The more obese -the less pubertal height gain

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Introduction

The QEPS growth model can describe pubertal growth1,2 (Fig 1).

In a population of a community-based setting, GrowUp 1990 Gothenburg BMI SDS range -3.5 to +4.1, there is a negative linear correlation between childhood BMI SDS and pubertal height gain (Fig 2), together with earlier onset of pubertal growth with higher BMI SDS for both sexes3.

Objective

To investigate the impact of BMI in childhood on the pubertal pattern of growth for obese children in a clinical setting.

Material/methods

Pubertal growth in obese children in a clinical setting (University hospital, Madrid) were analyzed and compared with the longitudinally followed population, the GrowUp1990 Gothenburg cohort (community-based setting). The obese study-group from Madrid included 47 children (26 females) with BMI SDS at diagnosis of +2.0 to +7.4. Analyses were done with the QEPS growth model1. Individual BMI SDS values were related to individual growth functions from QEPS-model; Pmax (specific pubertal gain, cm) and AgeP5 (age in years at 5% of the specific pubertal growth, representing onset of pubertal growth)2.

References:
2. Holmgren et al., BMC Pediatrics 2017;17:107
3. Holmgren et al., Pediatric Research 2017;81,448–454

Results -specific pubertal height gain

In obese children (Madrid), as well as in the population study (Gothenburg), BMI SDS showed a negative correlation with specific pubertal gain (Fig 3).

There were differences when compared to the population study; however, the patterns were similar as seen in Figs 3 & 4. (Pmax = 13.66-1.35 x BMI SDS in girls, 18.05-1.61 x BMI SDS in boys, population study).

Results -age at onset of pubertal growth

There was a linear correlation of obesity degree (BMI SDS) and onset of pubertal growth (AgeP5): 9.67 years - 0.121 x BMI SDS in girls, 11.59 years - 0.115 x BMI SDS in boys (Fig 5). The results were similar to the results from the population study (with AgeP5 9.82 years - 0.137 x BMI SDS in girls, 11.81 years - 0.127 x BMI SDS in boys), meaning that every increase in BMI SDS by 1 is equal to 0.24 cm less pubertal height gain for females and 1.05 cm for males (Fig 4).

The higher BMI SDS in childhood, the less the specific pubertal gain, the earlier the onset of pubertal growth.

BMI is an important modifier of pubertal growth in both normal-weight & obese children.

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