

Comprehensive treatment of patients with open bite

The content of the topic:

The treatment of the open bite plans taking into account the age of the patient, the degree of the morphologic, aesthetic and functional disturbances with others anomalies of the bite in transversal and sagittal planes, anomalies of the allocation of the single teeth and dentitions.

The treatment of the different forms of the open bite consist of:

- The elimination of the factors, which leads to development of the open bite;
- The stimulation of the growth or the increasing of the dento-alveolar height in the frontal part one or two jaws;
- The delay of the vertical growth or the dento-alveolar contraction in the lateral parts of the jaws;
- The rebuilding of the muscles' action and the function of the oral cavity;
- The decreasing of the tongue' size and the increasing of the volume of the oral cavity.

The treatment of malocclusions in vertical plane it is advisable in stages of physiological occlusion height elevation.

There are singled out 4 stages of the physiological elevation of occlusion height:

- the 1st falls on 2-2.5 years, i.e. the moment of all temporary teeth eruption completion;
- the 2nd is marked at the age of 6 years, i.e. the time of 1st permanent molars eruption;
- the 3rd – 12-13 years, after the complete replacement of temporary teeth with permanent, due to the vertical growth of the alveolar process, full value eruption and regular reciprocal arrangement of other permanent molars;
- the 4th – 18-25 years, i.e. as a result of the eruption and regular articulation of the 3rd molars; if they are absent, occlusion height elevation occurs at the expense of dento-alveolar lengthening. At all stages, as occlusion height increases dynamically the frontal overbite depth decreases, and dentitions correlation becomes orthognathic.

In the period of **milk occlusion** the main task of treatment is:

- pernicious habits elimination;
- normalization of tongue position in the quiescence and during functioning;
- obtaining nasal breathing, lips closure, regular swallowing and speech sounds pronunciation.

By indications the plastic surgery of the shortened tongue frenulum is conducted Kraus' vestibular plate.

Dento-gnathic functions are normalized by means of exercises with a logopedist and curative gymnastics. To break the child of the habit to suck fingers, lips, different objects, functional acting vestibular or vestibule-oral devices are used: individual Kraus' and standard Schonher's vestibular plates, and also domestic pre-orthodontic trainers. To break the child of the habit to suck tongue and swallow incorrectly, Kraus' vestibular plate is used.

The vestibule-oral plate is applied for the treatment of open bite in combination with posterior occlusion, developed because of tongue sucking or irregular swallowing. The plate is indicated for the treatment of posterior occlusion at the initial stage of its development.

In the process of treatment it is important to attend to the correct position of the patient's head during sleep (it cannot be thrown back); the orbicular muscle of mouth is to be trained with the help of curative gymnastics. Exercises with support are beneficial, including exercises with the vestibular plate, Dass' activator.

In the period of transitional dentition varieties of two-jaw functionally acting devices are used to normalize jaw growth and open bite treatment. They are



particularly indicated in the final period of temporary occlusion and initial period of transitional dentition, i.e. at the age of 5.5-9 years.

Klamt's open activator is made taking into account the main variety of occlusion anomaly (distal or mesial). The tongue is pulled aside from the teeth with the help of wire loops, located in the region of the vertical fissure between the incisors.

Baiters' bionator of the 2nd type is intended for the treatment of open bite. This bionator differs from the basic one: there is a plastic shield in its anterior part,

which pulls the tongue apex aside from the dental arches and hampers the pernicious habit of pressing frontal teeth with the tongue.

Muelleman's propulsor and Andresen-Haupl's activator and other functionally acting devices with occlusive side plates in the region of contacting teeth and without them are used in the process of treating distal open bite. These devices' action is expected to change the tone of the mastication muscles, and also the muscles of the tongue, lips and cheeks, to normalize the position of the tongue and its functions.

Because of such tasks each of the mentioned devices has a support for the tongue in the anterior or (by indications) lateral part, i.e. in the part of disjoined teeth.

For the treatment of open bite the function regulator FR-4 (with occlusive side plates) is used, for the treatment of open bite in combination with posterior occlusion – FR-I and FR-II, for the treatment of mesial occlusion – FR-III.

If at open bite only the last (temporary) molars close, and the rest of teeth are disjoined, at normal tongue size it is possible to regrind these teeth tubercles selectively. The earlier open bite orthodontic treatment is begun, the shorter the term and the more favorable prognosis are. In the period of temporary occlusion formation vertical jaw growth prevails, in which connection there are more possibilities for its normalization.

During the treatment of open bite, conditioned by dento-alveolar lengthening in the region of lateral teeth, vertical extra-oral pull bearing on the parietal part of the head and the lower part of the lower jaw body is used. With this purpose a hat and a chin sling are used.

Occlusion elevation on a device with occlusive side plates for the influence on the teeth and alveolar process in the lateral parts and extra-oral pull usage accelerate treatment.

Occlusal bite planes and tongue guard with vertical chin cup



Treatment – Skeletal Open Bites

▪ Growing patients

• High-pull Headgear on maxillary 1st molars



Posterior Bite Block
(impede lower molars extrusion)

In the initial period of transitional dentition the same treatment measures are resorted to as in the period of temporary occlusion. To eliminate the pernicious habit of laying the tongue between dental arches in the part of the defect and sucking it there is made a device for the upper jaw with wire supports for the tongue. Dento-alveolar lengthening is achieved with the help of removable devices with different springs, levers, vestibular or lingual arches for teeth transfer.

A removable one-jaw orthodontic device for the treatment of open bite has special actively influencing elastic wire elements in the form of vestibular arches or springs, and also lock elements on the transferred teeth. The latter are fixed to the teeth with the help of glue composite materials, also they may be welded or soldered to the rings on the transferred teeth. Hooks, tubes-grooves, Malyhin's fixing element may be used as lock elements. They may be applied on the upper or lower jaw, and by indications — on both simultaneously (Khoroshilkina).

Steel rings or plastic gum shields with lock elements are fixed on teeth with movable orthodontic appliance is introduced into the oral cavity, and vertically acting springs, previously activated, are introduced into the lock elements, in such a way exerting dosed pressure onto the transferred teeth and creating vertical pulling and drawing of the frontal teeth. The anterior part of the device, which is adjacent to the palate, is tightly pressed to it and significantly improves device fixation. The posterior part of the device promotes lateral teeth intrusion via occlusive side plates and clasps. The springs are periodically activated (unbent

once in a fortnight).

Fixed appliances are also used in the treatment of open bite. For the transfer of the teeth of one jaw there may be used an extra-coronal vestibular arch, fixed in tubes, soldered or welded to the rings on the support temporary or 1st permanent molars. In the region of non-contacting teeth the arch is bent U-like. There are often fixed rings with hooks on the transferred teeth. Dento-gnathic lengthening is achieved with the help of rubber recoil.

At dento-alveolar shortening in the region of both upper and lower teeth fixed devices with interdental pull are used. With this purpose there are made rings on the teeth subject to transfer, soldering hooks, buttons and other appliances from their vestibular and oral side, or bracket system are used.

In the initial period of permanent occlusion the enumerated methods of treatment and appliances are used. With age dental arches narrowing at open bite increases, in which connection the first stage of treating it is dental arches dilation, especially of the upper one. For this purpose a dilating device with a screw and support for the tongue is used – to break the patient of the habit to lay the tongue between the dental arches.

Angle's devices and bracket system are used for dental arches dilation and dento-gnathic lengthening, which is achieved with the help of inter-maxillary rubber recoil. Every arch in Angle's device is bent in such a way that it is located by cutting edges. Then they are set at the level of the interdental gingival papillae apices and fixed to the transferred teeth with the help of lock appliances, ligature wire. At that, the elastic wire arches tend to take the initial position and transfer pulling to the teeth fixed with a head-chin strap and an extra-oral pull to them. By means of using Angle's apparatus it is possible to normalize individual teeth position, dilate or narrow the dental arches, correct open bite. Teeth are to be transferred gradually not to damage their periodontium and neurovascular fascicles, not to cause support teeth displacement.

With the purpose of alveolar shortening in the region of lateral teeth the action of Angle's apparatus is combined with extra-oral pulling.

At indications to dento-gnathic shortening in the region of lateral teeth and simultaneous lengthening in the region of upper frontal teeth Herbst-Kozhokaru's device is used. Also there are applied Johnson's devices, bracket system, including the one with inter-maxillary pulling.

The treatment is accelerated, might be more effective, and its results – more persistent if during orthodontic treatment different methods of orthodontic treatment stimulation are used.

Open bite treatment, especially in teenagers and adults, must be complex including:

- 1) surgical procedures (plastic surgery of the shortened frenula of tongue, lips);

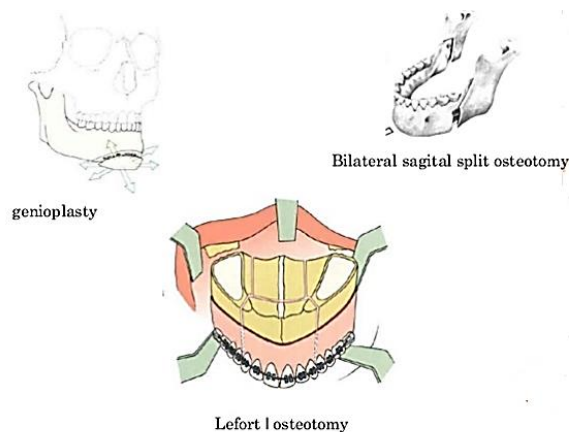
2) learning from a logopedist correct tongue articulation with surrounding tissues in the quiescence and during speaking;

3) resorting to curative gymnastics for the normalization of breathing and swallowing functions;

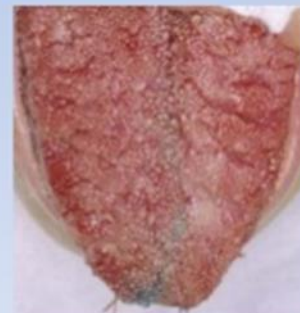
4) using intraoral orthodontic appliances with a rest for the tongue, devices for dento-gnathic lengthening in the region of open bite and by indications – dento-gnathic shortening in the region of lateral teeth, applying vertical extra-oral pulling for the vertical transfer of teeth; prophylactic measures – restoration of the teeth crowns at their carious destruction, enamel hypoplasia and teeth replacement with prostheses after their

In some cases open bite in adults may be treated with the help of prosthetics. It is indicated at sufficient length of the upper lip, moderate size of the mandibular angles, and insignificant elongation of the lower part of face.

In patients older than 18 years, in cases when with the help of orthodontic and complex methods of treatment there is no possibility to eliminate open bite at the most evident dental arches deformation, it is eliminated by means of a surgical method. The method of surgical treatment is chosen, taking into consideration the place and deformation degree of jaw parts.



6 - Partial Glossectomy in patients with *true macroglossia* or increased tongue size .



Orthodontic treatment duration depends on the degree of open bite manifestation, the period of its formation, variety, possibility of eliminating functional disorders, the degree of orthodontic treatment complexity.

In the period of temporary occlusion the complex treatment of the dento-alveolar form of open bite is the most effective if patients begin using orthodontic appliances in the period of 1st permanent molars coming out.

In the period of permanent occlusion with the purpose of eliminating dental arches and jaws deformations there are applied methods of orthodontic treatment stimulation, which considerably accelerates treatment and constant results obtaining.

The prognosis of treating the dento-alveolar form of open bite is more favorable than of the gnathic form. The result also depends on the age of treatment beginning. If functional disorders are not completely eliminated in the process of orthodontic and complex treatment, anomaly recurrence may appear. The prognosis of treating the gnathic form of open bite depends on the degree of its manifestation and jaws deformation. At considerable increase of the basal angle (40° and more) and macroglossia esthetic prognosis of treatment is unfavorable.

The duration of retention period partially depends on the treatment method. After correcting occlusion with functionally acting devices (vestibular plate, Muelleman's propulsor, Andresen-Haupl's activator, Klamt's open activator, Baiters' bionator, Frankel's function regulator, etc.) there is no need in the elimination of retention apparatus functional disorders. After the usage of mechanically acting devices with one-jaw or inter-maxillary pull retention period equals the period of treatment or more than 6-8 months on average. The patient must gradually get out of the habit of using dento-alveolar traction and use the pull only during sleep.

The following errors might take place during open bite treatment:

1. During open bite elimination in the anterior part of dental arches attention is paid to dento-alveolar lengthening in this part, without diagnosing dento-alveolar lengthening in the region of the upper lateral teeth. If no measures are taken concerning dento-alveolar shortening in the region of upper molars, after obtaining contacts between frontal teeth the face form remains disturbed. A smile exposes not only crowns of teeth, but also alveolar processes, which disharmonizes facial features.

2. Applying big force during teeth transfer may cause teeth painfulness, loosening, crowns color change as a result of hemorrhages in the pulp.

Teeth traction is erroneous if they are densely located. Preliminary the dental arches must be dilated, or dense teeth location is to be eliminated by means of extracting some of them.