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**CYCLIC CHANGES IN THE VAGINA:**

- Changes during the menstrual cycle:

The vagina changes in response to hormonal fluctuations of the menstrual cycle. At mid-cycle when estrogen is at its highest, vaginal tissue becomes thicker and fuller. The cervix at the top of the vagina moves and changes shape throughout the cycle. Before and after the fertile window, the cervix is low and can be felt in the vagina with a firm texture and the hole in the centre of the cervix is closed. During the fertile window, the cervix is higher in the vagina, the hole opens and is softer when touched.

- Changes during sex:

When a female is sexually aroused, increased blood flow is directed towards the genitals causing the vaginal walls to be engorged with blood and additional lubrication is produced. The vagina expands by lengthening and widening in shape, a process called vaginal tenting. This shape change happens as the uterus and cervix are drawn higher into the pelvis, creating more space and the cervix moves higher away from any semen ejaculated. This allows semen to mix with female genital fluids necessary for fertilization.

- Changes with age:

The vagina is strongly influenced by hormonal changes throughout the body. During the reproductive phase and before menopause, more layers of tissue are found lining the vagina due to the stimulation of high estrogen levels.

The vagina is also influenced by changing hormone levels during pregnancy. Increased blood flow is directed towards the pelvis causing a deeper colour change of the vulva and vagina. The vagina walls progressively relaxes during pregnancy and after pregnancy, the vagina and vaginal opening temporarily widen.

As people age, the walls of the vagina become more relaxed and the diameter of the vagina widens. After menopause when estrogen is lower, the walls of the vagina become thinner and frailer which can cause symptoms of vaginal dryness and decreased vaginal discharge.

### **CYCLIC CHANGES IN THE BREASTS:**

Breast changes continue to occur throughout a woman's life. It starts with development of lobes, then mammary glands develop and at about 35 years of age, the milk ducts shrink leading to saggy breasts.

- Changes at puberty and menstrual cycle:

When ovaries start to produce and secrete estrogen, fat in connective tissue collect causing breasts to enlarge. Once ovulation and menstruation begin, the enlargement of breasts begin with formation of secretory glands at the end of milk ducts. The breast and duct system continue to grow and mature with the development of glands and many lobules.

The hormone estrogen is produced by the ovaries in the first half of the menstrual cycle, it stimulates the growth of milk ducts in the breasts. The increasing level of estrogen at

mid- cycle leads to ovulation. Next, progesterone takes over in the second half of the cycle and stimulates the formation of milk glands. These hormones are responsible for the cyclical changes many women feel in their breasts before menstruation which include pain, swelling, soreness. Women also have change in breast texture during menstruation as breasts appear lumpy.

- During pregnancy:

The areola begin to swell, followed by the swelling of the breasts themselves. Most pregnant women feel soreness on breasts and nipples, this is as a result of the growth of the milk duct system and the formation of many lobules.

By the sixth month of pregnancy, the breasts are fully capable of producing milk. Other physical changes occur as well including breast blood vessels become more visible, the areola becomes darker and larger.

- During menopause:

When a woman reaches her late 40s and early 50s premenopause is starting and the levels of estrogen and progesterone production changes. Estrogen levels decrease and without estrogen, the connective tissue in milk ducts become dehydrated and are no longer elastic. The breast tissue which was prepared to make milk shrinks and loses its shape, this leads to saggy breasts.

## **2.THE MENSTRUAL CYCLE:**

The menstrual cycle begins from the first day of bleeding and ends just before the next menstrual period . Menstrual cycles normally range from about 25–36 days. Menstrual bleeding lasts 3-7 days depending on the individual.

Menstrual cycle is regulated by hormones. Luteinising hormone and follicle stimulating hormone produced by the pituitary gland, promote ovulation and stimulate the ovaries to produce estrogen and progesterone. Estrogen and progesterone prepare the uterus and the breasts for possible fertilization.

There are three stages of the menstrual cycle:

- Follicular (before egg release)
- Ovulatory (egg release)
- Luteal (after egg release)

When the **follicular** phase begins, levels of estrogen and progesterone are low. As a result, the top layers of the endometrium breakdown and are shed, menstrual bleeding occurs. At about this time, follicle stimulating hormone is slightly increased stimulating development of several follicles in the ovary. Each follicle contains an egg. As the level of follicle stimulating hormone decreases later in this phase, only one follicle continues to develop. This follicle produces estrogen.

The **Ovulatory** phase begins with a surge in luteinising hormone and follicle stimulating hormone levels.

Luteinising hormone stimulates egg release which usually occurs 16 to 32 hours after the surge begins. The estrogen level decreases during the surge and the progesterone level starts to increase.

The **luteal** phase; luteinising hormone and follicle stimulating hormone levels decrease.

The ruptured follicle closes after releasing the egg and forms a corpus luteum which produces progesterone. During most of this phase, estrogen level is high. Progesterone

and estrogen levels cause the lining of the uterus to thicken more to prepare for possible fertilization.

If the egg is not fertilised, the corpus luteum degenerates and no longer produces progesterone. The estrogen level decreases, the top layer of the lining breakdown and are shed and menstrual bleeding occurs.

If the egg is fertilised, the corpus luteum continues to function during early pregnancy. It helps to maintain the pregnancy.