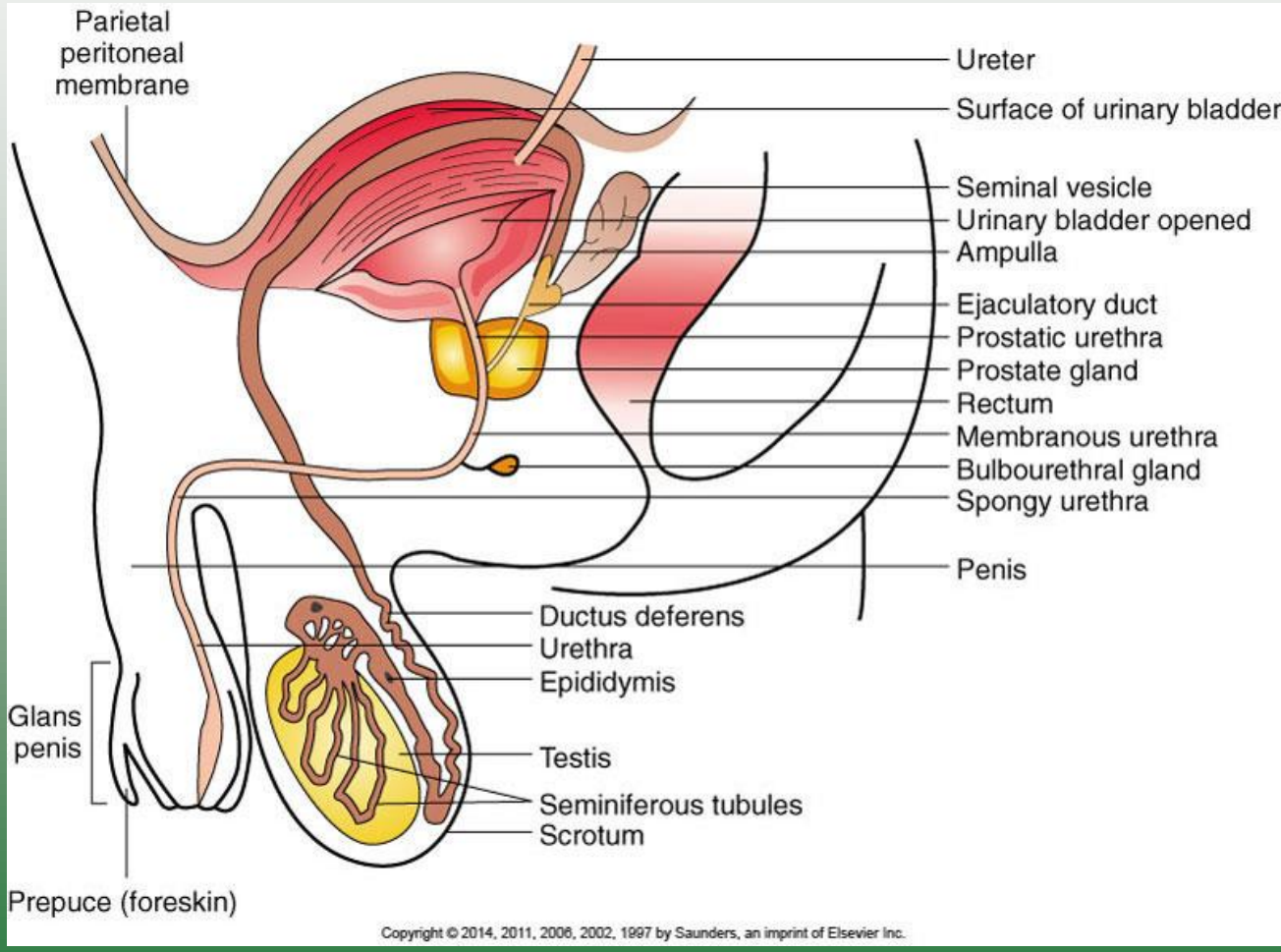
Chapter 19

Reproductive System Disorders

Review of Male Reproductive System

- **Testes**—spermatogenesis
- **Epididymis**—maturation of sperm
- **Vas deferens**—transport of sperm to urethra
- **Seminal vesicles**—secretion to nourish sperm
- **Prostate gland**—secretions to balance pH
- **Cowper glands** (bulbourethral)—secretes alkaline mucus
- **Penis**—ejaculation of semen

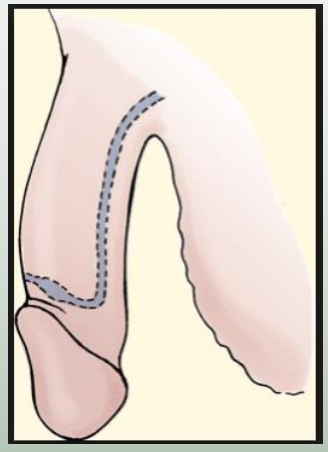


Male Reproductive System

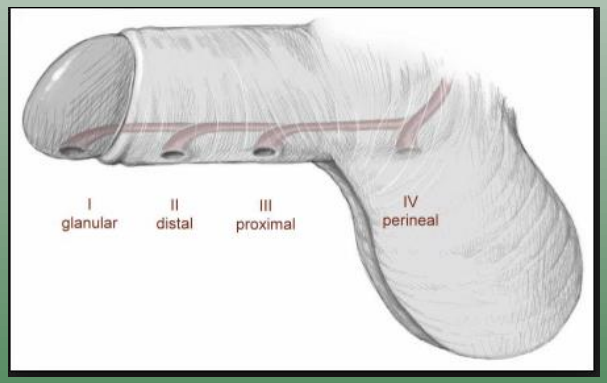
- Male hormones
  - **Follicle-stimulating hormone** (FSH)—initiates spermatogenesis
  - **Luteinizing hormone** (LH)—stimulates testosterone production
  - **Testosterone**—maturation of sperm, sex characteristics, protein metabolism, muscle development

Congenital Abnormalities of the Penis

- **Epispadias:**
  urethral opening on dorsal or upper surface of the penis



- **Hypospadias:**
  urethral opening on ventral surface (underside) of the penis

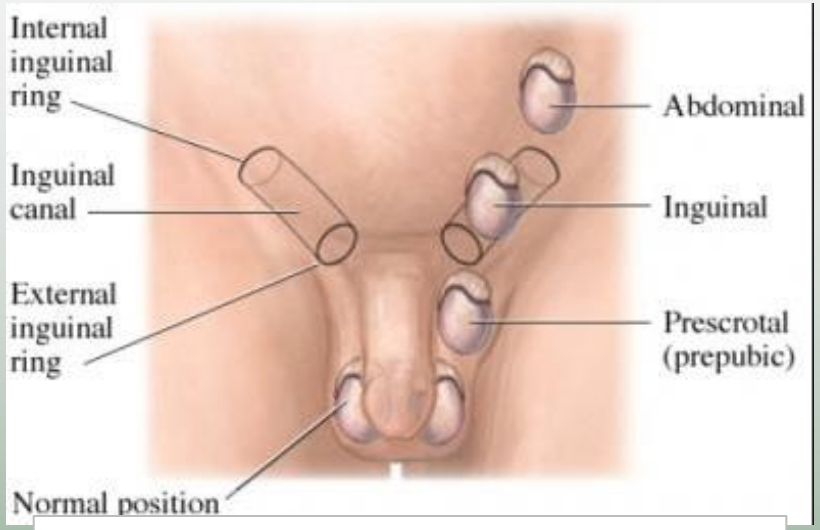


  Either condition may result in incontinence or infection.

- **Treatment:**
  surgical reconstruction

Disorders of the Testes and Scrotum

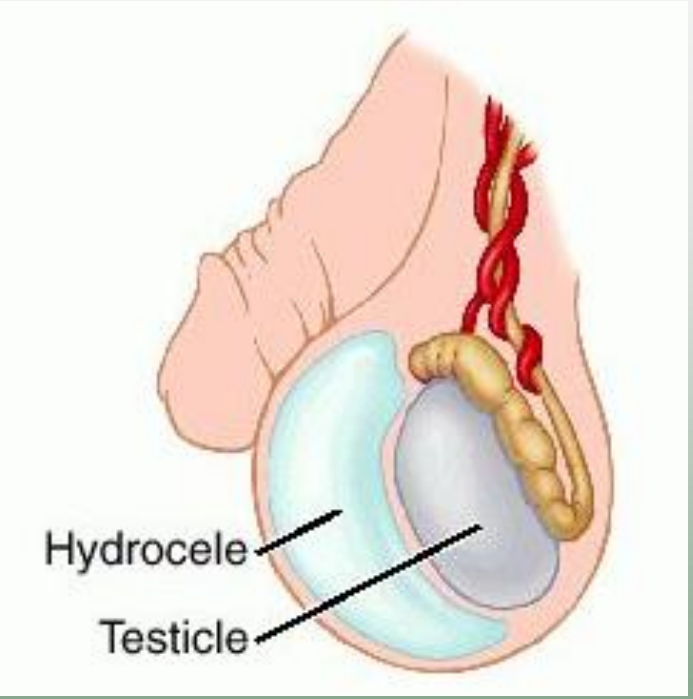
- Cryptorchidism—testis fails to descend into scrotum properly
- Ectopic testis—testis positioned outside of scrotum
- Can cause degeneration of seminiferous tubules and spermatogenesis is impaired
- Risk of testicular cancer increased significantly if treatment not done by age 5 years



The testes normally develop in the abdomen and descend into the scrotum

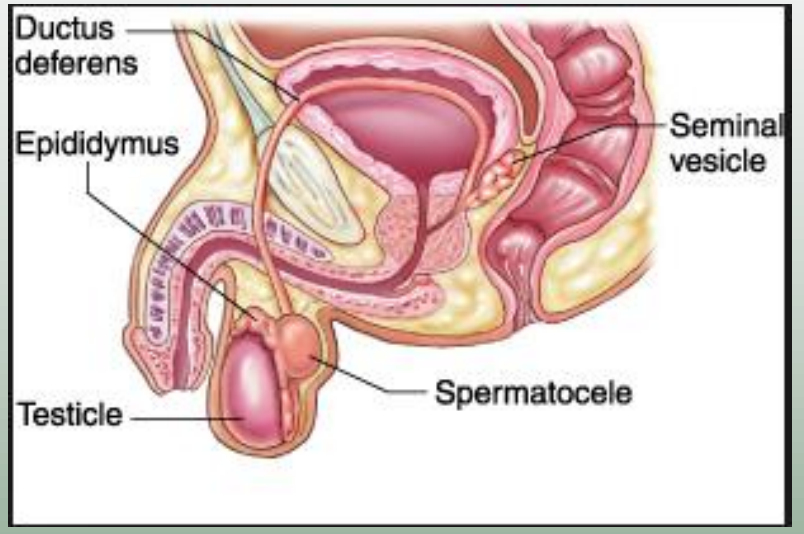
Disorders of the Testes and Scrotum

- **Hydrocele**—occurs when excessive fluid collects in space between layers of the tunica vaginalis of the scrotum
  - May occur as congenital defect in newborn
  - May be acquired as result of injury, infection, tumor
  - May compromise blood supply or lymph drainage in testes



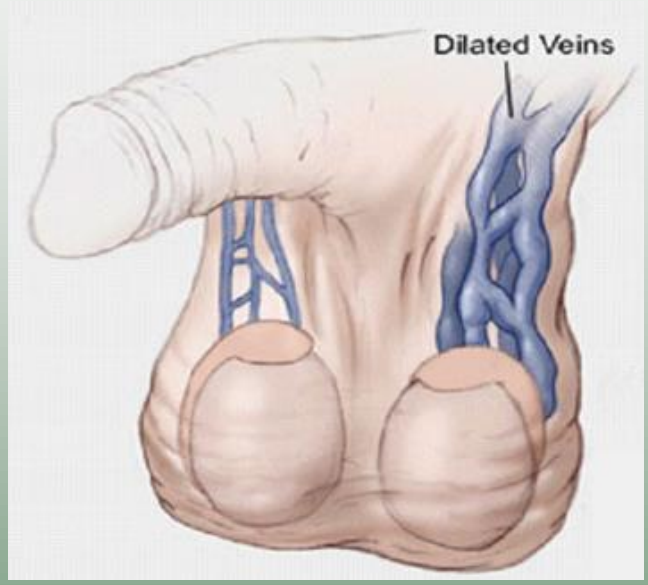
Disorders of the Testes and Scrotum

- Spermatocele—cyst containing fluid and sperm that develops between the testis and the epididymis
  - May be related to developmental abnormality
  - Surgical removal



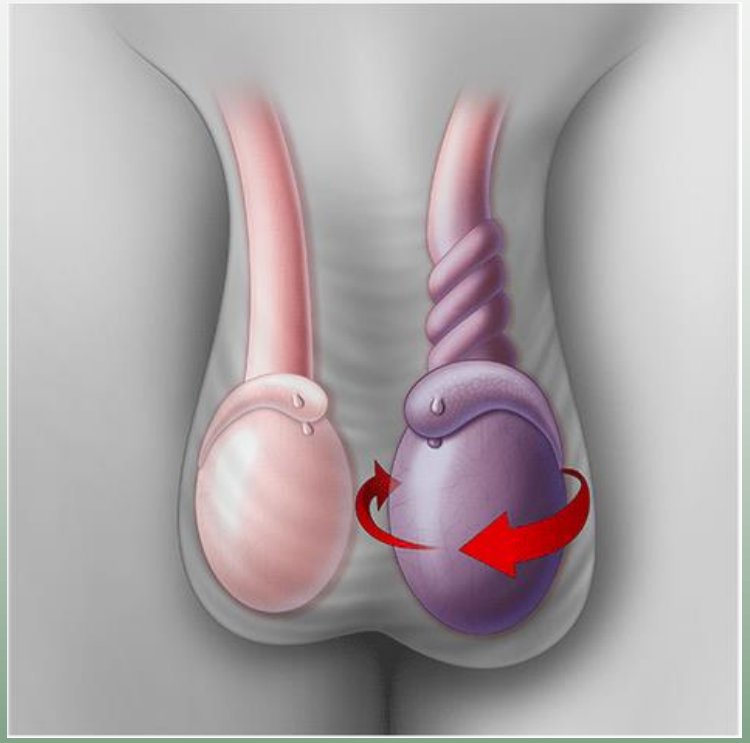
Disorders of the Testes and Scrotum

- Varicocele—a dilated vein in the spermatic cord
  - Lack of valves allows backflow in veins; leads to increased pressure and dilation
  - Causes impaired blood flow to testes and decreased spermatogenesis
  - Requires surgery



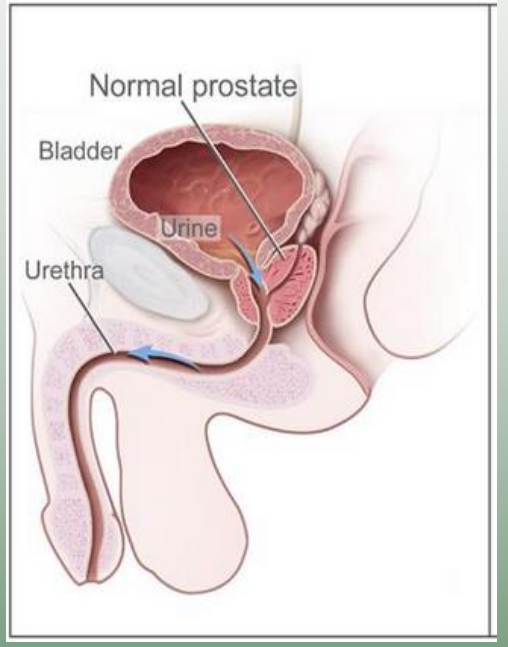
Disorders of the Testes and Scrotum

- Torsion of the testes—testes rotate on spermatic cord, compressing arteries and veins
  - Ischemia develops, scrotum swells
  - Testis may be infarcted if torsion is not reduced
  - Can occur spontaneously or following trauma
  - Treated manually and surgically



Inflammations and Infections

- Prostatitis: infection or inflammation of the prostate gland
- Four recognized categories
  1. Acute bacterial
  2. Chronic bacterial
  3. Nonbacterial
  4. Asymptomatic inflammatory



Prostatitis

- Acute bacterial—gland is tender and swollen, urine and secretions contain bacteria
- Nonbacterial—urine and secretions contain large numbers of leukocytes
- Chronic bacterial—gland only slightly enlarged, dysuria, frequency, urgency

Prostatitis (Cont.)

- Acute bacterial infection is caused primarily by *Escherichia coli* and sometimes by *Pseudomonas, Proteus,* or *Streptococcus faecalis.*
- Chronic bacterial infection is related to repeated infection by *E. coli.*
- These are opportunistic bacteria from the normal flora of the gut.

Prostatitis (Cont.)

- Occurs in:
  - Young men with UTIs
  - Older men with prostatic hypertrophy
  - In association with STDs
  - With instrumentation such as catheterization
  - Through bacteremia

Prostatitis (Cont.)

- Signs and symptoms
  - Both acute and chronic forms manifested by dysuria, urinary frequency, and urgency
  - Decreased urinary stream
  - Acute form includes fever and chills
  - Lower back pain
  - Leukocytosis
  - Abdominal discomfort
  - Systemic signs include fever, malaise,
  - Anorexia
  - Muscle aches

Prostatitis (Cont.)

- Treatment for acute or chronic bacterial infection
  - Antibacterial drugs such as ciprofloxacin
- Treatment for nonbacterial infection
  - Anti-inflammatory drugs and prophylactic antibacterial agents

Balanitis

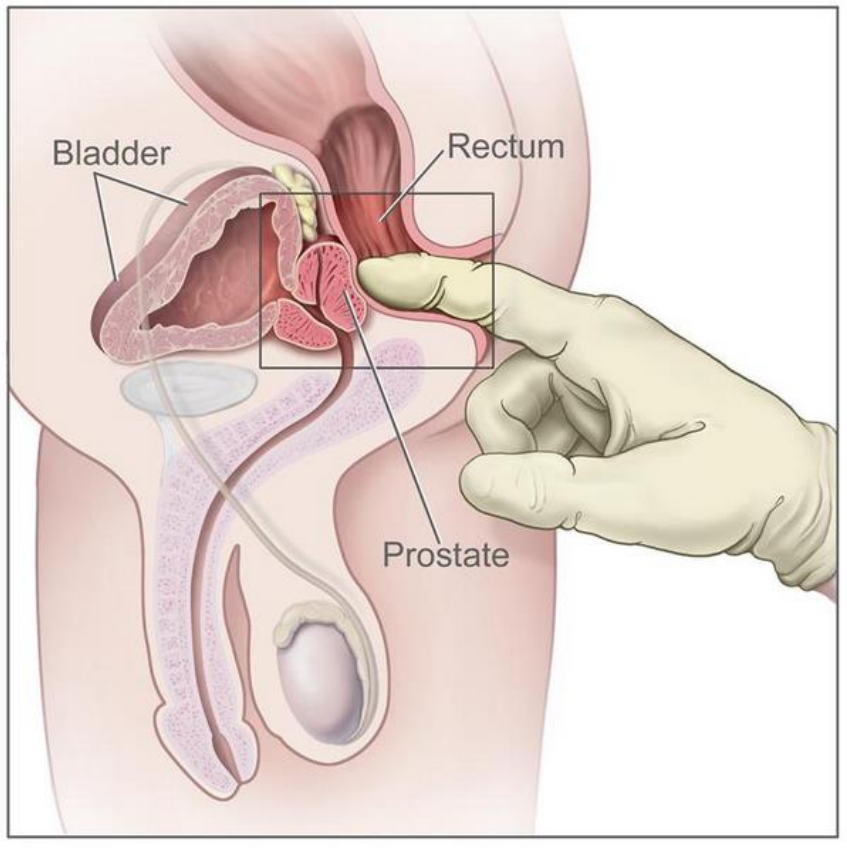
- Fungal infection of the glans penis
  - Sexually transmitted
- Caused by *Candida albicans*
- Vesicles develop into patches
  - Severe burning and itching
- Treatment—topical antifungal medication

Benign Prostatic Hypertrophy

- Occurs in up to 50% of men > 65 years
- Hyperplasia of prostatic tissue
- Compression of urethra and urinary obstruction
- Related to estrogen–testosterone imbalance
- Does not predispose to prostatic carcinoma

Benign Prostatic Hypertrophy

- Enlarged gland palpated on digital rectal examination
- Leads to frequent infections
- Continued obstruction causes distended bladder, dilated ureters, hydronephrosis, and renal failure if untreated.



Benign Prostatic Hypertrophy

- Signs and symptoms
  - Obstructed urinary flow
  - Hesitancy in starting flow
  - Dribbling
  - Decreased flow strength
  - Increased frequency and urgency
  - Nocturia
  - Dysuria occurs if infection is present.

Benign Prostatic Hypertrophy

- Treatment
  - Drugs such as dutasteride (Avodart) to **slow enlargement**
  - **Smooth muscle relaxers** such as tamsulosin (Flomax)
  - Combination of finasteride (Proscar) and doxazosin (Cardura) reduces progression of hypertrophy
  - **Surgery**

  - [do not have to memorize drug names, just know what they do – slow enlargement and relax smooth muscle.]

Prostate Cancer

- Most common cancer in men > 50 years
- Third leading cause of cancer death in men
- One in six men affected
- Most are adenocarcinomas arising near surface of gland
- The more undifferentiated the tumor, the more aggressive
- Many tumors are androgen-dependent.

Prostate Cancer

- Both invasive and metastatic
- Some forms are highly aggressive but others are not.
- 5% to 10% caused by inherited mutations
- Other causes—high androgen levels, increased insulin-like growth factor, history of recurrent prostatitis

Prostate Cancer

- Signs and symptoms
  - Hard nodule felt on periphery of gland
  - Hesitancy in urination
  - Decreased urine stream
  - Frequent urination
  - Recurrent UTI

Prostate Cancer

- Diagnosis
  - Serum markers
    - Prostate-specific antigen (PSA)
    - Prostatic acid phosphatase
  - Ultrasonography
  - Biopsy
  - Bone scans to detect metastases

Prostate Cancer

- Treatment
  - Surgery (radical prostatectomy)
  - Radiation: external or implanted pellets
  - If androgen-sensitive, then orchiectomy is effective, as well as antitestosterone drugs.
  - New chemotherapies are in clinical trials.

Cancer of the Testes

- Most testicular tumors are malignant.
- 1 in 300 affected
- Most common solid tumor cancer in young men
- Number of cases increasing
- Testicular self-examination is essential for early detection.

Cancer of the Testes (Cont.)

- Signs and symptoms
  - Tumors are hard, painless, usually unilateral
  - Testes may be enlarged or feel heavy.
  - Dull aching scrotum and pelvis
  - Hydrocele or epididymitis may develop.
  - Gynecomastia occurs if the tumor is hormone-secreting.

Cancer of the Testes (Cont.)

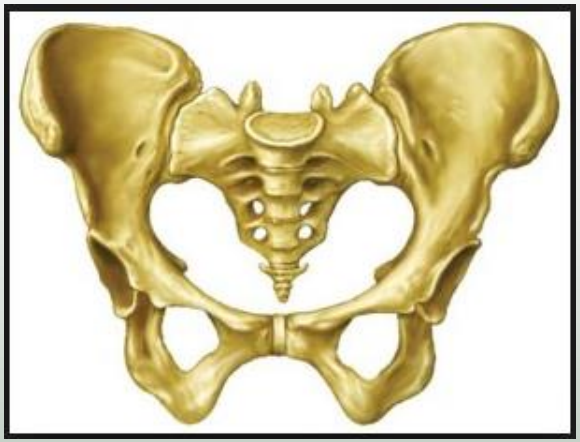
- Diagnostic tests
  - Biopsy is *not* usually done.
  - Tumor markers (hCG and AFP) help ID type.
  - Ultrasound
  - Computed tomography
  - Lymphangiography

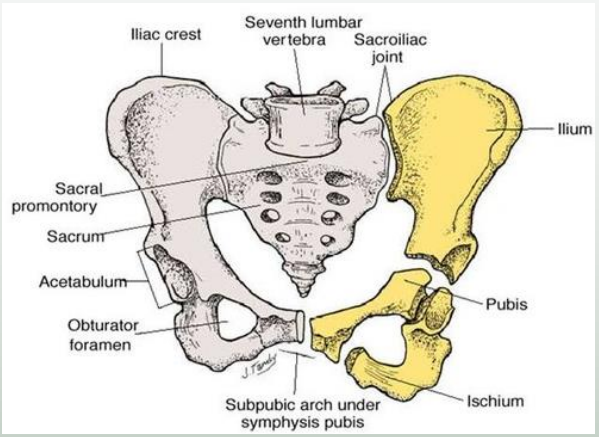
Cancer of the Testis

- Treatment
  - Combination of:
    - Surgery (orchiectomy)
    - Radiation therapy
    - Chemotherapy
  - **NOTE:** the client may wish to donate sperm prior to treatment to ensure future fertility.

<end of male reproductive section>

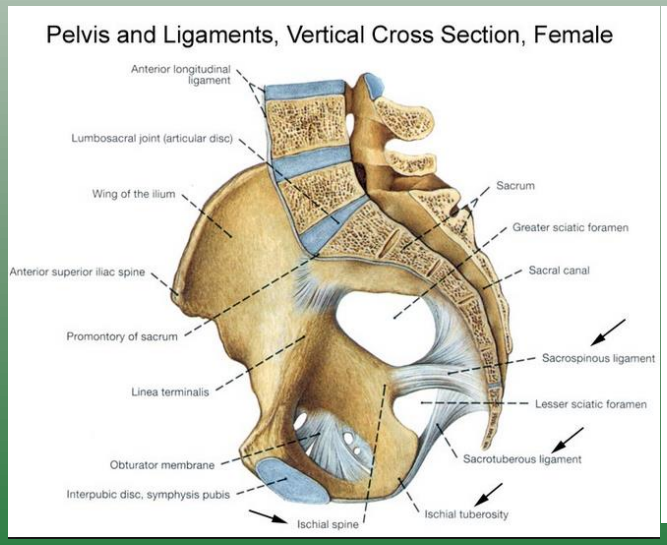
Review of the Female Reproductive System
[pelvic bone anatomy]

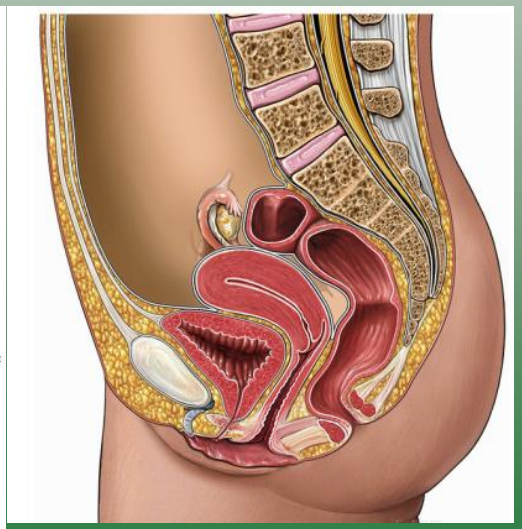


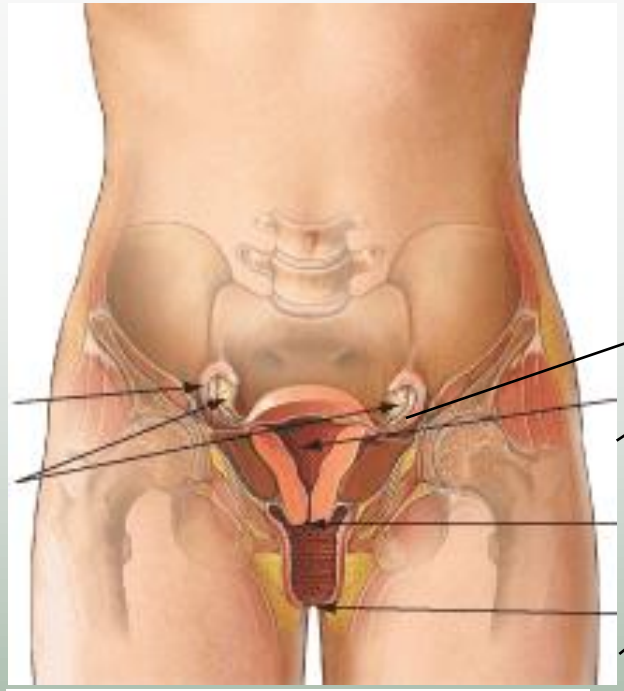


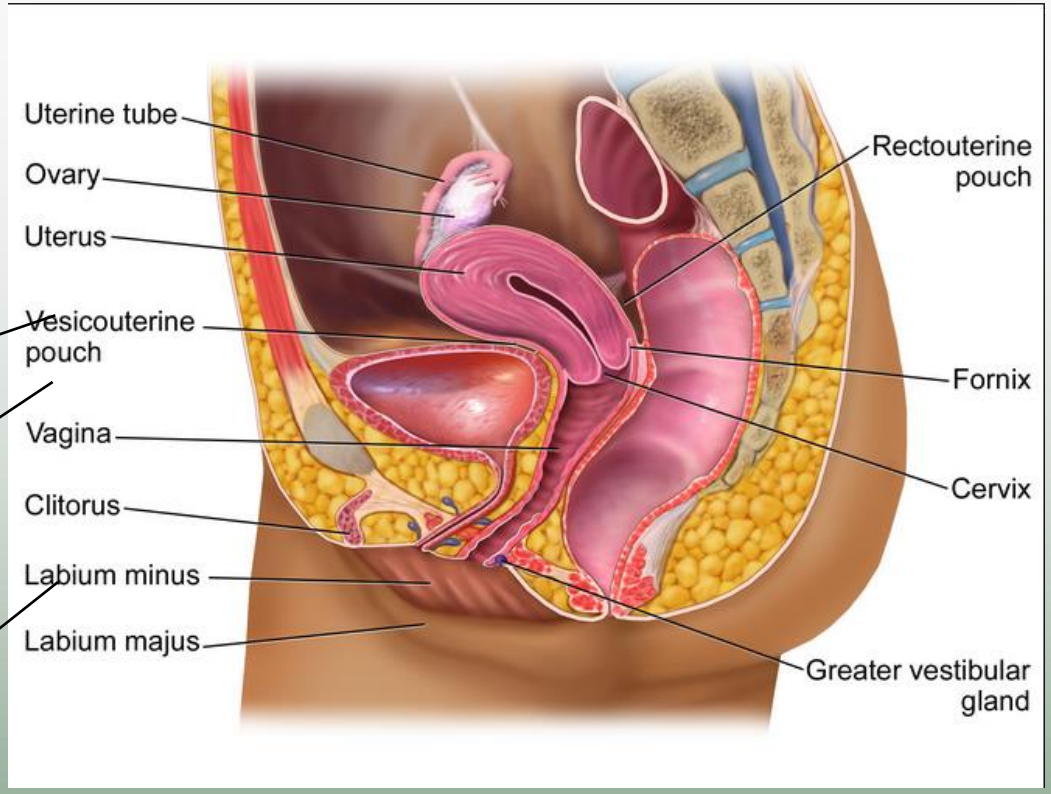
- In the adult, the pelvis is a fusion of bones seen in the diagram on the right.

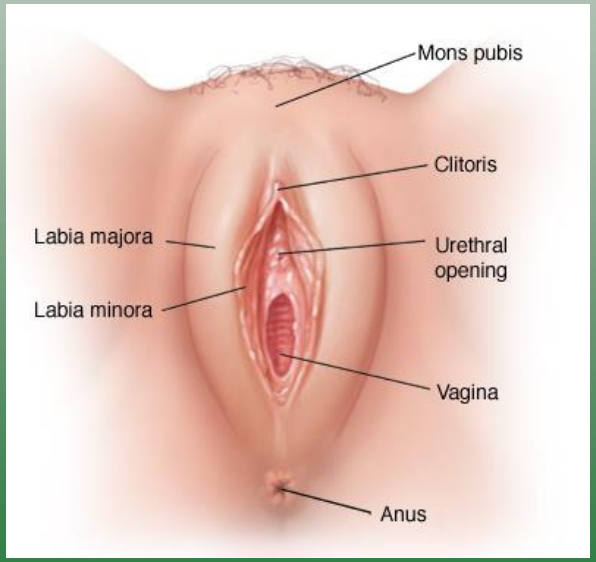
Half of this pelvis shows an exploded view so that you can visualize the individual bones and appreciate why the mid saggital section view shows only a small oval called the pubic symphysis.



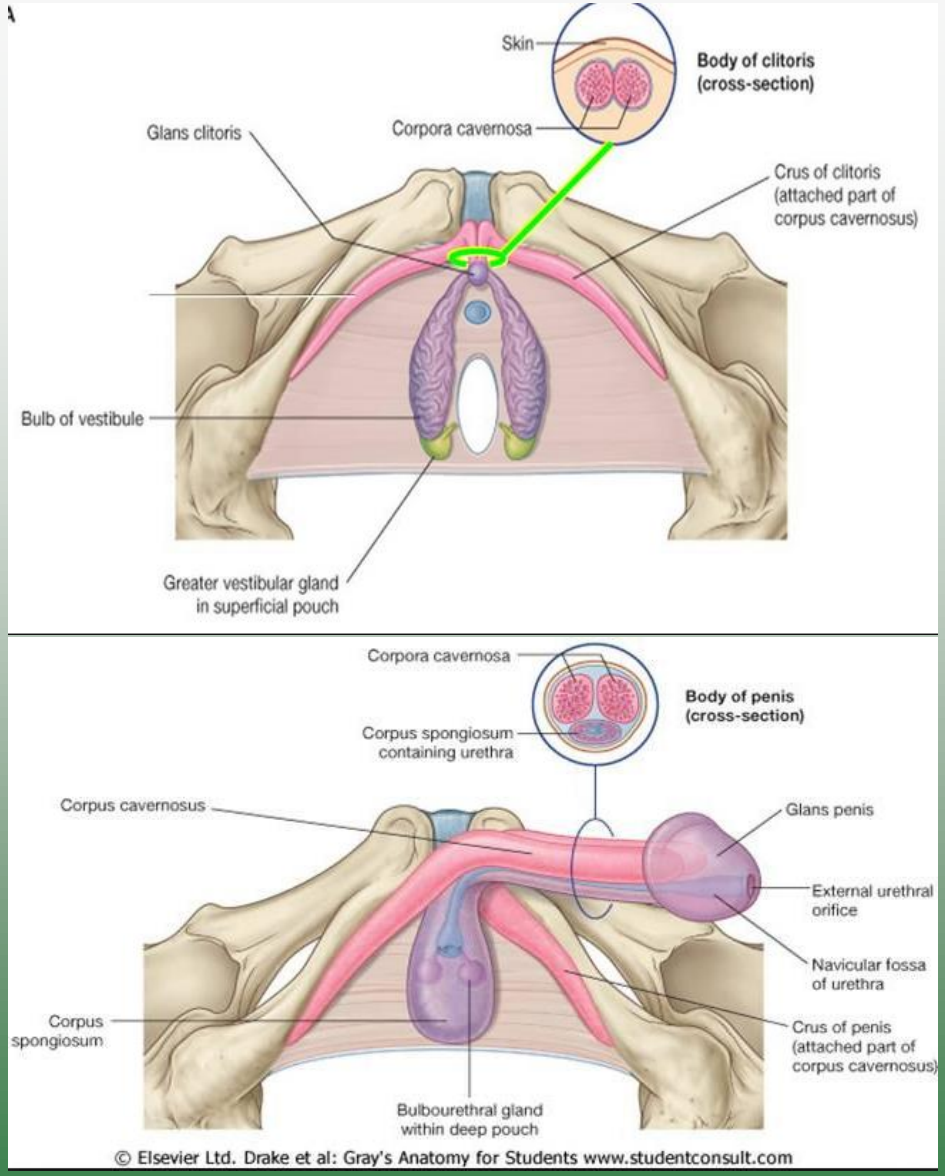








- **Vulva:** External genetalia that includes the mons pubis, labia majora, labia minora, and clitoris.
- **Clitoris:** erectile tissue anterior to urethra
- **Vagina:** muscular, distensible canal extending upward from the vulva to the cervix



Clitoris compared with Penis

These diagrams detail the complex anatomy of the clitoris and show that developmentally similar parts are present in the penis.

Just remember:

1. That the clitoral anatomy is mostly internal and that the part visible in the vulva comprises only a small part of the clitoris.

2. Erectile tissue in the clitoris has a similar developmental origin as erectile tissue in the penis.

Anatomy Defined

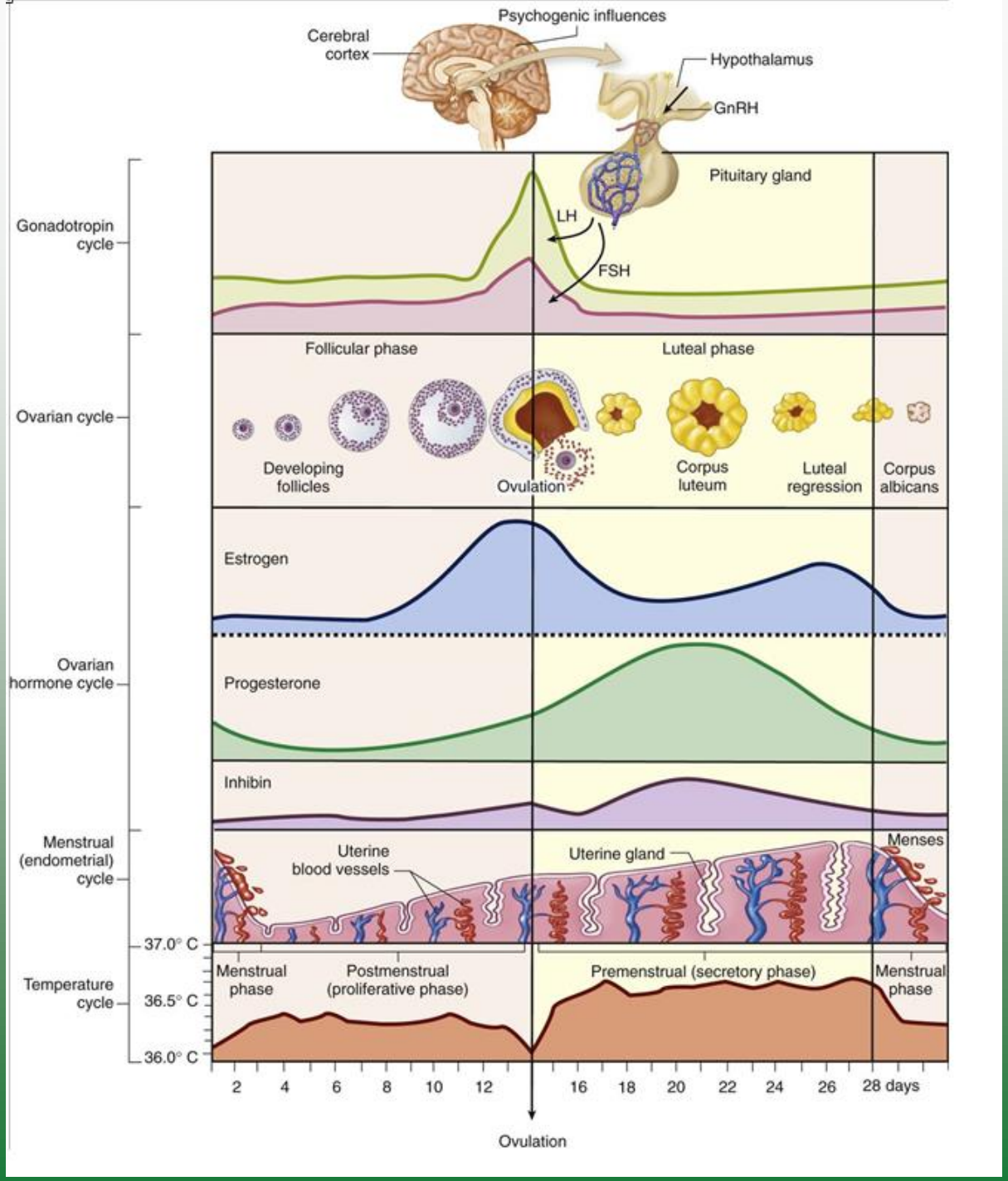
- Uterus—muscular organ within which fertilized ovum may implant and develop
- Cervix—opening into uterus and neck of the uterus
  - External os
    - Opening from vagina filled with thick mucus
    - Prevents vaginal flora from ascending into the uterus
  - Internal os
- Fallopian tubes (oviducts)—tubes from ovaries to uterus

- Ovaries—produce ova and estrogen and progesterone hormones

- Breasts
  - Glands produce colostrum and milk for newborn
  - Adipose tissue

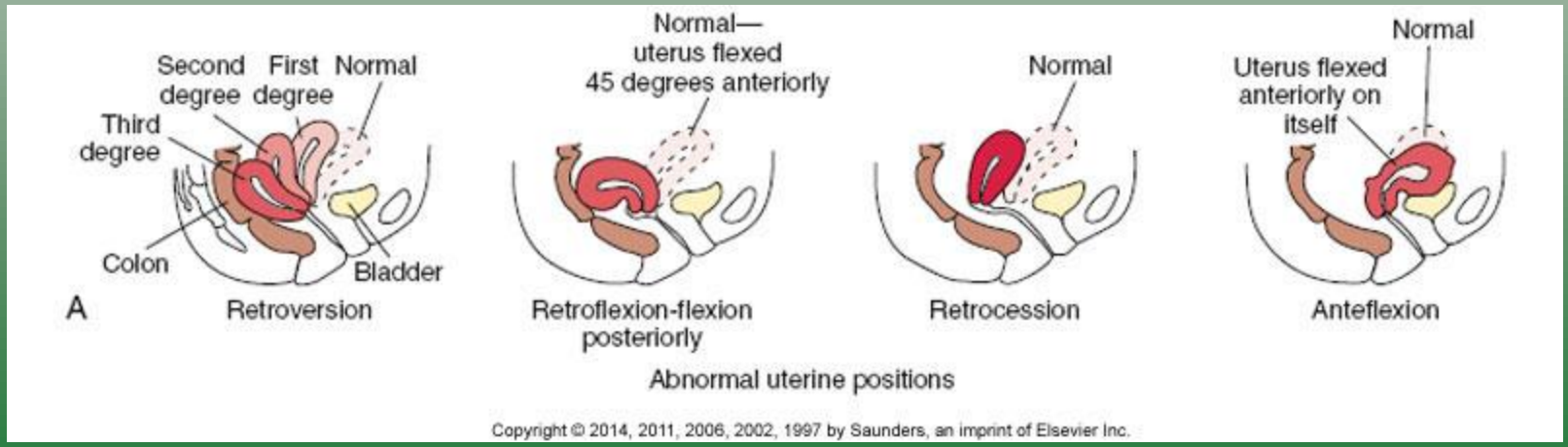
Menstual Cycle

- Hormones and the menstrual cycle
  - Cycle may be from 21 to 45 days
  - Cycle consists of:
    - Menstruation (days 1 to 5)
    - Endometrial proliferation and production of estrogen (days vary)
    - Maturation of ovarian follicle
    - Release of LH, causing ovulation
- Follicle (from wich ovum erupted) becomes the corpus luteum, produces progesterone
- Vascularization of endometrium in preparation for implantation (12 to 14 days prior to onset of next menstruation)
- If implantation does not occur:
  - Corpus luteum atrophies
  - Uterine muscle contracts → ischemia
  - Endometrium degenerates


Psychogenic influences
Cerebral cortex
Hypothalamus
GnRH
Pituitary gland
LH
FSH
Gonadotropin cycle
Follicular phase
Luteal phase
Ovarian cycle
Developing follicles
Ovulation
Corpus luteum
Luteal regression
Corpus albicans
Estrogen
Ovarian hormone cycle
Progesterone
Inhibin
Menstrual (endometrial) cycle
Uterine blood vessels
Uterine gland
Menses
37.0° C
Temperature cycle
36.5° C
36.0° C
Menstrual phase
Postmenstrual (proliferative phase)
Premenstrual (secretory phase)
Menstrual phase
2 4 6 8 10 12 16 18 20 22 24 26 28 days
Ovulation

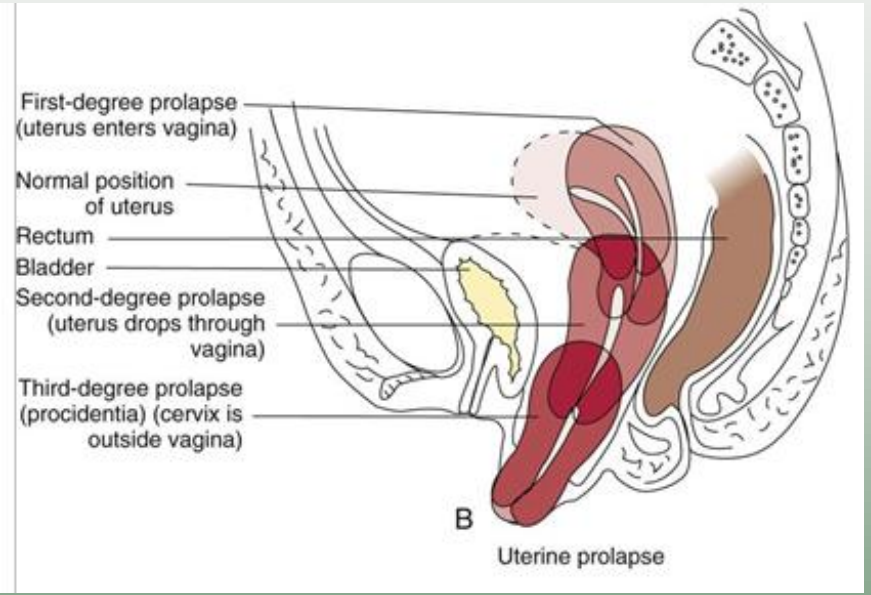
Structural Abnormalities

- Normal position of uterus
  - Slightly anteverted and anteflexed
  - Cervix downward and posterior
- Retroflexion of uterus
  - Uterus tipped posteriorly
  - May be excessively curved or bent
  - Marked retroversion may cause back pain, dysmenorrhea, dyspareunia
  - In some cases, infertility may occur.



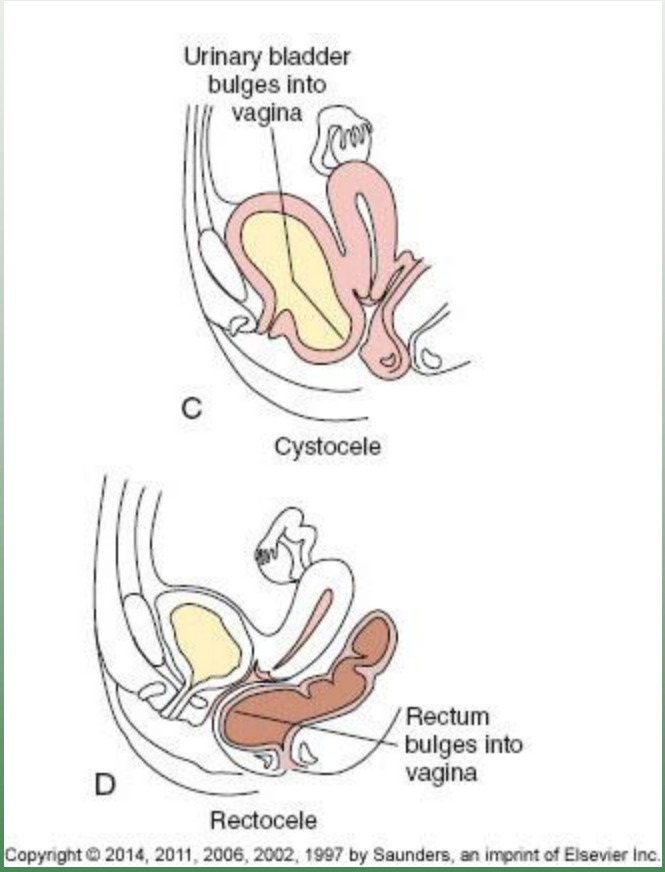
Structural Abnormalities (Cont.)

- Uterine displacement or prolapse
  - First-degree prolapse if cervix drops into the vagina
  - Second-degree prolapse if cervix lies at opening to the vagina
    - Body of uterus is in the vagina
  - Third-degree prolapse if uterus and cervix protrude through the vaginal orifice
    - Early stages of prolapse may be asymptomatic.
    - Advanced stages cause discomfort, infection, and decreased mobility.



Structural Abnormalities (Cont.)

- Rectocele
  - Protrusion of the rectum into the posterior vagina
  - May cause constipation and pain
- Cystocele
  - Protrusion of bladder into the anterior vagina
  - May cause UTIs
- If severe, conditions are treated surgically to increase the support of the pelvic ligaments.



Menstrual Disorders

- Menstrual abnormalities
  - Amenorrhea (absence of menstruation)
    - May be primary or secondary
      - Primary form may be genetic.
      - Secondary form usually hormonal imbalance
  - Dysmenorrhea: Painful menstruation
  - Menorrhagia
    - Increased amount and duration of flow
  - Metrorrhagia
    - Bleeding between cycles
  - Polymenorrhea
    - Short cycles of less than 3 weeks
  - Oligomenorrhea
    - Long cycles of more than 6 weeks

Menstrual Disorders (Cont.)

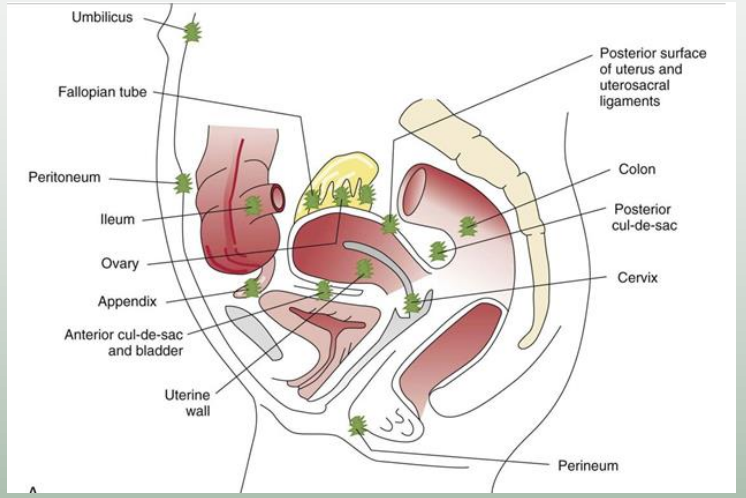
- Menstrual abnormalities (Cont.)
  - Premenstrual syndrome
    - Begins approximately 1 week before onset of menses
    - Pathophysiology not completely known; may be several forms
    - Breast tenderness, weight gain, abdominal distension or bloating, irritability, emotional liability, sleep disturbances, depression, headache, fatigue
    - Treatment is individualized and may include exercise, limiting salt intake, use of oral contraceptives, diuretics, or antidepressant drugs.

Abnormal Menstrual Bleeding

- Usual cause is lack of ovulation, but a hormonal imbalance in the pituitary-ovarian axis may be a factor.
  - Menorrhagia
    - Increased amount and duration of flow
  - Metrorrhagia
    - Bleeding between cycles
  - Polymenorrhea
    - Short cycles of less than 3 weeks
  - Oligomenorrhea
    - Long cycles of more than 6 weeks

Menstrual Disorders (Cont.)

- Endometriosis
  - Endometrial tissue occurs outside the uterus.
  - Ectopic endometrium responds to cyclical hormone changes.
  - Bleeding leads to inflammation and pain.
  - Fibrous tissue may cause adhesions and obstructions of the involved structures.
  - Cause has not been established but thought to be congenital in some cases
  - Treatment
    - Hormonal suppression
    - Surgical removal of ectopic tissue

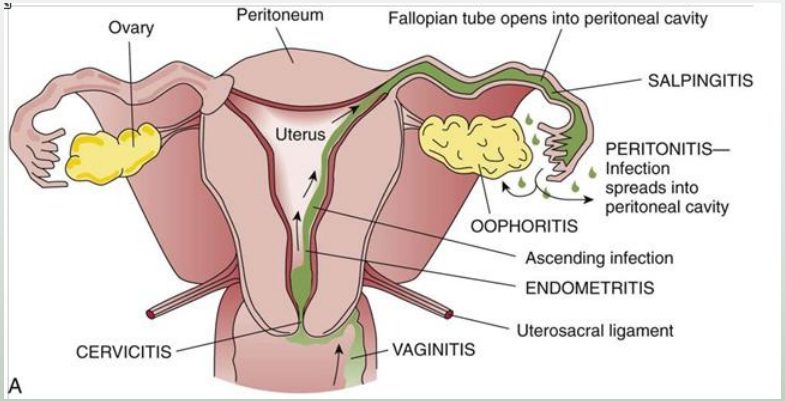


Infections: Candidiasis

- Form of vaginitis that is **not sexually transmitted**
- Caused by the fungus *Candida albicans*
- Opportunistic infection by normal flora of vagina
  - Antibiotic therapy (Augmentin causes it)
  - Pregnancy
  - Diabetes
  - Reduced host resistance
- Candidiasis causes red and swollen, intensely pruritic mucous membranes and a thick, white, curdlike discharge.
- May extend to vulvar tissues
- Antifungal treatment

Infections: Pelvic Inflammatory Disease

- Infection of uterus, fallopian tubes, and/or ovaries
- May be acute or chronic
- **Infection usually originates as an ascending infection from lower reproductive tract.**
- **Most** infections arise from **sexually transmitted** diseases, nonsterile abortions, or childbirth.
- **Scarring of tubes increases risk of infertility and ectopic pregnancy.**
- Potential acute **complications**
  - **Peritonitis**
  - **Pelvic abscesses**
  - **Septic shock**



Benign Tumors

- Leiomyoma (fibroids): benign tumor of the myometrium
- Ovarian Cysts: small cysts, many are self limited.
- Polycystic ovarian disease:
  - Absence of ovulation and infertility
  - Amenorrhea and Hirsutism
- Fibrocystic breast disease
  - Includes a broad range of breast changes and increased density of breast tissue
  - Cyclic occurrence of nodules or masses in breast tissue

Malignant Tumors

- Carcinoma of the breast
  - Incidence increases after age 20 years
    - Most cases in women between ages 50 and 69 years
  - Metastasis occurs via lymph nodes early in the course of the disease.
- Predisposing factors
  - First-degree relative with the disease
  - Longer and higher exposure to estrogen
  - Nulliparous or late first pregnancy
  - Lack of exercise, Smoking, High-fat diet
- Diagnosis: Mamogram and needle biopsy
- Treatment: Surgery, chemotheapy, radiation.
  - Agressiveness of surgery depends on stage of disease.
- Prognosis: Related to size on presentation (self exam is critical to early detection).

Carcinoma of the Cervix

- Most cases of cervical cancer are caused by human papillomavirus (HPV) infection, a sexually transmitted virus.
- Vaccines now exist against the causative strains of HPV.
- Routine Pap smears of cervical cells are important in identifying early, treatable stages of the disease:
  - By age 20 years or in the year that sexual intercourse begins
  - At intervals, as advised by health care worker

Ovarian Cancer

- Ovarian cancer
  - No reliable screening available
    - Large mass detected by pelvic examination
    - Transvaginal ultrasound
  - Considered a silent tumor
    - Few diagnosed in the early stage
    - Research is ongoing to identify markers for serum diagnosis.
  - Different types—vary in aggressiveness

Ovarian Cancer (Cont.)

- Risk factors
  - Obesity
  - *BRCA1* gene
  - Early menarche
  - Nulliparous or late first pregnancy
  - Use of fertility drugs
- Oral contraceptives containing progesterone are somewhat protective.
- Surgery and chemotherapy are usual treatments.

Infertility

- Cause may be a female condition, male condition, or a combination of both
  - Associated with hormonal imbalances
  - Age of parents
  - Structural abnormalities
  - Infections
  - Chemotherapy
  - Workplace toxins
  - Other environmental factors
  - Idiopathic

Sexually Transmitted Diseases (STDs): Bacterial

- Chlamydial infections
  - Considered one of the most common STDs
  - Caused by *Chlamydia trachomatis*
  - Males—urethritis and epididymitis
    - Symptoms include dysuria, itching, white discharge from penis (urethritis symptoms)
    - Painful, swollen scrotum, usually unilateral, fever (epididymitis); inguinal lymph nodes swollen
  - Females
    - Often asymptomatic until PID or infertility develops
    - Newborns may be infected during birth.

Sexually Transmitted Diseases (STDs): Bacterial (Cont.)

- Gonorrhea
  - Caused by *Neisseria gonorrheae*
    - Many strains have become resistant to penicillin and tetracycline.
  - Males
    - Most common site is urethra, which is inflamed
    - Some males are asymptomatic.
  - Females
    - Frequently asymptomatic
    - PID and infertility are serious complications.

STDs: Syphilis

- Caused by *Treponema pallidum,* a spirochete
- Primary stage
  - Presence of chancre at site of infection
    - Genital region
    - Anus
    - Oral cavity
  - Painless, firm, ulcerated nodule
  - Occurs about 3 weeks after exposure
  - Lesion heals spontaneously but client is still contagious

STDs: Syphilis (Cont.)

- Secondary stage
  - If untreated, a flulike illness occurs, with a widespread symmetrical rash—self-limited but client remains contagious
- Latent stage
  - May persist for years
  - Transmission may occur.
- Tertiary syphilis—irreversible changes
  - Gummas in organs and major blood vessels
  - Dementia, blindness, motor disabilities

STDs: Syphilis (Cont.)

- Organism can be transmitted to fetus in utero
- Baby born with tertiary syphilis changes that are not reversible
- Treatment is usually antimicrobial drugs.
- Increase in antibiotic resistant strains causing an increase in prevalence

STDs: Viral Infections

- Genital herpes—herpes simplex
  - Caused by HSV-2 or HSV-1
    - HSV-1 possible with oral sex
  - Lesions similar to HSV-1
  - Recurrent outbreaks of blister-like vesicles on the genitalia
    - Preceded by tingling or itching sensation
    - Lesions are extremely painful.
  - After acute stage, virus migrates back to dorsal root ganglion
  - Infectivity greater when symptoms are present

STDs: Genital Herpes (Cont.)

- Reactivation is common and may be associated with:
  - Stress
  - Illness
  - Menstruation
- Antiviral drugs are used for treatment and prevention of transmission.
- Infection is considered lifelong.

STDs: Viral Infections (Cont.)

- Condylomata acuminata—genital warts
  - Caused by HPV
  - Incubation period may be up to 6 months
  - Disease may be asymptomatic
  - Warts vary in appearance.
  - Warts can appear wherever contact with virus has occurred.
  - Warts can be removed by different methods.
  - May predispose to cervical or vulvar cancer

STDs: Viral Infections (Cont.)

- Trichomoniasis
  - Caused by *Trichomonas vaginalis,* a protozoan parasite
  - Localized infection
  - Men
    - Usually asymptomatic
  - Women
    - May be subclinical
    - Flares up when microbial balance in vagina shifts
    - Causes intense itching
  - Systemic treatment necessary for both partners