

REVIEW

The Progress of the General Prevention and Treatment of Pediatric Caries in China

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ABSTRACT

At present, caries has become one of the diseases that threaten peoples' health. Because caries usually does not affect patients' life safety, it is not paid enough attention to. In fact, the harm of caries to human health is significant. Caries can cause damage, defect or loss of teeth in the oral cavity. And it may seriously affect the quality of life and health of patients. Especially for children, they are in a critical period of growth and development. Caries may cause pain, lead to inflammation of alveolar bone and jawbone. The development of the dental system will be affected, and even lead to deformity. The prevalence of caries is high in children. Therefore, general prevention and treatment of caries is of great significance to the healthy growth of children.

1. Introduction

Caries is the most common disease in childhood, and also an important factor affecting children's health and growth. It has been listed as one of the chronic progressive diseases required more focuses on prevention and treatment worldwide by WHO. Caries is also known as the decayed teeth. And it's a bacterial disease. When suffering from caries, it is necessary to take timely measures to control it. If the control is not timely or not taken seriously, the continuous development of caries may lead to inflammation, which may affect the health and life of patients.^[1] As a susceptible population of caries, children are characterized by high prevalence and rapid development of caries. Clinical studies have confirmed that with the improvement of people's living stan-

dards and lifestyle changes, the incidence of dental caries is increasing, which is a risk factor that threatens children's health seriously. In this study, the characteristics and etiology of pediatric caries in China, and general prevention and treatment were analyzed comprehensively, so as to provide reference for the general prevention and treatment of pediatric caries in China.

2. The General Characteristics of Pediatric Caries in China

According to the clinical statistics, the prevalence of primary dental caries in children aged 5-year is 66.1%, and the filling ratio of caries is 3.4% in China. The prevalence of permanent teeth caries in children aged 12-year is 29.0%, and the filling ratio of caries is 11.2%. The data

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shows there are a large number of children with caries in China. At the same time, we can know that the prevalence of pediatric caries in rural areas is much higher than that in urban. Taking a city as an example, the prevalence of pediatric caries in rural area increased from 23.10% to 54.1% in 2008-2017, while the prevalence of pediatric caries in urban decreased from 25.5% to 12.22%. From the overall trend, with the advance of urban living standards and living conditions, as well as the improvement of people's health awareness, which directly decrease the prevalence of pediatric caries. Although rural living conditions have improved, health awareness is relatively deficient. As a result, the prevalence of caries is still relatively high.^[2]

3. Analysis of the Etiology and Related Factors of Caries

Caries is a chronic progressive bacterial disease, which often results in the progressive destruction of dental hard tissue caused by cariogenic bacteria under the influence of various factors. Caries develops from the superficial to the deep. Studies have shown that caries can develop shortly after tooth eruption, with infants as young as 6 months developing caries shortly after tooth eruption. Caries is much more harmful to children than adults.^[3] The occurrence of caries affects the basic functions of chewing and eating, and seriously affects the growth and development of children. The etiology and related influence factors are analyzed below. Details are as below:

3.1 Analysis of the Etiology of Caries

The major etiologic factors of caries are the four cascading factors -- bacteria, food, host and time. These are the main cause of caries, which many researchers agree consistently nowadays.

(1) Bacteria: A bacterium is the main factor of caries occurrence and continuous development. There are many types of bacteria causing caries, among which the most important bacteria are streptococcus mutans and lactobacillus. Among them, streptococcus mutans has strong cariogenic ability and is the dominant bacteria in the formation of dental plaque biofilm. It is one of the direct factors of caries, which can cause caries both in pit and fissure, and smooth surface. Streptococcus mutans and lactobacillus, the major pathogenic bacteria leading to caries, can gradually form dental plaque by mixing with food residues and salivary mucin in the oral cavity and firmly adhering to the tooth surface with the adhesin of bacteria. Dental plaque creates a certain microenvironment for bacterial metabolism. The bacteria can decalcify and dissolve

the enamel surface under dental plaque through acid production. Enamel caries is a continuous process of mineral salt loss, white spot surface demineralization lesion, and carious cavity formation. Studies have shown that the number of dental plaque in the oral cavity is positively correlated with the prevalence of pediatric caries.^[4]

(2) Food: in the process of caries formation, food is the important material basis for bacteria to play a role, among which carbohydrate is the main factor. If the food is high in sugar, it will provide energy for the bacteria in dental plaque to live and reproduce, and produce organic acids through metabolism. The long-term presence of these organic acids in the tooth surface and pit and fissure will lead to decalcification of tooth enamel. Among the several types of cariogenic carbohydrates, sucrose is the main cause of caries. In addition, we provide essential nutrients for tooth formation and development through food intake. In children with teeth developing, the intake of nutrients from food helps to develop the biochemical structure of tooth tissue. Teeth with good calcification have high caries resistance. If children do not have sufficient mineral salts and vitamins in their diet, their teeth will be less resistant to caries, which will create certain basic conditions for the occurrence of dental caries.

(3) The host's teeth, saliva, etc. The occurrence of dental caries is significantly related to the structure and morphology of the teeth. Deep pit and fissure of the occlusal surface and dental crowding are important defects that easily lead to retention of bacteria and food residues, which can be difficult to remove once occurs. Therefore, these substances are easy to lead to the occurrence of caries. Lack of mineralization, especially calcification of teeth, the dentin and enamel density decreased. Decrease ability to resist decay is another important factor leading to caries. Fluoride plays an important role in dental caries resistance, but its content in mineralized structure is low; in addition, saliva in the oral cavity also plays a role in the formation of dental caries. Saliva, which has the function of buffering and antibacterial, is the external environment of the tooth. When the amount of saliva on the tooth surface is large but thin, it can play a role in reducing the accumulation of bacteria and food residue, On the contrary, it is easy to lead to the retention of food, providing assistance for the formation and adhesion of bacteria on the tooth surface, inducing the occurrence of dental caries.

(4) Time: in addition to the above three factors, caries occurrence also needs a certain time of interaction. Long period of retention of food and bacteria in the oral cavity can significantly shorten the time of caries and accelerate the formation of caries.

3.2 Related Factors Causing the Occurrence Caries

Other main factors that lead to caries are social and family factors, children's dietary habits, etc. Social and family factors refer to the financial conditions, level of education, acceptance level of caries related knowledge, etc. Generally, financial condition is an important objective factor of pediatric caries. However, people's level of education and knowledge of caries are the key factors. Children's dietary habits are also an important factor leading to the increase incidence of dental caries. Studies have shown that the incidence of caries in children with a sweet tooth habit is 35.50% higher than that in children who do not like sweet food. This is because the sugar in sweet foods plays a leading role in the etiology of caries.^[5] In addition, regional factors are also an objective factor of caries. For example, the soil and water in some areas contain cariogenic or anti-caries components; and the fluorine content exceeds normal standard in some regions. The proper amount of fluoride can enhance the anti-caries ability of the teeth. It can enter the body through drinking water and food, which can reduce the incidence of caries.

The incidence of dental caries is also affected by poor lifestyle, poor or biased prevention awareness of caries, lack of caries prevention knowledge, etc. Firstly, poor lifestyle, such as children do not develop good oral hygiene habits, poor oral environment, which will lead to the breeding of bacteria, is an important factor of inducing caries; in addition, some children have bad dietary habits, including picky diet, monophagia, which results in the unreasonable dietary structure and nutritional intake. And then, these habits lead to a higher prevalence of dental caries. Secondly, children or parents do not have a profound awareness or have a weak awareness of caries prevention. They may think that a bad tooth is nothing and fail to take timely preventive measures in daily life. There are also some parents have the deviation of the preventive understanding of caries, especially to the primary teeth. Parents think that children will have teeth replaced. And it doesn't matter to have caries now. Therefore, insufficient attention has been paid to the prevention of caries, which may lead to the occurrence or deterioration of pediatric caries. Thirdly, most parents are lack the knowledge of caries prevention. Although some parents may be aware of the dangers of caries, the prevention methods are not correct. For example, incorrect brushing methods, choice of toothpaste and toothbrush will eventually lead to unclean teeth, food residue on the teeth. The prevention of caries did not achieve the ultimate ideal effect.

4. The General Prevention and Treatment Measures of Pediatric Caries

4.1. The General Prevention and Treatment Technologies of Pediatric Caries

4.1.1 Pit and Fissure Sealing Technology

This technology has formed a series of mature technologies through years of development. For example, ultrasonic cleaning pit and fissure sealing technology, sand blasting pit and fissure sealing technology, laser irradiation pit and fissure sealing technology. Based on evidence-based medicine, some scholars have proved that the caries prevention effect of pit and fissure sealing technology is effective, which can effectively reduce the incidence of caries. At present, this technology is the most commonly used and the most effective general prevention and treatment of pediatric caries.^[6]

4.1.2 Fluoride Caries Prevention Technology

A certain amount of fluoride can inhibit cariogenic bacteria and enhance the anti-caries ability of the teeth. Some scholars have proved through research that the combined application of this technology and pit and fissure sealing technology can achieve a better effect of preventing dental caries. At the same time, the use of fluoride toothpaste in daily life can also effectively reduce the incidence of dental caries.

4.1.3 Preventive Resin Filling Technology

With the continuous application and development of dental materials, this technology realizes the development of filling materials from composite resin to flowable resin, and the flowable resin filling materials have a higher preservation rate. Its application together with pit and fissure sealing technology can also effectively reduce the prevalence of pediatric caries.

4.1.4 Non-traumatic Restorative Treatment Technology

The technology has the advantages of simple operation and the like in the specific use, its anti-caries effect is also very good, and it is easily accepted by users. Because of its unique application advantages, it has been widely promoted and applied in clinical practice, and has a high success rate in comprehensive prevention and treatment of pediatric caries.

4.2 Comprehensive Prevention Measures for Pediatric Caries

4.2.1 Daily Oral Cleansing and Maintenance

In the first place, the correct and scientific tooth brushing method can remove the dental plaque adhered to the surface of teeth in a timely and deep manner, and the essentials of correct brushing are as follows: firstly, choose a better quality toothbrush and fluoride toothpaste suitable for children; secondly, the amount of toothpaste for each tooth brushing can be the size of a soybean; thirdly, brush teeth every morning and evening, each time for more than 3 minutes. In the next place, good eating habits are also very important for the prevention of pediatric caries. For example, children should try to eat less sweet or not eat, eat fewer snacks, especially to change the bad habit of eating before going to bed. At the same time, parents should do a good job of monitoring infant oral hygiene, and pay attention to the growth and development of infant teeth; for parents with a history of dental caries, prevention and maintenance should be strengthened to avoid cross-infection of bacteria through saliva, and early detection and treatment of pediatric caries should be achieved.^[7]

4.2.2 Supplementation of Various Nutrients

To prevent pediatric caries, children should also be supplemented with nutrients such as trace elements and vitamins that affect their teeth growth. Children whose teeth are in the growth and development stage should be timely and reasonably supplemented with vitamins or trace elements such as calcium, iron and vitamin D to promote the good growth of teeth, prevent the conditions such as dentin hypocalcification and dentin damage, so that children's teeth can enjoy a certain hardness and toughness and enhance.

4.2.3 Preventive Measures for Dental Caries Susceptibility Period

Generally, when children are 1-3 years old, their deciduous teeth have all erupted, which is the dental caries susceptibility period. Therefore, the prevention of dental caries should be done well in this period. For example, attention should be paid to the rational collocation of children's food and make supplementary food at home to avoid excessive intake of food additives, ensure that a balanced diet can promote the healthy growth of children, while ensuring the normal development of their teeth and enhance the tooth's ability to resist the dental caries.

4.2.4 Carry out Oral Health Publicity and Education

Every year, September 20 is the "Teeth-Care Day", which is set to enhance people's awareness of the importance of dental health, thereby improving the oral health level of Chinese people, and enhancing people's awareness of prevention and treatment of the pediatric caries. At the same time, in people's daily dental care, the importance of dental care can be publicized for people by means of text and video.

5. Conclusion

The prevalence of pediatric caries has a certain relationship with the impact of different periods. If there is malnutrition during the mother's pregnancy, it will affect the growth and development of the fetus in the maternal body, at the same time, it will also lead to the occurrence of fetal dental enamel hypoplasia, which will lead to dental caries caused by acid corrosion. Therefore, during pregnancy, women should pay attention to proper supplementation of various nutrients required by their bodies and the growth of the fetus, such as protein, various vitamins, calcium, iron and other trace elements. A balanced diet can prevent dental caries.^[8] The infants is in breast-feeding should be mainly fed with breast milk, because breast milk contains various nutrients needed by infants, and is easy to digest and absorb. If they are fed with milk or powdered milk, sugar should not be added in the preparation and avoid developing the habit of falling asleep with a pacifier to avoid dental caries that may develop soon after tooth eruption, and it's called "milk bottle caries"; if the baby has such bad habits, parents should pay attention to timely correction or ingesting a certain amount of warm boiled water after feeding, which plays a certain role in oral cleaning. After the baby is born for 6 months, complementary foods, such as vegetable porridge, egg yolk, can be provided, but attention should be paid to not adding sugar in the supplementary foods, so as to avoid creating conditions for the occurrence of dental caries.

Preschool age is a critical period for the growth and development of children's permanent teeth. Therefore, at this time, the amount of sugar in food intake should be controlled and the frequency of snacks eaten between meals should be reduced, which is an important link in the prevention of dental caries. Generally, 6-year-old children have the highest incidence of dental caries. Therefore, parents should pay attention to the development of children's good eating habits at this time. Parents should first have a certain understanding of nutrition knowledge, and focus on correcting bad ways and habits and oral hygiene

to achieve the goal of comprehensive prevention and treatment of pediatric caries.

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