

Useful Puberty Charts and Referral Criteria

Tanner staging (also called Sexual Maturity Ratings (SMR))

Tanner stage	Male genital appearance	Male genital description	Female pubic hair appearance	Pubic hair description	Breast appearance	Breast description
1		Testicular volume <3ml		No pubic hair		Elevation of papilla only
2		Testicular volume <3ml, change in texture to scrotal skin		Sparse growth chiefly along the labia/base of penis		Breast bud stage
3		Increase in size of penis with further testicular enlargement		Darker, coarser, more curled hair		Enlargement of breast and areola
4		Further enlargement of penis and testicles with development of glans penis		Adult type hair over a smaller area		Projection of the areola and papilla
5		Adult size and shape		Spread to the medial surface of the thighs		Recession of the areola to the contour of the breast, projection of papilla only

Fig 1
Tanner stages of development. (Reproduced with permission)

Sequence of pubertal events in males

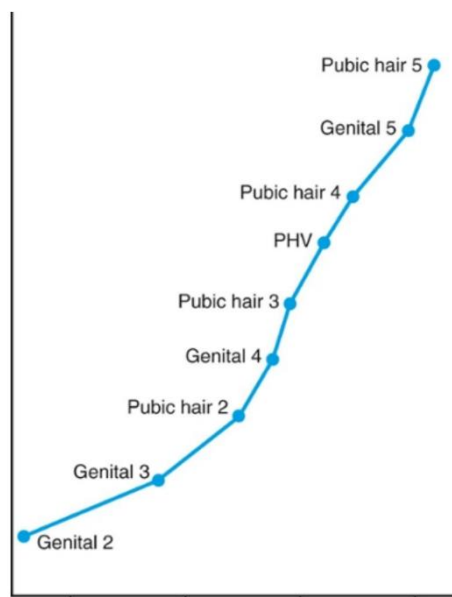


FIGURE 110-3 Sequence of pubertal events in males. PHV, peak height velocity. (

- the first visible sign of puberty and the hallmark of SMR 2 is testicular enlargement, beginning as early as 9.5 yr
- followed by the development of pubic hair
- followed by penile growth during SMR 3.
- Peak growth occurs when testis volumes reach approximately 9-10 cm³ during SMR 4. Under the influence of luteinizing hormone and testosterone, the seminiferous tubules, epididymis, seminal vesicles, and prostate enlarge.
- Sperm may be found in the urine by SMR 3; nocturnal emissions may be noted at this time as well.
- Some degree of breast tissue growth, typically bilateral, occurs in 40-65% of males during SMR 2-3 as a consequence of a relative excess of estrogenic stimulation. This generally resolves with ongoing maturation.

REFER:

- penile growth and/or testicular enlargement before age 9
- steep upward growth trend (increasing across one or more centile spaces—eg, below 50th to above 75th centile), in 3-6 months
- new onset polydipsia / polyuria, headaches or visual disturbances
- history of CNS disorders or injury eg. meningitis, irradiation, hypoxic ischaemic injury, neurofibromatosis

Useful Puberty Charts and Referral Criteria

Sequence of pubertal events in females

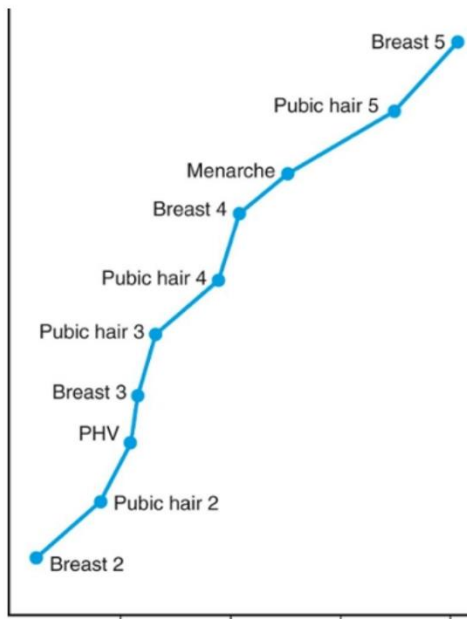
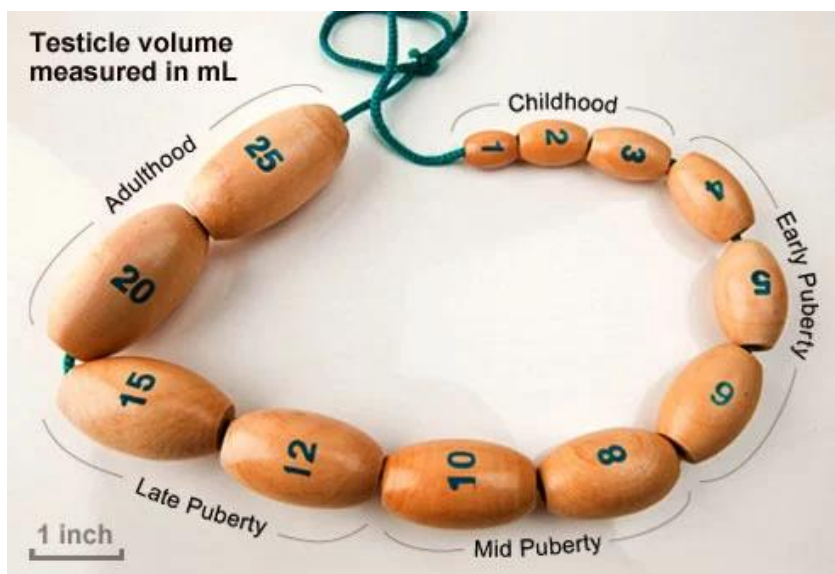


FIGURE 110-4 Sequence of pubertal events in females. PHV, peak height velocity.

REFER: See boys' referral box above. Also:

- Menarche before age 8 (consider other causes of vaginal bleeding)
- Progressive breast enlargement before age 8, over a period of 4-6 months, along with upward crossing of height centile(s)
- Clitoromegaly
- Café au lait macules (McCune Albright?)
- Presence of pubic hair in infancy, with or without breast development

- typically the first visible sign of puberty and the hallmark of SMR 2 is the appearance of breast buds (thelarche), between 8 and 12 yr of age.
- A significant minority of females develops pubic hair (pubarche) prior to thelarche.
- Less visible changes include enlargement of the ovaries, uterus, labia, and clitoris, and thickening of the endometrium and vaginal mucosa. A clear vaginal discharge may be present prior to menarche (physiologic leukorrhea).
- Menses typically begins 2.5 yr after the onset of puberty, during SMR 3-4 (average age: 12.5 yr; normal range: 9-15 yr).
- The timing of menarche is determined largely by genetics; contributing factors likely include adiposity, chronic illness, nutritional status, and the psychosocial environment.
- Not all precocious puberty needs active management but girls should have the opportunity to discuss the benefits and harms of investigation and treatment.



Measuring testicular volume

length 2.5cm = 4mls = early puberty

Testicular volume calculator available at <http://tvcalculator.nchri.org/>. Measure the width of the testis (cm) and assess the Tanner / SMR stage of genital development. Plug both these into the online calculator to get the volume (mls).