

A Study of Cavity & Its Associates



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Abstract

Teeth are one of the most sensitive parts of human body that require much care on the part of man. They help man in eating, chewing, drinking and speaking. Without the teeth, eating and speaking cannot be imagined. It is only through the teeth than clarity in utterances occurs and that food can be easily chewed and eaten. However, at certain stages of life, the people falling in different age groups suffer from the problems of tooth decay and cavities, as a result of which they have several complications hindering their normal routine of life and work. The increasing number of private dental clinics overcrowded with the patients suffering from the problems of tooth decay and cavity waiting in a long queue for the medical check up of their teeth witness it. One's own eating and drinking habits are responsible for cavities in particular. No doubt, in post-infancy, pre-childhood and old age tooth decay is a natural thing, but even the adults have untimely and unseasonal tooth decay for certain reasons. Tooth decay in the various parts of the teeth leads to cavities that result into severe complications.

However, prevention of cavities is possible if one is aware of the teeth structure and if one is regular and attentive to one's eating, drinking, sipping and brushing habits. Regular visits to the dentists for the sake of the medical examination of the teeth can help one overcome the problems of tooth decay and cavities.

The research paper, grounded in the theoretical implications served through the various studies, is a theoretical study, and designed on the scientific pattern with a systematic development of thought and observation. It surveys the various related aspects of cavities, such as, symptoms, causes, effects or complications and measures of prevention that can help the people overcome the problem of cavities. .

Keywords: Teeth Structure, Tooth Decay, Cavity, Incisors, Canines, Molars, Premolars, Tooth-Healthy Food and Drinks

Introduction

Of the several major and minor parts of body, teeth are very important. They help man chew the food and speak. Cavities and tooth decay are among the world's most common health problems. They're especially common in children, teenagers and older adults. But anyone who has teeth can get cavities, including infants. If cavities aren't treated, they get larger and affect deeper layers of your teeth. They can lead to a severe toothache, infection and tooth loss. Regular dental visits and good brushing and flossing habits are the best protection against cavities and tooth decay. Good oral and dental hygiene can help one avoid cavities and tooth decay. There are the following parts of human teeth-

Enamel

Made of a rock-hard mineral called calcium phosphate, enamel is the hardest white outer part of the tooth

Dentin

A hard tissue containing microscopic tubes, dentin is a layer underlying the enamel.

Pulp

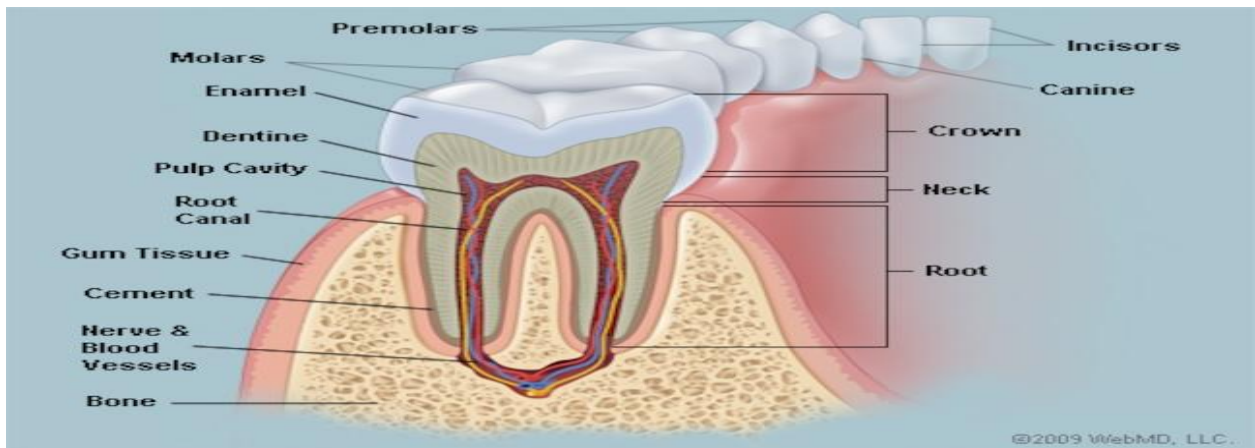
The softer, inner structure of the teeth through which blood vessels and nerves run.

Cementum

A tissue connecting layer that binds the roots of the teeth firmly to the gums and jawbone.

Periodontal Ligament

Tissues helping the teeth hold tightly against the jaw.



The picture of the teeth structure witnesses a complex teeth structure in humans that requires much care on the part of the people for their protection. It also reveals that a slight negligence on their part can lead to harmful effects relating to teeth. Each of the specified parts of teeth displayed in the picture requires alertness.

Cavity



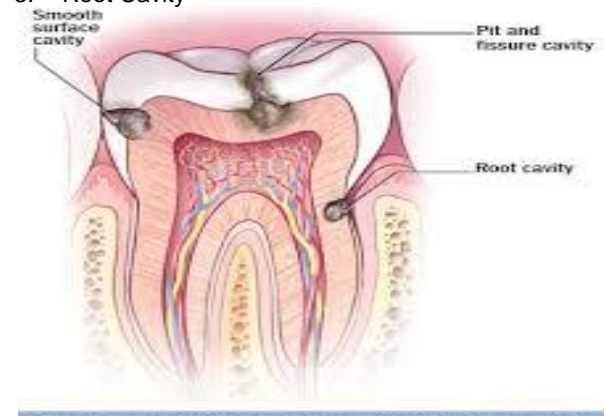
Cavities refer to tooth decay, which occurs when specific types of bacteria produce acid that destroys the tooth's enamel and its underlying layer, the dentin. Cavities are permanently damaged areas in the hard surface of your teeth that develop into tiny

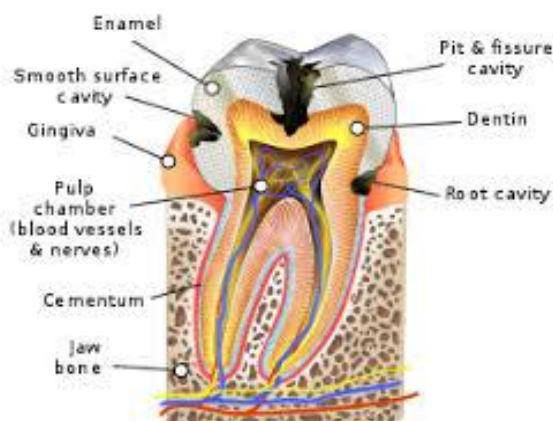
openings or holes. If left untreated, a cavity causes the tooth to decay significantly. Eventually, uncontrolled decay may destroy the tooth completely. There is also the risk of developing an infection related to an abscess when the infection spreads to the root of the tooth. Cavities are a result of poor oral hygiene and retained dental plaque on the tooth surface. Specific bacteria in plaque cause decay. Different types of bacteria in plaque, retained near the gum line, cause gum disease to occur, which is a condition to be treated by dentists. Toothache, tooth sensitivity to sweet, hot or cold foods or drinks, or pain when chewing are three possible indications to ensure cavity. Many different types of bacteria live in our mouths and build up on the teeth in a sticky film called dental plaque. When we eat and drink, these bacteria create acids, which can dissolve the protective layer beneath the retained plaque. The acid removes minerals from the enamel, which if left untreated can cause a cavity. Decay begins in the main portion of the tooth (the enamel) and as the enamel is broken down the decay can go deeper into the dentin and can eventually reach the nerve (pulp) of the tooth. Examination of the tooth surface and an x-ray by the doctors to see if the cavity has gone from the enamel into the dentin or pulp of the tooth is the way of diagnosis of cavity.

Types of Cavity

There are the following three types of cavities –

1. Smooth Surface Cavity
2. Pit and Fissure Cavity
3. Root Cavity



**What forms Cavity?**

There are several reasons due to which cavity is formed :-

Improper shape of Tooth

There are several developmental anomalies as well as normal tooth morphological variations which can lead to cavity formation such as deep pit and fissures

Improper cleaning of Tooth

This is one of the most common cause of cavity formation in general population which leads to plaque deposition also.

Low Fluoride Level

We should always use toothpaste having a minimum concentration of fluoride.

Improper Dietary Habits

Excessive intake of sugar causes demineralization of hard tissue surfaces.

**Symptoms of Cavity**

1. Toothache, spontaneous pain or pain that occurs without any apparent cause
2. Tooth sensitivity
3. Mild to sharp pain when eating or drinking something sweet, hot or cold
4. Visible holes or pits in your teeth
5. Brown, black or white staining on any surface of a tooth
6. Pain when you bite down

Causes of Cavity

1. Collection of food particles in molars and premolars
2. Certain foods and drinks, such as milk, ice cream, honey, sugar, soda, dried fruit, cake, cookies, hard candy and mints, dry cereal, and chips

3. Frequent snacking or sipping
4. Bedtime infant feeding
5. Inadequate and irregular brushing
6. Not getting enough fluoride
7. Medications, medical conditions, radiation to head or neck and chemotherapy drugs
8. Heartburn or gastroesophageal reflux disease (GERD)
9. Eating disorders

Complications of Cavity

1. Pain
2. Tooth abscess
3. Swelling or pus around a tooth
4. Damage or broken teeth
5. Chewing problems
6. Positioning shifts of teeth after tooth loss

Prevention of Cavity

1. Brushing and flossing daily
2. Eating sugary or starchy foods less often during the day
3. Use of fluoride toothpaste after eating or drinking
4. Using antibacterial mouth rinses
5. Chewing gum that contains xylitol
6. Visiting the dentist regularly for check up
7. Having dental sealants on the grooves and crannies that tend to collect food
8. Drinking tapwater added with fluoride
9. Avoiding frequent snacking and sipping
10. Eating tooth-healthy foods

Objectives of the Study

1. To study the teeth structure in humans
2. To learn about the types of teeth that are responsible for cavity
3. To study the problem of cavity in humans
4. To brood over the symptoms of cavity
5. To study the stages when one faces the problem of tooth decay
6. To find out the causes and effects of cavity
7. To concentrate the complications caused by cavity
8. To suggest how to prevent cavity

Review of Literature

Ankita Bansal, Navin Anand Ingle, Navpreet Kaur, and Ekta Ingle¹ observe the development of strategies to improve fluoride efficacy. Fluoride therapy in the form of varnish, gel, mouth rinse, or toothpaste has been used extensively as a caries-preventive intervention for over three decades. Main benefit of fluoride is in reducing the risk of dental caries. In recent years, rapid changes have occurred in the prevalence of dental caries across countries. Today countries show a decline in the prevalence in dental caries and more children are becoming caries free. Decline in dental caries may be attributed to the cariostatic efficacy of fluoride. Research into the mechanisms of anticaries efficacy of fluoride is ongoing, which may lead to better prevention strategies. New and/or improved fluoride products are entering the marketplace at an increased rate; these products include toothpastes, fluoride varnishes, fluoride-containing whitening agents, and other fluoride-containing cleaning products.

Wondemagegn Mulu, Tazebew Demilie, Mulat Yimer, Kassaw Meshesha, and Bayeh Abera²

observe that dental caries is the most common chronic infectious disease of childhood caused by the interaction of bacteria, mainly *Streptococcus mutans* and sugary foods on tooth enamel. Dental caries is a common public health problem in school children associated with poor oral hygiene, dietary and dental visit habits. Therefore, prevention measures such as health education on oral hygiene, dietary habits and importance of dental visit are obligatory for children.

Wendell Evans & Others³ observe in their study that preventative oral care can reduce the need for unpleasant dental drilling and filling by 30-50 percent. The findings of the study suggest that tooth decay or dental caries can be stopped, reversed, and prevented without the need for the traditional 'fill and drill' approach that has dominated dental care for decades. According to the authors, a preventative approach has major benefits compared to current practice. The study generalizes that application of high concentration fluoride varnish by dentists to the sites of early decay, attention to home tooth brushing skills, restriction of between-meal snacks and beverages containing added sugar, and risk-specific monitoring can help prevent tooth decay.

Anil K. Chaturvedi, William F. Anderson, Joannie Lortet-Tieulent, Maria Paula Curado, Jacques Ferlay, Silvia Franceschi, Philip S. Rosenberg, Freddie Bray, and Maura L. Gillison⁴ find out that human papillomavirus (HPV) has been identified as the cause of the increasing oropharyngeal cancer (OPC) incidence in some countries. OPC incidence significantly increased during 1983 to 2002 predominantly in economically developed countries. Among men, OPC incidence significantly increased in the United States, Australia, Canada, Japan, and Slovakia, despite nonsignificant or significantly decreasing incidence of OCCs. In contrast, among women, in all countries with increasing OPC incidence (Denmark, Estonia, France, the Netherlands, Poland, Slovakia, Switzerland, and United Kingdom), there was a concomitant increase in incidence of OCCs.

Science News⁵ says that a scientifically based approach that includes a tooth-decay risk assessment, aggressive preventive measures and conservative restorations can dramatically reduce decay in community dental practices, according to a new study. A dentist who uses CAMBRA obtains the patient's dental and medical history and conducts a clinical exam to assess caries early enough to reverse or halt progression and to determine caries risk factors. These factors include, among other things, acid-producing bacteria, frequent eating and drinking of fermentable carbohydrates ("snacking"), and abnormally low saliva flow and function. From this assessment, the dentist utilizes behavioral approaches and chemical treatments to optimize protective factors. The treatment plan typically incorporates remineralization through the use of fluoride and/or antibacterial therapies such as chlorhexidine and xylitol, minimally invasive restorative procedures to conserve tooth structure, and regular patient follow up.

Mehmet Sarikaya & Sami Dogan⁶ says that Researchers at the University of Washington have designed a convenient and natural product that uses proteins to rebuild tooth enamel and treat dental cavities. Remineralization guided by peptides is a healthy alternative to current dental health care. The new biogenic dental products can -- in theory -- rebuild teeth and cure cavities without today's costly and uncomfortable treatments. Peptide-enabled formulations will be simple and would be implemented in over-the-counter or clinical products. Bacteria metabolize sugar and other fermentable carbohydrates in oral environments and acid, as a by-product, will demineralize the dental enamel. Good oral hygiene is the best prevention, and over the past half-century, brushing and flossing have reduced significantly the impact of cavities for many Americans. Still, some socio-economic groups suffer disproportionately from this disease.

Kathleen Doheny⁷ reports that if the toothpaste is fluoride-free, brushing and flossing alone aren't enough to keep cavities away. The fluoride is what helps you avoid cavities. It's not [simply] keeping the teeth cleaner. For years, dental professionals have debated the importance of the "clean tooth" hypothesis versus the "sound tooth" hypothesis in preventing cavities. Those in the first camp say good oral hygiene will remove the sticky film of acid-producing plaque that breaks down the enamel and allows cavity-causing bacteria to invade the teeth. Others argue that brushing and flossing, no matter how intense, isn't enough to prevent cavities. Ferris Jabr⁸ reports that our teeth get damaged all the time. Most of the injuries they endure are due to everyday wear and tear as well as the activity of microbes in the mouth. These organisms coat the surface of each tooth and feed on meal remnants. As they break down particles of food, some of these microbes produce and secrete acids as a by-product. And that acidity degrades enamel—the tooth's hard outer layer. A lot of dental treatments are still in the dark ages," Sharpe says. "It's time to move on.

Report of the University of Sidney⁹ surveys that Professor Wendell Evans and his team developed the Caries Management System (CMS) – a set of protocols which cover the assessment of decay risk, the interpretation of dental X-rays, and specific treatment of early decay (decay that is not yet a cavity). The CMS treatment "no-drill" involves four aspects:

1. Application of high concentration fluoride varnish by dentists to the sites of early decay
2. Attention to home tooth brushing skills
3. Restriction of between-meal snacks and beverages containing added sugar
4. Risk-specific monitoring.

Report of the New York University¹⁰ says that a new study by researchers at NYU College of Dentistry, published in the journal BMC Oral Health, suggests that cavity prevention programs with a combination of prevention strategies may be more effective than one alone for reducing tooth decay...Ruff and Niederman are continuing to study how to optimize school-based cavity prevention. They are currently leading two large studies - a PCORI-

funded study in the Bronx and an NIH-funded study in New Hampshire - to compare two cavity prevention techniques in school-based dental programs. One technique is a more complex treatment similar to the combined primary and secondary prevention, but the Bronx and New Hampshire studies will also introduce the use of silver diamine fluoride, a non-invasive, cavity-fighting liquid that is painted onto teeth to halt the progression of tooth decay. The cavity prevention programs will begin in schools in the fall of 2018.

Hypothesis

1. Cavities are one of the most serious problems
2. The complex teeth structure in humans leads to cavity
3. Cavities are the result of tooth decay that takes place under various stages
4. Eating, drinking, thumb sucking and medication cause cavities
5. Cavities are curable
6. Cavities can be prevented through change in eating and drinking habits, and through awareness

Method

Content analysis and setting of 10 specific research questions designed with a view to covering all the major aspects of cavity form the basis of the study. The author followed all the steps required for making a theoretical study applying his practical approach to the theme. The steps undergone include-

1. Searching various reference books, journals and internet sites through search engines
2. A focused study of the literature on teeth structure and cavities
3. Making an overview of the subject
4. Selection of 10 studies including both the Indian studies and the ones carried out in abroad
5. Micro analysis of the contents
6. Making review of literature selected for the purpose
7. Formulating hypothesis relating to the various associates of cavities
8. Adding own observation of the patients suffering from cavity
9. Arriving at findings and conclusion
10. Systematically putting together of the contents to be presented through the paper

Research Questions

1. What type of teeth structure is there in humans?
2. How many teeth are there in the mouth of an adult and what is the number of each of the types of teeth?
3. What causes tooth decay?
4. What are the symptoms of cavities?
5. What are the various causes of cavities?
6. What age-group is most affected by tooth decay?
7. In what age do the people suffer from cavity most?
8. What complications are noticed in the patients suffering from cavities?
9. Can cavities be prevented?
10. If yes, what are the preventive measures of cavities?

Findings

1. The teeth structure in humans in complex.
2. The number of teeth in the mouth of an adult is 32. Of them, 8 are incisors (The middle four teeth on the upper and lower jaws), 4 are canines (The pointed teeth just outside the incisors), 8 are molars (Flat teeth in the rear of the mouth), 8 are premolars (the transitional teeth located between the canine and molar teeth) and 4 wisdom teeth. The crown of each tooth projects into the mouth. The root of each tooth descends below the gum line, into the jaw.
3. Tooth decay causes cavities
4. Plaque forms and plaque attacks leading to continuous destruction causes tooth decay
5. Mild sharp tooth pain and tooth sensitivity without any apparent cause, holes and pits in the teeth, staining on the surface of tooth are some of the symptoms of cavities
6. Collection of food particles, cavity-oriented foods and drinks, frequent snacking and sipping, lack of fluoride in drinking water, irregular teeth cleaning and eating disorders etc are some of the causes of cavities
7. The children ranging in the age group from 3 to 10 are most affected from tooth decay
8. Cavity is seen in the people of all the age groups, but it is seen most in the adolescents and in the people with the age of 40+.
9. Untimely severe tooth pain, swelling and puss, damage of teeth and chewing and drinking problems are some of the complications seen in the patients suffering from cavities
10. Cavities can be prevented through awareness by brushing the teeth regularly, using fluoride toothpaste and antibacterial mouth rinses, by getting the teeth examined regularly, and by eating tooth healthy foods, drinks and chewing substances.

Conclusion & Discussion

Cavities are more than just a nuisance. According to the World Health Organization, dental cavities affect nearly every age group and they are accompanied by serious health concerns. Additionally, direct and indirect costs of treating dental cavities and related diseases have been a huge economic burden for individuals and health care systems. Tooth decay is a progressive disease resulting in the interaction of bacteria that naturally occur on the teeth and sugars in the everyday diet. Sugar causes a reaction in the bacteria, causing it to produce acids that break down the mineral in teeth, forming a cavity. Dentists remove the decay and fill the tooth using a variety of fillings, restoring the tooth to a healthy state. Nerve damage can result from severe decay and may require a crown (a crown is like a large filling that can cap a tooth, making it stronger or covering it). Avoiding unnecessary decay simply requires strict adherence to a dental hygiene regimen: brushing and flossing twice a day, regular dental check-ups, diet control and fluoride treatment. Practicing good hygiene avoids unhealthy teeth and costly treatment.

In a word, the problems of tooth decay and cavities can be overcome with a little sensibility and awareness of the people. The people can protect their

teeth and can enjoy good eating and drinking provided they have certain precautions, such as, tooth-healthy food, enough of fluoride and regular dentist's advice and suggestions.

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