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Review Article

How Dental Plaque and Dental Calculus can Affect Children's Oral Health?

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Abstract

Brushing teeth regularly and daily is the best way to clean dental plaques. If it is not cleaned promptly, it can cause more severe and painful diseases of the mouth and teeth in children. Dental plaque is one of the most common causes of dental caries and gum disease. These plaques are thin and often pale layers of bacteria that stick to the surface of the teeth and do not disappear by washing with water. The accumulation of dental plaques around and around the gums leads to the development of gingivitis in most people.

Dental calculus and dental plaques also play a role in the improvement of dental caries. When the child eats sweet and sugary foods, the bacteria in the dental plaque break down these sugar particles and produce acid. Then these acidic substances dissolve the surface of the enamel in the area under the plaques, consequently, leads to a dental cavity.

Keywords: *Dental Calculus; Plaque; Caries; Gingivitis; Gum Disease; Sugary Foods; Acidic Substances*

Introduction

Childhood is the time to form lifestyle patterns, and oral hygiene is one of the most important habits that should be taught to the child. Failure to observe oral hygiene will lead to gum diseases and ultimately tooth loss. Although the primary teeth are temporary, these teeth should also be treated like permanent teeth because they are vulnerable to harmful agents, such as plaque formation and dental calculus which might affect the buds of the permanent teeth.

The plaque is a very thin, sticky, non-colored bacterium [1] that is created within 4 to 12 hours and can be detectable in 12 to 24 hours on the teeth surfaces [2], especially along the cervical margins [1]. The plaque is unpleasant, smells, and may be harmful; it can be a potential source of gingivitis which may lead to gingival pain. In another word, the bacteria found in the dental plaque provoke a host response leading to localized inflammation of the tissue [3] including a red, puffy appearance of the gums and bleeding due to brushing or flossing [4]. However, if it is left for an extended period, the inflammation may affect the supporting tissues and progress to periodontitis [5].

Removal of plaque is very important for children's oral health because permanent teeth are forming in this period. On the primary teeth, there is a thinner protective layer of enamel compared to the permanent teeth, so the plaque can have more harmful effects. The accumulation of plenty of plaque on the teeth surfaces for a long period may lead to enamel erosion, teeth decay, gingival inflammation, and stimulation of the pulp [6-9].

The plaque is constantly is forming on the surface of children's teeth. Shortly after the kid eats foods or drinks containing sugar or starch, the bacteria begin to release acidic substances, and the enamel tissue destruction starts.

The dental calculus, also known as tartar, is essentially a dental plaque that has become hard and sticky on the surfaces of the teeth for a long time. Because of its porous and highly absorbing nature, it can easily absorb external stains [10]. It may also occur in the gingival area or under it, causing the sensitivity and damage of the gums. By forming calculus, it provides a larger and more favorable surface area for the growth of pathogenic bacteria to adhere to the tooth surface that will result in more dangerous diseases such as dental caries and severe gum diseases. Usually, the inflammatory effects of the calculus on the gum are painless, and the patient may for a long time does not notice the damaging effect of the mass on his gums.

Although the formation of dental calculus is possible at any age, this problem is very common in early childhood [11] and children are usually more sensitive to this problem than young children because they mostly depend on their parents or caregivers to help them or supervise oral hygiene for preventing.

Tooth Decay, gingivitis, periodontitis, tooth loss, bad breath, and change the color of the teeth are the most important complications of accumulation of plaques and dental calculus on the teeth surfaces [12-14]. To prevent the formation of plaques and dental calculus on children's teeth, brushing routinely, using dental floss, restricting the use of sugar and carbohydrates, and dental examination every six months is mandatory for children.

Types of dental calculus

There are two types of dental calculus which vary widely among individuals and at different locations within the mouth.

Supragingival calculus: Is formed above the gum line. This type of mass is bright yellow or brown and is seen on the surface of the tooth.

Subgingival calculus: Is formed below the gum line within the groove between the teeth and the gum line. This type of mass is usually not seen with the eye on the surface of the tooth unless the gum tissue has already been removed from the teeth. The mass under the gingiva is usually brown or black.

The effect of dental calculus on teeth and gums

Any kind of dental calculus on the gum line can put the child's oral health in danger because the bacterial accumulation can damage the gums and cause them to become more sensitive and swollen. The presences of calculus on a child's teeth prevent him to brush or to do dental flossing properly. Gingival bleeding makes the kid terrified; consequently, the child is not willing to brush his teeth, at all. Over time, these conditions progress and can cause severe gum diseases. On the other side, the area beneath the dental calculus and dental plaques become more susceptible to dental caries [15].

If gingivitis is not treated promptly, it develops so that deep pockets are formed between the gums and the teeth, and pathogenic bacteria accumulation can lead to infection. Under these conditions, the child's immune system would send a series of chemicals to the site of inflammation to fight the infection that occurs there. These chemicals combine with bacteria and their secretions, and consequently, produce a destructive substance that injures bones and tissues that hold the teeth in place firmly. The results of some studies have also shown that there is a link between bacterial pathogens in periodontal diseases and heart diseases, and other serious diseases [16-20].

Complications due to the dental calculus and plaque of the tooth

Although the plaque exists on the teeth of all people, it should not be considered a simple and insignificant problem at all. If the plaque is not cleaned on the teeth, it can become a major contributor to severe periodontal disease [21]. Some complications of plaque accumulation on teeth are:

- Tooth decay
- Periodontal disease and gingivitis
- Bad breath
- Change the color of the teeth
- Tooth loss.

Combining the plaque with the sugary material in the mouth (resulting in different eating habits) leads to acid production. Acid causes tooth decay or perforation. If the caries is detected promptly, the dentist can remove caries and restore the tooth. But if decay is not treated, it progresses to the pulp and leads to pulpitis or dental abscesses. Under these circumstances, there might not be an alternative for the treatment of the tooth (depends on the decision of the pediatric dentist). But overall, there might be two options. In mild cases, the tooth may go under the treatment of pulpectomy (if the tooth can be preserved); or in severe cases, turn to tooth extraction.

Suggested treatments of dental calculus and plaque in children

It is usually treated with daily tooth brushing and dental flossing, the use of disinfectant mouthwashes, and tooth scaling by the dentist regularly; the symptoms are reversible. Professional teeth cleaning are the basis for the prevention of gum disease and dental caries. Measures taken by a pediatric dentist to clean teeth include:

- Removal of plaque on teeth
- Removal of the dental calculus (tartar) from the gum line
- Polishing and removing stains by prophylaxis paste.

The dental calculus below the gum line is a sign of gum disease and should be removed in another way.

Follow-up care after teeth scaling

Usually, after deep scaling, the child may complain about one to two days from pain, and up to one week for the sensitivity of his teeth. Sometimes the kid's gums may become swollen and slightly bleeding.

To prevent infection, control pain, and healing process, the pediatric dentist prescribes a pain reliever or mouthwash for him as soon as possible. Also, an anti-microbial dose of Doxycycline may be placed directly in the scaled pocket that is usually is prescribed for adult patients by the Periodontist [22]. Of course, this decision is should be considered by the pediatric dentist.

The dentist will make other appointments to see the improvement of the gum, and to measure the depth of his pockets. In case of increasing the depth of the pockets, other treatments may be required.

The necessity of tooth scaling

Removal of tartar to prevent multiple severe oral and tooth illnesses is critical. The accumulation of dental calculus can cause swelling of the gums and bleeding. This complication, known as gingivitis, is the first stage in the development of more severe gum disease [23]. The accumulation of calculus on the teeth creates an unpleasant scene. Because of the absorption of the stains and a range of toxic prod-

ucts, it gives a yellow halo to the teeth. The dental calculus tightens the space between the teeth; makes dental flossing difficult, and thus exacerbating dental problems. Accumulation of dental plaque and calculus around the teeth and gingiva are the major etiological factor which can affect the periodontal tissues leading to periodontal disease [24]. If the calculus is not removed, it will lead to periodontal disease; the tooth will become loose, and eventually, the child would be prone to tooth loss. Therefore, the elimination of plaque and calculus is the basis of periodontal therapy [25].

In adults, gum disease, in turn, can increase the risk of coronary heart disease, stroke, and diabetes [26-29]. In children with heart problems, bacteria that have accumulated in plaque and dental mass can easily enter the bloodstream and lead to dangerous diseases and complications such as endocarditis. This disease includes blood clots and infections of the lining of the heart [30]. There are many cases of chronic oral and dental illnesses that dental calculus can be the starting point for those. Therefore, teeth scaling can prevent bacterial endocarditis in these patients. In other words, the best way to prevent calculus formation is to have a complete oral and dental care program.

Conclusion

Dental plaque is a sticky substance that is formed due to tooth exposure to bacteria and residual food particles on the teeth surface. Unfortunately, dental plaque can cause many problems, such as dental caries and gum disease, in people of any age, including children. Therefore, it is important to teach children how to properly clean dental plaques. Besides that, parents should have a constant observation on children's oral hygiene so that in the future and until the end of life, they could always maintain healthy habits of oral and dental care and have beautiful and healthy teeth.

Dental calculus is not only a threat to the child's health and oral health but from point of view of smile and beauty, it can also create a lot of problems for kids. Because it has a very porous and permeable structure, the stains and colorants of the bacteria present in the plaque can also cause periodontal disease, such as gingivitis. The most effective way to deal with these plaques is to brush and regularly use dental floss. If they are not cleaned daily, the plaques accumulate and eventually absorb easily into the dental calculus. Parental negligence leads to the progression of periodontal diseases, caries, and ultimately loss of teeth.

Compliance with oral hygiene plays a very important role in the absence of accumulation of dental calculus and especially the color changes of the teeth. In the lack of dental care, the plaque becomes harden over time, and it cannot be removed by brushing, which needs the expertise of dental scaling.

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