The theme of the class № 1

Individual teeth anomalies

Individual teeth development anomalies are a widespread pathology causing a number of problems. According to the investigations data, this pathology is found in 12–22 % cases of all dento-gnathic anomalies and deformations.

There are the following classifications of individual teeth development anomalies.

Noncaries teeth affection classification (Stewart, Prescott, 1976):

1. Teeth number anomalies:
a) hyperdontia;
b) hypodontia.
2. Teeth size anomalies:
a) microdontia or macrodontia;
b) fused teeth;
c) teeth coalescence.
3. Teeth form anomalies.
4. Enamel structure anomalies:
a) enamel dysplasia;
b) enamel hypoplasia caused by external agents;
c) local enamel hypoplasia;
d) enamel hypocalcification.
5. Dentin structure anomalies:
a) dentinogenesis imperfecta;
b) dentin dysplasia;
c) regional odontodysplasia.
6. Cement structure anomalies.
7. Teeth color anomalies.

Noncaries hard tooth tissues affection classification (T.F. Vinogradova, 1978):

1. Anomalies, conditioned by external agents:
a) systemic enamel hypoplasia;
b) aplasia of milk teeth enamel in dysmature infants;
c) local enamel hypoplasia caused by an injure;
d) dental fluorosis;
e) “tetracycline teeth”.
2. Inherited anomalies, anomalies caused by imperfect hard tooth tissues structure:
a) amelogenesis imperfecta;
b) dentinogenesis imperfecta;
c) Steinton–Capdepon’s syndrome.
3. Anomalies of teeth number, size and form, genetically conditioned by heredity of the autosomal-dominant type.
4. Structure anomalies and tooth tissue malformations, arising as a result of a systemic pathology in the child’s organism:

a) Hutchinson's teeth at hereditary syphilis;
b) "amber" teeth at osteogenesis imperfecta;
c) grey-blue and brown teeth at hemolytic syndrome.

Color anomalies.

Tooth color mainly depends on enamel color, and enamel is the tissue rendering color normally. Teeth color is very different in different people as it is a hereditary character. This explains the scale of artificial teeth hues, by which we are guided during dental prosthesis making. There are cases of inheriting the blue or pink enamel color by enzygotic twins.

One should differentiate congenital and acquired teeth color. The latter may be conditioned by hard tooth tissues impregnation with any staining solution. Thus, at filling the root canals with resorcin-formalin paste the tooth later acquires the pink color (color insert), and at silver-plating – taupe. There has been observed hard tooth tissues color change caused by taking medicines, for example, tetracycline (from primrose to deep-brown). Now this preparation is not used in pharmacopeia, but other may appear. Only correctly obtained anamnesis may help in conducting differential diagnostics. Tooth color changes under the influence of not only exogenous, but also endogenous factors: smoking, foodstuffs coloring matter, lead influence at production plants. These color changes are mainly superficial – in the form of incrustation. The treatment consists in: refilling of the canals and tooth, and then dental bleaching with chemical solutions; intact teeth bleaching with ultraviolet rays (quartz).

Most often orthodontic treatment is resorted to, i.e. tooth replacement.

Hard tooth tissues structure anomalies.

Tooth tissues have different origin: ectodermal (enamel) and mesodermal (dentin, pulp, cement).

Teeth development process consists of the following stages:

- tooth anlage;
- tooth crown formation;
- loss of mineral enamel components;
- formation and loss of root dentin mineral components;
- eruption;
- root dentin and cement formation;
- root resorption (of temporary teeth);
- final enamel formation under the influence of saliva.

All the enumerated processes take place with the participation of life support systems sustained by the tooth pulp, periodontium, and saliva.

Tooth structure and development may be the result of inherited and acquired defects of the primary tissue (ectoderm and mesoderm), of which the enamel, dentin, and cement develop; also anomalies may arise as a result of the violation of the formation mechanism of the tooth crown enamel and dentin, root dentin and cement, the mechanism of the tooth eruption and root resorption. Besides, structure anomalies and malformations of the tooth may arise and develop as pathogenesis regularities of a systemic pathology – genetic, congenital or acquired.

Tooth structure and development anomalies may be classified according to T.F. Vinogradova (1987).

Hereditary tooth tissue structure anomalies are conditioned by imperfect structure of the tissues forming the enamel and dentin (hereditary diseases are conditioned, as a rule, by hereditary fixed genetic code changes, the so-called mutations). The latter may be both caused by external agents (e.g., ionizing radiation) and arise under the influence of the internal environment of the cell or the organism as a whole:

✓ Steinton-Capdepon's syndrome (hereditaiy derangement of the enamel and dentin structure; autosomal-dominant inheritance);

✓ amelogenesis imperfecta of the hypoplastic type (recessive inheritance, attached to Y-chromosome, or autosomal-dominant);

✓ dentinogenesis imperfecta of the hypoplastic type (recessive inheritance).

Anomalies of teeth number, size, and form are conditioned by vertical transmission. The type of isolated pathology inheritance is autosomal-dominant.

Structure anomalies and malformations of tooth tissues, arising as regularities of systemic pathology pathogenesis in the child's organism (hereditary, congenital, and acquired):

✓ "amber" teeth at amelogenesis imperfecta;

✓ Hutchinson's teeth at hereditary syphilis;

✓ grey, grey-blue, brown teeth at hemolytic syndrome and hemolytic jaundice of different etiologies;

✓ adentia, hypodentia and spinous teeth at ectodermal dysplasia; microdentia at hypophyseal nanism.

Structure anomalies and malformations of tooth tissues conditioned by the influence of external agents:

1) fluorosis;
2) "tetracycline teeth";
3) systemic nonspecific hypoplasia of the tissues of temporary and permanent teeth;
4) partial or complete aplasia of the temporary teeth enamel in premature infants;
5) focal hypoplasia conditioned by an injury, "exposing enamel to the wind" (at mouth breathing);
6) inflammatory processes;
7) tumors, cysts, etc.

Hyperplasia declares itself by the presence of a sharply limited mass covered with enamel (the so-called enamel drops) on the neck or root cement. Hypoplasia is characterized by the symmetric location of dental tissue defects not only on homonymous teeth, but also on the similar parts of the crown surface. Hypoplasia testifies to mineral metabolism disorder and bony skeleton decalcification in infancy. Central incisors affection with hypoplasia allows talking about decalcification process during the first year of the child's life, in case of all teeth affection – about the continuation of the process till later age.

Fluorosis is a kind of hypoplastic teeth affection conditioned by fluorine content in drinking water (more than 1.2 mg per liter). At that enamel decalcification arises, declaring itself by macules appearance. Fluorosis differs from caries by the

fact that a fluorosis macula is lighter than the carious one. Fluorosis macules are mainly located on the mastication tubercles, and carious ones – in the fissures and on the approxi-mal surfaces. Besides, fluorosis macules are located symmetrically. I.O. Novik differentiates 3 stages of teeth affection with fluorosis:

1) paper-white and slightly pigmented small macules of the enamel (slight fluoride intoxication);
2) maculation takes more than a half of the crown surface (moderate intoxication);
3) maculation affects the whole tooth and is combined with enamel erosions. Most often all the teeth are affected at that (severe fluoride toxicosis, which is often combined with other pathologic factors – rickets, infantile tetany, tuberculosis, other infectious diseases).

Teeth form anomalies.

Teeth form anomalies are most often caused by their germs development pathology. There are differentiated anomalies of teeth roots and crowns.

Crown form anomalies may concern both the morphological peculiarities of the mastication and incisal surfaces of teeth and crown size. They include:

1) spinous teeth, Hutchinson's teeth, deformed teeth – adelphomorphous, for example, "dens in dentis";
2) microdentia;
3) macrodontia (big or gigantic teeth).

To conduct perfect differential diagnostics one must detect the number of teeth. As a rule, supplemental teeth are spinous, but there are cases when complete teeth have this form. This mainly concerns the upper lateral and lower incisors. Sometimes the central left incisors are of atypical shape.

The mentioned pathology is treated by means of orthodontic methods, restoration of the correct anatomic form of teeth with the help of cosmetic crowns, or by means of therapeutic methods – with the help of restoration with composite materials.

Fused teeth are a special anomaly of teeth development. They were first mentioned in The Guide to Treating Teeth Diseases, translated into Russian under the editorship of Professor Hrube and published in 1898 in Kharkiv. The chapter on teeth anomalies was written by famous Munich Professor A. Sternfild.

A. Sterfild differentiates:

1) accreted teeth;
2) fused teeth;
3) double teeth.

As the author points out, fusion concerns only roots, when cement forms a common layer around the roots of two neighbouring teeth. Fusion means organic conjugation of the dentin of two neighbouring teeth. Fusion may spread on the whole two teeth or only on their crowns. According to the author, formation of double teeth is conditioned by the presence of supplemental germs (in one dental saccule there develop two germs instead of one; then they fuse partially or completely).

Wedl considers that double teeth form because of two dental germs presence instead of one. Fusion differs from union by the fact that union happens with the help of cement after the process of teeth formation is finished, and fusion takes place

during neighboring teeth formation. According to the author, only teeth roots are subject to union with the help of cement. A. Sternfild notes that when teeth fuse, dentinal mass of one tooth turns into the other tooth dentinal mass. Over such dentine mass in the region of root part there forms a common cement capsule, and in the crown part – common enamel membrane. Fusion border is marked by a more or less evident sulcus. Fusion might take place on the whole surface of teeth and be complete. When it is partial, either crowns or roots are fused. The pulp cavity of the fused teeth may be common (single), separate, and split (i.e. two-pronged near the root or crown part). Thus, pulp cavities fusion is not the main characteristics of teeth fusion.

In the literature one may find data about the fusion of supplemental teeth with complete teeth. Some authors deny this, which testifies to ideas disagreement.

Both milk and permanent teeth may be fused. The frontal group of teeth is subject to fusion most of all, these are permanent central and lateral incisors with supplemental teeth, milk lateral incisors with milk canine teeth (more often complete milk teeth are fused). Therefore in the period of milk occlusion fused teeth do not violate the dental arches and occlusion formation. Fused milk teeth are extracted with time if they stay in the dental arch too long. Timely extraction is the most important thing in such a case.

Until recently fused permanent teeth were, as a rule, extracted. But this way of solving the problem is not expedient. The most esthetically efficient variant of orthodontic treatment of the dental arches is preserving the frontal teeth, including the canine teeth (the so-called “esthetic six”), as they have no similar teeth in the dental arch. On the grounds of clinical, roentgenological, and histological investigations S.I. Doroshenko (1991) differentiates four types of fused teeth:

- the Ist type – layering or building-up of a supplemental part in the form of tubercles;
- the 2nd type – crown part fusion;
- the 3rd type – roots fusion;
- the 4th type – teeth fusion along the full length.

The author offered an original method of treating this anomaly, which consists in the hemisection of the less valuable part of the tooth and putting the remaining part into the necessary shape. There have been worked out different techniques of hemisection depending on the character of fusion, its length, the patient’s age, and orthodontic treatment aimed at closing the formed diastems and diaereses:

1) treating the teeth fused at separate pulp cavities;
2) treating the teeth fused at a single pulp cavity;
3) cautious treatment of fused teeth with the help of ledged hemisection;
4) a technique of orthodontic treatment of fused teeth.