

A novel type of Pubertal Height, Weight and BMI References, aligned for onset of Puberty

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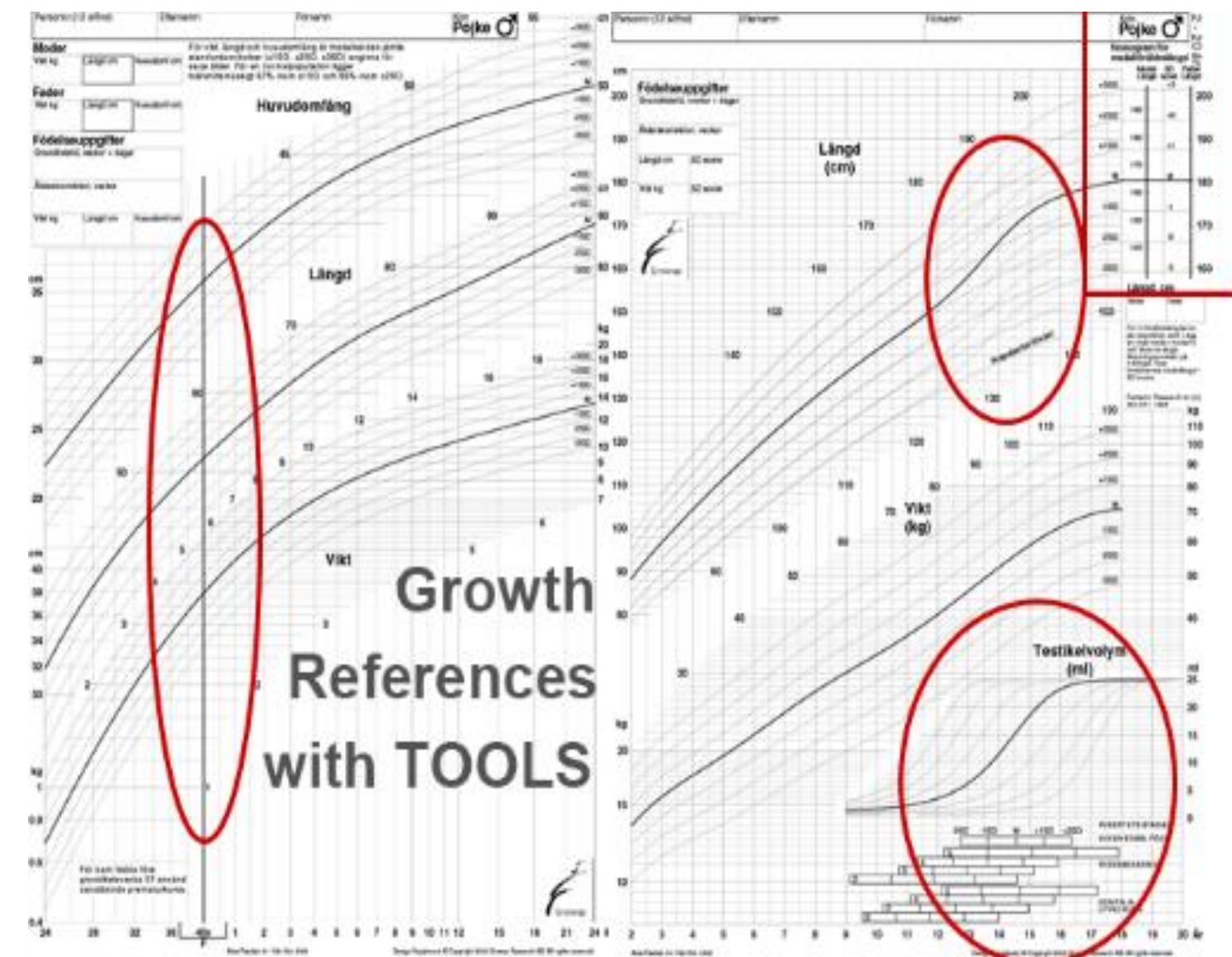
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Abstract 465 P1-P169

Rational

Growth references of today have growth charts for total height vs the chronological age¹ with different tools for the clinician:

corrected for gestational age², corrected for parental heights, & reference for prepubertal height: However, there are no specific references for height, weight & BMI considering biological age such as individual timing for the onset of puberty.



Aim

To fill this gap, we aimed to develop pubertal references for height_{SDS}, weight_{SDS}, BMI_{SDS}, aligned for the individual onset of pubertal growth, obtained from QEPS-growth model^{3,4}

Results

For both girls and boys we present onset of pubertal height aligned references for

1. total (QEPS) height_{SDS}, specific Pubertal height_{SDS} QES-function height_{SDS} (left);
2. for total weight_{SDS} (mid panel);
3. BMI_{SDS} (right panel);

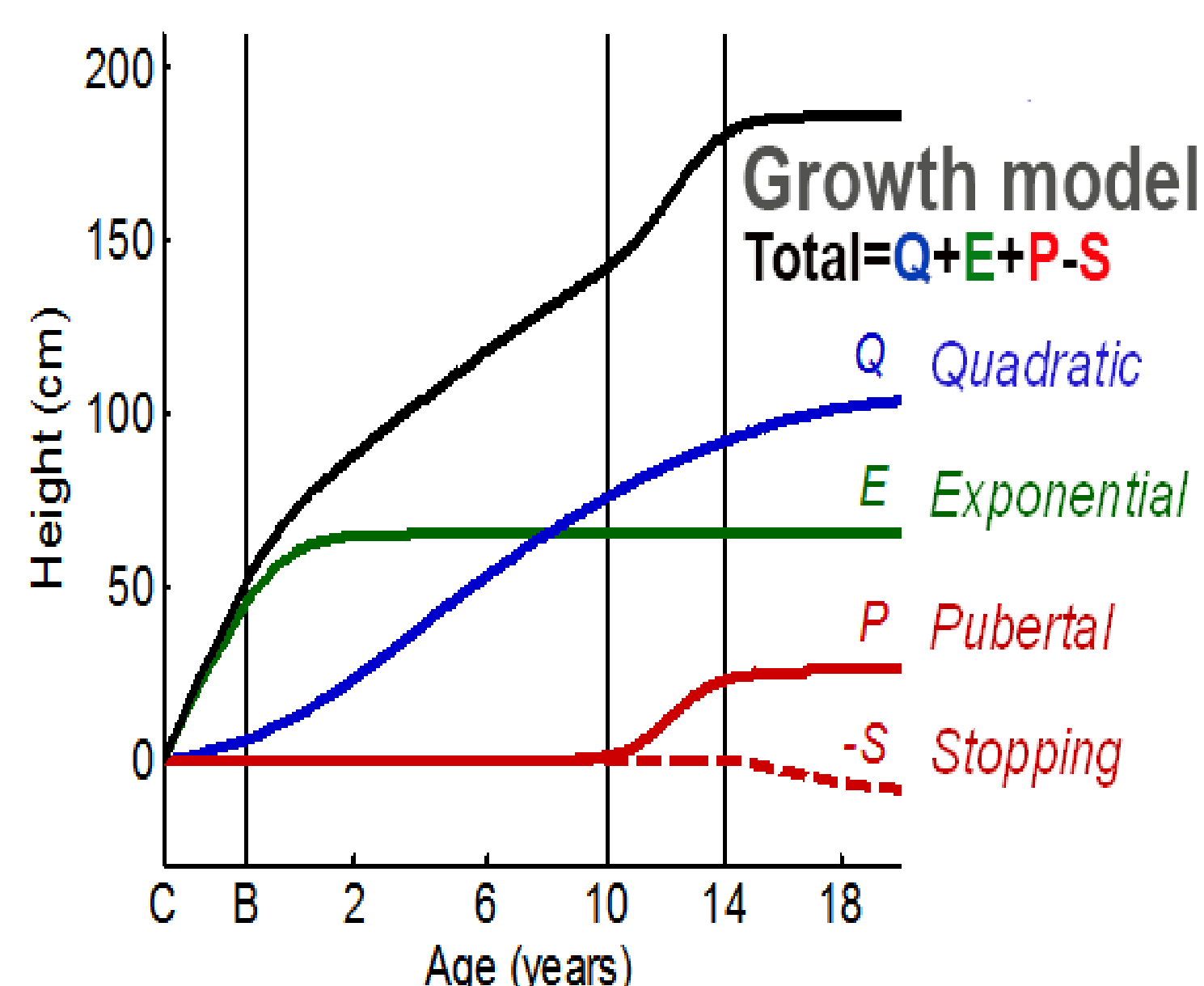
Height references, are updated for ongoing positive secular trend in height in Sweden⁵. In contrast, weight & BMI references were made similar to weight status in children from before the obesity epidemic, ie as the Swedish references of the GrowUp₁₉₇₄ Gothenburg cohort^{2,6}.

Methods

QEPS-model^{3,4} For each individual, a QEPS-function estimated height curve was obtained. Onset of puberty was defined as AgeP5, at 5% of specific P-function height.

All references were expressed in SDscores, aligning onset of pubertal growth of individuals in the reference population for total (QEPS) height, specific Pubertal-function height, & ongoing QES-function height.

This alignment, at Age P5, was also used for the LMS method developed total weight and total BMI references.



C=about 6 weeks after conception, B=birth.

Conclusion

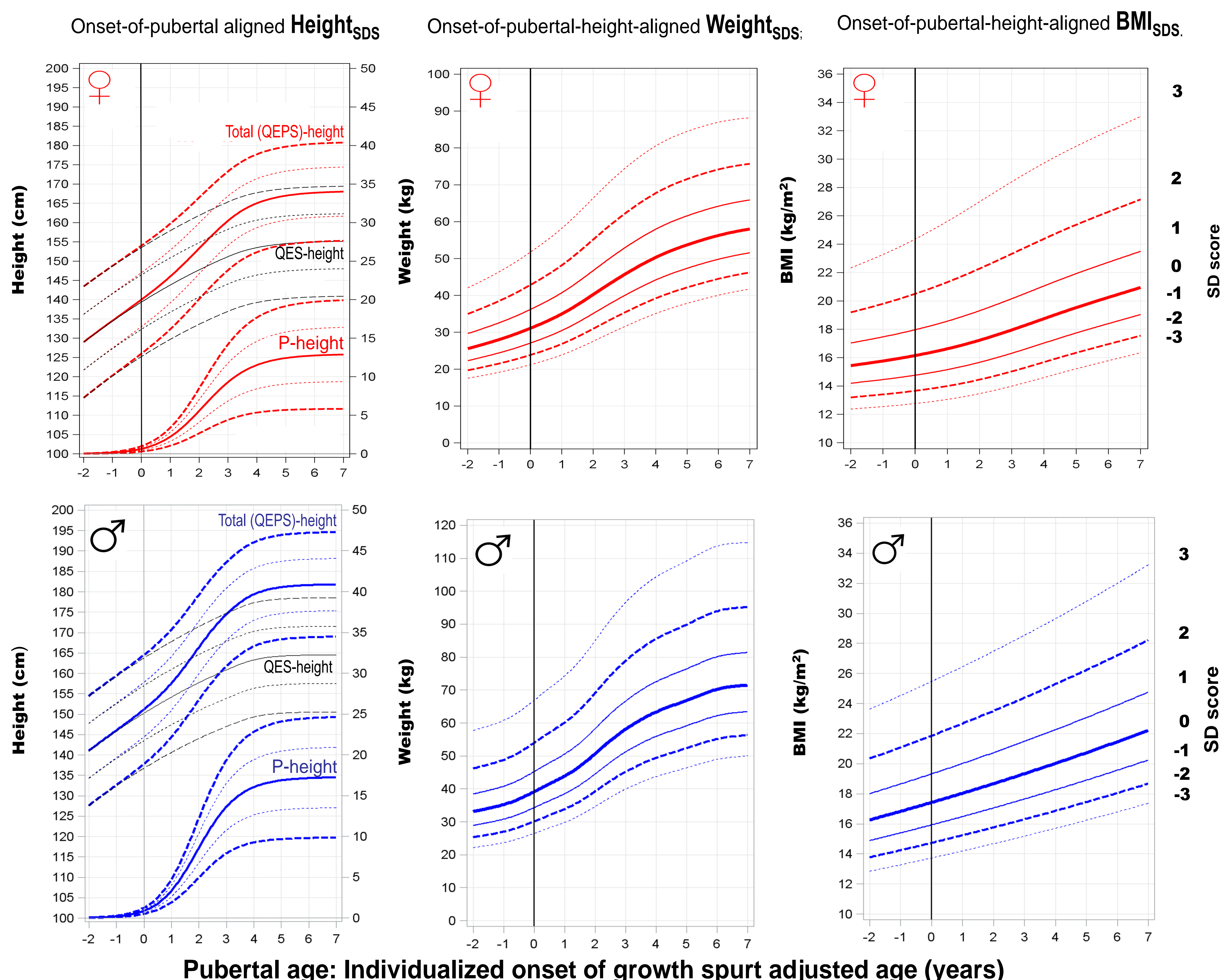
A paradigm shift for monitoring growth & weight during puberty by using references for pubertal height, weight & BMI, aligned for individual onset of pubertal growth.

For the first time considering the individual timing of puberty, comparing with peers of the same biological age/maturation, giving magnitude & tempo of growth in SDscores during puberty

*in the clinic for the individual child

*in research for groups of children

in order to estimate the change obtained for every time-period from onset to end of pubertal growth.



Pubertal age: Individualized onset of growth spurt adjusted age (years)

Material

Reference population: a subgroup of GrowUp₁₉₉₀ Gothenburg^{5,7} cohort of 1572 (763 girls) healthy children born at term around 1990 in Sweden of non-smoking mothers, mean 24 measures of weight and height from birth to adult height.

Onset of puberty was here defined as onset of individual pubertal growth spurt, ie the response for the sex-steroids in bone.

The response in gonads, as breast or testicular development, or sex steroid levels were not assessed in this population.

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