Lesson 12.1 Objective

- Discuss anatomic structures and physiologic processes related to the urinary system.

**Urinary System**

- Urinary system consists of:
  - Kidneys
  - Ureters
  - Urinary bladder
  - Urethra

**Kidney functions:**

- Regulate blood levels of ions
- Regulate blood pH
- Adjust blood volume
- Regulate blood pressure
- Produce hormones
- Produce and excrete urine (filtering wastes)
Urinary System (cont’d.)

- Nephrons
  - Filter substances out of the blood
  - Return useful substances to the blood
  - Form urine

Urinary System (cont’d.)

- Nephron:
  - (Image of a nephron)

Renin-angiotensin-aldosterone system

- Juxtaglomerular apparatus located in nephron secretes renin in response to low blood pressure
- Renin converts angiotensin from liver to angiotensin I

Renin-angiotensin-aldosterone system (cont’d.)

- Angiotensin I goes through lungs and becomes angiotensin II
- Angiotensin II causes aldosterone secretion which increases sodium and water reabsorption, this increases blood volume
- The increase in blood volume elevates blood pressure and improves blood flow to kidneys

Lesson 12.2 Objectives

- Define disorders of the kidneys and list appropriate massage considerations.
- Define disorders of the bladder and urinary tract and list appropriate massage considerations.
- Discuss renal dialysis and include appropriate massage considerations.

Kidney Disorders

- Glomerulonephritis
- Nephrotic syndrome
- Kidney stones
- Pyelonephritis
- Polycystic kidney disease
- Renal failure
**Glomerulonephritis**
- Inflammation of the glomeruli in the kidneys
- Massage is contraindicated in acute cases; otherwise, obtain medical clearance and avoid deep or vigorous massage over lumbar area

**Nephrotic Syndrome**
- Caused by damage to glomeruli in the kidneys; usually from local or systemic disease
- Obtain medical clearance; if granted, avoid deep or vigorous massage over lumbar area

**Kidney Stones**
- Stones located in the kidney, renal pelvis, or ureters
- Massage is contraindicated in acute cases; if client has history of kidney stones but none currently, avoid percussion over kidneys

**Pyelonephritis**
- Inflammatory condition of one or both kidneys
- Massage is contraindicated in acute cases; otherwise, obtain medical clearance and, if granted, suggest voiding before massage and avoid deep and vigorous massage over lumbar area

**Polycystic Kidney Disease**
- Formation of multiple grapelike cysts in kidneys
- Obtain medical clearance; if granted, suggest voiding before massage and avoid deep, vigorous massage over lumbar area

**Renal Failure**
- Failure of kidneys to perform their physiologic functions adequately
  - Renal insufficiency – only about 25% of renal capacity remains
  - End-stage renal failure – 10% or less of renal function remains
- Massage is contraindicated
Renal Dialysis

- Removal of toxins from blood when kidneys are unable; two main types:
  - Hemodialysis
  - Peritoneal dialysis
- Hemodialysis – external machine filters blood

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Disorders of the Bladder and Urinary Tract

- Urinary tract infection
  - Cystitis
  - Urethritis
  - Urinary incontinence

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Urinary Tract Infection

- Infection of one or more urinary structures; usually from bacteria; UTIs are classified by location
  - Cystitis: urinary bladder
  - Urethritis: urethra
  - Pyelonephritis: upper urinary tract
- Since UTIs relates to aforementioned diseases, follow massage recommendations for those specific diseases

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Cystitis

- Inflammation of urinary bladder; also called bladder infection
- Massage is contraindicated in acute cases; otherwise suggest voiding before massage and avoid deep and vigorous massage over lumbar and abdominopelvic areas if sensitive
Urethritis

- Inflammation of the urethra
- Suggest voiding before massage; avoid abdominopelvic area if sensitive

Urinary Incontinence

- Involuntary loss of control of bladder
  - Stress incontinence: urine loss during activities such as coughing, sneezing, laughing, and physical exercise
  - Urge incontinence: strong, sudden urge to urinate, bladder contracts, and then urine loss
- Suggest voiding before the massage; avoid abdominopelvic area if pressure causes uneasiness or discomfort