



## RESEARCH ARTICLE

### ORAL HEALTH AND NUTRITION

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#### ARTICLE INFO

##### Article History:

Received 18<sup>th</sup> February, 2018  
Received in revised form  
09<sup>th</sup> March, 2018  
Accepted 25<sup>th</sup> April, 2018  
Published online 30<sup>th</sup> May, 2018

##### Key words:

Oral Health, Nutrition, Diet,  
Caries, Periodontal Disease,  
Cancer, Oral surgery.

#### ABSTRACT

Collaboration between dietetics and dental professionals is necessary for oral health promotion and disease prevention and intervention.. Oral health and diet of a person have a synergistic bidirectional relationship. Oral infectious diseases, as well as acute, chronic, and terminal systemic diseases with oral manifestations, impact the functional ability to eat as well as diet and nutrition status. Likewise, nutrition and diet may affect the development and integrity of the oral cavity as well as the progression of oral diseases. A balanced diet is correlated to a state of oral health (periodontal tissue, dental elements, quality, and quantity of saliva). Vice versa an incorrect nutritional intake correlates to a state of oral disease. As we advance in our discoveries of the links between oral and nutrition health, practitioners of both disciplines must learn to provide screening, baseline education, and referral to each other as part of comprehensive client/patient care. Dietetics practice requires registered dietitians to provide medical nutrition therapy that incorporates a person's total health needs, including oral health.

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Citation: Medhavi Aggarwal, Dr. Megha Mahajan, Himanshi Handa, Paarth Sharma, Mridul Sharma and Harsimranjit Kaur, 2018. "Oral health and nutrition", *International Journal of Current Research*, 10, (05), 69457-69460.

## INTRODUCTION

Health is understood to be "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity". The programs for the prevention of oral diseases concern teaching about oral hygiene and healthy eating, fluoride prophylaxis, periodic check-ups, sessions of professional oral hygiene, and secondary prevention programs (Belcastro, 2007). The term "bionutrition" refers to the important interactions which exist between diet, use of nutrients, genetics, and development. This term emphasizes the role of nutrients in maintaining health and preventing pathologies at an organic, cellular, and subcellular level (Dion, 2007). Nutrition has been postulated as an alternative mediator (Joshapura, 1996). The impact of various oral conditions on nutritional status may relate importantly to nutrient intake and nutritional status. Several studies have established associations among nutrient intake, nutritional status, and various systemic diseases (Willett, 1994). The actualization of the synergistic bidirectional relationship can be accomplished through the roles of RD's as members of patient health care teams in health promotion and maintenance as well as disease management.

**Caries:** Caries is a demineralization of the inorganic part of the tooth with the dissolution of the organic substance due to a multifactorial etiology. The demineralization of the enamel and of the dentine is caused by organic acids that form in the dental plaque because of bacterial activity, through the anaerobic metabolism of sugars found in the diet (Bang, 1972). Demineralization occurs when the organic acids produced increase the solubility of the calcium hydroxyapatite that is present in the hard tissue of teeth. Dental caries is a major cause of tooth loss in the world. Nearly 42% of children and adolescents (ages 6 to 19 years) and approximately 90% of adults have experienced tooth decay (Harris, 2004). Although the prevalence and severity of caries has declined, there has been no observed reduction in the rate of early childhood caries in infants and preschool children (Beltrán-Aguilar, 2005). Feeding behaviors after prolonged bottle feeding or breastfeeding and patterns in the introduction of foods, when eating behaviors are being established, may influence prevention and treatment of this disease (Harris, 2004). The development of caries requires the presence of sugars and bacteria but it is influenced by the susceptibility of the teeth, by the type of bacteria, and by the quantity and quality of the salivary secretion. Saliva is supersaturated with calcium and

phosphate with a pH equal to 7, a level that favors remineralization. When acid stimulation is too strong demineralization prevails until the formation of a carious lesion (Olsson, 1979).

Diet can be a good ally in the prevention of caries (Moynihan, 1999).

- (i) Increase in the consumption of fibres: diminution of the absorption of sugars contained in other food.
- (ii) Diets characterized by a ratio of many amides/little sugar have very low levels of caries.
- (iii) Cheese has cariostatic properties.
- (iv) Calcium, phosphorus and casein contained in cow milk inhibit caries
- (v) Whole meal foods have protective properties: they require more mastication, thus stimulating salivary secretion.
- (vi) Peanuts, hard cheeses, and chewing gum are good gustative/mechanical stimulators of salivary secretion.
- (vii) Black tea extract increases the concentration of fluorine in the plaque and reduces the cariogenicity of a diet rich in sugars.
- (viii) Fluorine.

Diet education and counseling for caries prevention and control should address improved dietary habits for good oral health and general health and be routine components of comprehensive dental care (DePaola, 2002 and Sanders, 2004). Medically complex patients with caries should be referred to an RD.

### Diet and Periodontal Diseases

Periodontal disease is an oral infectious disease involving inflammation and loss of bone and the supporting tissue of the teeth. Although the pathogenesis of periodontal disease involves bacteria and the host response to these bacteria, there are local, systemic, and behavioral factors that influence the severity and progression of the disease (Genco, 2005; Nishida, 2000; American Academy of Periodontology, 2005 and Al-Zahrani, 2005). Periodontal disease evolves more quickly in undernourished populations: "...the pathology starts in the gum and could interest the periodontal ligament up to the alveolar bone..." The most important risk factor in the development of periodontal disease is represented by inadequate oral hygiene. Systemic influences on disease include types 1 and 2 diabetes mellitus, stress, cardiovascular disease, osteoporosis, immune status of the host, and presence of pathogens associated with periodontal disease in the subgingival flora [12,16-19]. Behavioral risk factors associated with periodontal disease include poor oral hygiene, tobacco use, and diet (Al-Zahrani, 2005 and Ritche, 2002). Malnutrition and bad oral hygiene represent two important factors that predispose for necrotizing gingivitis. Prevention programs against disease must therefore include a correct evaluation of the immune system and the promotion of nutritional programs. The aim of nutritional support in inflammatory diseases is to provide the right energy and nourishment to respond to the increased demand for protein synthesis in the acute phase, inflammatory mediators, antioxidant defence mechanisms, as well as for the promotion of tissue reparation. Some nutrients have a very important role in the resolution of the inflammatory process. These

observations confirm the relationship between diet and periodontal disease (Al-Zahrani, 2006).

### Diet and Oral Surgery

Diet and nutrient needs for oral surgery are to a large extent dependent on the extent of the surgical procedure, extent of impairment on oral function, duration of any impairment, and nutritional well-being of the individual before surgery. The dental professional should provide diet guidelines to surgical patients on a balanced diet and appropriate texture or consistency modifications for wound healing. Patients who may not be able to meet all of their needs by oral diet alone or who have an acute or chronic disease affecting their diet or nutrient needs should be referred to an RD for MNT. Nutrient deficiencies may compromise the integrity of the immune response, resistance to infection, and wound healing (Winkler, 2005), however, there is a paucity of scientifically sound research that supports nutrient supplementation beyond the DRIs in well-nourished individuals. Micronutrients and antioxidants including vitamins E and C and zinc play an important role in wound healing; supplemental use of these nutrients has not been shown to enhance response to surgery or promote wound healing. Nutrient needs after surgery are an active research area in systemic health; such research also is needed in relation to oral surgery. Maxillofacial trauma results in increased energy and nutrient needs for wound healing and depending on the location and extent of trauma; nutrition support may be needed. If intermaxillary fixation is done as a procedure, a liquid diet will be necessary until the teeth are released and following initial healing, a more varied diet will be desirable. Cooked foods can be blended of proper consistency with juice, milk, water, or broth added as a thinner and may be strained to remove particles and food fiber to prevent oral hygiene problems. The period of intermaxillary fixation which may last for 6 weeks, may be associated with many problems such as airway problems, poor nutrition, weight loss, poor oral hygiene, phonation difficulties, insomnia, social inconvenience, patient discomfort, work loss, and difficulty in recovering normal range of jaw function and more problematic in epileptics where it can be avoided. The significant changes in serum potassium levels during the fixation period in traumatized patients necessitate special attention regarding monitoring and supplementation of this electrolyte during the fixation period (Saber, 1991; Worrall, 1994; Kayani, 2015; Sheet, 2015 and Yazdani, 2015).

### Diet & Oral cancer

The association between diet and oral cancer is extremely serious. It is a pathology that is diagnosed in three hundred thousand new cases in the world every year and presents the greatest incidence in people who smoke, chew tobacco, and consume alcohol. The use of tobacco can alter the distribution of nutrients such as antioxidants, which develop a protective action toward the cells: smokers present levels of carotenoids and vitamin E in the blood that are superior to those in the oral mucous and, in addition, have a different distribution in comparison to the norm; the levels of folates in the blood and in the cells of the oral tissues of smokers are inferior to those of nonsmokers; the inside of the cheeks of smokers presents numerous micronuclei (modifications typical of pre- and neoplastic lesions) (Gould, 2006 and Taghavi, 2007).

The National Cancer Institute and the American Cancer Society have established some prudent dietary recommendations for the choice of food:

- Maintain a desirable body weight,
- Eat a varied diet,
- Include a new variety of fruits and vegetables in the daily diet,
- Consume a greater quantity of foods rich in fibre,
- Decrease the total intake of fats (30% less than the total calories),
- Limit the consumption of alcohol,
- Limit the consumption of salted food or food preserved with nitrates.

In a recent report Edefonti et al. showed that diets rich in animal origin and animal fats are positively, and those rich in fruit and vegetables and vegetable fats inversely related to oral and pharyngeal cancer risk (Edefonti, 2010).

### Diet and Implants

Diet and nutrition relative to dental implants merits consideration in several areas, including surgical wound healing, integrity of the alveolar bone, nutritional status of the patient, and the patient's ability to eat after the surgery (short term and long term). There is no published research supporting the need for nutrients beyond the DRI for individuals undergoing implant surgery. Diet modification in the immediate days after surgery depends on the number and location of implants placed. Anterior implants may impact the ability to bite food, whereas posterior ones may hamper chewing ability. The long-term impact of implant-supported dentures in comparison to traditional dentures on masticatory function and diet quality has been studied with mixed results (Morais 2003; Allen, 2006 and Feine, 2006). Although some studies have found that patients with implant-supported dentures consumed more varied and nutritionally adequate diets, others have found no significant difference between the diets of those using implant-supported dentures vs traditional dentures. The initial diet after placement of traditional or implant-supported dentures should be a nutritionally adequate diet with gradual advancement in food texture and consistency from finely cut, easily masticated foods that do not disperse easily in the mouth (such as rice) to a varied diet of whole foods.

Considerations to be kept

- Drink plenty of fluids.
- Avoid hot liquids or food.
- Soft food and liquids should be eaten on the day of surgery.
- Return to a normal diet as soon as possible unless otherwise directed.

Dentoalveolar surgeries can have short-term impacts on oral function and ability to eat and drink depending on the location and extent of surgery (Dawson, 2001).

### Conclusion

Given the extent of the problem, oral diseases are major public health problems in all regions of the world. Their impact on

individuals and communities as a result of the pain and suffering, impairment of function and reduced quality of life they cause, is considerable. Globally, the greatest burden of oral diseases is on the disadvantaged and poor population groups. The current pattern of oral disease reflects distinct risk profiles across countries related to living conditions, lifestyles and environmental factors, and the implementation of preventive oral health schemes. Poor nutrition plays an important role in the development of postoperative complications and may increase patient morbidity. Proper nutritional assessment and appropriate preventive measures should be undertaken in the patients undergoing maxillofacial surgery. Nutritional support should be considered in severely malnourished patients. The surgeon should look upon the diet as an adjuvant, similar to analgesics and antibiotics, which is a means of making the patient more comfortable and of speeding recovery. Some of the prime functions of adequate nutrition are to enhance convalescence, to promote wound healing, and to increase the patient's resistance to infection, but the indiscriminate use of nutritional support should be avoided to reduce postoperative complications. Henceforth, a basic knowledge of nutrition is essential for the treating surgeon. It is expected that the incidence of dental caries will increase in the near future in many of these countries as a result of growing consumption of sugars and inadequate exposure to fluorides. With the growing consumption of tobacco in developing countries, the risk of periodontal disease, tooth loss and oral cancer is likely to increase. Periodontal disease and tooth loss are also linked to chronic diseases such as diabetes mellitus; the growing incidence of diabetes may have a negative impact on the oral health of people in several countries. Thus, global strengthening of public health programmes through implementation of effective oral disease prevention measures and health promotion is urgently needed, and common risk factors approaches should be used to integrate oral health with national health programmes.

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