
THE IMPACT OF NUTRITION AND DIET ON ORAL HEALTH

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ABSTRACT

The craniofacial development, infections that affect the oral cavity and the risk of developing oral cancer are all significantly influenced by diet. These are just a few of the many ways that nutrition can affect one's dental health, but there are many more. Oro-dental conditions have a large and detrimental impact on an individual's sense of self-worth as well as their quality of life, and the treatment for these conditions can be fairly costly. Nutrition has an influence not just on the oral cavity but also on the teeth while a person is developing and a lack of nutrition can make periodontal disease and oral infectious illnesses worse. Oro-dental problems such as dental caries, dental erosion, developmental abnormalities, oral mucosal diseases, and periodontal diseases can all be avoided in part by eating healthy diet and keeping good oral hygiene. In this regard, dietary habits are an important factor. The most significant influence that nutrition has on teeth is, however, the local action of diet in the mouth on the development of dental caries and tooth erosion. The objective of this article is to give dietary recommendations for the prevention of dental illnesses and to review the evidence that shows a link exists between nutrition, food, and dental problems. In addition, the article will evaluate the data that implies a relationship exists between nutrition, food, and obesity.

Keywords—*Nutrition, Oral Health, Oro-dental condition, periodontal disease, dental caries, dietary habits.*

INTRODUCTION

Diet and nutrition have a significant influence on dental health and may be a factor in the development and progression of oral diseases and disorders such as periodontal disease, caries, and erosion, amongst others. Diet and nutrition have a significant impact on oral health and can play a role in the development and progression of oral diseases and disorders. Diet and nutrition are significant contributors to one's oral health, thus it is necessary to pay attention to both. Although nutrition can be defined as the micronutrients (vitamins and minerals) and macronutrients (carbohydrates, protein, and fat) in relation to the dietary needs of the body, diet refers to the specific foods that are consumed. Diet and nutrition have a reciprocal relationship with oral health in the sense that if the integrity of an individual's oral cavity is destroyed, this may also have an effect on the individual's capacity to eat in a normal, functional manner.

It is believed that the oral cavity is influenced by a broad variety of dietary components, such as macro- and micronutrients, and pH characteristics, as well as behaviors connected with the intake of foods and beverages that include these components. In addition, special dietary and nutritional considerations may be justified for the person depending on characteristics such as the individual's stage of development, their particular medical conditions and their socioeconomic situation. These factors can all have an impact. Patients who are older,

for instance, have a higher risk of experiencing tooth loss, poorer masticatory skills, and decreased appetite, all of which have the potential to have an influence on the patient's nutritional state. According to the findings of a comprehensive study that investigated the relationship between food intake and oral health in older individuals, it was discovered that tooth loss in the elderly population was associated with shifts in food consumption as well as a nutritional deficiency.

The National Maternal and Child Oral Health Resource Center (OHRC) (2014) developed the Nutrition and Oral Health: A Resource Guide to provide information to assist health professionals, program administrators, educators, parents, and others in promoting good eating and oral health practices to assist in the prevention of oral disease in pregnant women, infants, children, and adolescents. The guide is intended to provide information to assist in the promotion of good eating and oral health practices to assist in the prevention of oral disease in pregnant women, infants, children, and adolescents. This material is provided with the goal of assisting in the promotion of healthy eating habits and oral health practices in pregnant women, babies, children, and adolescents in order to aid in the prevention of oral illness in these age groups. There is a relationship between proper diet and having healthy teeth and gums. Diet and nutrition can have an influence on an individual's overall health and well-being, as well as the development, upkeep, and integrity of the oral cavity, as well as the progression of oral illnesses. Both a person's ability to eat and their nutritional status can be negatively impacted by oral disorders in the same way. Tooth decay, commonly referred to as dental caries, is brought on when bacteria in the mouth eat sugar from food and turn it into acid. This process is known as dental caries. This acid might cause the enamel of teeth to deteriorate, which would eventually lead to cavities. It is critical to have a dental home created for your kid as soon as the primary teeth begin to erupt. This will allow your child to get individualized caries-preventive treatment as soon as possible. These may include education on how to properly care for their teeth and advice on what diet they should follow.

Dietary recommendations are created once every five years by the United States Department of Health and Human Services and the United States Department of Agriculture to assist people in the United States who are at least 2 years old in selecting nutritious foods to eat in order to reduce their risk of developing chronic diseases and to enjoy a healthy diet. These dietary recommendations are intended to help people in the United States enjoy a healthy diet and select foods that will assist them in doing so. According to the Dietary Guidelines for Americans, an individual should try to consume less than 10 percent of their daily calories from added sugars. These recommendations are scheduled to take effect between the years of 2015 and 2020.

In addition, the World Health Organization (WHO) recommends limiting the intake of sugar to less than 10 percent of total energy intake per day and less than 5 percent of total energy intake per day for children in order to reduce the risk of weight gain and dental caries in children between the ages of 4 and 8. This recommendation is made in order to protect children from developing obesity and dental caries. For youngsters in this age range, this amounts to considerably less than 16 grams of sugar.

In addition, the American Heart Association recommends that children and adolescents consume no more than 25 grams of added sugar per day, which would indicate a reduction in their daily sugar intake. This would bring their total sugar consumption down to a healthier level.

The resource guide may be broken down into two discrete sections that can be accessed independently of one another. The first part of this article includes an overview of the numerous resources, such as brochures, information sheets, guidelines, curricula, and studies, that have been published earlier as well as fundamental

materials that have been published before. In the second section, a list of prospective resources is presented, which may include national coalitions, resource centers, national professional associations, and federal government bodies. Our mission is to make available resources that are not only useful but also accurate representations of the most recent developments in scientific theory and clinical application.

Nutrition and oral disease

When conducting a review of the effects that nutrition has on oral health, it is necessary to take into consideration three groups of oral tissues, each of which has a distinct structure, morphology, metabolism, and pathologic response. These three groups of oral tissues are the gingiva (gums), the dentition (teeth), and the periodontium.

- The hard tissues of the teeth, which have repercussions for dental health;
- The supporting structures of the teeth, which have repercussions for periodontal health;
- The oral mucosa, which has repercussions for mucosal health.

Dental and periodontal health will be covered in more depth than mucosal health because of the high prevalence of pathology in hard tissues and periodontal structures. This is because pathology is more likely to occur in these areas. This is because oral and periodontal disease are more prevalent today than they were in the past.

The Relationship Between Malnutrition and the State of One's Teeth

Malnutrition is a multifactorial condition that can have an early beginning during the intrauterine life or childhood of an individual, or it can occur during the lifespan of an individual as a direct result of inadequate nutrition as a cause. Either way, malnutrition can be prevented by maintaining a healthy life style and diet. It would appear that malnutrition has a variety of effects on the tissues of the mouth, one of which is the potential development of oral disorders. It accomplishes this by disrupting the homeostasis of the tissues, reducing the tissues' resistance to the microbial biofilm, and decreasing the tissues' capacity to repair themselves. Both the progression of oral diseases and the expansion of the oral cavity are impacted as a result of this factor. It's possible for an infant's teeth to develop differently depending on the foods they eat while they're young. Enamel hypoplasia can develop when there is an insufficiency in certain nutrients, which can lead to aberrant enamel development. This disorder can have a detrimental effect on a person's look and may make them more prone to acquiring dental cavities. Additionally, it can make them more likely to have tooth pain. Malnutrition can also raise the risk of dental caries by modifying the salivary glands, which can result in a reduction in the flow rate of saliva as well as a change in the composition of the saliva. This can increase the likelihood that dental caries will develop. In parts of the globe where there is little availability to sugar, malnutrition can increase the likelihood of dental caries developing. This occurs as a direct result of starvation, which results in improper enamel development and atrophy of the salivary glands. The condition known as hypocalcemia, which is frequently associated with malnutrition, is thought to be the primary reason for faults in enamel, which are also brought on by a deficiency in vitamin D.

Hypoplasia of the enamel has been connected to deficits in vitamin D and vitamin A, as well as to a condition known as protein-energy malnutrition, or PEM. Atrophy of the salivary glands, which is connected to both

PEM and vitamin A deficiency, decreases the oral cavity's defenses against infection and its capacity to buffer the acids created by plaque. This, in turn, makes the oral canal more susceptible to cavities. It was shown that malnutrition had a role as an etiological factor in dental hypoplasia, which led to an increased tendency to acquire cavities. In spite of the fact that there was universal consensus that malnutrition facilitated the formation of defective enamel, the mechanism that led to this result was not well understood. It wasn't until 1981 that Nikiforuk and Fraser made the connection between hypoplasia and hypocalcemia which is a common complication of malnutrition brought on by persistent diarrhea. Prior to that year, they had failed to make the connection. A deficiency of calcium in the body was the root cause of the condition known as hypocalcemia. Dental caries may be prevalent in rich civilizations that have a decent nutritional status; yet, it is far less prevalent in many groups that have a high prevalence of malnutrition. However, when underdeveloped countries are given sugar as part of their diet, the prevalence of dental caries skyrockets to levels that are significantly higher than what one would anticipate based on the experiences of industrialized nations. As a direct result of this finding, it has been hypothesized that fasting amplifies the carcinogenic effects of sugar to an even greater degree. When compared to the effects of food on the body locally, the nutritional systemic effects on the body are more significant.

In the framework of the connection between dietary factors and oral health, there is a uniqueness that has to be investigated with regard to the dental hard tissues. This must be done because of the connection between the two. Dental enamel, after it has been produced, is no longer sensitive to the dynamic exchange of ions along with organic molecules and particles with its oral environment. This is because dental enamel is impervious to ion exchange. On the other hand, once it has been produced, tooth enamel is no longer vulnerable to the effects of the systemic diet. The systemic and nutritional effects are one of the most significant groups of impacts, while the dietary and local effects are another. After doing research on a broad scale to investigate the role that nutrition, in general, plays in the expansion, maturation, and upkeep of oral tissues, it has become abundantly clear that there are two fundamental groups of impacts at play. The basic result of nutrition is the systemic impact that the nutrients that are ingested have on the growth, development, and maintenance of tissues and organs as well as the specific activities that they execute. The appearance and functionality of the oral cavity are both significantly influenced by the local effects of the foods that people consume. After eruption, the dental enamel is at its most vulnerable to the local side effects that can be caused by anything that can enter the mouth. These effects can be caused by anything from bacteria to food particles. Dietary components not only give critical nutrients for tissues of the host, but they also supply them for bacteria in the oral cavity, which utilize them as substrates if they are readily available. This is because bacteria in the oral cavity use dietary components as a source of energy. Components of the diet are also a source of vital nutrients for the bacteria that live in the mouth cavity. In addition to the 'indirect side effects' of items like bacterially digested carbohydrates and amino acids, there are 'direct side effects' of nutrients that are imposed by their ion concentration, (erosive) acidity, and physical properties.

The one-of-a-kind function that enamels fulfills in the overall structure of the mouth

The systemic molecular and cellular reactions to variables associated with nutrition and medication, some of which interact with oral factors and bacterial antigens, are associated with the development and lifelong integrity as well as the functioning of the tissues of bone, periodontium, mucosa, salivary glands, dentine, and pulp. These reactions are also associated with the systemic molecular and cellular reactions. On the other hand, enamel is only vulnerable to systemic impacts on its growth before it erupts; after it has erupted, it only

interacts with local or topical aspects of the environment. Because of the critical role that local impacts play in preventing the demineralization of teeth and inflammation of periodontal tissues, which are the two most significant threats to oral health, this analysis focuses on the adverse effects of food rather than the metabolic and nutritional components of nutrition. This is because of the critical role that local impacts play in preventing these threats. In any event, the pediatric dentist is not the person who should be giving food advice to a kid during the formative years of their life. The medical practitioner is the one who is ultimately responsible for carrying out this duty. However, even in this case, ensuring that there are no bacterial or cytotoxic irritants present locally requires a much higher level of attention than ensuring that there are sufficient levels of systemic nutrients. This is due to the fact that elements of systemic nutrition are more important to the preservation of periodontal and mucosal health than they are to the preservation of tooth structures.

The significance of non-fermentable sweeteners, especially the roles and responsibilities that they play in relation to dental caries. The pentitol xylitol and the hexitols sorbitol and mannitol are both examples of sugar alcohols. Sugar alcohols are sometimes referred to as polyols. These sugar alcohols have a delightful flavor, but they either do not contribute to tooth decay (as is the case with xylitol) or they contribute to tooth decay in a manner that is far less severe than sugars do. Numerous articles that are based on original clinical research, such as the Turku Sugar Studies, the 'Michigan Xylitol Programmer (1986-1995) the Belize City chewing gum trial and review paper', have conclusively established the caries preventive effect of these sugar substitutes, particularly of xylitol. Other studies, such as the Michigan Xylitol Programmer (1986-1995) have also reached the same conclusion. Countries such as Finland, the United States of America, and Canada were among those that participated in these investigations. It has been proven beyond a shadow of a doubt that xylitol has an effect that is stimulating on the salivary glands. It is also general knowledge that oral bacteria are capable of absorbing xylitol, despite the fact that xylitol, once it has entered the cells, transforms into a toxic xylitol phosphate that prevents it from being digested any further.

There are just a few questions that haven't been answered yet, including the following ones: Does the fact that xylitol increases salivary flow lead it to be more successful in reducing canes or does it have a unique remembering power of its own that contributes to its potency? Does xylitol change the make-up of the bacteria that live in the plaque? There is little doubt that specific growing conditions can cause xylitol-resistant mutants of mutans streptococci to emerge; nevertheless, it is essential to keep in mind that not every strain of these species displays this phenomenon. In the case that this mutation takes occurred, the cell will be unable to develop the cell wall transferase machinery that is necessary for transporting xylitol molecules around inside the cell. This will cause the cell to die. On the other hand, these resistant varieties of mutans streptococci appear to be less virulent, which might result in a less cariogenic plaque flora. It is not quite clear whether or not xylitol favorably modifies the composition of the plaque due to the fact that the capacity of various strains to produce resistant mutants might vary greatly from one another. This could be the cause of the lack of clarity.

Dietary components that are associated with an increased likelihood of erosive damage being done to the body's hard tissues

Caries lesions are caused slowly by the diffusion of protons from weak bacterial acids into enamel, preconizing the phosphate in apatite, which then releases calcium; the pore volume in this pre-carious hard tissue increases until finally it is weakened to the degree that the layer above the carious subsurface porosity collapses, and a caries cavity is formed. Caries lesions can be prevented by brushing your teeth twice daily with fluoride toothpaste. Erosion, on the other hand, is brought on by strong acids, such as the citric acid that

can be found in fruit and drinks that are acidic. This is in contrast to the diffusion-controlled growth of caries. When a tooth comes into touch with a strong acid, the surface layer of the tooth undergoes an instant and severe breakdown. This process is known as demineralization. Any mineral material at the contact that was just loosened by the acid and that otherwise could have a little opportunity to remineralize is removed by subsequent mechanical friction, such as that created by brushing one's teeth after eating grapefruit or apple for breakfast. This can happen when one brushes their teeth after eating grapefruit or apple for breakfast.

In Regards to the Implications of Nutrition and Food Consumption

If not addressed, a cavity can result in intense pain and the loss of a tooth, which can make it difficult or even impossible to chew certain foods. If left untreated, a cavity can lead to the loss of a tooth. Because of the frequency with which these issues prevent a person from chewing and ingesting enough quantities of food, as well as the fact that certain meals are difficult to chew and high in fiber content, malnutrition or poor digestion may result. In addition, a wide range of diseases, such as diabetes and cardiovascular disease, are able to exacerbate these problems and lead to poor oral health. Because bacteria use carbohydrates as a source of fuel, the incidence of cavities can be reduced by consuming fewer simple sugars like sucrose, glucose, and fructose. This is because bacteria use carbohydrates as a source of fuel. On the other hand, only moderate quantities of complex carbohydrates should be ingested in the body.

Additional conditions associated with oral health

Oropharynx cancer is often known as cancer of the mouth and throat.

With the noteworthy exception of heavy alcohol use, which has been associated to an increased risk of developing mouth cancer, researchers have not been able to establish a direct correlation between diet and the likelihood of developing oral or oropharyngeal cancer. In addition to these more general results, there has been little success in establishing a direct correlation. If the outcomes of studies on other forms of cancer are any indicator, then include a diet rich in fruits and vegetables in one's daily diet can help reduce the risk of developing cancer. According to the findings of a large prospective observational study, a lower overall consumption of fruit and vegetables was associated with a lower chance of developing head and neck cancer. This conclusion was reinforced by a meta-analysis that indicated a decreased incidence of head and neck cancer that was related with increasing intake of fruits and vegetables.

For more information about head and neck cancer, including oral and oropharyngeal cancer, check out the page on cancer of the head and neck that is located in the Oral Health Topics section of the ADA website.

Aphthous Ulcers (Aphthous Ulcers)

Canker sores, also known as recurrent aphthous stomatitis (RAS), have not been the topic of an adequate number of in-depth scientific research. This is despite the fact that RAS is one of the most common causes of mouth sores. As potential dietary causes, people have pointed to the consumption of hard, acidic, and salty foods and drinks, as well as alcoholic and carbonated beverages. The early data indicate that zinc insufficiency is more frequent in those who have RAS than in healthy individuals who do not have them and that zinc treatment promoted RAS resolution in those who were zinc deficient.

Xerostomia

Dry mouth, also called xerostomia, is a condition that can have a detrimental effect not only on a person's dental health but also on their whole quality of life. Dry mouth symptoms can be made much worse by dietary factors such as meals that are dry or acidic, beverages such as coffee and alcohol, and so on.

OBJECTIVES OF THE STUDY

1. To the study of the Teeth and Malnutrition
2. To the study of the Nutritional systemic impacts are greater than local dietary effects.

METHODOLOGY

The research, which was based on a survey, was carried out at Thakur Institute of Management Studies, Career Development & Research (TIMSCDR) by Mahatma Gandhi Missions Dental College & Hospital (MGMDCH) to study the role of Information Technology to control and enhance the impact of nutrition on the oral health of college students in Mumbai. Specifically, the study looked at how college students in Mumbai could benefit from using IT to control and improve the impact of nutrition on their oral health. More specifically, the participants were students attending various educational institutions in the Mumbai area.

The research that was done on the literature does not provide sufficient data to understand how student fraternities make use of information technology to control and enhance the effect that food has on dental health. As a direct consequence of this, a quantitative strategy was used in order to get a deeper comprehension of the scenario. The information was collected through the administration of a survey. In order to collect the information that was required, both a questionnaire and in-person interviews with the possible respondents, who in this case were students at a college, were carried out. The target demographic consisted of college students in Mumbai who were working toward degrees in a number of disciplines (including engineering, MCA, MBA, B.Sc., B. Com., etc.). These students were the intended recipients of the message. The people who were going to take part in the survey were briefed on the study and how it was going to impact them before the poll got underway. A well-designed and pretested questionnaire was sent out to the respondents in order to gain knowledge about the role and awareness of IT by the respondents in reinforcing good food habits that can have an impact on oral healthcare. This was done in order to obtain knowledge regarding the role and awareness of IT by the respondents in reinforcing good dietary habits that can have an influence on oral healthcare. The majority of those who responded to the questionnaire provided objective responses. By responding to the questionnaire, only 136 students from a broad variety of academic disciplines were able to contribute any information at all. In order for us to carry out the survey that had been meticulously organized, we needed to first obtain authorization from the dean. People who were going to take part in the survey were given background information on the research project and told how it would have an impact on them personally and professionally in their respective industries before the survey got underway. It was decided that the survey would be carried out on the proper day and at the suitable time in order to gather the findings that were necessary and relevant.

RESULT AND DISCUSSION

An inquiry was carried out at the TIMSCDR located in Mumbai. This investigation into the "Role of Information Technology to Control and Enhance the Impact of Nutrition on Oral Health of College Students in Mumbai" was carried out with the involvement of 136 different students by means of a questionnaire. The title of the study is "Role of Information Technology to Control and Enhance the Impact of Nutrition on Oral Health of College Students in Mumbai." The replies that were collected were recorded, and these responses included information about the respondents' dental health as well as their nutritional regimens. It was found that fifty percent of the children clean their teeth twice every day [Figure 1]. This reveals that only half of the people who replied to the poll make an effort to brush their teeth twice a day in order to improve their oral hygiene. This is concerning because brushing your teeth twice a day is one of the most effective ways to prevent cavities.

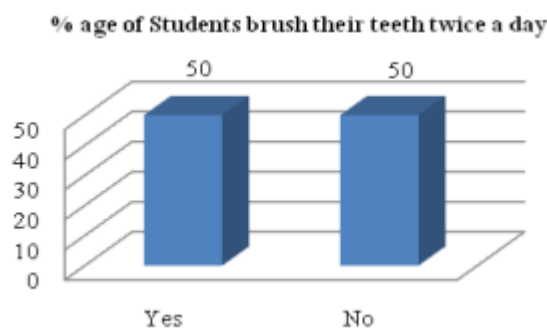


Fig. 1 Student brushing frequency.

It was discovered that the majority of students consume homemade food three times each day, which is evidence in and of itself that respondents had healthy nutritional routines.

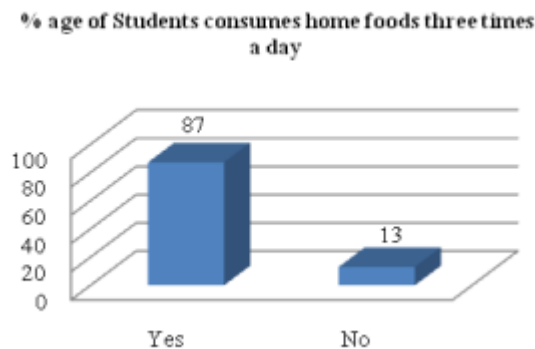


Fig. 2 Students eating homemade cuisine three times a day.

According to the findings of the survey, students consume junk food on a regular basis, and just three percent of students say they never eat junk food. This suggests that there is a requirement for students to be educated about the influence that junk food has on their health, as there is a requirement for students to be educated about the impact that junk food has on their health.

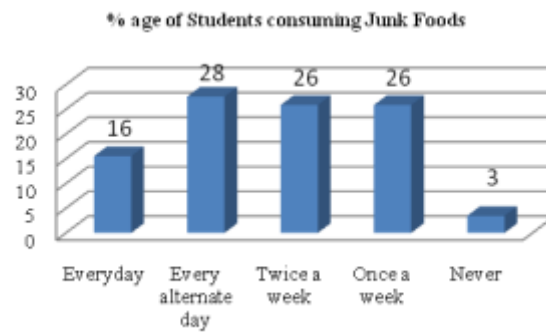


Figure 3: Students who eat junk food

The results of the poll indicate that just nine percent of the student population maintains regular visits to the dentist in order to keep their teeth and gums in healthy condition. The vast majority of students, which accounts for 91 percent, do not keep a follow-up about their oral health. It is essential for students to have a good understanding of both the state of their oral health at the present time and the effect that poor dietary practices have on their teeth. A student should make it a part of their routine to examine their oral health at least once per year in order to lessen the likelihood that they will acquire dental problems in the future.

CONCLUSION

The standard of a person's food is a crucial changeable component that has a considerable influence on the individual's level of oral health. It is possible for a person's nutritional state to have a negative impact on their oral health, which in turn may have a negative impact on their food intake, which may eventually lead to malnutrition. The state of a person's oral health can be an important factor in determining whether or not they continue to receive sufficient nourishment. Patients can be assisted in maintaining a good oral health status and correct nutrition with the support of multidisciplinary teams that work together. These teams comprise of general practitioners, dentists, nurses, and nutritionists. Poor dental health can be a sign of malnutrition, and vice versa: poor oral health can indirectly contribute to the development of malnutrition. Establishing habits of healthy eating is necessary in order to break free from this vicious cycle that never ends. It is the duty of the dentist to offer the patient dietary advice in relation to the patient's oral health, as this is part of the dentist's professional responsibilities.

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