SECONDARY DEFORMATIONS OF THE DENTITION

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ABSTRACT

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Secondary deformations of the dentition can be observed both with preserved dentition in cases of multiple carious lesions of the occlusal surfaces of teeth, anatomically incorrect restoration of the occlusal surfaces of the crowns of chewing teeth or their contact surfaces after filling, and with partial tooth loss in all age groups. With preserved dentition, secondary deformities are more common in young people aged 18-25 years, and they can also occur in children with untimely removal of baby teeth, caries, bad habits, etc.

The dental arch is a single whole, as it includes the alveolar process, in which the roots of the teeth and the existing contacts between the teeth are located. When one or more teeth are lost, a defect in the dentition occurs, while the unity of the dental arch is disrupted, resulting in new conditions for the functional activity of the chewing apparatus [1].

The physiological balance of the chewing apparatus, as well as the stability of the shape and function of the maxillary system, chewing muscles and soft tissues, is constantly influenced by morphological, physiological, constitutional, endocrine, and social environmental influences. Secondary deformities as complications after tooth extraction can occur at any age [2,11,13].

The risk factors for tooth loss are most often caries and its complications (pulpitis, periodontitis), periodontal diseases, tumors, and often injuries due to accidents [7,13].

With the development of secondary deformations of the dentition against the background of anomalies of the maxillary system, the pathological symptoms characteristic of anomalies and deformations with partial tooth loss are summarized [8].

Interventions for the removal of individual teeth are accompanied by persistent morphofunctional disorders in the maxillary system, which are characterized by displacement of individual teeth in different directions, atrophic or hypertrophic processes of the bone tissue of the alveolar processes [1,2,11].

Bone structure disorders are noted not only in the area of removed teeth, but also in the area of their antagonists and even in the area of intact teeth on the opposite side of the jaw, which puts the problem of treating this pathology in the category of urgent [16].

Data on the prevalence of pathology vary significantly, which is due not only to the timing of observations, but also to many other physiological and social factors. The occurrence of deformities after tooth extraction is noted in 20.75% of patients, an increase in them in the older age groups in 78.6%, and with unilateral end defects in 97.3% they are accompanied by secondary deformities [12].

Secondary deformations are manifested by moving the teeth towards the defect, vertical movement of the teeth (Popov-Hodon phenomenon, when a tooth devoid of antagonists moves vertically into the defect of the dentition, the distance between its occlusal surface and the alveolar process of the toothless area of the opposite jaw decreases, or the tooth touches the mucous membrane), the inclination of the teeth into the lingual, palatine or buccal sideways rotation around the axis, fan-shaped tooth separation in periodontitis) [3,4].

Horizontal secondary deformations occur after the loss of one or more adjacent teeth, and are detected when the position of the teeth that limit the defect changes. The severity of the deformity directly depends on many factors: the patient's age, the time elapsed after tooth extraction, the type of bite, and the condition of periodontal tissues. Secondary deformities, complicating the clinic of partial tooth loss, make it difficult to choose and conduct orthopedic treatment, and in some cases make it impossible [9].

Pathological changes occurring in the formed bite due to defects in the dentition are characterized by the fact that the interdependence between shape and function is disrupted. It was revealed that with distally unlimited defects, this system is qualitatively changed, which is confirmed by a violation of the metabolism of calcium salts, which is generalized and directly depends on the time that has elapsed since the loss of teeth and the nature of functional changes [5,17].

The loss of lateral teeth in the absence of antagonists leads not only to deformations of the dentition, but also to malocclusion, one of the varieties of which is malocclusion with a posteriorly shifted lower jaw. There is a form of decreasing bite. The developed stage of decreasing bite is characterized by the localization of the pathological process within the dentition and its transition to the temporomandibular joint. This pathology requires long-term orthodontic and then orthopedic treatment [6, 15].

After early removal of temporary teeth in children, adjacent teeth tilt downwards and tend to move towards the missing tooth. In this case, the dentition is shortened and often narrows. Also, due to the premature removal of baby teeth, there may be a delay in the eruption of permanent teeth or their early eruption, a change in the location of the rudiments of permanent teeth. All this leads to deformation of the dentition [11].

To date, there are several classifications of secondary deformities of the dentition. One of them is based on the morphological principle and includes six groups:

1. Dental rows are included, the deformation of which occurred due to vertical tooth-alveolar elongation of the upper teeth (unilateral or bilateral). 2. Deformation due to vertical dentoalveolar elongation of the lower teeth. 3. Deformation due to mutual vertical dentoalveolar elongation of the upper and lower jaws.

4. Deformity with sagittal displacement of teeth (medial and distal).

5. Rows of teeth with lingual, palatine or buccal displacement of teeth.

6. Deformity caused by combined tooth displacement

(fan-shaped tooth separation, rotation and tilt) [2,3,10]

When studying dental deformities and clinical manifestations of the Popov-Hodon phenomenon, two main forms of pathology were identified: the first form – simultaneously with tooth displacement, there is a visible increase in the alveolar process without bone resorption, exposure of the tooth root and the formation of a periodontal pocket. The second form, tooth displacement, is accompanied by atrophy of periodontal tissues and exposure of root cement. A visible increase in the alveolar process with a slight (within 1/4) periodontal resorption; There is no increase in the alveolar process, periodontal tissue resorption is detected at the level of half or more. At the same time, the following possible directions of tooth displacement are distinguished: vertical, medial tilt, distal tilt, tilt in the oral direction, tilt in the vestibular direction, combined displacement [4].

Normally, the chewing pressure is redistributed to the entire dentition. As soon as a dental defect occurs, conditions are created that disrupt the normal distribution of chewing pressure, eventually leading to traumatic overload of individual groups of teeth and the appearance of a traumatic node [1,3].

It is observed in the decompensated state of the affected dental system. It can be single or multiple, located on one or both dentitions. It can develop not only due to tooth loss, but also with anomalies of teeth and bite, approximal caries, improperly applied filling, manufacture of an artificial crown that increases the bite, uneven tooth abrasion and, as a rule, periodontal disease, when the intraalveolar part of a tooth or several teeth is shortened as a result of atrophy of the alveolar process [10].

The reflected traumatic node is characterized by a pathological condition in the area of the frontal teeth caused by changes occurring in both groups of chewing teeth. When chewing teeth are lost, all pressure is transferred to the area of the frontal teeth. But at the same time, they must perform not only the function of chewing food, but also the function of chewing. The symptoms in the area of the frontal teeth are pathological erasure, leading to a decrease in bite. With a pronounced lesion– speech disorders, Kosten's syndrome [8].

The main cause of pathological processes in the temporomandibular joint is a decrease in bite. Secondary deformations cause an adaptive compensatory reaction on the part of TMJ tissues. Clinically – arthropathy (crunching, clicking or pain in one or both joints during chewing or talking, sometimes there is a restriction of mouth opening, hearing loss, stuffy ears, dull pain in the ear, radiating to the parietal and occipital regions) [1, 10].

In order to normalize the occlusal surface and create correct occlusal ratios during subsequent prosthetics, the following methods are used: selective grinding of tubercles; orthodontic treatment; hardware-surgical method – a combination of sequential deocclusion with preliminary corticotomy; surgical method – removal of displaced teeth [14].

Dental rows represent the unity of the chewing organs of teeth operating in a community. A tooth can function normally only in the dental arch, which, in turn, plays a full role only with its continuity. Removing even one tooth disrupts the normal distribution of chewing pressure, and individual teeth become overloaded. At the same time, masticatory pressure turns from a factor stimulating metabolic processes in the periodontium into its opposite, a factor of destruction. [18]

Deformations of the maxillary system tend to increase, their treatment becomes prolonged and often requires the use of various orthodontic devices and surgical interventions. Therefore, at present, no one doubts the importance and necessity of early detection and treatment of dental anomalies and deformities, and this is possible only with dispensary supervision of children at the dentist. [19]

Modern elastopositioners of various designs are effective for the prevention of secondary deformations of the dentition in children during the period of early replacement bite. Timely pre-orthodontic correction of myofunctional disorders in children with the help of early orthodontic treatment using individually sized standard elastopositioners and myohymnastics allows to normalize the occlusion of the dentition, restore the function of the chewing apparatus, optimize the formation of the maxillary system during the growth and development of the child. [20]

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