Original Article: The Role of Vitamins and Minerals in Short Stature of Children

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ABSTRACT

Short stature in children can occur in two stages before birth (embryonic stage) and after birth or in both stages. During pregnancy, the mother plays an important role in this regard. Inadequate consumption of micronutrients, including drinking alcohol and smoking during pregnancy, leads to inadequate growth and low birth weight. Therefore, dietary supplementation and avoidance of alcohol and smoking will be essential for such mothers. Prolonged consumption of foods that are low in protein and therefore do not provide enough essential amino acids for the baby's body will slow or stop the baby's growth. Of course, consuming foods that are high in fat also prevents proteins from reaching the body of children as needed, and this will be problematic for their growth. In addition to energy (a significant portion of which comes from carbohydrates, simple and compound sugars) and fats and proteins (known as these three macronutrients), adequate intake of various micronutrients, such as vitamins and minerals, is essential for children to grow well. It is essential. The role of several micronutrients in ensuring adequate growth in children is well known. But it is not yet clear which of them has the greatest impact on children's developmental delay.

Introduction

It is a complex process and is influenced by genetic potential, endocrine system function, nutritional status, level of physical activity and the presence or absence of chronic diseases. Disorder in any of these cases can lead to stunted growth and short stature. Regular use of a growth chart and serial height recording from infancy is the key to detecting abnormal growth and initiating preventive and curative measures [1-3].

Short stature is mostly due to physiological factors such as natural or familial (genetic) causes, but may also follow important and treatable diseases (pathological causes) [4,5]. Pathological causes of short stature include chronic gastrointestinal or renal diseases,

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rickets, bone dysplasia, chromosomal disorders, various diseases such as malnutrition and lung diseases, blood and mental health problems [6].

Short stature occurs in most cases due to physiological factors such as genetics as well as pathology [7]. Pathological causes of short stature include chronic gastrointestinal or renal diseases, chromosomal disorders, various diseases such as malnutrition and lung and blood diseases and psychiatric problems. Another cause of short stature is related to hormonal disorders [8]. People's height is the result of the interaction of internal and environmental factors during the growth period. Internal factors that determine height are genetic factors that a person receives from their parents and can not be changed [9]. Influential environmental factors also include: nutrition, climate, climate and diseases, and... For example, the available evidence shows that proximity or distance to the equator is effective in the size of the body. In this study, we will discuss the role of vitamins and minerals affecting short stature.

Results

Oh help to increase the height of the child

Another cause of short stature is related to hormonal disorders. Given that changes in growth and height increase can be considered a sensitive indicator of general health, it is necessary to carefully study the growth pattern, especially in childhood. Tallness depends on several factors. People's height is the result of the interaction of internal and environmental factors during the growth period [10-12].

Internal factors that determine height are genetic factors that a person receives from his parents and cannot be changed. Environmental factors also affect: nutrition, climate, climate and diseases, and... For example, the available evidence shows proximity or distance to the equator affects the size of a person's body [10].

Although environmental and genetic factors cannot be easily separated, but by examining different nations, races and lands, it has been concluded that environmental factors such as proper nutrition and healthy diet are very important. Genetically, height increases after puberty. At this point, the complex interactions of genes, nutrients, and hormones culminate [11-13].

The ultimate goal of growth is to reach the point of reproduction and pass on the inheritance to the next generations, where height growth also reaches its peak. Proper nutrition has the greatest effect on the growth stages [14]. Puberty is the last chance to increase height. In addition to the growth hormone secreted by the pituitary gland, which is responsible for increasing height, the secretion of some hormones also affects height growth. Inhibits, and hypothyroidism can cause premature ligation of articular cartilage and stunted growth. Growth is in line with bone health and bone growth. There are many natural and industrial supplements, nutrients and hormones that are essential for this purpose that are effective in the process of bone growth and height increase [15,16].

Vitamins effective in increasing the height of the child

Taking the following vitamins can be a good way to prevent a child from being short.

1- Calcium

Calcium is essential for bone growth and density because it is the main bone mineral. Bones grow during childhood and adolescence, and even after growth stops, bone formation still continues but does not cause longitudinal bone growth and height increase. Calcium is found in dairy products such as milk, cheese, yogurt and... eggs, dark green leafy vegetables such as spinach, sardines, nuts. Some foods inhibit calcium absorption and have a negative effect on growth. These foods include drinks containing carbohydrates, salt, fat, sugar and coffee [17,18].

2- Magnesium

Its consumption increases bone density. Magnesium stimulates the thyroid gland to secrete the hormone calcitonin, which regulates the amount of calcium in the blood and the activity of bone cells. As magnesium and calcium in the blood increase, bone formation and longitudinal growth increase. Magnesium-rich

diets and supplements increase bone density and stimulate height growth [19,20].

3- B + group vitamins

Among the B vitamins, vitamins B1 and B2 are more effective than others in height growth and prevention of short stature.

4- Zinc

Zinc has an effect on the secretion of some hormones from the gonads and a positive effect on the thyroid gland and the secretion of calcitonin, as well as by increasing the production of vitamin D and thus the absorption of calcium in bone growth and height increase. On the other hand, zinc affects the activity of somatomedin hormone, which is stimulated by its growth hormone secretion, causes cartilage and bone tissue and is an effective factor in body growth and skeletal growth. Therefore, its deficiency will cause acute problems such as short stature.

5- Vitamin D.

Its maximum effect on bone and connective tissue health is effective in increasing height and preventing short stature in concomitant use with calcium. Vitamin D stimulates skeletal growth and height by increasing calcium absorption and its deposition in bone.

6- Vitamin C.

Vitamin C is one of the essential vitamins for growth as well as increasing height and skeletal growth. This vitamin increases the production of connective tissue and tendons and other components of skeletal tissue and makes it stronger. The source of this vitamin is fresh fruits such as citrus fruits, apricots, strawberries, mangoes, apples, bananas, tomatoes and vegetables.

7- Vitamin K.

This vitamin helps the body make a fully functional bone protein called osteocalcin. Osteocalcin with the help of this vitamin and with the proper connection of calcium and phosphorus salts in the bone strengthens and strengthens skeletal tissue and increases bone density by increasing bone mass.

8- Phosphorus

The main structure of bones is calcium and phosphorus, and most of the bones are phosphate (a derivative of phosphorus). Phosphorus is mostly found in protein-rich foods such as white meat such as chicken and fish, eggs, and in dairy and some legumes, which along with calcium form a strong bone structure and provide a good balance between calcium and phosphorus intake. Can cause proper height growth.

9- Other salts and vitamins

Many minerals and vitamins have a direct and indirect effect on the formation of connective tissue and bone matrix, increase the deposition of calcium and other minerals in bone and increase the activity of bone tissue-forming cells, thereby increasing bone longitudinal growth.

These salts include zinc, copper, manganese, silicon, strontium, fluoride. Even salts such as iodine (does not directly affect calcium metabolism but is needed to produce the T4 and T3 hormones secreted by the thyroid gland. Both hypothyroidism and hyperthyroidism both affect the circulation of bone marrow). Heights are indirectly effective. Other vitamins and their precursors, such as vitamin A and beta-carotene, are also good for bone and cartilage health.

10- Macronutrients

In addition to minerals and vitamins, macronutrients also have a significant effect on the growth and health of body tissues, including skeletal tissue. Protein-rich foods are good for your health and increase your height by stimulating the release of growth hormone. Of course, in addition to proteins, fats and carbohydrates are also needed to release growth hormone.

Protein is a good source of amino acids needed to produce growth hormone. High-protein foods include lean meats, poultry, fish, milk, soy milk, cheese, eggs, green beans, soybeans, pumpkin and watermelon seeds, almonds, peanuts, legumes, and oats.

Using balanced fats in your diet will help you grow. High-fat diets reduce protein intake and reduce the effect of growth hormone release, and on the other hand, such diets increase the

excretion of calcium and salts through the gastrointestinal tract.

10- Arginine

Arginine is one of the most important amino acids in stimulating the release of growth hormone in the body. This amino acid is found both naturally in food and industrially for various purposes, including height growth (L-arginine). This amino acid is usually supplied naturally in people with a proper and healthy diet and there is no need to eat it as a supplement. However, in children with short stature, its supplements may solve this problem by further stimulating growth hormone [35,36].

Conclusion

Treatment is often uncomplicated, but may increase intracranial pressure, pancreatitis, narrowing of the nerve canal in the wrist, hypoglycemia and diabetic coma, glucose tolerance and hyperglycemia, and diabetes mellitus, inadequate thyroid function, and acromegaly. Overgrowth of bones and connective tissue leading to changes in the face (such as protrusion of the jawbone and forehead), enlargement of the heart and heart damage (possibly and irreversibly), increased blood pressure, thickening of the skin, growth Abnormal hair, liver damage, impotence in adulthood, arthritis and arthritis. Regular and adequate sleep as well as exercise naturally affect growth hormone secretion because about 50% of growth hormone secretion is deep during sleep and growth hormone secretion increases during exercise. Finally, it is important to note that not all cases of short stature are abnormal, and the influence of genetic factors should not be overlooked. In relation to short stature due to improper nutrition and lack of micronutrients, this problem can be solved to some extent with proper nutrition and diet that meets the needs of the body. In cases of short stature due to chronic diseases and other hormonal causes, solving the underlying problem and treating the diseases is the first priority. Surgical procedures and bone grafting and the use of bone prostheses are usually not recommended due to the high complications and low success rate. Short stature should always be treated in a way that does not endanger the general health of people.

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