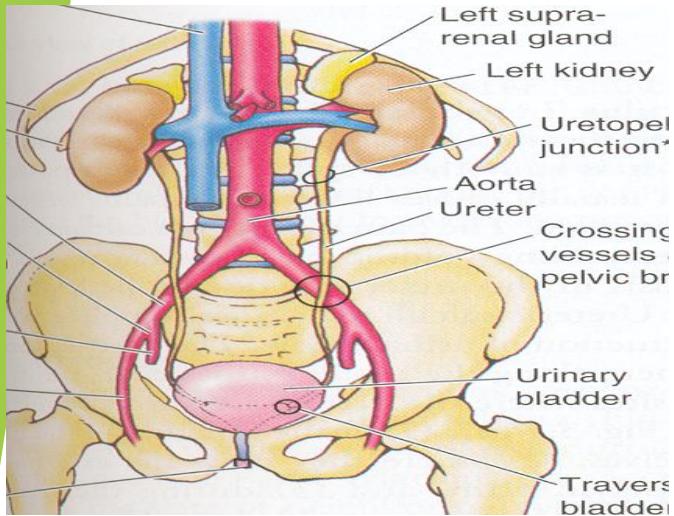


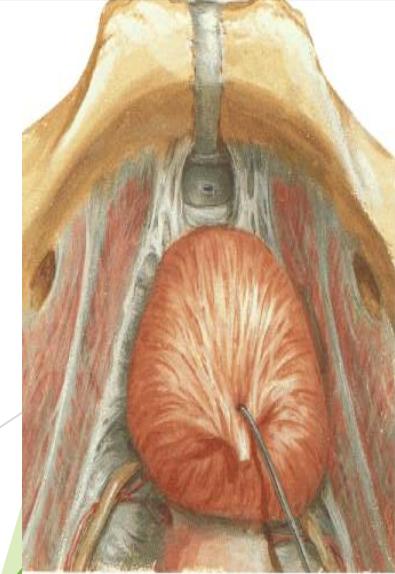
URETERS



URINARY BLADDER

Urethra

By
Dr. Priti Acharya



URETERS

DEFINITION:

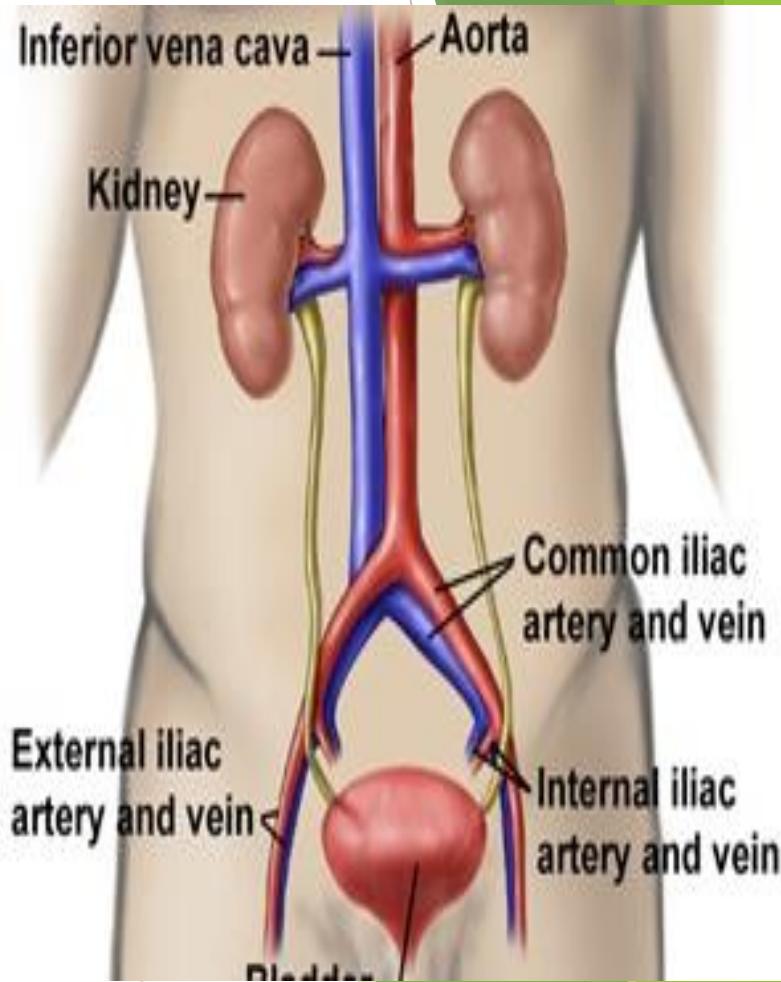
A pair of narrow , thick walled , muscular tubes.

They convey urine from the kidneys to the urinary bladder.

DIMENSIONS:

Length:25cm

Diameter:3mm



Location

- ▶ It begins at pelvis ureteric junction, infront of the tip of transverse process of L1 vertebrae
- ▶ Ureters is continuous with funnel shaped renal pelvis, then passes downward through abdominal cavity, behind the peritoneum infront of psoas muscle into the pelvis cavity and passes obliquely through the posterior wall of urinary bladder

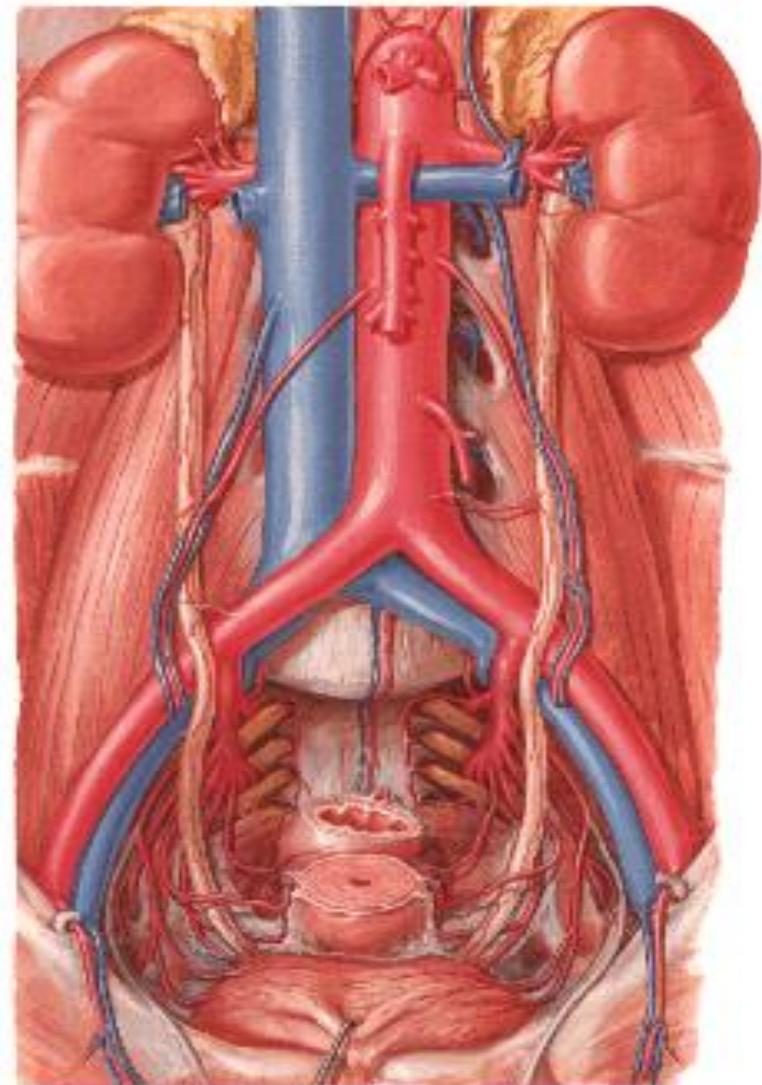
COURSE OF THE URETERS

► Divided into 3 parts

Renal pelvis

Abdominal part

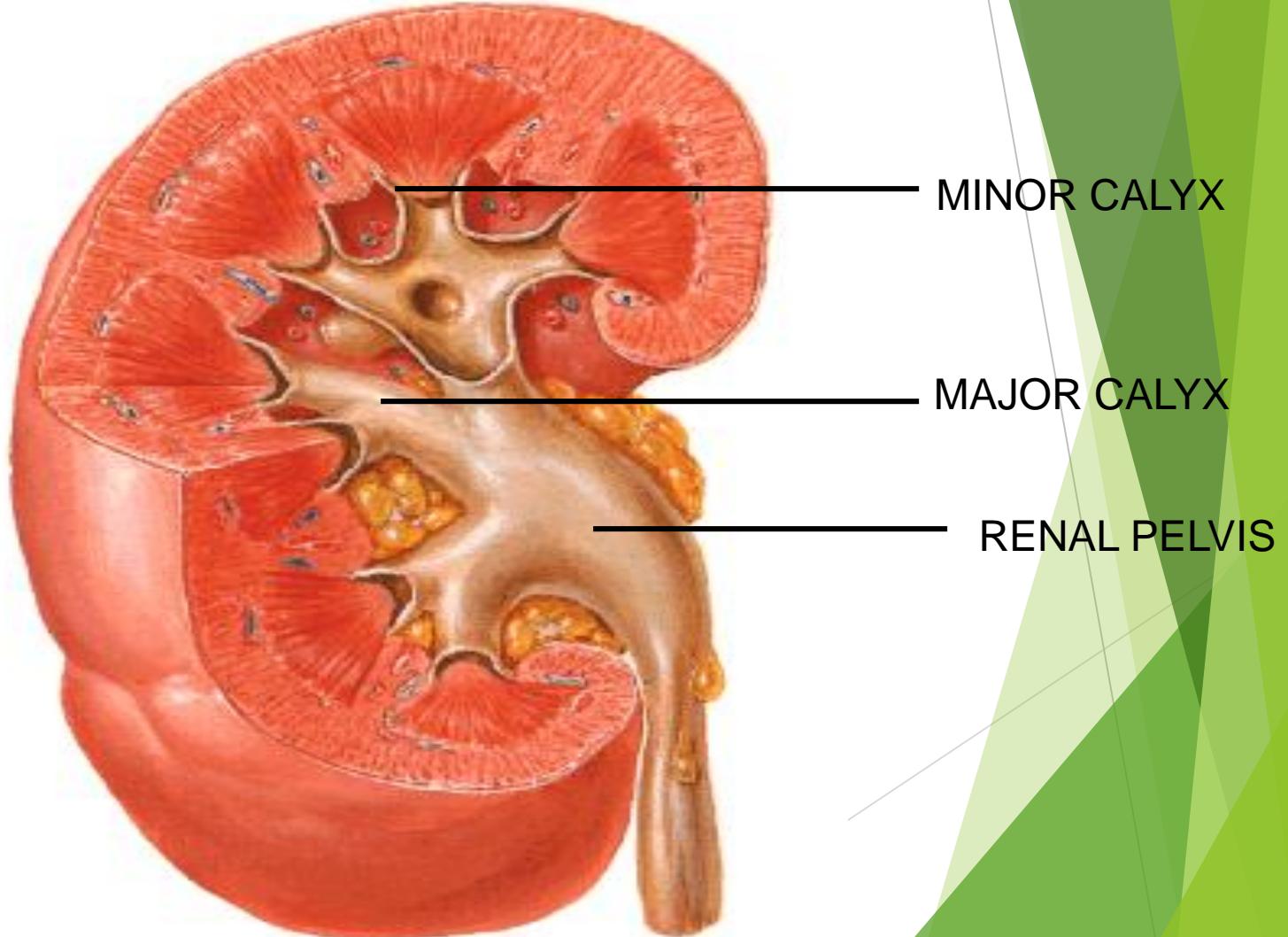
Pelvic part



Renal pelvis

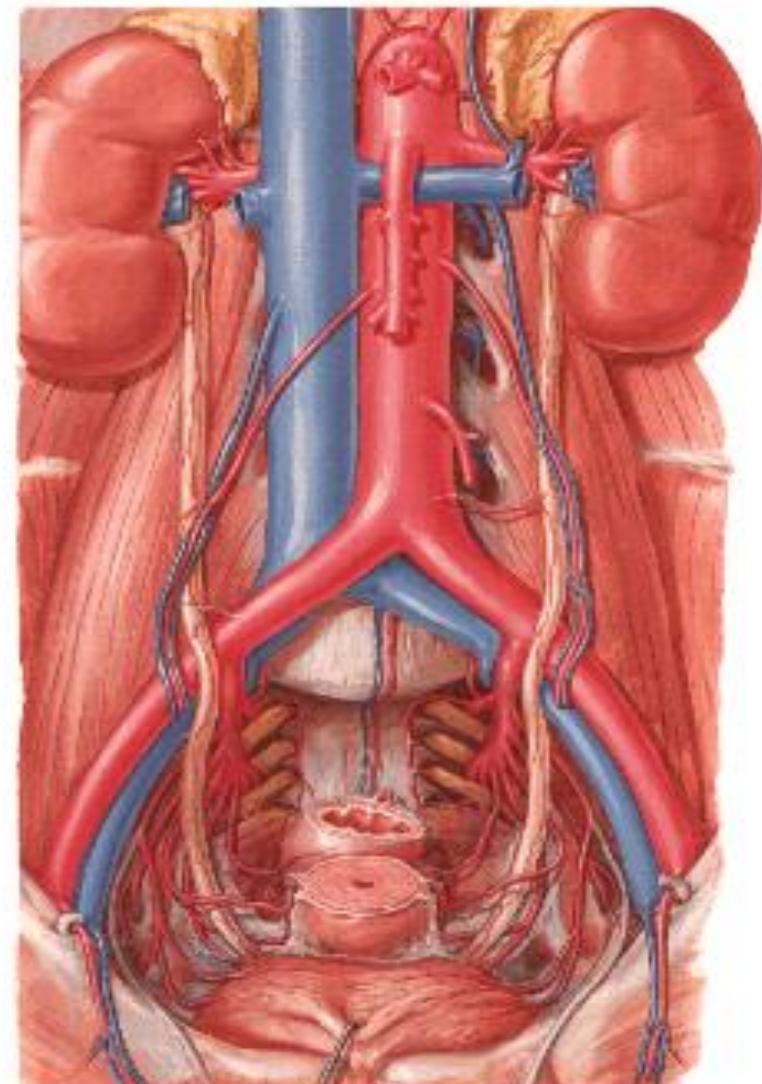
- ▶ Funnel shaped
- ▶ Formed within renal sinus by union of major calyces
- ▶ Pelvis part moves downward, and medially through hilum
- ▶ Continuous with abdominal part at lower level of lower end of corresponding kidney

RENAL PELVIS



Abdominal part of ureter

- ▶ Passes downward and slightly medially beneath the peritoneum of post abd wall
- ▶ Enter pelvic cavity by crossing bifurcation of common iliac artery



RELATIONS OF THE ABDOMINAL PART OF URETER

POSTERIOR RELATIONS

(On both the sides)

- Psoas major and fascia
- Tips of the transverse process of all the lumbar vertebrae

ANTERIOR RELATIONS

RIGHT SIDE

- ▶ Covered by parietal peritoneum
- ▶ Rt. Gonadal vessels
- ▶ Rt. Colic & ileocolic branches of superior mesenteric artery
- ▶ Coils of small intestine

LEFT SIDE

- ▶ Covered by parietal peritoneum
- ▶ Lt. Gonadal vessels
- ▶ Lt. colic & sigmoidal branches of inferior mesenteric artery
- ▶ Sigmoid colon

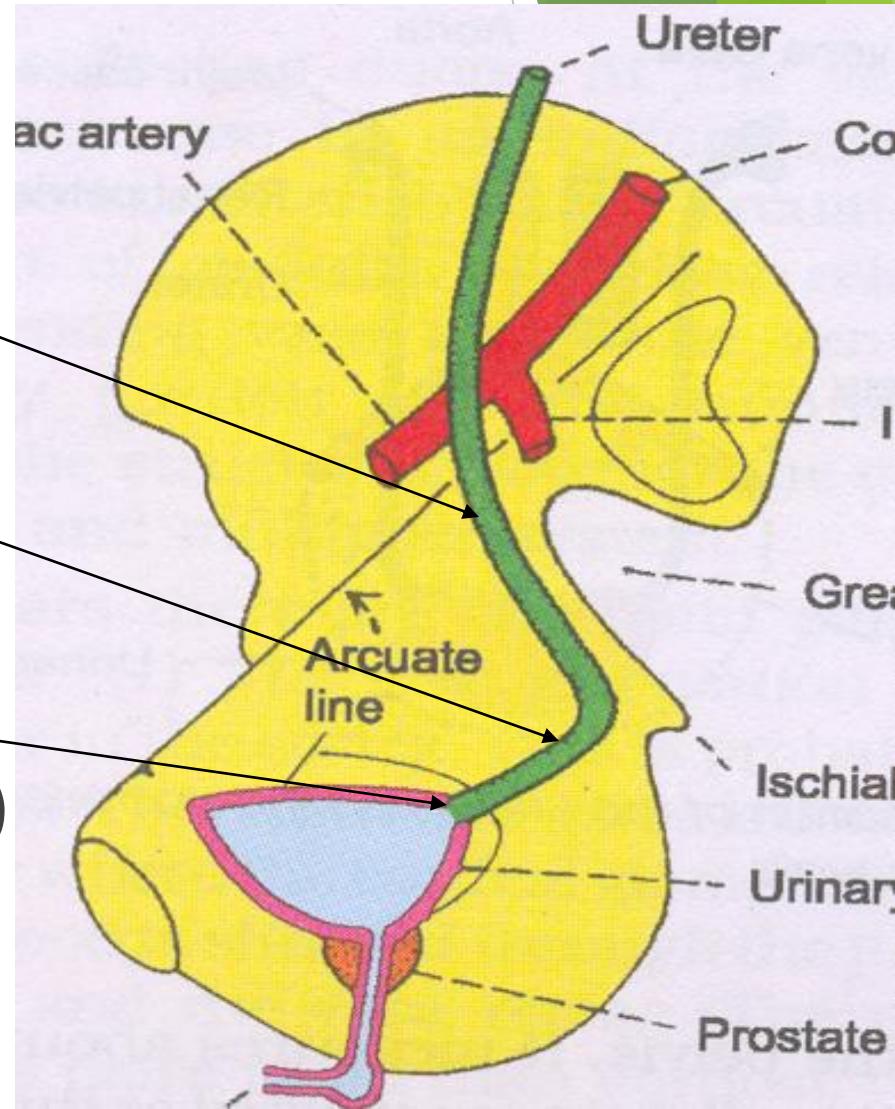
PELVIC PART OF URETER

- ▶ Further divided into 3 parts according to its course

- ▶ 1st part (Vertical part)

- ▶ 2nd part (Oblique part)

- ▶ 3rd part (Intravesical part)

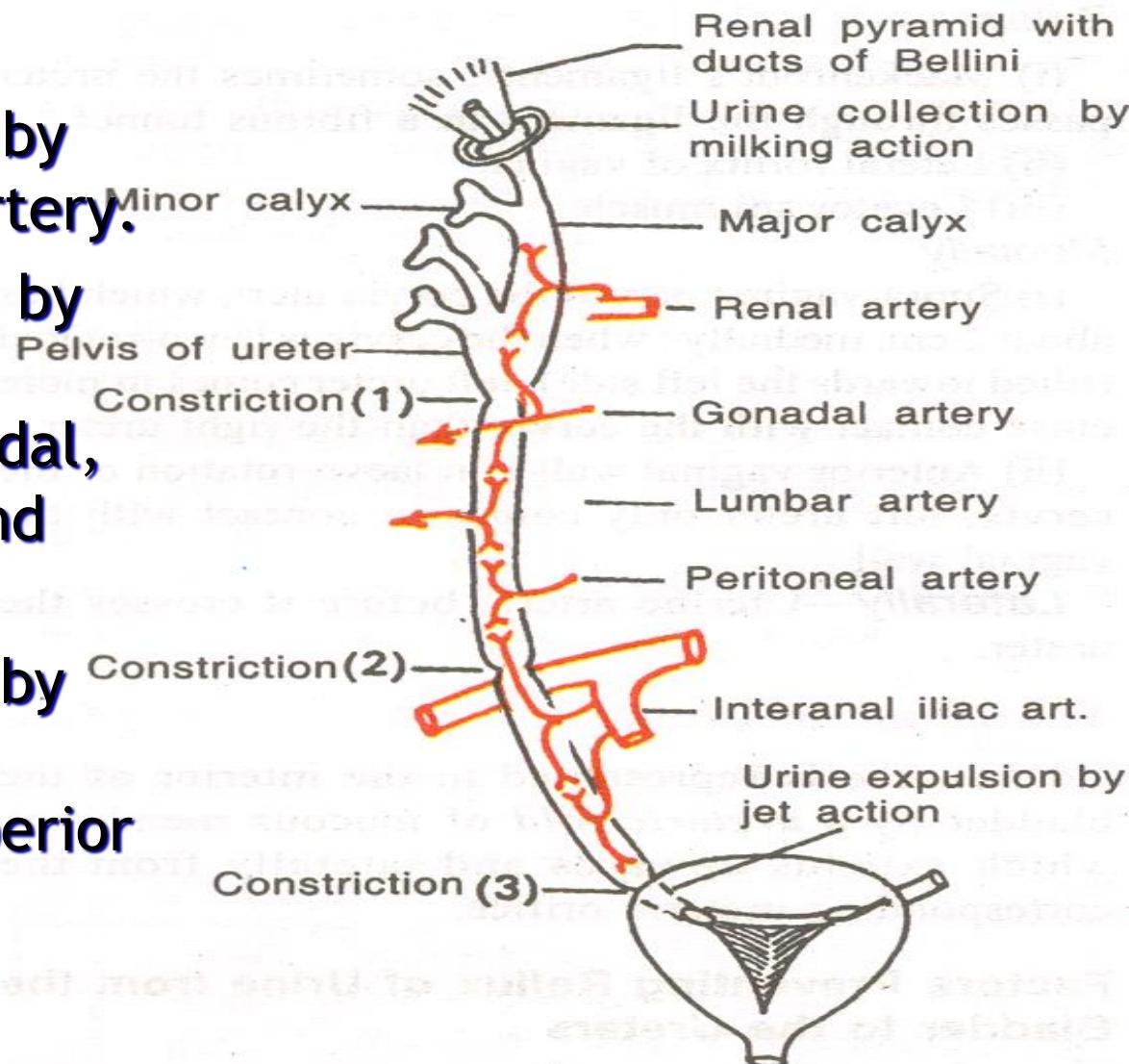


CONTRICTIONS OF URETER

- ▶ Pelvi-uretric junction
- ▶ Pelvic brim
- ▶ Point of entry into bladder wall

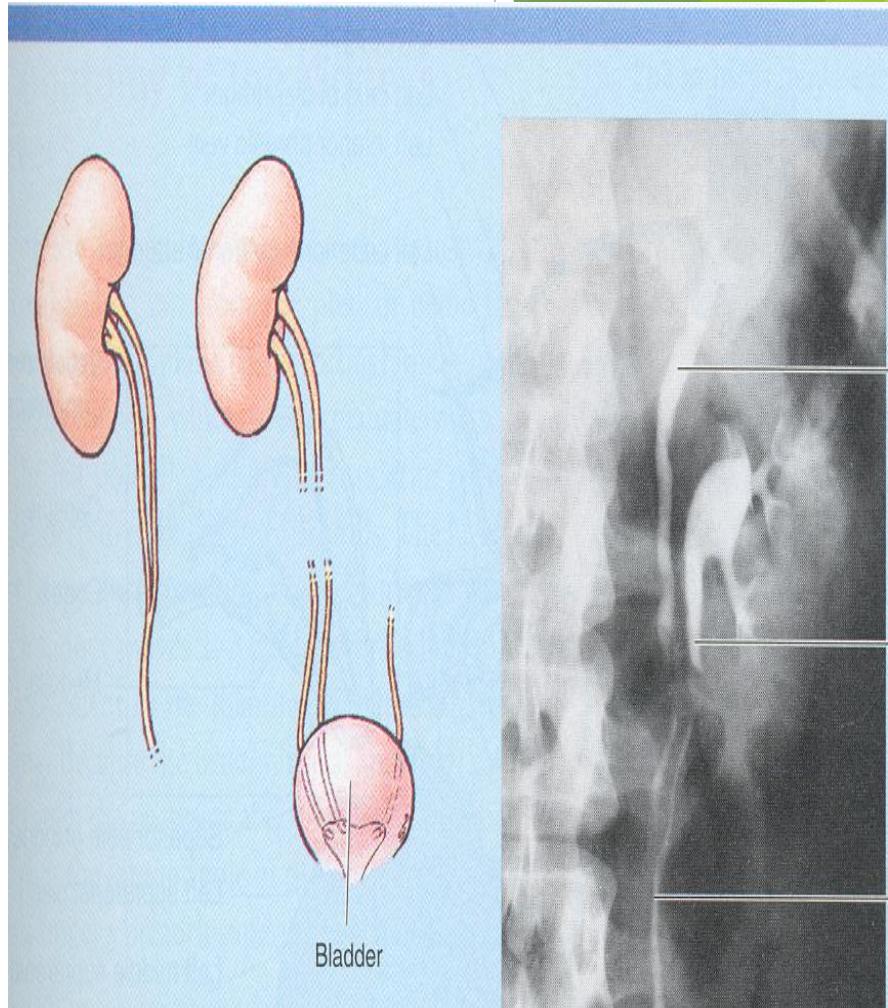
BLOOD SUPPLY OF URETER

- Upper part is supplied by branches from renal artery.
- Middle part is supplied by branches coming from abdominal aorta, gonadal, common iliac artery and internal iliac artery.
- Pelvic part is supplied by branches of vesicle artery(inferior and superior vesicles artery).



APPLIED ASPECTS

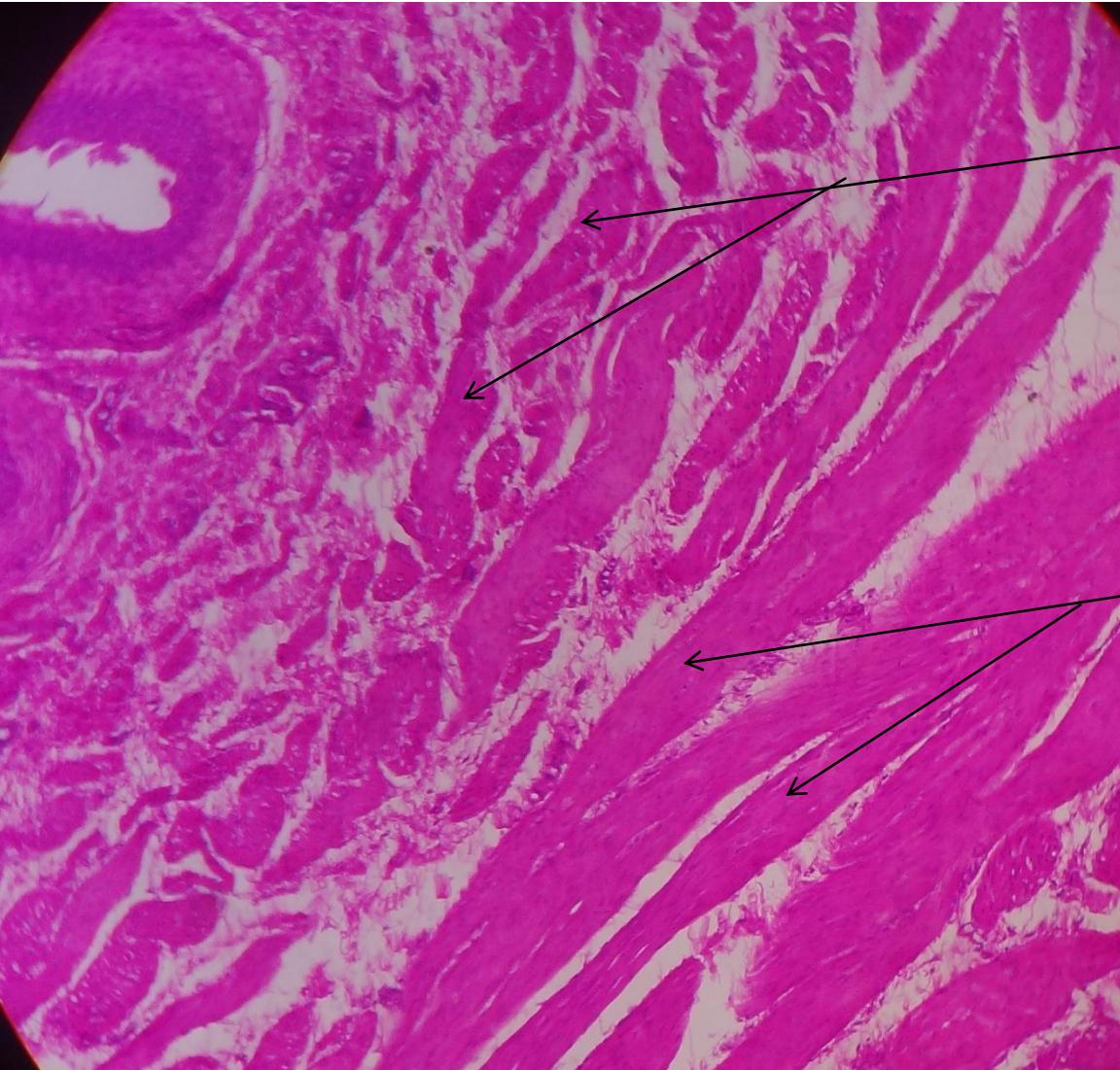
- ▶ Bifid renal pelvis
- ▶ Duplication of ureter
- ▶ Ureteric calculus



Layer of Ureter

- ▶ **Outer fibrous layer-** continuous with fibrous capsule of kidney
- ▶ **Middle muscular layer-** Inner longitudinal layer
 - Outer circular layer
- ▶ Performed peristalsis
- ▶ **Inner mucosa layer-** composed of transitional epithelium

Ureter 40x

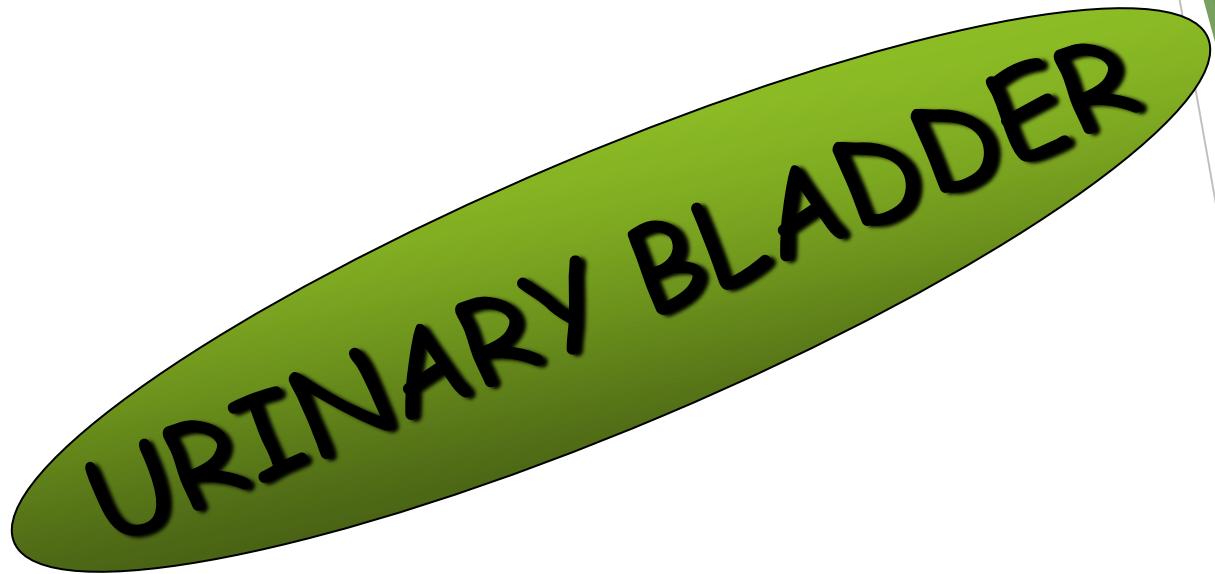


Inner longitudinal M

Outer circular M

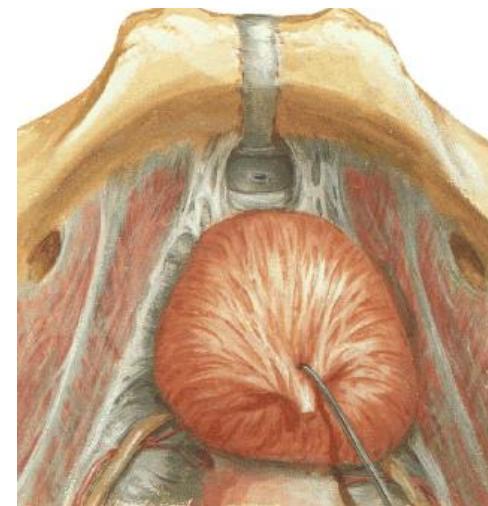
Key features to identify the slide of ureter

1. Presence of transitional epithelium.
2. Muscle coat made up of inner longitudinal & outer circular layers of smooth muscle.



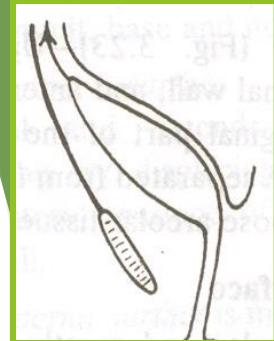
URINARY BLADDER

- > Urinary bladder is the temporary store house of urine which gets emptied through the urethra.
- > Hollow muscular organ.
- > Acts as reservoir of urine.



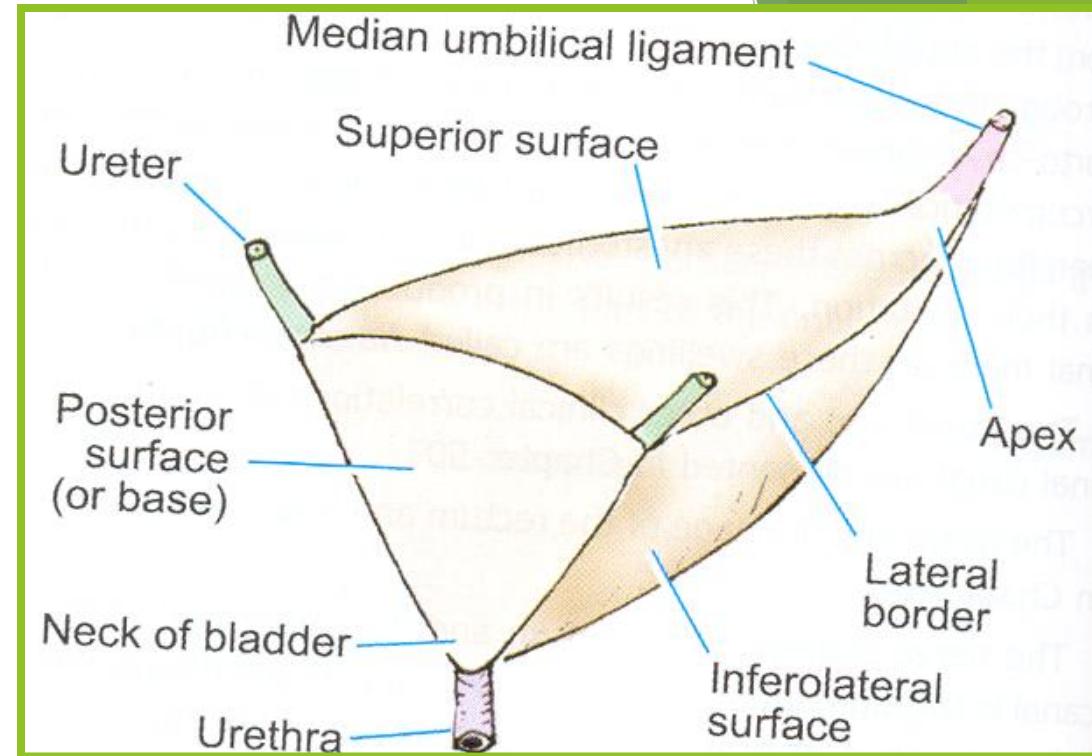
Position:

- ✓ In children, it is abdomino-pelvic and the neck of the bladder lies at the level of upper border of symphysis pubis.
- ✓ In adults, it is a pelvic organ and the neck lies just above the plane of the lower border of symphysis pubis.
- ✓ When distended it becomes abdomino-pelvic.



Shape:

- ▶ Tetrahedral when empty.
- ▶ Ovoid when distended.



Capacity

- ▶ Average capacity : 120 to 320ml.
- ▶ Sense of filling : 100 to 150ml.
- ▶ First desire for micturition : 150 to 250ml.
- ▶ Painful sensation : above 450ml.
- ▶ Anatomical capacity : volume of urine just before the rupture of bladder (about 1lit. Or more).

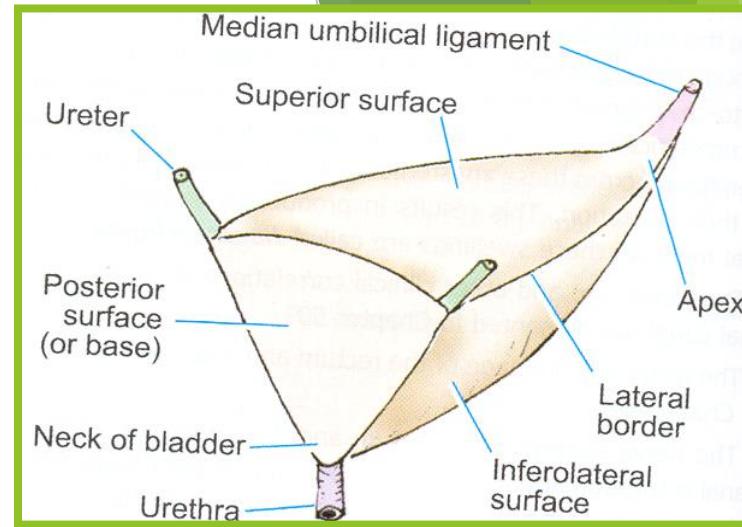
Parts:

- ▶ **Apex**
- ▶ **Base/fundus**
- ▶ **3 surfaces**

- ▶ **3 borders**
- ▶ **Neck.**

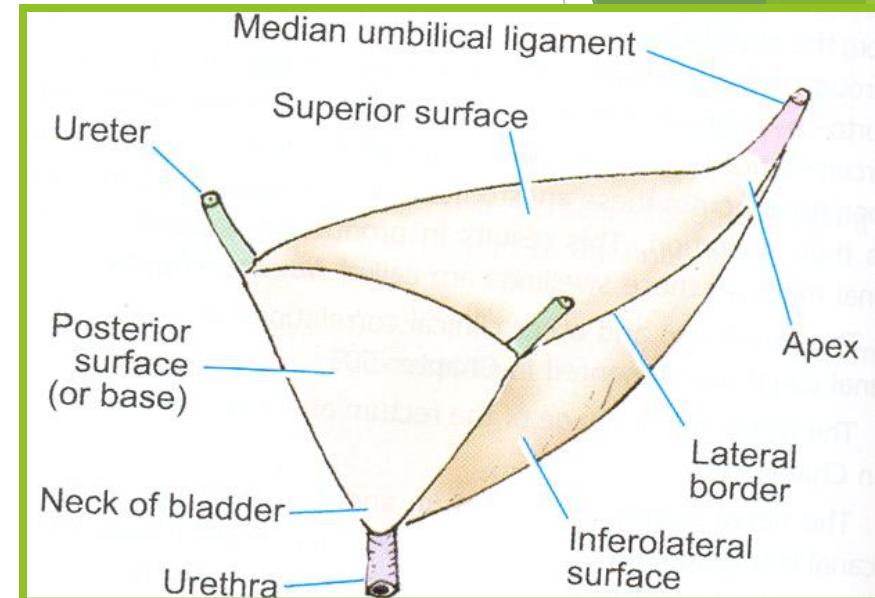
Superior
2 Infero lateral

Anterior
Posterior
2 Lateral



Relations:

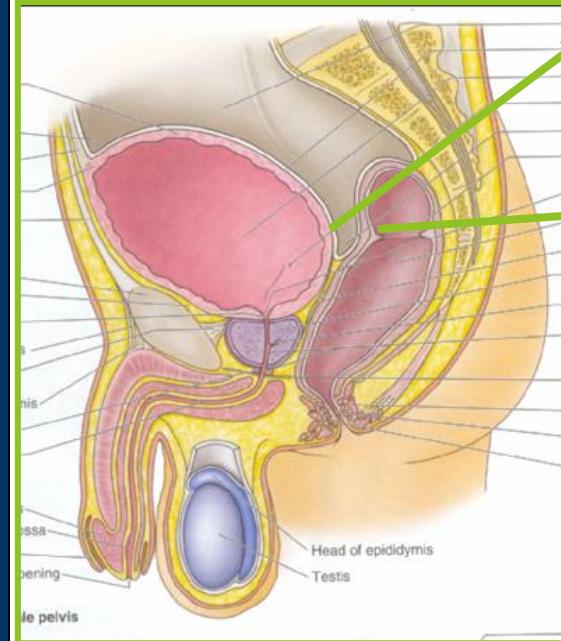
- ▶ **Apex:** directed forwards to the upper part of the symphysis pubis and gives attachment to the **median umbilical ligament**.



Base (fundus or posterior inf surface): non-peritoneal.

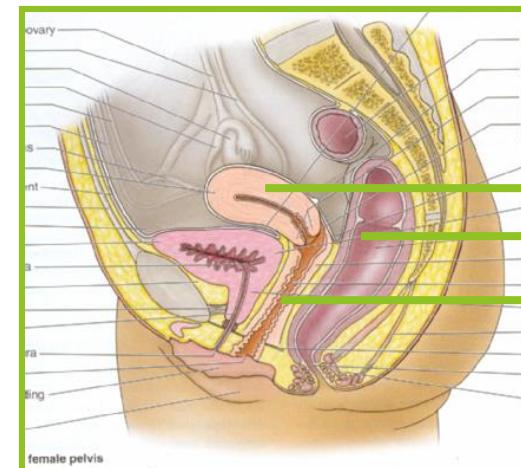
- ✓ **In male:** separated from the rectum by a pair of seminal vesicles, vas deferens and rectovesical fascia.
- ✓ **In females:** separated from the rectum by the upper part of vagina and cervix of uterus.

Male bladder



Rectovesical fascia

Female bladder

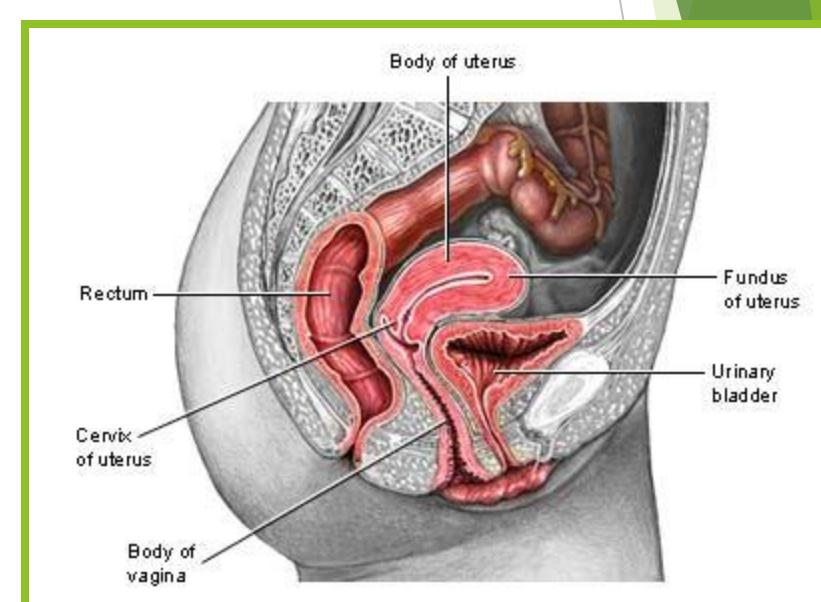
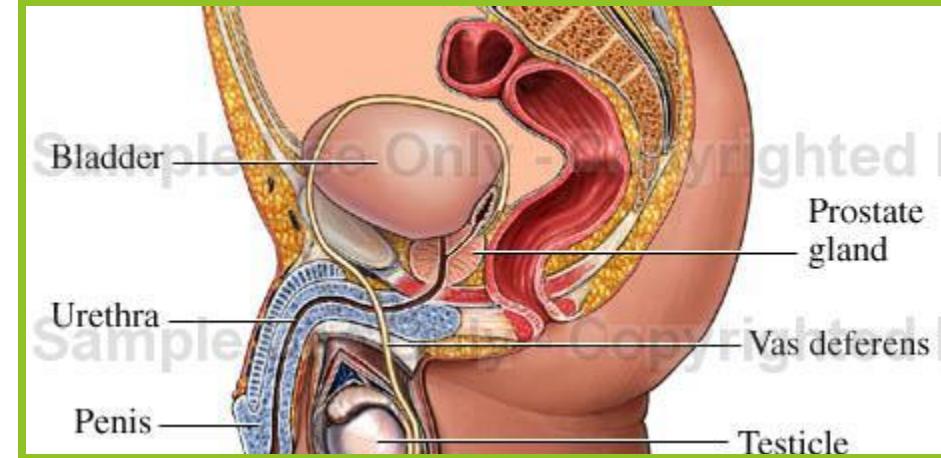


rectum

uterus
rectum
vagina

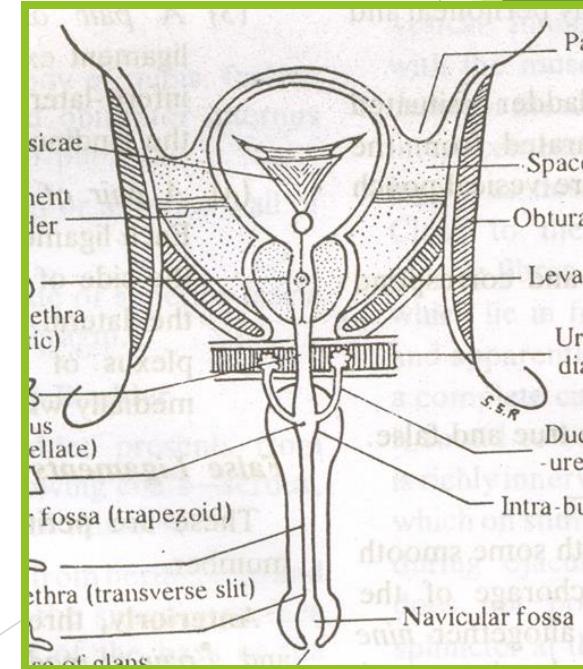
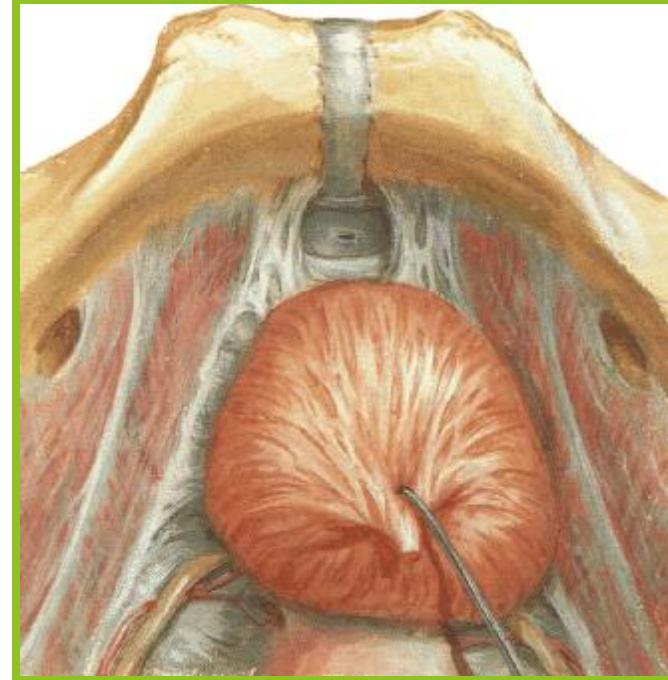
Superior surface:

- Triangular & covered with peritoneum.
- Related to sigmoid colon, coils of small intestine
- In female - anterior surface of the uterus.



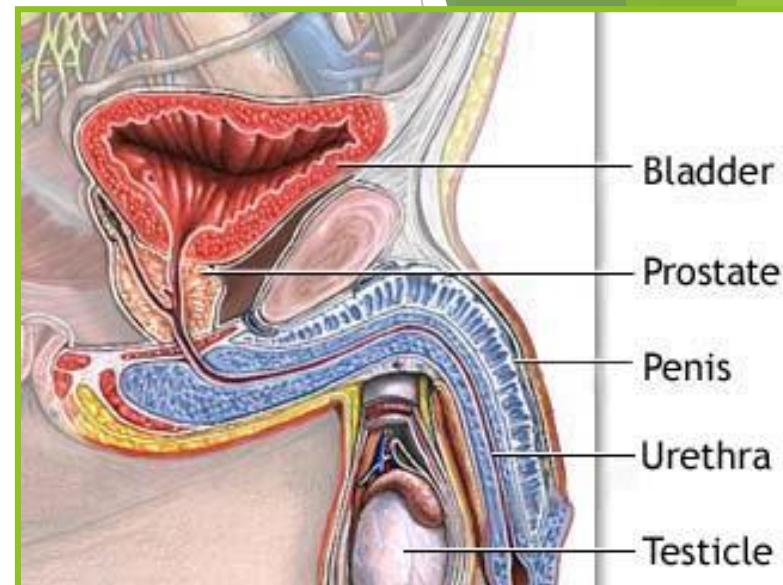
Infero-lateral surfaces:
Directed downwards and laterally and is non-peritoneal.

Related to the body of pubis and pubic symphysis and fascia covering levator ani muscle.



Neck:

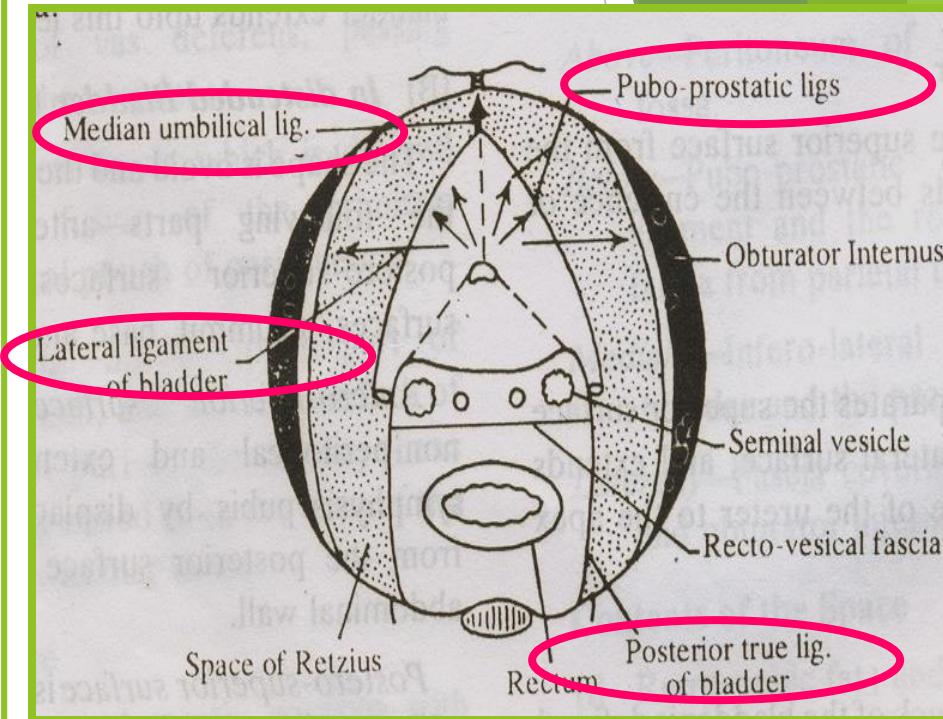
- ▶ Usually about 3 to 4cm. behind the lower border of symphysis pubis.
- ▶ In male the bladder neck lodges the prostate..
- ▶ It is the lowest point from where urethra begins.



- Fibrous bands with some smooth muscle fibres - help to support the bladder.

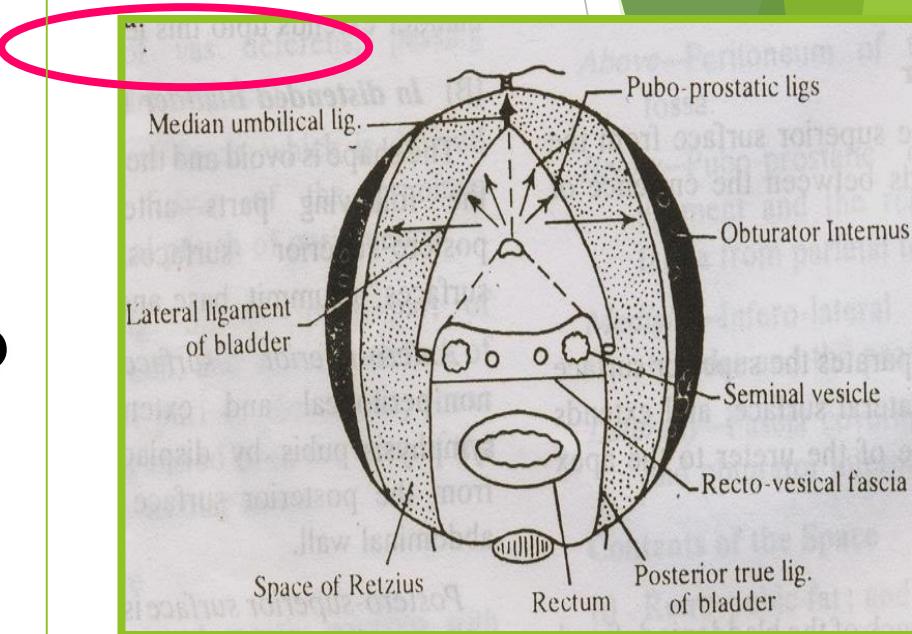
1. Median umbilical ligament
2. L&M Puboprostatic / pubovesical lig.
3. A pair of lateral ligaments.
4. A pair of posterior true ligaments.

Ligaments: True



- Peritoneal folds
 - Which don't form any support
1. Single Median umbilical fold- umb.to ub
 2. A pair of medial umbilical fold - obliterated portion umb artery.
 3. A pair of lateral false ligaments
 4. A pair of sacrogenital folds.

Ligaments: False



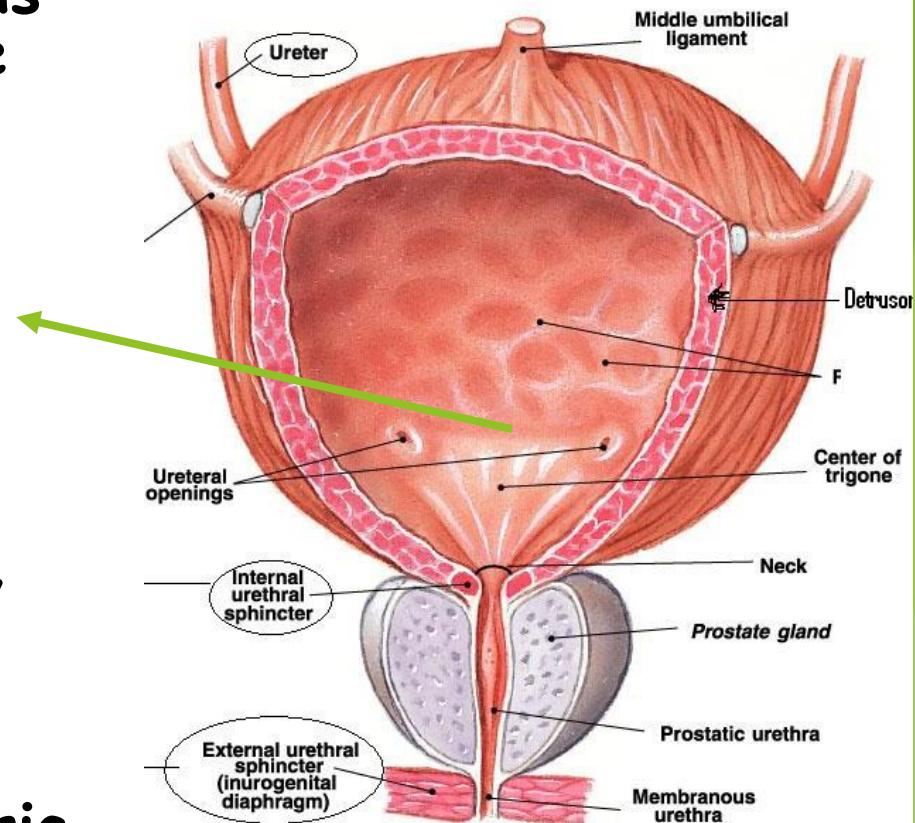
Trigone of the Bladder

In an empty bladder, the greater part of the mucosa shows irregular folds.

- It is a small triangle area on the inner aspect of the base of the bladder where the mucous membrane is firm & smooth due to the absence of submucous layer.

Boundaries

- ▶ Apex: directed downwards and forwards & is at the internal urethral orifice.
- ▶ Base: the inter ureteric ridge between the two ureteric orifices.
- ▶ Posterolateral angles: by the ureteric orifices.
- ▶ Sides: by urethro-ureteric lines.



Importance of trigone:

1. Most fixed and dependant part of the bladder
2. Richly supplied with blood vessels and nerves
3. Prevent back flow of urine in the ureter

Blood supply:

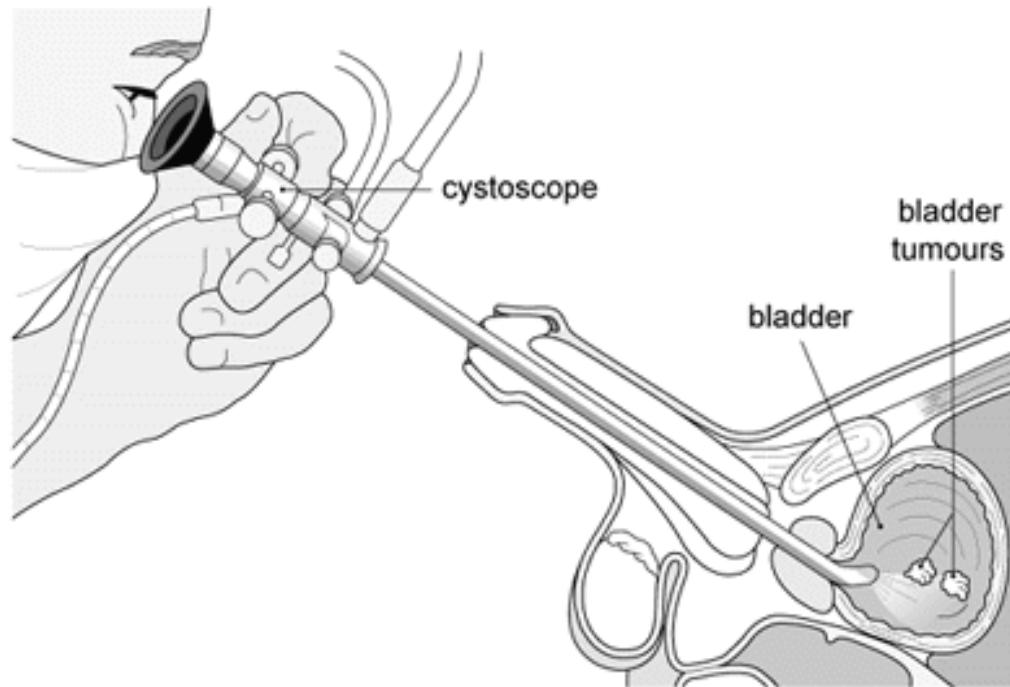
- ▶ Superior vesical artery- br. of internal iliac artery
- ▶ Inferior vesical artery- br. of internal iliac artery
- ▶ Obturator artery
- ▶ Inferior gluteal artery
- ▶ In female, a branch of uterine artery
- ▶ Veins correspond to the arteries and form a vesical venous plexus along the inferolateral surface of the bladder and finally drain into the internal iliac vein.

Applied anatomy

Cystoscopy:

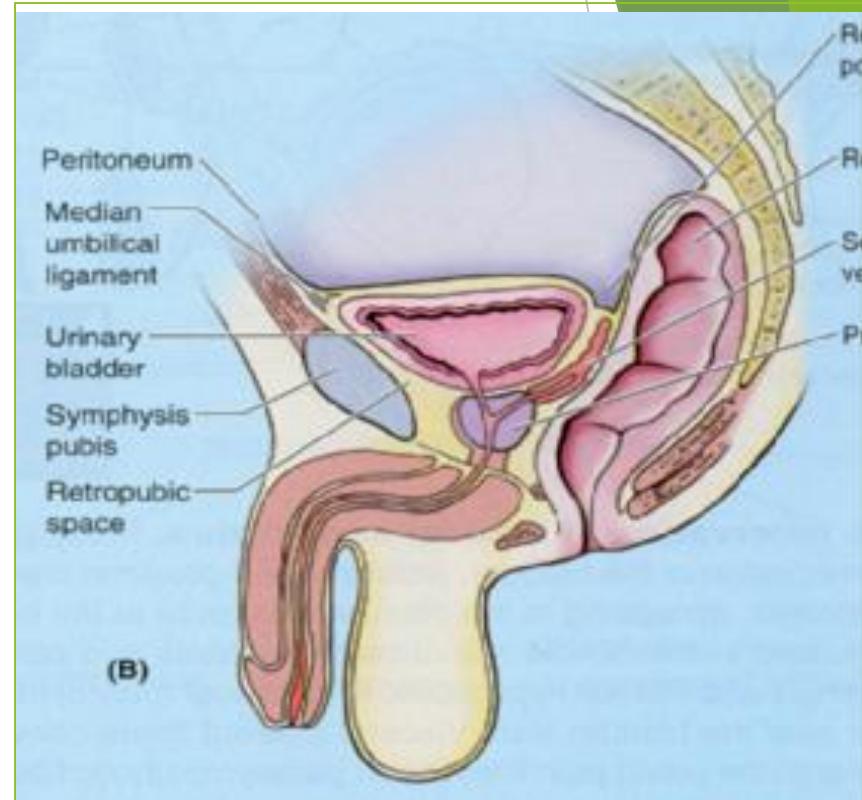
The interior of the bladder and its orifices can be examined with a cystoscope.

Procedure for cystoscopy

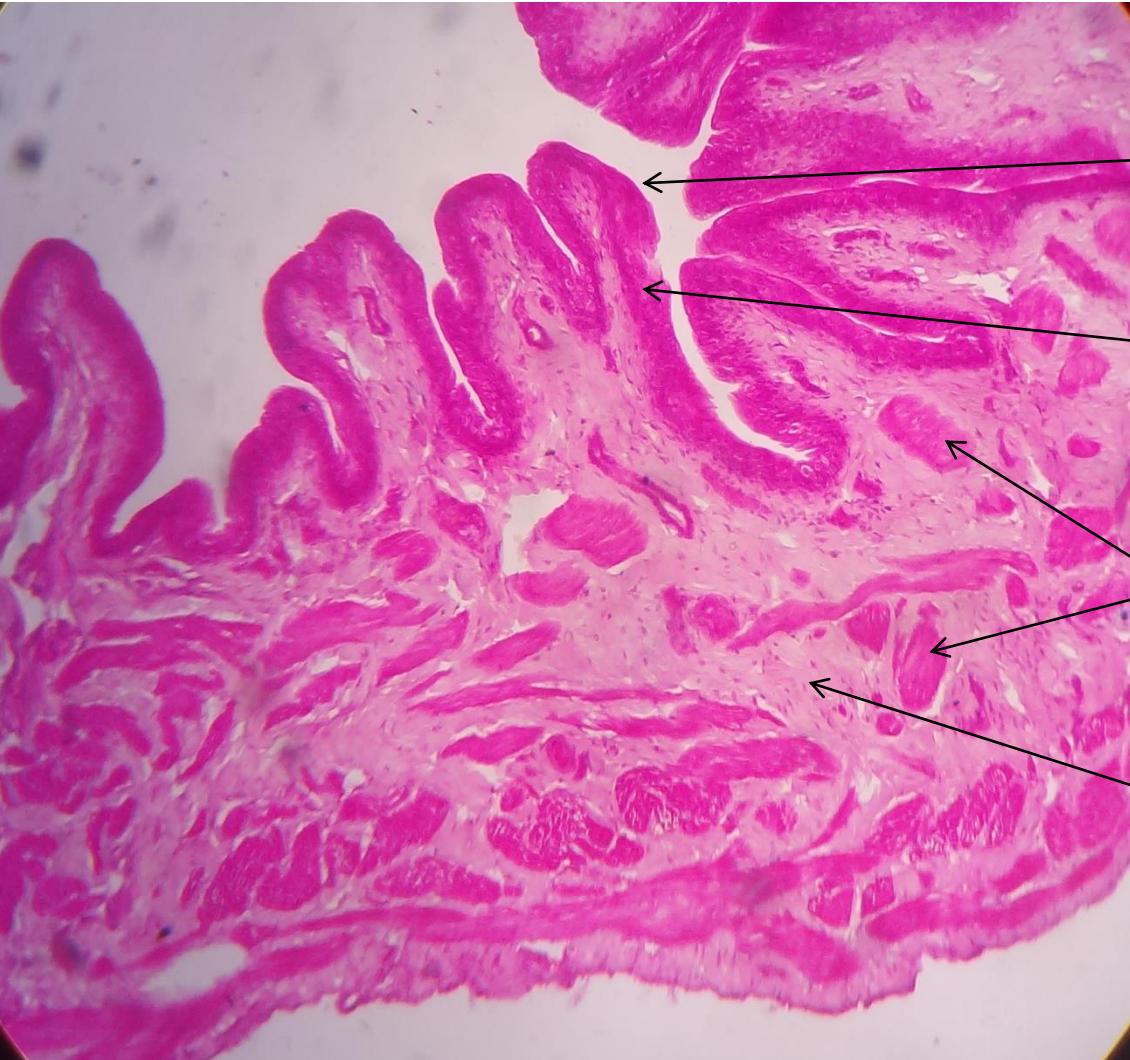


Suprapubic cystotomy

- Distended bladder can be punctured surgically superior to the pubic symphysis without damaging the peritoneum.



Urinary Bladder



Folds in the mucosa

Transitional
Epithelium

Bundles of smooth
muscle

Connective tissue

Key features to identify the slide of urinary bladder

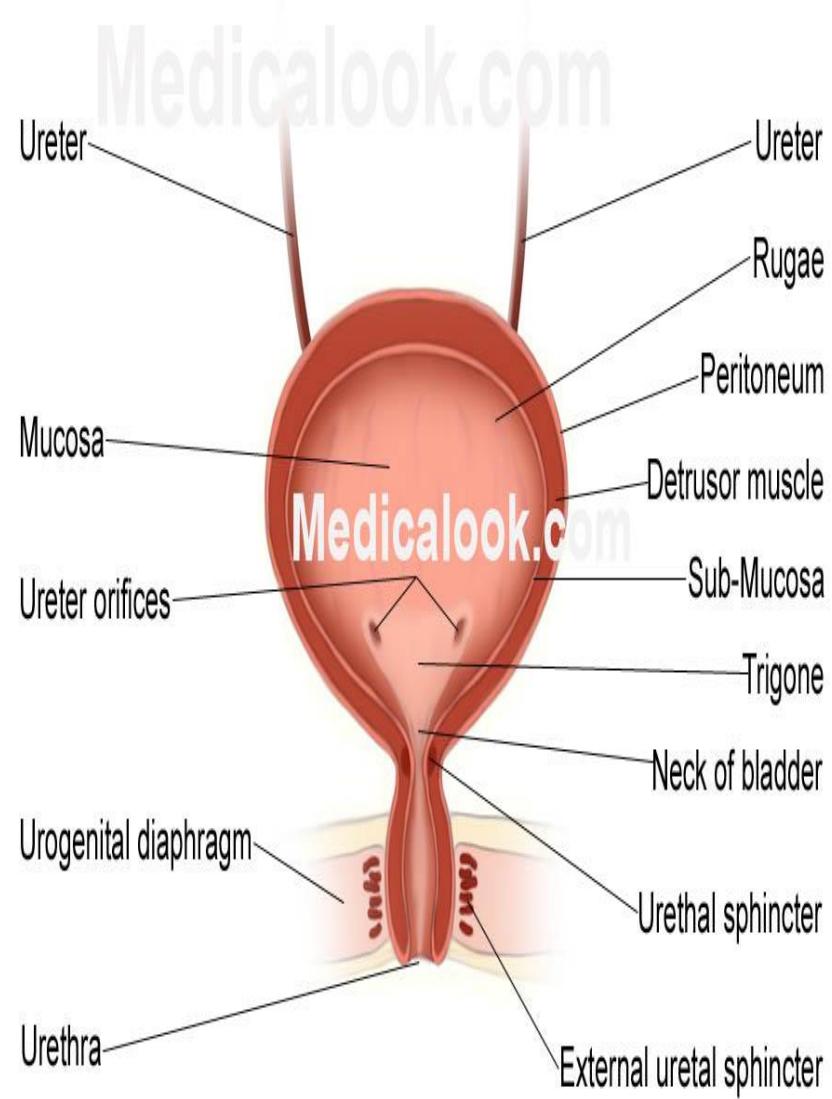
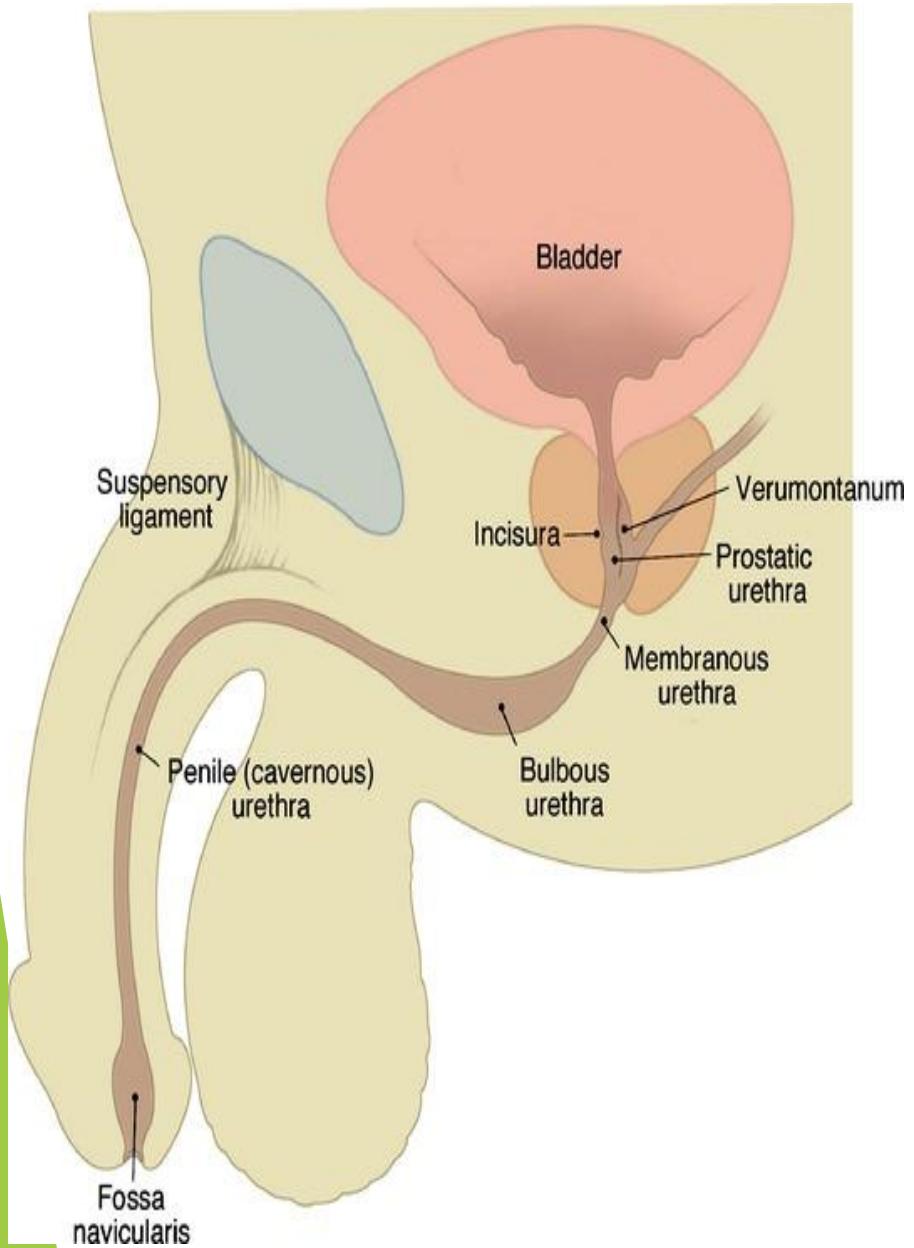
1. Presence of transitional epithelium.
2. Thick muscle coat made up of discrete bundles of smooth muscles separated by connective tissue.
3. Glands are absent.

Anomalies of Urinary Bladder

1. Agenesis
2. Duplicated
3. Ectopia Vesicae also known as exstrophy of bladder
 - Characterised by deficient anterior wall & exposure & protusion of the posterior wall of the bladder.

Male urethra

Female urethra

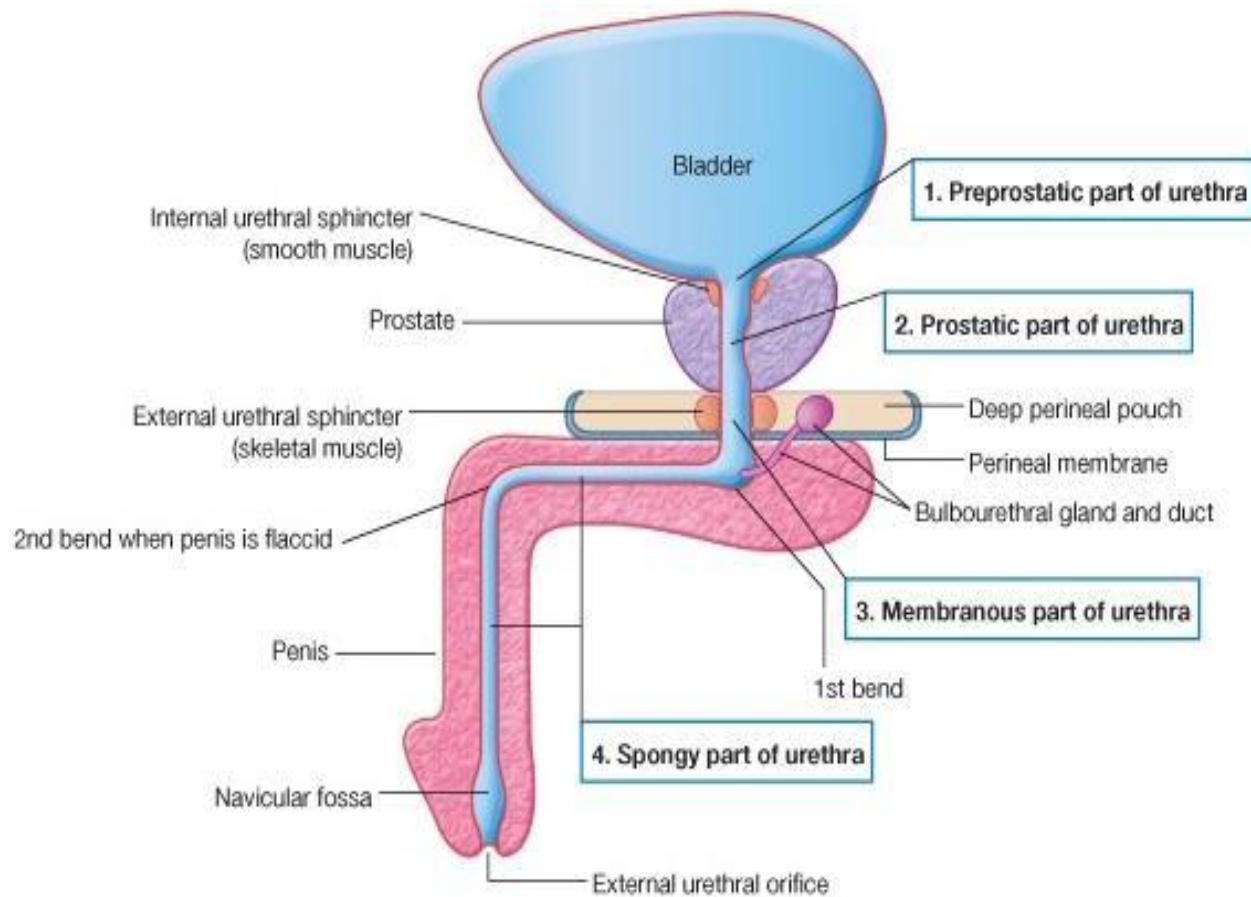


Urethra

- ▶ Conveys urine from body
- ▶ Internal urethral sphincter
 - ▶ Retains urine in bladder
 - ▶ Smooth muscle, involuntary
- ▶ External urethral sphincter
 - ▶ Provides voluntary control over voiding of urine

Male urethra

- It is common tubular passage for the elimination of urine & semen.
- Extends from the internal urethral orifice to external urethral orifice.
- Internal urethral orifice is in the urinary bladder & external urethral opening is at the end of the penis.
- Measurements; 18-20cm long.
- The urethra shows different curves shape.

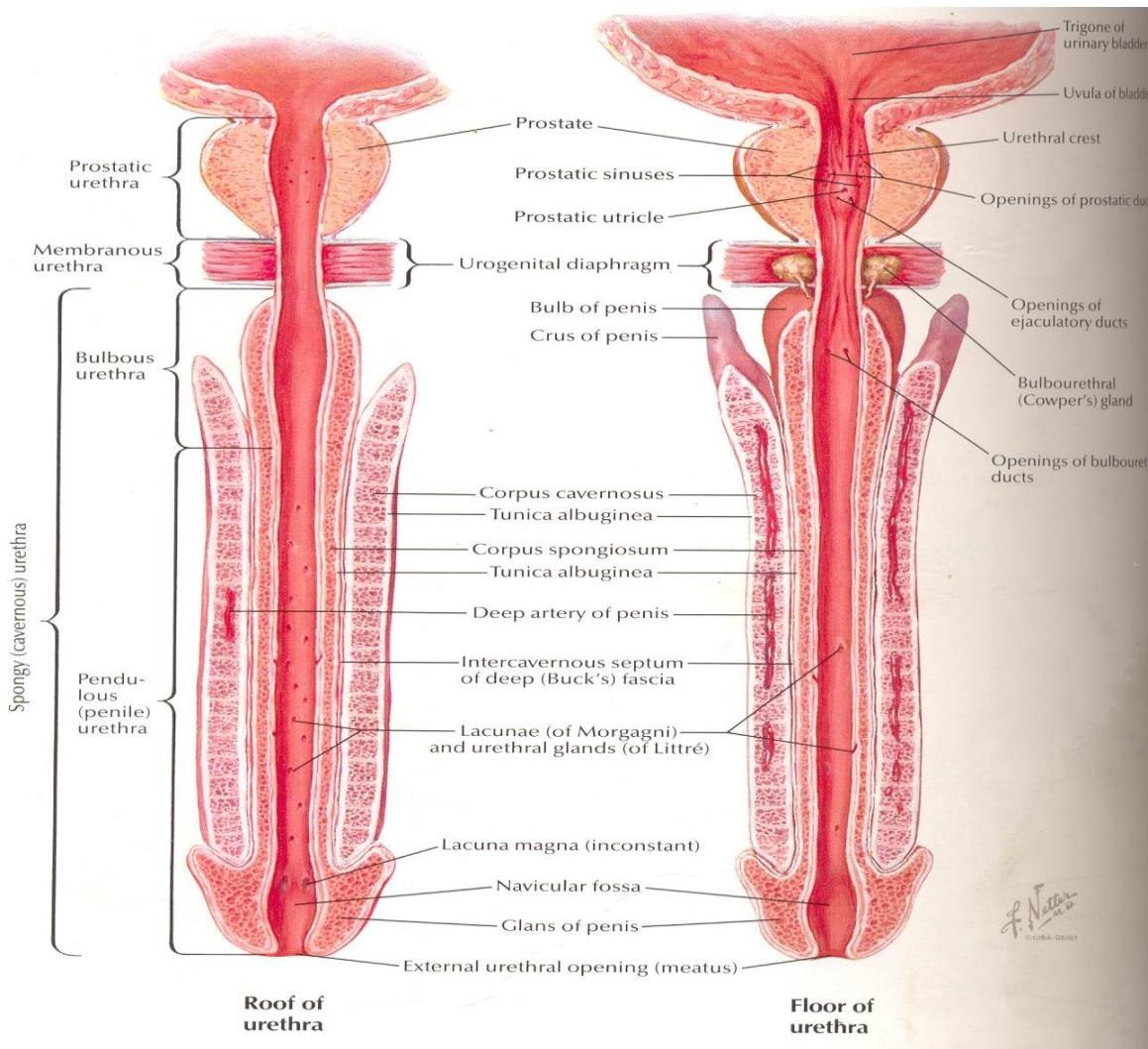


Parts

- ▶ Tot length=18-20cm
- ▶ Divided into 4 parts
- ▶ Preprostatic-1.5cm
- ▶ Prostatic-3cm
- ▶ Membranous- ant wall-2cm
- ▶ Post wall-1.25cm
- ▶ Spongy part- 15cm

Prostatic	Membranous	Spongy
1 inch	0.5	6 inch
In prostate	In the deep perineal pouch	In the bulb and corpus spongiosum
Widest	Narrowest	Has 2 dilatations Bulbar fossa Navicular fossa
Receive opening of ejaculatory duct, Prostatic utricle	Surrounded by external urethral sphincter	Receive opening of bulbar urethral gland

Parts of male urethra; It has 3 parts.



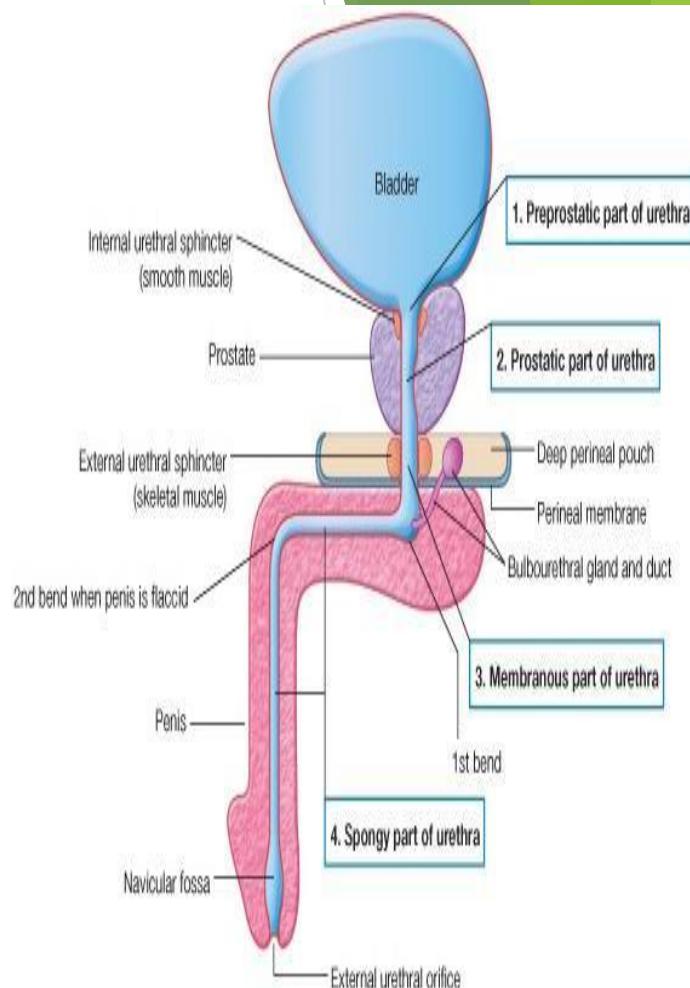
✚ Sphincters of urethra.

Internal Sphincter

- Involuntary
- Lies in between the neck of bladder and the prostate
- Surrounds the (pre prostatic part)internal urethral orifice.
- Smooth(Involuntary)

External Sphincter.

- Present in deep perineal pouch
- Surround the membranous part
- Skeletal muscle(Voluntary muscle)



- Arterial supply;
 - Inferior vesical, middle rectal, internal pudendal.
- Veins correspond to the arteries.
- Lymphatic drainage;
 - Prostatic & membranous parts drain into external & internal iliac lymph nodes.
 - Spongy part;deep inguinal nodes

- Nerve supply;
 - Sympathetic fibres.
 - Parasympathetic fibres,
 - Somatic fibres, derived from the urethral branch of the pudendal nerves



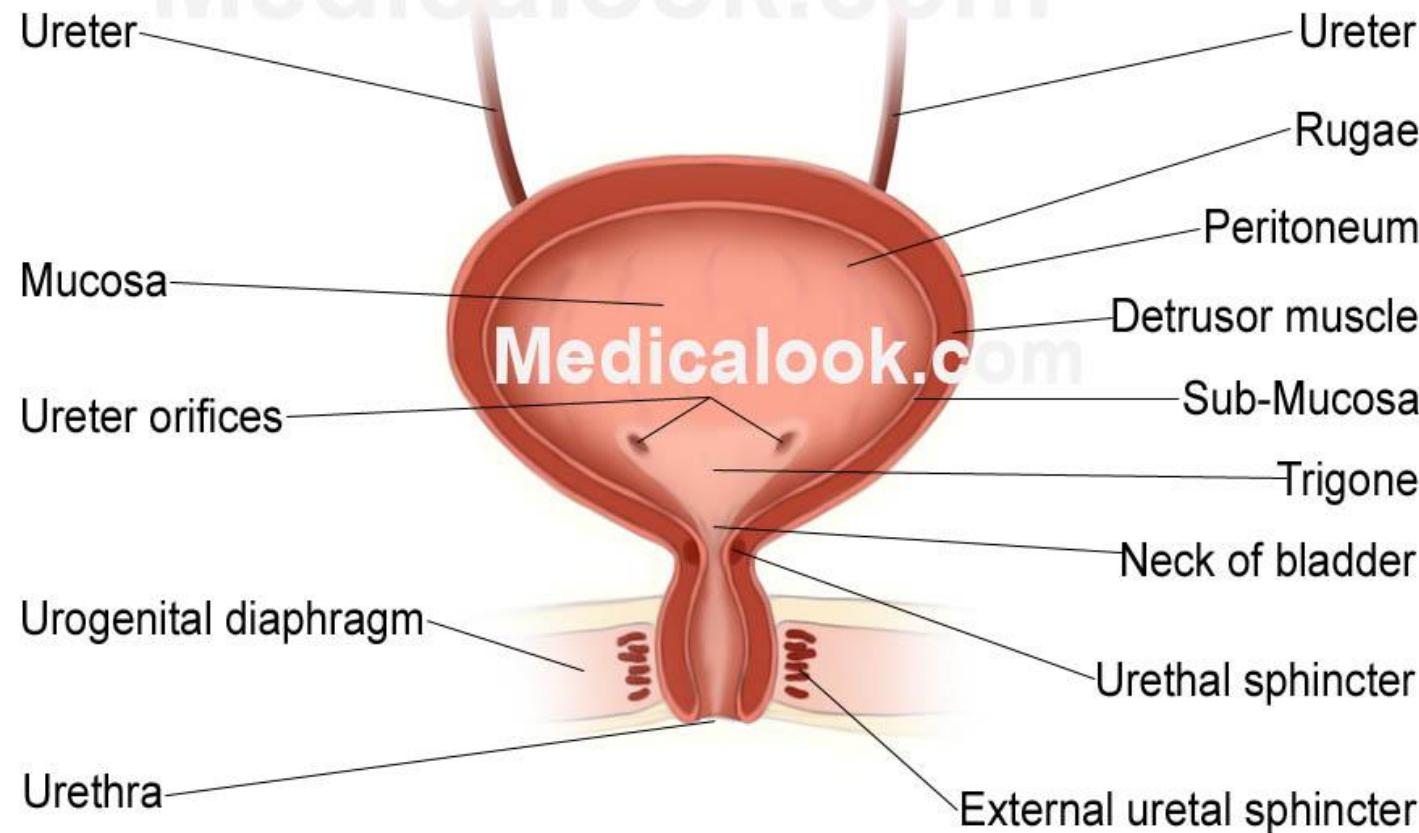
Applied anatomy.

Cystoscopy;

- ⊕ Examination of the interior & 3 orifices of the bladder.
- ⊕ Tubular endoscope is inserted through the urethra.
- ⊕ Tumour also can be removed using the method.

Urethritis - infection of urethra.

Female urethra



Female urethra

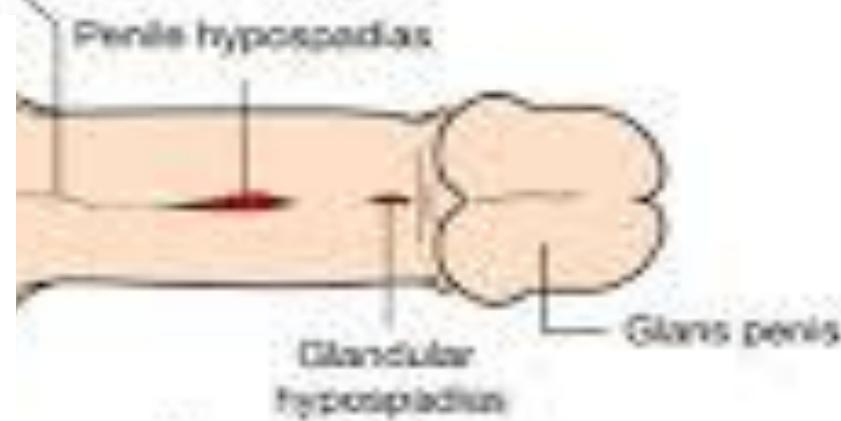
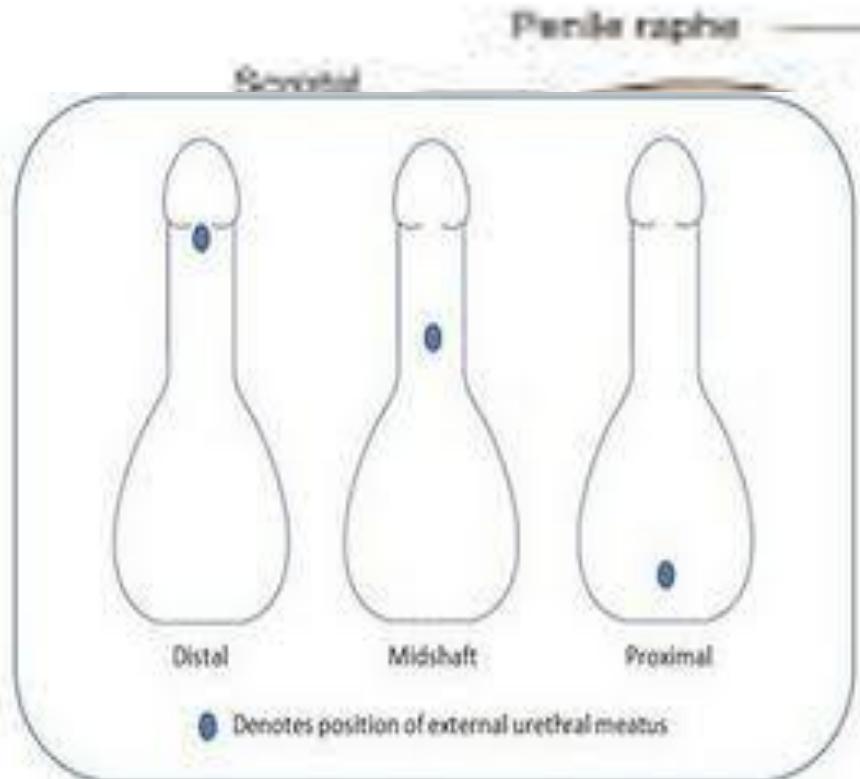
- ▶ Only 4 cm long.
- ▶ 6mm in diameter.
- ▶ Open in the vestibule.
- ▶ It begins at the internal urethral orifice of bladder, approximately opposite middle of the pubic symphysis.
- ▶ It is embedded in the anterior wall of vagina.
- ▶ It crosses the perineal membrane & ends at external urethral orifice.
- ▶ It is situated directly anterior to the opening of vagina & 2.5 cm behind the glans clitoris.

Blood supply

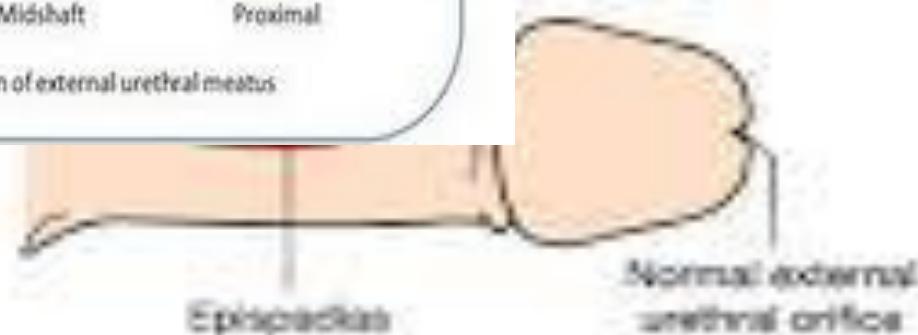
Superior Vesicle artery & vaginal artery.

Veins drains into internal pudendal vein.

- ▶ **Hypospadias** - is a common anomaly in which the urethra opens on the undersurface of the penis or in the perineum.
- ▶ **Epispadias** - a rarer condition in which the urethra opens on the dorsum of the penis close to ant abd wall



Hypospadias



Epispadias

