

PELVILOGY Program

PELVILOGY 2

Henry Gray (1821–1865)
Anatomy of the Human Body (1918)

By

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The Pelvis

The pelvis, so called from its resemblance to a basin, is a bony ring, interposed between the movable vertebra of the vertebral column which it supports, and the lower limbs upon which it rests; it is stronger and more massively constructed than the wall of the cranial or thoracic cavities, and is composed of four bones: the two hip bones laterally and in front and the sacrum and coccyx behind.

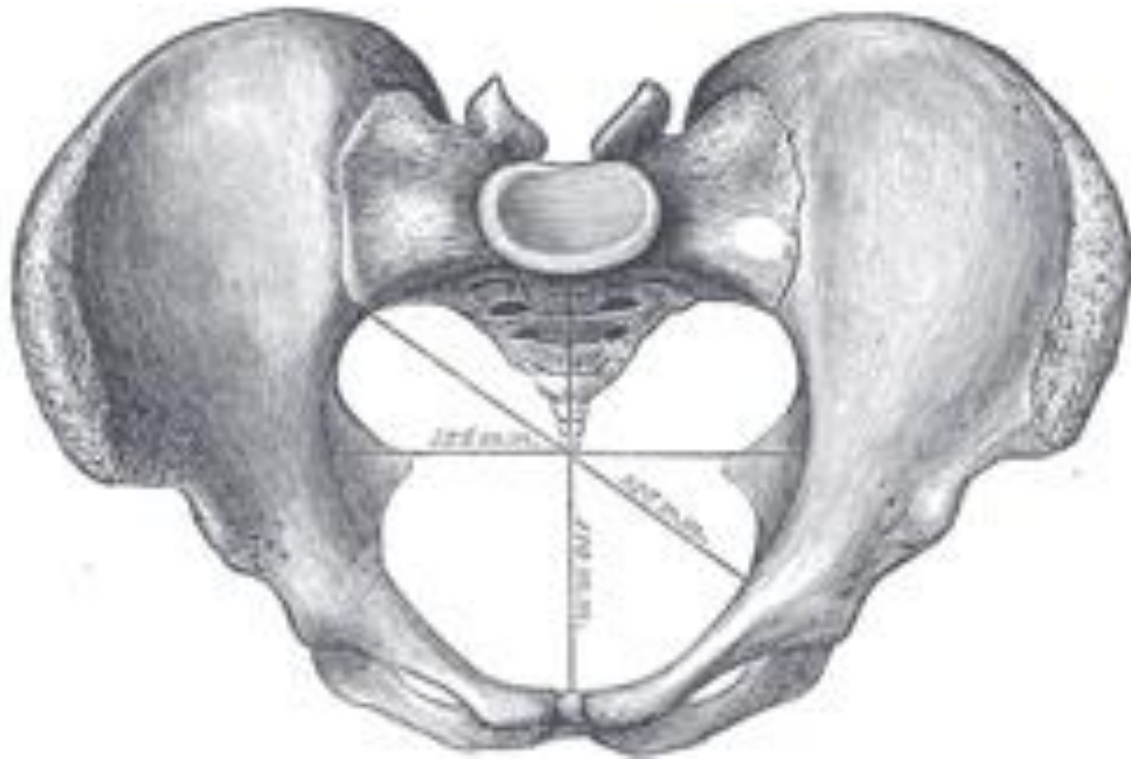
The pelvis is divided by an oblique plane passing through the prominence of the sacrum, the arcuate and pectineal lines, and the upper margin of the symphysis pubis, into the greater and the lesser pelvis. The circumference of this plane is termed the *linea terminalis* or pelvic brim.

The Greater or False Pelvis (*pelvis major*).—The greater pelvis is the expanded portion of the cavity situated above and in front of the pelvic brim. It is bounded on either side by the ilium; in front it is incomplete, presenting a wide interval between the anterior borders of the ilia, which is filled up in the fresh state by the parietes (the walls of a cavity or an organ) of the abdomen; behind is a deep notch on either side between the ilium and the base of the sacrum. It supports the intestines, and transmits part of their weight to the anterior wall of the abdomen.

The Lesser or True Pelvis (*pelvis minor*).—The lesser pelvis is that part of the pelvic cavity which is situated below and behind the pelvic brim. Its bony walls are more complete than those of the greater pelvis. For convenience of description, it is divided into an **inlet** bounded by the superior circumference, and **outlet** bounded by the inferior circumference, and a **cavity**.

The Superior Circumference.—The superior circumference forms the brim of the pelvis, the included space being called the **superior aperture** or **inlet** (*apertura pelvis [minoris] superior*). It is formed laterally by the pectineal and arcuate lines, in front by the crests of the pubes, and behind by the anterior margin of the base of the sacrum and sacro-vertebral angle. The superior aperture is somewhat heart-shaped, obtusely pointed in

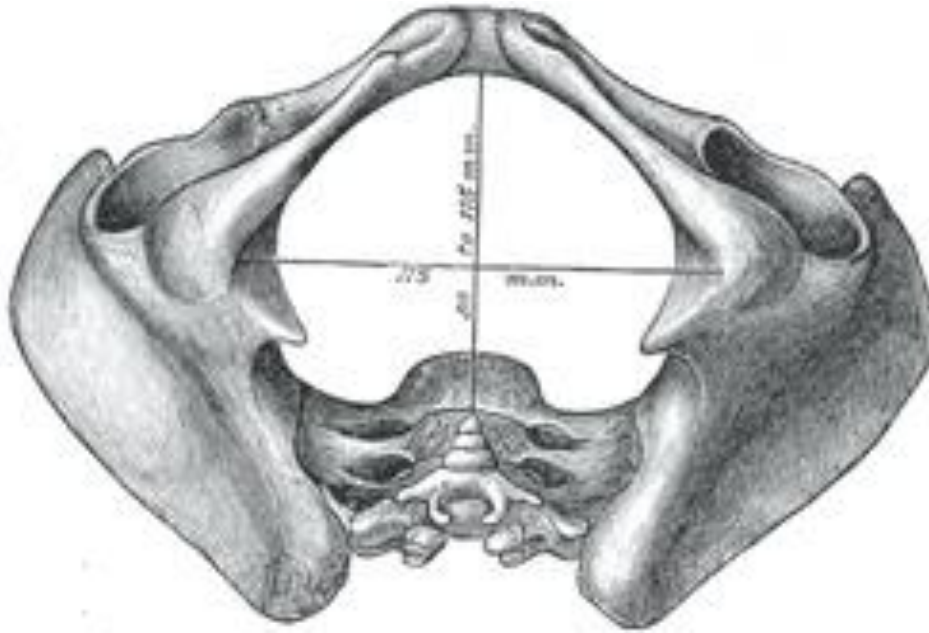
front, diverging on either side, and encroached upon behind by the projection forward of the promontory of the sacrum. It has three principal diameters: antero-posterior, transverse, and oblique. The **anteroposterior** or **conjugate diameter** extends from the sacro-vertebral angle to the symphysis pubis; its average measurement is about 110 mm. in the female. The **transverse diameter** extends across the greatest width of the superior aperture, from the middle of the brim on one side to the same point on the opposite; its average measurement is about 135 mm. in the female. The **oblique diameter** extends from the iliopectineal eminence of one side to the sacroiliac articulation of the opposite side; its average measurement is about 125 mm. in the female.



Diameters of superior aperture of lesser pelvis (female).

The **cavity** of the lesser pelvis is bounded in front and below by the pubic symphysis and the superior rami of the pubes; above and behind, by the pelvic surfaces of the sacrum and coccyx, which, curving forward above and below, contract the superior and inferior apertures of the cavity; laterally, by a broad, smooth, quadrangular area of bone, corresponding to the inner surfaces of the body and superior ramus of the ischium and that part of the ilium which is below the arcuate line. From this description it will be seen that the cavity of the lesser pelvis is a short, curved canal, considerably deeper on its posterior than on its anterior wall. It contains, in the fresh subject, the pelvic colon, rectum, bladder, and some of the organs of generation. The rectum is placed at the back of the pelvis, in the curve of the sacrum and coccyx; the bladder is in front, behind the pubic symphysis. In the female the uterus and vagina occupy the interval between these viscera.

The Lower Circumference.—The lower circumference of the pelvis is very irregular; the space enclosed by it is named the **inferior aperture** or **outlet** (*apertura pelvis [minoris] inferior*) and is bounded behind by the point of the coccyx, and laterally by the ischial tuberosities. These eminences are separated by three notches: one in front, the **pubic arch**, formed by the convergence of the inferior rami of the ischium and pubis on either side. The other notches, one on either side, are formed by the sacrum and coccyx behind, the ischium in front, and the ilium above; they are called the **sciatic notches**; in the natural state they are converted into foramina by the sacrotuberous and sacrospinous ligaments. When the ligaments are *in situ*, the inferior aperture of the pelvis is lozenge-shaped, bounded, in front, by the pubic arcuate ligament and the inferior rami of the pubes and ischia; laterally, by the ischial tuberosities; and behind, by the sacrotuberous ligaments and the tip of the coccyx.



Diameters of inferior aperture of lesser pelvis (female).

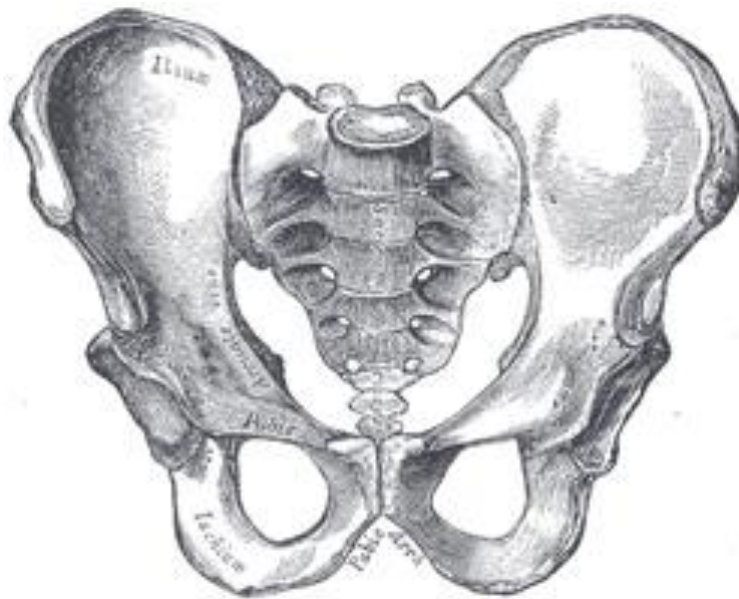
The diameters of the outlet of the pelvis are two, antero-posterior and transverse. The **antero-posterior diameter** extends from the tip of the coccyx to the lower part of the pubic symphysis; its measurement is from 90 to 115 mm. in the female. It varies with the length of the coccyx, and is capable of increase or diminution, on account of the mobility of that bone. The **transverse diameter**, measured between the posterior parts of the ischial tuberosities, is about 115 mm. in the female.



Median sagittal section of pelvis.

Axes.—A line at right angles to the plane of the superior aperture at its center would, if prolonged, pass through the umbilicus above and the middle of the coccyx below; the axis of the superior aperture is therefore directed downward and backward. The axis of the inferior aperture, produced upward, would touch the base of the sacrum, and is also directed downward, and slightly backward. The axis of the cavity—*i. e.*, an axis at right angles to a series of planes between those of the superior and inferior apertures—is curved like the cavity itself: this curve corresponds to the concavity of the sacrum and coccyx, the extremities being indicated by the central points of the superior and inferior apertures. A knowledge of the direction of these axes serves to explain the course of the fetus in its passage through the pelvis during parturition.

Position of the Pelvis.—In the erect posture, the pelvis is placed obliquely with regard to the trunk: the plane of the superior aperture forms an angle of from 50° to 60°, and that of the inferior aperture one of about 15° with the horizontal plane. The pelvic surface of the symphysis pubis looks upward and backward, the concavity of the sacrum and coccyx downward and forward. The position of the pelvis in the erect posture may be indicated by holding it so that the anterior superior iliac spines and the front of the top of the symphysis pubis are in the same vertical plane.

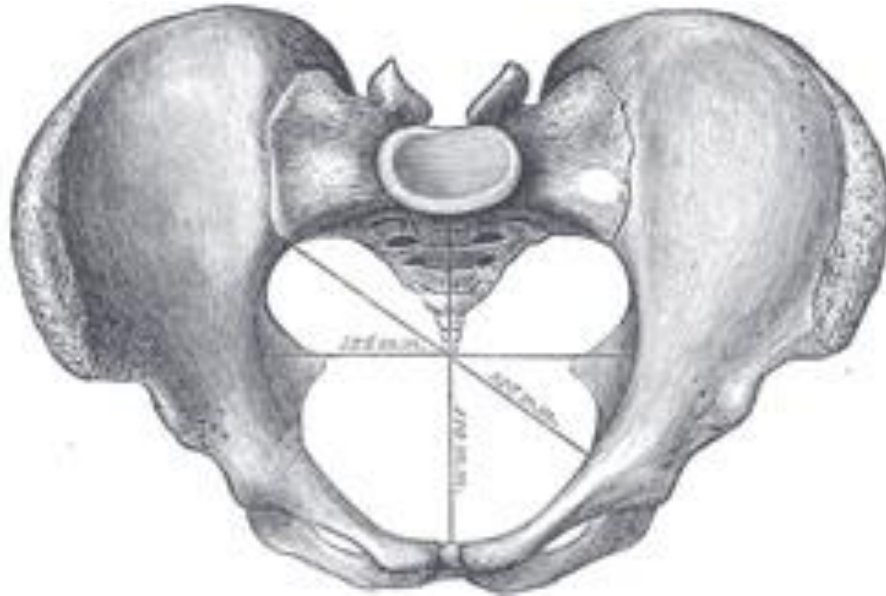


Male pelvis.

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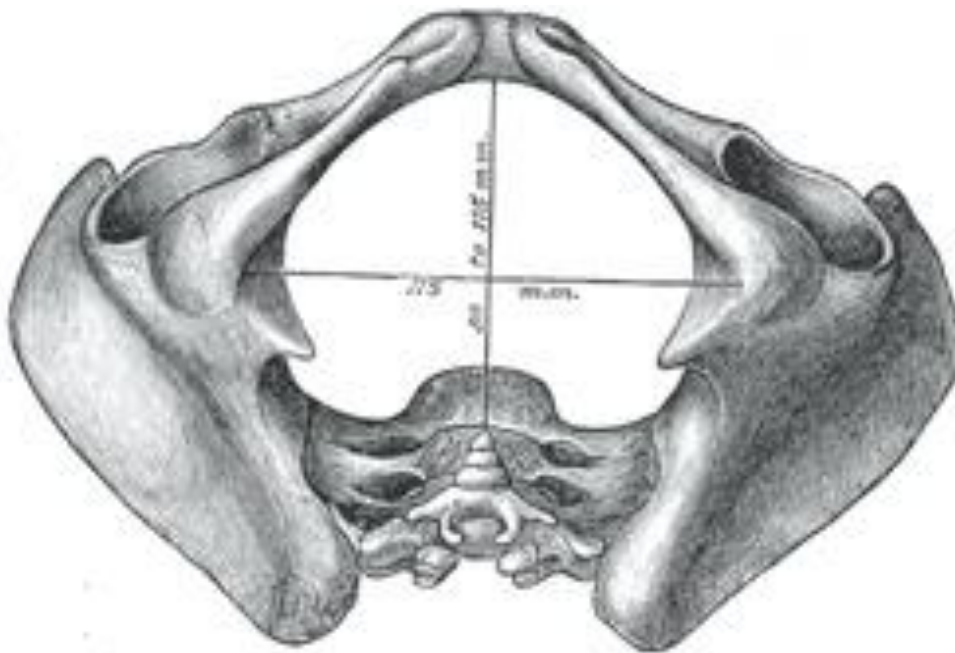
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Male pelvis

Differences between the Male and Female Pelves.—The *female* pelvis is distinguished from that of the *male* by its bones being more delicate and its depth less. The whole pelvis is less massive, and its muscular impressions are slightly marked. The ilia are less sloped, and the anterior iliac spines more widely separated; hence the greater lateral prominence of the hips. The preauricular sulcus is more commonly present and better marked. The superior aperture of the lesser pelvis is larger in the female than in the male; it is more nearly circular, and its obliquity is greater. The cavity is shallower and wider; the sacrum is shorter wider, and its upper part is less curved; the obturator foramina are triangular in shape and smaller in size than in the male. The inferior aperture is larger and the coccyx more movable. The sciatic notches are wider and shallower, and the spines of the ischia project less inward. The acetabula are smaller and look more distinctly forward. The ischial tuberosities and the acetabula are wider apart, and the former are more everted. The pubic symphysis is less deep, and the pubic arch is wider and more rounded than in the male, where it is an angle rather than an arch.

The size of the pelvis varies not only in the two sexes, but also in different members of the same sex, and does not appear to be influenced in any way by the height of the individual. Women of short stature, as a rule, have broad pelves. Occasionally the pelvis is equally contracted in all its dimensions, so much so that all its diameters measure 12.5 mm. less than the average, and this even in well-formed women of average height. The principal divergences, however, are found at the superior aperture, and affect the relation of the antero-posterior to the transverse diameter. Thus the superior aperture may be elliptical either in a transverse or an

antero-posterior direction, the transverse diameter in the former, and the antero-posterior in the latter, greatly exceeding the other diameters; in other instances it is almost circular.



Female pelvis

In the fetus, and for several years after birth, the pelvis is smaller in proportion than in the adult, and the projection of the sacrovertebral angle less marked. The characteristic differences between the male and female pelvis are distinctly indicated as early as the fourth month of fetal life.

Abnormalities.—There is arrest of development in the bones of the pelvis in cases of extroversion of the bladder; the anterior part of the pelvic girdle is deficient, the superior rami of the pubes are imperfectly developed, and the symphysis is absent. “The pubic bones are separated to the extent of from two to four inches, the superior rami shortened and directed forward, and the obturator foramen diminished in size, narrowed, and turned outward. The iliac bones are straightened out more than normal. The sacrum is very peculiar. The lateral curve, instead of being concave, is flattened out or even convex, with the iliosacral facets turned more outward than normal, while the vertical curve is straightened.”

Note : The measurements of the pelvis given above are fairly accurate, but different figures are given by various authors no doubt due mainly to differences in the physique and stature of the population from whom the measurements have been taken.