

Etiology and Pathogenesis of Dental Caries

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Abstract: the etiology and pathogenesis of dental caries are detailed in this article based on scientific and theoretical evidence.

Keywords: tooth, dental caries, etiology, pathogenesis, milk teeth, decay, glucose, streptococci, disease.

Caries is a Latin word that means bone decay. Scientifically, caries is the result of brittleness, softening and decay of the tissues caused by the loss of mineral salts (demineralization), which make up the main part of the enamel and dentin tissues and provide their hardness, due to various reasons, the integrity of the teeth and cavities. is the process of formation.²

Today, scientific investigations and data based on experiments show that dental caries are of great importance in the occurrence of dental caries.

Today, it is clear to everyone that the hard tissues of milk teeth and permanent teeth are affected by caries. The process of caries usually starts from the places where dental caries accumulate. As a result of the streptococci's use of dental plaque accumulated in such places, organic acids (milk, pyruvate, vinegar, apple, etc.) are formed from carbohydrate food residues, which reduces the RN index in the limited enamel area. As a result of consuming more carbohydrate foods, RN at the level of tooth enamel can decrease more sharply. Streptococcus mutans, lactobacilli and actinomycetes are the microorganisms actively involved in creating an acidic environment. Most of these microorganisms synthesize polysaccharides outside the cell from sugar in food. And they, in turn, penetrate into the base of dental caries and ensure that microbes are firmly established in caries.

Not only the type of carbohydrates, but also the form of their consumption play a role in the origin of caries disease. It is more dangerous to eat small amounts of carbohydrates than to eat a large amount of carbohydrates at once. Especially if they are sticky and eaten between meals, their cariesogenic effect is stronger.

Easily decomposed: intake of low molecular weight carbohydrates such as glucose, sucrose reduces the RN indicator to 4.4-5.0 degrees within 1-3 minutes. It takes 2-2.5 hours for RN to become normal (7.0-7.4). Such a change in the concentration of hydrogen ions, especially when the RN indicator is around 5.5, causes free hydrogen ions to penetrate into the tooth enamel layer and cause crystals to dissolve and demineralize.

The demineralization process can be reversed when the concentration of calcium and phosphate ions in the saliva is at the required level, i.e. remineralization. When such conditions arise, the crystals of the enamel layer undergo remineralization and are restored.

It is assumed that the organic acids formed as a result of the activity of bacteria penetrate into the enamel by diffusion and dissociate into ions, and the freed hydrogen ions have the opportunity to actively react with the mineral salts in the crystals.

In the initial period of caries, the enamel under the tooth enamel undergoes demineralization due to a change in the environment. At this stage of the disease, a "white spot" is formed. The pathological process can completely return to the "white spot" stage, and the enamel crystals can be completely

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² M.S.Muxamedova, F.L.Mirsalixova – "Manual for dentists", Beruni publishing house, 2018



restored. In this case, remineralization takes place at the expense of mineral salts passing through the lower layers of the damaged enamel and the composition of saliva around the tooth. The pathological process at the level of "white spot" occurring in the enamel can be imagined as follows.

Today, the causes of caries are divided into 2 groups:

I. Reasons that reduce the resistance of the tooth enamel layer to caries: Possible occurrences during pregnancy:

- ✓ Infection of a pregnant woman with acute infectious diseases
- ✓ Experiencing evening toxicosis
- ✓ Not eating rationally
- ✓ Irradiation with radioactive rays during pregnancy
- ✓ Lower than normal fluoride content in drinking water of a pregnant woman.

The development of dental caries is a complex pathological process that depends on many factors. Among such factors, mixed saliva in the mouth is one of the most important ones. In addition to providing important information about the internal organs and systems, the amount and properties of saliva directly affect the direction and speed of the caries process in the teeth. During the secretion of salivary glands into the oral cavity, it is saturated with calcium and phosphate minerals, and when it covers the surface of tooth enamel, it enriches it with these ions. The presence of bicarbonate, phosphate, and protein buffer systems in saliva ensures that saliva is a buffer that is extremely necessary for the body. This maintains the normal condition of the oral cavity. A decrease in the capacity of the salivary buffer system causes an increase in the rate of activation of caries. Enzymes in saliva also take part in processes that can occur in enamel. Their level of activity ensures the breakdown of carbohydrates in the oral cavity, the formation of organic acids, and thus participates in enamel demineralization. It is known that the diseases of the organs and the change in the general condition of the body affect the tissues of the oral cavity, including the enamel tissue, by changing the components of saliva. Disturbance of salivary secretion usually disrupts the stability of ion exchange between tooth enamel and oral fluid, which in turn causes a change in enamel structure. Of course, all such unpleasant conditions that may occur in the oral cavity do not always cause caries. The origin of enamel demineralization depends on the chemical composition of the enamel tissue and the degree of mineralization. These properties of tooth enamel are related to the general condition of the body before and during the period of tooth eruption. Therefore, it is necessary to ensure the health of the child's organism during pregnancy and the first years after birth, to provide a rational diet, and to provide additional fluorides. Such measures ensure complete formation and mineralization of hard tooth tissues. Today, the participation of the body's immune state in the caries process has not been fully resolved. It is only known that secretory immunoglobulins do not allow bacteria to stick to the surface of tooth enamel by causing agglutination. As a result, the presence of secretory immunoglobulins in saliva is an important factor in preventing caries, even if the oral hygiene is poor.

This type of caries is characteristic only of children's age, in which 8, 10 and sometimes all 20 milk teeth can be given over to the caries process. In such cases, it is possible to identify several caries cavities in one tooth at its different levels.³

In the literature, the caries process in this way is called acute, very acute, blossoming, runaway caries. This common caries can cause a complete destruction of the child's milk teeth.

This carious process, which quickly damages many teeth, can develop in most cases after experienced severe acute infectious diseases (measles, scarlet fever, rubella, angina, etc.). Such cases were also observed after chronic diseases (tonsillitis, bronchitis, etc.). In the process of caries, which damages many teeth, it is noted that caries lesions occur on all surfaces of teeth. Such a rapid course of caries causes the decay of the crown of the tooth in a short period of time, necrosis of the pulp tissue, and

³ I.X.Xalilov, B.O.Xudanov - "Children's therapeutic dentistry", Tashkent 2021



only the root part of the teeth is preserved. The process spreads to all the successive teeth, and by the age of 3-4 years, all the baby teeth are rubbed and decayed, which can lead to toothlessness.

