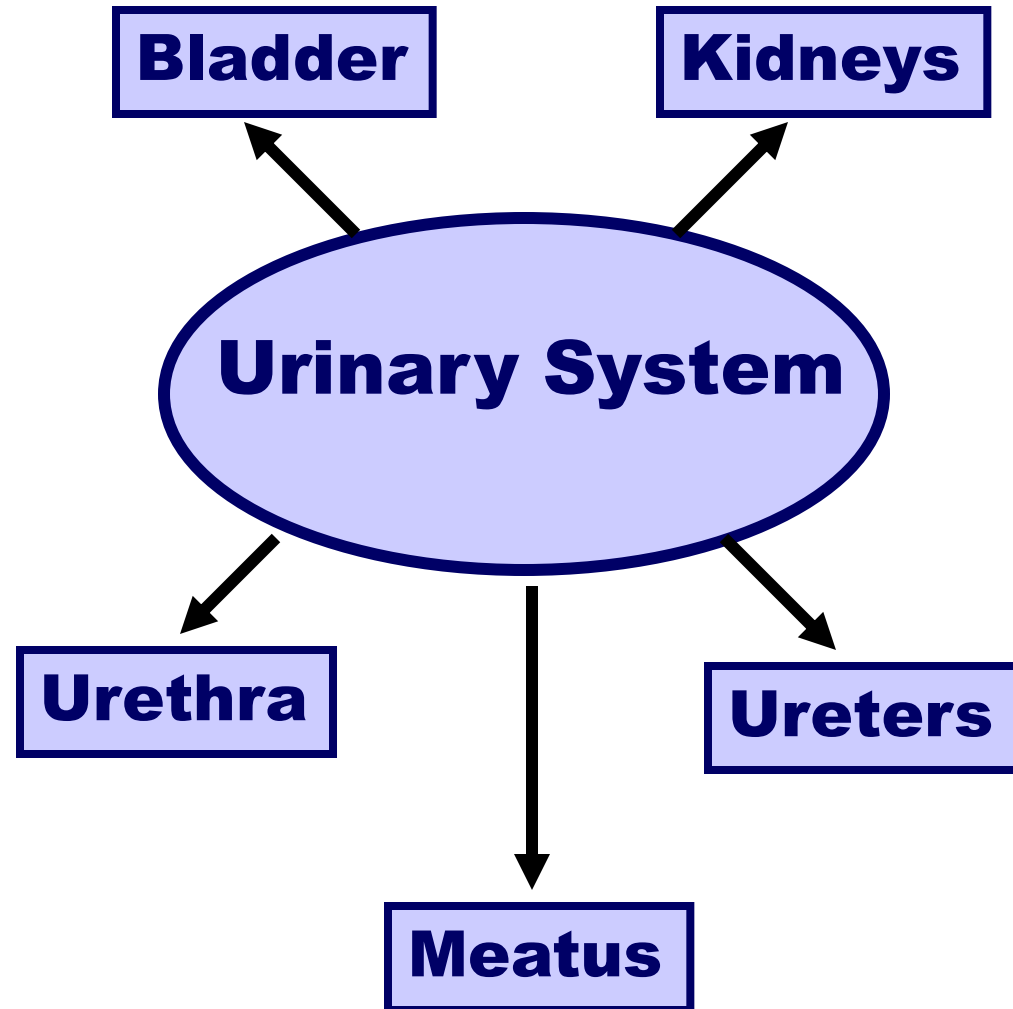
Objectives cont'd

- **List and define the major pathological conditions of the urinary system**
- **Explain the meaning of surgical terms related to the urinary system**
- **Recognize common pharmacological agents used in treating the urinary system**

Structure and Function

The Urinary System

- **Also called the excretory system**
- **Maintains water balance**
- **Removes waste products from the blood by excreting them in the urine**



Structure and Function

Kidneys

The kidneys are bean-shaped organs located in the retroperitoneal portion of the abdominal cavity on either side of the vertebral column.

Two Primary Functions

- To form urine for excretion**
- To retain essential substances the body needs in the process called reabsorption**

Structure and Function

Kidneys filter about 1700 liters of blood daily in the average adult.

Parts of the kidneys

- **Cortex**

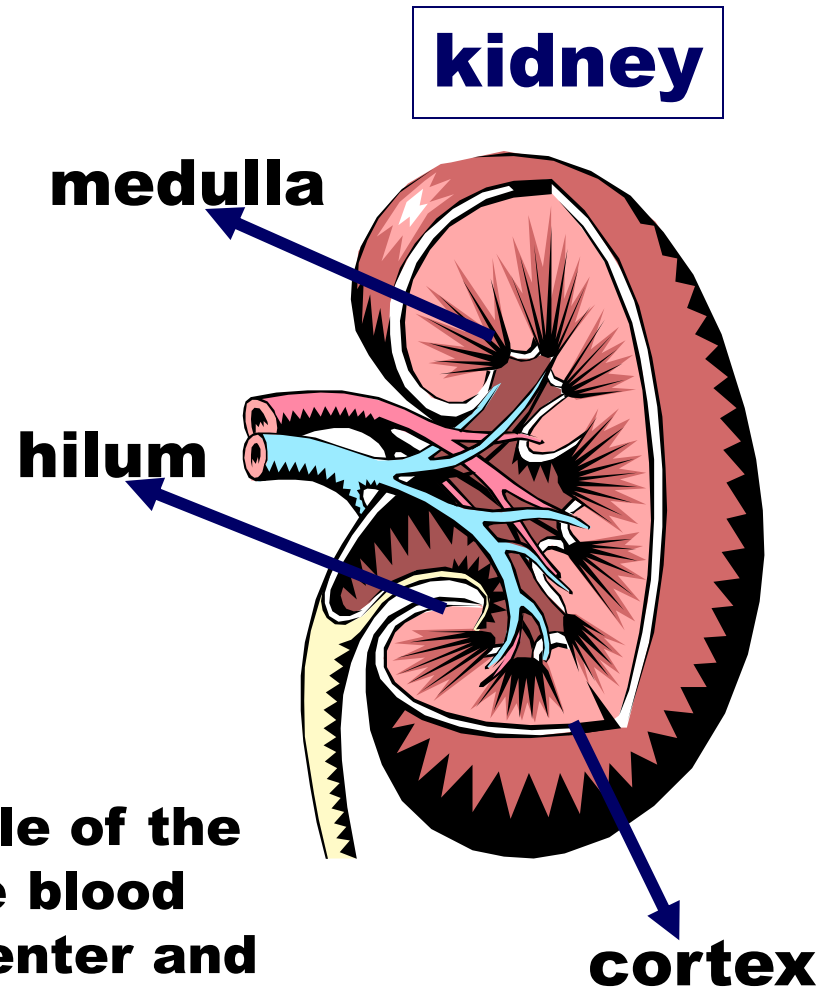
- outer protective portion

- **Medulla**

- inner soft portion

- **Hilum**

- a depression located in the middle of the concave side of the kidney where blood vessels, nerves, and the ureters enter and exit the kidneys



Structure and Function

Urine is produced by **filtration of:**

- water
- salts
- sugar
- urea
- creatinine
- uric acid

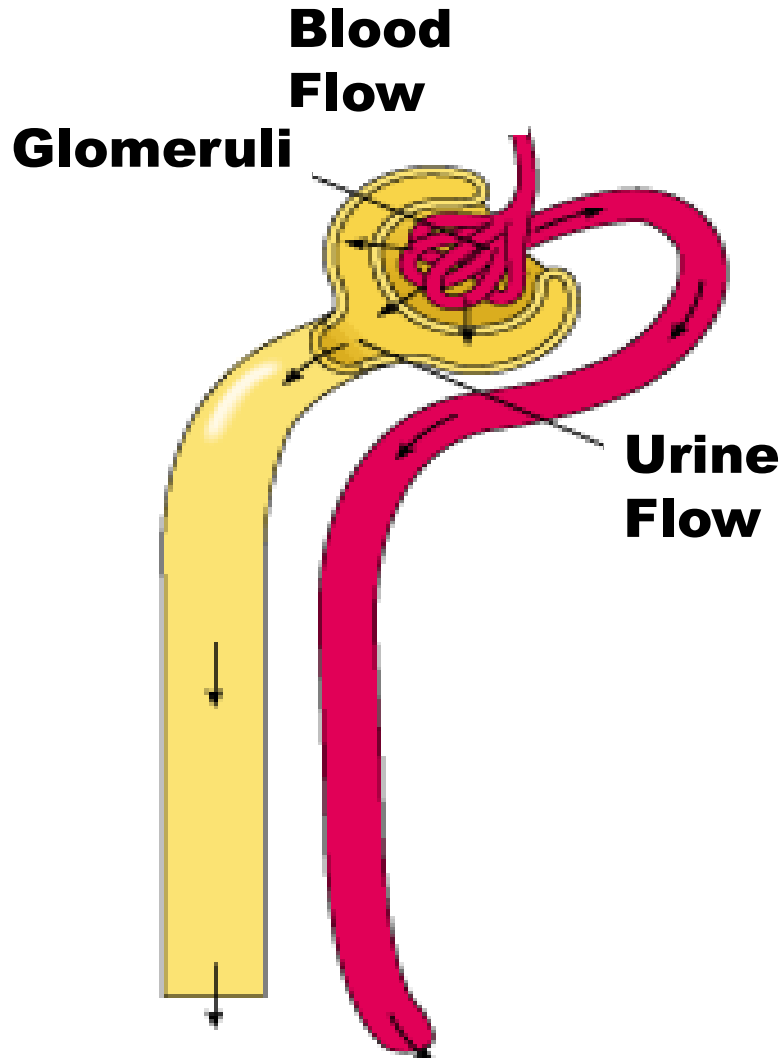
Each kidney contains more than 1 million **nephrons which are the functional units of the kidneys.**

Blood Flow through the Kidneys

Blood enters through the **renal artery → arterioles →**
Each arteriole leads to a **nephron → renal corpuscle**
(which has a group of capillaries called the **glomerulus)**

The glomerulus filters fluid from the blood, and is the first place where urine is formed in the kidneys.

Structure and Function



- **Blood flows through the glomerulus at a constant rate.**
- **Each glomerulus is surrounded by a capsule known as **Bowman's capsule**.**
- **Blood then passes into the **renal tubules** where some substances are **reabsorbed** and the remaining become urine.**

Structure and Function

Flow of Urine

glomerulus



renal tubules



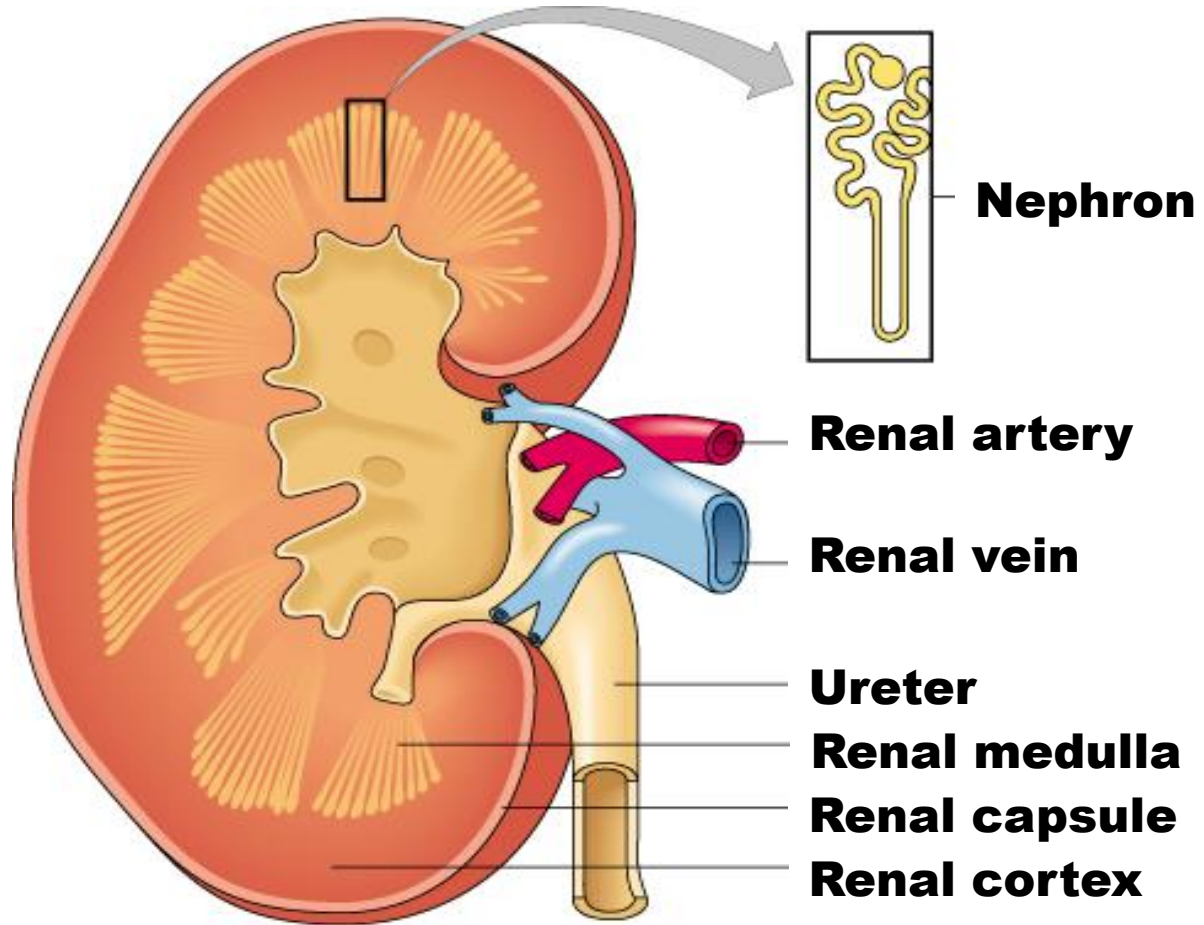
renal pelvis



renal calices



ureters



Filtered blood exits the kidneys via the renal vein.

The renal tubules carry urine to ducts in the renal cortex.

Structure and Function

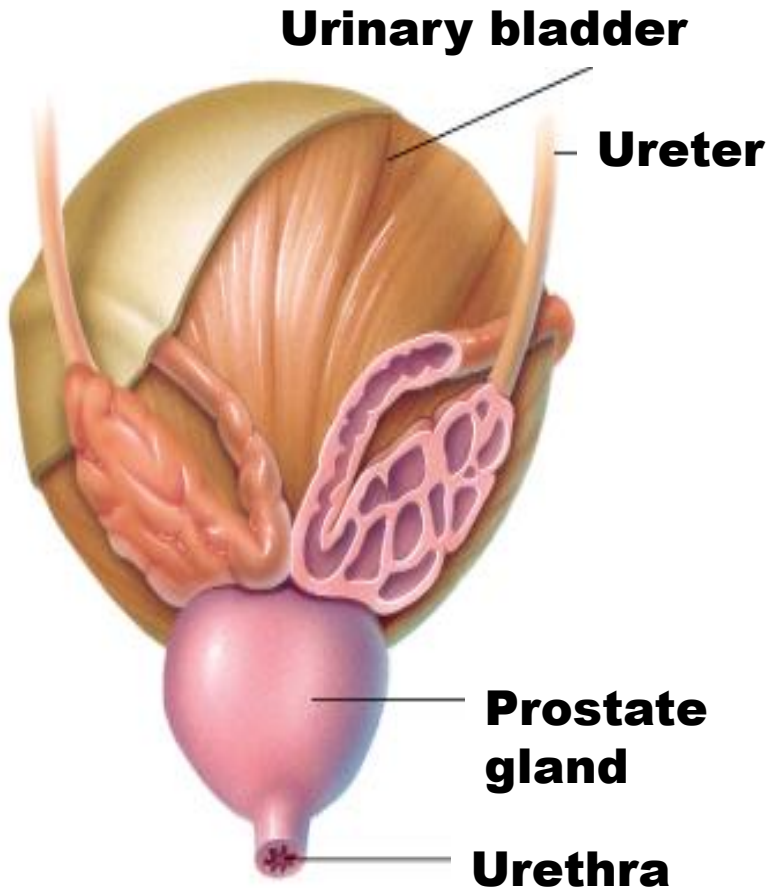
Ureters

- **A tube approximately 12-17 cm long attached to each kidney**
- **Made up of three layers of tissue**
 - **smooth muscle**
 - **fibrous tissue**
 - **mucous layer**

Peristalsis, a rhythmic contraction of the ureter smooth muscle which helps to move the urine into the bladder.

Structure and Function

Urinary Bladder



- **Hollow, muscular organ that stores urine**
- **Sphincter muscles** hold the urine in place
- **Holds 300 to 400 milliliters** of urine before emptying
- **Walls contain epithelial tissue** that stretch to allow the bladder to hold twice its capacity
- The **trigone** is a triangular area at the base of the bladder where the ureters enter and the **urethra** exits

Structure and Function

Urethra

A tube of smooth muscle with a mucous lining that carries urine from the bladder to the outside of the body.

Female Urethra

- **Approximately 1.5 inches long**
- **Opens through the meatus**

Excreting urine is called voiding or micturition

Male Urethra

- **Approximately 8 inches long**
- **Passes through three different regions:**
 - **prostate gland**
 - **membranous portion**
 - **penis**

Combining Forms and Abbreviations

Combining Forms

Meaning

cali(o)	↔	calix
cyst(o)	↔	bladder
glomerul(o)	↔	glomerulus
meato	↔	meatus
nephr(o)	↔	kidney
pyel(o)	↔	renal pelvis
ren(o)	↔	kidney

Combining Forms and Abbreviations

Combining Forms

Meaning

trigon(o) ●—————● **trigone**

urin(o) ●—————● **urine**

ureter(o) ●—————● **ureter**

urethr(o) ●—————● **urethra**

vesic(o) ●—————● **bladder**

Diagnostic, Procedural and Laboratory Terms

Urologists are physicians who specialize in disorders of the male and female urinary tracts, and the male reproductive system.

Common Tests

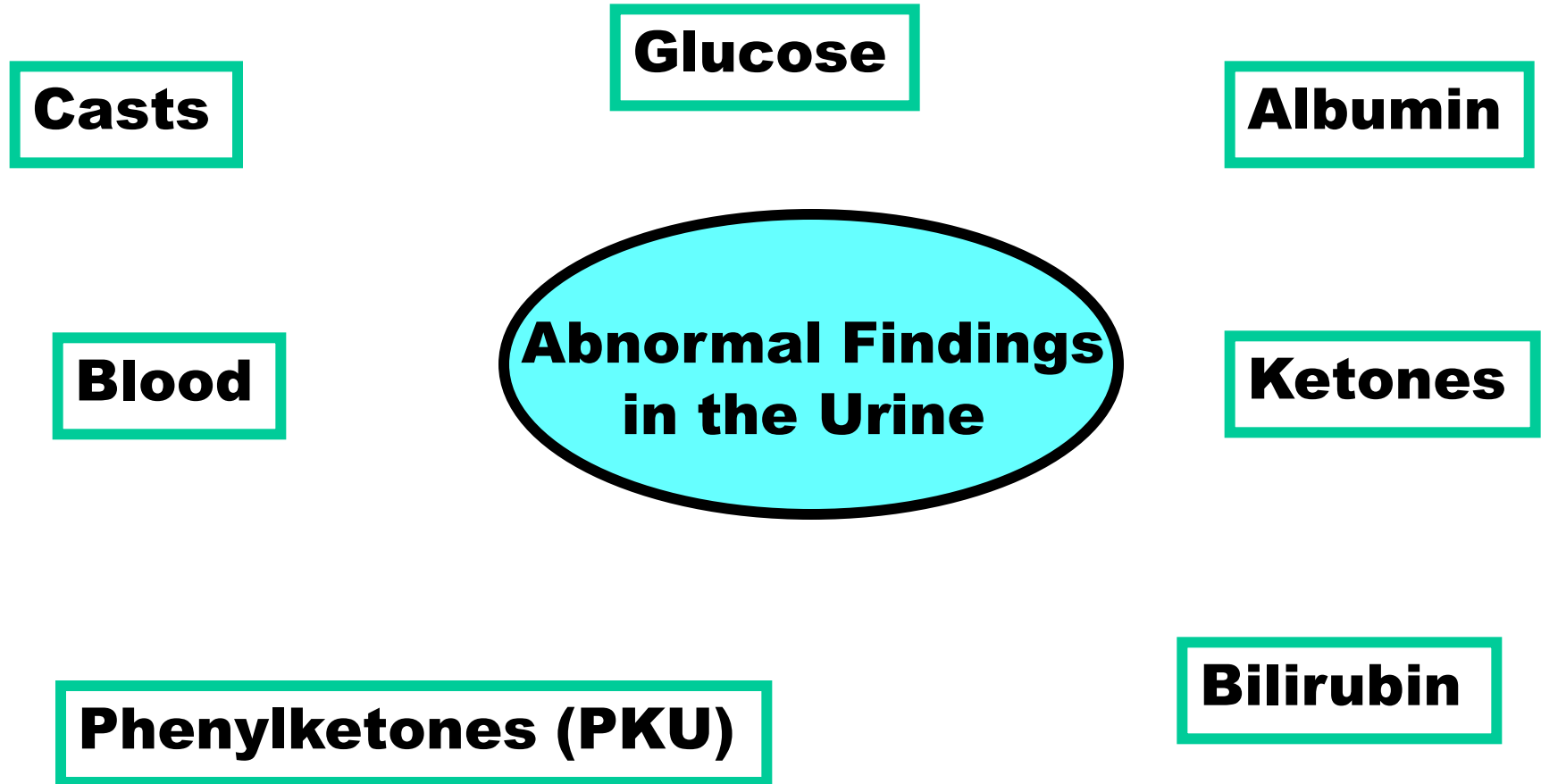
Urinalysis

- **Examination of the urine for its physical and chemical properties**
- **Obtained from patient who fill a specimen container or by urinary catheterization**

Characteristics of Urine

- **Normal urine is straw-colored and clear**
- **Normal specific gravity (SG) range is from 4.5 to 8.0**
- **Specific gravity measures the amount of wastes, minerals and solids present in the urine**

Diagnostic, Procedural and Laboratory Terms

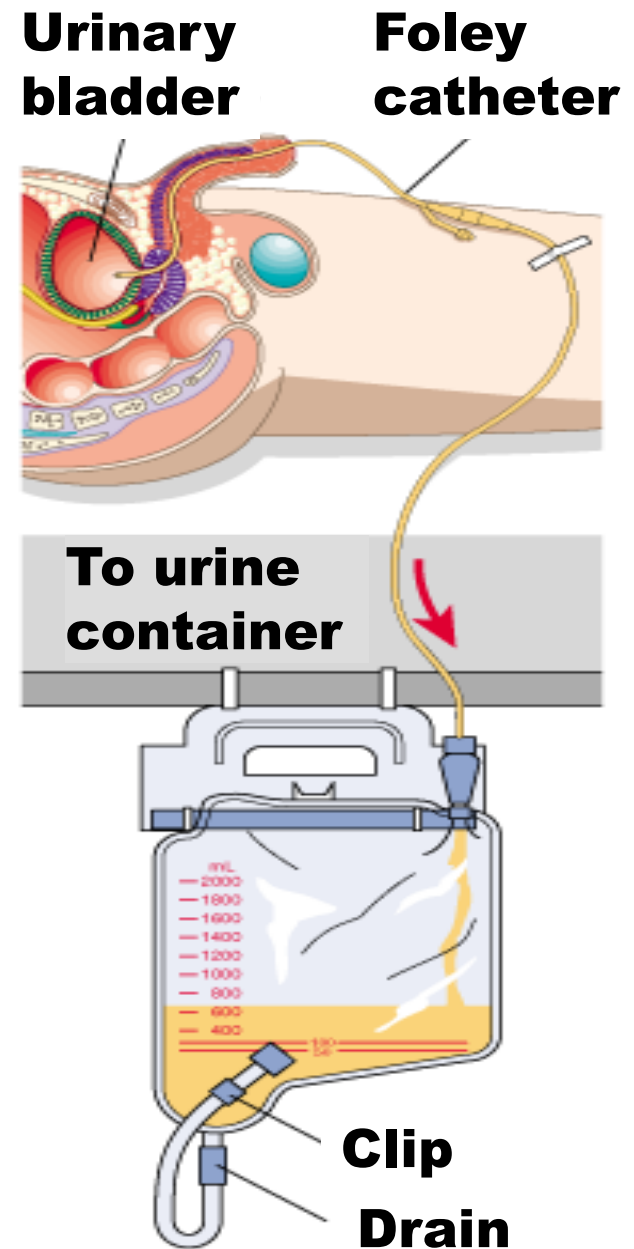
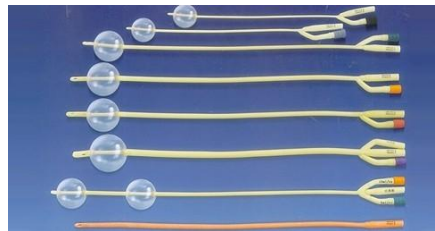


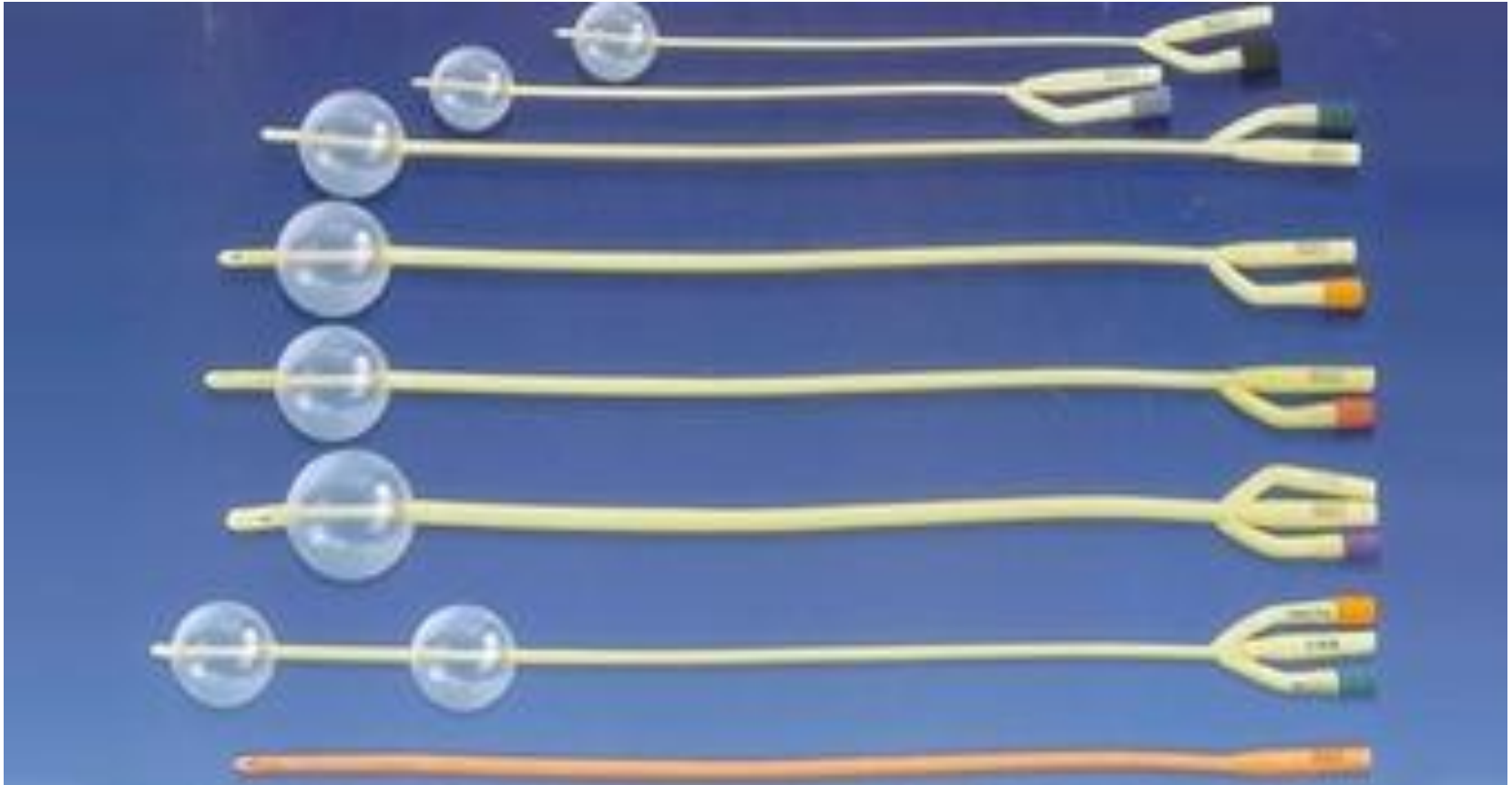
Diagnostic, Procedural and Laboratory Terms

Types of Catheters

Foley catheter

- An indwelling catheter held in place by an inflated balloon in the bladder





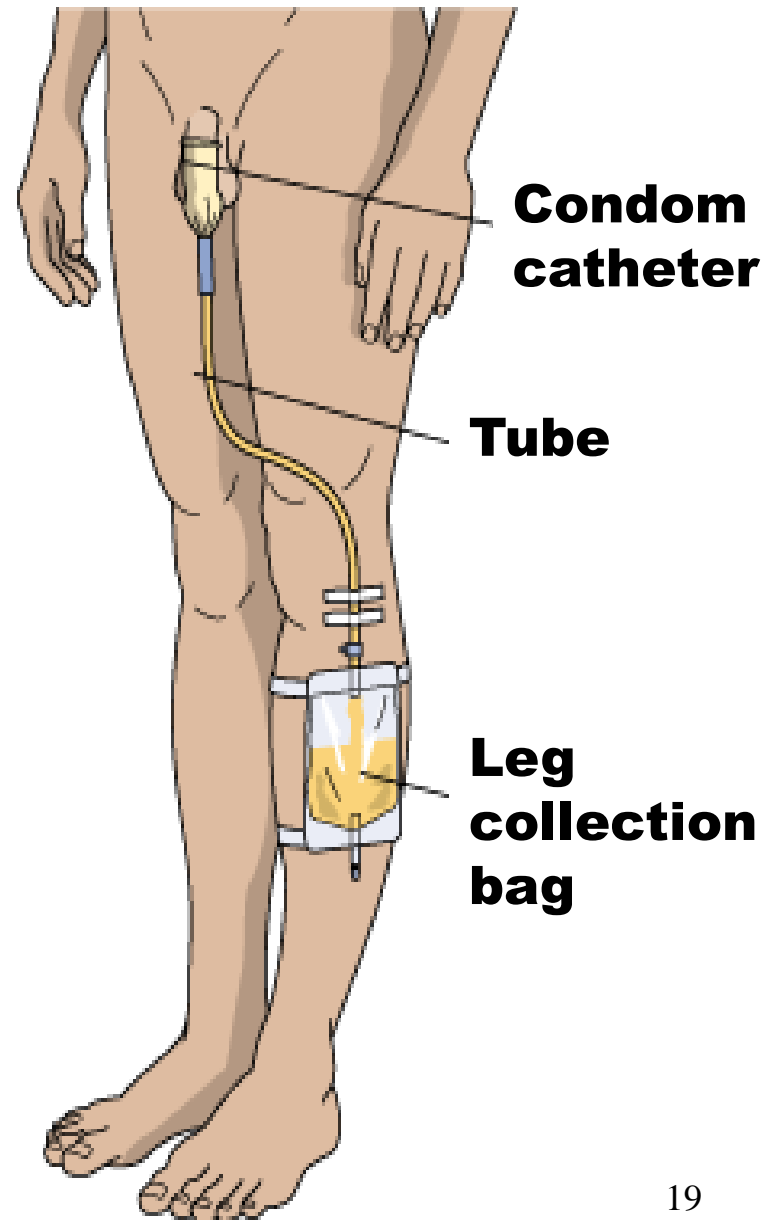
Types of Foley Catheters

Diagnostic, Procedural and Laboratory Terms

Types of Catheters

Condom catheter

- **External catheter consisting of a rubber sheath placed over the penis**





Condom Catheter

Diagnostic, Procedural and Laboratory Terms

Imaging Tests

- **Cystoscopy**

- tubular instrument used to examine the bladder

- **Intravenous Pyelogram**

- x-rays of the urinary tract after a contrast medium is injected into the bloodstream

- **KUB**

- x-ray of three parts of the urinary tract (kidney, ureter, and bladder)

- **Renal Scan**

- radioactive imaging used to diagnose kidney disorders



Pathological Terms

Terms Used to Describe Difficulties in Urination

anuresis

- **No urinary output**

dysuria

- **Painful urination**

enuresis

- **Lack of bladder control**

polyuria

- **Excessive urination**

incontinence

- **Involuntary discharge of urine or feces**

oliguria

- **Scanty urination**