ANATOMY OF FEMALE PELVIS

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Objectives

- Describe the anatomy of the pelvic wall, bones, joints & muscles.
- Describe the boundaries and subdivisions of the pelvis.
- Differentiate the different types of the female pelvis.
- Describe the pelvic floor.
- Describe the components & function of the pelvic diaphragm.
- List the arterial & nerve supply
- List the lymph & venous drainage of the pelvis.
RESOURCES

ESSENTIAL OF HUMAN ANATOMY & PHYSIOLOGY
By Elaine Marieb and Suzanne Keller

ATLAS OF HUMAN ANATOMY
By Frank Netter

KENHUB
www.kenhub.com
The bony pelvis is composed of four bones:
- **Two hip bones**, which form the anterior and lateral walls.
- **Sacrum and coccyx**, which form the posterior wall.

These four bones are connected by four joints and lined by four muscles.

The bony pelvis with its joints and muscles form a strong basin-shaped structure (with multiple foramina),

The pelvis contains and protects the lower parts of the alimentary, urinary tracts and internal organs of reproduction.
- **Anteriorly**
  - Symphysis pubis (cartilaginous joint).
- **Posteriolateraly**
  - Two Sacroiliac joints. (Synovial joins)
- **Posteriorly**
  - Sacrococcygeal joint (cartilaginous),
- The pelvis is divided into two parts by the pelvic brim.
- Above the brim is the false or greater pelvis, which is part of the abdominal cavity.
- Below the brim is the true or lesser pelvis.
- The false pelvis is bounded by:
  - Lumbar vertebrae posteriorly
  - Iliac fossae and the iliacus muscle laterally
  - Lower part of the anterior abdominal wall anteriorly.
  - It supports the abdominal contents.
- The true pelvis has inlet, outlet and cavity.
  - The cavity is a short, curved canal, with a shallow anterior wall and a deeper posterior wall.
  - It lies between the inlet and the outlet.
Pelvic Inlet
- Anteriorly: Symphysis pubis.
- Posteriorly: Promontory of sacrum, ala of sacrum.
- Laterally: Ileopectineal (arcuate) lines.

Pelvic Outlet
- Anteriorly: Symphysis pubis
- Posteriorly: Coccyx
- Anterolaterally: Ischiopubic ramus
- Posterolaterally: Sacrotuberous ligament
- In female, the sacrum is usually wider and shorter.
- Also, the Angle of the pubic arch is wider.
- The promontory and the ischial spines are less projecting.
Information of the shape and dimensions of the female pelvis is of great importance for obstetrics, because it is the bony canal through which the child passes during birth.
The pelvis has four walls:
- Anterior
- Posterior
- Lateral
- Inferior or floor

The walls are formed by bones and ligaments that are lined with muscles covered with fascia and parietal peritoneum.

- **Anterior wall** is the shallowest wall and is formed by the posterior surfaces of the bodies of the pubic bones, the pubic rami, and the symphysis pubis.

- **Posterior wall** is large and formed by sacrum, coccyx, piriformis muscles and their covering of parietal pelvic fascia.
- **Origin:** Pelvic surface of the middle 3 sacral vertebrae.
- **Exit** the pelvis through the greater sciatic foramen.
- **Insertion:** Greater trochanter of the femur.
- **Action:** Lateral rotator of the femur at the hip joint.
- **Nerve supply:** Sacral plexus.
- It is formed by:
  - Part of the hip bone below the pelvic inlet,
  - Obturator internus with its covering fascia and the obturator fascia.
  - Sacrotuberous ligament.
  - Sacrospinous ligament.
- **Origin**: Inner surface of the obturator membrane and the hip bone.
- **Exit**: the pelvis through the lesser sciatic foramen
- **Insertion**: into the greater trochanter of the femur.
- **Action**: Lateral rotator of the femur at the hip joint.
- **Nerve supply**: Nerve to obturator internus.
- Basin-like structure which supports the pelvic viscera and is formed by the **pelvic diaphragm**.
- It stretches across the true pelvis and divides it into:
  - **Main (true) pelvic cavity** above, which contains the pelvic viscera.
  - **Perineum** below which carries the external genital organs.
- It is formed by the levator ani and the coccygeus muscles with their covering fasciae.
- It is incomplete anteriorly to allow passage of the urethra in males and urethra with vagina in females.
- It is a wide thin sheet-like muscle.

- **Origin:**
  - Back of the body of the pubis
  - Tendinous arch of the obturator fascia
  - Spine of the ischium.

- Its fibers are divided into three parts:
  - Pubococcygeus.
  - Puborectalis.
  - Iliococcygeus.
- **Anterior Fibers (Pubococcygeus)**
  - originates from the posterior surface of the body of the pubis
  - inserted into the perineal body and coccyx.
  - supports the prostate (or constricts the vagina)
  - stabilizes the perineal body
  - forms a sling around the prostate or the vagina

- **Intermediate Part (Puborectalis)**
  - Forms a sling around the recto-anal Junction.
  - It has a very important role in maintaining fecal continence.

- **Posterior Part (Iliococcygeus)**
  - Inserted into the anococcygeal body and the coccyx
- **Nerve Supply**
  - Perineal branch of the 4th sacral nerve
  - Perineal branch of the pudendal nerve.

- **Actions of levator ani:**
  - The muscles of the two sides form an efficient muscular sling that supports and maintains the pelvic viscera in position.
  - They resist the rise in intra pelvic pressure during the straining and expulsive efforts of the abdominal muscles (as in coughing).
  - They have a very important role in maintaining fecal continence.
  - They serve as a vaginal sphincter in the female.
- **Shape:** Small triangular muscle.
- **Origin:** Ischial spine.
- **Insertion:** Lower end of sacrum and coccyx
- **Action:** Assist the levator ani in supporting the pelvic viscera
- **Nerve supply:** branches of the 4th and 5th sacral nerves
BLOOD SUPPLY & INNERVATION
• One of the two terminal branches of the common iliac artery.
• Arises in front of the sacroiliac joint
• It descends downward & backwards over the pelvic inlet.
• It divides at the upper border of the greater sciatic foramen into anterior and posterior divisions.
  • **Posterior division supplies:**
    o Posterior abdominal wall.
    o Posterior pelvic wall.
    o Gluteal region.
  • **Anterior division supplies:**
    o Gluteal region.
    o Perineum.
    o Pelvic viscera.
    o Medial (adductor) region of thigh.
    o The fetus (through the umbilical arteries).
- **From posterior division**
  - Iliolumbar artery.
  - Lateral sacral arteries (2 branches.)
  - Superior gluteal artery.
- **From anterior division**
  - Obturator artery.
  - Inferior gluteal artery.
- **Umbilical artery**
  - Superior vesical artery:
    - The distal part of this artery fibrosed and forms the Medial Umbilical Ligament.
- **Inferior Vesical artery** in male or vaginal in female
  - In the male it supplies, the prostate and the seminal vesicles.
  - It also gives the artery of the vas deferens.
- **Middle rectal artery**
- **Internal pudendal artery**
  - It is the main arterial supply to the perineum.
- **Vaginal artery**
  - Replaces the inferior vesical artery.

- **Uterine artery**
  - Crosses the Ureter superiorly and supplies the uterus & uterine tubes.

- **Ovarian artery**
  - Arises from the abdominal aorta.
- **Internal Iliac Veins**
  - It collects tributaries corresponding to the branches of the internal iliac artery.
  - Joins the external iliac vein in front of the sacroiliac joint to form the common iliac vein

- **Ovarian Vein**
  - Right vein drains into IVC
  - Left vein drains into left renal Vein.
- The lymph nodes and vessels are arranged in a chain along the main blood vessels.
- Thus, there are external iliac nodes, internal iliac nodes, and common iliac nodes.
- Lymph from Common iliac nodes and the (ovaries, uterine tubes and fundus of uterus) passes to lateral aortic (paraortic) nodes.
- **Somatic**
  - Sacral plexus

- **Autonomic**
  - **Sympathetic**
    - Pelvic part of sympathetic trunk:
      - The two sympathetic trunks unite inferiorly in front of the coccyx and form a single ganglion (Ganglion Impar).
    - Superior & Inferior
    - Hypogastric plexuses
  - **Parasympathetic**
    - Pelvic splanchnic nerves (From S2, S3, S4)
QUESTIONS?

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