- **Terminologies:**
  - **Amenorrhea** = absence of menstruation.
  - **Menarche**: is the first menstrual cycle experienced by a female occurring as early as the age of 9 years.
  - **Menopause**: absence of menstruation for more than 12 months (1 year).
  - **Pre-menopausal period**: 2-5 years before actual menopause when the menstrual cycle becomes eclectic with varying periods of amenorrhea until it completely disappears.

- **There are two types of amenorrhea:**
  - **Primary**: in which a woman never experienced menstruation before.
    - If there is no menstruation but secondary female sexual characteristics are present → wait until the age of 16 → if still there is no menstruation → start your investigations.
    - If there is no menstruation and no secondary female sexual characteristics at the age of 14 → start your investigations to determine the cause.
  - **Secondary**: in which a woman used to get her periods but then menstruation stopped for some reason.

- **Always remember than the most common cause of amenorrhea is pregnancy.** Therefore, when a female presents to your clinic complaining of amenorrhea → you must confirm that she is not pregnant by checking β-hCG levels.

- **Before investigating the causes of amenorrhea** → always define if the patient has a normal genetic constitution (is that human in front of me a male or a female?), check for the presence of internal genital organs and if gonads are ovaries or testicles.

- **When is amenorrhea considered to be physiological?**
  - Before menarche (Pre-pubertal period).
  - During pregnancy.
  - Lactation amenorrhea: which is considered as a method of contraception.
  - Menopause.

- **Classification of causes of amenorrhea:**
  - **Reproductive outflow tract abnormalities:**
    - **Mullerian agenesis:**
      - It causes primary amenorrhea.
      - Mullerian ducts are not formed. Therefore, upper 2/3 of vagina, cervix, uterus and fallopian tubes will not be present. Notice that the lower 1/3 of vagina will be present because it develops from ectoderm.
      - Ovarian function is normal.
      - Normal female with normal secondary sexual characteristics.
    - **Transverse vaginal septum:**
      - It causes cystomenorrhea in which menstruation occurs but it is not visible due to an obstruction of the outflow tract.
      - Etiology: failure of lower 1/3 of vagina to canalize.
      - Genetic constitution: 46, XX
      - Ovarian function is normal.
**Testicular feminization syndrome:**
- Defect in androgen receptors resulting in normal-appearing female.
- Female external genitalia with rudimentary vagina.
- Uterus and fallopian tubes are generally absent.
- Testes are present with ↑testosterone and LH.
- Genetic constitution: 46,XY

**Imperforate hymen:**
- It causes cryptomenorrhea.
- Etiology: absence of hymen canalization.
- Normal ovaries, internal and external genitalia, and secondary female sexual characteristics.
- Blood is collecting in vagina and extending to reach the uterine cavity thus causing abdominal pain and distention.
- Physical examination shows: bluish discoloration of the hymen and enlarged uterus due to hematometria.

**Cervical stenosis:**
- It is a rare cause of secondary amenorrhea.
- Stenosis occurs after a cervical surgery, radiation therapy, cervical infection or deep cervical cautery.
- Diagnosis is based on clinical findings.

**Asherman’s syndrome:**
- It causes secondary amenorrhea.
- Etiology: intrauterine adhesions occurring after vigorous uterine curettage.
- Diagnosed by:
  - Hysteroscopy.
  - Hysterosalpingography.

**Ovarian disorders:**
- **True gonadal dysgenesis:**
  - It causes primary amenorrhea.
  - Etiology: failure of migration of germ cells.
  - Genetic constitution: 46,XX or 46,XY.
  - Internal and external genitalia of a female are infantile.
  - Investigations show: ↑FSH and LH
  - Diagnosis by: laparoscopy.

- **Tuner syndrome (X):**
  - It causes primary amenorrhea.
  - Genetic constitution: 45,XO
  - Characterized by: undifferentiated gonads, short stature, webbed neck, cardiac problems and other features.
  - Investigations will show: ↑FSH and LH.
  - Diagnosis: chromosomal study
Premature ovarian failure:
- It causes secondary amenorrhea (early menopause before the age of 40 years!).
- Etiology: familial, irradiation, chemotherapy and autoimmune diseases.
- Investigations will show: ↑FSH and LH

Resistant ovary syndrome:
- Hormonal receptors Which are supposed to be found in ovaries are absent.

Anovulation:
- The most common form is Polycystic Ovarian Syndrome (PCOS).
- Chronic anovulation may result in oligomenorrhea and eventually amenorrhea.

Pituitary disorders:
- Pituitary adenomas:
  - The most common being prolactinoma which results in hyperprolactinemia that leads to secondary amenorrhea.
  - Investigations will show: ↑prolactin level
  - Diagnosis through: CT-scan or MRI. Notice that adenomas large in size might compress on the optic chiasma leading to visual disturbance.
  - Treatment: cabergoline (bromocriptine is not used anymore due to its adverse effects).
- Sheehan’s syndrome:
  - It causes secondary amenorrhea.
  - It is considered as a complication of postpartum hemorrhage. Severe low blood pressure deprive the body of oxygen and causes damage to the pituitary gland → hypopituitarism.
  - Investigations will show: ↓pituitary hormones.
  - Diagnosis: the lady will present to your clinic complaining of inability to lactate!

Hypothalamus disorders:
- Functional hypogonadotrophic hypogonadism:
  - It causes secondary amenorrhea.
  - Occurring in those ladies who exercise vigorously (athletes) thus they will lose their period.
  - At least 17% of body fat is required for initiation of menses and 20% to maintain it.

Emotional stress.
Weight loss: amenorrhea occurs when weight is 15-20% below the ideal body weight.
Pseudocyesis: false pregnancy associated with ↑LH and prolactin. These cases are not seen anymore especially after ultrasound was introduced to the medical field.
Drug-induced amenorrhea: depoprovera, danazol, GnRH agonists and post-pills.
Other endocrine disorders include:
- Hypothyroidism: ↑TSH and prolactin.
- Cushing’s syndrome.
- Congenital adrenal hyperplasia:
  - It causes primary amenorrhea.
  - 21-hydroxylase deficiency → ↑androgens → virilization.