

## Growth, Bone Maturation, and Biochemical Changes in Brazilian Children From Two Different Socioeconomic Groups

Growth and bone maturation were measured to assess the influence of malnutrition on growth in two groups of children and adolescents (ages 7 to 17 years) in Brazil. The groups (674 from the upper socioeconomic class and 226 from the lower socioeconomic class) were evaluated for weight, height, and bone age. Biochemical measurements, including plasma calcium, phosphorus, alkaline phosphatase, and serum proteins, were also taken.

The growth of children from the upper socioeconomic class was similar to American standards for growth, with the mean weight and height following the 50th percentile curves on the National Center for Health Statistics growth charts. However, the children from the lower socioeconomic class were underweight for their height and growth retarded for their chronological age. Their mean values for weight and height fell below the 25th percentile on the same growth charts. Interestingly, boys were more severely affected, with many having height measurements below the 5th percentile.

Evidence of delayed skeletal maturation was seen in only 9% of the upper socioeconomic class children, while 84% of the lower socioeconomic class children had a delay in bone age of at least two years. Boys were more affected than girls, and bone age delays of greater than three years were seen only in boys. Abnormal bone structure, including evidence of growth arrest and fewer coarse trabeculae, was also found in 13% of the children in the lower socioeconomic class.

Plasma calcium, magnesium, vitamin D, and total protein levels

were similar in both groups of children and no signs of rickets were found. In underprivileged children, albumin levels were significantly lower ( $P < 0.001$ ) and plasma alkaline phosphatase and phosphorus levels remained elevated even after the predicted age of the adolescent growth spurt had been reached. Menarche was delayed by two years in the girls of the lower socioeconomic class.

Linhares EDR et al. *Am J Clin Nutr* 1986;44:552.

**Editor's comment**—The authors describe a serious problem of chronic malnutrition in the lower socioeconomic class that affects as many as 50% of Brazilian children. This study also points out that environmental conditions may be more important than racial fac-

tors in influencing growth. Privileged Brazilian children grew and developed as well as American children.

The gender differences in height and development may also be culturally induced. The more severely impaired growth seen in underprivileged boys may reflect the fact that adolescent boys are forced to find work while the girls remain at home. Long hours and poor working conditions generally affect health and nutritional status adversely, thus resulting in impaired growth and delayed adolescent development. Effective programs to protect the young in underprivileged communities, where malnutrition is prevalent, could alleviate the unfortunate consequences of nutritional dwarfing.

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## Growth in Thyrotoxicosis

Buckler and co-workers followed 46 children and adolescents who developed thyrotoxicosis after infancy to determine the effects of this condition on growth velocity, adolescent development, and ultimate height. As expected, girls with thyrotoxicosis outnumbered boys in this study, where 41 of the 46 subjects were female. Diagnosis was based on symptoms, clinical signs, and biochemical measurements of thyroid hormone levels. All but two subjects were adequately controlled by medical treatment, as determined by clinical and biochemical criteria.

At presentation, most of the children had heights above average and some were very tall (average, + 0.75 SD). The skeletal age was often more advanced than the height age, but to a variable degree. The children were underweight for age (average, - 0.32 SD) and thus quite underweight for height.

Ultimate height for the girls was + 0.54 SD, which is greater than their target height (+ 0.0 SD) based on the midparental centile values.

Buckler JMH et al. *Arch Dis Child* 1986;61:464.

**Editor's comment**—As expected, these children were tall and had advanced bone ages at presentation. The advanced bone ages were often out of proportion to the increase in height. However, the ultimate height prognosis was good, which is not the case with patients whose increased height and advanced bone age are accompanied by virilizing adrenal hyperplasia or precocious puberty. What cannot be determined is the role of "good control" of thyrotoxicosis on ultimate height, since many patients had periods of mild toxicity or mild hypothyroidism while on therapy.

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