Oral Manifestations of Malnutrition III. The Effect of Proteins

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Vitamins, miners, and proteins are important constituents of diet. The overconsumption or deficiency (Mnutrition) of these food items lead to the development of various types of disorders and diseases. The effects of vitamins mnutrition upon the orodent structures and the or manifestations of miners, mnutrition have been previously reported (Khadiin, 1981; Khadim, 1982). The present article des with or manifestations of mnutrition due to excessive or low intake of proteins in the food.

Proteins constitute a most important supporting structure of protoplasm and provide for a large variety of chemic reactions which are essenti for life processes. Proteins in the diet are broken down into simpler components cled amino acids which in turn are required for the following purposes: (Building of tissue growth during the period of growth or pregnancy and milk production during lactation; maintenance of the structure of tissue cells including their content of proteinS containing enzyme systems, (ii) Manufacture of certain extern secretions (digestive enzymes of imentary can) and intern secretions like those of anterior pituitary, thyroid, adren medulla; (iii) Formation of antibodies and maintaining the norm concentration of plasma proteins;. (iv) Provision of nitrogen for the biosynthesis of non-protein compounds such as the porphyrins of hemoglobin and the nucleic acids;. (v) Biosynthesis of tissue proteins.

Twenty two different amino-acids ordinarily are required for the synthesis of tissues, proteins and absence of any one of them could prevent their formation. The body has the power of synthesizing the majority of these amino-acids, known as non-essenti amino-acids, but there are some that cannot be synthesized in amounts adequate for metabolic needs and must be provided de novo from the diet. These amino-acids are termed essenti amino-acids. Eight amino-acids, i.e., Isoleucine, leucine, lysine, methionine, phenylanine, threonine, tryptophane and vine are essenti for man. The remaining amino-acids can be synthesized in vivo from essenti amino acids (Rosen et , 1946; Gieger 1947).

Withdrawl of a single essenti amino-acid produces an abrupt change to a negative nitrogen bance in human beings and inorder to maintain the nitrogen bance, the protein intake (and for that matter of the essenti amino-acid) must be at least equ to the loss; this has been cculated to correspond to approximately 1 gm of protein daily per kilogram body weight for the standard adult man (Dolby, 1975).

Protein deficiency is usuly associated with coric deficiency and occurs in many pathologic states besides simple starvation. Protein deficiency is, therefore, common in prolonged febrile illnesses, massive burns, large chronic ulcers, stress, hyperthyroidism, disorders of digestion and absorption and metabolic diseases which interfere with its utilization, protein deficiency may so arise from hemorrhage, kidney disease, fracture of bones and surgic operations (Nizel, 1970).

Protein deficiency ters the intestin absorption of iron, lipids, vitamins and carbohydrates (° Arroyave et , 1959; El-Shobaki et , 1972;Mayor et ., 1972) and will certainly result in a loss of cories and a deficiency of essenti amino-acids, miners, and lipotrophic agents (Kerr, 1970). One of the major clinic manifestations of gener protein deficiency is edema and is cled nutrition, war/or hunger edema. The permeability of the capillaries and the osmotic pressure are tered to such an extent that fluid accumulates in the tissues. Protein mnutrition can affect antibody formation, phagocytic activity, tissue integrity and non-specific resistance factors (Scrimshaw, 1966): a decrease immune response is, therefore, a common accompaniment (Rosen and Geefhuysin, 1971; Mathur et ., 1972). Individus with inadequate protein diets exhibit impaired wound heing, susceptibility to bacteri infection and liver disease.

Since protein deficiency and starvation accentuate the destructive effect of microbi plaque (Stahl et ,

195 5), protein deficient children may be more susceptible and more seriously affected by common childhood infections. The severity of the defects depends on the degree of protein deprivation. Certain amino-acids, e.g., tryptophane and lysine have been shown to be more important than others (Baretta et ., 1954; Baretta and Burnik, 1955). Methionine restores the process of wound heing to norm and lysine, methionine, threonine, and glysine are cariostatic (Nizel, 1970).

Or manifestations of protein deficiency may include features that are similar to those resulting from deficiency of vitamin B complex. The atrophic or mucosa contains red ulcerated lesions. Xerostomia, severe atrophy of the parotid glands and detachment of atrophic or mucosa are the prominent or features. Protein deficiency causes impaired wound heing and so accentuates the destructive effects of loc irritants (Prichard, 1972) and occlus truma (Miller, 1957) upon the periodont tissue, Individus with protein deficient diets experience severe periodont disease (Sheehan, 1966) and early spread of pre-existing lesions in the mouth. The prevence of periodont diseases in Indians may be attributed to low intake of protein (Pindborg et ., 1967). Increased tooth mobility and increased gingiv inflammation in protein deficient subjects have so been reported (Cheraskin et ., 1967; Dachi et ., 1966). Angular cheilitis occasionly occurs and fissures may so appear on lower lip. Loss of pigment ong the bucc border of the lip is occasionly marked in dark skinned races (Trowel et ., 1952; Van Wyk, 1965; Giliman, 1970).

Deficiency of protein and therefore, of the essenti aminoacids in children, leads to the condition known as KWASHIORKOR; these children suffer from sever pathologic conditions of the mouth not seen in hethy children. Children who suffer protein-cori mnutrition have crowded' and rotated teeth giving an appearance of a mouth full of jumbled teeth (Trowel et ., 1954). Delayed eruption and hypoplasia of deciduous teeth, manifested by kwashiorkor in Nigerian children may so be attributed to protein deficiency (Enwonwu, 1969). The mouths of kwashiorkor patients have been described by Van Wyk (1965) to be dry, dirty and easily traumatized, with the epitheium readily becoming detached from the underlying tissue, leaving a raw, bleeding surface. According to Pindborg et . (1967) such patients show more instances of acute necrotizing gingivitis (5%), cancrüm oris (4%), moniiasis (7%), atrophy of the tongue papillae (21%), coated tongue (13%), angular cheilosis (15%) and unspecified stomatitis (2%).

Experiment protein deficiency in anims

A number of investigators have studied the effects of protein deprivation on the oro-dent structures in experiment anims and it has been demonstrated that when border line protein deficient diets are fed through Out the reproductive cycle of rates, the offsprings have sever or and dent defects (Shaw and Griffith, 1963). The teeth are smler and more caries prone than norm. The third molars in the offspring erupt late and have tered cusp pattern. Deficiency of lysine or tryptophane produced an irregular predentine layer and a number of inter-globular spaces in poorly ccified dent matrix (Irving, 1956; Baretta et ., 1954).

Caries, produced experimently in rodents, have been reduced significantly Dy adding casin to an otherwise cariogenic diet (Nizel, 1970). Dietary protein is closely associated with the heth of periodont ligament (Miller and Nizel, 1966), and anims, kept on protein deficient diet, show increased and accentuated downward growth of the epitheli attachment as a result of degeneration of the gmgiva and periodont ligament. The minerized tissues are equly affected so that the jaws are smler in size and there is retardation of cementum deposition (Frandsen et ., 1953; Chawla and Glickman, 1951). In the molar teeth the norm dentineapposition is interrupted, the cementum shows resorption on the root surface (Stones, 1962) and there is osteoporosis of the veolar bone (Baretta and Bernick, 1955). The papillae of the tongue disappear and the tongue becomes reddened and smooth around the anterior margin (Stein and Ziskin, 1949). Scloping of the edges of the tongue may develop due to edema and its consequent pressure against the teeth.

Conclusions

Mnutrition, besides producing gener effects on other organs/systems of the body, leads to the development of well defined development and pathologic changes in the or mucosa, tongue, teeth, gums and jaw bones. Proper understanding of the relationship between deficiency of good constituents and various ailments of the or cavity is, therefore, of immense importance for prevention and treatment of a variety of orodent disorders.

In developing countries like Pakistan poverty and ignorance are the major causes of mnutrition. Basic education of the teeming majority and improvement in their socioeconomic conditions are, therefore, the essenti prerequisites for the prevention of diseases caused by mnutrition. Suitable arrangements for the provision of different varieties of good materis (meat, vegetables and fruits) on reasonable prices and strict control on over-consumption and wastage of these items are so necessary for this purpose.

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