

# **Factors effecting growth and development**

## **Introduction**

Growth is a dominant biological activity during the first two decades or so of human life, including, of course nine months of prenatal life. Growth is an increase in the size of the body as a whole or the size attained by specific parts of the body. It is a fundamental characteristic of all living organisms. Growth is a form of motion. Growth means the increase in the size of the various parts and organs of the body by multiplication of cells and intercellular components during the period commencing from fertilization to physical maturity. Changes in size are outcomes of three underlying cellular processes: (a) an increase in cell number or hyperplasia; (b) an increase in cell size or hypertrophy; (c) an increase in intercellular substances or accretion. Hyperplasia, hypertrophy and accretion all occur during growth, but the predominance of one or another process varies with age and the tissue involved. The increase in number is a function of cell division (mitosis), which involves the replication of DNA and the subsequent migration of the replicated chromosomes into functional and identical cells.

## **Factors Affecting Growth And Development**

The integrated nature of growth and maturation is largely maintained by a constant interaction of genes, hormones, nutrients and other factors. These factors also influence physical performance. Some are hereditary in origin. Others, such as season, dietary restriction, severe psychological stress, originate in the environment and simply affect the rate of growth at the time they are acting. Others again, such as socio-economic class, reflect a complicated mixture of hereditary and environmental influences and probably act throughout the whole period of growth.

### **Genetic factor**

The height, weight or body-build of a child or an adult always represents the resultant of both the genetical and environmental forces, together with their interaction. It is a long way from the possession of certain genes to the acquisition of a height of 2m. gene depends for its expression firstly on the internal environment created by all the other genes, and secondly on the external environment. The control of body size is certainly a complicated affair involving many genes, yet a disturbance in a single gene or group of genes may produce a widespread and drastic effect, as in the condition of achondroplasia, which is inherited as a simple dominant. On the other hand, the effects may be quite restricted and specific. The genetic control of dental maturation and

eruption appears to be separate from that of skeletal maturation, and there is even evidence that the genes controlling the growth of different segments of the limbs are independent of each other. It is now believed that dental development and the sequence of ossification are primarily genetically controlled; the timing of ossification is partly influenced by genetic factors and partly by environmental ones. Maturation as a whole is even more affected by environment, but genetic influences are still detectable. It seems that the genetic materials operate throughout entire period of growth. Heredity influenced the rate of growth of early maturers or late maturers. Parent – offspring correlation in regard to height from birth to maturity for each sex and sex has been reported. Chromosomal abnormalities suggest genetical control on growth. Genetic factors probably play the leading part in the difference between male and female patterns of growth.

**Environmental** There is a well-marked seasonal effect on velocity of growth visible in most human growth data. Growth in height is on average fastest in spring and growth in weight fastest in autumn. This is true at all ages, including adolescence. The mechanism of the seasonal effect is not known; probably variations in hormone secretion are involved. Climate seems to have a very minor effect on overall rate of growth in man. It has been suggested that each major race of mankind varies in stature according to the climates in which they live. Seasonal variation in growth has also been observed in many studies. Longitudinal studies have shown that only about 30% of the children have cycles of increase and decrease in growth velocity which are strictly seasonal. The remaining children show accelerations and decelerations of growth which can not be clearly related with seasons.

### **Nutritional**

Growth is closely related with nutrition. A sufficiency of food is essential for normal growth. An adequate supply of calories is naturally essential for the normal growth of humans and the need varies with the phase of development. Nine different amino acids have been claimed to be essential for growth and absence of any one will result in disordered or stunted growth. Other factors are also essential for growth. For example, zinc plays a part in protein synthesis and is a constituent of certain enzymes; a deficiency of zinc causes stunting, interference with sexual development and falling out of hair. Iodine is needed for the manufacture of the thyroid hormones. Bone will not grow properly without an adequate supply of calcium, phosphorus and other inorganic constituents such as magnesium and manganese. Iron is required for the production of haemoglobin. Vitamins play an important part in growth. Vitamin A is thought to be control the activities of osteoblasts. In vitamin C deficiency the intercellular substance of bone is inadequately formed. Vitamin D deficiency is the cause of rickets. Malnutrition during childhood delays growth,

and malnutrition in the years proceeding adolescence delays the appearance of the adolescent spurt. Growth studies have demonstrated that malnutrition may cause serious impairment of growth. The term malnutrition generally refers to the effects of an inadequate intake of calories or other major dietary components such as proteins. Malnutrition may also result from diseases which decrease the appetite or interfere with digestion and assimilation. A majority of malnourished children fail to achieve their full genetic potential of body growth (both linear and ponderal) and are thus stunted or wasted or both.

### **Cultural**

The physical growth of human beings is definitely affected by cultural factors. Culture differs from ethnic group to ethnic group. The body growth differences correlate with varied cultural groups. The physical growth of the body follows some adaptations in different geographical areas of distribution of the groups.

### **Socioeconomic**

Socioeconomic influence on human growth is also a well known factor. Children from different socioeconomic levels differ in average body size at all ages that have been investigated. The upper groups being always more advanced along the course to maturity. The cause of this socio - economic differential are probably multiple. Nutrition is almost certainly one, and with it all the habits of regular meals, sleep, exercise and general organization that distinguish, from the point of view, a good home from a bad one. Growth differences are more closely related to the home conditions than to the strictly economic status of the families and home conditions reflect the intelligence and personality of the parents. Size of family exerts an indirect influence on the rate of growth. In a large family with limited income the children do not get proper nutrition. As a result the growth is affected. The number of children in the family exerts an effect on the children's rate of growth. Children in large families have been shown to be usually smaller and lighter than children in small families. Possibly this is because in large families children tend to get less individual care and attention. Healthy growth and development requires family-centered, community-based, culturally competent, coordinated care and support throughout the life course during preconception and prenatal periods, infancy, childhood, adolescence, and adulthood.

### **Environment**

The environment plays a critical role in the development of children and it represents the sum total of physical and psychological stimulation the child receives. Some of the environmental factors influencing early childhood development involve the physical surroundings and geographical conditions of

the place the child lives in, as well his social environment and relationships with family and peers. It is easy to understand that a well-nurtured child does better than a deprived one; the environment children are constantly immersed in contributes to this. A good school and a loving family builds in children strong social and interpersonal skills, which will enable them to excel in other areas such as academics and extracurricular activities. This will, of course, be different for children who are raised in stressful environments.