Literature Review: Problems of Dental and Oral Health Primary School Children

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Abstract

Elementary school children or the age group 6-12 years who are in mixed teeth, it is important in maintaining the health of primary teeth which at this time has an important role in the development and maintenance of permanent teeth later. The results of basic health research by the Indonesian Ministry of Health in 2018 showed that 93% of children in Indonesia have oral health problems, which means only 7% do not have dental and oral health problems**.** Children this age really like sweet and sticky foods, and do not understand how to maintain good oral health. This study aims to collect dental and oral health problems in elementary school children and how to deal with them. The design used is a literature review with criteria published from 2007-2020. Based on the articles collected, there are several dental and oral health problems for elementary school children, both those affecting the hard tissues of the teeth and soft tissues or supporting teeth. Parents and schools play an important role in educating children of this age to become accustomed to maintaining oral health.

Keywords: *Dental health problems for children, Age group 6-12 years, Elementary school children.*

Introduction

The Global Burden of Disease Study 2017estimated that oral and dental diseases affect nearly 3.5 billion people worldwide, with permanent dental caries being the most common condition. Globally, it is estimated that 2.3 billion people suffer from permanent dental caries and more than 530 million children suffer from caries in their primary teeth.[1] The results of basic health research by the Indonesian Ministry of Health in 2018 showed that 93% of children in Indonesia experience dental and oral health problems, which means only 7% do not experience dental and oral health problems.[2]

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In elementary school children or the age group 6-12 years who are in mixed teeth, it is important to maintain the health of primary teeth which at this time has an important role in the development and maintenance of permanent teeth later. Dental and oral health problems can be broadly divided into two, namely those that attack hard tissue and soft tissue. Teeth and mouth problems in children can have a negative effect on their well-being, quality of life and health. In addition, it is known that the relationship between dental and oral health problems can develop into systemic conditions such as cardiovascular disease and diabetes later in life. Therefore, special attention needs to be given to handling these cases such as increasing prevention and handling measures from an early age.[3]

Methods

The method used in writing this article is a *literature review,* which is a literature search, both international and national, which is conducted using the ELSEVIER, PubMed database. A search for journal articles obtained 10 articles from 2007 to 2020 using the keywords "dental health problems in children", "dental health and elementary school children", "caries and periodontitis for children aged 6-12 years."

Results

Tooth eruption period Dental

development is divided into several stage: Van der Linden (1985) [4]

1. Period of primary teeth (primary dentition) Primary

Tooth eruption generally occurs between the ages of six to thirty months after birth, and lasts until the age of six years. In general, the sequence of eruption of primary teeth is the first molar, first incisor , second incisors, canines, and second molars

2. Mixed dentition

period There are several transitional periods, the first transition period occurring between the ages of six to eight years, marked by the deciduous incisors being replaced by the permanent incisors and the first permanent molars starting to erupt; then the inner transition period, starting at the age of nine years and the fixed incisors had all erupted; the second transition period y it is characterized by the canine and primary molars being replaced by the canines and permanent premolars and the second molars having erupted.

3. Permanent dentition period

This period is a period of complete tooth development, when the roots of the permanent third molars are fully formed and reach the occlusal peak

Dental and oral health problems in primary school children

Children aged around 6 to 12 years or elementary school children still do not know how to maintain oral hygiene. Therefore, efforts to maintain oral health must be done from an early age. Elementary school age is the ideal time to practice motor skills of children, including brushing their teeth. [4,5]

Caries in children

Caries is a dental and oral health problem that most often occurs in children in the world. *The World Health Organization* (WHO) states that the incidence of caries in children is 60-90%. The high prevalence of caries in school children is influenced by various factors (multifactorial) which include the host (teeth and saliva), agent (cariogenic bacteria), environment and time. Dental health efforts need to be viewed from several aspects, namely environmental aspects, and knowledge, education, public awareness and handling of dental health including prevention and care. Dental caries is a disease that attacks the hard tissues of the teeth by demineralizing the enamel. This demineralization process can worsen tooth enamel and dentin to the point of causing damage. This is more common in individuals who frequently eat foods that contain sugar. Caries can affect the child's growth and cause discomfort.[6,7,8,9,10,1,,12,13] Caries can cause toothache, discomfort, eating disorders, tooth loss, and stunted child development. In addition, caries can also affect the concentration of children in schools.[14,15,16]

First Permanent Molar Caries

Play a role in the development and growth of the dental arch, have the main task of mastication, affect the vertical distance of the maxilla and mandible, the height of the occlusion, and the proportion of esterica. Mandibular first permanent molars are generally the first permanent teeth to erupt at the age of around 6-7 years, so they are the teeth most at risk of caries, also because at that age children have the behavior to eat sweet and sticky foods. If the tooth is exposed to caries, it can result in extraction, which creates new risks such as changes in tooth position, affecting occlusion, TMJ disorders, and the mastication process that affects the absorption of food nutrients.[14, 34,35]

Periodontal disease of children

Periodontal disease is estimated to affect 90% of the world's population. Periodontal disease or so-called periodontitis, usually begins with gingivitis. This can occur due to poor oral and dental hygiene so that

plaque forms on the teeth. Periodontitis causes loss of connective tissue which can cause teeth to fall out of their socket. This of course can cause several negative impacts, such as disruption of chewing, speech, and quality of life of children. [3,6.36,,38]

Gingivitis induced plaque and gingival disease modified by systemic factors related to the endocrine system. Gingivitis, which is characterized by inflammation of the gingiva without loss of attachment to bone, often occurs in children. Although the microbiology of this disease has not been fully characterized, the increased levels of Actinomyces sp., Capnocytophaga sp., Leptotrichia sp., And Selenomonas sp. sub gingivitis has been found in experimental gingivitis in children when compared with gingivitis in adults. Therefore, this species is likely to play a role in its etiology and pathogenesis. Normal and abnormal fluctuations in hormone levels, including changes in gonadotrophic hormone levels during puberty, can alter the gingival inflammatory response to dental plaque. Likewise, changes in insulin levels in diabetic patients can affect gingival health. In both situations, there is an increased inflammatory response to plaque. However, the gingival condition usually responds to a thorough cleaning of bacterial deposits and improves daily oral hygiene.[15]

Periodontal tissue has an important role. Periodontal disease is a disease that often occurs in soft tissues and takes root in early childhood. Periodontal disease can include gingivitis and periodontitis. Untreated periodontal disease can damage the soft tissue and then damage the hard tissue of the tooth, which can lead to tooth loss. This of course can have a negative impact, such as disruption of chewing, speech, and quality of life, it is also known that there is a relationship between oral health problems that can develop into systemic conditions such as cardiovascular disease in the future[3]

Premature loss[7]

Premature loss of primary teeth because caries has an effect on the development of permanent teeth and not only reflects the unfortunate lack of knowledge about the course of the disease but also forms a negative attitude about the prevention of dental caries in adult teeth. Losing primary teeth can cause less space for permanent teeth. It is sometimes considered by ordinary people that the loss of primary teeth, which are sometimes referred to as baby teeth, has little effect because it is only temporary. However, primary teeth can be used from 2 to 7 years of age or older, or about 5 years or more in total. Multiple teeth were used from 6 months to 12 years of age, or 11.5 years in all. Thus these primary teeth are used and contribute to the health and well-being of the individual during the first years of his greatest development, physically and mentally.

Premature loss of primary teeth, retention of primary teeth, absence of congenital teeth, tooth anomalies, and insufficient space are considered important factors in the initiation and development of malocclusion. Premature loss of primary teeth due to tooth neglect is likely to result in loss of arch length and consequently a tendency to crowding in the permanent teeth.

Traumatic dental injury

can be an important public health problem, not only because of its relatively high prevalence but also because of its profound impact on children's daily life. This is due to physical and psychological discomfort, pain, and other implications such as a tendency to avoid laughing or smiling, which can affect social relationships. The main causes of traumatic dental injuries are falls and collisions, sports activities, traffic accidents, and violence. It is also known that increased dental overjet and inadequate lip coverage significantly increase the likelihood of dental injury when people have an accident.

Persistence of primary teeth

persistence of teeth is that the primary teeth have not fallen out properly, but the permanent replacement teeth have grown. The causes of tooth persistence include ankylosis, slow root resorption of primary teeth, hypothyroidism, nutritional deficiencies, genetic disorders such as cleidocranial dysplasia, or due to the abnormal position of permanent tooth seeds. This tooth persistence only occurs during the change of teeth which can result in disruption of the eruption of the permanent teeth. If there is disruption in the eruption of permanent teeth, it can cause malocclusion, esthetic disturbances, and disturbance of the masticatory muscles. Primary school age children are 6-12 years old on average. This age range is a mixed dentition period which is known as a critical period of growth and development, therefore

regular monitoring is very important to do so that there is no disturbance in this period. One of the disorders that can occur is the persistence of primary teeth. Lack of knowledge about the tooth replacement process can lead to tooth persistence. If the tooth persistence is not treated immediately, it will result in malocclusion. [17,18,19,20,21,37]

Malocclusion

Malocclusion is a deviation in the location of the teeth and / or a malrelation of the dental arch (jaw) outside the acceptable range and is considered aesthetically or functionally unsatisfactory. Malocclusion is a health problem that has received full attention. Malocclusion has been the third most common oral disease, after dental caries and periodontal disease. Malocclusion can cause dissatisfaction with aesthetics because it can interfere with smiling, besides that malocclusion can change the way of speaking, breathing, change facial posture, interfere with chewing, swallowing, cause *temporomandibular joint disorders,* and pain is found in many children with malocclusion can cause dissatisfaction with aesthetics because it can interfere with smiling, besides that malocclusion can change the way they speak, breathe, change facial posture, interfere with chewing, swallowing, cause *temporomandibular joint disorders,* and pain is commonly found in malocclusion children.[22,23]

Grabe divides the etiological factors of malocclusion into 2, namely extrinsic and intrinsic:[24]

1. Extrinsic factors: Hereditary, trauma, bad habits, malnutrition, malfunctions

2. Intrinsic factors: abnormalities in the number, shape and size of teeth, *premature loss,* persistence of primary teeth, and deciduous dental caries.

Treatment and prevention

Some preventive treatments that can be carried out to prevent dental and oral health problems in primary school children from an early age, namely:[10,11,12,13]

1. Prevention of plaque and bacteria by brushing and dental floss use

2. Systemic and local intake.

fluoride water as a systemic fluoride intake is said to be effective in reducing caries rates by 20-40%. Fluoridation of drinking water can provide topical and systemic effects, but is more effective when given in the pre-eruption age of permanent teeth. The recommended dosage limit for drinking water fluoridation is 0.7 ppm, to balance the benefits of preventing dental caries and reducing the likelihood of fluorosis. Another systemic fluoride preparation, namely fluorine tablets, is not recommended for children living in areas where fluorine content in water is 0.3 mg F / L. Indicated for children with high caries risk. Research by Ekstr and and Olive (1999) states that after 40 minutes of consuming fluoride tablets, the fluorine concentration in saliva increases and after 120 minutes the fluorine concentration decreases

. Topical application of fluorine is a technique of applying fluoride directly to the tooth surface with the aim of providing opportunities for fluoride to penetrate. into tooth enamel and then fluoride ion will replace the hydroxyl ion in the enamel so as to increase the resistance of the enamel to acid attack. The combined application of topical fluorine will increase the remineralization effect and increase the hardness of the enamel. Both individually and professionally, fluorine topically has 3 mechanisms of action, namely through increased remineralization, prevention of demineralization and inhibition of bacterial glycolysis.

3. Pit and fissure sealants

Materials that are placed in tooth pits and fissures that aim to prevent dental caries. Pits and fissures on the occlusal surface of the posterior teeth are one of the factors contributing to caries. This morphology facilitates the retention of debris and barriers that cause caries. Compared to the smooth surface of the teeth because the inside of the pits and fissures is difficult to reach by the bristles of the toothbrush. This results in a higher frequency of caries in the pits and fissures than in smooth surface caries. Fissure sealants are given at the beginning of the tooth eruption in order to prevent food residue bacteria in the pits and fissures. Materials that can be used for the application of fissure sealants include composite resin and glass ionomer cement. Composite resins and glass ionomer cements have different compositions and application techniques. The composite resin binds tightly to the enamel surface by means of micromechanical bonds created by the acid

in the etching technique. Meanwhile, glass ionomer cement bonds chemically in the presence of ion exchange and can release fluorine, thus making it anti-caries properties.[17,18]

4. Resin restorative preventive

Treatment which is the development of the use of sealants on occlusal surfaces, namely the integration of caries prevention with sealants and caries fillings with composite resin materials on the same surface. The goal is to stop the initial process of caries in pits and fissures, especially in teeth with deep pits and fissures, and to take caries prevention measures in pits and fissures in the same tooth.

5. Restoration

Restoration is a filling that is applied to the tooth by removing the carious tissue first without involving the pulp tissue. Indicated for carious lesions that do not involve the pulp. The use of restoration materials can be glass ionomer cement or composite resin

a. Glass Ionomer Cement

Pros: releases *fluorine* so it is indicated for patients with high caries risk

Disadvantages: low modulus of elasticity, making it difficult to withstand large chewing loads. GIC is also very soluble in saliva

b. Composite Resin

Advantages: not easily dissolved in saliva and good aesthetics

Disadvantages: polymerization continues and can endanger the vitality of the pulp [25]

6. Pulpectomy

Pulpectomy is the removal of all pulp tissue from the pulp chamber and root canals. In primary molars, mechanical retrieval of the entire tissue is not possible due to the complex morphology of the root canals. Pulpectomy can be done in 3 ways, vital pulpectomy, de-vital pulpectomy, and non-vital pulpectomy. The indication for pulpectomy treatment is primary teeth with infection beyond the pulp chamber of vital or non-vital teeth. Root absorption is less than apical 1/3. Internal absorption but not root perforation. Continuation of treatment if the pulpotomy fails. Contra indication is if the periapical abnormality is already involved. Widespread absorption of tooth roots. Public health is not good. The patient is not cooperative. Loose teeth due to pathological conditions The

The choice of pulpectomy cases for primary teeth is teeth whose pulp has been infected and the pulp tissue in the root canals is still vital. If left in this state the pulp degenerates / necrosis which will cause negative signs and symptoms, the situation will continue. Pulpectomy can still be performed but the success will decrease due to extensive pulp degeneration[26]

7. Root canal treatment

Canal treatment is a treatment that aims to relieve pain and control sepsis from the pulp and surrounding periapical tissues and restore the diseased tooth so that it can be biologically accepted by the tissue the surroundings. This means that there are no more symptoms, can function properly and there are no other pathological signs. Root canal treatment for permanent teeth in children is performed just like root canal treatment for adult teeth. However, what distinguishes the management is the need for a psychological approach and good communication to the patient.

In general root canal treatment is indicated for: 1) enamel that is not supported by dentin; 2) teeth with infections that pass through the pulp chamber, both vital teeth, partial necrosis and non-vital teeth; 3) periapex tissue abnormality on the radiographic image of less than one third of the apex; 4) dental crowns can still be restored and are useful for prosthetic purposes (for bridge restoration pillars); 5) the teeth are not loose and the periodontium is normal; 6) X-ray showed root resorption not more than one-third apical, no granuloma; 7) the patient is in good condition; 8) the patient wants his teeth to be preserved and is willing to maintain the health of his teeth and mouth; 9) the patient's economic situation allows.

In general, contraindications to root canal treatment include: 1) vertical root fracture; 2) restoration can no longer be carried out; 3) periapical tissue damage involving more than one third of the tooth root length; 4) alveolar bone resorption involves half of the root surface

of the tooth; 5) the patient's systemic condition, such as uncontrolled diabetes mellitus.[27]

8. Correction of malocclusion

Treatment for correcting malocclusion in children is adjusted according to cases of malocclusion in children, correction of malocclusion using orthodontic treatment. The goal of orthodontic treatment is to improve the appearance and profile of a person's face which affects the improvement of social life and quality of life, has good occlusion function so that masticatory function is normal, and tooth stability after treatment. For the correction of malocclusion in children, fixed devices or removable devices such as removable appliances, twin blocks, bionators, facemasks, chin cups, headgear, frankel, and others can be used for the correction of malocclusion. [4]

9. Extraction

Tooth Is a process of removing the tooth from the alveolus, where the tooth can no longer be treated. This procedure is usually done with routine procedures on patients, because tooth extraction is the easiest and best way to get rid of toothache if the tooth cannot be maintained anymore.[24,25,26,27] It is indicated in teeth that have extensive carious lesions that can no longer be treated, remaining roots, supernumerary teeth, persistence of primary teeth, and teeth that are due to be extracted. Contraindicated if the patient has uncontrolled systemic disease, the presence of a malignant tumor, and an acute infection.[28]

Discussion

Caries can cause toothache, discomfort, eating disorders, tooth loss, and stunted development of children. Apart from that, caries can also affect the concentration of children in school. Research by Martins L, et al. (2016) examined the impact of caries on the quality of children's daily schooling, that dental caries was found to be significantly associated with children's quality of life related to oral and dental health in activities such as eating, sleeping, and carrying out daily activities. Rebelo M, et al. (2018) examined the effect of dental and oral health in children on achievement and school attendance, that children with caries experience poor achievement and school attendance.[19,20]

Caries in primary school children

Several studies assessing the prevalence of caries in vulnerable primary school children aged 6-12 years in various parts of the world, the results of a study by Markovic et al., 2013 (Europe) stated that of 1240 children aged 6-12 years there were 88.8% of children experiencing caries, Jokic et al., 2013 (Europe) out of 1825 children aged 6 years, 57.86% of children had caries. Bhayat & Ahmad 2014 (Saudi Arabia, Asia) studied 360 children aged 12 years, 57.2% had caries, Iwasaki et al., 2014 (Japan, Asia) out of 1893 children aged 12 years, 97.3% had caries, Lingerew et al. al., 2014 (Ethiopia, Africa) there were 147 children aged 6-12, 17.6% had caries.

Akyuz et al., 2015 (Turkey, Europe-Asia) studied 325 children aged 6-12 years, 91% of children had caries. Arora & Bhateja, 2015 (India, Asia) out of 100 children aged 12 years, 57% of them have caries. Arangannal et al., 2016 (India, Asia) of 2976 children aged 6-12, 68.8% had caries, Hiremath et al., 2016 (India, Asia) of 13,200 children aged 6-11 years, 78.9% of children had caries , Hover et al., 2017 (Canada, America) of 133 children aged 6-12 years, 15.1% had caries, Doumit & Doughan, 2018 (Lebanon, Asia) of 1433 children aged 6-8, 88.05% had caries and age 12 years, 80.38% had caries.[3]

In Indonesia, the prevalence of tooth decay in children continues to increase from year to year, the results of the 2007 the prevalence of tooth decay in children aged 5-9 years is 21.6%, while DMF-T aged 12 years is 0.91. in 2013 the prevalence of tooth decay aged 5-9 years was 28.9%, aged 12 years who experienced tooth decay was 24.8% with an average DMF-T of 1.4, results in 2018 the prevalence of tooth decay in children aged 5-6 years, namely 93%, aged 12 years who experienced tooth decay by 65.5% with an average DMF-T of 1.89.[28,29,30,31,32,33]

Periodontal disease in primary school children

Periodontal disease is estimated to affect 90% of the world's population. Bhayat and Ahmad, 2014 (Saudi Arabia, Asia) out of 360 children aged 12 years, 70.8% have gingivitis, Rodan et al., 2015 (Jordan, Asia) of 40 children aged 6-11 years there are 70.2% have periodontitis, Markovic et al., 2013 (Bosnia and

Herzegovina, Europa) of 1240 children aged 6-12 years 43% have periodontitis, Arora & Bhateja, 2015 (India, Asia) out of 100 children aged 12 years, 20% have periodontitis.[3,20]

Conclusion

Teeth and mouth problems in children can have a negative effect on their well-being, quality of life and health. Caries and periodontal disease are the most common dental and oral health problems in children, the main cause of which is plaque buildup. Children aged 6 to 12 years or school age children still do not know how to maintain oral hygiene. Therefore, efforts to maintain oral health must be done from an early age.

Suggestion

Schools are the ideal social environment in which dental health promotion strategies can be applied to improve children's oral health and develop good and lasting oral health behaviors. School-age children can experience behavioral changes through interventions at school and improvement.

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