

- 12 Voss LD, Wilkin TJ, Bailey BJR, Betts PR. The reliability of height and height velocity in the assessment of growth (the Wessex growth study). *Arch Dis Child* 1991;**66**:833-7.
- 13 Tanner JM, Whitehouse RH, Hughes PCR, Vince FP. Effects of human growth hormone treatment for 1 to 7 years on growth hormone deficiency, low birthweight, inherited smallness. Turner's syndrome and other complaints. *Arch Dis Child* 1971;**46**:745-82.
- 14 Brook CGD. Treatment of growth deficiency. *Clin Endocrinol (Oxf)* 1988;**30**:197-204.
- 15 Karlberg J. On the modelling of human growth. *Stat Med* 1987;**6**:185-92.
- 16 Karlberg J, Albertsson-Wikland K. Infancy growth pattern related to growth hormone deficiency. *Acta Paediatr Scand* 1988;**77**:385-91.
- 17 Hindmarsh PC, Brook CGD. Normal growth and its endocrine control. In: Brook CGD, ed. *Clinical paediatric endocrinology*. Oxford: Blackwell Scientific Publications, 1989:57-73.
- 18 Wit JM, Van Unen H. Growth of infants with neonatal growth hormone deficiency. *Arch Dis Child* 1992;**67**:920-5.

Commentary

Growth and puberty are intimately related and in the adolescent age range it is difficult to dissociate one from the other. There are several variable factors affecting growth at adolescence. Normal children enter puberty at differing ages, from 9.0 to 13.5 years in girls and from 9.5 to 14.0 years in boys. They also progress through puberty at differing rates; the fastest girls pass through puberty in 18 months whereas the slowest boys may take five years. In younger children (<8 years in girls and <9 years in boys) it is acceptable practice to use SD scores to compare a child's height with the height of normal children of the same chronological age. Unlike growth in younger children, growth standards for a whole population during the pubertal years have little meaning when applied to an individual; it depends on what stage of puberty an adolescent has attained. Therefore in the adoles-

cent years, it is more appropriate to compare rate of growth with children of the same stage of sexual maturation than those of the same chronological age.

Clinicians are often presented with the problem of a child with late puberty and attempt to relate growth rate to chronological age by experience of what is perceived to be normal: is the problem abnormal growth or abnormal puberty? This is an important distinction to make in order to reduce the number of inappropriate endocrine investigations and to limit the use of growth hormone treatment to those who would benefit. This is of particular relevance in this clinical situation as all tests of growth hormone secretion are notoriously difficult to interpret in the phase of growth deceleration of late prepuberty in boys and girls and early puberty in boys. The authors present data that provide a continuum of growth standards throughout prepuberty, so that a meaningful height SD score can be calculated, despite many children being less advanced in sexual maturation than their peer group. Paediatric endocrinologists usually extrapolate normal data for growth velocity in children with absent puberty in a similar fashion to the data in figs 1 and 2. However Rikken and Wit have been able to quantify this which is a step forward in providing height SD score data with which to determine if growth is abnormal, even in the absence of pubertal development.

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