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DYSFUNCTION OF VARIOUS SYSTEMS AND ORGANS OF THE BODY IN CHILDREN WITH ENAMEL HYPOPLASIA

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Abstract

Hypoplasia is a congenital, or less commonly acquired, pathological condition in which the enamel of permanent or primary teeth in children fails to develop sufficiently. The condition manifests itself as the formation of various plaques and depigmented areas on the enamel surface; in some cases, the condition is accompanied by changes in the shape and size of the teeth.

Keywords

Hypoplasia, enamel, erosive hypoplasia, sulcular hypoplasia, mixed hypoplasia, oral cavity, encephalopathy, nephropathy.

Enamel hypoplasia is a developmental defect of enamel that occurs as a result of metabolic disturbances in developing teeth and manifests itself in quantitative and qualitative changes in enamel [1,3,5].

Depending on the period of life during which the unfavorable factor acts, a distinction is made between enamel hypoplasia, prenatal and neonatal enamel hypoplasia, and Turner's tooth:

Enamel hypoplasia is a developmental disorder of permanent teeth due to diseases of the child: diseases of the central nervous system, in which calcium and phosphorus metabolism is disrupted; diseases of the endocrine system (usually the thyroid and parathyroid glands); acute infectious diseases accompanied by metabolic disorders, hypovitaminosis C, D, E (especially rickets); kidney diseases, allergic diseases; diseases of the digestive system; toxic dyspepsia, alimentary dystrophy;

Prenatal enamel hypoplasia is enamel hypoplasia of primary teeth that occurs as a result of a number of conditions affecting pregnant women: rubella, toxoplasmosis, idiopathic epilepsy, alcoholism, hormonal imbalances, exposure to physical factors during pregnancy (radiation), and inadequate or inadequate nutrition during pregnancy. Defects are localized on the incisors of the anterior teeth and the cusps of the molars.

Neonatal enamel hypoplasia is enamel hypoplasia of primary teeth that occurs as a result of factors related to the condition of the fetus (prematurity) and childbirth (birth trauma, asphyxia). The enamel defects are localized closer to the neck of the teeth.

A Turner tooth is a manifestation of loc alized hypoplasia. This type of lesion is characterized by impaired development of the enamel (and sometimes dentin) of individual permanent teeth. The causes of the appearance of Turner's tooth are chronic apical periodontitis of the temporary predecessor tooth, damage to the follicle of the permanent tooth as a result of mechanical trauma to the temporary tooth, and traumatic removal of the temporary predecessor tooth [4,6].

Enamel defects can appear as spots, streaks, grooves, or even areas of complete enamel loss (aplasia). They appear from the moment teeth erupt; they are typically the same size on identical teeth, and the lesions are symmetrical. They are located parallel to the incisal or chewing surface of the teeth, most often localized on the vestibular surface and cusps. The walls and edges of the defects are smooth, and yellow-brown pigmentation is possible. With significant enamel destruction, short-term pain from temperature stimuli occurs[2,4].

A Turner tooth is characterized by a disruption in the development of the hard tissues of individual permanent teeth. Clinically, three types of changes are possible with a Turner tooth: discoloration (white or yellow-brown opacity of the enamel), defects (hypoplasia), and defects and discoloration[5,13].

In the initial stages, cervical caries in children is asymptomatic. As the disease progresses, symptoms such as enamel stains (yellow or brown), sensitivity when brushing, and reactions to temperature and chemical irritants appear. If symptoms appear, consult a dentist. During an examination, the doctor will determine the severity of the disease, the number of affected teeth, and the depth of the lesion, and suggest treatment options[6,9].

Depending on the severity, cervical caries is divided into three types:

Compensated. Tooth decay progresses slowly, with isolated enamel lesions detected upon examination. It is necessary to visit a dentist every three months and regularly undergo enamel remineralization (strengthening) both in person and at home.

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Subcompensated. Enamel lesions develop over several months. Regular dental hygiene and enamel strengthening with fluoride-containing compounds are also necessary. A single restoration with a composite material may be possible, depending on the depth of the lesion[5,11].

Decompensated. Severe progression, with rapid progression of caries and spread to adjacent teeth, accompanied by acute pain and requiring immediate treatment. Most often, this type of lesion is treated under general anesthesia, and damaged teeth are restored with crowns.

Cervical caries also develops in permanent teeth, especially during the eruption of second molars. It is caused by poor oral hygiene, an unbalanced diet, and high carbohydrate intake. This process is detected during preventive examinations, and treatment (composite restoration, fluoride applications) is administered depending on the depth of the lesion[3,7].

The main principles of diagnosing enamel hypoplasia are:

identifying the etiologic factor that influenced the onset and development of enamel hypoplasia, its characteristic clinical manifestations, as well as determining medical indications for treatment, selecting a treatment method, and the specialist's approach;

differential diagnosis of enamel hypoplasia;

identifying the relationship between the child's dental and general health.

Mandatory diagnostic measures include:

collecting anamnesis;

Oral examination using additional instruments, palpation, percussion, assessment of the condition of dental hard tissues, dentition, fillings, dentures, and orthodontic appliances (if present), assessment of the condition of periodontal tissues and oral mucosa;

Dental health index assessment: dental caries intensity index (DHI), Green Hygiene Index, Vermillion (OHI-S) or Silness, Loe Plaque Index (PLI), periodontal tissue condition assessment indices (Gingival Index Loe, Silness – GI).

Additional diagnostic measures (as medically indicated) include:

vital staining of dental hard tissues;

instrumental diagnostic examination (radiological examination method): targeted intraoral contact radiography;

consultation with an orthodontist. Differential diagnosis of enamel hypoplasia, prenatal enamel hypoplasia, neonatal enamel hypoplasia is carried out with hereditary disorders of hard dental tissues, enamel caries, erosion and grinding of hard dental tissues; Turner's tooth - with enamel caries, dentin caries.

The general principles of medical prevention and treatment of enamel hypoplasia are conservative and restorative treatment methods (the choice of method depends on the degree of aesthetic impairment when smiling, the depth of the defect, the type and area of the defect, and the degree of post-eruptive enamel mineralization)[3].

The conservative method is considered the initial stage before restorative treatment and includes correcting individual oral hygiene in combination with the topical application of fluoride, calcium, and phosphorus preparations;

The restorative method involves restoring the anatomical shape of the tooth using modern adhesive materials or orthopedic structures (for medical reasons). Therapeutic treatment for patients with enamel hypoplasia includes:

Mandatory treatment:

Motivation and education on oral hygiene using toothpastes containing calcium, phosphorus, and fluoride ions in accordance with age recommendations (0 to 2 years – 1,000 ppm in a "rice grain" amount; 2 to 6 years – 1,000 ppm in a "small pea" amount; and over 6 years – 1,450 ppm in 1-2 cm of paste), professional tartar removal; monitoring the effectiveness of oral hygiene in children over 6 years of age (supervised teeth cleaning);

Remineralizing therapy for 1 month twice a year (calcium-phosphate-containing topical medications), fluoride-containing varnish or gel 4 times a year;

Fissure and pit sealants (glass ionomer or methacrylate sealants);

Turner tooth restoration using glass ionomer cements;

additional treatments for enamel hypoplasia, prenatal hypoplasia, and neonatal hypoplasia (as medically indicated):

Dental restoration using compomers, giomers, and composite materials (by a pediatric dentist), prosthetics using veneers and artificial crowns (by an orthodontist); Turner's tooth – prosthetics using artificial crowns (by an orthodontist);

to restore chewing function and for aesthetic reasons with an occlusal surface decay index of 0.6 to 0.8 – fabrication of artificial crowns (performed by an orthodontist);

use of medications in the treatment of patients (children) with enamel hypoplasia according to the appendix.

The frequency of medical monitoring is determined by the activity of the caries process: low activity – twice a year; moderate activity – four times a year; high activity – four to six times a year[5].

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