MED437
KING SAUD UNIVERSITY

ANATOMY
Team 437

Ureters, Urinary Bladder & Urethra

Lecture 2

تمت المراجعة
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Please check our Editing File

هذا العمل لا يغني عن المصدر الأساسي للمذاكرة

{وَمَنْ يَتَوَكَّلْ عَلَى اللَّهِ فَهُوَ حَسْبُهُ}

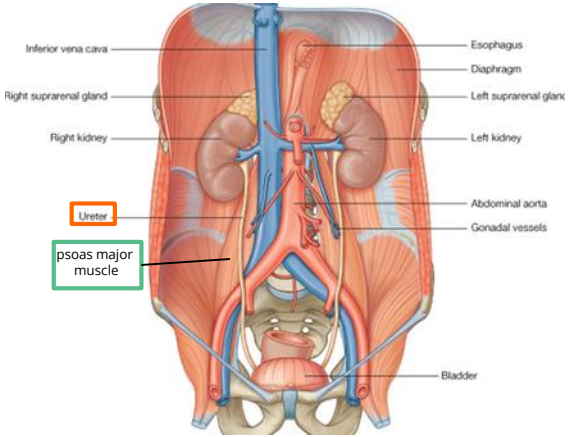
Objectives

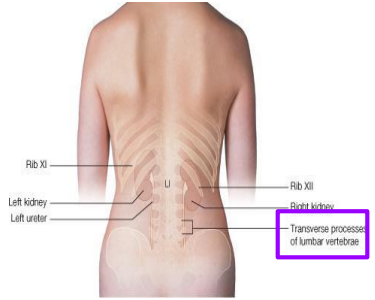
- **Describe the course of ureter & identify the site of ureteric constrictions.**
- **Describe the important relations & identify certain areas (trigone, uvula vesicae) in the base of urinary bladder.**
- **List the blood supply, lymphatic drainage & nerve supply of urinary bladder**
- **Differentiate between male & female urethra regarding length, structure, course & function.**

- Text in BLUE was found only in the boys' slides
- Text in PINK was found only in the girls' slides
- Text in RED is considered important
- Text in GREY is considered extra notes

Ureter

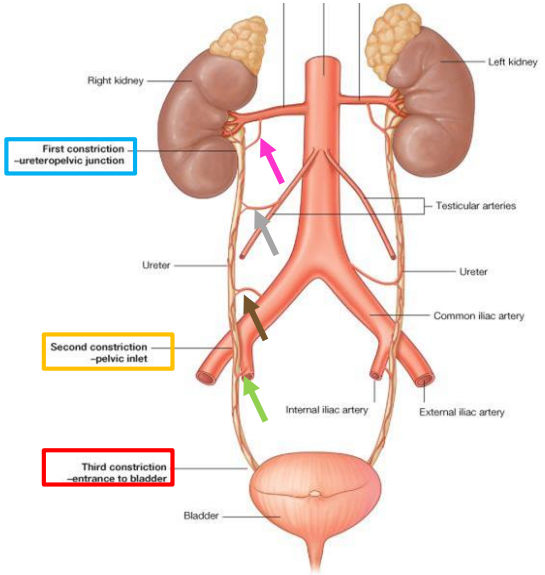
- Definition: it is a **muscular tube** transporting urine from kidney to urinary bladder.
- Length: 25 – 30 cm
- Beginning: it **begins as** a continuation of renal pelvis (or pelvis of ureter).
- Course in abdomen:
  - It descends **anterior to** psoas major muscle (opposite the tips of lumbar transverse processes ,on the x-ray it will appear in front of them because the muscles are radiolucent).
  - It crosses **anterior to** the **end (bifurcation) of common iliac artery** to **enter pelvis**.
- Course in pelvis & termination:
  - It runs **downward** & **backward** to the **level of ischial spine**. It curves forward
    to open in **upper lateral angles** of the **base** of urinary bladder.
  - It **runs obliquely** for **¾ inch** in **wall of bladder before opening** (valve-like part prevents urine from going back).





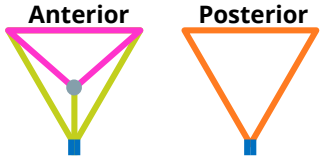
Ureter

- Sites of constrictions (obstruction-stone impaction):
  - **1st:** At ureteropelvic (between renal pelvis and ureter) junction
  - **2nd:** At pelvic inlet (site of crossing of common iliac artery)
  - **3rd:** At site of entrance to bladder
- Arterial supply:
  - Renal artery
  - Gonadal artery
  - Common iliac artery
  - Internal iliac artery

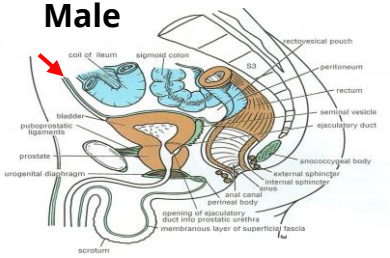


Urinary bladder

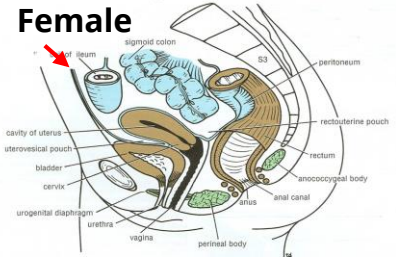
- It is pelvic organ.
- It has the shape of three-sided pyramid placed on one of its angle **(neck)**.
- It has **apex**: directed anteriorly
- It has 4 surfaces:
  - Posterior surface (base): directed posteriorly
  - Superior surface
  - Two infero-lateral surface (right and left inferolateral)



Male



Female



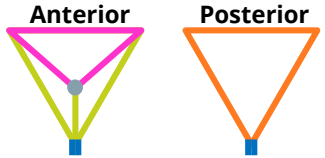
Apex

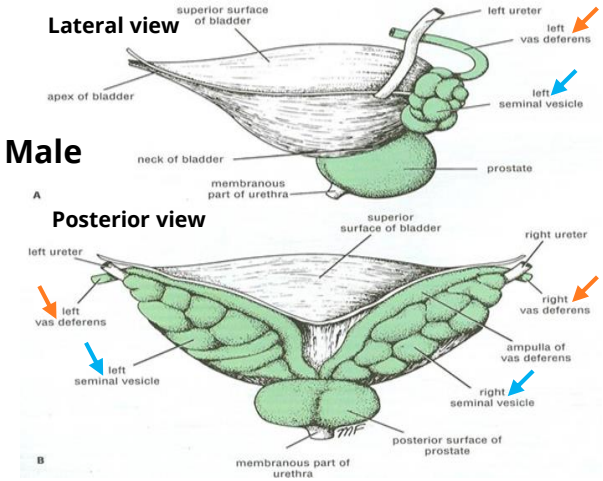
- Is directed forward.
- Is related to (lies behind) **upper border** of **symphysis pubis**.
- Is connected to umbilicus by the **median umbilical ligament** (remnant of urachus,more explanation in embryology).

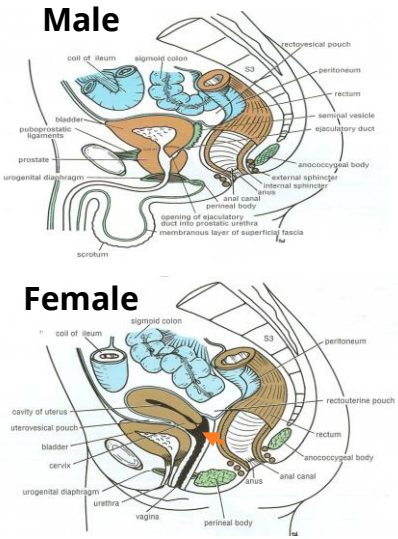
Urinary bladder

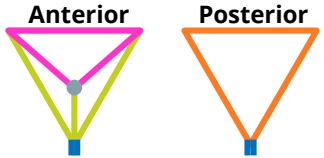
Posterior surface (base)

- Is directed backward
- In male: Is related to **vas deferens** & **seminal vesicle** of both sides
- In female: Is related to **vagina**









Urinary bladder

Superior surface

- In male: is related to **coils of ileum** & **sigmoid colon**
- In female: is related to the **uterus**

Infero-lateral surface

- Are related to **retropubic fat** separating them from pubic bones

Retropubic fat:

- accommodates distention of bladder
- Continuous with anterior abdominal wall.
- **Rupture of bladder** → escape of urine to anterior abdominal wall

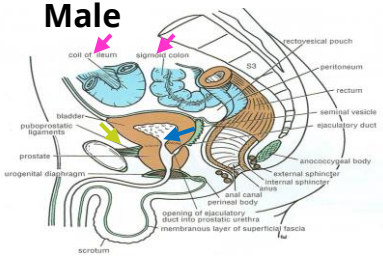
Neck

- Is the **lowest** & **most fixed** part of urinary bladder.
- Is continuous with urethra.
- Is **related** to **(lies behind) lower border of symphysis pubis**
- In male: Is related to **upper surface** of **prostate gland** (**inferiorly**, it rests on the **base of prostate**).

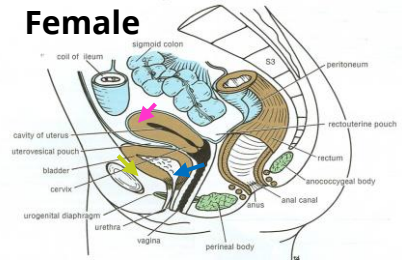
Interior

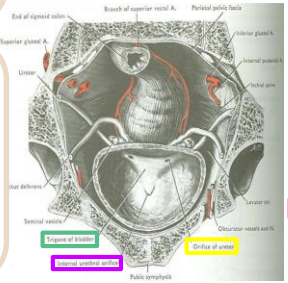
- **Mucous membrane** is **folded.** "All urinary bladder except trigone"
- **Uvula vesicae:** elevation behind **internal urethral orifice**, produced by median lobe of prostate gland
- **Trigone:** a triangular area in base of bladder bounded by the **2 ureteric orifices** & **internal urethral orifice**. Its **mucous membrane** is **elastic (not folded)** "only trigone"

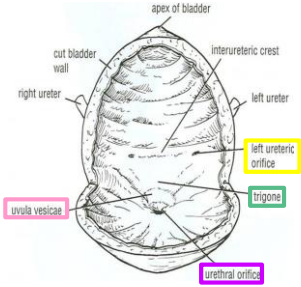
Male



Female



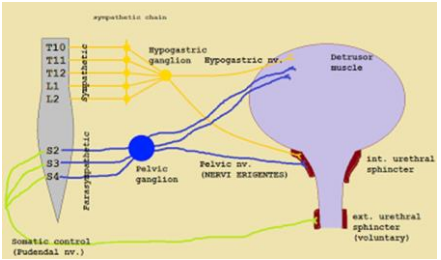




Urinary bladder

Capacity			
Empty		Distended	
Empty bladder is a pelvic organ. Accommodates from 300 – 500ml of urine.		Is circular in shape. **Bulges into abdominal cavity**.	

Supply		
Arteries	from internal iliac artery	
Veins	into internal iliac vein	
Lymph	into internal iliac lymph nodes	
Nerves	**Parasympathetic**	through pelvic splanchnic nerves from S2, S3, & S4
	Sympathetic	from L1 & L2 through hypogastric nerves
	Sensory	transmitting pain due to overdistention of bladder (via general visceral afferent fibers from bladder to CNS).



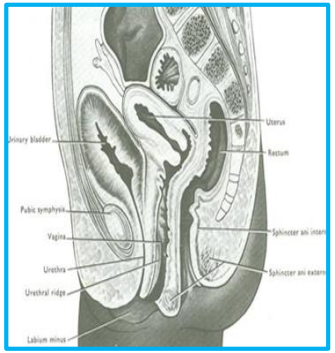
***Urination** involves coordination between the central, autonomic, and somatic nervous systems.

Urinary bladder

ONLY in boy's slides

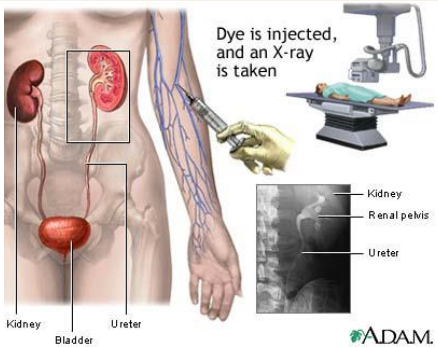
Position

- Is found in abdomen until age of 6 years
- Begins to enter the enlarging pelvis from age of 6 years onward
- Is found entirely in pelvis at puberty
- **The picture** shows a median sagittal section of a newborn female child.



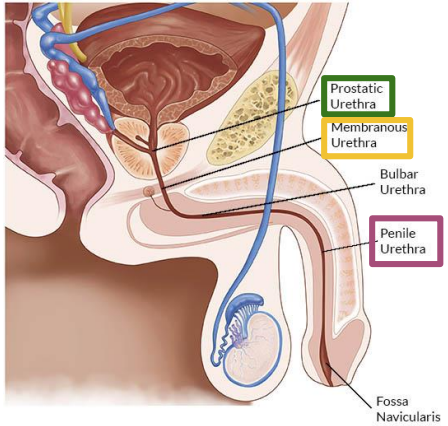
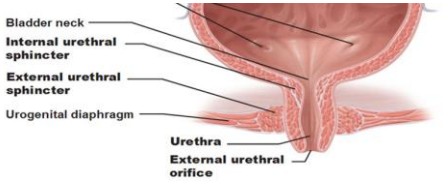
IVU (IVP)

- IVU: Intravenous Urogram | IVP: Intravenous Pyelogram
- **IVU** (Post micturition) also called IVP ,is an x-ray exam that uses an injection of contrast material to evaluate your kidneys, ureters and bladder and help diagnose (demonstrates) a bladder stone or any obstruction in the urinary system.



Here the right side is obstructed

Urethra

Urethra	Characters	Picture
Male urethra (20 cm)	• **Prostatic urethra (length=3 cm):** Widest & most dilatable Extends from **neck** of bladder inside **prostate gland** **Structures openings into prostatic urethra:** 1) Ejaculatory ducts: containing sperms & secretion of seminal vesicles 2) Ducts of prostate gland • **Membranous urethra (length=1 cm):** Surrounded by external urethral sphincter • **Penile (spongy) urethra (length=16 cm):** Extends **inside penis** & opens externally through external urethral orifice **(narrowest part of whole urethra)**	
Female urethra (4 cm)	• Has only urinary function. • Extends from **neck** of urinary bladder to open externally through the **external urethral orifice (anterior to the vaginal opening)**	

Summary

Ureter:

- Beginning: as continuation of renal pelvis
- Course: descends anterior to: psoas major & ends at (bifurcation) of common iliac artery.
- Termination: opens at upper lateral angle of base of urinary bladder
- Sites of constriction: at uteropelvic junction, at pelvic inlet, at site of entrance of bladder
- Arterial supply: renal, gonadal, common & internal iliac arteries

Urinary bladder:

- Apex: related to symphysis pubis, continuous with median umbilical ligament
- Base: related to vas deferens & seminal vesicle (in male) & to vagina (in female)
- Superior surface: related to coils of ileum & sigmoid colon (in male) & to uterus (in female)
- Inferolateral surfaces: related to retropubic fat
- Neck: continuous with urethra, related to upper surface of prostate gland (in male)
- Trigone: lies in the base of bladder, bounded by ureteric orifices & internal urethral orifice, its mucous membrane is elastic
- Uvula vesicae: dilatation behind internal urethral orifice, produced by the median lobe of the prostate gland
- Supply: internal iliac (artery, vein, lymph nodes)
- Nerves: parasympathetic (S2,3,4), sympathetic (L1,2)

Male urethra:

- Function: both urinary & genital
- Length: 20 cm, divided into prostatic (3 cm), membranous (1 cm) & penile (16 cm)
- Course: Extends from neck of bladder to open externally through external urethral orifice (narrowest part of whole urethra)

Female urethra:

- Function: urinary only
- Length: 4 cm
- Course: Extends from neck of bladder to external urethral orifice (anterior to vaginal opening)

MCQs

(1) _____ it begins as a continuation of renal pelvis?

A) Kidney
B) Ureter
C) Urinary bladder
D) Urethra

(2) runs obliquely for _____ in wall of bladder _____ opening ?

A) ¾ inch, before
B) ½ inch, before
C) ¾ inch, after
D) ½ inch, after

(3) Sites of constrictions (obstruction-stone impaction in ureter?

A) At ureteropelvic junction
B) At pelvic inlet (site of crossing of common iliac artery)
C) At site of entrance to bladder
D) All of them

(4) Apex of urinary bladder is related to?

A) Lower border of symphysis pubis
B) Upper border of symphysis pubis
C) upper surface of prostate gland
D) to vas deferens & seminal vesicle of both sides

(5) Urinary bladder has apex & _____ surfaces:

A) 2
B) 3
C) 4
D) 5

MCQs

(6) Which one of the following structures is related to the inferolateral surface?

A) Prostate gland
B) Sigmoid colon
C) Retropubic fat
D) Seminal vesicle

(7) If urinary bladder distended, the capacity?

A) Bulges into abdominal cavity
B) Both A & C
C) Accommodates urine
D) Non of them

(8) The neck of urinary bladder in male related to?

A) Lower border of symphysis pubis
B) Upper border of symphysis pubis
C) Upper surface of prostate gland
D) to vas deferens & seminal vesicle of both sides

(9) Which one of the following is the site of uvula vesicae?

A) In the superior surface of urinary bladder.
B) Behind the internal urethral orifice.
C) Between the 2 ureteric orifices.
D) In relation to the apex of urinary bladder.

(10) Which of them is sympathetic supply of urinary bladder?

A) Through pelvic splanchnic nerves from S2, S3, & S4
B) Via general visceral afferent fibers from CNS to bladder
C) Via general visceral afferent fibers from bladder to CNS
D) L1 & L2 through hypogastric nerves

Answers

(1) B
(2) A
(3) D
(4) B
(5) C
(6) C
(7) A
(8) C
(9) B
(10) D

GOOD LUCK 

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