The theme of the class № 14

Open bite. Etiology, pathogenesis, prevention

The content of the topic:

Open bite is referred to vertical anomalies. According to statistics, from 1.7 to 5.3 % patients have this anomaly. A.D. Mukhina and Z.F. Vasylevska believe that open bite is more often met in older age than in children with temporary occlusion. Open bite is characterized by the presents of the gap between the frontal or lateral teeth. The gap could be symmetric (between the homonymous teeth) or asymmetric, one-sided or two-side (between the lateral teeth).

Open bite is met in many classifications. Thus, according to **Angle's** classification, open bite is referred to the 1st class, when "occlusion key" is preserved, jaws are located in "mesiodistal harmony", and the pathology is located in the frontal part, and also in individual teeth anomalies: *infraocclusion of frontal teeth and supraocclusion of lateral teeth*.

D.A. Kalvelis viewed open bite as a vertical anomaly and divided it into:

-true open bite (rachitic): because of bony tissue disease muscles development advances the process of mineralization and resists self-regulation;

- ***traumatic*** *(*caused by pernicious habits).

By **Bateman's classification** this form of the bite is named the open bite with the underdevelopment of the elevator muscle of lower jaw and the orbicular muscle of the mouth.

V.Y. Kurliandskyi refers open bite to individual teeth position anomalies -

infraocclusion and vertical jaw underdevelopment.

Z.F. Vasylevska singles out three forms of open bite:

1) all frontal teeth or a part of frontal teeth do not articulate;
2) frontal teeth and premolars do not articulate;
3) frontal teeth, premolars and the 1st molars do not articulate.

F.Y. Khoroshilkina classifies open bite by the size of the vertical gap:

- the 1st stage - less than 5 mm;
- the 2nd stage - less than 9 mm;
- the 3rd stage - more than 9 mm.

The author also differentiates gnathic and dentoalveolar open bite by cephalometric image.

K. Lebreil and I. Fischer-Brandes view open bite as:

1. frontal open bite;
2. lateral open bite:
   a) unilateral;
   b) bilateral.

By WHO' classification the open bite is considered to the anomalies of the dental arches.

By Grygorjeva's classification the open bite is pathological bite, could be frontal or lateral, also neutral, mesial and distal regarding to the lateral teeth relationship.

Determinative factors, which caused the development of the open bite:

1. Heredity.
2. Children diseases with the impairment jaw-bone mineralization (rachitis).
3. The bad habits (finger sucking, suck the (baby's) dummy, lips, cheek and the outside things.
4. Oral breathing as a result of bad habit or adenoid vegetations.
5. Pathologic function of tongue (passing between the lips).
6. Congenital cleft of lip, alveolar process and palate, which caused the

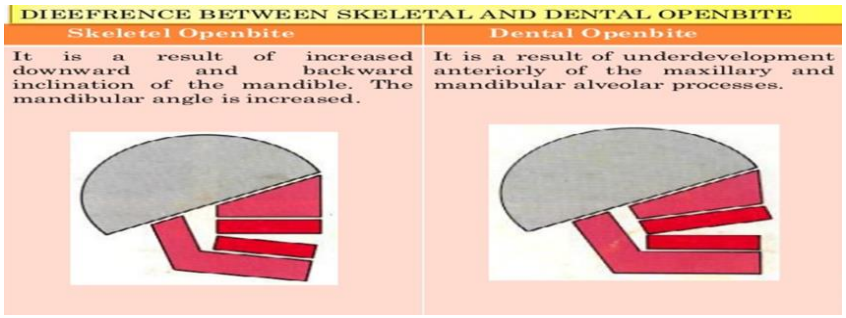
underdevelopment of the frontal part of the upper jaw.

7. Excess vertical growth of the lower jaw.
8. Atypical position of the dental germs of the second teeth
9. Macrooglossia.
10. Palatopharyngeal tonsils enlargement promotes forward tongue displacement, its irregular location.
11. Swallowing dysfunction (irregular swallowing with laying the tongue between the dental arches); infantile type of swallowing, when the child pushes the tongue tip off closed lips and draws the lips into the oral cavity;
12. Speech disturbance (irregular articulation of the tongue with surrounding tissues) promotes incomplete teeth eruption and open bite formation in the anterior part of the dental arches.
13. Irregular position during sleep (the head thrown back).
14. Individual teeth adentia, macrodontia on one of the jaws.
15. Violation of the sequence of upper and lower temporary teeth transitional dentition or of the terms of permanent teeth eruption.
16. Shortened tongue frenulum hampers its movements, leading to irregular position of the tongue apex, most often — between incisors. Not infrequently at such position children bite lateral tongue parts, which causes bilateral open bite development.

Pathogenesis of the open bite is caused by disturbance of jaw growth in unfavorable heredity, mothers' diseases during pregnancy, calcium changing's transgressions as a result **of rachitis**, endocrine diseases. Agapov, Iljina-Markosjan, Korkhaus devoted the much considerable deformated effect of the masticatory muscles on pathologically modified bone tissue. Consequently the lower jaw bends up in molar region under the action of jaw-erector muscles (masticator muscles, temporal and inner pterygoid muscles). In chin region the lower jaw bends down as a result of the traction of lower jaw- depressor muscles (digastric, mylohyoid and geniohyoid muscle). At that the upper jaw deforms in the lateral part with lengthening of the frontal part. The deformation of the upper jaw is descended under

the action of muscles which fasten to temporal bone, maxillary tuber, pterygoid process of sphenoid bone and pull down a zygomatic arch, alveolar process and surrounding tissues. The compression of the lateral part of the upper jaw evokes the dental arch modification – saddle-shaped and V-shaped forms. As a result of early rachitis trapezoid form with constriction in frontal part may be observed; as a result of late rachitis the lower molars bend forward to the tongue under the action of mylohyoid muscles.

Mostly in consequence of the bad habits the open bite develops with others anomalies of the bite in transversal and sagittal planes. The development of sucking mechanism begins from 18 week of pre-natal growth. When the temporary teeth are erupted, the sucking function fades away and the mastication function develops. But in special situation the sucking reflex is remained, the child sucks a finger, a lip and a tongue. As a result of such bad habits the open frontal bite develops. When the child sucks or bites the cheek, open lateral bite develops.



The dysfunction of the nasal breathing also stimulates the development of the open bite. The child respires with the open mouth and the deformation of the hard palate arises from the buccal muscle' exertioning with forming the "Gothic palate".

So as to make easier the breathing, the child displaces the lower jaw in back position, and this relation between the jaws contributes the development of the distal bite. Under the action of masticatory muscles the upper jaw narrows in the lateral part; the fore-part of the upper dental arch becomes longer as a result of the disturbed lips' closing.

The mechanism of the swallowing also changes after a number of years. When the temporary bite forms, the physiological "infantile" type of the swallowing is replaced by the somatic type. The conserved "infantile" type of the swallowing is

caused the development of the open bite.

Congenital cleft of the lip, the alveolar process and the palate are caused the underdevelopment of the frontal part of the upper jaw with forming of the asymmetric open bite.

In rare instances the open bite develops as a result of damage of the jaws and temporo-mandibular joint, the atypical position of the germs of the second teeth, excessive growth of the lower jaw.

The clinical systematization of the open bite' forms (Holovko)

I. Causes of the development.

II. Aesthetic disturbances (the facial signs).

1) feebly marked facial signs

2) well-marked facial signs of anomaly

a) the lengthening of the lower facial part;

b) the open mouth;

c) the intensive lips closing;

d) the flatness of the labiomental and nasolabial fold;

e) the increasing of the mandibular angle.

The evidence of the aesthetic disturbances depends on the child's age, the degree of the morphologic and functional signs of the bite' deformation with the pathology of the bite in the lateral and sagittal planes.

The facial configuration depends on the vertical gap – the more one's the better aesthetic disturbances. The symptom of "lemon –peel or thimble" appears as a result of the disturbed lips closing.

The anomaly is diagnosed on the grounds of:

- clinical examination;
- photometric face investigation;
- study of diagnostic jaws models;
- jaw orthopantomograms;
- lateral teleroentgenograms of head