



Dental and oral health is the condition of the oral cavity, including the teeth and their supporting tissue structures, which is free from pain and diseases such as mouth and throat cancer, mouth wound infections, periodontal (gum) disease, tooth decay, tooth loss, and other diseases and disorders that cause limits the individual's capacity to bite, chew, smile, and speak. This book on Dental and Oral Diseases is intended for all groups, both health academics and health students, especially students of the Dental Health study program, so it is hoped that this book can become additional reference material in providing health care to patients suffering from dental and oral problems.

The material discussed in this book includes:

CHAPTER 1 Basic Concepts of Dental and Oral Health

CHAPTER 2 Cleft Lip Labioschisis

CHAPTER 3 Thrush

CHAPTER 4 Dental Caries

CHAPTER 5 Bleeding Gums

CHAPTER 6 Abraded Teeth

CHAPTER 7 Large Holes in Teeth and Remaining Roots

CHAPTER 8 Oral Cancer

CHAPTER 9 Oral Tumors

CHAPTER 10 Periodontitis

CHAPTER 11 Gingivitis

CHAPTER 12 Tooth Erosion

CHAPTER 13 Glossitis

CHAPTER 14 Growing Wisdom Teeth

CHAPTER 15 Dentin Hypersensitivity

CHAPTER 16 Halitosis

CHAPTER 17 Bruxism

MOUTH TOOTH DISEASES

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DISEASE MOUTH & TEETH



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FOREWORD

Alhamdulillah, we pray to the presence of Almighty God who has given me His grace and guidance so that this chapter book can be compiled. This chapter book is intended for lecturers, practitioners and health students as reading material and additional references.

This chapter book entitled Dental and Oral Diseases tries to present and package several important things in an effort to improve dental and oral health. This chapter book contains everything related to various types of dental and oral diseases compiled by several lecturers from various universities.

This book is packaged practically, without being complicated and straight to the point. Happy reading.

Kendari, June 2023

Writer

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CHAPTER

1

Basic concepts Dental Health and Mouth

Dr. Miftah Tri Abadi, M.Kes.

A. Introduction

The realization of a general state of health is the desire of all parties, both individually but also by families and groups and society. Therefore, various efforts are made to achieve this healthy condition and one of them is providing health services, including dental and oral health services (Azwar, 1996).

Development in the field of dental and oral health is an integral part of general health development as stated in the national health system as stated in Law Number 36 of 2009. This cannot be separated from the fact that dental and oral health is an integral part of overall body health, so Maintaining dental and oral health is very important to strive for or carry out (Ministry of Health of the Republic of Indonesia, 2019). In this case,

The Central Government and Regional Governments bear the duties and responsibilities for the provision of dental and oral health services, as well as the private sector and society in general. In this way, it is hoped that dental and oral health services will be provided that are safe, high quality and easily accessible to the community itself.

The general goal of development in the field of dental and oral health is to achieve optimal levels of dental and oral health in the community. To achieve this goal, efforts are being made in the field of dental and oral health through promotional efforts, preventive efforts, curative efforts and rehabilitative efforts in an integrated, integrated and sustainable manner (Ministry of Health of the Republic of Indonesia, 2016). This effort is intended to maintain and improve the level of dental and oral health in the community in the form of improving health, preventing disease, treating disease and restoring public health.

In general, the form of dental and oral health service efforts includes 2 forms of service efforts, namely the first is dental and oral health services in the form of services

medical, secondly, dental and oral health services in the form of dental and oral health services sourced or community-based (Karmawati, Astit and Ita, 2014).

B. Understanding

In the Ministry of Health number 89 of 2015 concerning dental and oral health efforts, it is explained that what is meant by dental and oral health is a condition of the hard tissue and soft tissue of the teeth and related elements in the oral cavity, which allows individuals to eat, speak and interact socially without experiencing dysfunction, aesthetic disturbances and discomfort due to disease, occlusion deviations and tooth loss so that they are able to live socially and economically productive lives (Ministry of Health of the Republic of Indonesia, 2016).

One model of approach in implementing dental and oral health efforts is a model of dental and oral health care approach which is based on basic human nature which requires basic needs in maintaining physiological and psychological balance which aims to maintain life and health (Ministry of Health of the Republic of Indonesia, 2012). In general, care services are a model of approach in implementing programs or activities that are carried out in a planned manner with certain results for a certain group. The dental and oral health care model is provided directly to patients or clients to meet their needs. In this case, the implementation or administration of dental and oral health care is complete, meaning that all dental and oral health problems experienced by patients or clients can be resolved completely.

In general, the definition of dental and oral health care services is planned dental and oral health services aimed at certain groups which can be attended within a certain period of time and carried out continuously in the areas of promotive, preventive and

curative care given to individuals, groups and society (Notoatmodjo, 2010). This care model approach basically always pays attention to 5 basic human needs, namely physiological needs, safety, love, self-esteem and self-actualization to increase respect and appreciation for the dignity of patients or clients as human beings (Putri, 2016).

C. Providing Dental and Oral Health In general,

providing dental and oral health services is the responsibility of the government at both the central and regional levels as stated in the national health system. However, the involvement of the public and the private sector is of course a supporting factor in the government's efforts to provide dental and oral health (Derby and Wals, 2003).

The government, both central and regional levels, is basically responsible for ensuring the availability of dental and oral health resources, both regarding health personnel, health facilities and health supplies in the context of providing safe, quality and affordable dental and oral health for the community. The form of government responsibility in administering dental and oral health is in accordance with the hierarchy of government bureaucracy from the center to the regions, each having its own authority in accordance with the government hierarchy (Ministry of Health of the Republic of Indonesia, 2016). These authorities include: 1. Central Government (Menkes)

- a. determine planning policies for the needs of dental and oral health workers, health facilities, dental and oral health supplies.
- b. Procure health workers, health facilities, dental and oral health supplies.
- c. carry out advocacy in encouraging adequate budget allocation for dental health services and

mouth at all levels of government, both central and regional levels.

- d. developing, supervising and improving the quality of dental and oral health personnel, health facilities and dental and oral health supplies.

2. Provincial Government (Governor)

- a. determine planning policies for the needs of dental and oral health workers, health facilities, dental and oral health supplies in the region.
- b. Procure health workers, health facilities, dental and oral health supplies on a provincial scale.
- c. provision of budget allocation funding for the provision of dental and oral health services provincial scale.
- d. developing, supervising and improving the quality of dental and oral health personnel, health facilities and dental and oral health supplies.

3. City/Regency Government (Mayor/Regent)

- a. determine planning policies for the needs of dental and oral health workers, health facilities, dental and oral health supplies in the region.
- b. Procure health workers, health facilities, dental and oral health supplies on a city/district scale.
- c. provision of budget allocation funding for the provision of dental and oral health services city/district scale.
- d. developing, supervising and improving the quality of dental and oral health personnel, health facilities and dental and oral health supplies, through the implementation of licensing activities.

D. Dental and Oral Health Efforts

Dental and oral health efforts are any activity and/or series of activities carried out in an integrated, integrated and sustainable manner to maintain and improve the level of dental and oral health of the community in the form of improving health, preventing disease, treating disease and restoring good health carried out by the government. and/or the community (Ministry of Health of the Republic of Indonesia, 2012).

In general, dental and oral health efforts are aimed at 3 main targets, namely:

1. Individual
2. Family
3. Society

Regulation of dental and oral health efforts as stated in the Republic of Indonesia Minister of Health Regulation Number 89 of 2015 concerning dental and oral health efforts (Ministry of Health of the Republic of Indonesia, 2016), is intended to provide guidelines and references for service providers dental and oral health for:

1. Realize professional, comprehensive and integrated dental and oral services according to standards,
2. improve health service management and information more effective and efficient teeth and mouth,
3. increase the quantity, quality and equal distribution of resources human dental and oral health,
4. increase regional participation in meeting the needs for facilities, infrastructure and equipment in the field of dental and oral health.

E. Dental and Oral Health Services

Dental and oral health services are any efforts to provide dental and oral health services that are carried out to improve the level of dental and oral health, prevent and cure disease and restore dental and oral health for individuals, families, groups or communities as a whole.

complete, integrated and quality (Karmawati, Astit and Ita, 2014).

In general, dental and oral health services are both individual and community services. Dental and oral health service efforts must meet the requirements in accordance with service standards, professional standards and operational standards for dental and oral health services in accordance with applicable laws and regulations. The provision of dental and oral health services is the responsibility and is carried out by the government, both the central government and regional governments, which are carried out in an integrated, integrated and sustainable manner (Ministry of Health of the Republic of Indonesia, 2012).

In principle, dental and oral health services are provided or implemented with an approach to the human life cycle where each individual experiences individual growth and development phases. In its implementation, dental and oral health services are provided comprehensively, taking into account the specific needs of treatment according to the phases, such as services for pregnant women, services for children and adolescents, and services for elderly groups, as well as services for groups of people with disabilities.

Dental and oral health services for pregnant women are carried out aimed at fetuses and pregnant women in order to optimize fetal growth and development and prevent the occurrence of congenital abnormalities of the body, especially those related to *dento-orofacial*. The aim of dental and oral health service efforts in groups of pregnant women is to maintain and improve the dental and oral health of pregnant women in order to help optimize the overall health of the mother in an effort to ensure good fetal growth and development (Putri, 2016).

Dental and oral health services for children and adolescents are carried out by prioritizing promotive and preventive approaches without neglecting curative approaches

and rehabilitative. Dental and oral health services for children and adolescents include services for infant groups, toddler groups, pre-school age groups, elementary school children and first-level senior school children.

Dental and oral health services for the elderly/older age group are provided in health facilities or other facilities that provide dental and oral health efforts with community resources. These efforts must ensure and facilitate the elderly group to receive dental and oral health services according to their needs in a safe, quality and affordable manner.

F. Dental and Oral Health Resources

In general, dental and oral health resources include 3 dental and oral health resources (Ministry of Health of the Republic of Indonesia, 2016), namely:

1. Health Service Facilities

Health service facilities are service facilities that provide dental and oral health services, both at the first level level (first level facilities) and advanced level referral health service facilities. First level health service facilities are health facilities that provide basic dental and oral health services and make referrals. Meanwhile, advanced level service facilities are service facilities that provide specialist medical services and dental and oral health support

2. Human Resources

Dental and oral health human resources include 2 types, namely health workers and non-health workers. Health personnel are medical personnel and medical technical personnel who have competence and authority in accordance with the provisions of statutory regulations.

invitation. Meanwhile, non-health personnel are trained personnel who provide community dental and oral health services using a promotive and preventive approach.

3. Dental Health Supplies

Dental health supplies are elements in providing dental and oral health services in the form of medicines, medical equipment, and everything else needed. in implementation efforts. Requirements for dental and oral health supplies are to meet safety, efficacy and quality in accordance with the provisions of applicable laws and regulations.

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CHAPTER

2

Harelip Labioschisis

Dr. Mira Sri Gumilar, M. Epid

A. Introduction

Cleft lip is a disorder characterized by a gap in the upper lip which can be accompanied by a gap in the palate. Cleft lip and cleft palate disorders can occur separately or together.

A cleft lip accompanied by a gap in the roof of the mouth will create a direct connection between the nose and the mouth.

Cleft lip occurs due to disturbances in fetal development in the *median nasal* and *maxillary processes* during the embryological period which occurs in the first trimester of pregnancy. A cleft lip causes problems both functionally and aesthetically. If this condition is accompanied by failure of fusion of *the palatine processes* during the embryonic period, the cleft lip can be accompanied by a cleft palate.

B. Epidemiology of Cleft Lip

Of the overall prevalence of cleft lip, 46% are cleft lip with cleft palate, 33% are cleft palate, and 21% are cleft lip only. Cleft lips on one side occur nine times more often than cleft lips on both sides. The incidence of cleft lip on the left side occurs more often than the incidence of cleft lip on the right side.

The prevalence of cleft lip in men is twice as high as in women.

Globally, cleft lip can occur in 1 in 700 live births with an incidence of between 0.8 to 2.7 per 1000 live births. The incidence rate of cleft lip varies based on geographic location, ethnicity, and gender. The highest incidence based on ethnicity is Asian ethnicity and the lowest incidence is African ethnicity.

As many as 65% of abnormalities that occur in the head and neck are cleft lip and cleft palate.

Nationally, the prevalence rate for cleft lip in Indonesia

is 2.4%. When separated by province, the highest prevalence of cleft lip is in DKI Jakarta Province at 13.9%. This figure is very far above the national figure, namely 2.4%. Other provinces such as South Sumatra, Riau Islands, West Nusa Tenggara, Nanggroe Aceh Darussalam respectively have a prevalence of 10.6%; 9.9%; and 8.6%. The provinces with the lowest prevalence, namely 0.4%, are Jambi, West Kalimantan and West Sulawesi Provinces.

The incidence of cleft lip can increase due to a decrease in the perinatal death rate, a decrease in the death rate during surgery, an increase in fertility rates, marriages between close relatives, and an increase in the success of surgery.

C. Etiology of Cleft Lip

There are two categories of cleft lip and cleft palate, namely syndromic and non-syndromic. As many as 70% of cases of cleft lip and palate are non-syndromic, where the condition is isolated and not caused or associated with other health conditions. The remaining 30% of cases of cleft lip and cleft palate are in the syndromic category where the condition is accompanied by other structural abnormalities outside the cleft region.

The etiology of cleft lip is not fully known. To date, based on the results of several studies, cleft lip has a multifactorial etiology related to hereditary and environmental factors. The hereditary factor in cleft lip is 75% recessive and 25% dominant.

Cases of cleft lip can be caused by chromosomal abnormalities and teratogenic effects. In chromosomal abnormalities there are specific gene mutations which are also found in cases of *van de Woude syndrome* (IRF6) and *Treacher Collins* (TCOF1).

In addition, mutations in several genes such as IRF6, MSX1, and

FGFR1 can be associated with dental abnormalities, cleft lip and cleft palate which can occur in a family tree with more than one occurrence. Therefore, these genes are associated with genetically inherited causes of cleft lip.

Apart from genetic mutations that allow cleft lips to be inherited genetically, there are genetic mutations that interact with exposure to cigarette smoke. These genes are TGFA, MSX1, TGFB3, RARA, P450, GST, and EPHX.

The presence of these genes causes cleft lips, apart from being caused by hereditary factors, it can also be influenced by external factors such as exposure to cigarette smoke.

Other external factors that cause cleft lip etiology are maternal age, medication, nutrition, infection, radiation, emotional stress, and trauma.

D. Classification of Cleft Lip

Cleft lip is classified both on the basis of morphology and on the basis of anatomically involved organs. Cleft lip classification is used to provide an overview of the degree, location and variations in the condition of the cleft. The cleft lip classification was created to provide a simple and clear picture of the condition of the cleft lip. Some classifications of cleft lip are as follows:

1. Classification According to Veau

Veau's classification divides cleft lips based on embryology and topography. Veau's classification based on embryology consists of:

- a. Unilateral cleft lip occurs due to failure of fusion between *the maxillary process* and *the medial nasal process* on the side with the cleft. b. Bilateral cleft lip is caused by failure of fusion between *the maxillary process* and *the medial nasal process* on both sides.
- c. Medial cleft lip results from failure of *the medial nasal processes* to fuse and form *intermaxillary segments*.

- d. *Oblique cleft lip* results from failure of fusion maxillary process with *lateral nasal process*.

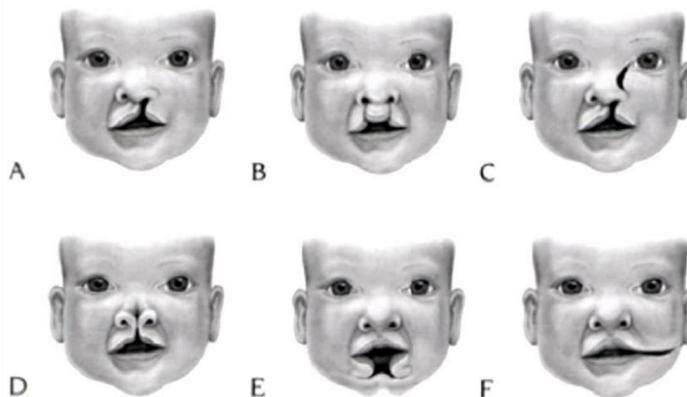


Figure 2.1 Veau's embryological classification (A) unilateral cleft lip; (B) bilateral cleft lip; (C) oblique cleft lip; (D) medial cleft lip with *nasal defect*; (E) *median mandibular cleft*; (F) *unilateral macrostomia*.

(Source: Geoffrey H. Sperber, 2013)

Veau's classification based on topography of the cleft lip consists of:

- a. Class I: unilateral cleft in vermillion
- b. Class II: fissures are found on the vermillion and lips
- c. Class III: fissures on the vermillion, lips and base of the nose
- d. Class IV: bilateral clefts, both complete and incomplete

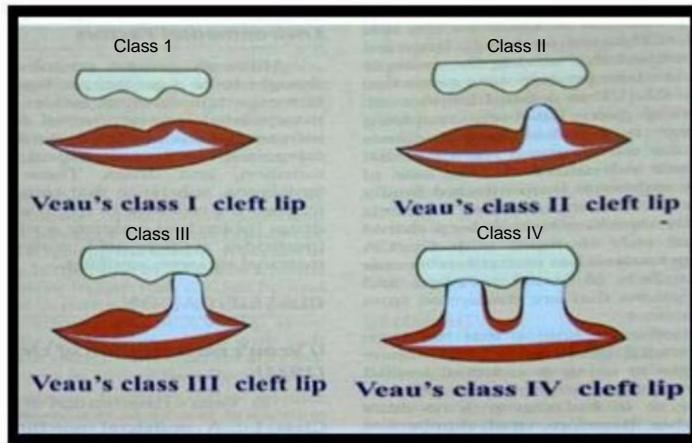


Figure 2.2 Veau Topographic Classification

(Source: Divya Subramanyam, 2020)

2. Classification according to Kernahan

The Kernahan classification is depicted with a Y strip structure as in Figure 2.3

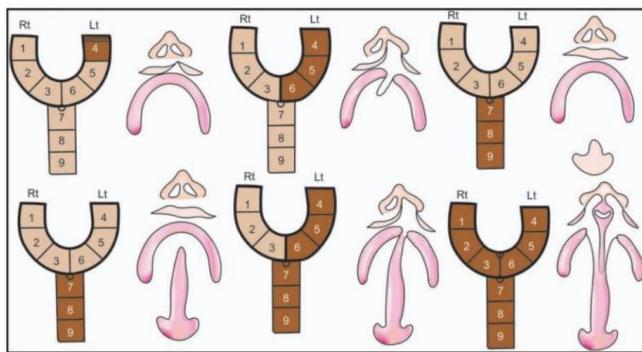


Figure 2.3 Kernahan classification

Source: Neelima Anil Malik, 2008

Caption:

Areas 1 and 4: towards the right and left sides of the lips

Areas 2 and 5: alveolar bone

Areas 3 and 6: roof of the mouth anterior to the *incisive foramen*

Areas 7 and 8: hard palate

Area 9: soft palate

In this classification, the primary palate is separated from the secondary palate with *the incisive foramen* being used as the boundary separating the gap. The primary palate includes the upper lip, alveolar bone and roof of the mouth which is *anterior to the incisive foramen*. The secondary palate includes the hard palate and soft palate which are *posterior to the incisive foramen*.

3. Otto Kriens Classification (LAHSHAL System)

Otto Kriens classification using the LAHSHAL system.

This classification is able to provide an overview of the location, size and type of gaps.

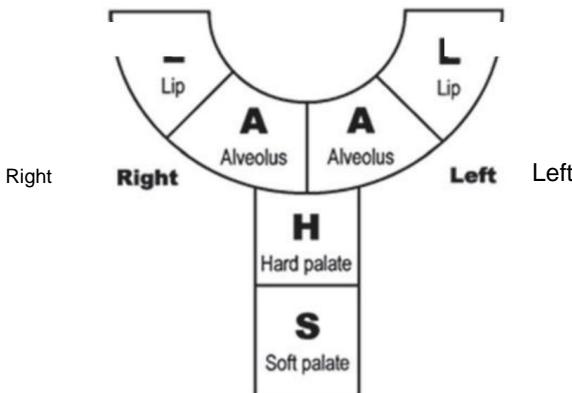


Figure 2.4 LAHSHAL System Cleft Lip Classification

Source: Serrano P., et.al., 2009

Caption:

L (lips): Lips

A (alveolus): Gums

H (hard palate): Hard palate

S (soft palate): Soft palate

Clefts or complete schisis in the labium, alveoli, hard palate and soft palate are described with the capital letters LAH and S, whereas if the schisis is incomplete

written in lower case. Microschisis can be written in lower case letters in brackets. If there are no gaps then the sequence is crossed out. The following is an example of using the LAHSHAL system:

- a. Type of abnormality CLP/LA---AL, the use of capital letters indicates a complete gap and the position of the letters on the right and left indicates the abnormality occurs on two sides. This classification code describes abnormalities in the form of complete gaps in the lips (*L=lips*) and gums (*A=Alveolar*) on the right and left sides. Cases classified as LA---AL are shown in the following image.



Figure 2.5 Case of Cleft Lip LA---AL

Source: Sjaifuddin Noer (2017)

- b. Type of abnormality CLP/---SHAL, use of capital letters indicates a complete gap and the position of the letters on the left indicates the abnormality occurs on the left side. This classification describes abnormalities in the form of complete gaps in the soft palate (*S=Soft Palate*), hard palate (*H=Hard palate*), gums (*A=Alveolar*), and lips (*L=lips*) and on the left side. Cases with classification --- SHAL is in the following image



Figure 2.6 Case of Cleft Lip ---SHAL

Source: Sjaifuddin Noer (2017)

- c. Type of abnormality CLP/l-----, the use of lowercase letters indicates an incomplete gap and the position of the letters on the right indicates the abnormality occurs on the right side. This classification code describes an abnormality in the form of an incomplete gap in the lip (*l=lips*) on the right side. Cases with classification l----- is in the following image



Figure 2.7 Cases of Cleft Lip l-----

Source: Sjaifuddin Noer (2017)

E. Management of Cleft Lip

Management of cleft lip should be carried out during pregnancy so that management can be carried out as early as possible. At the pregnancy stage, treatment is directed at early detection and early diagnosis. At this stage, Plastic Surgeon Specialists (Sp. BP), Pediatric Specialists (Sp. A), Obstetrician Specialist (Sp. OG), Oral Surgery Specialist (Sp. BM), and general practitioners. If a diagnosis of cleft palate has been established, counseling and nutritional assistance can be provided to the parents by involving a Psychiatric Specialist and Clinical Nutrition Specialist.

Management of cleft lip after a child is born is based on the child's age. If the cleft lip is accompanied by a cleft palate, then management in the early stages focuses on providing nutrition to prevent aspiration in the child and helping the child suck milk. At the age of 0-1 week, treatment is carried out to provide nutrition by tilting the child's head at a 45° position. If the cleft lip is accompanied by a cleft palate, at the age of 1-2 weeks an obturator is installed which aims to cover the cleft so that the child can suck milk and avoid aspiration.

At the age of 10 weeks, *Labioplasty* is performed by fulfilling the *Rules of Ten* criteria, namely, the child is 10 weeks old, the child's weight is 10 pounds, and the hemoglobin level is more than 10 gr%. At the age of 1.5 to 2 years palatoplasty can be performed because at this age the child has started to talk. At the age of 2-4 years, *speech therapy is performed*, at the age of 4-6 years *Velopharyngoplasty* can be performed to restore the function of the valve formed by the *tensor veli palatini* muscle and the *levator veli palatini muscle*. Apart from that, children are also trained to speak consonants and blow.

At the age of 6-8 years, treatment is carried out for adjusting the dental arches (orthodontics). At the age of 8-9 years, *alveolar bone grafting is performed*, then at the age of 17-18 years, re-orthodontics is performed. At the age of 17-18 years it is carried out

examination of the symmetry of the mandible and maxilla.

1. Dental and Oral Health in Treating Cleft Lips

General dental and oral health maintenance can be done by:

- a. Provide an explanation to children or parents about the causes of tooth decay and gum disease
- b. Suggests the use of fluoride when necessary
- c. Explain post-operative wound care teeth and mouth area.
- d. Brushing teeth and cleaning the mouth, if the child is more than 6 years old, you can clean between the teeth and clean the tongue.
- e. Using toothpaste containing fluoride in patients over 6 years of age
- f. Cleaning the obturator in infants with aged 0-2 years
- g. Regular dental check-ups at the dental health service and mouth
- h. Radiographic examination of children over 6 years of age year
- i. When the premolars and molars begin to grow, a *fissure sealant procedure can be performed.*
- j. Early detection of white or brown spots on the surface of the teeth

Orthodontic treatment is carried out since the child is 0 years old. At the age of 0-2 years an obturator for the palate can be given. Providing an obturator to babies can help provide nutrition so that the baby's weight can be achieved optimally. The baby's weight is one of the prerequisites so that the baby can be given surgery immediately.

When a child is over 6 years old, orthodontic procedures or orthopedic surgery can be performed. Assess whether a graft to the alveolar bone is needed, treatment through maxillary and/or palatal expansion. When

When children reach adolescence, consideration can be given to the patient's need for specific jaw and orthodontic surgery to correct severe malocclusions.

2. Psychosocial Aspects in Cleft Lip Sufferers

Surgical and orthodontic procedures for children with cleft lip are carried out from the age of 0 to 18 years.

Some cases even cause lifelong disability in sufferers. Apart from having an impact on economic conditions, cleft lip incidents also have an impact on the psychosocial life of sufferers.

The performance of children with cleft lip is lower compared to normal children. The cause of the lack of achievement in children with cleft lip is not clearly known, but it is possible that it is related to lack of hearing ability, speaking ability, social and emotional factors. In social settings, several studies show that children with cleft lips tend to be shy and withdrawn. Children with cleft lips tend to interact less socially and are dependent on family support. Therefore, psychological counseling assistance is needed for parents and children with cleft lip.

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CHAPTER



3

Ulcer

Slamet Riyadi, SKM., MPd

A. Introduction

The mouth is an open cavity through which food and water enter. The mouth is the initial part of the digestive system.

In the mouth there are teeth, tongue and saliva. Teeth are hard, small white bones that grow in rows, are rooted in the gums and function for chewing food and biting. The tongue (*lingua*) is a collection of skeletal muscles on the floor of the mouth that helps digest food. The tongue functions as: a sense of taste, stirs food, helps swallowing, helps clean the mouth and helps speak. Saliva is saliva that comes out of the mouth produced by the salivary glands.

Teeth are one part of the body that is very important for health in general. Even though the teeth are small and people often ignore their existence, if the bulla has had a toothache, only then will you feel how much the whole body hurts, then there is a possibility that the dental disease is no longer mild and more complex treatment may be needed. Advanced dental care requires a long time and a lot of money.

The spread of toothache can be anywhere, teeth are the focus of infection from other parts of the body, for example the eyes, heart. For this reason, if someone wants their body to be healthy, they need healthy teeth.

Dental health is one of the health aspects of the body that cannot be ignored. To keep your teeth healthy, you need a way to look after them.

How someone can maintain good dental health requires knowledge about dental and oral diseases.

The health of the surrounding oral tissue cannot be ignored because if it is not looked after properly it can also cause other health problems around the oral cavity, such as stomatitis or canker sores which are also often experienced by people who do not maintain dental hygiene and

his mouth. Thrush can occur in anyone, both children and adults.

1. Lips and cheeks

The outer surface is covered by skin and contains hair and sweat glands. The inner surface of the lips has a thin epithelial layer and is slightly convex because it contains several small salivary glands.

The profile of the upper and lower lips can explain dental abnormalities that occur, for example, in class II malocclusion or also called a bird's facial profile where the upper teeth are more advanced than the lower teeth (more than four millimeters). This can cause pinching of the lower lip and between the upper teeth. and below, but can be treated with orthodontic treatment or jaw surgery.

The inner surface of the cheek is also covered with mucosa which is closely attached to the muscle structure beneath it.

On the surface of the cheek near the area of the second molar of the upper jaw there is a *duct* (the exit of the large parotid salivary gland), this causes a lot of tartar in that area.

This blood can also be found stuck to food residue left between the cheek and teeth, this is what can cause dental caries. Moreover, an unharmonious position of the back teeth can result in repeated bites on the inner surface of the teeth. Clinically this can be seen by the presence of whitish horizontal lines.

2. Floor of the mouth and tongue

If the tongue is lifted, at the bottom of the tongue you will see a thin layer called *the frenulum* which connects the tongue to the floor of the mouth right in the middle. Sometimes it happens that *the frenulum* is too short and tight so it cannot lift the tongue, including cleaning the lower teeth which also becomes difficult. This is usually treated with surgical cutting. The tongue is divided into 2 areas:

- a. The V-shaped front 1/3 area consists of small protrusions called *papillae*. These *papillae* contain nerves and taste organs (*taste buds*).

This area requires cleaning by brushing and gargling, to remove invisible food residue. If left untreated, a thick layer of fungus or plaque can form. A depression in the form of a line sometimes appears in the middle of the surface of the tongue.

- b. The back 1/3 of the tongue is usually paler in color, contains lymphoid tissue facing the pharynx.

3. Palate and Pharynx

The roof of the mouth is also called the palate. Consists of the hard palate (hard palate) and soft palate (soft palate). The hard palate covers most of the roof of our mouth and plays an important role in the mastication system. Apart from clarifying our speech, its function is also to strengthen the attachment of dentures. Torus palatinus (protrusion in the middle of the palateum with varying sizes). This often happens, apart from causing discomfort when wearing dentures, it also makes it difficult to install them. The soft palate divides the two regions of the pharynx. The pharynx regulates the flow of air through the mouth and nose during breathing and speaking.

4. Saliva

Saliva (saliva) is a mixture of various fluids found in the oral cavity. This fluid comes from the major and minor salivary glands. Saliva functions as a cleaning fluid in the mouth. So sufficient amounts are needed, a lack of saliva will result in a high amount of plaque in the mouth. The acidity level of saliva also influences tooth cavities or caries. The more natural it is, the easier it is for caries to occur (Donna Pratiwi, 2009)

B. Definition of canker sores (stomatitis)

Thrush occurs more often in women. First appears usually at the age of 10-40 years. Small canker sores (less than 1 cm in diameter) often appear in a group of 2-3 open wounds, usually disappear by themselves within 10 days and do not leave scar tissue. Larger canker sores are rare and irregular in shape, take several weeks to heal and often leave scar tissue.

Several definitions related to the meaning of canker sores:

1. According to Endah Kusumawardani, canker sores (*Chanker sores, ulcer afrosa*) are small open sores in the oral cavity, which cause pain.
2. According to Yekti Mumpuni and Erlita Pratwiwi, 2013, Recurrent Aphthous Stomatitus (thrush) is a wound that is limited to the soft tissue of the oral cavity. The term recurrent is used because these lesions usually come and go.



Figure 3. 1 Thrush

Recurrent aphthous stomatitis (SAR) or more commonly called canker sores, is a soft tissue disease of the oral cavity whose cause is unknown, usually accompanied by pain. The nature of this disease will heal itself within a certain period of time, but it is possible that it will appear again in certain circumstances. This disease is experienced by many people. According to Burkett (1971), there are more women sufferers than men

with a ratio of 1:6. According to Shafer (1974), this disease is often found in the age group 10-30 years (Isnindiah Koerniaty, 2006)

According to Shif's research, hormonal factors apparently have a relationship between the menstrual cycle and the onset of SAR. Many have reported that the incidence of SAR increases during premenstruation. Meanwhile, during the menstrual and ovulation periods the numbers are relatively moderate (Ship, 1961)

Shifer (1974) said that during pregnancy there is a reduction in SAR lesions and they appear again at the time of delivery.

Regarding the allergy factor, SAR is often found in asthma sufferers, sufferers of allergies to certain foods and drugs. Stanley (1973) divided SAR clinically into 2 groups, namely: Major type or recurrent necrotic mucosa denitis and minor type or recurrent aptomatic or maculo fibrinous stomatitis.

C. Symptoms

The main symptom is pain, which lasts for 4-10 days. The pain will get worse if the tongue touches the canker sore or if the sufferer eats spicy or hot food (Endah Kusumawardani, 2011):

D. Etiology

Recurrent aphthous stomatitis is characterized by recurrent ulceration of the oral mucosa without other signs. This disease can be associated with immunological disorders, hematological disorders, psychological disorders or allergies.

E. Diagnosis

Diagnosis is made based on the discovery of canker sores and the pain felt by the patient. Thrushes appear as round, white spots with red edges. Almost always forms in loose, soft tissue, especially on the inner lips or cheeks, tongue or palate.

soft palate of the mouth, and sometimes in the throat. (Endah Kusumawardani, 2011).

Generally, the most common cause of stomatitis (thrush) is the hemolytic streptococcus bacteria which also causes pain in the esophagus. But in *stomatitis catarrhalis* and *pneumococcus*. These are the organisms that usually cause *cattarhalis* disease in children (Ircham Machfoedz, 2005)

Based on the appearance of the lesion, recurrent aphthous stomatitis can be divided into minor ulceration if the diameter is less than 1 cm and heals without scarring, major ulceration if it is more than 1 cm, healing takes longer and leaves a scar; ulcerasiherpertiformis if the ulcerations are small and gather (Indah Irma Z, 2013).

F. Treatment

The goal of treatment is to reduce pain until the wound heals on its own. Gargling with warm water and eating soft foods can reduce the discomfort caused by canker sores. Anesthetic (eg thick lidocaine) can be applied to the wound or used as a mouthwash. This drug can temporarily reduce pain so that sufferers can eat, although it slightly affects the taste. Carbosimethylcellulose can also be applied topically to reduce pain. If there is more than one wound, tetracycline mouthwash is given. This drug is also given to sufferers who experience repeated attacks of severe canker sores (Endah Kusumawardani, 2011)

Antihistamines are drugs used to treat allergies, as well as to treat complaints of runny noses and runny noses. Using this drug causes several side effects, one of which is dry mouth, this is because this drug triggers a decrease in saliva production, while saliva is needed to maintain moisture and oral health.

One of the complications caused by dry mouth is gum infection which is indicated by symptoms of pain,

red and swollen gums. Dry mouth is also one of the causes of bad breath (halitosis). Even though there are several negative impacts from consuming the drugs that have been mentioned, these drugs are still needed. The wise step is not to consume this medicine carelessly, without thoroughly consulting a doctor or health worker who has knowledge of these medicines. A healthy body, teeth and mouth conditions remain normal (Agam Ferry Erwana, 2013)

Treatment in cases of aptomatic stomatitis must be accompanied by therapy for the disease causing it, in addition to administering topical emollients, such as orabase in mild cases of 2-3 minor ulcerated lesions. In more severe cases, corticosteroids such as topical triamcinolone or fluocinolone can be given, 3 or 4 times a day after meals and before bed. Tetracycline can be given to reduce pain and the number of ulcerations. If they are not responsive to corticosteroids or tetracyclines, dapsone can be given and if this fails, thalidomide can be given (Indah Irma Z, S. Ayu Intan, 2013).

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CHAPTER

4 | **Dental caries**

* Drg. Anie Kristen, M.Pd*

A. Introduction

Caries is a disease of hard tooth tissue, namely enamel, dentin and cementum, which is caused by the activity of microorganisms in fermentable carbohydrates. A sign of caries is tissue demineralization tooth hardness which is then followed by material damage its organic. As a result, bacterial invasion occurs and the ability pulp and spread of infection to the periapical tissue can cause pain. However, remember it is possible that remineralization occurs, at a very late stage This disease can be stopped early. (Kidd, 2013)

Caries is the result of the interaction of bacteria on the tooth surface, plaque, and diet (especially carbohydrate components which can be fermented by plaque bacteria into acids, especially lactic and acetic acids) resulting in demineralization of hard tooth tissue and requires sufficient time for the event (Putri, MH, Herijulianti, E., and Nurjanah, N., 2010).

B. Caries Etiology

Caries is the result of several trigger factors, namely *host*, substrate, bacteria and time.

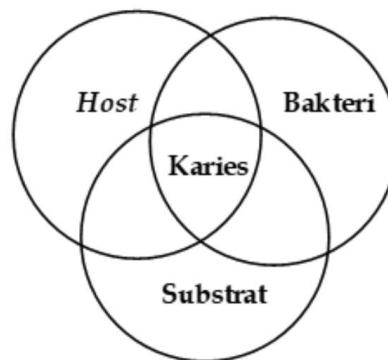


Figure 4.1 Etiological Factors of Caries

1. Hosts

The host or host is the tooth, explained several things related to caries on teeth is a factor of tooth morphology (size and shape teeth), enamel structure, chemical and crystallographic factors. Pit and Deep fissures in the morphology of the back teeth, accompanied by rough tooth surfaces are very influential accumulation of food debris and plaque adhesion helps the caries process. Tooth enamel has a complex chemical composition containing 97% minerals, 1% water, and 2% organic matter. Enamel contains many minerals the denser the enamel crystals are and the more resistant the enamel will be (Pintaulli and Hamada, 2008). The quality of the teeth bad, as enamel hypomineralization may increase risk of caries and changes in the amount and quality of saliva (Cameron and Widmer, 2008).

2. Substrate

The substrate is the result of carbohydrate fermentation. Bacteria require a substrate as an energy source and the final product of bacterial metabolism, namely acid (Cameron and Widmer, 2008). Carbohydrate components that can fermented by bacteria to become acid is acid lactate and acetate (Putri, et al., 2012). Food and Drink which contains carbohydrates (sucrose). metabolized by bacteria in plaque, which causes the pH of the plaque to acid, resulting in demineralization e-mail. The process of pH returning to normal requires time around 30-60 minutes, if you consume carbohydrates regularly Repeatedly will maintain the pH in an acidic state (Kidd and Bechal, 2013).

3. Bacteria

The oral cavity consists of a variety of organisms including *Eubacteria*, *Archaea*, *Fungi*, *Mycoplasmas*, *Protozoa* and possibly viral flora that can persist over time. There are 500 to 700 species in the oral cavity or *Phylotypes* of which only 50 to 60% are processed.

The rest of the flora has not been cultivated at this time identified using molecular techniques.

Bacteria in the oral cavity are classified as gram positive organisms and gram negative organisms, and the second according to oxygen requirements, namely anaerobic or facultative anaerobes (Samarayanake, 2012). Bacteria that can trigger caries are *Streptococcus mutans* and *Lactobacillus* which can make acid from carbohydrate. These bacteria have the ability create extra cellular polysaccharides that help bacteria adhere to teeth and each other in plaque (Kidd and Bechal, 2013).

4. Time

Acidic conditions that occur repeatedly will causing loss of enamel crystals and subsequent damage to the enamel surface, which can take months or even years (Cameron and Widmer, 2008). The initial decalcification occurs in the subsurface for 1-2 years before it becomes cavity (Putri, et al., 2012)

C. Caries Risk Factors

Risk factors for caries are caries experience, fluoride use, *oral hygiene*, bacterial count, *saliva* and pattern Eat.

1. Caries experience

Epidemiological research has proven its existence relationship between caries experience and future caries development. The sensitivity of this parameter almost reaches 60%. The prevalence of caries in deciduous teeth can predict caries in permanent teeth (Pintaulli et al Hamada, 2008).

2. Use of flour

Flour has a function in the remineralization process tooth. Remineralization and demineralization must be balanced In preventing caries, the use of flour will reduce the risk of caries (Duggal, et al., 2013).

The use of flour is obtained systemically and locally. Flour Systemically obtained from drinking water, tablet consumption flour, and drops. Use of flour locally or can reach the enamel without digestion, for example Local use of flour includes toothbrushes, mouthwash and topical application of flour (Putri, et al., 2012).

3. *Oral hygiene*

One indicator of oral hygiene is plaque, which is a component in caries formation. The incidence of caries can be reduced by mechanically removing plaque from the tooth surface. Oral hygiene can be improved by using interdental cleaning tools and regular dental examinations.

Routine dental examinations can help detect and monitor dental problems that have the potential to become caries (Pintauli and Hamada, 2008).

4. *Oral hygiene*

One indicator of *oral hygiene* is plaque, which is a component in caries formation. The incidence of caries can be reduced by mechanically removing plaque from the tooth surface. *Oral hygiene* can be improved by using cleaning tools Interdental and regular dental check-ups. This routine dental examination can help detect and monitor dental problems that have the potential to become caries (Pintauli and Hamada, 2014).

5. Number of bacteria

The beginning of the caries process is played by bacteria *Streptococcus mutans*, then after cavities *Lactobacillus* bacteria increase. A critical pH state will increase acid production in plaque which will increase the caries process (Cameron and Widmer, 2008).

6. *Saliva*

Saliva functions as a *buffer* and cleans food debris in the mouth (Pintauli and Hamada, 2008). Apart from that, *saliva* also has a role in this

bacterial cleaning, antimicrobial, and process remineralization. Tooth remineralization occurs due to the calcium, phosphate and potassium ions contained in saliva (Putri, et al., 2012).

Salivary flow in children increases until the child is 10 years old, but after adulthood there is only a slight increase. Individuals whose *salivary function decreases*, caries activity will increase significantly significant (Pintaulli and Hamada, 2008).

7. Diet

The risk factor for caries will increase when consumed. Repeated carbohydrates will maintain the *pH* in an acidic state (Kidd and Bechal, 2013), food consistency will affect the length of time food stays in the oral cavity and sticking of food residues in the oral cavity (Pintaulli and Hamada, 2008). Children who have a habit of consuming sweet and sticky foods will increases the risk of caries (Aisman, 2009).

D. Types of Dental Caries

1. Based on Caries Stage

In this classification, caries is divided according to its depth:

a. Superficial Caries

The new caries only affects the enamel, but not the dentin caught.

b. Media Caries

Caries has affected the dentin, but has not exceeded half the dentin.

c. Deep Caries

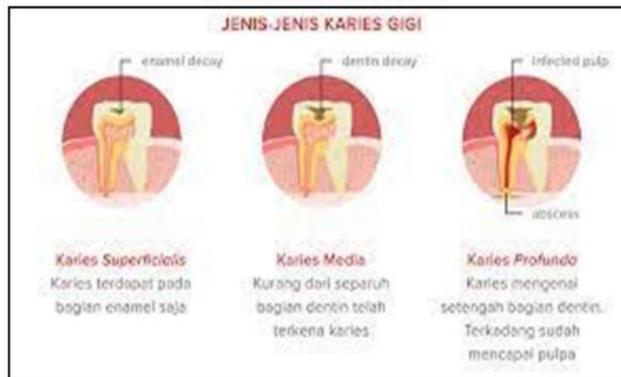
Caries affects more than half of the dentin and sometimes even the pulp. Deep caries can be further divided into 3 parts, including:

1) Stage I deep caries. The caries has passed half the dentin, usually there is no inflammation pulp.

2) Stage II Deep Caries. Layers are still found

thin layer that limits the caries to the pulp. Usually pulp inflammation occurs here.

- 3) Stage III Deep Caries. The pulp has opened and various kinds of pulp inflammation are found. (Rasinta, 2017).



2. Based on the location of the caries

GV Black classifies the upper cavity into 5 parts and is marked with a Roman number, where is the cavity

Classified based on the tooth surface affected caries. These divisions include:

a. Class I

Caries found in the occlusal part (recesses and fissures) of premolars and molars (posterior teeth).

Can also occur on anterior teeth at the foramen caecum.

b. Class II

Caries is found on the approximal part of the molar or premolar teeth, which generally extends to the occlusal part.

c. Class III

Caries that is located on the approximal part of the front teeth, but has not reached the incisal margin (yet reaching the incisal third of the tooth).

d. Class IV

Caries that is located on the approximal part of the front teeth and has reached the mango-incisal (has reached the incisal third of the tooth).

e. Class V

Caries that occurs in the neck third of the front teeth and back teeth on the labial, lingual, palatal or buccal surfaces of

tooth.

f. Class VI

Caries found on the incisal edge or occlusal prominence of the back teeth caused by abrasion, attrition or erosion (Rasinta, 2017)

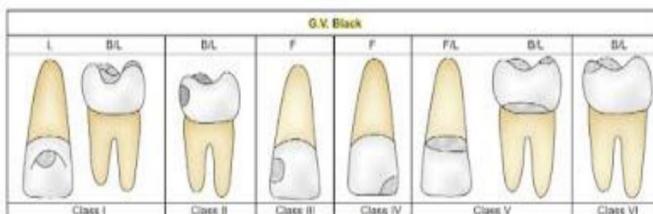


FIGURE 2.15: G.V. Black's classification of dental caries

3. Based on the number of tooth surfaces affected by caries

a. Simple Caries

Caries found on one surface only,
for example labial, buccal, lingual, mesial, distal, occlusal.

b. Complex Caries.

Caries that has spread and affects more than one person tooth surface areas, for example mesio-dystoincisal, mesio-occlusal (Rasinta, 2017)

4. Classification by severity

According to this classification, caries is grouped into:

a. Incipient caries: affects less than half
enamel thickness

b. Moderate Caries: affects more than half
enamel thickness, but does not reach the dentin junction

and email.

- c. Advanced Caries: regarding the dentin-enamel interface and less than half the distance to the pulp.
- d. Severe Caries: affects more than half the distance to pulp. (Rasinta, 2017).

5. Classification based on WHO

This classification is based on the shape and depth of the carious lesion and divided into 4 scales, including:

- a. D1: clinically detected enamel lesions.
- b. D2: cavity in enamel.
- c. D3: cavity involving dentin.
- d. D4: lesion extends to the pulp.

(Rasinta, 2017)

E. The process of occurrence of dental caries

In our mouths there are various kinds of bacteria.

One of these bacteria is *Streptococcus*. This bacteria gather to form a soft and sticky layer

This is called plaque that sticks to the teeth. Some of the plaque in the teeth converts sugar and carbohydrates from food and drink that are still stuck to the teeth into acids that can damage teeth by dissolving them.

minerals in teeth. Disappearance process

mineralization of the tooth structure is called demineralization, while the increase in minerals in the tooth structure is called with remineralization. Dental caries occurs due to processes demineralization is greater than remineralization. The initial stage of dental caries is the formation of black spots that cannot be cleaned with a toothbrush. If these spots are left alone they will get bigger and deeper.

If this caries has not reached the tooth enamel, then not yet feels nothing. However, if it has penetrated the tooth enamel then it will hurt (Ramadhan, 2010).

F. Dental Caries Assessment

Dental and oral health status, in this case dental caries, can be assessed using index values. An index is a measure expressed by numbers of the condition of a group/group against a particular dental disease. These measurements can be used to measure the severity of a disease ranging from mild to severe. Data about a person's caries status can be used as a caries index so that the assessment given by the examiner is the same or uniform (Herijulianti, 2002).

1. DMF-T Index

The DMF-T index is an index used to assess dental and oral health status, in this case permanent dental caries. Dental caries is generally caused by poor oral hygiene, resulting in the accumulation of plaque containing various types of bacteria. *DMF-T* is an abbreviation for *Decay Missing Filled-Teeth* (Herijulianti, 2002).

The *DMF-T* value is a number that shows the number of teeth with caries in a person or group of people. Number *D* (*decay*) is a tooth with a cavity due to dental caries, number *M* (*missing*) is a tooth that was removed due to dental caries, number *F* (*filled*) is a tooth that was filled due to caries and is in good condition (Amaniah, 2009). The *DMF-T* value is the sum of *D* + *F* + *T*. The main indicator for measuring *DMF-T* according to WHO is in children aged 12 years, which is expressed by the *DMF-T* index, namely ≤ 3, which means that at the age of 12 years the number of cavities (*D*), removed due to dental caries (*M*), and teeth with good filling (*F*), no more or equal to 3 teeth per child (Amaniah, 2009).

The formula used to calculate *DMF-T*:
$$DMF-T = D + M + F$$

Average *DMF-T* = Number of *D* + *M* + *F* / Number of people examined.

DMF-T category according to WHO :

- a. 0.0 – 1.1 = very low
- b. 1.2 – 2.6 = low
- c. 2.7 – 4.4 = medium
- d. 4.5 – 6.5 = high
- e. 6.6 > = very high

2. Def-t index

This *def-t* index is the same as *DMF-T*, only it is an index. This is used for primary teeth. *E* here means exfoliation, namely the number of primary teeth that are lost due to caries or have to be extracted due to caries. However, in some studies exfoliation is not used (*df-t*) because it prevents the possibility of errors, whether during exfoliation the respondent's teeth were actually lost due to caries or something else. In primary teeth, teeth are often lost due to physiological resorption or can also be caused by trauma.

Formula for *def-t*

the same as that used in *DMF-T* (Radiah, 2013).

G. Consequences of Dental Caries

Caries can cause impacting pain in mastication disorders so that nutritional intake will reduced affects the growth and development of children. Dental caries that is not treated, apart from being painful over time, can also cause swelling due to the formation of pus coming from the tooth. This situation in addition to interfering with masticatory function and appearance, speech function is also disturbed (Lindawati, 2014).

H. Prevention of Dental Caries

According to Tarigan (2014), prevention of dental caries aims to improve the standard of life by extending the usefulness of teeth in the mouth. Prevention

Dental caries can be divided into:

1. Pre-eruption actions

This action is indicated for the perfection of the enamel and dentin structures or teeth in general. Examples include providing vitamins, especially vitamins A, C, D and providing the minerals Ca, P, F, Mg.

2. Post-eruption actions

In this action, several methods are used like:

a. Diet management

This is the most common and significant factor for caries disease. Acids are constantly produced by the plaque that forms from carbohydrates in large quantities will cause saliva to buffer, so that the process remineralization does not occur. The first action that can be taken to prevent caries is Limit foods that contain them carbohydrates, especially sucrose (Putri, Herijulianti and Nurjannah, 2010).

b. Plaque control

Several studies show that there is a link between tooth brushing and development dental caries, control plaque by brushing your teeth strongly important before suggesting other things to the patient. To be successful, things must be taken into account is:

c. Choosing a good toothbrush and using it.

- 1) How to brush your teeth properly.
- 2) Frequency and duration of brushing.
- 3) Use of fluorine paste.
- 4) Use of dis closing material.

5) Use of fluorine.

The efforts undertaken include:

is increasing the fluorine content in the diet, using fluorine in drinking water, application directly on the tooth surface (topical application), or added to toothpaste.

I. Treatment of Dental Caries

Initial measures for the treatment of dental caries, small cavities teeth should be filled immediately. If teeth are not filled immediately, the process of increasing the size of the hole in the tooth will continue. Holes cannot close by themselves naturally, but need to be filled by a doctor teeth (Afrilina and Gracinia, 2007).

Diseased or cavities cannot be cured by administering medication. These teeth can only be treated and restored to their original chewing function by drilling or chipping the tooth can only be restored to its shape by means patching. The process of filling teeth, other than tooth tissue If there is disease, healthy tooth tissue must also be taken, because bacteria have entered the deep part of the tooth, after that a filling is carried out to restore the shape of the tooth to its original shape, so that it can function properly. good (Massler, 2007).

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CHAPTER

5

Bleeding Gums

Sri Febrianti, S.ST.M.Pd

A. Introduction

Dental and oral problems in Indonesia are still very common namely, it has a prevalence of 25.9% of the Indonesian population, according to the 2013 Basic Health Research (Risikesdas), experiencing dental and oral health problems. The city of Surabaya, which was included in the 2013 Risikesdas statistics, revealed that a larger percentage of the population there than the country as a whole, 37.9%, had dental and oral health problems. Although there is little danger of death associated with oral disease, it can reduce performance, be a source of infection, and cause systemic disease

(Mahendra Nur, Krismariono and Rubianto, 2017)

The low level of behavioral variables and public awareness of maintaining dental and oral health is one of the main elements that influences the community's dental and oral health status. The condition of bleeding gums is often ignored by society, even though this condition is a sign of a health problem in the body's condition.

The low level of behavioral variables and public awareness of maintaining dental and oral health is one of the main elements that influences the community's dental and oral health status.

The condition of your teeth and gums needs good care. from the idea of focused infection, which was widely discussed in the 19th and early 20th centuries. According to this belief, infections in the oral cavity lead to the development of a number of inflammatory disorders, including appendicitis, arthritis and gastric ulcers.

The significance of dental infections in a number of systemic disorders, including heart and vascular diseases, lung diseases, diabetes, stroke, cancer, etc., has been verified by advances in categorization and identification of oral bacteria and immunological studies. It is also increasingly clear that disease-causing germs can spread to other parts of the body through the mouth and teeth. Many epidemiological studies show oral infections, especially gum disease

bleeding) and inflammation of the tissues that support the teeth (periodontitis), are risk factors for systemic disease.

The reason for bleeding gums is inadequate dental hygiene, which causes plaque buildup on the surface of the teeth and gums. Bleeding gums is inflammation, or inflammation that affects the gingiva. Plaque-forming bacteria make toxins that irritate the gums and cause gingivitis, which makes bleeding easy. Apart from that, gingivitis can also occur due to vitamin deficiencies, especially vitamin C. (Fedi, Vernino, and Gray, 2004)

The soft tissue that covers the jawbone in the upper and lower jaw and the neck of the teeth is called the gum, sometimes known as the gingiva. One of the tissues that supports teeth is the gum itself. The neck of the tooth appears to be held by the gums. Some gums are securely connected to the jawbone, while others are attached very loosely to the neck of the tooth.

The free gum margin is this area. (free marginal gingiva).

The interdental papilla is the free gum margin located between two neighboring teeth.

Bleeding gums are gums that are inflamed or infected with bacteria. The words gingiva and itis both refer to gums. If the gums are healthy, the following signs will appear:

1. The color is pink.
2. The gums and jawbone are securely joined together.
3. Has a circumference like a crescent moon and resembles a shape knife teeth.
4. No discomfort.
5. No bleeding.

Signs of inflamed gums are swollen, very red and bleed easily. Signs of inflamed gums are swollen, very red and bleed easily.

The nerves that give life to the teeth, as explained above, always travel together with the blood vessels as well. For the life needs of teeth and other tissues

around the teeth in the mouth, namely the gums and others, this nerve runs from the central nervous system in the brain, to the mouth and teeth through the middle of the lower jaw, and the upper jaw for the upper teeth. For the gums, apart from going through the jaws, there is also going through the soft tissue of the inner cheeks and so on. Since gums are living tissue, care must be taken to maintain them. This is done by brushing your teeth, the soft bristles of the toothbrush must be applied to the surface of the gums, so that the gums are massaged or sorted by the pressure of the soft toothbrush bristles. That way the blood flow will be smoother.

B. Definition of Bleeding Gums

Gum or gingival irritation, which can occur at any time after teething and is a common occurrence, causes bleeding gums.

Gum bleeding is a sign of gum inflammation caused by certain disorders. This problem can also develop in those who wash their teeth too vigorously or have blood clotting problems.

C. Causes of bleeding gums

Poor dental hygiene leads to plaque buildup on the teeth and gums, which is the main cause of bleeding gums. Toxins produced by bacteria in plaque stimulate the gums, resulting in gingivitis and bleeding gums (Tariqan, 2013).

Dental and oral hygiene plays an important role in dental health because it can cause various disorders, both local and systemic. The development of plaque, which causes tartar on the teeth and is caused by food residue that is not removed, is the most frequent cause of bleeding gums. Plaque will become tartar if left on the teeth for more than 72 hours. Periodontal disease, which includes symptoms such as bleeding gums, can be prevented by practicing proper oral hygiene.



Figure 5.1 Bleeding Gums

D. Prevention and Treatment of bleeding gums

Treatment is needed for medical problems that cause or worsen bleeding gums. Overgrowth of the gums must be removed surgically if medication is the root of the problem. Additional vitamins are given if there is a deficit of niacin and vitamin C.

Within two weeks, acute bleeding gums usually stop without therapy. For patient comfort when eating and drinking, anesthetic mouthwash can be administered.

To reduce plaque and avoid mouth infections, chlorhexidine mouthwash can be used. The dentist removes food particles and microorganisms from behind the gum folds when pericoronitis occurs. After removal of the upper teeth and antibiotic treatment for several days, the lower molars are also removed if the X-ray shows

the lower molars are unlikely to develop fully.

E. Risk Factors for Bleeding Gums

Anyone can experience bleeding gums. But that's the thing make bleeding gums more likely, including:

1. Have a bad habit of cleaning your teeth too hard;
 2. are elderly; 3.
- wearing false teeth that are not installed correctly; 4. lack of vitamins C and K in sufficient quantities; 5. suffer from diabetes;

6. have a weak immune system, such as HIV/AIDS;
7. Experiencing thrombocytopenia, namely a lack of platelets,
such as someone suffering from dengue fever;
8. using blood thinners such as warfarin or clopidogrel; or

9. Suffering from blood clotting disorders (hemophilia)

F. Tips for choosing, storing the right toothbrush and how to brush your teeth correctly

A good toothbrush meets the following requirements:

1. The stem is slim and easy to hold.
2. Small toothbrush head.
3. Toothbrush bristles are required to be flat and flexible.

Apart from meeting the requirements, storing a toothbrush should also not be underestimated. You should rinse your mouth after brushing your teeth. Then, hang it upside down. When added, the water does not dry out immediately, and remaining bacteria will grow. hanging it will cause the toothbrush to dry out quickly, which will encourage bacterial growth. After eating and before bed are the ideal times to brush your teeth.

Consuming hard foods or brushing your teeth too hard and using the wrong brushing technique can also trigger bleeding in the gums. The basic principle of regular tooth brushing is to thoroughly clean and remove all plaque from the surface of the teeth. Brush your teeth with several strokes. Be patient. Before moving, clean one side. Avoid brushing the gum surface when cleaning the side surfaces, both inside and outside (gum tip).

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CHAPTER

6

Abraded Teeth

Sukarsih, S.Si.T, M.Pd

A. Introduction

An important component that supports the development of ideal dental and oral health is maintaining oral hygiene. Successfully maintain healthy teeth by brushing your teeth every morning following the recommendations and before bed. Toothbrushing techniques such as combination, vertical, horizontal, roll, charter, stillmen, circular, and bass which have been determined based on certain indications according to needs are several things that need to be considered when brushing teeth (Christiany, et al, 2015).

The gingival margin bands can be pulled away from the apical location of the cemento enamel junction with improper tooth cleaning techniques, which can lead to tooth abrasion. In cervical teeth, the abrasion is wedge-shaped or "V" shaped, and the teeth become sensitive to hot and cold thermal stimuli. Fractures in the cervical area of the tooth may occur due to further abrasion.

Although abrasion can occur in all teeth, abrasion is more common in the canines and premolars of the upper and lower jaws (Hunter and West, 2000).

The Word Health Organization (WHO) stated that according to Hanif et al. (2015), the prevalence of tooth abrasion in humans increases from 3% in their 20s to 17% in their 70s.

an. There are several age groups that experience more tooth abrasion in Indonesia. The age range of 30 to 39 years is represented by 22.58%, 40 to 49 years by 45.45%, and 50 to 59 years by 53.33%. According to the survey, premolars 36.65% of the teeth in the upper jaw and 38% of the teeth in the lower jaw were the teeth that experienced the most abrasion. (WHO in Kalangie, et al, 2016).

How you brush your teeth, your brushing technique, and how hard you brush are all risk factors for tooth abrasion in humans. Apart from that, the type of toothbrush bristles, their stiffness, and the abrasive nature of the toothpaste used are factors that cause tooth abrasion (Meshramkar, et al, 2012)

B. Definition of Abraded Teeth

Tooth abrasion is an injury that can erode the surface layers of teeth while damaging deeper parts (Tarigan, 2019). According to Ghom and Mhaske (2008), tooth abrasion is a mechanical process in which tooth material is lost. Tooth enamel and dentin are lost and degraded in an abnormal condition called abrasion. The friction force between teeth and external objects is what damages teeth. Brushing habits, such as how often you floss, the type of toothbrush you use, and the way you brush your teeth, can cause tooth abrasion. Tooth abrasion due to using a toothpick in the interdental area can cause abrasion between the two

teeth (Sitanaya, 2017).



Figure 6.1 Tooth Abrasion

C. Causes of Abraded Teeth

Abraded teeth are caused by something rubbing or friction on the surface of the teeth. Brushing your teeth too vigorously and using a toothbrush with hard bristles are common causes of abrasion.

Toothpicks or partial denture grips can also cause abrasion (Tarigan., 2019).

Brushing teeth with a horizontal technique, mostly done by people who have not been given special knowledge of brushing teeth, usually strong pressure can cause tooth abrasion (Putri, et al., 2013). The etiology of abrasion is usually excessive toothbrushing movements, especially in a horizontal direction with abrasive toothpaste (Scully and Cawson, 1995).

Causes of tooth abrasion: brushing teeth with a horizontal technique and too hard pressure; nail biting habit; using a toothpick in the tooth gap; using abrasive toothpaste; bad habits of opening bottle caps with teeth and biting pencils; bruxism. Combining mechanical and chemical action is the cause of tooth abrasion (Sitanaya, 2017).

D. Due to tooth abrasion

Tooth abrasion takes the form of sharp pieces, like the letter V and is shinier yellow in color than the original tooth.

Gives an unfavorable appearance effect. Erosion of the tooth surface can occur quickly in the thin enamel layer in the tooth area. Tooth abrasion initially occurs in the form of gingival recession on the labial surface and neck of the affected tooth, sometimes accompanied by *hypersensitivity*. Groove formation when cementum and dentin are abraded, especially in canines. if the abrasion is severe enough, teeth can fall out (Scully and Cawson, 1995).

According to Houwink et al, (1993), apart from how you wash your teeth, how often and when you do it has a big impact. The recommendation to brush your teeth after eating and before going to bed has often been followed until now, but recently the lack of schedule has seen a large number of pain complaints, most of which begin with pain due to abrasion.

Tooth abrasion can also occur when brushing teeth horizontally, which causes parallel friction and continuous damage to the enamel surface with too much pressure (Putri, et al. 2013).

E. Prevention of tooth abrasion

Prevent tooth abrasion: Use a soft-bristled toothbrush and toothpaste with a lower abrasion level; Brushing your teeth immediately after consuming acidic foods will quickly damage your teeth; After consuming acidic foods, gargling with water is better than brushing your teeth directly (Tarigan, 2019).

Bad behavior that causes tooth abrasion can be stopped (Eversole, 2011) to prevent tooth abrasion.

The possibility of additional abrasion can be avoided by changing bad habits and using more appropriate techniques when cleaning teeth.

F. Treatment of Abraded Teeth

Treatment for abrasion of teeth, if it causes aesthetic defects or hypersensitivity, restore it with resin composite (Scully and Cawson, 1995). The toothbrushing technique used should be a combination technique, so that tooth abrasion does not occur.

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CHAPTER

7

Large Holes in Teeth and Remaining Roots

Dr. Sri Hidayati, MKes

A. Introduction

It is estimated that 90% of school-aged children worldwide and most adults have suffered from dental caries (cavities). The highest prevalence of caries is in Asia and Latin America. The lowest prevalence is in Africa. In the United States, dental caries (cavities)

is a chronic childhood disease that often occurs and the rate is 5 times higher than asthma. Caries (cavities)

is the primary pathological cause of tooth loss in children. Between 29% and 59% of adults over the age of fifty experience cavities.

The number of caries cases is decreasing in various developing countries, due to increased awareness of dental health and preventive measures with fluoride therapy (Baehni, 2008).

This disease is characterized by cavities. If left untreated, this disease can cause pain, tooth nerve death (*necrose*) and periapical and systemic infections which can harm the sufferer, and can even result in death (Ash & Nelson, 2003.)

B. Understanding

Dental caries or cavities is a localized dental disease that damages hard tooth tissue which occurs due to the interaction of several factors, namely host (teeth), agent (bacteria), substrate (diet), and time. Caries is caused by neglecting oral hygiene, resulting in plaque buildup. Plaque is a thin layer that adheres tightly to the surface of the teeth and contains a collection of bacteria (Whiley and Beighton, 2013).

Dental caries (cavities) is a chronic disease whose process lasts quite a long time in the form of chronic and continuous loss of mineral ions from the enamel surface on the crown or root surface of the tooth caused by bacteria and the products they produce. This damage is only visible microscopically at first, but lasts long

Over time, emai will appear in the form of white spot lesions or softening of the cement at the root of the tooth.

C. Causes of cavities (dental caries)

Caries is caused by the interaction of various factors, such as host factors (teeth and saliva), microorganisms, substrate (food) and time as an additional factor.

The microorganisms that cause caries are bacteria of the type *streptococcus* and *lactobacillus*. However, from various studies it is reported that *streptococcus mutans* (s. Mutans) is the most frequently found caries-causing agent. The interaction of s. mutans on the tooth surface causes the enamel demineralization process. The caries process is characterized by demineralization of the hard tooth tissue, followed by destruction of the organic material. If this demineralization process continues to repeat itself quickly and is not balanced with remineralization, caries can occur. If this process continues, it will reach the dentin and pulp, and can even cause necrosis. This will cause bacterial invasion and damage to the pulp tissue as well as the spread of infection to the periapical tissue and cause pain (Itjingningsih, 1995).

D. Distribution of dental caries

Based on depth (Rasinta Tarigan, 1993)

1. Superficial Caries: caries that only affects the enamel and does not affect the dentin
2. Media caries: a tooth cavity that touches the dentin but does not touch half of the dentin
3. Deep caries: a tooth cavity that has affected more than half of the dentin and sometimes has affected the dental pulp

E. The course of dental caries

Tooth cavities are caused by several types of acid-producing bacteria which can cause damage

carbohydrate fermentation reactions including sucrose, fructose, and glucose (Cate, AR Ten. 1998). The acid produced affects tooth minerals so that they become sensitive at low pH.

A tooth will experience demineralization and remineralization. When the pH drops below 5.5, the demineralization process becomes faster than remineralization. This causes more tooth minerals to melt and create holes in the teeth.

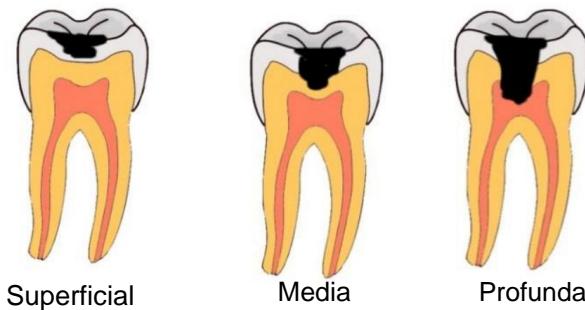


Figure 7.1 The course of dental caries (cavities)

F. Large Holes in Teeth

If caries is not treated, it can spread to the dentin or pulp. If this caries has spread and caused the dentin tubules to be exposed, microorganisms will easily enter or invade the pulp (Baehni, PC and b.

Guggenheim, 2008). When the pulp tissue is exposed due to caries, an inflammatory reaction begins to develop, often resulting in an abscess localized to the periapical part of the tooth. In this condition, pulpitis is considered irreversible. Irreversible pulpitis usually varies in intensity and duration, in some cases there is spontaneous pain that cannot be overcome by analgesics, so it requires further treatment, namely root canal treatment (Bots CP, 2004).



Figure 7. 2 Large Holes in the Teeth

1. Symptoms of large cavities

At the beginning of the hole formation, this condition does not cause any symptoms in the sufferer. However, as the hole gets bigger, this condition can trigger various symptoms, such as: toothache, tooth sensitivity, mild to severe pain when consuming sweet, hot or cold foods or drinks, visible holes in the teeth, black or white brown stains on the surface. teeth, pain when biting.

2. Treatment of cavities

Treatment for cavities depends on the severity. There are several ways to treat it, including:

a. Patching

If the cavity is still small and not deep, it can be filled immediately.

b. Root Canal Treatment

If the tooth cavity is large and deep enough to reach the root canal, the dentist will perform root canal treatment first. This is done by removing rotting nerve tissue and blood vessels. When the root canal has been cleaned of

rotten nerve tissue and blood vessels, then the channel will be filled with medicine. After that, the tooth will be filled. Or you can also make a restoration or crown on it.

c. Crown Making

If the tooth decay is severe enough to leave little remaining crown, treatment can be done by making a dental crown.

d. Revocation

Revocation is the last step that can be taken. This is usually needed if the cavity in the tooth is too severe, so other treatment cannot be carried out.

G. Remaining Roots

The remaining root (stump) in dentistry is called "*radix gangrene*." Gangrene means something is dead and it is no longer useful. Root residue is a condition where the tooth crown is lost due to caries which has destroyed the tooth enamel so that only the tooth root remains

(Baehni, PC and B. Guggenheim, 2008). The remaining roots can become a fertile place for bacteria to breed. It is also very annoying because it causes pain and swelling (Ash & Nelson, 2003). Pain and swelling indicate the body's reaction to a tooth infection. The remaining tooth roots must be removed and cleaned, because their presence is a source of growth of microorganisms or bacteria and can cause infection in the teeth and surrounding tissue.

Microorganisms play a major role in the occurrence of caries (Ramayanti, 2013).

1. Causes of Tooth Root Remains

Remaining roots in teeth generally occur due to cavities or caries that are not treated or are the result of tooth decay due to prolonged infection (Ash & Nelson, 2003). Apart from that, remaining tooth roots can also be caused by trauma and incomplete tooth extraction. . Remaining roots that are not treated immediately can become a source of infection, abscess and can even be a risk factor for systemic disease. Dental caries occurs because there are bacteria in the mouth and

carbohydrates that stick to the teeth over time certain things are not cleaned. Bacteria in the mouth will secrete toxins that will convert carbohydrates into an acidic substance which causes enamel demineralization. If after every meal you have the habit of gargling and brushing your teeth, dental caries will not occur because the demineralization process can be balanced by the remineralization process by saliva as long as the mouth is clean.

Good oral hygiene will not give bacteria the opportunity to create holes in our teeth. Caries, which initially only shows white spots on the enamel, will eventually turn brown and become hollow. If oral hygiene is not maintained, the holes can become wide and penetrate the dentin layer. At this stage, if there is no dental treatment, the hole becomes wider and deeper until the pulp area of the tooth contains many blood vessels, lymph and nerves. In the end, infected teeth become an entry point for bacteria to spread

throughout the body.

2. Symptoms and Treatment of Remaining Tooth Roots

The remaining tooth roots should be treated so that they do not cause complications or problems in the future. Problems that may arise if the remaining tooth roots are left untreated are infection, swollen gums, pain, bad breath, cosmetically and aesthetically disturbing, and triggering gum cysts. Management of remaining tooth roots depends on clinical examination of the tooth roots and supporting tissue. Tooth roots that are still intact with good supporting tissue can still be treated. The pulp tissue is removed, replaced with artificial pulp, then a dental crown is made. Tooth roots that are shaky and the supporting tissue cannot be treated need to be removed. For remaining tooth roots measuring more than 1/3 of the tooth roots that occur as a result of tooth extraction, it is best to still remove them. This matter

You may need to take an X-ray of your teeth first. Removing remaining tooth roots is generally easy. The teeth have suffered serious damage so that the tissue supporting the teeth is no longer strong. For difficult cases, light surgery is required. Before extraction, the patient should take antibiotics several days beforehand. This is to suppress infections that have occurred. Root caries often occurs and mostly when the root surface has been exposed due to root recession (exposed roots), due to unhealthy gums that have been exposed to bacteria. The root surface is increasingly susceptible to demineralization of the enamel or because the cementum is demineralized at a pH of 6.7. More commonly found on the facial, approximal and lingual surfaces. Upper molars are a frequent location of root caries.



Figure 7. 3 Caries affecting the roots

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CHAPTER

8

Oral Cancer

Dr. Karin Tika Fitria, M. Biomed

A. Introduction

Oral cancer is a type of malignancy that is found throughout the world with varying prevalence rates (Sarode *et al.*, 2020). Oral cavity cancer, which is the top 6 most frequently encountered malignancy and the top 15 causes of death in the world, includes cancer located in the lip area, oral cavity and also the oropharynx (The GLobal Cancer Observatory, 2020).

The surface of the oral cavity is lined with squamous epithelial tissue so that the most common type of oral cancer (95%) is squamous cell cancer . Meanwhile, other types found include cancer of the salivary glands, lymph glands, bones and soft tissue (Watters *et al.*, 2021). WHO data shows that the incidence of oral cancer reached 377,713 new cases with 177,757 deaths in 2020 (The GLobal Cancer Observatory, 2020).

Oral cancer is more common in men than women and almost 95% of oral cancer is found in patients over 40 years of age (The GLobal Cancer Observatory, 2020; Watters *et al.*, 2021). However, based on research, diet patterns and oral health have the potential to be etiological factors, so that the incidence of cases at younger ages is also increasing (Gross, Mazul and Zevallos, 2020).

Socioeconomic influences can play a role in the incidence and prognosis of treatment. Only a third of oral cancer cases are detected at an early stage, while others are found at an advanced stage, affecting the prognosis of treatment (Bruch and Treister, 2017).

B. Pathogenesis

The pathogenesis of cancer is called carcinogenesis. This process is a genetic change process that can change cell molecular function, cell morphology and cell behavior. Genes that play a role in carcinogenesis are *oncogenes* and *tumor suppressor genes* (TSGs).

Oncogenes are genes that code for molecules of growth factors, growth factor receptors, protein kinases, signal transducers, nuclear phosphoproteins, and transcription factors. So if the genes that regulate growth are disturbed, cells can grow with abnormal shape and function.

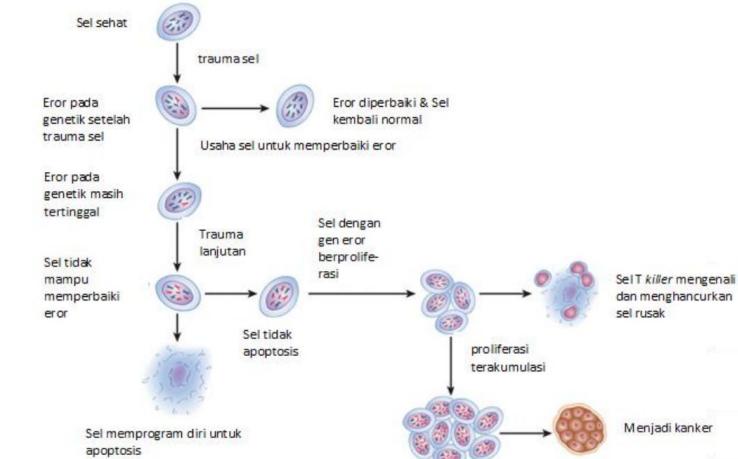


Figure 8.1 Carcinogenesis chart. When cell DNA is exposed to carcinogens, cells will experience death or apoptosis or carry gene defects during proliferation to form tumor masses (Myers and Curran, 2014).

Tumor suppressor genes (TSGs) are genes that regulate growth restriction, when cell growth and differentiation should stop. If there is interference with this gene, cell growth cannot be controlled (Watters *et al.*, 2021).

C. Etiology and Risk Factors

The incidence of oral cancer is related to age, where there is an accumulation of genetic changes and the role of duration of exposure to carcinogenic substances, physical and chemical irritants, viruses and hormonal effects. Apart from that, immunological factors also play a role in the pathophysiology of oral cancer (Watters *et al.*, 2021).

Several risk factors associated with *Squamous Cell Carcinoma* (Bruch and Treister, 2017; Watters *et al.*, 2021):

1. Cigarettes

A large number of carcinogens are contained in cigarettes and in the combustion products. Ingredients that play a role include *polycyclic aromatic hydrocarbons* containing *benzene*, *tobacco-specific nitrosamines*, and *aromatic amines*. This material can damage epithelial tissue according to the exposure dose by damaging the DNA repair mechanisms of cells and the potential for important gene mutations that can lead to malignant conditions. Smokers have a 5-10 times greater tendency to develop oral cancer than non-smokers. Using clove cigarettes and pipe cigarettes also carries the same risks.

Although the risk of using e-cigarettes in the incidence of oral cancer is unknown, it cannot be said to be safe for users.

2. Alcohol

Alcohol consumption can increase the risk of oral cancer, especially in moderate and heavy alcoholics, who on average consume around 5-8 glasses containing 10-15 grams of alcohol. In addition, the combination of alcohol and cigarette consumption can produce a synergistic effect in increasing the risk of oral cancer.

The ethanol content in alcohol can disrupt the permeability of the oral mucosa, allowing other carcinogens that may be contained in alcoholic drinks to penetrate the tissue more easily.

3. Mechanical trauma and inflammation

Trauma and irritation to the oral mucosa that is left unchecked can be a potential risk of causing carcinogenesis. Irritation of dentures, irregularly shaped teeth, bad fillings and

irritation and the habit of continuously biting the cheek which causes trauma and inflammation can trigger disruption of the cell regeneration process. Galvanic reactions from patches located close to the mucosa also have the potential to be a risk factor (Panta and Andreadis, 2019).

4. Exposure to light

Exposure to UV rays is a risk of cancer on the lips and other extraoral areas due to the cumulative effects of UV exposure. The occurrence is more often found on the lower lip.

5. Viruses

Several viruses have been linked to oral cancer. One of them is *the Epstein-Barr Virus (EBV)* which is associated with the occurrence of nasopharyngeal cancer, *Burkitt's lymphoma* and other forms of lymphoma. *Human Herpesvirus (HHV-8)* is also associated with the occurrence of *Kaposi Sarcoma* in HIV-infected patients.

6. Immunosuppressants

Someone with a low immunological condition, such as HIV patients, will be more susceptible to oral cancer, such as *Squamous Cell Carcinoma*, *Kaposi Sarcoma*, and *Non-Hodgkin Lymphoma*.

7. Nutrition

Low consumption of fruit and vegetables, high consumption of meat, tobacco use plus alcohol drinking habits

increases the risk of oral cancer. Foods high in vitamins A, C, E and selenium have antioxidant protective effects, especially on cancer in epithelial tissue (Watters *et al.*, 2021).

8. Others

Hyperplastic candidiasis is also thought to be associated with premalignancy, although the pathogenesis is still not clear. Apart from that, *Syphilis* infection is also associated with the incidence of tongue cancer, but the causal relationship cannot be ascertained.

D. Types of Oral Cancer

The most common malignant condition found in the oral cavity is *Squamous Cell Carcinoma*.

However, several other malignant conditions can also manifest in the mouth and surrounding areas (Prabhu, 2022).

1. *Squamous Cell Carcinoma*

Cancer of the lips (*Lip Squamous Cell Carcinoma*) has an etiologic cause caused by exposure to UV rays, as well as the use of unfiltered cigarettes. People with fair skin who work a lot outside the building and *immunocompromised* patients are at risk of developing this cancer. Lip cancer is more often found in the lower lip (90%) and is more often found in men. The condition initially begins with epithelial thickening, induration, scab formation and then shallow ulceration. Approximately 10% of cases can metastasize to regional lymph nodes.

Oral cavity cancer (*Oral Squamous Cell Carcinoma*) has a multifactorial etiology. 75% is related to smoking habits and chewing tobacco. Apart from that, excessive alcohol consumption and

even when combined with smoking it can increase the risk even higher. Cancer in the oral cavity is initially asymptomatic. Areas that are often found are the lateral border and ventral surface of the tongue, the floor of the mouth, the lingual part of the alveolus, and the retromolar part of the buccal mucosa. In India, the buccal mucosa is the most common area.

This oral cavity cancer can have clinical symptoms as follows:

- a. *Exophytic growths* such as mushroom, cauliflower, papillary or verruciform, *non-healing ulcers* with induration (hardening) and eversion (protruding) edges, fissures, red, white spots or a combination
- b. Unhealed tooth socket
- c. Tooth mobility of unknown cause

- d. Trismus
 - e. Dysphagia
 - f. Pain in advanced stages (due to secondary infection or neural infection)
 - g. Enlarged cervical lymph nodes h.
- Involves bone manifestations (advanced stage)
- i. Loss of weight and metastases to other organs in advanced stages

Verrucous carcinoma is another type of *Squamous Cell Carcinoma* whose manifestations are seen on the buccal mucosa, tongue, lips, alveolar ridge gingiva and base of the tongue. Predilection occurs in men. The clinical picture seen is a papillary exophytic mass. This cancer grows slowly.

2. Melanoma (Malignant Melanoma)

This cancer is a malignant neoplasm that originates from melanocyte tissue. This cancer is the 3rd most frequently encountered skin cancer. Mucosal events are quite rare. The etiology of this cancer is exposure to solar radiation. The risk factors for this cancer are people with light skin, people with skin that burns easily and develops *freckles*, a family history of melanoma, having a large number of nevi (colored spots from melanocyte cells) and in individuals with immune disorders. This cancer has a predilection for women. In the oral cavity, the areas that often occur are the hard palate and alveolar ridge of the upper jaw. 30% of melanomas occur as a result of long-term hyperpigmented lesions. Melanoma is usually asymptomatic with brown or black spots in the early stages, then grows laterally. In the advanced stages, nodular growth, ulceration, loose teeth and even bleeding will occur. In advanced stages, the growth of cancer tissue will penetrate deeper into the root tissue and

As many as 50% will metastasize to lymph nodes in the neck area, while 29% metastasize to organs located further away. Most cases are diagnosed at an advanced stage.

3. Kaposi's Sarcoma

This malignant neoplasm in blood or lymph vessel tissue is caused by infection with *human herpes virus type 8 (HHV- 8)*. There are 4 forms of *Kaposi's Sarcoma* that have been found in the world. These include the classic form, the form found in endemic cases in Africa, the form associated with immunosuppression and the form associated with AIDS.

Incidents related to HIV/AIDS are often found on the skin and oral cavity, namely on the hard palate, gingiva and tongue. Clinical manifestations begin with a flat, purplish area that expands to form a nodular, ulcerated and bleeding mass.

The differential diagnosis of this cancer is purpura, ecchymosis, hematoma, hemangioma, melanoma, *bacillary angiomatosis* and *pyogenic granuloma*. If the lesion is small and localized, the treatment is surgical excision, while for larger lesions, intra-lesional injection is given using a chemotherapeutic agent. In advanced stages, chemotherapy can be given.

Meanwhile radiotherapy is not recommended to avoid mucositis.

4. Fibrosarcoma

This cancer is a malignant neoplasm originating from fibroblasts whose clinical manifestation is a red soft tissue mass with or without ulceration on the surface. The areas frequently affected by this cancer are the tongue, gingiva, buccal mucosa and lips. This cancer can also affect the jawbone.

5. Rhabdomyosarcoma

This cancer is a malignant neoplasm that affects skeletal muscles. Manifestations in the oral cavity that can be found are on the tongue, then the soft palate, hard palate and buccal mucosa. Most cases do not cause pain, but sometimes there are also those with pain or even paresthesia.

6. Leiomyosarcoma

This cancer is a malignant neoplasm that affects the smooth muscle of the blood vessels and the circumvallate papilla of the tongue. The symptoms felt are the slow growth of a rubber-like mass, either without pain or accompanied by pain.

The differential diagnosis of this cancer is *pyogenic granuloma*, *leiomyoma*, *peripheral ossifying fibroma*, *angiosarcoma* and *Kaposi's sarcoma*.

7. Osteosarcoma

This cancer is a term for bone cancer.

Bone cancer can occur in the lower jaw with characteristic bone or osteoid formation from tumor cells

8. Odontogenic carcinoma

Odontogenic neoplasm is cancer that originates from the remaining epithelium and mesenchyme of the tooth germ. Types of malignancy of odontogenic tissue based on WHO classification are:

- a. Odontogenic carcinoma, namely *ameloblastic carcinoma*, *primary intraosseous carcinoma*, *sclerosing odontogenic carcinoma*, *clear cell odontogenic carcinoma*, *ghost cell odontogenic carcinoma*.
- b. *odontogenic carcinosarcoma*
- c. *odontogenic sarcomas*

Other malignancies that do not originate from tissue

Odontogens are:

- a. *Chondrosarcoma*
- b. *Mesenchymal chondrosarcma*
- c. *Osteosarcoma*

E. Management and Side Effects of Treatment

Oral cancer is treated with surgical procedures, radiation therapy, chemotherapy or a combination of the three (Ibsen and Phelan, 2018).

When treated with radiation therapy, patients usually experience mucositis as a side effect which appears in the 2nd week of treatment. Mucositis usually presents as erythema and ulceration. Apart from that, patients also experience difficulty eating, pain when swallowing and loss of their sense of taste due to their mucositis. If radiation hits large salivary glands, irreversible salivary gland damage can occur causing severe xerostomia, so that the mucosa is easily irritated and there is a risk of *radiation caries*. The risk of *osteoradioecrosis* (bone necrosis due to radiation treatment) can also occur due to reduced blood supply to the bones. This occurrence is more common in the mandible than the maxilla.

Complications in the oral cavity that may occur during chemotherapy treatment are usually mucositis and ulceration. This is because the drugs used for chemotherapy target cells that usually divide quickly, such as epithelial basal cells. As a result, the epithelium becomes atrophic and ulcers appear. Apart from that, cells in the bone marrow can also affected, so that the number of blood cells decreases in all types of blood cells (red blood cells, white blood cells and platelets). Patients can become anemic due to reduced red blood cells and are at risk of opportunistic infections (such as candidiasis) due to reduced white blood cell counts. Sealin also carries a risk of bleeding problems due to reduced platelet counts.

Therefore, patients who will undergo therapy need a thorough examination to eliminate the risk of infection, such as removing root teeth or teeth that have the potential to cause infection (Ibsen and Phelan, 2018).

F. Prevention

Prevention of oral cancer is mainly by avoiding etiological factors such as smoking and alcohol consumption. Setting a diet with complete nutrition rich in fresh fruit and vegetables can be a way to protect yourself from the risk of cancer. It has not been proven that intake of vitamins or antioxidants can effectively reduce the risk of oral cancer.

Vaccination against viruses that cause cancer can be done as a prevention. However, without vaccination, every woman who has active sexual relations can be exposed to HPV exposure (Watters *et al.*, 2021).

Routine check-ups with a dentist or dental clinic make it possible to find cancer at a very early stage so that it can improve the prognosis for recovery.

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CHAPTER

9 | Oral Tumors

Dr. Retno Dwi Sari, M.Kes

A. Introduction

Tumor is a medical term that describes the clinical condition of swelling or enlargement. However, it is often used as a synonym for neoplasm. In terms of Neoplasia, it means new growth. Neoplasia is a process where cells experience abnormal and uncontrolled proliferation. Neoplasm itself is a mass of cells (Ibsen and Phelan, 2018).

Tumors are divided into 2 categories, namely benign tumors and malignant tumors. Benign tumors or neoplasms have localized clinical features. May have a capsule or be surrounded by a wall of fibrous connective tissue.

Sometimes benign tumors can invade surrounding structures but do not have the ability to extend to distant locations or metastasize. Meanwhile, cancer is a term used for malignant conditions. A discussion of cancer can be read in chapter 8.

Tumors that manifest in the oral cavity can be **odontogenic**, i.e. originating from odontogenic tissue, or **non-odontogenic**, i.e. originating from tissues other than those forming teeth. Several causes of swelling/tumors in the jaw include cysts, odontogenic tumors. Giant cell lesions, fibroosseous lesions, non-odontogenic bone neoplasms and metastases from neoplasms (Odell, 2017).

Table 9.1 Tumor naming based on tissue origin

Tissue Origin of Benign	Tumors	Malignant Tumors
Epithelium		
flat Epithelial (squamous)	Papilloma	Squamous cells carcinoma or epidermoid carcinoma
Basal Cells	Seborrheic keratosis	Basal cell carcinoma
Adenoma gland or duct		Adenocarcinoma
Neuroectoderma		

Melanocytes	Nevus	<i>Melanoma</i>
Connective Tissue		
Fibrous	<i>Fibroma</i>	<i>Fibrosarcoma</i>
Cartilage (cartilage)	<i>Chondroma</i>	<i>Chondrosarcoma</i>
Bone	<i>Osteomas</i>	<i>Osteosarcoma</i>
Fat	<i>Lipomas</i>	<i>Liposarcoma</i>
Endothelium		
Blood vessel	<i>Hemangioma</i>	<i>Angiosarcoma</i>
Lymphatic vessels	<i>Lymphangioma</i>	<i>Lymphangiosarcoma</i>
Muscle		
Smooth muscle	<i>Leiomyoma</i>	<i>Leiomyosarcoma</i>
Striated Muscle	<i>Rhabdomyoma</i>	<i>Rhabdomyosarcoma</i>
Tooth germ tissue		
Email organa	<i>Ameloblastoma</i>	<i>Ameloblastic carcinoma</i>
Dental Papilla	<i>Odontogenic myxoma</i>	<i>Odontogenic myxosarcoma</i>

Source: (Myers and Curran, 2014; Ibsen and Phelan, 2018)

Naming tumors usually uses prepositions that describe the origin of the cells or tissue.

The addition of the word *-oma* indicates tumor. For example, a tumor in fat tissue is called a *lipoma*, or in bone tissue it is called an *osteoma*. Cancer is also named in the same way. Such as cancer in epithelial tissue is called *squamous cell carcinoma*, or *epidermoid carcinoma*, or cancer in connective tissue is called *sarcoma*, such as those originating from bone are called *osteosarcoma* (*osteogenic sarcoma*).

Table 9.2 Differences between Benign Tumors and Malignant Tumors

Benign Tumors	Malignant Tumor
Usually the cells are well differentiated	Can be differentiated well or anaplastic differentiation

Usually growth is slow	growth up to fast	slow
Mitotic features are rare	Mitotic images are often found	
Usually in capsules	Invasive and not encapsulated	
No metastases	Metastases	

Source (Ibsen and Phelan, 2018)

B. Types of tumors that manifest in the mouth

Papillomas are not actually categorized as pure neoplasms, but rather tissue proliferation induced by viral infection. There are 200 genotypes of *Human papillomavirus (HPV)*.

The virus infects the basal layer of epithelial cells and then cell proliferation occurs. Transmission occurs through direct contact with sufferers. The clinical manifestation of papilloma is the growth of small tissue with a diameter of <1 cm on the palate which is white to pink in color. The surface can be papillary or verrucous. The shape is usually stalked (Kerr and Trochesset, 2021)..

Chondroma is a benign tumor of cartilage tissue.

However, its occurrence in the jawbone is rare (Kerr and Trochesset, 2021).

Osteoma is a benign tumor composed of bone tissue. The shape of the jaw is similar to the torus palatinus, torus mandibularis. Osteomas grow on the surface of bones and can be felt by palpation. Often asymptomatic, but depending on its size and location, it can also cause trismus, malocclusion, sometimes pain. Aesthetically, it can also cause facial asymmetry and prominent swelling (Shaw and Chan, 2022).

Lipoma is a benign tumor of adipose mesenchymal tissue. Its appearance in the oral cavity is rare.

Lipoma incidents occur in the buccal mucosa and tongue. The clinical picture seen is a yellow/orange mass with a thin epithelial surface and shadowed blood vessels on the surface.

Hemangioma is a vascular tumor and is a pure endothelial cell neoplasm. In 4-5% of cases that appear in babies, hemangiomas are usually visible a few weeks after the baby is born and grow quickly.

Surgical management in this case needs to be considered carefully because the lesion bleeds very easily (Bruch and Treister, 2017).

Odontogenic tumors are tumors that grow from the tissue that forms dental tissue. Most odontogenic tumors are benign, malignancy can occur but is rare.

Table 9.3 Classification of central odontogenic tumors

<i>Epithelial Odontogenic Mesenchymal Mixed Tumors</i>	<i>Odontogenic Odontogenic Tumors Tumors</i>	
<i>Ameloblastoma</i>	<i>Odontogenic myxoma</i>	<i>Ameloblastic fibroma</i>
<i>Calcifying epithelial odontogenic tumor (CEO)</i>	<i>Cementifying fibroma</i>	<i>Ameloblastic fibroodontoma</i>
<i>Adenomatoid odontogenic tumor (AOT)</i>	<i>Ossifying fibroma</i>	<i>Odontoma</i>
<i>Calcifying Odontogenic Cyst (Calcifying cystic odontogenic tumor)</i>	<i>Cementoblastoma</i>	

Ameloblastoma is a benign tumor with slow growth but locally aggressive that can be found in the maxilla and mandible. This tumor has a capsule that infiltrates the surrounding tissue and can cause damage. Death can occur when the tumor is located in the maxilla and pushes against brain tissue and surrounding vital structures (Ibsen and Phelan, 2018).

Calcifying epithelial odontogenic tumor (CEO) is also known as Pindborg tumor. This tumor is a benign tumor that does not occur as often as ameloblastoma. This tumor

unique because the cell proliferation does not show the typical characteristics of odontogenic epithelium. These tumors consist of islands and polyhedral sheets of epithelial cells. Radiographically, this tumor appears as unilocular or multilocular radiolucency. Calcifications that form within the tumor appear as radioopaque images within the radiolucency (Ibsen and Phelan, 2018; Kerr and Trochesset, 2021)

Adenomatoid odontogenic tumor (AOT) is a benign epithelial odontogenic encapsulated tumor that has different incidence distribution characteristics based on age, gender and tumor location. Approximately 70% occur in women in their 20s and 70% are located in the anterior maxilla and mandible.

Most are related to the presence of crowns from impacted teeth, generally impacted canines. Radiographically, a circular radiolucency is visible. The differential diagnosis of this tumor is a dentigerous cyst. However, the difference is that AOT extends beyond the cemento-enamel junction and can affect 50%-60% of the root. The condition of tumor calcification is characterized by the appearance of a radioopaque radiographic appearance (Ibsen and Phelan, 2018).

In the pathogenesis of AOT, epithelial-mesenchymal interactions play an important role in tooth growth and neoplasia. Several molecular markers that play a role in the process of tumor formation include *Transforming growth factor β* which plays a role in encouraging the cell differentiation process, *Hepatocyte growth factor*, which plays a role in encouraging tumor cell proliferation. Enamel proteins such as ameloblastin, amelogenin and amelotin play a role in cytodifferentiation (Sarıyalioğlu Güngör et al., 2021), (Nivia and Sunil, 2019).

Calcifying Odontogenic Cyst (Calcifying cystic odontogenic tumor) is part of a group of lesions that contain “ghost cells”. WHO groups this tumor into the odontogenic tumor group. Microscopic examination showed a cystic structure lined by odontogenic epithelium. The epithelium looks like in ameloblastoma consisting of ameloblast-like cells and stellate reticulum-like areas.

Odontogenic myxoma is a benign odontogenic mesenchymal tumor that is found most often in individuals aged 10-29 years. Radiographically, this tumor has a unilocular or multilocular appearance but most often appears in a multilocular form, like a radiolucent honeycomb. If the tumor enlarges it can shift the position of the teeth. The microscopic image shows a non-encapsulated tumor infiltrate consisting of a pale mucopolysaccharide substance. This tissue is similar to the dental papilla in the embryological process of teeth.

Cementifying fibroma is a benign tumor with rounded, calcified borders which is a fibro-osseous lesion. Tumors are usually found in adults in their 3rd or 4th decade of age. Women have a higher incidence than men. Patients affected by this tumor may be asymptomatic or have symptoms of bone enlargement or facial asymmetry.

Cementoblastoma is a benign neoplasm where cementum tissue grows together with the root. Tumors are usually found in young patients under 30 years of age. Unlike other odontogenic tumors, this tumor has painful symptoms. The radiographic appearance can be clearly identified as a radioopaque mass fused with the root surrounded by a radiolucent halo. This radiolucent halo area is the periodontal ligament. In the early stages, these lesions present with a radiolucent radiological appearance that resembles periapical inflammatory disease. This tumor is located in the root of the molar or premolar. Some cases can cause localized bone expansion. Microscopic examination shows a proliferation of cementum fused with the root.

Ameloblastic fibroma is a mixed benign tumor consisting of epithelial and mesenchymal tissue. This tumor is found in children and adults, but is most often found in individuals aged less than 20 years.

The predilection for cases occurs more in men. While the locations most often found are in the premolar region and

mandibular molars. Most patients are asymptomatic, but bone expansion and swelling sometimes occur. Radiographically, *Ameloblastic fibroma* appears as unilocular or multilocular radiolucency, which can be seen either clearly or not.

Ameloblastic fibro-odontoma is an odontogenic tumor benign which has the appearance of ameloblastic fibroma and odontoma. Radiographically, the visible image is clear raduolucency in the form of unilocular or multilocular. Calcifications of various sizes and shapes are often seen within the radiolucency. This calcification indicates tooth formation.

Odontoma is an odontogenic tumor composed of enamel, dentin, cementum and pulp tissue.

This tumor is the most frequently found type of odontogenic tumor. This tumor is divided into two, namely *compound odontoma* and *complex odontoma*. *Compound odontoma* is composed of a collection of small teeth. Meanwhile, *complex odontoma* consists of enamel, dentin and pulp tissue whose structure does not resemble normal teeth. *Odontomas* are mostly sized small, but large lesions can cause swelling, dislocate teeth or inhibit the growth of permanent teeth.

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CHAPTER

10

Periodontitis

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A. Introduction

Periodontal disease is a chronic, painless and slow-moving disease. This disease usually does not interfere with activities, so people who suffer from this disease are not aware of any pathological changes in the tissue supporting their teeth. The initial form of periodontal disease is usually encountered at the age of 30 years. The prevalence and severity of periodontal disease increases with age (Schei et al, 1959; Plasschaert et al, 1978; Loe et al, 1978; Becker et al, 1979) Periodontitis is an inflammatory disease of the tissue. periodontal which can cause damage to the supporting structures of the teeth (Newman et al., 2015; Ionel et al., 2015; Struillou et al., 2010).

Periodontal disease, according to WHO data, is one of the oral cavity diseases that has the highest prevalence in the world with the Community Periodontal Index (CPI)

Score 4 (periodontal pocket \geq 6mm) reaches 10-15% of the world's adult population (Petersen and Ogawa, 2005). The United Kingdom Adult Dental Health Survey 2009 showed that 37% of the UK adult population suffered from chronic periodontitis and 8% severe periodontitis (Needleman, 2016). Periodontitis is a disease of the periodontal tissue that affects the supporting tissues of the teeth due to plaque accumulation.

RISKESDAS 2018 shows that the percentage of periodontitis is 74.1% (KEMENKES, 2018). So if it is not treated immediately it will get worse.

The consequences that often arise from the prevalence of periodontal disease in Indonesia are increasing every year, especially in Indonesia, periodontitis is still considered very high. Periodontal disease is the presence of swelling, inflammation, redness at the gingival edge, and bleeding on probing in the pocket area or gingival sulcus. Predisposing factors for disease in the periodontal tissue are stress, nutritional deficiencies, systemic disease, alcohol and tobacco consumption, genetics and plaque accumulation (Newman et al., 2015; Segura et al., 2015).

Porphyromonas gingivalis is a gram 2 negative bacteria in plaque which is known to have many virulence factors so it can invade tissue and cause disease. This bacteria triggers an immune system reaction that can cause damage to periodontal tissue and alveolar bone (Newman et al., 2015; Taguchi et al., 2015; Struillou et al., 2010).

B. Definition of Periodontitis

Periodontitis occurs if *gingivitis* spreads to the structures supporting the teeth. Periodontitis is one of the main causes of tooth loss in adults and is the main cause of tooth loss in old age. (Indah Irma z, S.ayu Intan, 2013) Periodontitis is a serious gum infection that damages the soft tissue and bone that supports the teeth.

All periodontal disease, including *periodontitis*, will affect the *periodontium* or tissue around the teeth. *Periodontitis* can cause tooth loss or worse, as well as an increased risk of heart attack or stroke

and other health problems. Periodontal disease is chronic inflammation by bacteria that attack the periodontium, in the supporting tissues of the teeth such as gingiva, cementum, periodontal ligament and alveolar bone.



Figure 10.1 Comparison of healthy teeth and teeth suffering from periodontitis

Source: <https://www.istockphoto.com/id/vector/illustration-medical-vector-penyakit-gigi-dan-periodontitis-sehat-yang-realistik-gm>

Periodontitis is different from Gum Inflammation (Gingivitis). *Gingivitis* refers to inflammation of the gums, while *Periodontitis* refers to gum disease and tissue or bone damage. Untreated *gingivitis* can develop into *periodontitis*. In simple terms, it can be said that *periodontitis* causes permanent changes in the supporting structures of the teeth, whereas *gingivitis* does not cause damage (Mumpuni, Pratiwi, 2013).

C. Etiology

The etiology of periodontitis is the attachment and accumulation of plaque which is a collection of bacteria. The dominant bacteria that cause periodontitis are *Actinobacillus actinomycetem comitans*, *Fusobacterium nucleatum*, *Peptostreptococcus micros*, *Porphyromonas gingivalis* and *Tannerella forsythia*, apart from that it can also be influenced by systemic factors which are predisposing factors and influence local irritating tissue reactions (Tedjasulaksana, 2016) The presence of adhesions and the accumulation of bacteria will cause damage to the periodontal tissue at an early stage and is followed by increased flow of gingival crevicular fluid and its components. Plaque is also suspected as a cause of *periodontitis*. Plaque forms on teeth when starches and sugars in food interact with bacteria normally found in the oral cavity. Plaque that is not removed

For 2 - 3 days it can harden under the gum layer so that it becomes tartar.

D. Clinical Signs and Symptoms of Periodontitis

1. Swollen Gums, usually swelling occurs in the area around periodontal tissue, especially gums (gingiva)

2. Bright Red Gums, occur around teeth that are inflamed due to vasodilation of blood vessels.
3. Gums feel numb to the touch
4. Gum recession, root exposure can accompany *chronic periodontitis* but is not always a sign of the disease. When there is recession, pocket depth measurements are only a partial reflection of the total amount of periodontal damage. The gums push forward, making the teeth appear longer.
5. Tooth mobility The degree of tooth mobility can be grouped as follows:
 - a. Grade
 1. Only felt
 - b. Grade 2 is easy to feel, labiolingual shift 1 mm
 - c. Grade 3 labiolingual shift of more than 1 mm, upward and downward mobility of the teeth in the axial direction
6. Alveolar bone damage Alveolar bone resorption and periodontal ligament damage are the most important signs of chronic periodontitis and are one of the causes of tooth loss. The first radiographic sign of periodontal damage is loss of density of the alveolar rim 7. Halitosis and unpleasant taste Disturbing tastes and odors often accompany periodontal disease, especially if oral hygiene is poor. Acute inflammation, with the production of pus that comes out of the pocket when the pocket is pressed, also causes halitosis.
8. Loose teeth, if the swelling of the gums continues, treatment or care is not carried out so that the teeth become damaged too loose and the teeth come loose.
9. One of the important signs of chronic periodontitis is that the abscess is tender and sore unless the condition is preceded by inflammation. Pain or soreness when the tooth is percussed indicates active inflammation of the supporting tissue, which is most acute if there is abscess formation where the tooth is very sensitive to touch.

10. Tooth migration Movement of teeth (or teeth) out of their proper position within the arch is a common sign of periodontal disease and one of the causes of concern for patients. The position of the teeth in a healthy condition can be maintained by the balance of the tongue, lips and occlusal pressure. When the supporting tissue is damaged, this pressure determines the tooth migration pattern.

E. The process of periodontitis

In the early stages, periodontal tissue inflammation related to dental plaque occurs only on the gingiva, which is called *gingivitis*. This condition is characterized by erythema and gingival edema/swelling as well as increased depth of the gingival sulcus. Inflammation of the gingiva can spread to the periodontal ligament and alveolar bone, causing loss of periodontal ligament attachment and resorption of the alveolar bone which is characterized by tooth mobility (Newman et al., 2015; Struillou et al., 2010). Not all cases of gingivitis develop into periodontitis (Newman et al., 2015; Kayal, 2013).

F. Factors that increase the risk of periodontitis

1. Frequent inflammation of the gums (Gingivitis)
2. Heredity
3. Poor/low oral hygiene
4. People often consume tobacco
5. *Diabetes Mellitus* sufferers
6. People are already old
7. Low body immunity, such as leukemia sufferers
8. and HIV/AIDS.
9. People with poor nutrition
10. Frequently consume certain drugs without consulting a doctor
11. Hormonal Changes. Like during pregnancy
12. Abuse of certain drugs.

G. Periodontitis Management

Periodontitis treatment aims to reduce inflammation, eliminate gaps that form between the gums and teeth, and treat the causes of gum inflammation. Method used depends on the severity.

1. *Scaling*, to remove tartar and bacteria on the surface of the teeth and the bottom of the teeth
2. *Root Planing*, to remove and prevent further buildup of bacteria and tartar, as well as smooth the surface of the tooth roots.
3. *Giving antibiotics, oral, mouthwash or gel, for eliminate bacteria that cause infection*
4. Extraction of affected teeth, so that the buildup of bacteria does not get worse and attack the surrounding teeth
5. If *periodontitis* is severe, a procedure will be carried out operation.

The recommended way to prevent *periodontitis* is to maintain good oral hygiene consistently, such as brushing your teeth twice a day with the right technique and time. Maintain a balanced diet, carry out regular check-ups every 6 months at a health service center, and consume lots of fibrous foods, high in water, such as fruit -

fruit.

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CHAPTER
11

Gingivitis

Pariati, S.ST., M.Kes

A. Definition of Gingiva (Gums)

Gingiva is the outermost part of periodontal tissue. Gingiva is often used as an indicator if periodontal tissue is affected by disease. This is because most periodontal tissue diseases start from the gingiva, sometimes the gingiva can also reflect the alveolar condition beneath it (Putri, Herijulianti, and Nurjannah, 2010).

The main function of the gingiva is to protect the surrounding tissue in the area around the oral cavity. The oral cavity is often exposed to food and drinks with high temperatures, mechanical pressure, and various types of bacteria. To protect the tissue around the oral cavity, the gingiva has a defense mechanism, namely the immune defense mechanism and saliva. The clinical picture of normal gingiva can be described by color, size, contour, consistency, surface texture, and bleeding tendency on palpation or probing with light pressure.

According to (Riva Irlinda, 2011) the gingival part consists of:

1. Attached epithelium is the gingiva that covers the alveolar bone and is attached to the enamel surface under the neck of the tooth,
2. Free gingiva Extension from the gingival sulcus to the gingival margin.
Attached to the tooth surface,
3. The gingival sulcus is the space between the free gingiva and the tooth.
A healthy gingival sulcus is approximately 2 mm deep.
4. The gingival edge is the upper edge of the gingiva, its shape follows the curve of the cervical line of the tooth,
5. Attached gingiva is gingiva that attaches from the base of the sulcus to the mucogingival junction,
6. The mucogingival junction is the line that separates the attached gingiva.

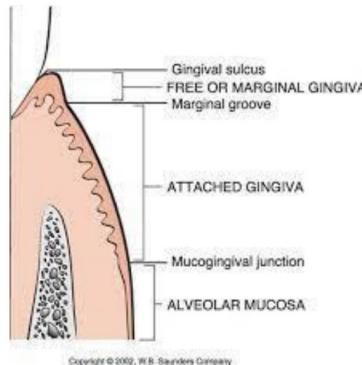


Figure 10.1 Gingival Anatomy

B. Gingival Clinical Features

Normal gingiva is pink with thin, knife-like edges and curved contours that match the contours of the teeth. But it can vary from person to person depending on the amount of melanin pigment in the epithelium, the degree of epithelial keratinization and vascularization, and the fibrous nature of the underlying connective tissue. In certain races, gingiva that appears darker is normal. If there is disease, the gingival contour often becomes enlarged and rounded due to stagnant blood vessels, and increased formation of collagen fibers. In healthy conditions, gingiva has a chewy consistency, is strong and adheres tightly to the underlying bone. Healthy gingiva will not bleed when the periodontal probe is inserted into the sulcus with light pressure.

The clinical picture of the gingiva is the basis for knowing pathological changes that occur in the gingiva affected by a disease. According to (Herijulianti, 2009) the clinical picture of normal gingiva consists of:

1. Gingival Color

The color of normal gingiva is generally pink (coral pink) which is caused by the blood supply and the degree of keratin layer of the epithelium and pigment cells. This color varies from person to person and is closely related to cutaneous pigmentation. Pigmentation

on the gingiva usually occurs in individuals who have dark skin color. Pigmentation of the attached gingiva begins from brown to black. The color of the alveolar mucosa is redder because the alveolar mucosa does not have a keratin layer and the epithelium is thin.

2. Gingival Size

The size of the gingiva is determined by the number of cellular, intercellular elements and blood supply. Changes in gingival size are the most common presentation of periodontal disease.

3. Gingival Contour

Gingival contour and size vary greatly. This situation is influenced by the shape and arrangement of the dentition in the arch, the localization and extent of the proximal contact area and the embrasure (interdental) dimensions of the oral and vestibular gingiva. Interdental papillae cover the interdental part of the gingiva so that it appears sharp.

4. Gingival Consistency

The gingiva is tightly attached to the underlying structure and does not have a submucosal layer so the gingiva is immovable and rubbery.

5. Gingival Texture

The surface of the attached gingiva is mottled like orange peel. These spots are usually called stippling. Stippling will be clearly visible when the gingival surface is dried.

According to Putri, Herijulianti, and Nurjannah (2010), the gingiva is divided into two parts, namely attached gingiva . gingiva) and unattached gingiva

1. Unattached gingiva (free gingiva or marginal gingiva), namely:

Unattached gingiva or also known as free gingiva or marginal gingiva is the part of the gingiva that is not tightly attached to the tooth, surrounding the neck area of the tooth, making a curve like a seashell. Unattached gingiva from the crown to the enamel cemento junction.

2. Attached gingiva / attached gingiva, namely: Attached gingiva is a continuation of the marginal gingiva, extending from the free gingival groove to the muco-gingival junction. The attached gingiva is tightly attached to the cementum starting from one third of the way to the periosteum of the alveolar bone.

C. Signs of Healthy Gingiva

1. Pink, salmon red, or coral red in color, and depending on the amount of melanin pigment in the epithelium, the degree of carination of the epithelium and the vascularization and fibrous nature of the underlying connective tissue,
2. An increase in the size of the gingiva is a sign of periodontal disease,
3. The contour is curved or wrinkled like orange peel and slippery,
4. Resilient Consistency,
5. Attached to underlying structures, teeth and bones alveolar,
6. Not easy to bleed, no edema, and no exudate,
7. On the attached gingiva there is stippling,
8. Gingival sulcus not more than 2 mm (Fedi, Vemino and Grey, 2005).

D. Definition of Gingivitis

Gingivitis is a form of periodontal disease with the characteristic of being reversible which is manifested by inflammation of the gingiva as a result of plaque buildup on the teeth.



Figure 11.2 Gingivitis

E. Characteristics of Gingivitis

The characteristics of gingivitis according to (Manson & Eley, 1993) are as follows:

1. Color Change

The clinical sign of gingival inflammation is discoloration.

Gingival color is determined by several factors including the number and size of blood vessels, thickness of the epithelium, keratinization and pigment within the epithelium.

The gingiva becomes red when vascularization increases or the degree of epithelial keratinization decreases or disappear.

2. Red or bluish red color

As a result of proliferation and keratinization caused by chronic gingival inflammation. The veins will contribute to the bluish color. Change will make a contribution

color gingiva

in the inflammatory process. Color changes occur in the interdental papilla and gingival margins that spread to the attached gingiva.

3. Changes in Consistency

Both chronic and acute conditions can produce changes to the normal stiff and firm gingival consistency. In chronic gingivitis conditions, destructive or edematous and reparative or fibrous changes occur simultaneously and the consistency of the gingiva is determined based on the dominant condition.

4. Changes in Gingival Tissue Texture.

The normal gingival surface texture is like orange peel which is commonly referred to as stippling. Stippling is found in the subpapillary area and is limited to the attached gingiva predominantly, but extends to the interdental papilla.

5. Change in Gingival Position.

The presence of lesions on the gingiva is one of the features of gingivitis.

6. Changes in Gingival Contour.

Changes in gingival contour are associated with gingival inflammation or gingivitis but these changes can also occur in other conditions.

F. Causes of Gingivitis

The causes of gingivitis are divided into two, namely the main cause and secondary or predisposing causes. The main cause of gingivitis is the accumulation of microorganisms that form a colony as well as nutritional, hormonal, hematological factors, psychological disorders and drugs (Manson & Eley, 1993).

Secondary causes include local factors and systemic factors.

1. Local factors

- a. Dental plaque is a soft deposit that forms a biofilm that accumulates on the surface of teeth or other hard surfaces in the oral cavity such as restorations loose and fixed.
- b. Dental calculus is a calcified mass that adheres to the surface of natural teeth and artificial teeth. Usually calculus consists of bacterial plaque that has undergone mineralization. Based on the location of its attachment in relation to the gingival edge, calculus can be divided into supragingival and subgingival calculus.
- c. White material is a soft, sticky deposit, yellow or grayish white in color, and its adhesive strength is lower than dental plaque.
- d. Dental stain is a pigmented deposit on the surface tooth.
- e. Debris / food waste.

2. Systemic factors

Systemic factors are factors associated with body conditions, which can influence the response of the periodontium to local causes. These systemic factors are:

- a. Endocrine (hormonal) factors include: puberty, pregnancy, and menopause.
- b. Nutritional disorders and deficiencies include: deficiencies vitamin.
- c. Protein deficiency and drugs include: drugs that cause non-inflammatory gingival hyperplasia and hormonal contraceptives.
- d. Hematological diseases: leukemia and anemia.

G. Risk Factors for Gingivitis

Gingivitis can be experienced by anyone. Even so, there are a number of conditions that put a person at higher risk of developing *gingivitis*, namely:

1. Oral health is not maintained because you are lazy about brushing your teeth,
2. Advanced age,
3. Family history of *gingivitis*,
4. Using false teeth that don't fit properly,
5. The habit of smoking or chewing tobacco,
6. Hormonal changes during puberty, menstruation, pregnancy, or the effects of using birth control pills,
7. Nutrient deficiencies, including vitamin C,
8. Dry mouth,
9. Viral infection or fungal infection,
10. Certain diseases, such as HIV/AIDS, leukemia, etc diabetes,
11. Consuming calcium antagonist type hypertension medication or anti-seizure medication,
12. Therapy to treat cancer,

H. Types of Gingivitis

According to Rosad (2009), the classification of gingivitis based on severity is divided into 2:

1. Acute Gingivitis

The clinical picture of acute gingivitis is swelling originating from acute inflammation and soft gingiva. Grayish debris

with the formation of a membrane consisting of bacteria, polymorphonuclear leukocytes and degeneration of the fibrous epithelium.

In acute gingivitis, vesicle formation occurs with intercellular and intracellular edema with degeneration of the nucleus and cytoplasm as well as cell wall rupture.

2. Chronic Gingivitis

The picture of chronic gingivitis is soft swelling that can form a depression when pressed and visible fluid infiltration and exudate in the inflammation.

During probing, bleeding occurs and the gingival surface appears reddish. Degeneration of connective tissue and epithelium can trigger inflammation and changes to the network. Connective tissue experiences swelling and inflammation that extends to the surface of the epithelial tissue. Epithelial thickening, edema and leukocyte invasion are separated by areas of elongation of the connective tissue. The consistency is stiff and rough in microscopically visible fibrosis and Epithelial proliferation is a result of chronic inflammation prolonged.

I. The Process of Gingivitis

The process of gingivitis According to Besford (1996), the process of *gingivitis* is divided into several stages, namely:

1. First stage

Plaque found on the teeth near the gums causes the gums to become red (darker than pink), slightly swollen (rounded and shiny, not thin and spotty like orange peel), bleeds easily when brushed (due to small wounds in the gum pockets), no pain.

2. Second stage

After several months or several years this inflammation persists. Plaque can cause the uppermost fibers between the jawbone and the roots of the teeth decomposes, and this is followed by partial loss of bones

jaw at the attachment site. The gum pockets also become deeper as the height of the jawbone decreases, the gums remain red, swollen and bleed easily when brushed, but do not feel painful.

3. Third stage

After several months without proper plaque removal, stage three may occur. At this time more of the jawbone will be damaged and the gums will recede, although not as fast as the bone damage. The gums become deeper (more than 6 mm), because the bone is lost, the teeth become sore, loose and sometimes the front teeth start to move from original position. redness, the swelling, and bleeding are still the same as before, and there is still no pain.

4. Fourth stage

These stages usually occur in the 40s or 50s, but can sometimes be earlier. After several more years of remaining without good plaque removal and gum care, the final stage can be reached, now

most of the bones around the teeth have been damaged so that some teeth become very loose and start to hurt, at this stage it is a stage of gingivitis that is left untreated, so that the gingivitis continues to the worst stage.

The most acute is periodontitis.

J. Due to Gingivitis

According to Srigupta (2004), Gingivitis is not immediate handled, it can result in the following things:

1. Bleeding in the mouth can be caused by many factors, gingivitis usually causes bleeding in the gingiva which is often ignored or often ignored,
2. Periodontitis is inflammation that attacks the larger periodontal tissue (periodontal ligament, cementum and alveolar bone).

K. Prevention of Gingivitis

Maintain cleanliness and health of teeth and gums. Because the cause of gingivitis is plaque, cleanliness of teeth and gums is the main thing. Maintaining oral hygiene, namely; 1. Brush your teeth regularly after every meal and before sleeping.

2. Adjust your diet and avoid foods that damage your teeth, namely: foods that are high in sugar.
3. Using dental floss.
4. Clean plaque and tartar regularly.
5. Check your teeth regularly at the dentist and health center once every 6 months.
6. And pay attention to risk factors.

L. *Gingivitis* Treatment

Treatment of *gingivitis* or gum inflammation aims to relieve symptoms and prevent complications. Some treatment methods to treat gingivitis are:

1. Scaling and root canal treatment using laser or sound waves,
2. Filling or replacing damaged teeth, if necessary
It is associated with *gingivitis*.

To help the recovery process as well as prevent *If gingivitis* occurs again, follow these simple steps:

1. Brush your teeth with fluoride toothpaste after waking up and before going to bed. It would be better if you brush your teeth after every meal.
2. Use a soft toothbrush and replace it every 3 or 4 months,
3. Clean between your teeth with dental floss at least once a day, and use anti-septic mouthwash or *mouthwash* to reduce plaque between teeth,
4. Reduce foods and drinks that are high in sugar,

5. Clean your teeth at the dentist, at least twice a year.
However, if you have tooth and gum disease and are at risk of developing *gingivitis*, have your teeth cleaned by the dentist more often,
6. Don't smoke or chew tobacco.

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CHAPTER

12

Dental Erosion

Drg. Emma Krisyudhanti, MDSc

A. Introduction

Teeth are one of the organs that we often use to function in our lives. The main function of teeth is to chew food (mastication), speak (phonetics) and to maintain appearance (aesthetics).

However, teeth are also an organ that is often and easily damaged. Damage that occurs to teeth can be caused by various things, for example bacteriological, physical or chemical causes. Physical causes can be caused by thermal or mechanical factors. Among all the causes of tooth decay, bacteriological causes are the most common, while tooth decay that occurs most frequently and is a public complaint is caries. However, tooth decay due to non-bacteriological causes should not be ignored because although it is less prevalent than caries, the impact caused by non-bacteriological causes cannot be ignored. One of the ways tooth decay due to non-bacteriological causes is tooth wear.

Tooth wear or loss of tooth structure can take the form of attrition, abrasion, abfraction and tooth erosion (Hastuti, 2022). Wear in the broadest sense refers to damage to the tooth structure resulting from loss of material from the surface of the tooth due to continuous frictional movement of two or more materials, or interaction between the oral cavity environment and the materials in the oral cavity. In dentistry we recognize the wear and tear of hard tooth tissue and the wear of restorative materials that replace enamel and dentin. Tooth wear is a complex multifactorial phenomenon conditioned by the interaction of biological, mechanical and chemical factors. There are two characteristics of tooth hard tissue wear, namely physiological wear and pathological wear. Physiological wear and tear often occurs in elderly individuals and it is a natural condition because it is related to the function of the teeth as a means of mastication. Pathological wear can have two causes

basic mechanisms, namely mechanical wear and chemical wear (Morozova Y, 2016).

Mechanical wear includes abfraction, friction and abrasion. Abfraction means the microstructural loss of hard tooth tissue due to load concentration with typical localization in the cervical region of the tooth. Attrition means the loss of hard tooth tissue due to direct contact with the tooth without the participation of other substances. It is known that there is pathological attrition and also physiological attrition, which is based on the function of the stomatognathic system and the natural mechanisms of tissue aging. Unlike attrition, abrasion means the loss of hard tooth tissue caused by physical damage due to the mechanical action of substances from the external environment. This problem of mechanical wear of teeth has occurred from ancient to modern eras. Modern studies on the prevalence of mechanical wear of hard dental tissues show that 3% of individuals aged 20 years have signs of tooth wear and this increases to 17% of individuals aged 70 years (Morozova Y, 2016).



Figure 12.1 Abfraction, caused by tooth flexion during loading (Lopez, et al., 2012)



Figure 12.2 Attrition: loss of enamel, dentin, or restoration due to tooth-tooth contact (Lopez, et al., 2012)



Figure 12.3 Abrasion: pathological wear of tooth substance due to bio-mechanical friction processes, for example triggered by incorrect tooth brushing methods (Lopez, et al., 2012)

The next type of wear of hard tooth tissue is chemical wear due to the action of acids originating from exogenous or endogenous factors. This chemical wear and tear is a modern-day human disease. Anthropological studies of the skeletal remains of Australian Aboriginal hunters, historical and prehistoric Native American skulls, and European human populations show no evidence of dental erosion. Increased exposure of acids to the hard tissues of teeth has occurred with the advent of the era

agriculture, especially in the Middle Ages, when the technique of processing food through fermentation was developed.

In the era of modern society there has been a significant increase in acid exposure to hard tooth tissue. There is also an increase in the prevalence of erosive lesions among the younger generation which, according to several studies, can occur in children or adolescents, reaching 50-60% of the population (Morozova Y, 2016).

Tooth erosion is not a new lesion in the world of dentistry. An epidemiological survey in Hong Kong states that 75% of children aged 12 years experience tooth erosion and in Libya, there are 40.8% of children aged 12 years who experience tooth erosion. In Greece, 8.8% of children aged 5 years have eroded teeth. In the city of Jakarta, Indonesia, the prevalence of tooth erosion in children aged 12 years is 88% and 23.3% of children aged 5 years have had tooth erosion (Pratiwi & Ardy, 2020).

This chapter will specifically discuss dental erosion because data from RISKESDAS 2018 shows that the proportion of dental erosion increases with age, as does the depth of erosion that occurs. As you get older, the erosion that occurs can get deeper, even involving the pulp (Indonesian Ministry of Health, 2019).

B. Etiology of Tooth Erosion

Tooth erosion is damage to hard tooth tissue that looks smooth and shiny, occurs on the enamel with or without involving dentin, and is not caused by bacterial infection (KemenkesRI, 2019). Tooth erosion is also often defined as the loss of tooth substance without the presence of caries and plaque. This is a normal physiological process and occurs throughout life but is often considered a pathological process when the degree of decay is excessive or the rate of loss of tooth structure occurs rapidly, or if it causes functional, aesthetic or sensitivity problems (A Paryag, 2014).

According to the American Dental Association (ADA, 2021), tooth erosion is the loss of chemically mineralized tooth substance caused by exposure to acids that do not come from oral bacteria.

Erosive demineralization is a chemical process characterized by acid dissolution of tooth hard tissue, and its etiology is multifactorial.

The nature of damage due to tooth erosion is progressive and irreversible due to chemical processes without involving bacterial activity. In tooth erosion, the enamel demineralization process occurs by acid, but it does not come from acid resulting from bacterial metabolism. This acid can come from inside the body (intrinsic factors) and outside the body (extrinsic factors). Intrinsic acid in tooth erosion can be caused by acid originating from digestive disorders such as in sufferers of gastroesophageal reflux disease (GERD), bulimia, anorexia and other diseases caused by excessive acid production. Extrinsic acid

The cause of tooth erosion is acid obtained from consuming foods and drinks that contain acid (low pH), and can also come from exposure to acid vapors in the community (Lussi, 2006; Ren, 2011) cit.
(Pratiwi & Ardy, 2020).

The explanation of various intrinsic and extrinsic factors that cause tooth erosion is as follows (ADA, 2021):

1. Intrinsic Factors

Intrinsic erosion is caused by the entry of stomach acid into the oral cavity with a frequency, duration and/or intensity that exceeds the ability of saliva to minimize the effects of erosion, usually occurring several times a week and over a long period of time. Gastric acid can reach the oral cavity in cases of gastroesophageal reflux disease (GERD), a common condition in which stomach contents rise back into the esophagus and/or mouth.

Other conditions that can threaten tooth erosion from stomach acid are the result of repeated vomiting, as occurs in bulimia nervosa, chronic alcoholism,

or pregnancy, which is called hyperemesis gravidarum.

a. **Gastroesophageal reflux.** Gastroesophageal reflux disease is considered a predisposing factor for dental erosion due to chronic regurgitation of gastric contents. Occasional regurgitation of stomach acid after eating, especially after overeating, is considered normal, up to about an hour a day. However, in GERD sufferers, the entry of stomach acid into the oral cavity during sleep is very damaging to the teeth, because saliva production and swallowing movements are reduced, and when in the supine position, the lower molars can be affected by stomach acid entering the oral cavity. Increased intra-abdominal pressure (for example, from obesity or pregnancy) can also increase reflux.

Two common symptoms of GERD are heartburn and/or regurgitation of stomach acid, and other manifestations of GERD are dysphagia, dyspepsia, hoarseness, abdominal pain, or a sour taste (or burning sensation) in the mouth or throat. Dysregulation of gastrointestinal enzymes and hormones and reflux disorders have been identified as two potentially important contributors to the occurrence of GERD.

The prevalence of GERD in all age groups is reported to range from 9% to 33%, with some evidence indicating an increase in the prevalence of GERD in the United States since 1995. There is a scientific review that states that the average prevalence of erosions in adult patients with GERD is 32 .5% (range: 21% - 83%) and 17% among children with GERD (range: 14% - 87%). In addition, a meta-analysis concluded that individuals with GERD symptoms that occur at least weekly have a risk of esophageal adenocarcinoma of up to five

times higher.



Figure 12.4 Moderate to severe erosion due to GERD in deciduous teeth.

**Photos courtesy of Martha Ann Keels, DDS, PhD
(ADA, 2021)**

- b. **Bulimia.** Bulimia nervosa is a serious eating disorder characterized by self-induced vomiting as a way to maintain a desired body weight. It is a relatively common disorder among women in western industrialized countries, with a prevalence of approximately 5% in women aged 18–35 years. Among individuals with bulimia, there is an erosion prevalence of more than 90%. Individuals with bulimia or other eating disorders generally have poor oral health, and a systematic review found that patients with eating disorders and/or self-induced vomiting had a five to seven times higher risk of tooth erosion. Patients with bulimia are generally of average body weight, and dentists are often the first to recognize this condition by the characteristic erosion that often occurs on the lingual-palatal surfaces of the anterior maxillary teeth caused by the forced expulsion of stomach acid onto the anterior teeth during vomiting. .



Figure 12.5 Characteristics of Erosion Patterns in Patients

Bulimia

Photos courtesy of Craig Mabrito, DDS (ADA, 2021)

c. **Chronic Alcoholism.** Alcoholism, with a prevalence of around 10% in Western countries, can cause erosive tooth wear when there is frequent vomiting and/or increased regurgitation or even when consuming low doses of alcohol over the long term. Tooth erosion in individuals with alcoholism can be exacerbated by the consumption of acidic drinks. One study found that between 49% - 92% of teeth in individuals with alcoholism showed signs of erosion. As in bulimia sufferers, in alcoholic patients, the palatal surfaces of the anterior maxillary teeth are the most affected by erosion, but relatively high levels of erosion severity are also found on the occlusal and palatal surfaces of the posterior teeth, as well as the incisal edges of the anterior maxillary teeth.

d. **Pregnancy.** Although tooth erosion is rare in pregnancy, erosion has been reported in women experiencing hyperemesis gravidarum, where nausea and vomiting can be experienced for a long period of time.

2. Extrinsic Factors

Erosion due to extrinsic factors can arise from a combination of diet, lifestyle, environmental or work factors that expose teeth to acids in drinks or inorganic acid vapors in the environment.

- a. **Drink.** The extrinsic factor that is the main predisposing factor for tooth erosion is frequent consumption of soft drinks, sports drinks and fruit juices with low pH values (2.0-3.5). Any drink with a low pH can increase the risk of erosion, especially if consumed frequently. Drinks that are acidic, but if not consumed frequently, cannot be said to be a factor causing erosion, for example wine.

Wine is a drink that is naturally acidic but is not consumed as often as sports drinks and diet sodas. In 2016, a study by Reddy et al. measured the pH of 379 commercially available beverages in the US, and found that 93% of them had a pH of less than 4.0.

A number of studies support the hypothesis that acids from food are the main factor causing tooth erosion. A 2012 meta-analysis found more than double the risk of erosion from soft drinks as well as an increased risk from chewable vitamin C tablets. Other studies, including a 2015 meta-analysis, determined that natural fruit juices as well as carbonated soft drinks and sour and sweet snacks and sweet and sour candies are significant predisposing factors for erosion.

- b. **Lifestyle.** More frequent consumption of fruit and highly acidic sports drinks, combined with decreased saliva flow and dehydration from exercise or strenuous activity, may increase the risk of erosion. Intense exercise can also improve

the possibility of gastroesophageal reflux.

Although there is some evidence that vegetarian diets and excessive use of vinegar-based dressings may lead to increased erosion, critical analysis of this topic notes that the evidence regarding the erosivity of vegetarian diets has significant limitations and is relatively weak overall.

c. **Lifestyle.** Frequent consumption of highly acidic fruit and sports drinks, coupled with decreased saliva flow and dehydration from exercise or strenuous activity, may increase the risk of erosion.

Intense exercise can also increase the likelihood of gastroesophageal reflux. There is also evidence that vegetarian diets and excessive use of vinegar-based dressings can lead to increased tooth erosion.

d. **Environmental and Occupational Risks.** Airborne industrial acids can cause tooth erosion among factory workers, especially in munitions, battery and fertilizer factories. Swimmers who frequently use swimming pools that contain chlorine also have the potential to experience erosion caused by the pH of the water. In research, that water

something said
swimming pools that are not disinfected
could well be a source
Extrinsic acid causes tooth erosion (Almira, 2019).

Apart from being able to cause aesthetic problems and associated oral health problems, severe erosional activity can cause exposed dentin, hypersensitivity, and ultimately lead to loss of affected teeth (ADA, 2021) .

C. Clinical Measurement of Tooth Wear (Wear Index)

Tooth)

The severity of tooth wear can be measured using a measuring tool called the tooth wear index. There are many indices that can be used to measure tooth wear, such as the index introduced by Smith and Knight which is used to measure tooth wear itself, regardless of the cause.

Table 12. 1 Smith and Knight Tooth Wear Index

Score	Surface	Criteria
0	B/L/O/I C	No loss of enamel surface characteristics. No loss of contour.
1	B/L/O/I C	Loss of enamel surface characteristics. Minimal loss of contour.
2	B/L/O I C	Loss of enamel exposing dentine for less than one third of surface. Loss of enamel just exposing dentine. Defect less than 1 mm deep.
3	B/L/O I C	Loss of enamel exposing dentine for more than one third of surface. Loss of enamel and substantial loss of dentine. Defect less than 1-2 mm deep.
4	B/L/O I C	Complete enamel loss - pulp exposure - secondary dentin exposure. Pulp exposure or exposure of secondary dentine. Defect more than 2mm deep - pulp exposure - secondary dentine exposure.

B: buccal; L: lingual; O: occlusal; I: incisal; C: cervical.

Source: (Lopez, et al., 2012)

Apart from the Smith and Knight index, there is also an index developed by JD Eccles. The Eccles Index initially classified lesions broadly as early, small and advanced, without strict definition of criteria, thus allowing for broad interpretation. Later, this index was refined and expanded, with greater emphasis on descriptive criteria. This index is presented as a comprehensive qualitative index, which assesses the severity and location of erosion due to non-industrial causes, and is considered one of the main indices on which other indices are based. In essence, this index is divided into three erosion classes, indicating the type of lesion, assigned to four surfaces, representing the surface on which erosion is detected

(Lopez, et al., 2012).

Table 12.2. Eccles index for dental erosion originating from non-industrial causes

Class	Surface	Criteria
Class I		Early stages of erosion, absence of developmental ridges, smooth, surfaces of maxillary incisors and canines.
Class II	Facial	Dentine involved for less than one third surface; two types Type 1(commonest): ovoid-crescentic in outline, concave in cross differentiate from wedge shaped abrasion lesions Type 2: irregular lesion entirely within crown. Punched out.
Class IIIa	Facial	More extensive destruction of dentine, affecting anterior teeth part of the surface, but some are localised and hollowed out.
Class IIIb	Lingual or palatal	Dentine eroded for more than one third of the surface area. Gingival white, etched appearance. Incisal edges translucent due to loss of is flat or hollowed out, often extending into secondary dentine.
Class IIIc	Incisal or occlusal	Surfaces involved into dentine, appearing flattened or with cupping. Undermined enamel; restorations are raised above surrounding.
Class IIId	All	Severely affected teeth, where both labial and lingual surfaces are may be affected; teeth are shortened.

Source: (Lopez, et al., 2012)

Bardsley et al. pioneered the use of a new, simplified version of the tooth wear index when conducting an epidemiological study on a large number of adolescents in North West England. Assessment of tooth wear is based on the presence or absence of exposed dentin. A partial recording system was used, collecting data from 40 surfaces including the occlusal surfaces of the first four molars and the labial, incisal and lingual-palatal surfaces of the six upper and lower anterior teeth.

Table 12.3. Simplified Grading Criteria for the Bardsley Tooth Wear Index

Score	Criteria
0	No wear into dentine.
1	Dentine just visible (including cupping) or dentine exposed.
2	Dentine exposure greater than 1/3 of surface.
3	Exposure of pulp or secondary dentine.

Source: Lopez, et al., 2012

D. Dental Erosion Examination

A thorough examination is required both extra-orally and intra-orally. Extra-oral examination can show facial signs of alcoholism such as facial redness and angiomas, as well as enlarged parotid glands which can also be indicators of autoimmune disease or anorexia. Masseter muscle hypertrophy can also indicate a habit of clenching or grinding your teeth (bruxism). Intra-oral examination may show signs of salivary hypofunction such as dry mouth with reduced amount of saliva, foamy or thick saliva.

A shiny surface or wear on the tooth or restoration may also be observed.

The clinical features of erosive lesions include: extensive depressions in the smooth tooth enamel or loss of enamel surface anatomy, extrusion of the occlusal surface with exposure of the dentin. The eroded enamel sits higher than the underlying dentin because dentin is less mineralized than enamel and erodes more quickly after exposure. In anterior teeth, there is increased incisal translucency, incisal chipping and, in moderate to severe cases, loss of the incisal edge. Erosion caused by vomiting or acidic food usually affects the palatal (inside) surface of the upper teeth

(Paryag & Rafeek, 2014).



Figure 12.6 Upper anterior teeth showing moderate levels of tooth wear (A Paryag, 2014)



Figure 12.7 Lower anterior teeth showing crown incisors eroded due to erosion (Paryag & Rafeek, 2014)

E. Prevention of Tooth Erosion

Tooth erosion that has already occurred can be prevented from becoming worse, by paying attention to the cause of the erosion. Below are some options for treating active tooth erosion:

1. Treating medical disorders or diseases underlying it.
2. Taking antacid tablets 3. Modifying the pH of the food or drink that is causing the problem
4. Change the patient's lifestyle to avoid food or the drink.
5. Rinse with water after consuming food and sour drink.
6. Drink through a straw.
7. Reduce the strength of the abrasive by using a soft-bristled toothbrush and brushing your teeth gently
8. Give yourself at least half an hour before brushing your teeth after consuming acidic foods and drinks (teeth will soften)
9. Using a tooth remineralization agent containing fluoride after brushing your teeth.
10. Apply fluoride gel, solution or varnish to the teeth periodically

F. Tooth Erosion Treatment

Treatment for tooth erosion can take the form of restorative or rehabilitative efforts that require a multidisciplinary approach and can include treatment ranging from simple restorations to whole mouth rehabilitation, such as removable dentures, fixed dentures or bridges, veneers, onlays, artificial crowns if it is indicated that the patient has problems with aesthetics, function, tooth sensitivity or tooth loss due to structures that have weakened the teeth (Paryag & Rafeek, 2014).



Figure 12.8 Eroded upper anterior teeth have been restored with tooth-colored composite dental material (Paryag & Rafeek, 2014)

G. Things that can be conveyed to patients with tooth erosion

For patients with tooth erosion, when undergoing treatment, we should provide therapeutic communication, in the form of (ADA, 2021):

1. Avoid acidic foods between meals, reduce intake of acidic drinks and eliminate behaviors that increase wear on teeth, especially chewing or holding acidic fluids between the teeth, or in the mouth.
2. Drinking with a straw placed behind the front teeth can minimize the habit of gargling liquids, especially if the drink is acidic.

3. Drink water when eating, or gargle with water after consuming sour drinks, candy or sour foods
4. After vomiting, gargle with water, mouthwash sodium bicarbonate, or milk.
5. Saliva helps remove acids; Chewing gum can help protect teeth from erosion by increasing saliva flow.
6. Drink milk along with acidic foods or drinks, which contributes to remineralization and helps neutralize acids.
7. Gargle with water instead of brushing your teeth immediately after consuming acidic drinks.
8. Use a soft-bristled toothbrush and fluoride toothpaste.

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CHAPTER

13 | GLOSSITIS

* I Ketut Harapan, S, SiT, M.Kes*

A. Introduction

The tongue is a muscular organ found in the oral cavity of humans and other vertebrates. The tongue is one of the organs of the digestive system, along with teeth, saliva, lips and cheeks. The surface of the tongue is covered with a thin mucous membrane and consists of several parts, namely the base of the tongue (floor), the body of the tongue (corpus), the tip of the tongue (apex) and the edges of the tongue (edge).

The tongue also has papillae, small protrusions on its surface that help humans with their sense of taste. Papillae consist of several types, namely spongy papillae, filiform papillae, vallate papillae and foliate papillae. The main function of the tongue is to help us taste food

and drink, as well as for talking and chewing food.

Some important features of language are: Some important functions of the tongue include:

1. Sensing taste: The tongue has thousands of taste receptors that help us perceive various tastes such as sweet, salty, sour, bitter and umami.
2. Helps swallowing: The tongue helps guide food to the back of the mouth so it can be swallowed easily.
3. Helps speaking: The tongue plays an important role in the formation of sounds, especially consonant sounds.
4. Keeps the mouth moist: The tongue also plays a role in keeping the mouth moist and helps prevent dehydration.
5. Helps clean teeth: The tongue can also help clean teeth by removing bacteria and food debris from the teeth and mouth.

B. Disorders of the tongue

The tongue is often associated with clinical symptoms of systemic disease in the body and is also associated with a number of other non-systemic conditions. Speech disorders are easy to recognize, making speech disorders easy to recognize.

The sensitivity of the taste buds (tongue) when absorbing taste stimuli is different for each person. If we eat too hot, too spicy, too salty or too sour, the sensitivity of our tongue is disturbed and this disturbance is only temporary. We can also feel disturbances in the body through the taste of the tongue.

Changes in salt taste are related to blood pressure. The oral cavity feels less salty than usual, there is a possibility of high blood pressure or high blood pressure.

Sweet taste is a sign of homeostatic disorders. A bitter taste indicates a disease/infection in the body. Type

Disorders of the sense of taste that can occur on the tongue are:

1. Hypogeusia: A condition where a person experiences a decrease in the ability to perceive the overall taste of food.
2. Ageusia: A condition in which a person loses the ability to fully taste food.
3. Dysgeusia: A condition where a person experiences changes or distortions in the ability to perceive the taste of food.
4. Parageusia: A condition in which a person perceives a taste of food that has nothing to do with the actual food eaten.
5. Kakogeusia: A condition where a person feels the taste of food is unpleasant or unpleasant even though the food is actually delicious or normal.

Deterioration of the sense of taste can be caused by certain diseases or as a side effect of certain medications.

Some diseases that can cause taste disorders on the tongue are respiratory tract infections, diabetes, neurological diseases, malnutrition or cancer. Various drugs that can cause loss of taste in the tongue include antibiotics, chemotherapy, and pain relievers.

C. Tongue disorders

Loss of taste on the tongue can occur in someone with tongue disorders, which include swelling

and loss of papillae on the tongue and may also indicate systemic disease. There are several types of abnormalities that can occur on the tongue:

1. **Glossitis:** Glossitis is an inflammation of the tongue that can cause the tongue to become swollen, red, and painful. Some causes of glossitis include infection, nutritional deficiencies, or allergic reactions to food or medicine.
2. **White tongue:** A white tongue can be caused by various factors, such as fungal infections, bacterial infections, vitamin or mineral deficiencies, or excessive use of antibiotics.
3. **Glossodynia:** Glossodynia is a condition in which the tongue feels painful or burning, even though there are no signs of inflammation or infection. The cause of glossodynia is not known with certainty, but it may be related to stress, depression, or hormonal changes.
4. **Pale tongue:** A pale tongue can be a sign of anemia or iron deficiency in the body.
5. **Spotted tongue:** A spotted tongue can be a sign of symptoms associated with certain diseases, such as scarlet fever or Reiter's syndrome.
6. **Tongue cancer:** Tongue cancer is rare, but can be a serious condition. Symptoms of tongue cancer include pain, white or red spots on the tongue, and difficulty swallowing or speaking.

D. Glossitis

The word “glossitis” comes from ancient Greek, where “glossa” means tongue and “itis” means inflammation.

Although glossitis can occur in all ages and genders, it can also be a symptom of several other conditions, including anemia, diabetes, hypothyroidism, and Crohn's disease. This condition can affect a person's ability to taste food. Apart from that, glossitis can also cause sensitivity of the tongue to certain foods, which

This can further reduce appetite. If glossitis is not treated immediately, this condition can worsen and cause more serious complications such as infections of the mouth and teeth. The etiology of glossitis can occur due to: There are many potential etiologies for glossitis. These include:

a. Iron deficiency anemia

b. Pernicious anemia

Deficiency of 2-Vitamin B: a.

Vitamin B1

b. Vitamin B2

c. Vitamin B3

d. Vitamin B6

e. Vitamin B9

f. Vitamin B12

2. Infection:

a. Viral: herpes viruses, as well as post-herpetic glossitis b.

Bacteria: rare in immunocompetent patients c. Fungi: the most

common *Candida* species d. Parasites: malaria, spirochetes

3. Medicine:

a. ACE inhibitor b. Albuterol

c. Organosulfur antimicrobial drugs such as (sulfanilamide, sulphathiazole) d.

Oral contraceptive

pills e. Lithium carbonate

4. Others: a.

Psychological factors (conversion disorder, anxiety) b. Exposure to

irritants, for example alcohol, spicy foods, and

tobacco.

c. Normal familial variant (cracked tongue, tongue
geographic)

d. Mechanical irritation (burns, chronic dental trauma) e. Poor
hydration

f. Down Syndrome

- g. Psoriasis and other autoimmune conditions
- h. Burning mouth syndrome

E. Types of Glossitis

1. Hairy Tongue



Figure 13.1 **Hairy tongue**. White "fur" in the middle of the tongue

Hairy tongue is a benign condition that is usually caused by overgrowth of the filiform papillae, which usually appear on the tongue as a full or partial white coating on the front of the tongue that looks like thin white hairs, which is why the condition is called hairy. called the tongue or "hairy tongue" (Figure 12.1). A hairy tongue is common in healthy people who smoke, breathe through the mouth, or have poor oral hygiene, in people on low-fiber diets, and also in people who are dehydrated and have a fever.

2. Smooth tongue



Figure 13.2 **Smooth tongue**

The clinical appearance is in the form of a tongue that looks shiny and smooth covering almost the entire surface of the tongue and erythematous (a medical term that refers to a skin condition that is inflamed and reddish or pink), usually sufferers complain of a burning sensation or pain on the tongue. The tongue can appear red, pink, or magenta.

3. Fissured Tongue



Figure 13.3 **Fissured tongue**

This tongue condition shows a long and deep central indentation on the dorsal part of the tongue with several irregular side indentations. Fissures can occur elsewhere on the dorsal tongue, including on the sides. The gaps formed allow bacteria to grow and worsen inflammation. This condition normally occurs with age. Fissures can form without symptoms unless they become inflamed due to trapped food debris and bacterial overgrowth.

4. Rhomboid median glossitis



Figure 13.4 **Rhomboid median glossitis**

Median rhomboid glossitis is also called chronic candidiasis and central papillary atrophy of the tongue. It is rare, men are affected three times more often than women. This condition clinically appears as a rhomboid/rhombus shaped plaque on the middle part of the tongue with surface changes in the form of hypertrophy or atrophy (a medical term that refers to a decrease in the size or number of cells, tissues or organs in the body that normally develop or increase in size).

Sufferers may complain of a slight burning sensation on the tongue when eating spicy food, although most do not show symptoms. On clinical appearance, there is a flat or raised spot with clear red to red-white borders on the midline of the tongue. The surface of the affected tongue looks smooth.

5. Geographic tongue



Figure 13.5 **Geographic tongue**

Geographic tongue has many other names including benign migratory glossitis, erythema migrans, and glossitis areata migrans. The clinical appearance is erythematous and white spots on the dorsum of the tongue. Red patches lack papillae and are atrophic, whereas white areas have normal or hypertrophic papillae. The patches are irregular and well-defined, resembling a map. Typically plaque varies in location and shape hourly to daily. This tongue condition usually has no symptoms except for a plaque that resembles a map image on the surface of the tongue. 40% of people have geographic tongue

experiencing a fissured tongue, when a fissure appears, pain can occur if it becomes inflamed.

F. Prevention

Some actions that can be taken to prevent glossitis include:

1. Avoid risk factors: Avoid risk factors for glossitis, such as smoking, excessive alcohol consumption, and exposure to chemicals that damage the tongue.
2. Maintain oral hygiene: Maintain good oral hygiene by regularly brushing your teeth twice a day, cleaning your tongue and using mouthwash to kill bacteria in the mouth.
3. Eat a healthy diet: Eating a healthy, balanced diet with sufficient vitamins and minerals, including vitamin B12, folic acid, and iron, can help prevent malnutrition that can cause glossitis.
4. Treating the underlying medical condition: If glossitis is caused by an underlying condition, such as anemia or an autoimmune disease, treating that condition can help prevent glossitis.
5. Avoid trauma to the tongue: Avoid damaging the tongue by avoiding hot food or drinks, chewing food carefully, and avoiding biting the tongue

G. Care/Treatment

Most causes of glossitis are self-limited and do not require treatment if the trigger can be stopped.

Symptoms of the disease can be suppressed with good oral hygiene and the use of mouthwash (some "miracle mouthwashes" contain corticosteroids and lidocaine, which can relieve acute exacerbations of migratory glossitis). Some additional special treatments include:

1. Hairy tongue: smoking cessation, rehydration, curing fever, and correction of mouth breathing, including increasing fiber consumption. Brush your tongue 5 to 15 strokes daily using a soft-bristled toothbrush and toothpaste.
2. Smooth tongue : This condition is a manifestation of nutritional deficiencies such as nutritional deficiencies of iron (anemia), folic acid, vitamin B12 (pernicious anemia), riboflavin, or niacin. Treatment can be done by consuming deficient nutrition.
3. Cracked tongue: treatment is done by brushing the tongue (5 to 15 times) with toothpaste and a soft-bristled brush after eating and before going to bed to prevent the accumulation of food residue and bacteria in the cracks. If the pain is unbearable a topical anesthetic such as thick lidocaine can be applied before meals.
4. Thomboid median glossitis: topical antifungals can be applied (anistatin suspension applied twice a day, or clotrimazole can relieve the disease).
5. Geographic tongue: this is a self-limiting disorder that usually lasts several months to years.
Palliative therapy with topical corticosteroid antifungal medication, or topical analgesics may be helpful.

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CHAPTER

14

Teething

Youngest

Rawati Siregar, S.Si.T, M.Kes

A. Teeth

Humans have 2 types of teeth during life, namely teeth during childhood which are called deciduous teeth (primary teeth) and another which should be there until the end of adulthood which are called permanent teeth (secondary teeth).

Human teeth, which were originally primary teeth, undergo changes to permanent teeth including size, shape and constituent structures during the growth and development of the body.

Normal permanent teeth in adults total 32 teeth, 16 teeth in the upper jaw and 16 teeth in the lower jaw consisting of 8 incisors, 4 canines, 8 premolars and 12 molars.

B. Wisdom Teeth (Molar)

Teeth The molars located at the back of the jaw are teeth that are important for remaining in the mouth as long as we continue to chew food.

The molar function is:

1. Plays an important role in chewing food, including chewing, grinding and crushing.
2. It is important to maintain the vertical distance of the face (influence facial appearance)
3. It is a protective space for other teeth to remain in place (jaw arch).

If we lose our molars, it will disrupt our chewing system and cause jaw joint problems. Unlike the first molars, wisdom teeth or wisdom teeth are the teeth that grow last and have the same function as the first molars.

C. Wisdom Teeth (Wisdom Teeth)

Wisdom teeth are the third molars that grow in adulthood, usually between the ages of 17 and 17

25 years. Wisdom teeth are located at the back of the upper and lower jaw and usually grow hidden under the gums or jawbone.

Normally, a person will have 4 wisdom teeth, namely 2 on the upper jaw and 2 on the lower jaw. However, some people also have few or no wisdom teeth.

Wisdom teeth begin to grow in the jawbone from an early age. These teeth can grow normally and do not cause problems with the gums or other teeth.

Wisdom teeth that grow abnormally can cause oral health problems such as jams, infections, cavities and gingivitis. Therefore, it is important to maintain the health of wisdom teeth so that problems caused by wisdom teeth can be treated immediately.

Signs of wisdom tooth eruption include tooth and gum pain, swollen gums, headaches, and difficulty opening the mouth.



Figure 14.1 Shape anomalies in wisdom molar teeth

There are several theories about wisdom teeth. Several theories these include:

1. Evolutionary theory According to this theory, wisdom teeth were used by primitive humans to help them eat harder and coarser foods. However, along with changes in people's diets, wisdom teeth no longer function as they should and often cause health problems.

2. Limited Jaw Space Theory This theory argues that wisdom teeth grow so late that modern human jaws do not have enough space to accommodate these additional teeth. As a result, wisdom teeth often grow abnormally and cause problems such as misalignment or infection.
3. Malnutrition theory Some experts link the growth of wisdom teeth to poor nutrition in childhood. Poor nutrition can affect the growth and development of teeth, causing wisdom teeth to become abnormal or not even grow.
4. Heredity Several studies show that the tendency to have problems with wisdom teeth can be inherited. If parents or other family members experience problems with their wisdom teeth, it is likely that other people also experience the same problems.

D. Wisdom Teeth Anomalies

Abnormalities or anomalies in wisdom teeth are often found in adults.

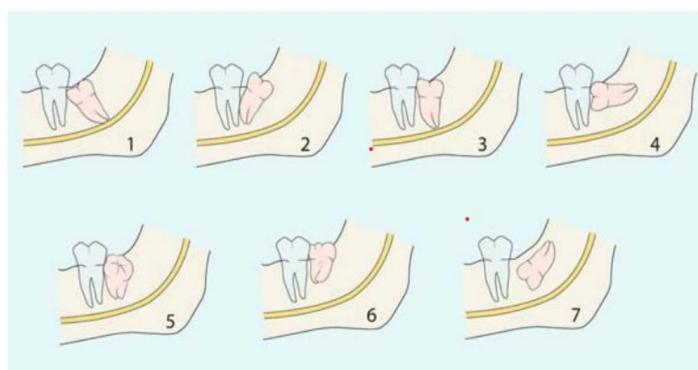


Figure 14.2 Classification of Wisdom Teeth Anomalies

According to Archer (1975) and Kruger (1984)

Caption:

1. Mesioangular
2. Distoangular

3. Vertical
4. Horizontal
5. Bucoangular
6. Linguoangular
7. Inversion

There are several factors that can cause problems with wisdom teeth, including:

1. Limited space:

Because wisdom teeth grow later, the space in the jawbone can be filled by other teeth. As a result, wisdom teeth do not have enough space to grow in the correct position, so they can get stuck under the gums or jawbone.

2. Misaligned wisdom teeth:

Some people have wisdom teeth that are crooked or misaligned. This can cause wisdom teeth to press on other teeth and cause health problems mouth.

3. Irritated wisdom teeth:

When wisdom teeth erupt, the gums can become irritated and swollen. This can cause pain and inflammation.

4. Compared with age:

Wisdom teeth usually erupt between the ages of 17 and 25 years. At this age, the jawbone is no longer developing, so there may not be enough space for wisdom teeth to fully erupt.

E. Genetic

Some people may have a genetic predisposition to abnormal wisdom teeth or be at risk for dental problems.



Figure 41.3 The operculum is a flap of tissue that can cover the crown of a tooth that is erupting/growing, this flap is subject to irritation and infection around the crown

F. Treatment of wisdom tooth growth and development anomalies

Treatment for abnormal wisdom teeth depends on the type of problem that arises. If wisdom teeth grow normally and do not cause problems, no special treatment is needed. However, if wisdom teeth grow abnormally and cause problems, several treatments can be done:

1. Tooth extraction

If wisdom teeth become stuck in the gums or jawbone, they may need to be removed to avoid infection or damage to other teeth and gums.

2. Operation

If the wisdom teeth grow abnormally, such as leaning in or growing backwards, surgery may be needed to remove the wisdom teeth and reposition the other teeth. This surgical procedure in dentistry is called dentures

3. Orthodontic treatment:

If wisdom teeth come in and affect the position of other teeth, orthodontic treatment, such as braces or expansion,

may be needed to correct problems with misaligned or misaligned teeth.

4. Oral care:

If erupting wisdom teeth cause problems with other teeth and gums, oral and gum care is needed, such as plaque removal or root canal treatment.

It is important to visit your dentist regularly to check your teeth and gums, including wisdom teeth. If you experience problems with your wisdom teeth or other teeth, see a dentist immediately to get the right treatment.

G. Prevention

Regular visits to the dentist every six months can detect the possibility of impacted teeth early. In addition, it is important to maintain oral hygiene at all times, especially by:

1. Brush your teeth twice a day, in the morning after breakfast and at night before sleeping
2. Brush your teeth thoroughly down to the molars
3. Use a toothbrush with soft bristles to avoid irritation
4. Use a brush with a small brush head that can fit down to the teeth
5. Change your toothbrush regularly every three to four month
6. Use toothpaste that contains fluoride.

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CHAPTER

15

Hypersensitive Dentin

* Drg. Rina Kurnianti, M.Pd*

A. Introduction

Dentin exposure due to loss of the enamel or cementum layer is relatively common in permanent teeth, this condition is usually called dentin hypersensitivity. The exposed dentin layer due to loss of enamel or cementum due to thermal stimulation, osmotic pressure, or chemicals can cause pain for a short duration. The resulting feeling causes discomfort for the patient.

Several factors such as abrasion, attrition, abfraction, erosion, caries, gingival recession and amelogenesis imperfecta can cause dentin hypersensitivity. Epidemiologically, dentin hypersensitivity can occur in all age groups, but 30% of the population experiences dentin hypersensitivity at the age of 20 to 30 years, according to Bahsi.E et al in 2012.

The sequence starts from *the canine* and first premolars followed by the incisors, second premolars and molars. The number of cases of dentin hypersensitivity is around 74% in the world, with the highest number occurring in Nigeria, 68% and 27% in Indonesia. Albasraireh and Aljamal explained that cases of dentin hypersensitivity occur more often in women than men.

B. Process of Dentin Hypersensitivity

1. Odontoblast Transducer Theory

Odontoblasts serve as cell receptors, through synaptic connections with nerves indirect changes in odontoblast potential. This process causes pain at the endings of the nerve fibers at the pulpal border. This theory was proposed by Rappet et al., but the evidence for this theory is less convincing.

2. Hydrodynamic Theory

The hydrodynamic theory describes how pain can be explained by the movement of fluid in the dentin tubules. This theory was introduced in 1964 by *Brannstrom and Astron*. In this theory, it is explained that the loss of cementum in the cervical area of the tooth causes the dentin tubules to open, resulting in

allows the movement of fluid in the dentin tubules indirectly which stimulates the extremities of the nerves in the pulp causing a sensation of pain.

This theory can also conclude that dentin hypersensitivity starts from exposed dentin experiencing stimulation, then the fluid in the dentin tubules moves to the peripheral or peripheral nerve receptors in the pulp which then transfers the stimulation to the brain and ultimately causes a pain response or perception of pain.

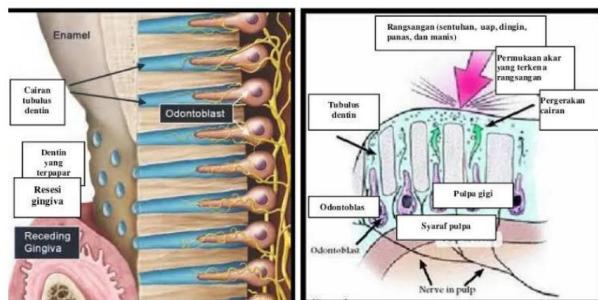


Figure 15.1 Description of Brannstrom's hydrodynamic theory

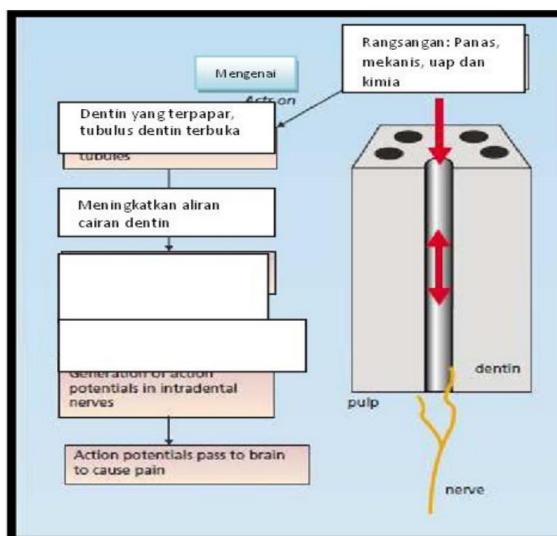


Figure 15.2 Illustration of theoretical mechanisms

hydrodynamics (Orchardson R and Gillam DG. J Am Dent Assoc 2006; 137: 991).

C. Causes of Dentin Hypersensitivity

1. Gingival recession

The initial occurrence of dentin hypersensitivity is a further consequence of gingival recession. Where according to Loe et al A shift of the gingival edge from its normal position on the crown surface of the tooth to the apical direction (root surface) below the Boundary Cementum Enamel (BSE) is defined as gingival recession. Carranza divides recession into two types, namely: recession which can be seen clinically as an abnormality periodontal with some exposed roots and hidden ones that are lined by pocket walls inflamed and can only be known by means examination by a periodontal probe.

Exposed tooth roots are caused by gingival recession and contamination with the cavity environment mouth. This anomaly causes hypersensitivity. Dentin hypersensitivity can cause various problems in a person, for example discomfort when there is a change in temperature, trauma when brushing teeth, sour or sweet food and drinks and other factors.



Figure 1 5 .3 Gingival Recession (DriskoCH. International Dental Journal 2002; 52: 386).

Gingival recession usually occurs due to age, and is also related to the length of time the gingiva has been exposed to etiological factors. The causes of gingival recession include anatomy

alveolar bone labial plate, thin alveolar bone, fenestrations, poor oral hygiene. Improper toothbrushing technique, frenulum attachment that causes tissue to move towards the cementoenamel junction and occlusal trauma in patients who have active periodontal disease and loss of periodontal attachment can cause more severe sensitivity. Other factors that cause gingival recession are periodontal surgery, scaling, root planning or crown preparation. The prevalence of dentin hypersensitivity due to gingival recession is around 36.8%

2. Periodontal Disease

Exposed root surfaces can be caused by: gingival recession and some treatment procedures periodontal, such as *scaling* and *root planing*. Procedure *Scaling and root planing* can cause loss of periodontal tissue attachment and erosion of cementum.

Therefore, dentists must be careful in carrying out periodontal treatment procedures.

The dentin layer or root surface in normal conditions can cause sensitive teeth after periodontal treatment procedures. The most infected areas of dentin hypersensitivity are the cervical and root surfaces. This is possible because the thickness of the enamel on the cervix is thinner than other locations. In addition, the rate of enamel loss is influenced by activity brushing teeth.

In histology, in cases of dentin hypersensitivity, dentin tubules are twice as wide as normal tubules and the number of tubules per area is higher. During periodontal procedures, patients will usually return for two to three more visits to check whether there is pain when brushing their teeth or not.

Poor dental health is associated with recession secondary to periodontal disease, improper brushing causes associated recession

dental health. The severity of gingival recession will increase with increasing age. Neime et al stated that it is the most effective way to maintain oral hygiene is mechanical, namely brushing your teeth. However, way brushing too hard and inappropriately can cause other unwanted problems. Abnormalities that may occur vary from lesions on the gingiva, gingival recession, and abrasion of the root surface.

According to Miglani et al, dentin hypersensitivity goes through two stages, local lesions due to loss of enamel or cementum and/or caused by diseases that cause root exposure. Dentin hypersensitivity due to enamel loss occurs due to non-carious cervical lesions (abrasion, erosion, abfraction or attrition). The most frequent cause is erosion by intrinsic or extrinsic factors, namely diseases related to stomach acid, systemic diseases, bulimia and diets that cause the oral environment to become acidic. Meanwhile Ozcan and Canacki argue that the main cause of enamel loss is friction, with a prevalence of 41.7%.

Abrasions can occur due to tooth brushing activities, for example a stiff toothbrush, frequency and method of brushing teeth, etc. Abfraction is a lesion caused by hyperbiomechanical forces leading to fracture of the enamel or dentin prism.

D. Predisposing Factors

Until now the exact cause of gingival recession is not known, but it is often associated with factors such as high attachment of the frenulum to the gingiva, bad habits, incorrect tooth position, tooth brushing, erosion due to acidic foods and iatrogenic factors. related to procedures

Dental fillings, for example periodontal treatment procedures or fillings in the cervical area. Apart from that, there are predisposing factors that cause gingival recession

namely: gingival inflammation, incorrect way of brushing teeth, abnormalities of the surrounding soft tissue and frenulum or muscle attachments. Apart from that, there are also factors that influence the susceptibility to gingival recession, namely: tooth root morphology, excessive occlusal pressure, tooth position, inadequate attached gingival areas.

The inflammatory process that causes damage to connective tissue and proliferation of the epithelium is called gingival inflammation. There is a decrease in the epithelial surface caused by the proliferation of epithelial cells into the connective tissue, which is clinically described as recession. The technique of brushing teeth in a horizontal direction with hard bristles accompanied by rather strong pressure causes gingival recession. Gingival abrasion is a clinical form of recession that occurs due to error. Tooth brushing generally occurs in patients with relatively healthy gums, plaque buildup and good *oral health*.

Attachment of the frenulum or muscle that is too close to the cervical spine can disrupt the gum tissue. Thin tissue with loose attachments make it more likely that a sulcus will form which will facilitate the accumulation of food waste.

There are several factors that cause this to happen gingival recession. One of them is influenced by the position of the teeth, if the bone plate becomes thinner and decreases in height, the position of the teeth rotates, *tilts* or labioverts. The gingiva is susceptible to recession due to other factors, such as excessive occlusal pressure, can cause changes in the surface of the vestibular bone and thinning.

E. Triggers for Dentin Hypersensitivity

The trigger for dentin hypersensitivity can be stimulation of the open dentin tubules such as tactile or touch, chemicals, steam, and cold temperature stimuli or hot. Among these factors are the most frequent causing dentin hypersensitivity is cold stimulation

because it can cause fluid movement inward. It can be concluded that there is a fast and intense response to cold stimuli compared to a slow response to hot stimuli. Therefore, pain receptors will change due to changes in pressure in the pulpal area along the dentin.

There is fluid flow in the dentin tubules (into and outward) will cause stimulation of the pulp nerve, as in hydrodynamic theory. The perception of pain in dentin hypersensitivity will arise starting from the exposed dentin experiencing stimulation, then the tubular fluid moves to peripheral nerve receptors in the pulp which then sends the stimulus to the brain and this is in accordance with hydrodynamic theory.

Apart from hot and cold stimuli, *bleaching* (whitening) teeth can also cause dentin hypersensitivity. Sensitivity in the occlusal part of the tooth indicates an incorrect filling or excessive occlusal pressure that affects the nerves in the tooth. This case must be taken into consideration for further treatment actions.

F. Management of Dentin Hypersensitivity

According to the type of treatment, dentin hypersensitivity consists of non-invasive and invasive treatments. Non-invasive treatment can be done by adding ingredients which generally include toothpaste, mouthwash, desensitizing agents containing gel, while invasive treatment includes pulpectomy, restoration and periodontal surgery (laser). Restorations typically use composite resin or glass ionomer cement as additional fillers to seal exposed dentin tubules and block sensitivity. This restorative material is only used in cases of loss of tooth structure.

Periodontal surgery is aimed at covering exposed dentin, especially at the exposed roots. Other treatments using lasers aim to close open dentin tubules or shorten the depth

dentin tubules so that fluid movement in the dentin tubules becomes limited. Pashleys explained that the mechanism for treating dentin hypersensitivity using lasers is to coagulate and precipitate plasma proteins in the dentin tubule fluid or by influencing nerve fiber activity.

An alternative treatment for dentin hypersensitivity is to use hypnotherapy which is divided into several phases, namely the first discussion phase, introduction phase, intensification or consolidation phase, intervention or therapy phase, final phase and final discussion as a follow-up. Evaluation of this method did not show significant effectiveness compared with medical therapy. However, hypnotherapy shows a longer duration of effect compared to medical methods.

Hypnotherapy for cases of dentin hypersensitivity is limited to patients who have knowledge or experience with hypnotherapy

Based on hydrodynamic theory, covering or blocking open dentin tubules can reduce or even eliminate dentin hypersensitive reactions. If dentin hypersensitivity is caused by caries or non-caries, it requires appropriate restoration such as glass ionomer cement or composite materials. In cases without cavities, materials containing fluoride can be used to trigger the re-formation of the dentin layer, such as fluoride varnish, calcium phosphate, potassium nitrate and oxalate.

The treatment plan for cases of dentin hypersensitivity is in the form of *dental health education* (DHE) regarding the causal factors. In cases of mild to moderate sensitivity, provide education regarding the correct way to brush your teeth and choose toothpaste that suits the patient's needs and can be done at home. If complaints of pain still persist, action is needed *in the office* or directly at the clinic.

If these two measures are not effective, then endodontic treatment is considered as a last option.

Classification based on mechanism of action is differentiated

The mechanism of action is to interfere with painful stimuli (nerve desensitization using potassium nitrate) and block the flow of tubular fluid thereby closing the dentin tubules. some examples are protein precipitation with glutaraldehyde, silver nitrate, zinc chloride, potassium oxalate, calcium phosphate, calcium carbonate, and bioactive glasses. adhesive dentin coating with fluoride varnishes, oxalic acid and resin, glass ionomer cement, composite, and dentin bonding agent, laser using neodymium aluminum garnet, homeopathic medication with propolis.

There are various application techniques for dentin desensitization agents in various forms, for example topical cream, varnish, toothpaste, polish powder, single dose applicator, powder/liquid mixture, modified resin.

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CHAPTER

16 | Halitosis

Surayah, S.ST, M.Pd

A. Introduction

Oral health is important for the general health and well-being of the body and greatly influences the quality of life, including speech function, mastication and self-confidence. Oral health problems will have an impact on a person's performance. To maintain healthy teeth and mouth, we must be diligent in brushing our teeth properly and correctly regularly and paying attention to the food we consume.

Ancient humans made most of their food from vegetable matter, including fruit. For this reason, they usually chew strongly and for a long time. The allegation is not without strong reasons and support. Health experts in America have long announced the results of their research, namely that children who chew longer tend to have cleaner and stronger teeth.

The risk of developing dental disease for them is relatively small. It was also added that chewing for a long time plant foods, especially fruit, will support healthy teeth. In general, people think that fruit is useful as a dessert after eating. Apart from adding carbohydrate and vitamin content to staple foods, it also cleans food debris between the teeth.

However, the results of this expert research show that more than that, every time you chew, it stimulates the production of saliva.

The more you chew, the more saliva comes out. Within five minutes of chewing, hundreds of times more saliva remains in the mouth than when you are still (not chewing). It is not enough just to chew fruit to achieve good dental health. There is a social aesthetic that requires everyone to be able to smile brightly with healthy teeth, and the smell of their mouth must be fresh all the time.

B. Definition

of Halitosis is bad breath, bad breath, unpleasant and nose-piercing. An unpleasant odor can be smelled when the sufferer exhales, originating from the mouth or nose area which produces a disturbing odor. In many cases, bad breath can generally be overcome by maintaining oral hygiene, but chronic halitosis cannot be eliminated simply by regular cleaning measures such as brushing your teeth, but you need to consult a doctor to find out any serious conditions that may be the cause. Halitosis is not limited by age, race, sex or socio-economic level

somebody.

C. Symptoms

There are several symptoms of Halitosis:

1. Often feels bad in the mouth.
2. Other people comment on the smell of your breath, then offer you some kind of candy or medicine to flavor your breath.
3. Without realizing it, you often use products that eliminate bad breath, breath fresheners or similar.
4. Other people don't want to be close when talking to you.
5. You feel dry mouth or your saliva is thicker than usual. This condition can be corrected with all the efforts you make.

D. Cause

The cause of halitosis or bad breath according to Dr. Robert can occur due to the presence of microorganisms on the surface of the tongue which produce a lot of VSC or Volatile Sulfur Compound which is a volatile sulfur compound that has an unpleasant odor. The causes of bad breath come from two things, namely general and local health conditions.

1. General

- a. Infection or abnormality in the shape of the sinuses

- b. Tonsil infection
- c. Lung, kidney and liver disorders
- d. Blood disorders
- e. Diabetes
- f. Bladder disorders
- g. Menstruation
- h. Carcinoma or cancer
- i. Certain foods (eg shallots, onions
white, cabbage)
- j. Vitamins (especially in high doses)
- k. Alcohol
- l. Smoke
- m. Foreign body in the nose (in children)
- n. Medications (paraldehyde, triamterene and inhaled
anesthetics, insulin injections)
- o. Sore throat

2. Local

- a. Large and numerous cavities
- b. Periodontal or gum disorders
- c. Infection or swelling in the mouth d. Cancer in
the mouth
- e. Condition of dryness in the mouth (xerostomia)
- f. Allergy
- g. Development of gram-negative type *anaerobic* bacteria .
- h. Poor dental hygiene
- i. Tartar

Sometimes the problem with dentures is closely related to bad breath, therefore it is highly recommended for those who wear dentures to clean their teeth and mouth extra to avoid bad breath, even though we cannot actually avoid bad breath, but at least we can reduce the unpleasant odor. That. Pregnant women also often do not notice that their mouth odor is bad due to not maintaining good oral hygiene.

Please note that food ingredients that have a strong smell such as durian, jackfruit, Ambon bananas can also cause bad breath. The smell of this type of food will be absorbed by the walls of the small intestine, enter the bloodstream, through the liver to the lungs and exhaled through the breath. Even the smell of food like this can stay in the lung tissue for up to two days.

The smell of a person's mouth when they wake up is unpleasant, because during sleep, saliva is blocked, not much comes out. This means that there is no process of cleaning the mouth, even the saliva contained in the substances it contains will undergo a chemical process and also a process of decay by germs, giving rise to an unpleasant odor. The diagnosis is made based on symptoms and the results of a thorough physical examination of the mouth and nose. Other examinations that may need to be carried out are *endoscopy*, abdominal x-ray and chest x-ray.

E. Treatment

There are several methods that can be used to treat bad breath.

1. Get into the habit of chewing sugar-free candy or gum to increase saliva production, because saliva is a natural mouth cleanser with antibiotic content that can overcome the number of oral bacteria.

2. If saliva production decreases, maintain mouth moisture by drinking eight glasses of water per day. Keep the water in your mouth as long as possible (minimum 20 seconds) and gargle briefly before exhaling, the longer the water lasts being in the mouth the better.

3. Choose types of vegetables such as carrots or celery as snacks.

4. Vitamin C deficiency is one of the factors causing bad breath. Smokers are advised to consume vitamin C regularly because nicotine destroys the vitamin C content

inside the body. For sufferers of severe bad breath, it is better to stop smoking.

5. Clean your teeth and tongue using toothpaste with baking soda. Brush your teeth properly and correctly at least twice a day, every morning after breakfast and at night before bed.
6. Use a *water pik* (special dental water sprayer) that can removes remaining dirt between the teeth.
7. Use mouthwash that contains bad breath neutralizing ingredients such as *cetylperidinium chloride* (CPC), *zinc chloride*, or *chlorhexidine*.
8. When you are going to attend an important event, such as a reception or presentation, you can gargle with a solution of hydrogen peroxide and water, in a ratio of 50:50, one teaspoon, then swish in your mouth for one minute.
9. Use mouth freshener or mouth spray, preferably one that contains chlorophyll.
10. Some bad breath conditions caused by an empty stomach or fasting can only be overcome with one easy step, namely eating.

Important to avoid halitosis is to carry out thorough health and hygiene care in all parts of the oral cavity every day. Good oral hygiene will keep your teeth and surrounding tissues healthy.

Teeth and bad breath have a big influence on a person's appearance, someone who has healthy teeth and fresh breath will increase their self-confidence when talking to other people.

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CHAPTER

17

Bruxism

* Rosmawati, S.Si, T, MPH *

A. Introduction

Bruxism is a person's unconscious habit of clenching the upper and lower jaw accompanied by chewing movements of the teeth of the upper and lower jaw, left and right. Bruxism is known as the habit of grinding your teeth. Bruxism usually occurs during sleep at night even though there are times when you are awake (Lobbezoo, et al, 2010).

Bruxism with hard pressure causes a loud sound, with hard pressure it can cause severe wear of the tooth surface in a short time. Bruxism can also occur with light pressure so that it does not produce a significant sound (Putri, et al, 2008).

The prevalence of Bruxism is more than 70% due to anxiety and stress, in conditions of awake bruxism or sleep bruxism. In adults, the prevalence of awake bruxism is around 20% due to stress and anxiety (Shetty et al, 2010).

B. Types of Bruxism

Several types of Bruxism based on the cause and time of occurrence.

1. Sleep Bruxism is a type of Bruxism that many people experience, more often at night when someone is asleep.
2. Awake Bruxism is Bruxism in someone who is active. The movement of teeth grinding during activities when someone experiences stress, nervousness, anger or anxiety. This type of Bruxism can also occur when someone is concentrating on something.
3. Bruxism in children occurs when babies are about to grow milk teeth and in children when permanent teeth are about to grow. Apart from that, Bruxism in children can also be caused by stress, abnormal alignment of the upper and lower teeth.

C. Causes of Bruxism

Bruxism or teeth grinding does not happen all the time especially when someone sleeps, but is triggered by several factors, especially in adults, namely:

1. Problems with *the occlusal* jaw where *discrepancy occurs* or when the teeth of the lower jaw and upper jaw do not meet normally will increase the risk of Bruxism.

2. Effects of Certain Drugs

The use of certain drugs can also increase the risk of Bruxism, including psychotropic drugs, antipsychotics, anti-depressants.

3. Psychological Factors

A person can experience Bruxism due to psychological disorders such as stress, anxiety, nervousness and frustration. The habit of grinding teeth due to stress at work is more likely for men to experience it.

4. Sleep Disorders

People who experience *obstructive sleep apnea*, sleep paralysis, sleep talking are susceptible to Bruxism.

5. Family History Factors (*Heredity*)

People with family members who have the habit of grinding their teeth while sleeping are at risk of experiencing Bruxism. Bruxism can be inherited from parents, grandparents.

6. Lifestyle Factors

Teeth grinding can also be caused by an unhealthy lifestyle, such as: a. Drinking alcohol excessively, b. Consuming excessive caffeine, c. Excessive smoking habits, d. Using sedatives or the like for a long period of time.

D. Symptoms of Bruxism

Grinding your teeth will put pressure on the tissue, muscles and structure of the jaw over time

old ones can damage teeth. Symptoms of Bruxism that need to be recognized are as follows:

1. Annoying teeth grinding sound.
2. Difficulty sleeping.
3. Pain in the head.
4. Pain in the jaw.
5. Pain in the gum area.
6. Increased tooth sensitivity to temperature.
7. There is a problem while eating.
8. Limited movement of the jaw.
9. Pain in the jaw muscles.
10. Dental discomfort.
11. Ear pain.
12. Anxiety and stress.
13. Psychiatric disorders.

E. Due to Bruxism

In severe cases Bruxism can result complications in the form of (Putri, et al, 2008):

1. Pain in the chewing muscles, headaches and chest pain
ear
2. Changes in tooth shape due to Bruxism result in wear of the tooth surface so that the tooth crown becomes short, the enamel becomes thin as a result the dentin becomes exposed
3. Teeth become sensitive to cold and pressure
4. Fracture of the tooth
5. Inflammation or displacement of the jaw joint

F. Bruxism Management

Treatment for bruxism is carried out using two methods, medical or independent. The aim of treating Bruxism is to reduce and prevent permanent damage to the teeth as a result of teeth grinding

(Ohayon, et al, 2001).

1. Medical Treatment

Medical treatment is carried out in several ways: a. Mouth Protector or *Mouthguard*

A mouth guard or *mouthguard* is a device used to protect the surface of the tooth crown. Mouth guards are mostly used at night. A mouth guard that fits the patient's mouth so that the surface of the teeth can be prevented from damage (Putri, et al, 2008)

b. Dental Crowns

Artificial dental crowns are used for bruxism patients with crooked teeth. The purpose of an artificial dental crown is to repair the tooth surface and its arrangement and prevent tooth damage due to friction resulting from too frequent tooth grinding.

c. Operation

Surgery is the last alternative when protection of the tooth surface and artificial dental crowns are not successful in treating bruxism. The aim of surgery on patients is to correct crooked teeth in the hope that bruxism can be overcome after the teeth become better.

d. Sleep Apnea Treatment

Patients who experience bruxism with obstructive sleep apnea can overcome sleep disorders by using a CPAP (continuous positive airway pressure) device as a solution. CPAP helps prevent the throat from closing during sleep so that various symptoms of sleep apnea can be avoided.

e. Psychotherapy and Biofeedback

Psychological therapy is one way to treat bruxism which can help reduce the habit of teeth grinding. Biofeedback is a type of therapy that can help control jaw muscle activity.

2. Handling independently

a. Changes in sleep patterns

Lack of adequate quality sleep is a contributing factor to bruxism. In an effort to reduce the symptoms of bruxism, it is recommended to improve sleep patterns, with quality sleep or adequate rest, bruxism can gradually decrease.

b. Reduce stress

If you are experiencing problems, you should find ways to relieve them, such as by

do physical activity, take a warm bath, enjoy hot tea, listen to music or do other activities that can have a relaxing effect on the body and mind.

Reducing stress levels can minimize the risk of bruxism.

c. Avoid certain drinks before bed

It's best not to consume alcoholic drinks or those containing caffeine a few hours before bed, because they can worsen Bruxism.

d. Regular Dental and Oral Health Checks

Regular examination of dental and oral health is one way to detect bruxism

early, so that treatment can be done early.

G. Prevention of Bruxism

Prevention of bruxism is more aimed at implementing stress management, such as through breathing exercises, relaxation exercises such as meditation, exercise, listening to your favorite music, consulting with a counselor or therapist. By managing stress well, reducing or avoiding all forms of anxiety, the risk of bruxism can be reduced.

Regular dental and oral health checks can also detect bruxism early, so that potential bruxism can be treated quickly and effectively. Stress management becomes

The main key to avoiding bruxism and regular dental and oral health checks are also important to detect bruxism early (Koyano, et al, 2008).

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