

Anatomy of the Female Pelvis

Components:

1. Bony pelvis
2. Supporting structures
3. Organs
4. Supply systems

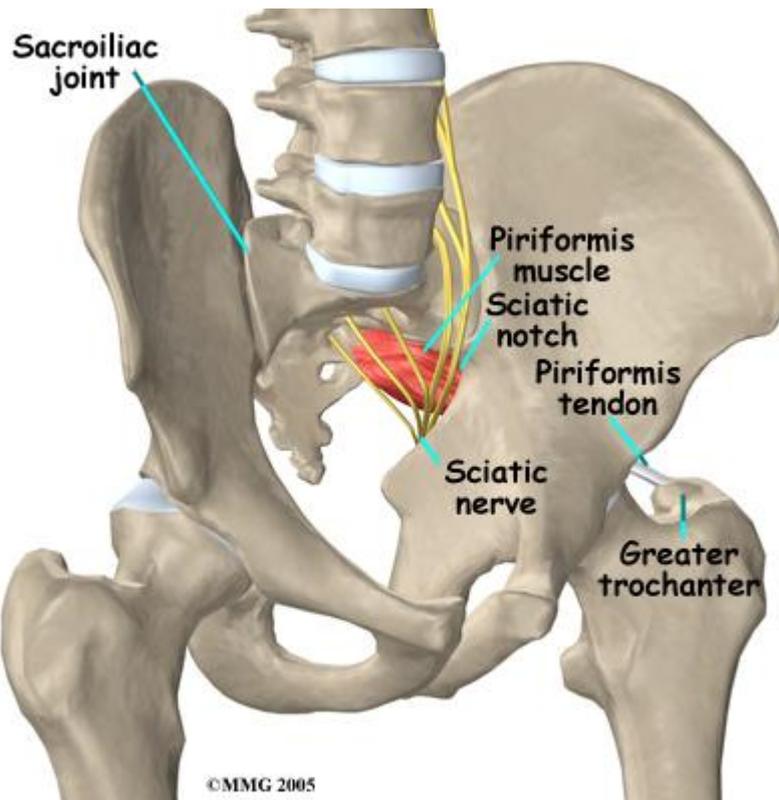
1. Bony pelvis

The pelvis consists of a bony structure formed in a ring to enclose mostly the organs of the lower part of the abdomen. These are bladder, urethra, uterus, ovaries, vagina and rectum.

The sidewall is formed by a bony structure composing of 3 parts pubis, ileum and ischium. The two sides are joined in front to each other through the symphysis pubis. At the back it attached to the sacrum by way of the sacroiliac joint.

In the upright position the pelvis is tilted almost horizontal to increase support.

In the sidewall there is a foramen covered by muscle called the obturator foramen. This foramen is often used in pelvic surgery for access or to support grafted material.



2. Supporting structures

Constant pressure in the upright position places stress on the organs to descend. Support is supplied by a number of muscles as well as connective tissues, called fascia and ligaments.

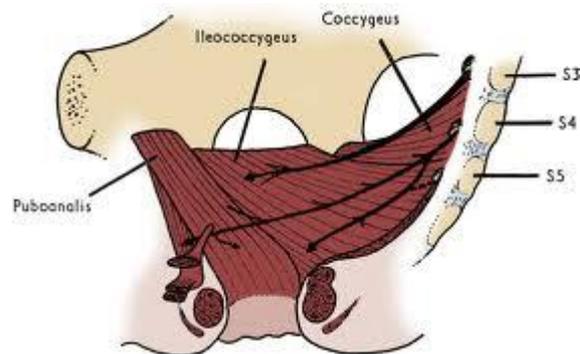
The main muscle support comes from the big muscle the levator ani. The name implies that the main function is lifting the anus but it actually consists of 3 components (puborectalis, iliococcygeus and coccygeus) supports the whole pelvis. It forms the pelvic floor and between the left and right muscles there is a hiatus that will form the opening for the urethra, vagina and anus.

Around the vaginal orifice there are 3 superficial or perineal muscles that adds to the support. (Bulbospongiosus, ischiocavernosus and transfers perineus)

The rest of the supporting structures are formed by fascia and condensations of the fascia called ligaments. Fascia will give the organs area to distend into and also gives access to blood vessels and nerves. The

quality and strength of these structures vary in different people and if weak make them susceptible to develop pelvic organ descend or prolaps.

Repair procedures are focussed on repairing these support structures.



3. Organs.

3.1 Bladder and urethra:

The bladder is a hollow muscular organ that must store urine at low pressures and empty on demand. The muscle is called the detrusor muscle and is smooth or involuntary muscle. The fibres run in different directions and condensates towards the bladder neck to help with continence. The inner lining is a specialized covering (urothelium) that prevents the urine from irritating the nerves in the muscle.

The urethra is approximately 4cm long and controls the flow of urine. The function is depended on muscle, elastic component and support. The muscle consists of an involuntary and voluntary part that overlaps in the middle. The support is by ligament attachment to the pubic bone.

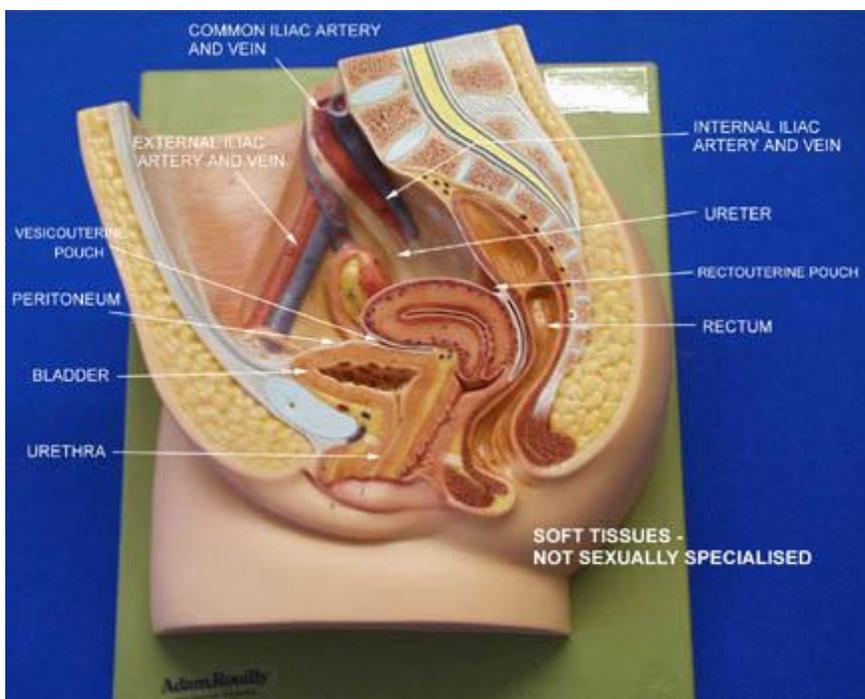
3.2 Vagina:

The vagina is a fibro muscular tube, extending from the uterus to the external opening. The inner lining consists of skin like epithelium and is surrounded by smooth muscle and connective tissue.

In the upright position the upper 2 thirds of the vagina is almost horizontal and the lower third vertical.

3.3 Rectum and anus:

The rectum is the lower end of the large bowel and the external opening is the anus. Control of faeces and stools is achieved by an involuntary and voluntary component. Involuntary muscle is part of the bowel muscle and voluntary muscle connected to the levator ani muscle. (Puborectalis)



4 Supply systems:

Tissues have to get oxygen and nutrients and get rid of CO₂ and waste products. This is done through arteries that supply and veins that take away. The arteries mainly run in the connective tissues then enter an organ or muscle and branches off ever so smaller until it starts collecting and then it joins together and the vein exits at the same point and travel back the same route as the artery.

In the pelvis vessels enter and exit at numerous points in a muscle or organ. Veins also often form plexuses that can bleed a lot with trauma or surgery.

Messages need to be conveyed to and from tissues and that is achieved by different nervous systems. Somatory nerves supply voluntary muscle function. These are usually single nerves that can be identified.

Involuntary supply is done through to opposing systems, the sympathetic and parasympathetic system. Sympathetic systems will control sphincter contraction and parasympathetic smooth muscle contraction. The nerves are mostly in plexuses or hatch unto arteries and mostly not easily identified.

Summary:

Anatomy of the pelvis is extremely important in understanding the normal, preventing problems, diagnosing and treating abnormalities.