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Puberty starts earlier

OPINIONS

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New Norwegian data show that the median age for the onset of puberty in Norwegian girls is six months earlier than previously believed.

New growth curves for Norwegian girls and boys were published in 2009 (1). At that point, there were no data available for the pubertal development of children and adolescents in Norway. Puberty reference data from Denmark collected in the period 1991–1993 were therefore included in Norwegian growth charts for the 4–19 age group (2). Danish and other international studies have later shown that the onset of puberty is shifting towards an earlier age, particularly in girls (3). Knowledge about the pubertal development in Norwegian children is now available to us, thanks to data from the second Bergen Growth Study (4, 5). We have therefore revised the growth curves from 2009 by adding these reference data for normal puberty in girls and boys.

Using the puberty reference data

An assessment of pubertal development is generally based on clinical examination of secondary sexual characteristics. In girls, the onset of puberty is defined by whether breast development has started. In boys, the onset of

puberty is defined by whether the testicular volume has reached 4 mL, and this is assessed by comparative palpation of the testes using a Prader orchidometer (see appendix 1 for the clinical methods used to assess pubertal development).

The puberty reference data are based on the so-called Tanner scale, which was published by the paediatrician James Tanner in the 1960s (6, 7). The Tanner scale is used to define the stages of pubertal maturity, with quantity of pubic hair (in both sexes) and breast maturation (in girls) being measured on a scale from 1 to 5. Not all girls/women reach stage B5/P5, and not all boys reach P5, so these stages have been excluded from the reference data. The revised reference data also present new percentiles for first menstruation (menarche).

In the second Bergen Growth Study, ultrasound was used as an additional means of establishing pubertal development. This is a new method used to characterise the stages of breast maturation and testicular volume. Because ultrasound is not available in normal clinical practice, these measurements are not included in the updated reference data.

As before, reference data for pubic hair, breast development, menarche and testicular volume are shown as percentiles on horizontal lines along the x-axis of the growth curves (see appendices 2 and 3). The 3^{rd}, 10^{th}, 25^{th}, 50^{th}, 75^{th} and 97^{th} age percentiles are indicated with numbers. The 3^{rd} percentile indicates the age at which 3 % of girls and boys respectively have reached a certain stage.

Clinical consequences

The median age for the *onset* of puberty in Norwegian girls is currently 10.4 years, which is six months earlier than in the Danish reference data used previously. The onset of puberty in Norwegian boys is currently 11.7 years, which matches the Danish reference data (11.8 years). The median age for menarche is 12.7 years in the Norwegian reference data. This is a difference of 8.7 months compared to the Danish reference data, and it is five months earlier than in the first Bergen Growth Study (2003–2006). We have previously recommended that the threshold age for precocious and delayed puberty should be retained in line with current paediatric guidelines (8, 9). Precocious and delayed pubertal development is defined by the ages that are ± 2 standard deviations from the mean or median. It is recommended that girls under the age of 8 and boys under the age of 9 who present with signs of pubertal development should be assessed with a view to establishing the underlying cause of precocious puberty and possible treatment. According to the new reference data, girls should have started puberty by 13 years of age and boys by 14.5 years of age.

> ***«Knowledge about the pubertal development in Norwegian children is now available to us, thanks to data from the second Bergen Growth Study»***

The puberty reference data tell us how girls and boys are currently developing in Norway. The references are based on data from a random sample of healthy children (703 girls and 514 boys) aged between 6 and 16 from seven schools in the municipality of Bergen. The study population's prevalence of overweight and obesity is similar to that of the general population of children in Norway, and the relationship between those of Norwegian and non-Norwegian origin is comparable to that found in children and adolescents in Norway as a whole (16.2 % of the girls and 22.6 % of the boys were of non-Norwegian origin). We are therefore of the opinion that the sample is representative of the general Norwegian population in this age group, and that the reference data are applicable to children and adolescents residing in Norway. The reference data will indicate if a puberty marker has appeared early, normally or late, but they provide no information about health or disorders. A thorough clinical examination of the patient and their medical history should be the first step towards establishing precocious or delayed puberty.

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