

Als de pubertaire ontwikkeling
gestoord is ...

Prof. Dr.M.Craen

PUBERTEIT

“Puberty” is the transitional period in life during which the individual reaches sexual maturity and reproductive function.

Parke 1929

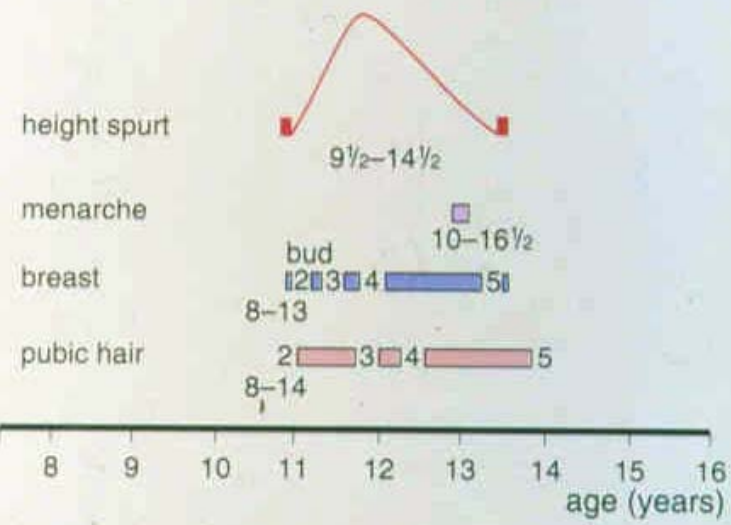
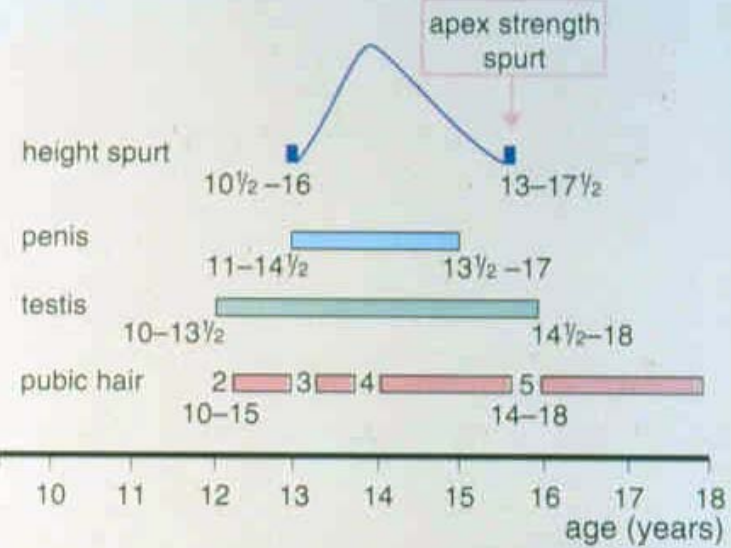
Puberteit

- “Normale” puberteit
- Pubertas praecox
- Pubertas tarda

“Normale puberteit”

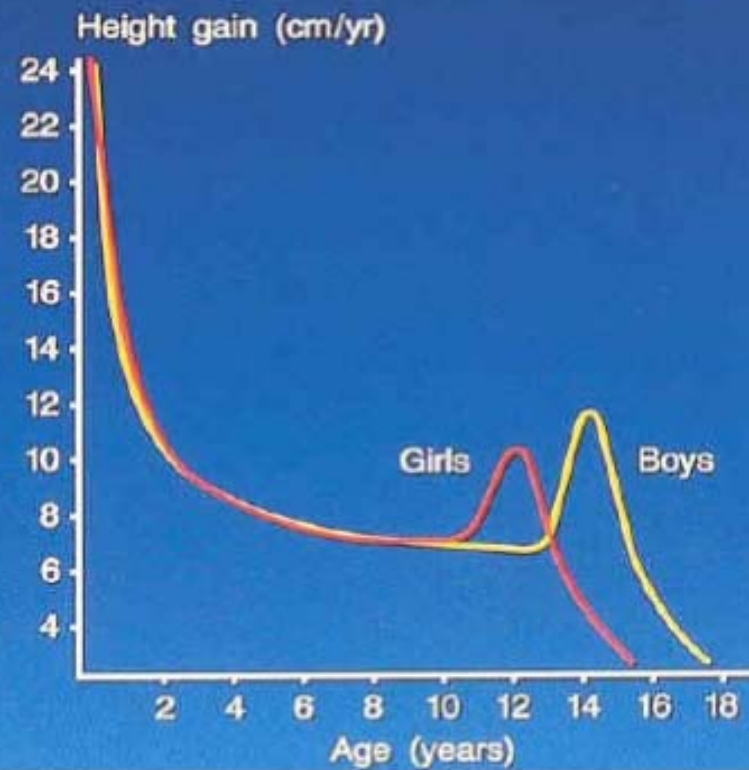
- Variabiliteit
- Verschil jongens/meisjes
- Centraal bestuurd

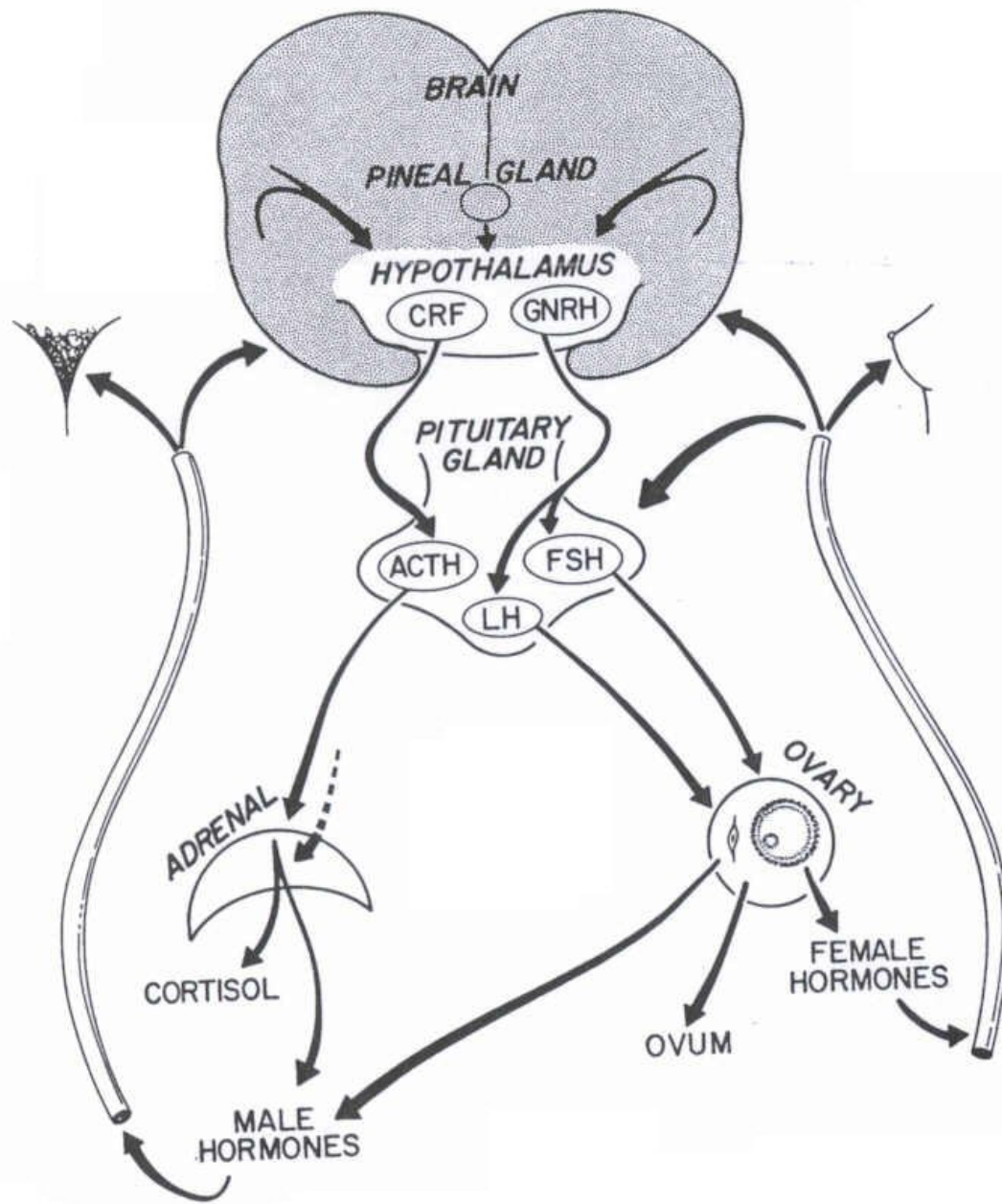
SECONDARY SEXUAL DEVELOPMENT

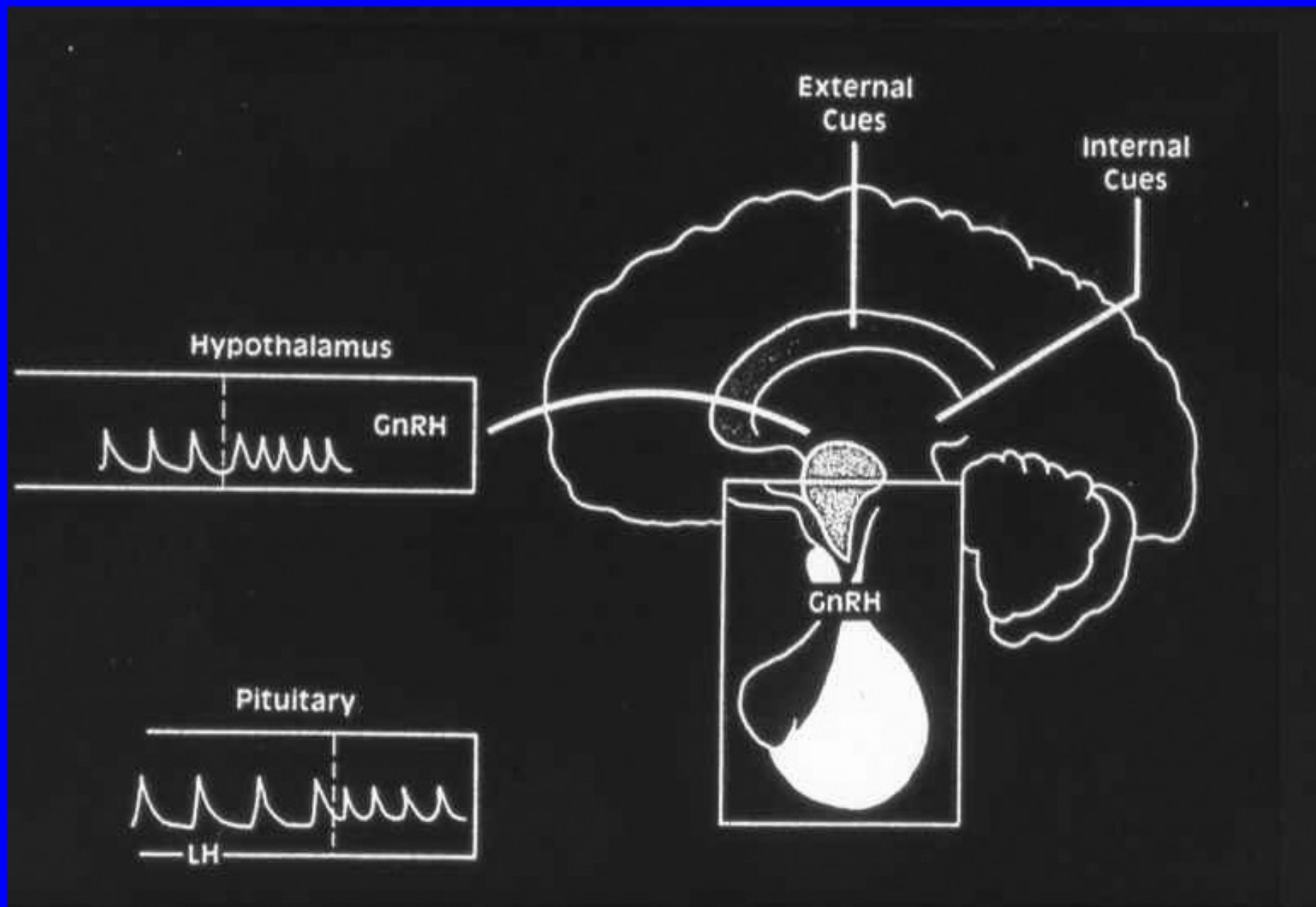


lengtetoenamen volgens pubertaire rijping

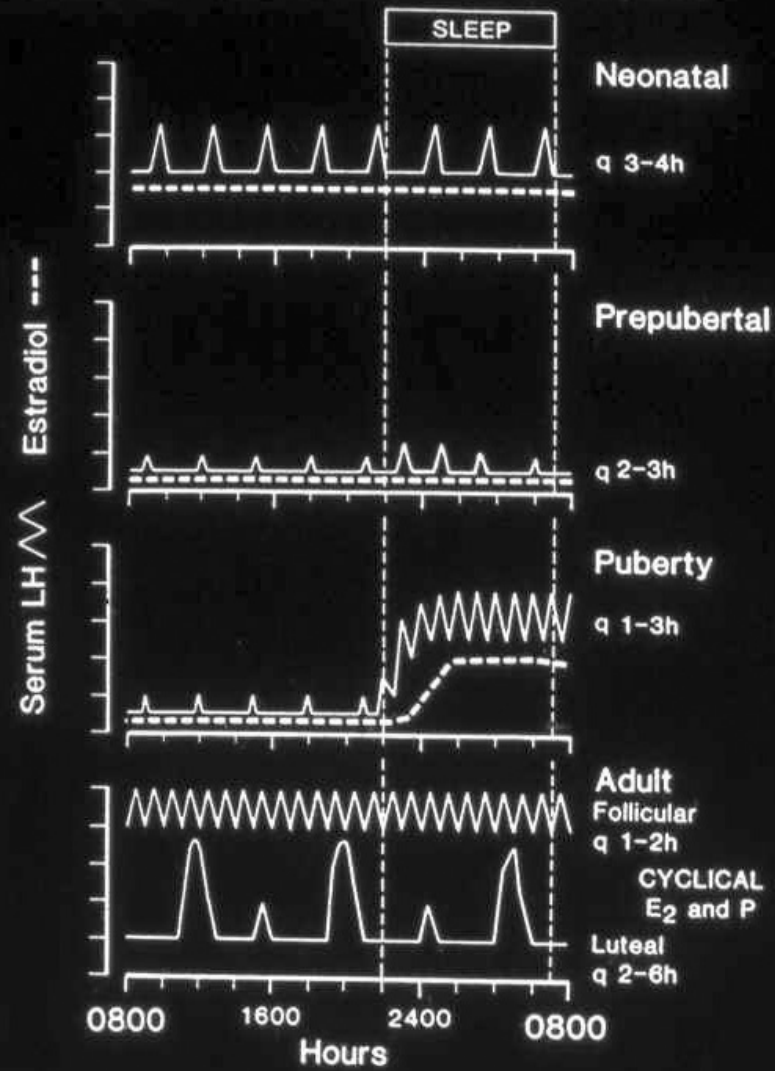
The Pubertal Growth Spurt







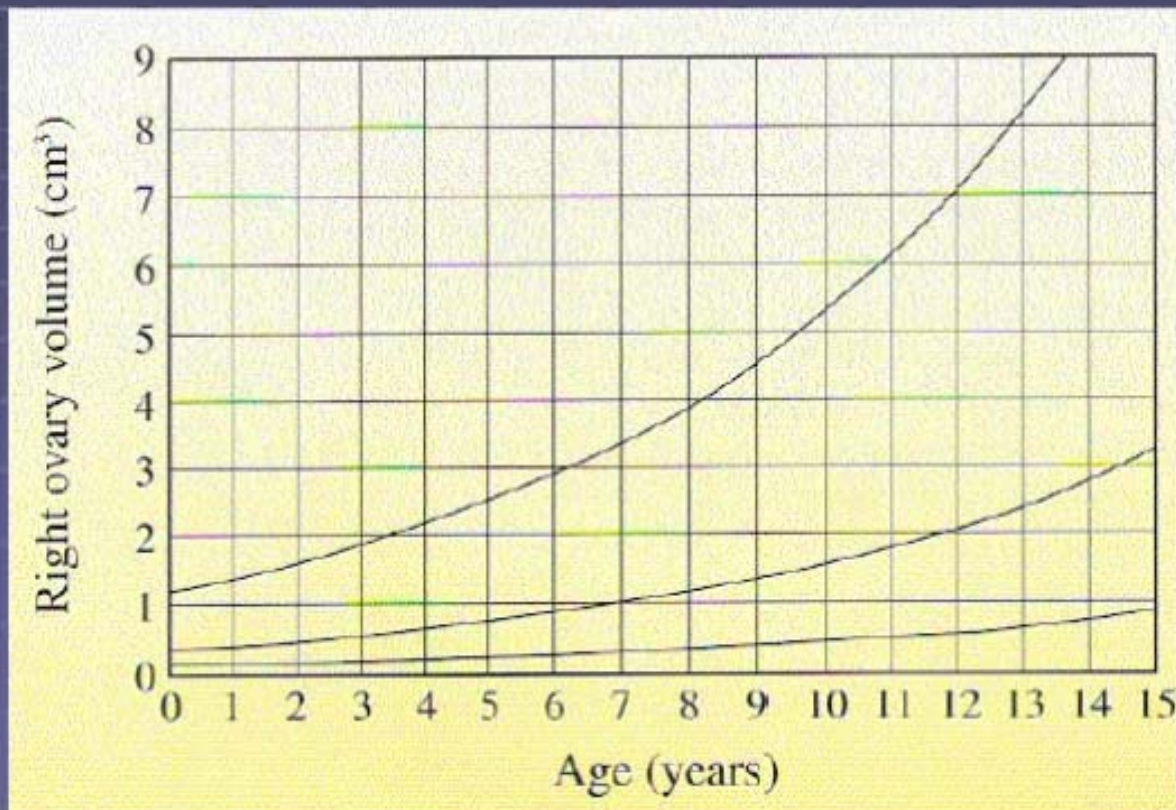
b. PULSATILE GnRH SECRETION IN FEMALES



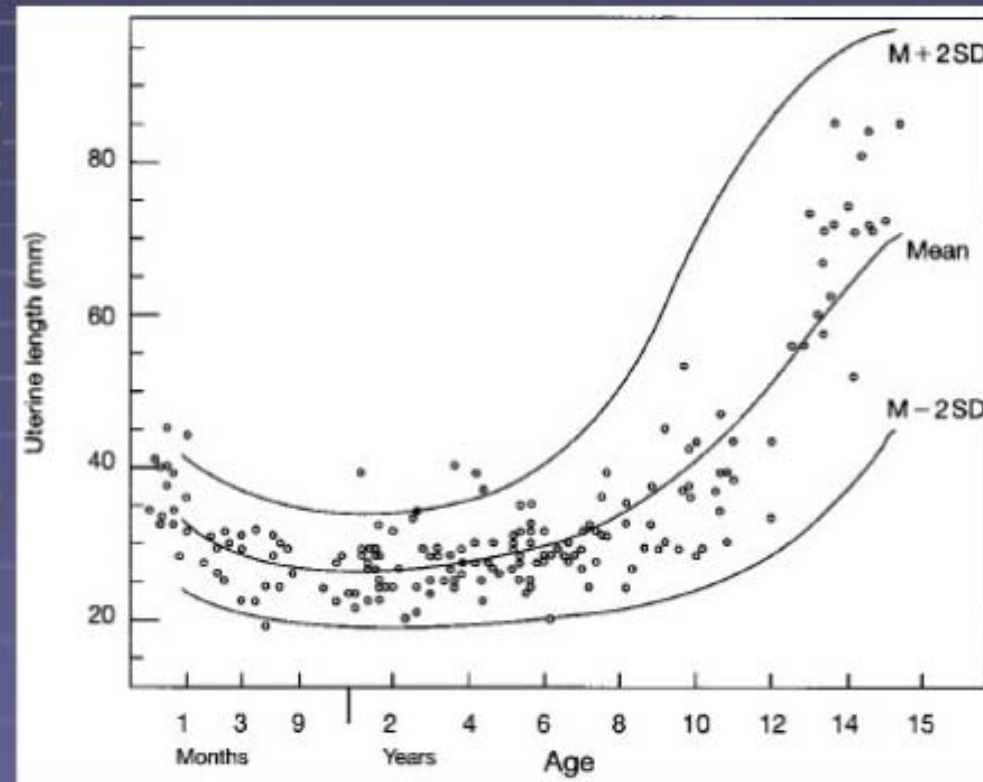
Meisjes

- Ovaria : oestrogeen toename
 - Groeiversnelling
 - Botmaturatietoename
 - Borstontwikkeling
 - Groei uterus
- Bijnier : DHEAS
 - Oksel - pubisbehaarng

De groei van het ovarium



De groei van de uterus



De borstontwikkeling bij het meisje

M1



M2



M3



M4



M5



De leeftijd van menarche in België.



Jongens

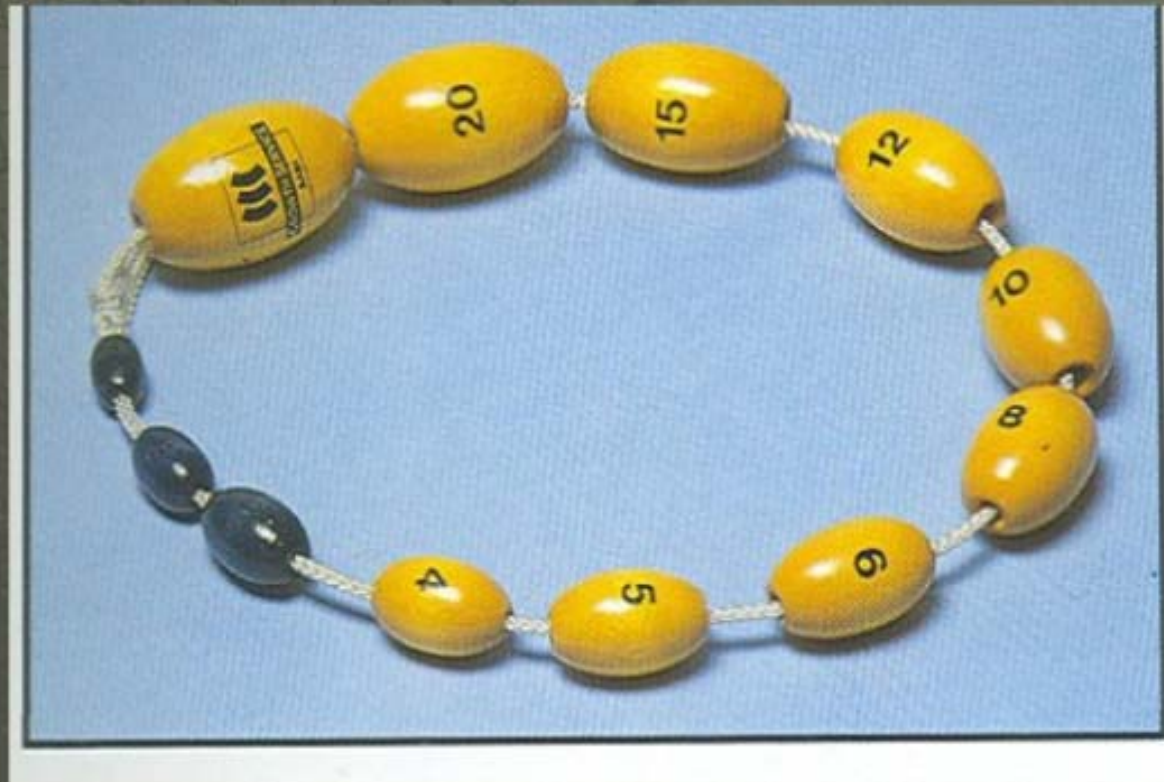
Testes : tubuli seminiferi /

(volume testes)

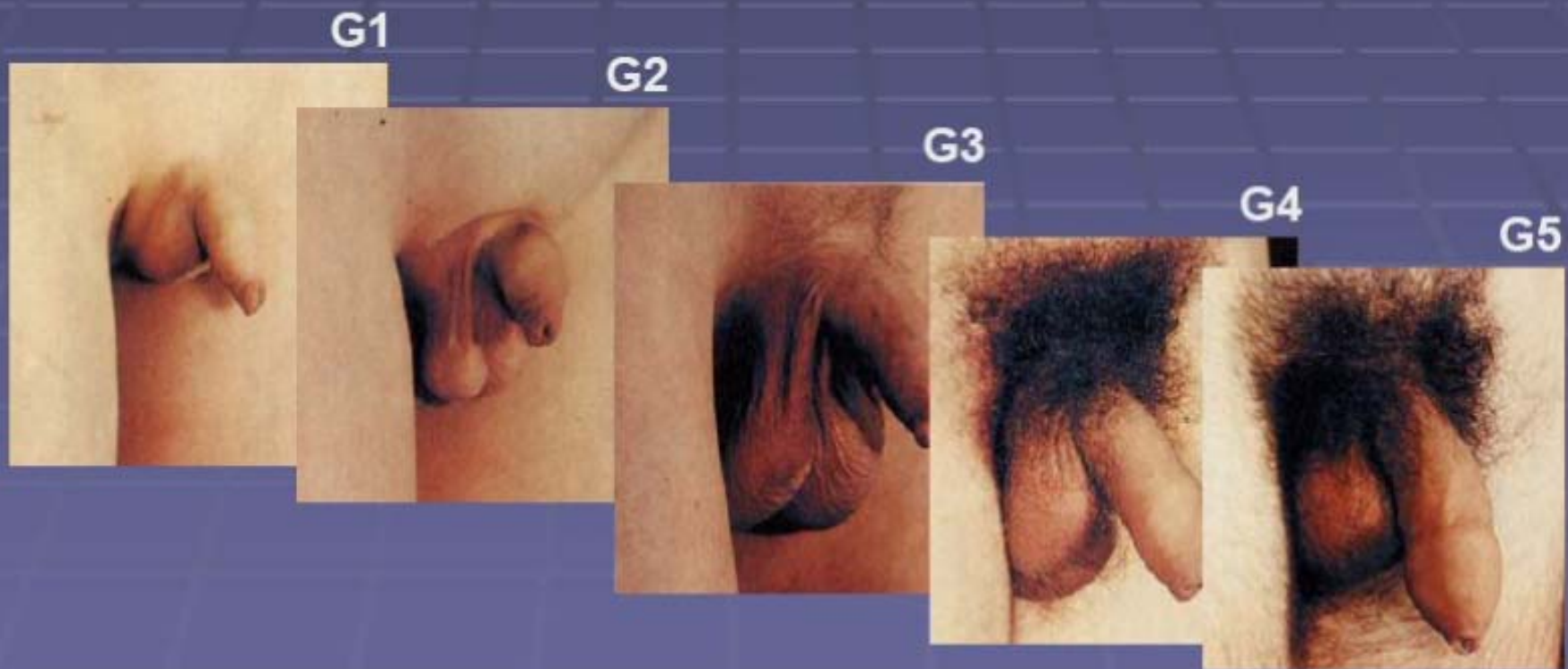
testosterone

- » Groeiversnelling
- » Botmaturatietoename
- » Penis groei
- » Spier- stem - beharing

De meting van het testes volume Prader orchidometer

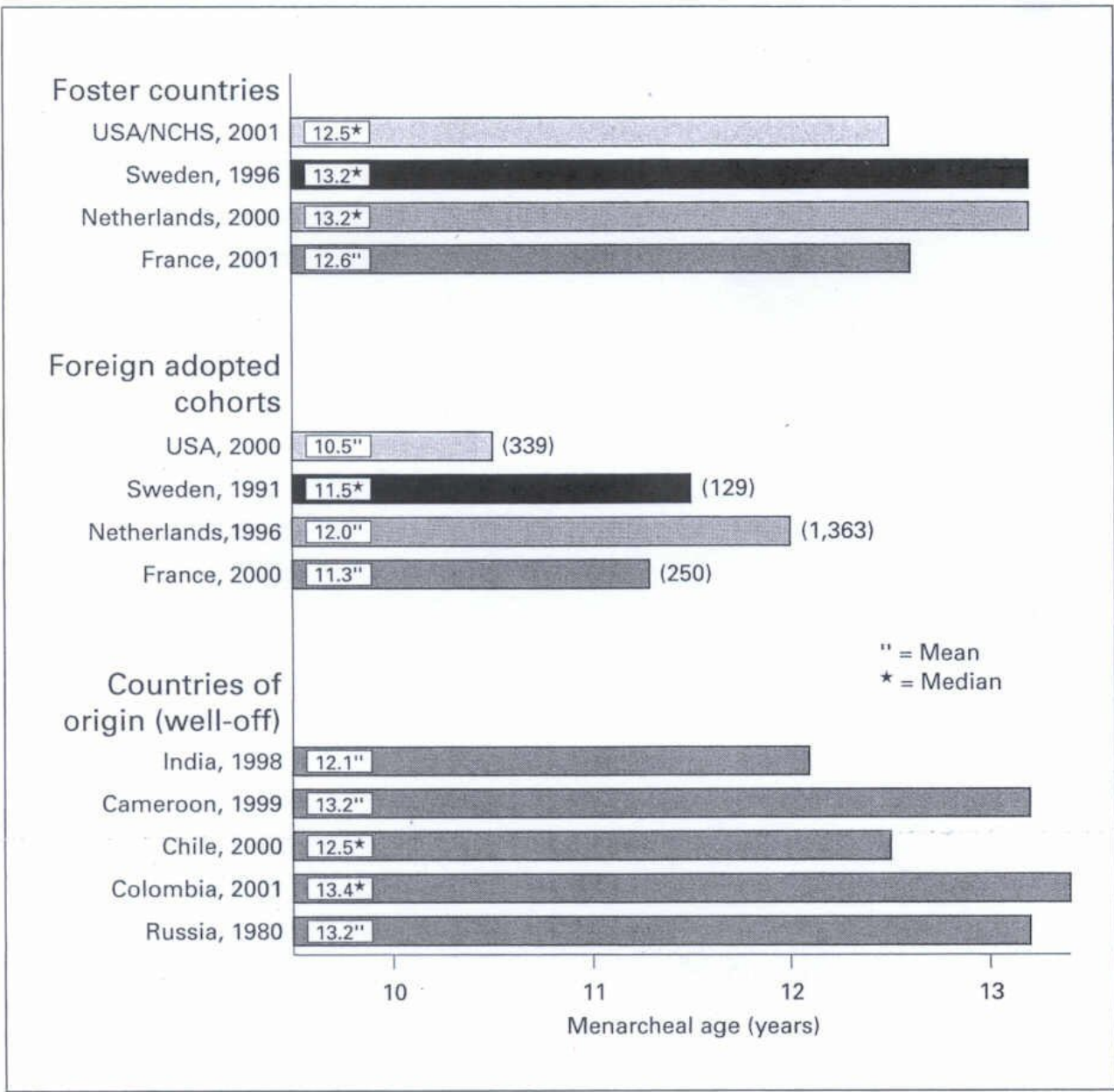


De genitale ontwikkeling bij de jongen

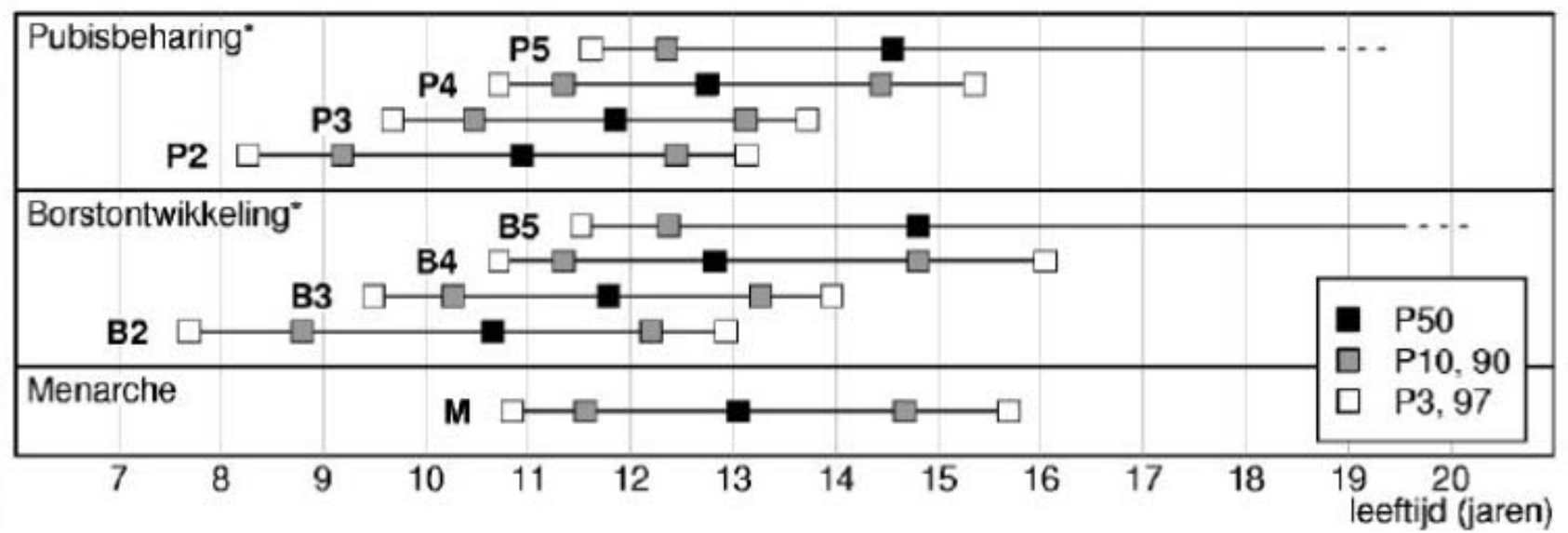
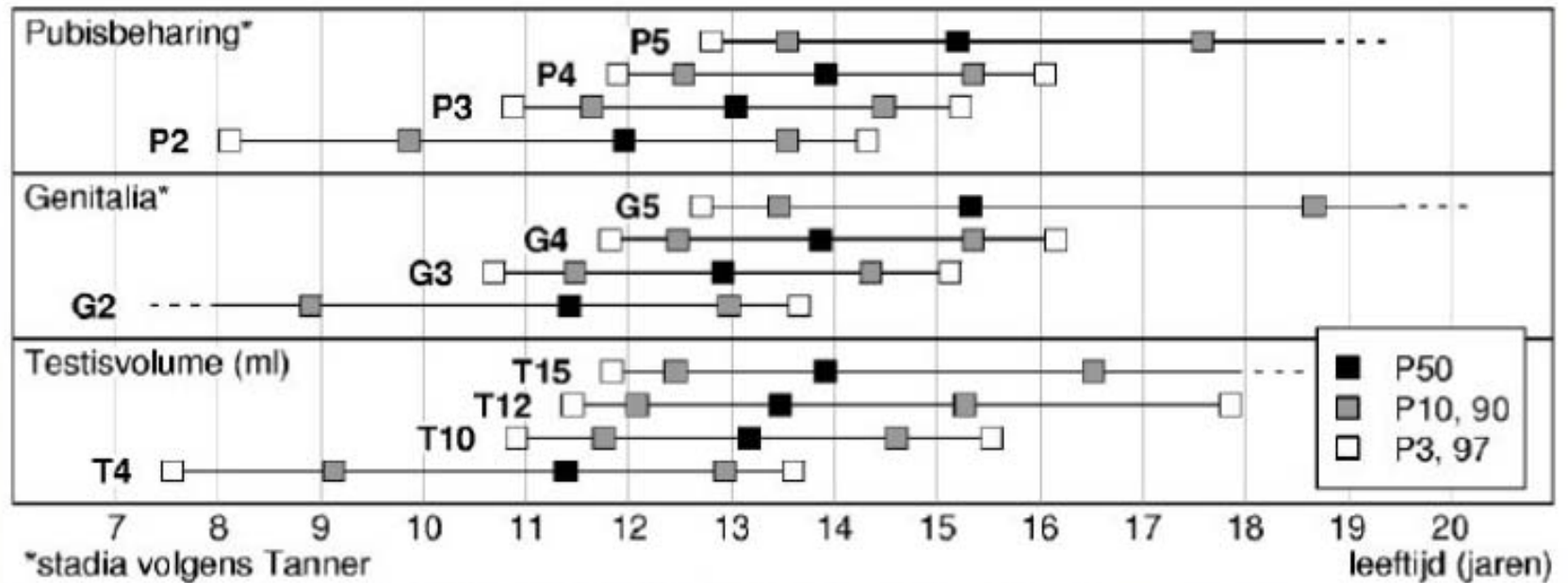


Timing en tempo van puberteit

- Genetisch (familiaal)
- Omgevingsfactoren
 - Nutritie
 - Chronische ziekten
 - Intra-uteriene groeiachterstand
 - Adoptie
 - Endocriene disrupters



De limieten van de pubertaire stadia



Limieten van de normale puberteit

AGE LIMITS FOR PUBERTAL DEVELOPMENT (yr) (Tanner & Davies, 1985)

	PRECOCIOUS	EARLY NORMAL	MEAN	LATE NORMAL	DELAYED
centile	~99	97	50	3	~1
G ₂ boys	9.0	9.5	11.5	13.5	14.0
M ₂ girls	8.0	8.9	10.9	12.9	13.5
menarche	10.0	10.8	12.7	14.6	16.0

TRUE PRECOCIOUS PUBERTY

= CENTRAL

= COMPLETE

= GnRH-DEPENDENT

Sexual maturity

isosexual

heterosexual

Pubertas praecox

- Te snelle groei
- Te snelle botmaturatie
- Eindgestalte kleiner dan verwacht
- Psycho-emotionele stress

CAUSES OF CENTRAL PUBERTAS PRECOX Girls and Boys

- Idiopathic

- CNS-Disorders

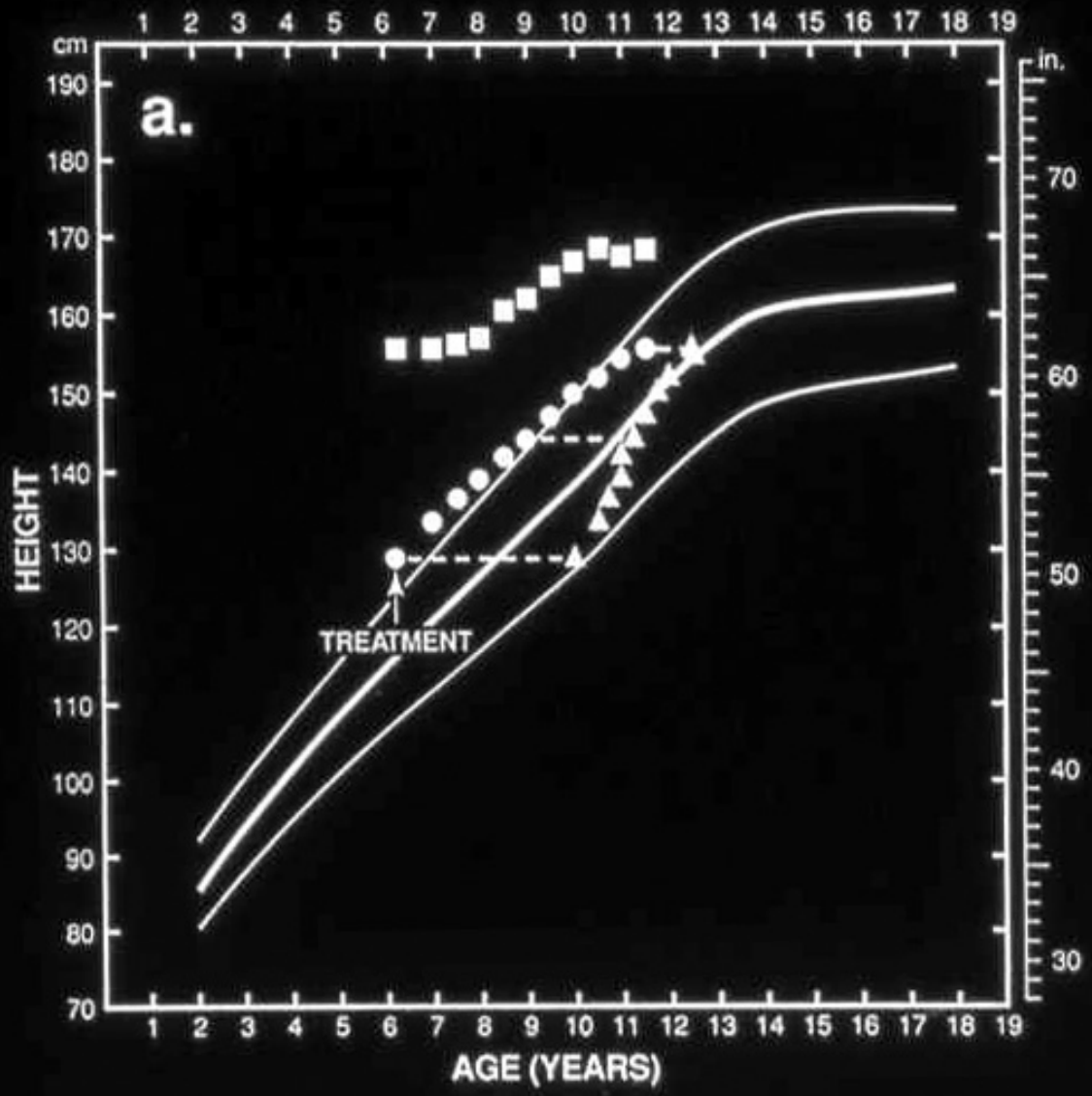
- . Tumors :
 - Hormone producing
 - Space occupying
- . Infections
- . Head Trauma
- . Cranial Irradiation
- . Congenital Malformation

- Others

- . Hypothyroidism
- . Mc-Cune Albright
- . Neurofibromatose

Behandeling pubertas praecox

- Causale behandeling (chirurgisch)
- Symptomatische behandeling :
LHRH analoog



PSEUDO PRECOCIOUS PUBERTY

= INCOMPLETE

= GnRH-INDEPENDENT

CAUSES OF PSEUDO PRECOCIOUS PUBERTY Girls

Ovaria : Tumors
Cysts
Autonomous E_2 -Producing

Adrenal : Enzyme Defects
Tumors

Iatrogenic E_2 -Exposure

CAUSES OF PSEUDOPRECOXIOUS PUBERTY
Boys

HCG-Tumors : Liver
CNS

Testes : Tumors
Autonomous T-Producing

Adrenal : Enzyme Defects
Tumors

Iatrogenic T-Exposure

VARIATIONS OF PUBERTAL DEVELOPMENT

- **PREMATURE THELARCHE**
- **PREMATURE ADRENARCHE**
- **PREMATURE ISOLATED MENARCHE**

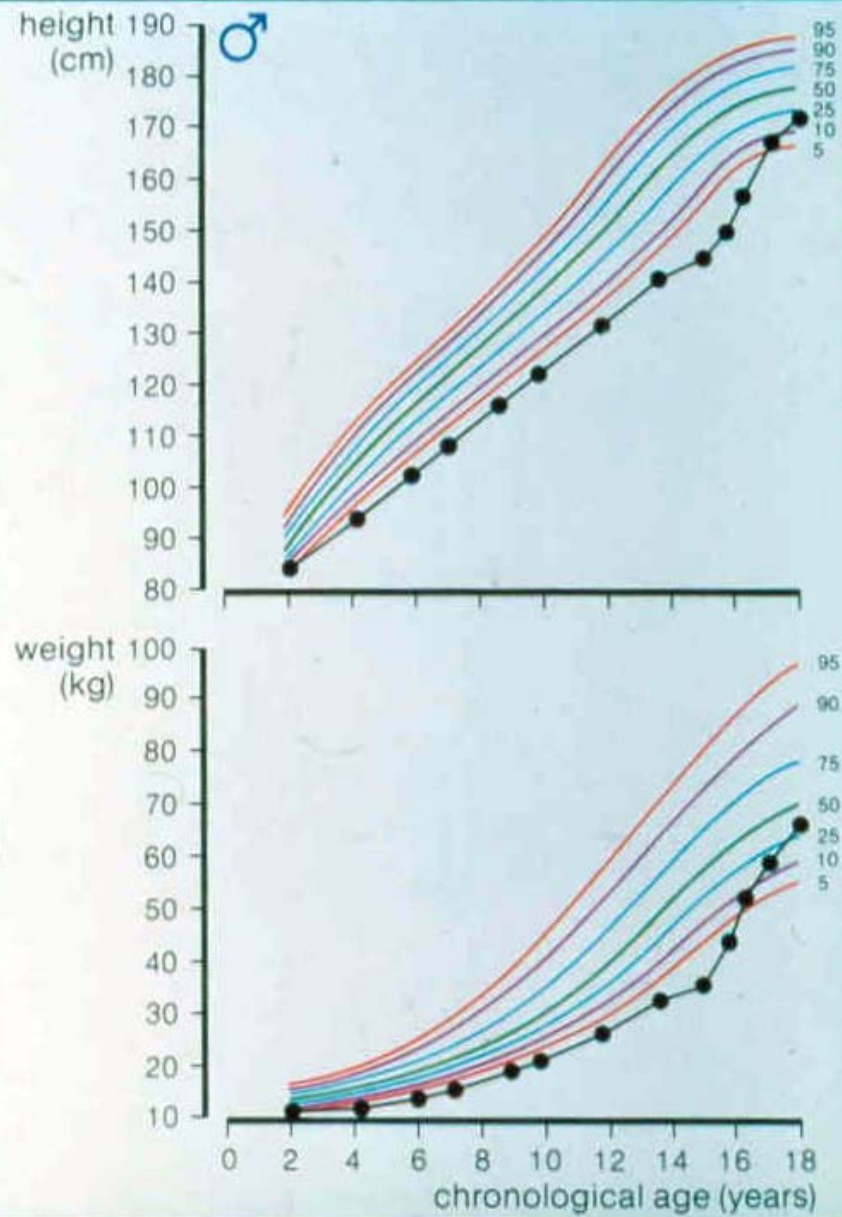
Pubertas tarda

- Uitblijven van pubertaire groeispurt
- Vertraagde botmaturing
- Verminderde botmineralisatie
- Psycho-emotionele stress

CAUSES OF DELAYED PUBERTY

- **Constitutional delay of growth and puberty**
- **Sexual infantilism of CNS origin**
- **Sexual infantilism of gonadal origin**

GROWTH IN CONSTITUTIONAL DELAYED ADOLESCENCE



SEXUAL INFANTILISM OF GONADAL ORIGIN

1. Congenital

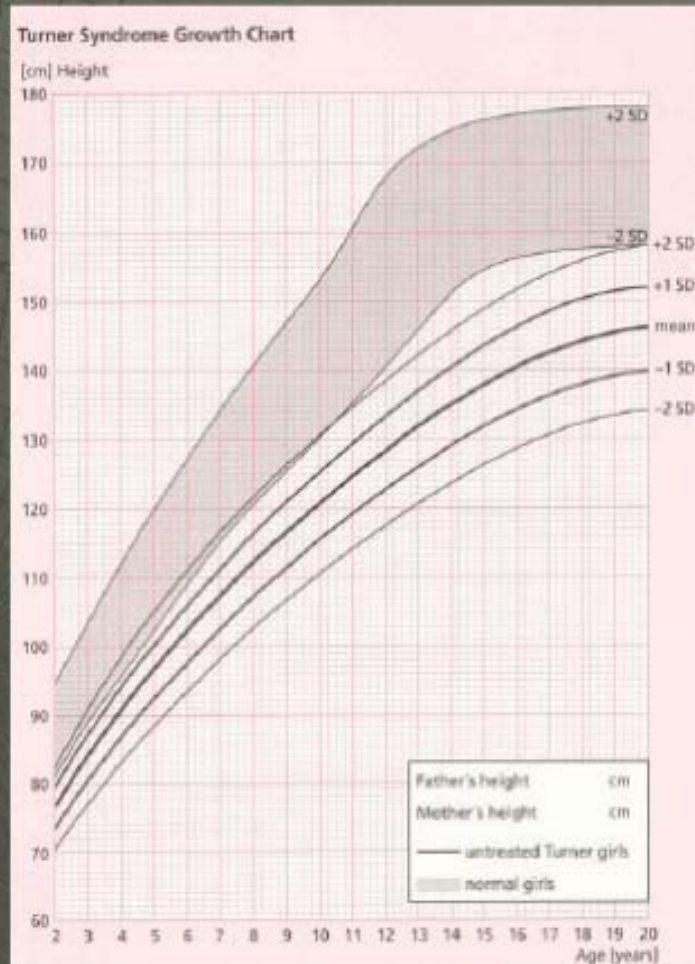
- Gonadal agenese (Turner)
- Pure gonadal agenese or dysgenesis

2. Acquired

- Irradiation
- Chemotherapy
- Surgery

3. Autoimmune destruction

Groeicurve voor Turner syndroom



Behandeling pubertas tarda

- Substitutie jongens
 - Sustanon
 - Humegon
- Substitutie meisjes
 - Oestrogenen
 - Progestativa



Elk **MEISJE** dat op 13,5 jaar geen B2 vertoont **OF**
afwezigheid van menarche 4 jaar of méér na B2-score **OF**
geen menarche op 16 jaar

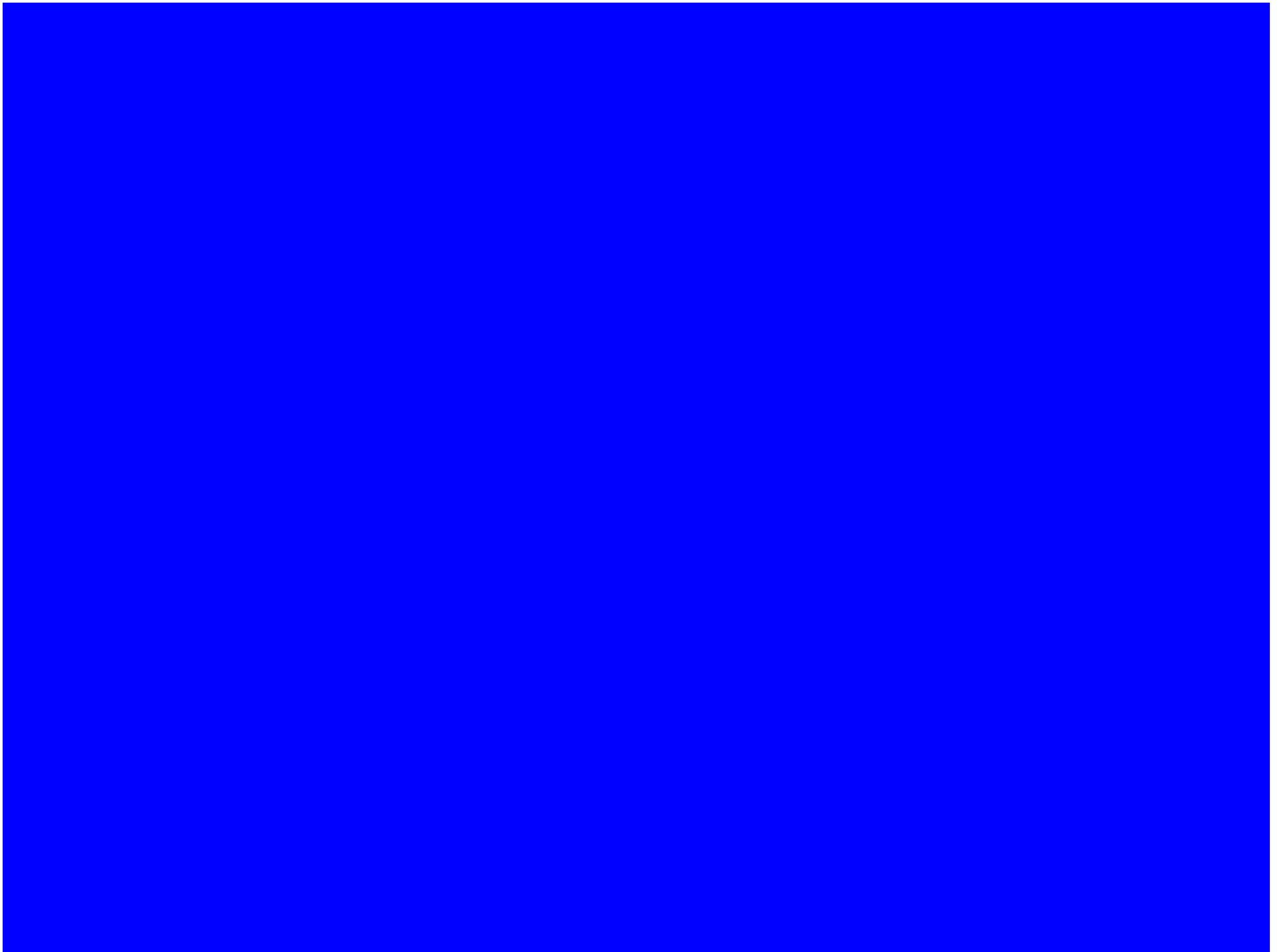
verwijzen

Elke **JONGEN** die op 14 jaar nog geen G2 **EN** testikelvolume ≥ 4 ml vertoont

verwijzen

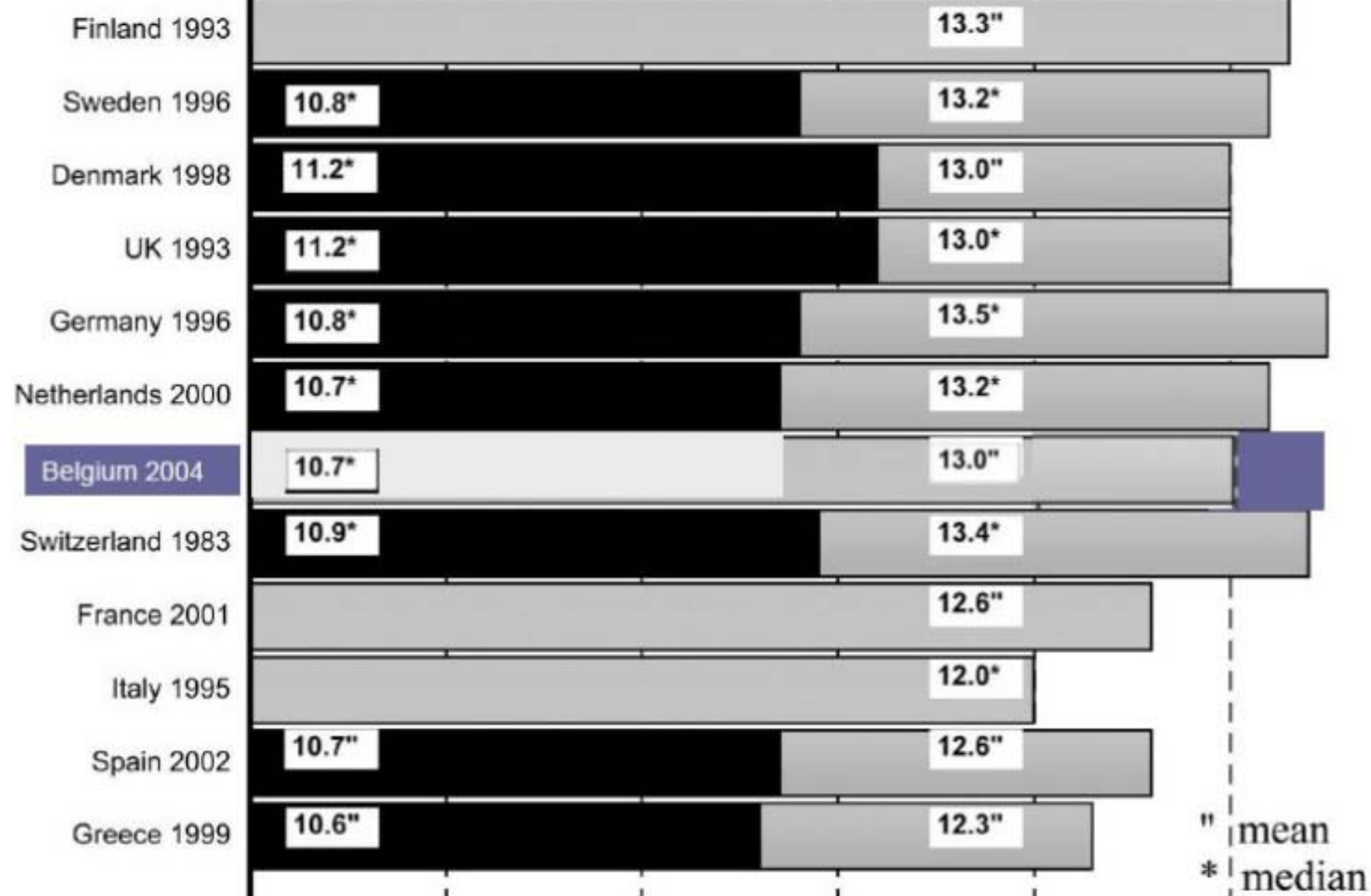
Elke **JONGEN** die op 14 jaar G2 **EN** testikelvolume 4 ml vertoont

selectief consult na 1 jaar
ter controle van G-progressie
en toename van het testiculair volume



De leeftijd van menarche

	Mean age at menarche (years)
European	12.8
African	12.4
Asiatic	12.3
Indo-Mediterranean	12.4



De leeftijd van menarche

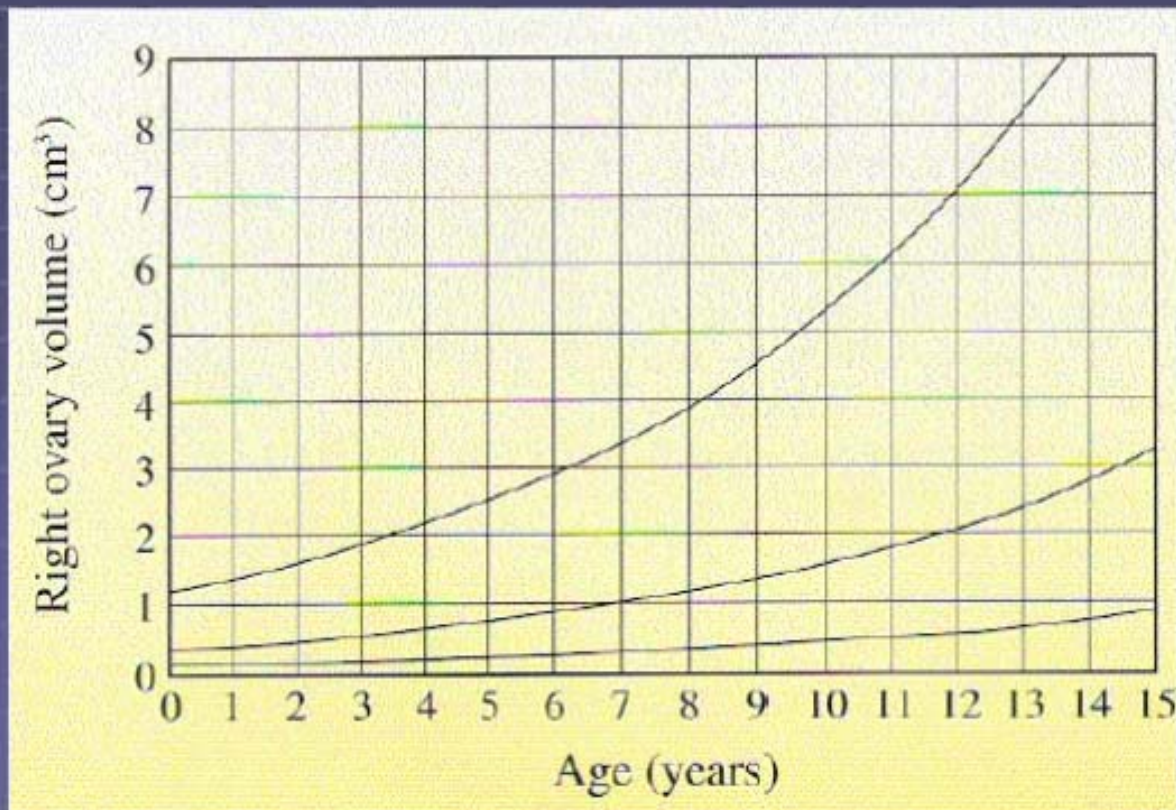
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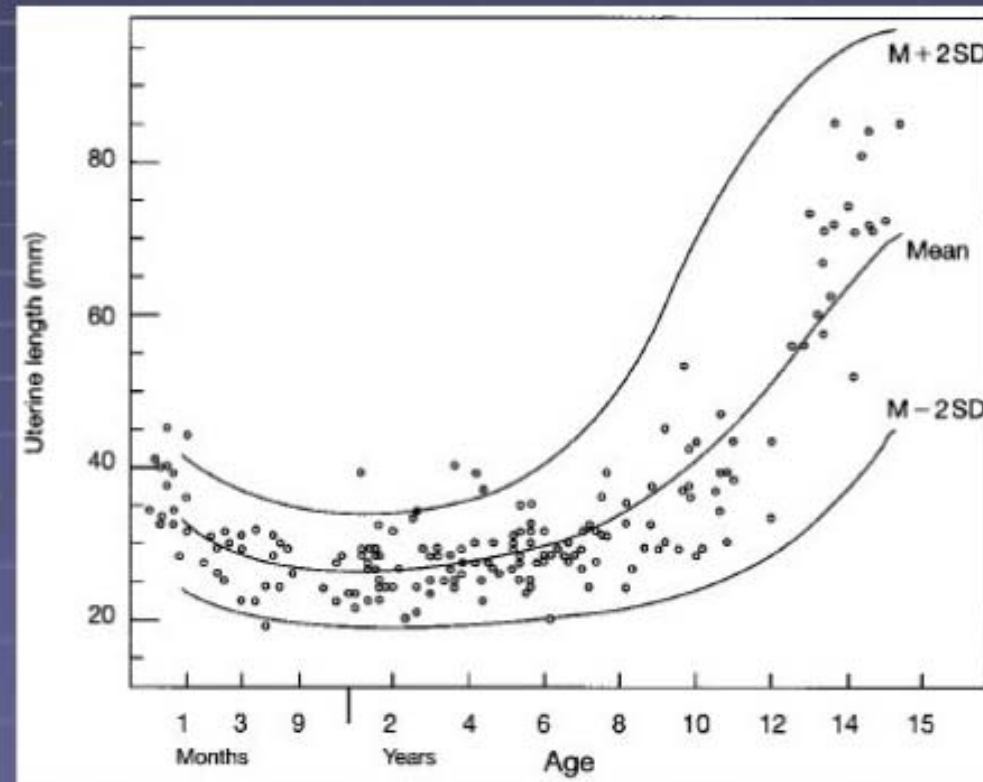
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De groei van de uterus



De borstontwikkeling bij het meisje

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M2



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M4



M5



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