

Puberty and pubertal disorder

by

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Puberty

is the process of reproductive and sexual development that change a child to an adult
onset usually gradual begin at age 8 and last
for about 5 years to be completed

mechanism

Not exactly clear

Required intact HPO axis

GnRH

Suppressed in prepubertal period

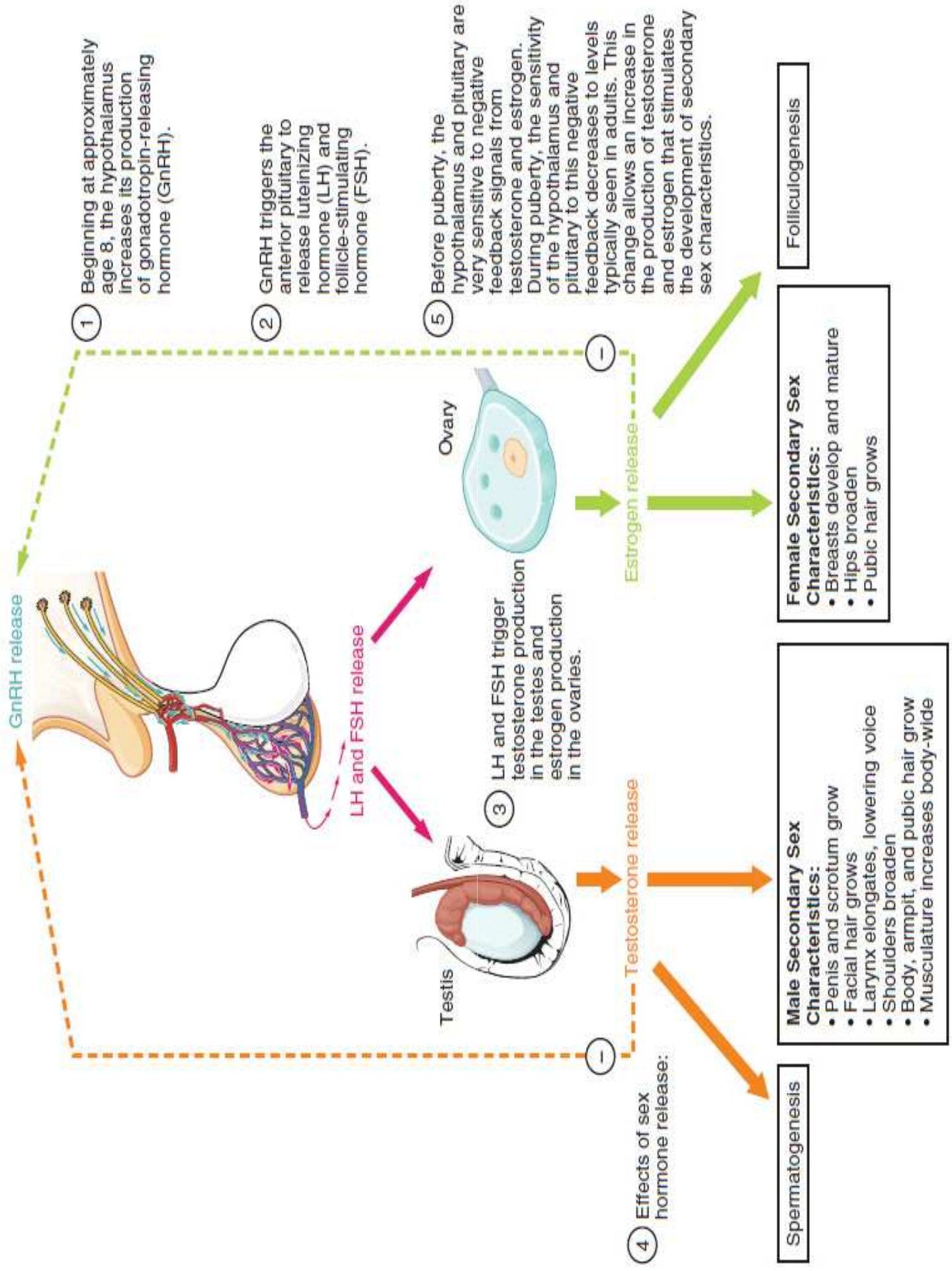
At 8-9 year of age pulsatile secretion begin

Affected by many signals as

Leptin ,insulin ,, corticotrophines ,thyrotrophines
,neurotransmitters,melatonin

GnRH stimulates pit gland to produce FSH AND LH

Which act on the ovary to produce sex hormones



Physical changes

Breast development (thelarche)

Pubic hair growth (adrenarche)

Growth spurt

Axillary hair growth

Menstruation (menarche)

Body image

Genital tract changes

Psychological changes

Tanner classification of female adolescent development.

Stage	Breast	Pubic hair
I	Papillae elevated (pre-adolescent), no breast buds.	None
II	Breast buds & papillae slightly elevated.	Sparse, long slightly pigmen.
III	Breasts and areolae confluent, elevated.	Dark, course, curly.
IV	Areolae and papillae project above breast.	Adult-type, pubis only
V	Papillae projected, mature.	Lateral distribution.

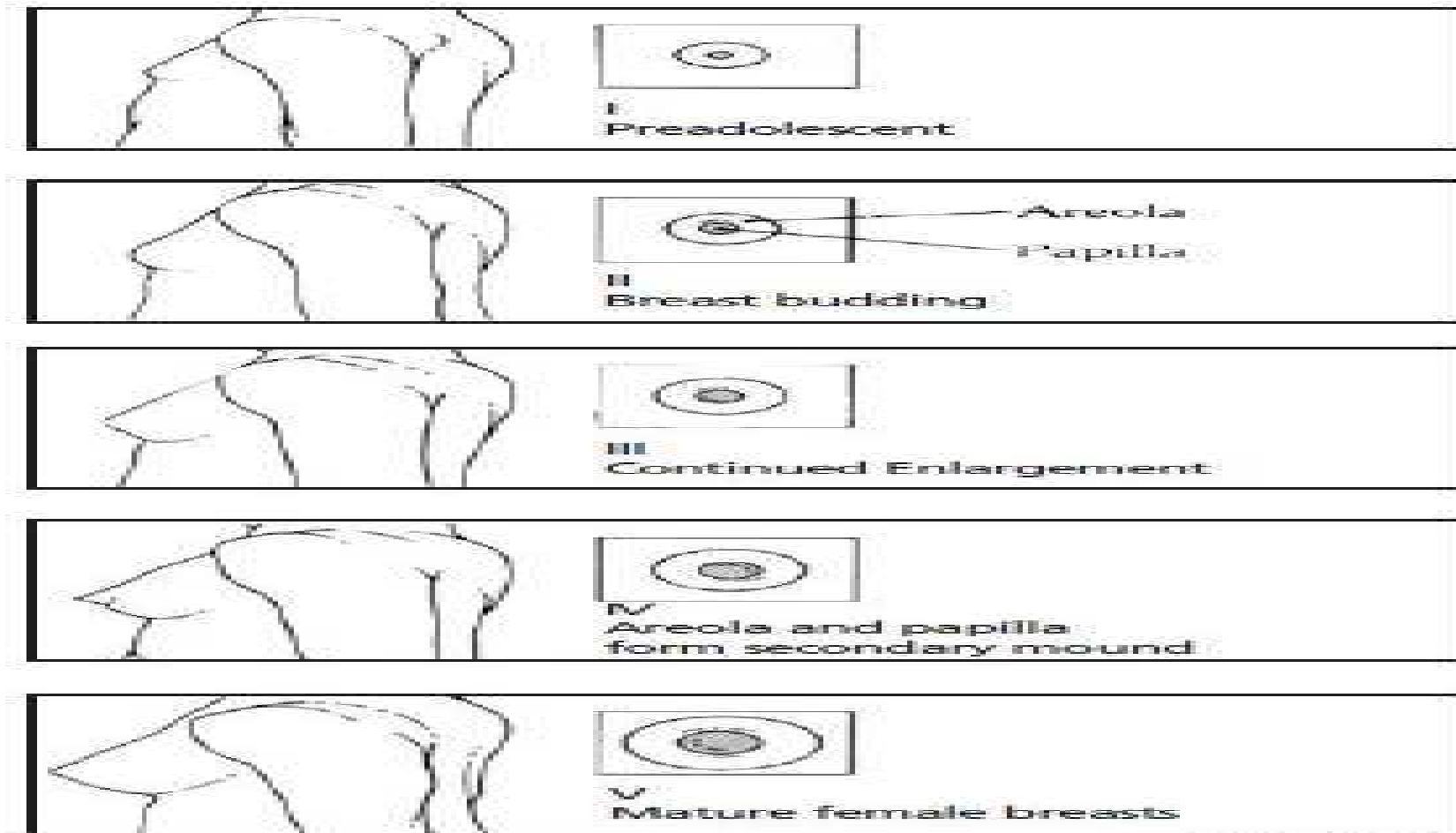
Tanner staging of puberty

Stage	Age	Breasts	Pubic hair	E2 Pg/ml
I	7	Nipple	Nil	< 10
II	10	Breast bud	Sparse labial	10-20
III	11	Smooth contour	Dark curled hair	20-40
IV	13	Secondary mound	Adult type hair	40-60
V	14	Mature breast	Adult distribution	> 60

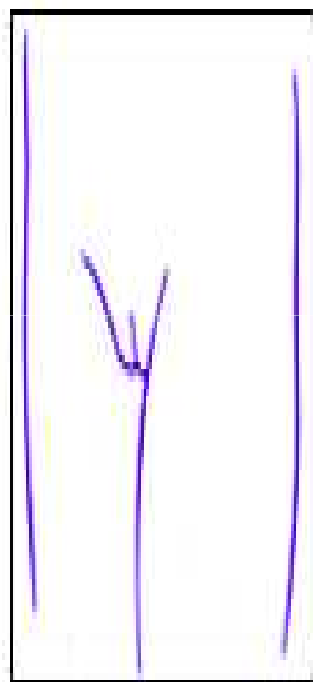
NB: Menarche coincides with stage IV



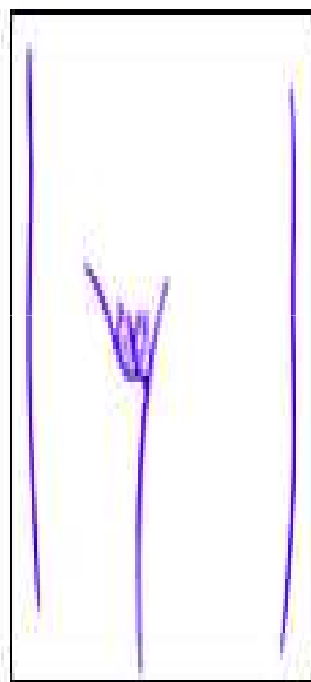
Breast development



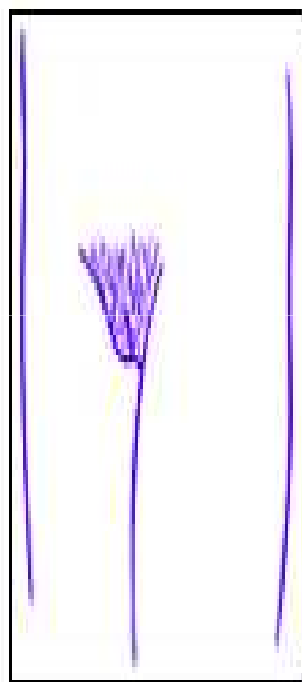
Pubic hair growth



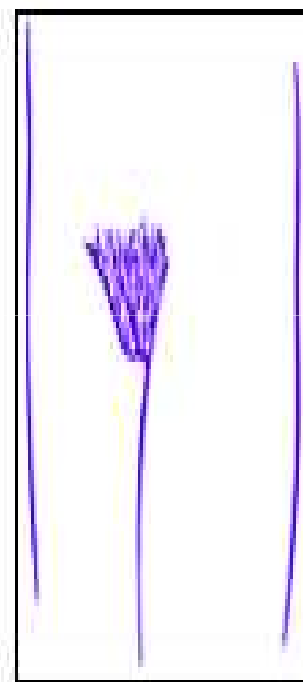
Stage 1



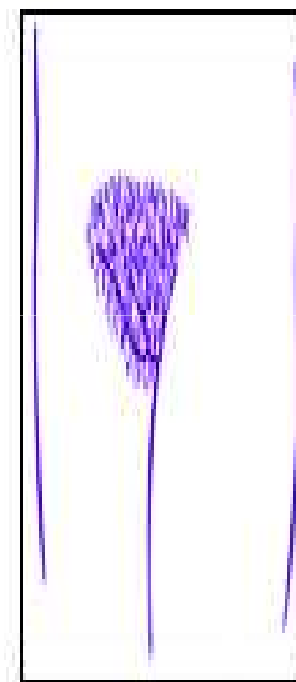
Stage 2



Stage 3



Stage 4



Stage 5

Axillary hair growth



When Do
Girls Stop
Growing?



familia

Growth spurt

Usually begin at age of 8 year

Accelerated growth of 8 cm/ year (height)

Final height of female reached 2-3 year after menarche due to closure of epiphysis caused by oestrogen

Menarche

Starting of menstruation

Usually occur 2 years after breast development

Age of onset variable depend on
environmental ,nutrition ,genetic ,

Mean age is 12 year

Menstrual cycle irregular and take 2-3 year to be
regulated due to immature ovary

Other changes

Fat distribution of the body (feminization)

Body odor and sweating

Genital tract changes

Vulva (fat deposition , labial enlargement)

Vagina (thicker epithelium , PH change)

Cervix (Elongated and distinct from uterus)

Uterus (Enlarged ,endometrial changes)

ovaries (increase in size ,folliculogenesis)

Pubertal disorder

Delayed puberty

No sign of puberty at age of 14 year

Causes

Central (Hypogonadotrophic hypogonadism)

Prepheral (hypergonadotrphic hypogonadism)

Hypogonadotrophic hypogonadism

NO GnRH secretion from hypo thalamus

Causes

Constitutional

CNS pathology

Trauma

Tumor

Infiltration

Chronic and endocrine illness

Anorexia nervosa

Excessive exercise

Pitutary gland dysfunction (craniopharangioma)

Congenital (kallman syndrome)

hypergonadotrophic hypogonadism)

Causes

Ovarian agenesis or dysgenesis

Chromosomal abn XO

Chemotherapy and radiation

Drugs

May be occur later in life causing secondary amenorrhea

management

Proper history

Examination (general and local)

Investigation

- Hormonal profile

- Karyotype

- Imaging (x ray , US ,CT and MRI)

- exclude systemic disease

Treatment

- according to the cause

- idiopathic , initiate pubertal changes by exogenous hormones (GnRH in pulses or sex hormones)

Precocious puberty

Appearance of pubertal signs below age of 8 year in female and 9 year in male

Partial (appearance of only one or two features) as thelarche or adrenarche

Complete precocious puberty (full features of puberty)

Causes

Central

CNS defect result in early production of hormones)

Tumor , hydrocephaly ,infiltration ,

Pit. Gland dysfunction

Prepheral

Endogenous sex hormones

Ovarian (Hormone secreting tumor)

Adrenal (tumor , CAH)

Exogenous sex hormones

Lab Diagnosis

- With sensitive assays, **serum LH** concentrations are undetectable in prepubertal children but become detectable in 50-75% of girls and a higher percentage of boys with central sexual precocity.
- Measurement during sleep increases diagnostic power and reveals the pulsatile LH secretion.
- GnRH stimulation test. Predominant LH response over FSH after iv administration of GnRH or agonist like Leuprolide. However in girls, LH:FSH ratio can remain low until mid-puberty. In such girls with "low" LH response, the central nature of sexual precocity can be proved by detecting pubertal levels of estradiol (>50 pg/mL), 20-24 hr after stimulation with leuprolide.

Management

History

Examination (general and local)

Investigation

Hormonal profile

Karyotype

Exclusion of systemic and endocrine disease

Imaging x ray for bone age

US (abdominal and pelvic)

CT , MRI (Brain ,abdomen ,pelvice)

Treatment

Partial or isolated

(reassurance after exclusion of the cause which should be treated if identified)

Complete

Treat the cause if identified

If no identified cause or non treated cause as chromosomal or genetic abnormality

Arrest production of sex hormones by GnRH analoge

Precocious puberty

- ❖ Premature sexual development before (8 yr in female, 9 yr in male)

- ❖ **Dominant in girls** whom it is usually **idiopathic**.

- ❖ **rarer in boys** in whom an underlying lesion is likely.

Delayed puberty

- ❖ Absence of pubertal development (14 yr in female, 15 yr in male)

- ❖ **Dominant in boys**, in whom constitutional delay is much the commonest cause





Thank you