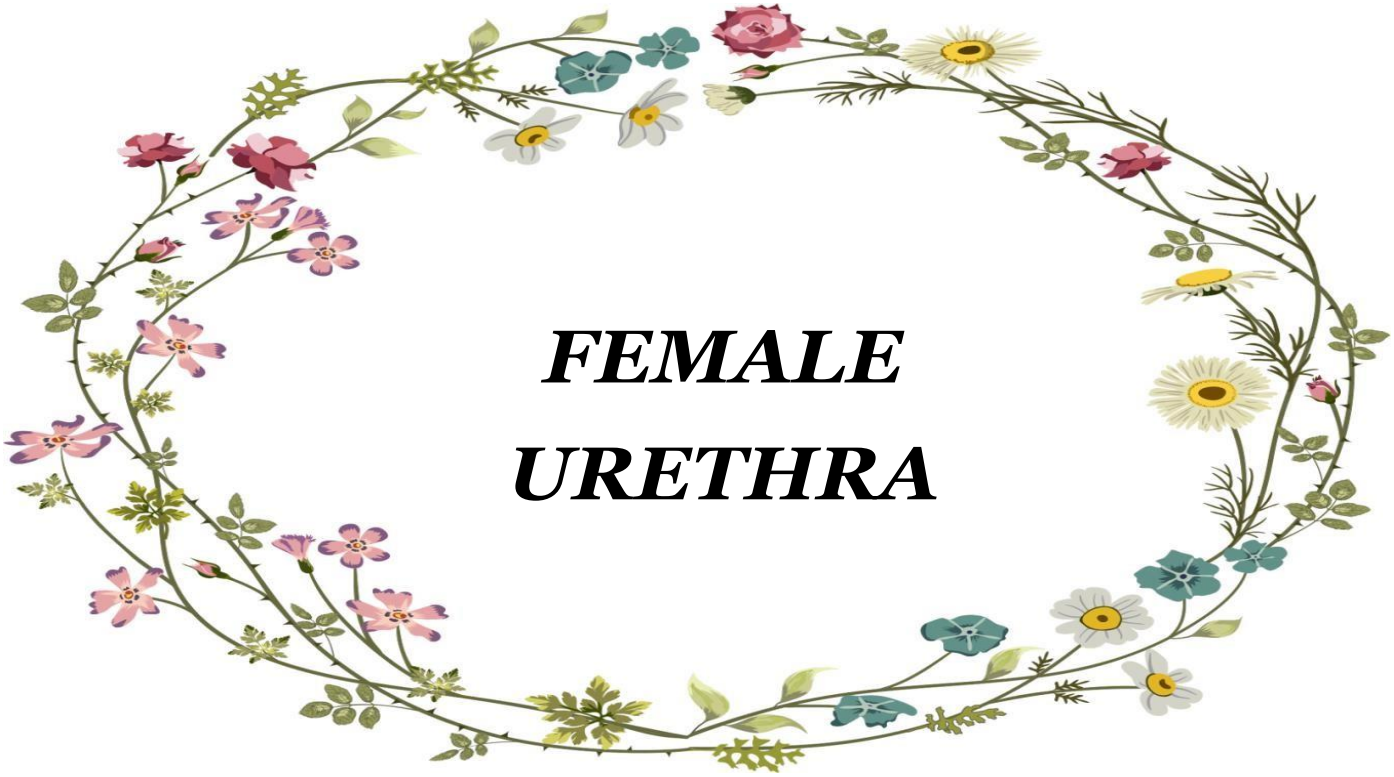

FEMALE URETHRA

I. INTRODUCTION

The female urethra is a musculomembranous duct. It extends from the neck of the bladder to the external urethral meatus in the vestibule of the vulva. The female urethra is not simply in front of the vagina but is embedded within the vaginal wall. It has a particularly short course and plays a major role in micturition, urine excretion.

II. DESCRIPTIVE ANATOMY

A- DIMENSIONS

The female urethra is four centimetres long and has an internal diameter of seven millimetres with an important compliance. The functional length of the urethra is the length involved in urinary continence, thus, it corresponds to the supradiaphragmatic portion, above the urethral sphincter, and is three centimetres long. With the urethra being such a short straight tube, catheterization in the female is simple compared with the male, but it must be remembered that in the later stages of pregnancy the urethra may be considerably stretched so that the catheter may have to be passed for more than twice the normal distance. The pubic symphysis lies in front; the full-term fetal head can compress the urethra against it, and the vaginal stretching during birth can increase the urethral length to ten centimetres.

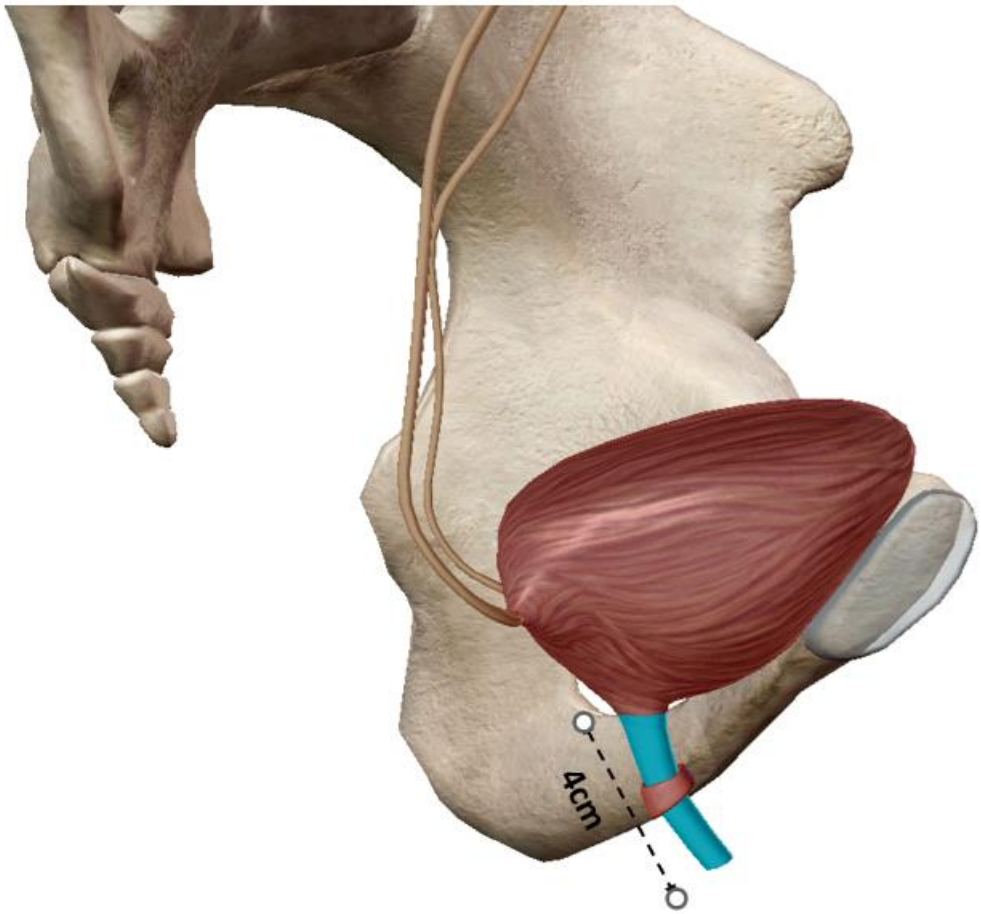

Figure 1: Lateral view of the female urethra

B- ORIENTATION

The female urethra is a short straight tube passing from the neck of the bladder at the lower angle of the trigone to the external urethral meatus in the vestibule of the vagina in front of the vaginal orifice and 2.5 cm behind the clitoris. The external meatus is the least dilatable part of the urethra. The female urethra has an oblique axis downwards and forwards forming the posterior urethrovesical angle of a hundred degree with the base of the bladder. As it leaves the bladder, fibres of the pubovaginalis part of levator ani lie adjacent to it embedding it to the vaginal

wall through the vesicovaginal septum, thus, all except its uppermost end is embedded within the vaginal wall.

In the female urethra, there is no internal urethral sphincter, the urethral sphincter is external to the urethra and is thickest near the middle of it.

III. STRUCTURE

A- URETHRAL WALL

The urethral wall is made of four layers and is four millimetres thick. (Figure 2)

From the inner to the outer layer, the mucous membrane is lined by transitional epithelium, its lamina propria contains the urethral glands resulting from the invagination of the epithelium and a rich venous plexus similar to the corpus spongiosum. The urethral glands have a mucous secretion that has a protective role against urine.

Macroscopically, it is pinkish and contains longitudinal folds. The median posterior fold is the most visible and is constant even when the urethra is dilated and constitutes the urethral crest. The urethral lacunae are depressions scattered through the mucous membrane and constitute the openings of the urethral glands.

The urethral muscle is continuous with the vesical muscle, the inner layer is longitudinal and the outer layer is circular.

The outer layer is the adventitia. It is a thin layer of lax connective tissue and is continuous with the vesical fascia and the superior and inferior fascia of urogenital diaphragm and, thus, is absent in the diaphragmatic part of the urethra.

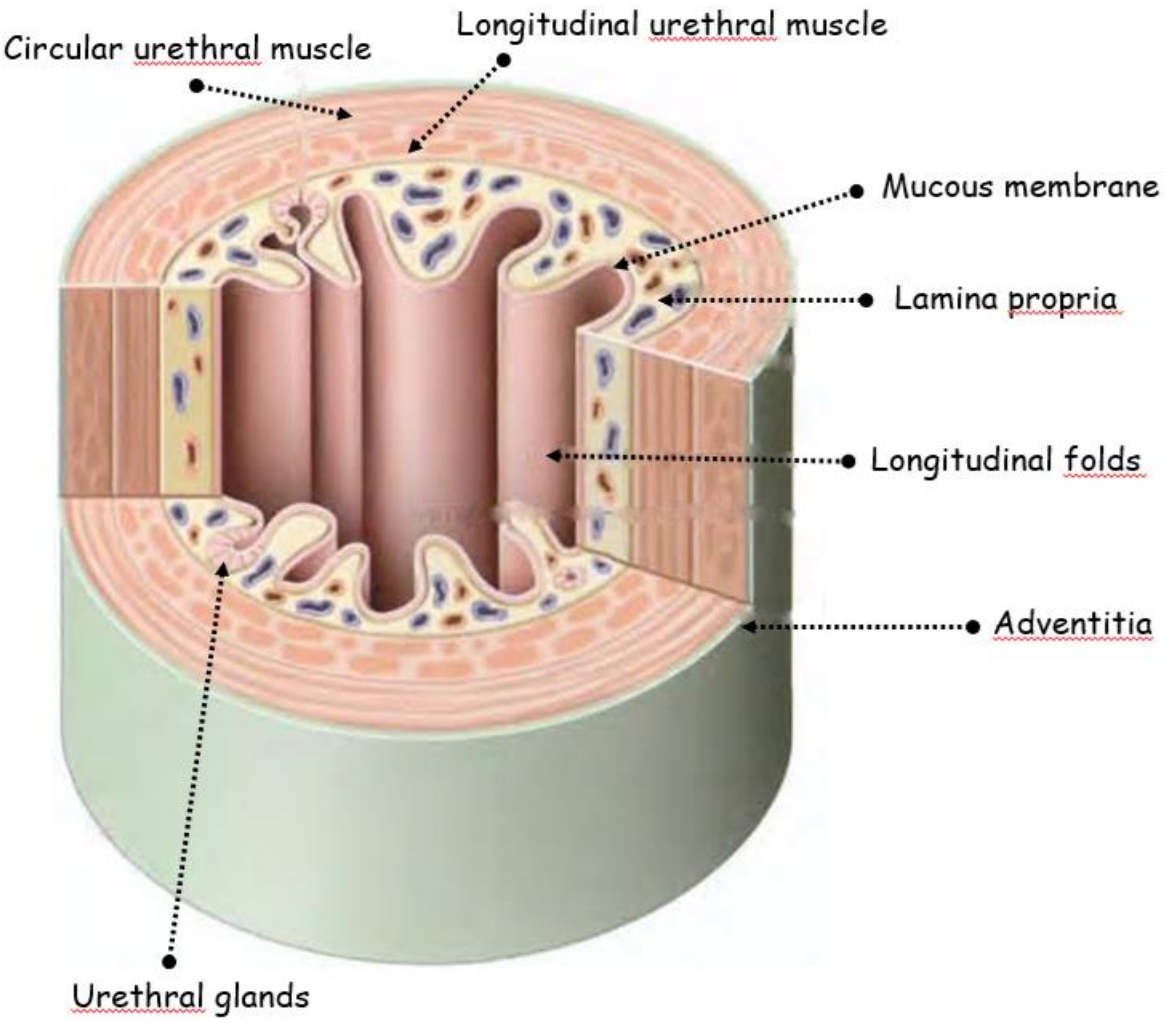

Figure 2: Horizontal section of female urethra

B- URETHRAL SPHINCTER

The urethral sphincter is a made of circular skeletal muscle fibres schematically divided into two muscles: the compressor urethrae muscle and the urethrovaginal muscle. (Figure 3)

It circles the urethra outside the visceral muscle and is thickest near the middle and in front than at the sides or back and two centimetres high. The compressor urethrae is made of transverse fibres attached to the pubic rami and the urethrovaginal is made of circular fibres circling the urethra and arched fibres attached to the perineal body and the lateral walls of the vagina. It is supplied by the perineal nerve.

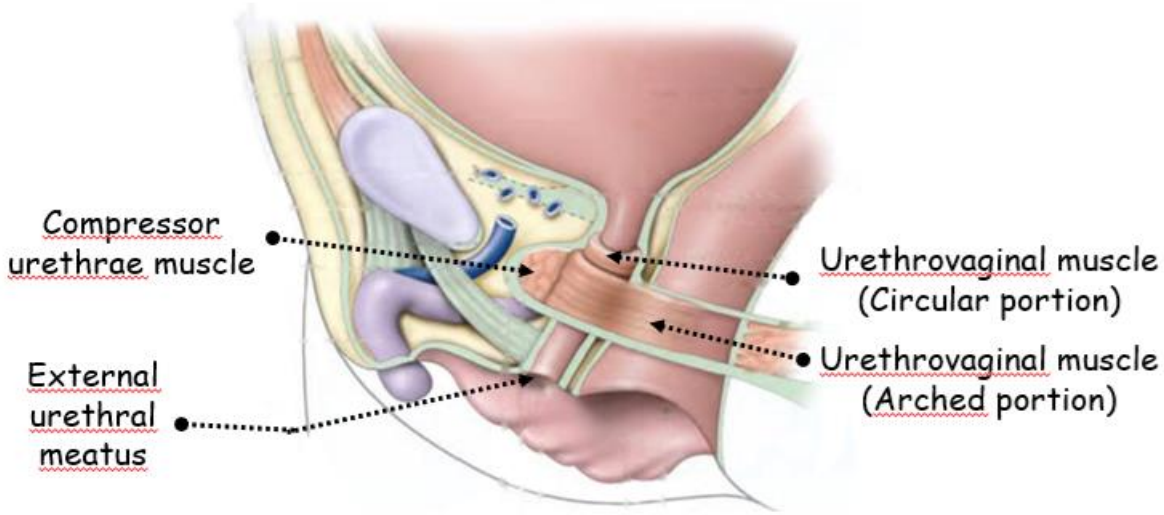

Figure 3: Sagittal section of the female urogenital perineum

IV. ANATOMICAL RELATIONS

A- SUPRADIAPHRAGMATIC PART

The supradiaphragmatic part is in contact with the retropubic veinous plexus in the retropubic space of Retzius and is fixed to it by the pubovesical ligaments.

Outside, it is cradled between the pubovaginalis part of levator ani muscles and is in contact with the anterior recess of the ischiorectal fossa.

Backwards, the urethra is not only in contact but embedded in the anterior wall of the vagina.

B- DIAPHRAGMATIC PART

The diaphragmatic part of the female urethra is surrounded, in the deep perineal space, by the urethral sphincter and, thus, is in contact, forwards, with the compressor urethrae muscle and the transverse perineus ligament and, laterally, with the urethrovaginal muscle and the dorsal artery and nerve of clitoris. It is fixed to the urogenital diaphragm by its superior and inferior fascia, the latter also known as the perineal membrane.

C- INFRADIAPHRAGMATIC PART

The infradiaphragmatic part lies in the superficial perineal space between the clitoris, dorsal vein of clitoris and the expansion of suspensory ligament of clitoris, forwards, the paraurethral glands, bulbs of vestibule and crus of clitoris, laterally, and the anterior vaginal wall, backwards.

D- EXTERNAL URETHRAL MEATUS

The external urethral meatus is situated in the urethral portion of the vaginal vestibule between, in front, the glans of clitoris and the frenulum of clitoris, at the back, the urethral carina

of vagina and, outside, the paraurethral glands and their ostia at five and seven o'clock five millimetres away.

V. BLOOD SUPPLY; LYMPH DRAINAGE AND NERVE SUPPLY

A- ARTERIES

The supradiaphragmatic part is supplied by branches of the vaginal, uterine and inferior vesical arteries. The perineal part of the female urethra is supplied by the urethral branch of the internal pudendal artery.

B- VEINS

The veins of the female urethra drain to the vesical and vaginal plexuses and the veins of the bulb of vestibule which flow into the internal pudendal vein.

C- LYMPH DRAINAGE

The lymphatics of the female urethra drain into the external and internal iliac nodes.

D- NERVES

The nerves of the female urethra are provided from the inferior hypogastric plexus. The urethral sphincter is supplied by the perineal nerve a branch of the pudendal nerve.

VI. CONCLUSION

The female urethra is a short pelvic and perineal musculomembranous duct that, unlike men, ensures urine excretion only. Thus, the urethral sphincter is, exclusively, the urinary continence sphincter. It has numerous pelvic and perineal relations and a pelviperineal blood supply.