Exploring usefulness of a new type of pubertal height references based on growth aligned for onset of Pubertal growth

Kerstin Albertsson-Wikland1 ∗, Aimon Niklasson2, Anton Holmgren2,3*, Lars Gelander2, Andreas Nierop1,4

Rational

Height references have so-far been available only related to chronological age and not considering the broad individual variation in the timing and tempo of pubertal maturation and growth. Therefore, growth references and growth charts for the adolescent period have been of limited usefulness both for monitoring growth in individuals and for research. Here we explore the usefulness of a new type of pubertal height reference allowing alignment of individuals’ growth curves based on timing of pubertal growth spurt.

Results

Early/Average/Late maturers: When using height reference according to chronological age, the height curve was left-shifted for early and right-shifted for late maturers, high-lightening the minimal usefulness of ordinary references only considering age.

Tall children gain more height during puberty owing to more basic growth despite less specific pubertal growth, whereas short children gain less height during puberty due to less basic growth despite more specific pubertal growth (compared to reference).

Obese children have less specific pubertal height gain than thin children with an underlying low amount of specific P-function growth and more basic growth before puberty that was maintained during puberty (compared to reference population) whereas the opposite was found in thin children.

Methods & Material

References for total-height, specific-pubertal-heightSDS (P-function) and basic-heightSDS (QES-function) was constructed from QEPS (Quadratic-Exponential-Puberty-Stop-function) estimated height curves aligned for time/age at onset of pubertal growth (defined as 5% P-function) from 1572 healthy GrowUpGothenburg-cohort children. Usefulness were explored using GrowUpGothenburg-cohort children with different pubertal timing (early <1.5yrs average ±0.25yrs, late >+1.5yrs); tall/short stature; high/low BMI.

References: