The theme of the class № 17

Transversal malocclusion. Cross bite. Etiology, pathogenesis, prevention, clinical manifestation and diagnosis

The content of the topic:

Transversal plane is characterized by

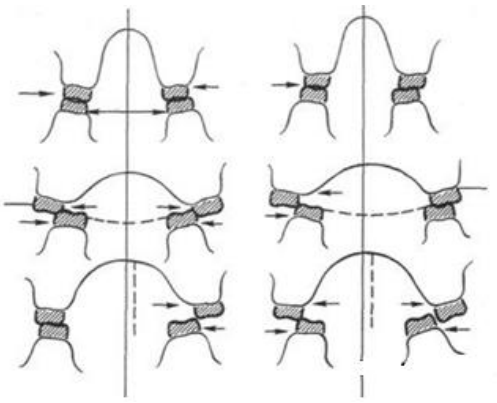
- Midline matching (face line, lip frenulum, interincisor lines);
- Upper dental arch wider than lower on the size of buccal cusps.

According to Betelman's occlusion classification, cross bite is a pathological occlusion, belonging to transversal anomalies, which may be uni- and bilateral. Cross bite may be also viewed as labial (buccal) and lingual occlusion (according to Angle's classification of individual teeth position).

The WHO views cross bite as dental arches correlation anomaly:

- lateral teeth cross bite;

- lingual occlusion of the lower lateral teeth.



Kalvelis included cross bite to transversal anomalies, in particular – to the inadequacy of the lower and upper dental arches width:

- violation of lateral teeth correlation on both sides (bilateral cross bite);

- violation of lateral teeth correlation on one side (unilateral cross bite).

Y.I. Havrylov and **I.I. Uzhumetskene**, taking into account the diversity of clinical presentations, differentiate three forms of cross bite:

The Ist form – buccal cross bite.

1. Without lateral lower jaw displacement:

a) unilateral, conditioned by unilateral narrowing of the upper dental arch or jaw, dilation of the lower dental arch or jaw, these signs combination;

b) bilateral, conditioned by bilateral symmetric or asymmetric narrowing of the upper dental arch or jaw, dilation of the lower dental arch or jaw, these signs combination.

2. With lateral jaw displacement:

a) parallel to the median-sagittal plane;

b) diagonally.

3. Combined buccal cross bite – combination of the 1st and 2nd varieties signs.

The 2nd form – lingual cross bite.

1. Unilateral, conditioned by the unilaterally wide upper dental arch, the unilaterally narrowed lower jaw, or combination of these disorders.

2. Bilateral, conditioned by the wide upper dental arch or jaw, narrowed lower jaw, or these signs combination.

The 3rd form – combined (buccal-lingual) cross bite.

1. Dento-alveolar — dilation or narrowing of the dento-alveolar arch of a jaw; combination of signs on both jaws.

2. Gnathic – dilation or narrowing of the jaw basis (underdevelopment, overgrowth).

3. Articular – lateral displacement of the lower jaw (parallel to the median-sagittal plane or diagonally).

L.V. Ilyina-Markosian singles out two forms of cross bite:

- without lower jaw displacement;

- with lateral lower jaw displacement.

Grigorieva L.P. differentiate two forms of cross bite:

- laterognathic (the upper dental arch covers the lower one);

- laterogenic (the lower dental arch covers the upper one).

On the basis of cephalometric methods of investigation Schwarz, Khoroshilkina, and Shcherbakov distinguish next forms of cross bite:

1. *Dento-alveolar cross bite* (dento-alveolar dilation or narrowing of the dental arch) – unilateral or bilateral.

2. *Gnathic cross bite* (narrowing or dilation of the jaws basis).

3. *Articular cross bite* – lower jaw displacement:

- parallel to the median-sagittal plane;

- diagonally.

A.A. El-Nofeli was the first to use the terms "buccal" and "lingual" to denote cross bite. According to the scholar, the buccal cross bite is such a dental arch correlation, at which the upper lateral teeth vestibular tubercles go into the longitudinal tubercles of the lower teeth. At the lingual cross bite upper the lateral teeth completely or partially slip by the lateral ones on one or both sides.

Cross bite may be conditioned by numerous **etiological agents**, the most important of which are:

- heredity;
- prenatal pathologies;
- malposition;
- amniotic fluid excess pressure;
- gestational toxicosis, injuries, infectious diseases, avitaminosis, etc.;
- birth injuries (torticollis);
- fibrous dysplasia (McCune-Albright's syndrome);
- shortening or lengthening of the lower jaw branch (Franceschetti-Tsvalen's syndrome of the l^{st} branchial arch);
- atypical position of teeth germs;
- adentia;
- violation of eruption process on one side (retention, violation of eruption sequence);
- underdevelopment or overgrowth of one of the jaws;
- functional insufficiency of mastication muscles on one side;
- infancy diseases (osteomyelitis, staphylococcosis, etc.), leading to bone deformations;
- calcium dysbolism;
- nonunion (most often unilateral), residual defect of the chin after urano-staphyloplasty;
- neoplasms;
- TMJ disease (ankylosis);
- unilateral facial hemiatrophy (facial nerve paresis), neuralgias;
- irregular position during sleep (on one side, putting a hand or a fist under the cheek);
- pernicious habits: supporting a cheek with a hand, sucking fingers, biting different objects on one side;
- irregular wearing out of the milk teeth tubercles;
- bruxism;
- caries, premature teeth extraction;

- irrational prosthetics.

Cross bite may develop in different periods of occlusion – milk, permanent, transitional dentition. It may also complicate vertical and sagittal occlusion anomalies, may be complicated by dental arches and individual teeth pathologies.

Cross Bite Clinical Presentation and Diagnostics

At cross bite intraoral and extra-oral signs depend on the form and degree of pathology manifestation.

At cross bite face configuration is violated, lower jaw transversal movements are hampered, which may lead to irregular distribution of mastication pressure, traumatic occlusion, and periodontal tissues disease. Some patients complain of buccal mucosa biting, irregular speech sounds pronunciation.

TMJ function is not infrequently violated, especially at occlusion anomaly with lateral lower jaw displacement.

The clinical presentation of each cross bite variety has its peculiarities.

1. *At the buccal cross bite without lower jaw* displacement face asymmetry is possible without dislocation of the chin midpoint, which is detected by the relation to the median plane.

Intraoral signs. The median line between the upper and lower central incisors usually coincide. But at dense position of the frontal teeth, their displacement, dental arches asymmetry it may be dislocated. In such cases the location of the basis of the lips and tongue frenula is found. The degree of dental arches correlation violation may be different. The upper lateral teeth buccal tubercles may be located in the longitudinal sulci on the mastication surface of the lower teeth or not touch them.

2. *At the buccal cross bite with lower jaw displacement* face asymmetry is observed, conditioned by the lateral displacement of the chin relative to the median-sagittal plane.

The left and right profiles of such patients are differentiated by the form, which progresses with age.

Intraoral signs. The median line between the upper and lower central incisors does not usually coincide because of lower jaw displacement, the change of the dental arches (and not infrequently jaws) form and size. The lower jaw may displace parallel and diagonally to the median-sagittal plane. Position of the articular heads of the lower jaw in the joint changes at its lateral displacement, which shows on the mesio-distal correlation of lateral teeth in occlusion. Distal correlation of the dental arches appears in the place of displacement, in the opposite place – neutral or mesial correlation. Palpation of the TMJ region during opening and closing of the mouth on the side of lower jaw displacement shows normal or feebly marked movement of the articular head, on the opposite side –

marked stronger. At mouth opening the lower jaw in lateral position may shift to the central one, at closing – return to the initial position. In some patients there was noted the increase of mastication muscle proper tone and volume, which increases face asymmetry.

To characterize lateral lower jaw displacement **Ilyina-Markosian**'s and **clinical tests are used:**

the 1st test – examination of the face in physiological rest (disjoint in 2 mm).

the 2nd test – examination of the face in habitual occlusion.

the 3rd test – a patient is offered to open the mouth wide, facial signs of the pathology are studied. Face asymmetry increases, decreases or disappears depending on its reason (if face asymmetry increases and diagonal lower jaw displacement takes place, the pathology is of articular form);

the 4h test – the lower jaw is set in usual occlusion, then facial harmony is evaluated from the esthetic point of view, there are detected the degree of lower jaw displacement, the size of inter-occlusal space in the region of lateral teeth, dental arches narrowing (or dilation) degree, facial skeleton bones asymmetry, etc.

The studying of an anterio-posterior head radiograph or cephalometrics not infrequently shows asymmetric development of the facial bones of left and right side, their irregular location in the vertical and transversal directions, diagonal lateral lower jaw displacement. The shortening of the lower jaw body or branch in the place of displacement or the thickening of this jaw body and of the chin on the opposite side are noted.

3. *At the lingual cross bite on the basis of face examination* en face and in profile lower jaw displacement and chin flattening are not infrequently detected.

Intraoral signs. Sometimes mastication muscles hypotonia, mastication function disorder, lower jaw blocking, its lateral movements violation are detected. Occlusion and the form of dental arches change. At the excessively wide upper dental arch or the sharply narrowed lower one, the upper lateral teeth partially or completely slip by the lower ones on one or both sides.

4. *At the combined buccal-lingual cross bite* facial, dental, articular, muscle and other signs are characteristic of both buccal and lingual cross bite.

The final diagnosis based on the clinical and laboratory research (anthropometric, biometric (Pont method), X-ray).