ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)

IJDSIR : Dental Publication Service

Available Online at:www.ijdsir.com

Volume – 7, Issue – 3, June – 2024, Page No. : 205 - 210

Role of Nutrition in Oral and Dental Diseases - A Comprehensive Review

[1]Dr. Shaik Mobeen, MDS, Department of Oral Medicine and Radiology, MNR Dental College & Hospital, Sangareddy, Telangana

[2]Dr. Rathod Prakash, MDS, Department of Oral & Maxillofacial Surgery, MNR Dental College& Hospital, Sangareddy, Telangana

[3]Dr. Adusumilli Praveena, MDS, Department of Oral Pathology and Microbiology, MNR Dental College & Hospital, Sangareddy, Telangana

[4]Dr. Nalluri. Meghana, BDS, Intern, Department of Oral Medicine and Radiology, MNR Dental College & Hospital, Sangareddy, Telangana

[5]Dr. Shahzadi Tahmina, BDS, Intern, Department of Oral Medicine and Radiology, MNR Dental College & Hospital, Sangareddy, Telangana

[6]Dr. S. Jayashankar, BDS, Intern, Department of Oral & Maxillofacial Surgery, MNR Dental College& Hospital, Sangareddy, Telangana

Corresponding Author: Dr. Shaik Mobeen, MDS, Department of Oral Medicine and Radiology, MNR Dental College & Hospital, Sangareddy, Telangana

Citation of this Article: Dr. Shaik Mobeen, Dr. Rathod Prakash, Dr. Adusumilli Praveena, Dr. Nalluri. Meghana, Dr. Shahzadi Tahmina, Dr. S. Jayashankar, "Role of Nutrition in Oral and Dental Diseases - A Comprehensive Review", IJDSIR- June – 2024, Volume –7, Issue - 3, P. No.205 – 210.

Type of Publication: Review Article

Conflicts of Interest: Nil

Abstract

Without good dental hygiene, there can be no health. A Robust mouth is necessary for overall wellbeing. What exactly does this remark signify, even though it may be well known to all of us? Less often than not, oral health, or the condition of our mouths, is really significant. General health is vital for our overall psychological well-being and experience of life, as demonstrated by this significant indicator. Untreated tooth decay, commonly referred to as cavities, is the most common ailment in the world, while being mostly avoidable. Maintaining our oral and dental health is crucial when considering the possible negative effects of untreated dental disorders, such as pain, diminished quality of life, missed school days, broken family relationships, and lower productivity at work.

Keywords: Dental Hygiene, Robust Mouth, Oral Health

A Healthier Mouth: What Is Its Meaning…?

The oral cavity, sometimes known as the mouth, connects the throat to the lips. It is essential for people of any age to have healthier mouths and functioning teeth since teeth are necessary for basic human functions including respiration, communication, and chewing. In good health, mouth tissues are moist, odorless, and painless. In addition to the teeth, a properly functioning mouth also has healthy gingival tissue, commonly referred to as the gums, and the supporting bone known as the periodontium [1]. The gingiva may differ in coloration between pale pink to highly pigmented, and its pattern and color might vary from person to person. Healthy gingiva is firm, not swollen or red, and does not bleed when brushed or flossed. In an appropriate oral tradition, there will be no untreated tooth decay [2]. Untreated dental deterioration and masses, bleeding from ulcers, and unusual colors on the surface of the tongue, the cheeks, or gums are not present in a mouth that is healthy. Teeth should not be crooked if they are firmly attached to the gingiva and bone.

Nutrition plays a significant role in growth and development, prevention of infection, protection from chronic diseases including cancer. This is true even to oral and dental problems as well. Under-nutrition which is still a major problem in our country would result in subnormal cranio-facial development, improper development of teeth, delays and defects in eruption and so on. The oral epithelium in a malnourished child would be atrophic and so on. The oral epithelium in a malnourished child would be atrophic and thereby prone to ulcerations and effect of saliva decreases further increasing the risk of infection [3]. Periodontal disease is also frequent in the malnourished. There are also issues of concern like the presence of a chronic focus of infection which enhances inflammatory cytokine production which in turn contributes to endothelial damage and risk of atheroma formation in the blood vessels. Micronutrient deficiencies in the form of inadequate B Vitamins are well known to result in various forms of stomatitis.

Dietary-related dental conditions include decay in the mouth, enamel developmental issues, chipping of teeth, and periodontal gum disease. Micronutrients with antioxidant potential like Zn, Vitamin C, Beta carotene etc. would promote oxidative damage to the dental tissues. Because of its antioxidant qualities and function in preserving and mending healthy connective tissues, vitamin C may have a connection to periodontal disorders. Periodontal disorders are also linked to deficits in vitamin D [4].

The relationship between calcium intake and periodontal diseases may be due to the significance of calcium in building the density in the alveolar bone that supports the teeth [5].

Breast feeding is now indicated for an initial group of 6 months to ensure a proper growth and to lessen the possibility of infection and malnutrition. While brain development is also improved in breast fed infants, early childhood caries is also found to be prevented by breast feeding though this issue is still controversial. The post eruption causes of tooth decay are in connection with the higher sugar intake additional to erosion due to acidic beverages [6, 7].

Fluoride is most effective in dental caries prevention when a low level of fluoride is constantly maintained, however many parts of India have unacceptable levels of ground water fluoride leading to fluorosis which cause dental mottling and dental fluorosis.

The habit of chewing betel quid and its association with oral sub mucous fibrosis is well established. The advent of new chewing materials like pan masala etc.; have

made it worse. Our study found that those who use pan masala OSMF much earlier than those used to traditional chewing. This is probably because Beta carotene rich betel leaf is absent in pan masala. Tobacco chewing or smoking is the major contributor to oral cancer. Studies on reverse smokers have shown that with antioxidant vitamins there was a reversal of the pre neoplastic lesions. Just as in pan masala, ghutka which are in a ready to chew form of tobacco have increased the frequency of oral cancers to the extent that it occurs earlier and in young people [8, 9]. Tobacco surpasses the way the immune system responds to an oral infection, which hinders the recovery process after oral surgical procedures and with inadvertent injuries, accelerates diabetics' periodontal deterioration and it has a detrimental effect on the cardiovascular system.. Furthermore, tobacco greatly increases the risk when combined with areca nut and alcohol. The majority of tobacco use's oral side effects lower quality of life; even something as basic as halitosis, as complex as oral birth defects, as common as periodontal diseases or as trouble some as complications during wound healing. With associated diabetes or as undesirable as issues that arise when a wound heals. With associated diabetes the prevalence of periodontal diseases would only get worse.

The regular consumption of about 400 gms of fruits and vegetables are known to minimize the consequences of developing cancers. Malignanciesof whole body and oral cavity particularly.

Good nutrition and health baits would greatly reduce the morbidity and mortality due to oral ailments [10, 11].

Tips regarding Oral Health

Use toothpaste and consume fluoridated water: Fluoride helps strengthen tooth enamel and can prevent tooth decay. Drinking fluoridated water and using fluoride toothpaste are effective ways to incorporate this mineral into your oral care routine.

Maintaining proper dental hygiene: Twice-daily thorough tooth brushing and flossing are essential for removing plaque, bacteria, and food components that may cause cavities and gum disease.

Regular dental visits: visiting the dentist on a yearly basis (Twice annually) is crucial for preventive care, early identification of oral health problems, and professional cleanings.

Avoid tobacco products: Tobacco use increases the possibility of mouth cancer, Loss of teeth, gingival disease and other oral health problems. Quitting smoking and avoiding other forms of tobacco can significantly enhance dental health.

Limit alcoholic drinks: Alcoholic beverages, especially those high in acidity or sugar, can contribute to tooth enamel erosion and decay.

Moderation and choosing less harmful options can help protect oral health.

Manage diabetes: Maintaining blood sugar control is crucial for general health and can aid in avoiding consequences like gum disease. Good oral hygiene and regular dental visits are especially crucial for individuals with diabetes.

Address dry mouth: Dry mouth can raise the chance of dental deterioration and gum disease. Managing drugs that result in dry mouth, staying hydrated, and using sugar-free products can alleviate symptoms and protect oral health.

Seek medical attention for alterations in smell and taste: Abrupt alterations in smell and taste can be signs of underlying health issues, including issues with dental health. Consulting a doctor or dentist can help identify and address the cause.

Assist with oral care for those unable to do it themselves: Providing assistance with brushing and flossing for individuals who cannot do it independently is important for maintaining their oral health in order to preserve their dental health and overall well-being.

Chewing xylitol gum void of sugar: Chewing sugar-free gum with xylitol between meals can stimulate saliva production, which helps neutralize oral acid and shield teeth from deterioration.

Diet for Gingivitis

A diet high in refined carbohydrates (especially sucrose) promotes periodontal disease. Frequent consumption of sugar increases plaque build up and risk of gingivitis. Sugars also promote periodontal disease by reducing the ability of the white blood cells in the gums to destroy the pathogenic plaque bacteria. Sucrose is particularly destructive in sticky form (like candy and baked goods) because clings longer to the teeth. Regular intake of foods rich vitamin C[2], high- quality protein and zinc can help maintain the integrity of the periodontal tissues.

Micronutrients – Gingivitis

Nutrient	Suggested Daily Dose	Comments
Vitamin C	0.5-1.0g(best if taken together with a bioflavonoid complex)	Vitamin C may help heal inflamed gums and reduce bleeding. It also helps maintain the immune system to fight periodontal infection[2-4]
Folic Acid	500 g-1mg (can also be taken as a 0.1% solution of folate mouthwash, rinsing with 1 tablespoon twice daily)	Can be an effective treatment for periodontal disease[5,] diseased gums may contain only low levels of folate
Vitamin D and Calcium	5-10 g vitamin D and 600mg calcium	Can help maintain the bones surrounding and supporting the teeth [6,7]

Diet for Caries

Sucrose is extremely cariogenic, whereas lactose (milk sugar) and fructose are less likely to cause caries. Unlike sugars, fats and protein cannot be used by bacteria to produce acid [12]. Moreover, fats can coat the teeth and form a protective layer, whereas proteins increase the buffering capacity of the saliva. Milk products or cheese rather than sugary foods at the end of meals can reduce acid formation and help prevent tooth decay.

Optimum nutrition during childhood can encourage formation of thick, acid- resistant enamel. The teeth gradually form and calcify from birth through the teen years, and a fluoride and vitamins C and D are important. Fluoride, incorporated into the enamel structure, sharply increases resistance of enamel to acid . Insufficient fluoride leaves teeth vulnerable to tooth decay [13]. Low level fluoride supplementation has great benefits; adding trace amounts of fluoride to the water or salt supply can reduce risk of caries in children by more than two-thirds. However, too much can actually impair enamel formation and cause weakened, discolored teeth. In areas where water is fluoridated, supplementation with fluoride mouthwashes or tablets in unnecessary. However, in areas where the best time to give a fluoride supplement is at bedtime, after cleaning the teeth.

Micronutrients – Caries

Nutrient	Suggested Daily Dose	Comments
Fluoride	0.25mg as drops during infancy; the 0.5-1mg during childhood and adult years	Only indicated if fluoride levels in drinking water are <0.7ppm. Can substantially toughen enamel against acid at tack [9,10]
Multivitamin supplement for children	Should contain 10 g vitamin D and 20-50mg vitamin C	Vitamin D and C are important for tooth formation

Canker Sores (Oral Aphthae)

Oral Aphthae, commonly called canker sores, are small painful ulcers that occur on the oral mucosa. They can be triggered by multiple factors. Certain forms streptococci can produce Aphthae, Particularly after minor trauma (From the toothbrush, accidently biting the cheek) produces a break in the tissue.

Diet-Aphthae

In certain individuals Aphthae may be caused by food sensitivity. An elimination diet can identify the offending foods which can then be avoided. Highly acidic foods- tomatoes, citrus fruits- can produce Aphthae in susceptible individuals. Stress can also be a trigger. Because they compete with and reduce the number of oral streptococci, Lactobacillus in yogurt and other fermented milk products can reduce the frequency and severity of Aphthae. People who have frequent Aphthae may benefit from daily consumption of Lactobacillus-containing foods Micronutrients- Aphthae

Nutirient	Suggested Daily Dose	Comments
Zinc	30-60mg	Can help prevent Aphthae, particularly in individuals with marginal zinc status[13,14]
Vitamin B complex	Balanced supplement containing all the B vitamins; ample folic acid and vitamin B are particularly important	B vitamins promote health and strength of the oral mucosa
Vitamin A	2000 g	Helps maintain health and integrity of oral tissues

Bottom Line – There is No Health without Oral Health

Conclusion

As growing research and studies reveal the link between oral health and overall health, it becomes more evident that taking care of your teeth isn't just about having a nice smile and pleasant breath. Here's why it's so crucial:

Oral Health and Systemic Health: Studies increasingly demonstrate the correlation between oral health and various systemic conditions such as heart disease, diabetes, and complications during pregnancy. Poor oral health can exacerbate these conditions, while maintaining good oral hygiene can contribute to better overall health.

Mental Health and Oral Health: Positive oral health doesn't just benefit the body; it's also linked to mental well-being. A healthy smile can boost self-confidence and contribute to a positive self-image, leading to improved mental health and quality of life.

Preventive Measures: Practicing good oral hygiene, including brushing and flossing regularly, along with routine dental check-ups, is essential for preventing oral health problems. These preventive measures not only maintain oral health but also contribute to overall health and well-being.

Healthy Lifestyle Choices: Adopting a healthy lifestyle, which includes avoiding excessive sugar consumption, quitting smoking, and limiting alcohol intake, supports both oral and systemic health.These choices reduce the risk of oral health issues and contribute to better overall health outcomes. By prioritizing oral health through regular dental care, healthy habits, and lifestyle choices, individuals can enhance their well-being, reduce the risk of systemic diseases, and enjoy a healthier, happier life.

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