

HOSPITAL PHYSICIAN®

PEDIATRIC ENDOCRINOLOGY BOARD REVIEW MANUAL

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The *Hospital Physician Pediatric Endocrinology Board Review Manual* is a study guide for fellows and practicing physicians preparing for board examinations in pediatric endocrinology. Each manual reviews a topic essential to the current practice of pediatric endocrinology.

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Partial and Gonadotropin-Dependent Precocious Puberty

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Partial and Gonadotropin-Dependent Precocious Puberty

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INTRODUCTION

Puberty is a complex biologic and psychological process marked by the appearance of secondary sex characteristics and the onset of the ability for sexual reproduction in association with skeletal maturation and a rapid increase in growth velocity. Puberty is a gradual process initiated by changes in neuronal function in the hypothalamus that trigger a cascade of neurohormonal events ultimately leading to the characteristic physical changes associated with sexual maturation. Although the neurohormonal process of puberty begins earlier, it is the appearance of body changes that is typically used to define the onset of puberty.

Several possibilities exist to describe deranged progression of puberty. Puberty may occur too early (precocious puberty) or too late (delayed puberty), or the tempo (time from onset to maturation) may be too slow or too rapid. Additionally, puberty can progress along the same prepubertal phenotypic gender (isosexual) or may cross over to the opposite gender (heterosexual, as in virilization in a female). The most common scenarios seen in clinical practice involve either early (precocious) or delayed puberty. Early puberty warrants clinical evaluation to rule out the presence of a tumor or other serious underlying causes and because of the potential association with premature closure of the growth plates, which can lead to adult short stature. Not surprisingly, precocious puberty is alarming to most families, given the associated implications of premature sexual maturation and the attendant psychosocial issues.¹

This manual is the first of a two-part review of precocious puberty. This part begins with an overview of normal pubertal development and the classification of precocious puberty. This is followed by a discussion of the general clinical evaluation of precocious puberty and the specific approach to the child who presents with partial forms of precocious puberty or with gonadotropin-dependent precocious puberty (GDPP). The review continues in the next manual with a discussion of gonadotropin-independent precocious puberty (GIPP).

NORMAL PUBERTY

TIMING

The timing of normal pubertal development has come under question in recent years. In 1997, a study from the Pediatric Research in Office Settings (PROS) reported that puberty was occurring earlier in girls, with thelarche (breast development) occurring as early as age 7 years in whites and age 6 years in African-Americans.² Based on the findings in the PROS study, the Lawson Wilkins Pediatric Endocrine Society (LWPES) initially recommended that a pathologic cause for precocious puberty be pursued only if breast and/or pubic hair development occurred before age 7 in white girls or age 6 in African-American girls.³ The validity of this new standard was called into question, however, partly because evaluation of girls in the PROS study was performed via visual inspection only, with no accompanying palpation, and because of concerns about the randomness of the selected population. Although the PROS study suggested that pubertal changes were occurring earlier in girls, the vast majority of patients in the study with early pubertal changes displayed single signs of puberty and therefore did not meet the definition of true precocious puberty. The recommendation to lower the ages of normal puberty was also criticized by several pediatric endocrinologists, who felt that serious pathology would be missed if the accepted age of puberty was lowered.^{4,5} Based largely on these publications, both the LWPES and The Endocrine Society issued a press release in 2001 reversing their decision and calling for further evaluation of all girls with early signs of puberty. Despite the questions about earlier onset of partial forms of precocious puberty, the age of menarche (initiation of the menstrual cycle) did not appear to have changed.

This review uses the age of puberty originally outlined by Marshall and Tanner in 1969 and 1970 (ie, 8 years in girls and 9 years in boys).^{6,7} These age guidelines are supported by expert pediatric endocrinologists.^{8,9} This conservative approach will aid the caregiver in preventing