

THE MINISTRY OF HEALTH OF UKRAINE
THE HIGHER STATE EDUCATIONAL INSTITUTION OF UKRAINE
"UKRAINIAN MEDICAL STOMATOLOGICAL ACADEMY"

Approved
at the meeting of orthodontics department
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protocol № 1
Head of department _____ L.V. Smaglyuk

METHODICAL RECOMMENDATION
for independent work of students during the preparation
to practical lessons and the lessons

Academic discipline	Orthodontics
Module №3	Children's dental prosthetics
The theme of the lesson №7	Removable orthodontic appliances.
Course	V
Faculty	Preparation of foreign students

Poltava 2017

1. Relevance of the topic: in Ukraine, the instrumental method of treatment of dento-alveolar anomalies and deformities of the bite with different designs of orthodontic appliances is the most common and affordable for wide segments of the population (children, adolescents and adults). So knowledge about operation and indications of orthodontic appliances principles are important for dentists.

2. Specific objectives:

Classification of removable orthodontic appliances;

Design of removable orthodontic appliances;

Indications of removable orthodontic appliances various designs;

The principles of removable orthodontic appliances operation;

Activation methods of removable orthodontic appliances;

The principles of treatment with removable technique;

Features of retention period in the treatment with removable orthodontic appliances.

3. Basic knowledge's, abilities, skills necessary for studying the topic (interdisciplinary integration)

Name of previous disciplines	Skills
1. Anatomy	Periods of human development. The structural features of the facial skeleton and skull bones. The structure of the TMJ in different ages.
2. Prevention of dental diseases	The timing, order and sequence of permanent teeth eruption.

4. Tasks for independent work in preparation for the lesson.

4.1. A list of key terms, parameters, characteristics that a student should learn in preparation for the lesson:

Term	Definition
1.The appliance method of treatment	The method of providing treatment of malocclusion by using special apparatus – orthodontic appliances.

4.2. Theoretical questions to the lesson:

1. Classification of removable orthodontic appliances.
2. Indications for use of orthodontic appliances removable constructions.
3. Contraindications to the use of removable orthodontic appliances.
4. Characteristics of the removable functional orthodontic appliances.
5. Characteristics of the removable mechanical orthodontic appliances.
6. Retention period in the treatment of removable orthodontic appliances.

4.3. Practical work that are performed in class:

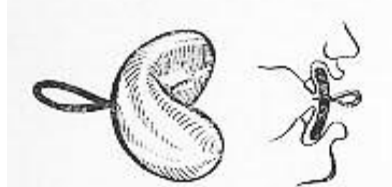
1. To select the most efficient design of removable orthodontic appliance for the treatment of different types of dento-alveolar anomalies;
2. To activate the removable orthodontic appliance;
3. To apply and correct the removable orthodontic appliances.

The content of the topic:

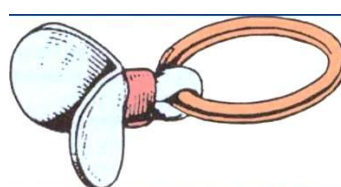
Functionally Acting Orthodontic Appliances (Passive).

Orthodontic appliances, whose therapeutic action is based on the directed change of dynamic balance between expression muscles, which continuously influence the dental arch in the lingual direction, and the tongue, which counteracts this pressure in the vestibular direction, are named functionally acting.

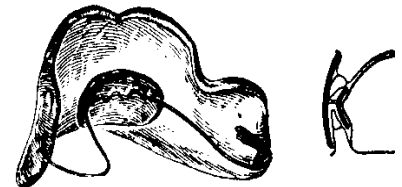
One of the main directions in developing these appliances was the creation of vestibularly located constructions for the normalization of the expression muscles function. Vestibular plates (of Korbitz, Schoncher, Craus, Muellemann, Dass, Hinz) protect dental arches from the pressure of the lips, cheeks, fingers, and different objects. They normalize lips closure, the functions of breathing and swallowing, train the orbicular muscle of mouth. Appliances with a grid for the tongue normalize its correct position and prevent excessive pressure on the frontal group of teeth. The usage of functionally acting appliances is effective in the young age (in the period of milk occlusion and at the beginning of the first period of mixed dentition), when it is possible to take account of the growth of jaw bones and especially of the apical basis. Constructive elements of functionally acting appliances include: buccal shields, labial bandages, vestibular mantels, limiting grids for the tongue, etc.



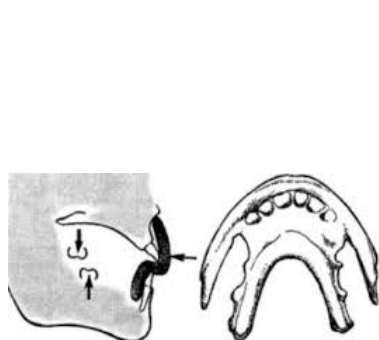
Korbitz



Schoncher



Craus



Muellemann



Dass



Hinz

Hinz' vestibular plates (Germany) is a preventive appliance for early orthodontic treatment of occlusion anomalies in children of 3-6 years, substantiated by 30-years' experience of usage by orthodontists and children's dentists. The plates promote pernicious habits elimination and prevent the development of soft tissues dysfunction, which causes dental arch deformation in milk occlusion.

Vestibular plates (with a blue ring), radius 30 mm, for mixed dentition:

- eliminate the very reasons for anomaly development;
- promote speech defects elimination;
- correct tongue position;
- eliminate usual oral breathing;
- normalize lips closure;
- strengthen the orbicular muscle of mouth;
- promote myofunctional training.

Vestibular plates (with an orange ring), radius 22.5 mm, for milk occlusion:

- prevent the pernicious habit of sucking a finger;
- change oral breathing to nasal;
- eliminate tongue dysfunction;
- provide myofunctional therapy;

Vestibular plate “H” – a bead for tongue control:

- prevents oral breathing at incorrect tongue position;
- prevents incorrect tongue position at rest;
- is helpful at speech defects.

Vestibular plate “K” (shield):

- a shield for biting with lower frontal teeth;
- prevents the pernicious habit of sucking a finger at underdeveloped lower jaw;
- is indicated at all types of mandibular retrusion or protrusion of upper incisors; eases and trains lips closure. If the plate is worn with the shield upwards, deep overbite is eliminated.

Vestibular plane with a wire valve:

- prevents open bite development;
- resists tongue dysfunctions at speaking and swallowing.

At each swallowing movement and at speaking a child lays the tongue between the dental arches and natural interocclusal contact may be violated. The valve, resisting the laying of the tongue, prevents open bite formation.

Preorthodontic Trainer

1. The trainer corrects myofunctional pernicious habits and evens erupting teeth.
2. Labial projection in the form of an arch exerts slight pressure on the frontal teeth in the process of coming out.
3. The “tongue” for the tongue actively trains the tongue apex position.
4. The restrictor for the tongue restricts tongue movements and its pressure on teeth.
5. Labial bumpers force the child to breathe through the nose, take off redundant muscle pressure.



The initial trainer (blue) is soft, which provides its flexibility and quick adaptation, eliminates myofunctional problems. It is administered at evident disocclusion in most cases.

The final trainer – final leveling of teeth.

Further leveling of teeth is conducted with the help of a stiff (pink) trainer, which is rather tight. The principle of operation is the same as at applying an orthodontic wire arch. When teeth are in their places, big efforts are needed for their final leveling.

Myofunctional characteristics (design) are the same as in the initial trainer.

The final trainer is applied in subsequent 6-12 months. Longer wearing may be recommended depending on the results and the further phase of orthodontic treatment.

Lately, a new trend in orthodontic treatment – with the help of aligners (elastomers) – is widely popularized abroad.

The method of treating dento-gnathic anomalies offered by Frankel in 1960 also deserves attention. Frankel views violations of the function of mastication, swallowing, breathing, speech, and also the change of the tone of perioral, occipital, and cervical muscles as the underlying cause of dento-gnathic anomalies' arising. The author considers the habit of keeping one's mouth open and complicated nasal breathing to be especially harmful.

The devices, offered by Frankel, were named function regulators. In contrast to most other orthodontic appliances they are hardly a source of mechanic influence on dental arches, but promote function normalization and correct formation of dental arches and occlusion. It is a removable two-jaw device, whose basic elements are lateral shields and vestibular bandages. The first liberate the lateral areas of teeth from cheeks pressure and stimulate the growth of jaws and apical basis of the upper and lower jaws in the sagittal direction.

Parts of the device are joined with the help of metal arches made of elastic wire. Depending on the clinical presentation, dental arches may be disconnected or their masticatory surfaces may touch the biting platform. The lateral shields are adjacent to the vestibular surface of teeth or are distant from them. The author has offered three types of the devices: the 1st and the 2nd – for the treatment of posterior occlusion, combined with protrusion (the 1st) or retrusion (the 2nd) of the upper frontal teeth, the 3rd – for the elimination of mesial occlusion.



Treatment with appliances of functional action is combined with active myotherapy and constant observation of the lips and tongue position. Thus, anomalies are eliminated by means of influencing not dental arches and through them – jaws and muscles function, but vice versa, by influencing muscles and through them – jaws and dental arches.

Functionally Directing Orthodontic Appliances (Passive)

The creation of functionally directing orthodontic appliances was a significant step forward in the development of the arsenal of medical orthodontic means.

Devices of functional action are differently constructed inclined planes (with 30-45° angulation), biting platforms, occlusive side plates, which transfer teeth or the whole lower jaw in the sagittal, transversal, and vertical directions. No actively acting elements are put into them. The source of force is the contractile capacity of the mastication muscles in the period of certain teeth closing with the inclined plane, biting platform or occlusive side plates; at that, in other areas dental arches are disconnected. The devices act in discontinuous manner.

A.Y. Katz is the initiator of the functional method in orthodontics. In 1933 he offered functionally directing appliances for the treatment of dento-gnathic anomalies. Katz believed that the force of functionally directing appliances is regulated by the parodontium receptors, i.e. it can only act within certain limits, and if it becomes excessive, pain appears and muscles contraction weakens or strengthens according to reflex. Such regulation of orthodontic force (depending on individual peculiarities and the reactivity of each patient's parodontium) should prevent pathologic changes in the parodontium tissues. But, according to the experimental data of H.T. Sukharev and D.A. Kalvelis, at application of functionally directing devices there arise severe tissue transformations, which overstep the limits of normal tissue reactions. According to I.S. Rubinov, therapeutic efficacy of directing appliances is connected with the function of mastication muscles and reflexes of occlusion disconnection.

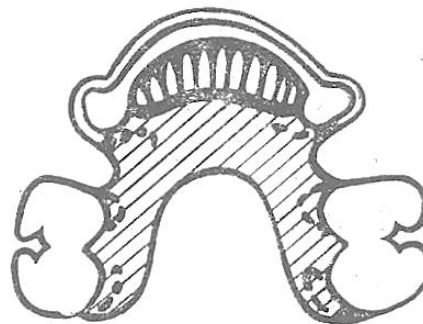
Removable Appliances of Functionally Directing Action

With the purpose of eliminating the rigid action of fixed appliances on teeth they were removable; Schwarz' gum shield, B.N. Bynin's gum shield, Schwarz' device with a biting platform, etc. The usage of masticatory muscles contraction as the main source of energy for teeth transfer allowed attaching inter-maxillary action to one-jaw fixed and removable appliances due to the presence of a passively acting functionally directing element in their construction (inclined plane, biting platform, occlusive side plates, etc.).

B.N. Bynin's gum shield with an inclined plane is made of plastic, covers the whole lower dental arch, and goes under the upper teeth with its inclined plane. Indications to its application and principles of its action are the same as in Schwarz' gum shield, but it may be used at middle frontal overbite (in this case the lower frontal teeth are almost not inclined orally). In the process of treatment, when lateral teeth start touching the gum shield, their masticatory surfaces are filed off, which provides repeated occlusion disconnection and device's action prolongation.

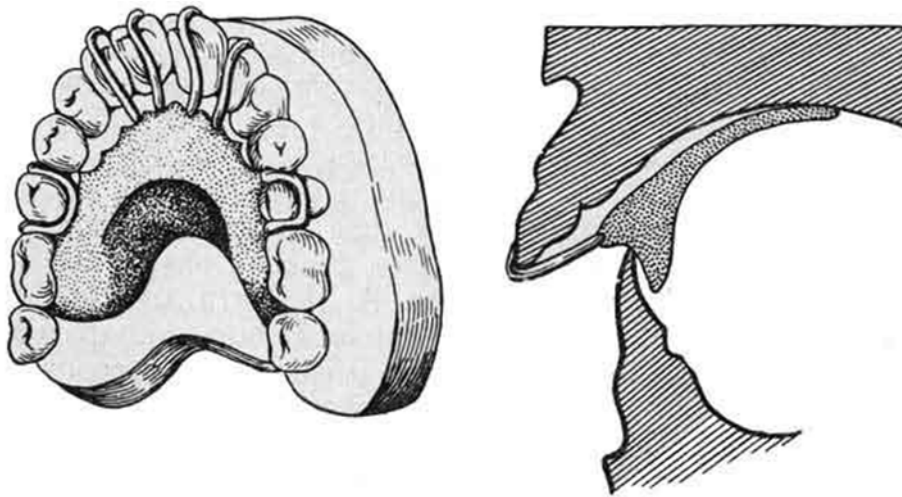


Schwarz' plate on the upper jaw with an inclined plane for the treatment of posterior occlusion. Schwarz' plates on the upper jaw with a biting platform in the region of frontal teeth for deep overbite elimination or occlusive side plates in the region of lateral teeth for open bite treatment.



Schwarz' plate

Biting Katz' platform, used for the treatment of prognathism and deep overbite. The peculiarity of its construction is throw-over hooks, which lean over the cutting edges of frontal teeth onto their labial surface, and an inclined plane. The platform does not border on the mucous tunic of the frontal part of the palate and necks of teeth. At biting the frontal part of jaws rebuilds. In their lateral parts vertical growth takes place due to occlusion disconnection. Besides, at the moment of closure the lower frontal teeth slide on the inclined plane and the lower jaw dislocates forward.



Biting Katz' platform

Appliances of Mechanical Action

The force of these devices' action lies in the very construction of the device and does not depend on the contractile ability of the masticatory muscles. The active part of the device is the source of force: arch and spring springiness, elasticity of rubber recoil and ligatures, the force developed by the screw, omega, levers, etc. The intensity of appliances' action is regulated arbitrarily by the doctor, who uses their active part. The used force of pressure or recoil should be individual. To avoid complications it is expedient to use small forces of action, which approach natural forces, and activate appliances under the control of designing devices, providing the period of rest.

Removable Appliances of Mechanical Action

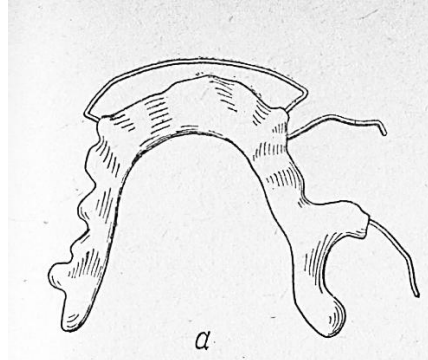
Determination to eliminate at least partially the described above drawbacks of fixed appliances promoted the development, approbation, and implementation of removable mechanically acting orthodontic appliances. This was enabled by the invention of methacrylate – the basic component of modern plastics.

Construction of the plastic basis of removable appliances is conducted by the method of hot polymerization; the method of cold polymerization of self-hardening plastic; the method of plastic casting; the method of stamping acrylic plastic after its warming-up, the so-called pneumo-vacuum formation.

These devices include plate appliances in combination with screws, springs, vestibular arches. The first removable plate appliances for the treatment of occlusion anomalies were offered after the discovery of caoutchouc vulcanization (1839). In the 1960s Kingsley constructed a plate with a dilating screw. Nord improved it, having offered a screw of his construction. Further improvement of Nord's idea belongs to Schwarz.

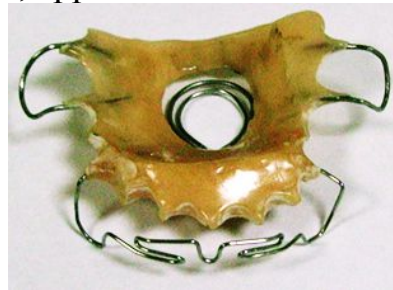
V.S. Kurylenko's appliance for teeth transfer in the mesio-distal direction. It is a removable plate, into which movable and immovable levers of orthodontic wire (0.6 mm in diameter) are welded. The movable lever, being adjacent to the approximal surface near the very neck of the transferred tooth, provides its transfer without rotation around the vertical or horizontal axis. The active lever easily revolves in the basis and may be used for the transfer of 2 and even 3 teeth,

especially if it is needed to transfer them in one direction. Retracting arch, inclined plane, and other elements of removable orthodontic appliances may be built into the plate, which shortens the term of anomalies treatment.

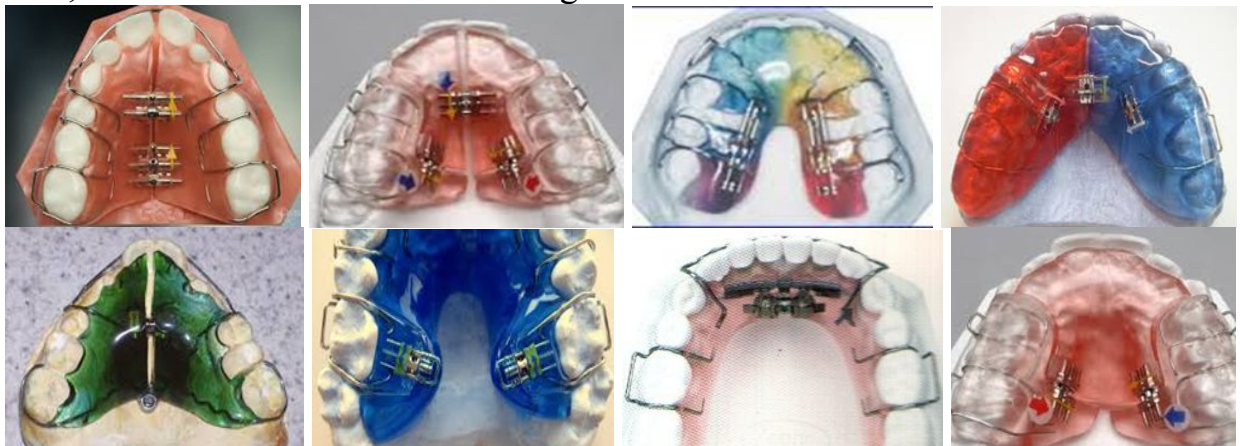


Kurylenko's appliance for teeth transfer

Removable appliances of mechanical action include S.I. Doroshenko's appliance, Robert's appliance, appliances for distal teeth transfer.



Nowadays there are used removable appliances with different location of screws (of definite size, dimensions, and in certain quantity) in accordance with the area, which should be dilated or brought out in the vestibular direction.

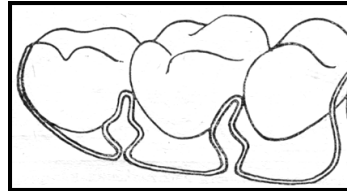


Different location of screws

All the appliances with mechanical action require proper fixation. To attach endurance to plate appliances various clasps are used: ordinary retentive, Jackson's throw-over, Schwarz' arrow-like, Adams' clasps. Wire of different thickness and elasticity is used to make these clasps. Retentive, arrow-like, and Jackson's clasps are made of stiff wire 0.7-1.1 mm thick (arrow-like clasps are bent with the help of special forceps), Adams' clasps – of stiff or stiff-elastic wire 0.6-0.7 mm in diameter.



Jackson's



Schwarz'



Adams'

In orthodontics, in order to dilate dental arches and transfer individual teeth removable appliances with springs and vestibular arches are widely used, and Coffin's dilating plate is considered their predecessor. These appliances act by means of unbending or pressing corresponding loops. Springs location, the form of their bend and of vestibular arch depend on clinical presentation. To make vestibular arches stiff wire 0.7-0.8 mm in diameter is usually used, for flexible processes – 0.5-0.6 mm, for Coffin's spring – 1.0-1.5 mm.

Removable appliances act in discontinuous manner, as children use them during a couple of hours in the course of a day. At that, the factor of injuring a child is excluded in the period of treatment and stay in a collective, because children can use removable appliances at home only. Characterizing the described above removable appliances it should be mentioned that they act with less force, with breaks (they can be taken off), they are more hygienic. Removable orthodontic appliances, during a short period of time creating enhanced functional load on a certain area, stimulate bony tissue rebuilding: irritation is transferred not only to the teeth but also to the bony tissue of the jaw.

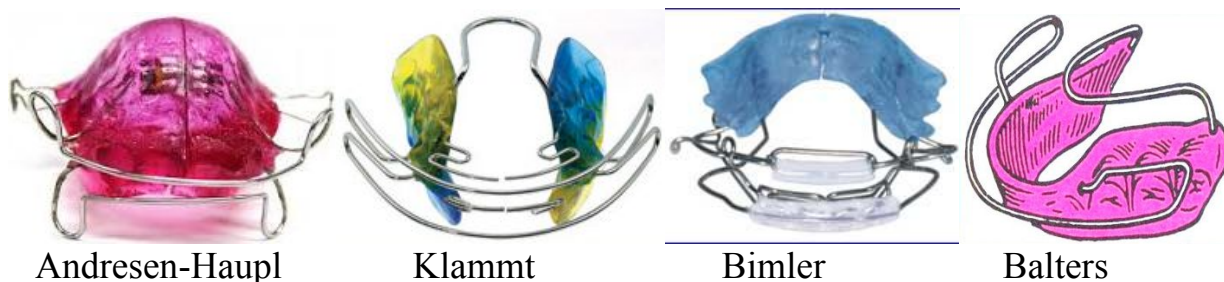
The slower the appliance acts, the more harmonious the processes of resorption and apposition of bony tissue around the transferred teeth are. The fact that the orthodontic appliance, with which the treatment was conducted, may be also used as a retentive one, is very important. These appliances are administered at treating dento-gnathic anomalies at any age with their individual construction in every case. But sometimes, despite all their positive qualities, removable appliances appear to be insufficiently effective. This is explained by the fact that children break doctor's instructions about the way and duration of using the appliances. Irregular wearing of them, big breaks in application may lead to the wrong idea of their seemingly ineffective action. This implies that the decisive role in using removable appliances is played by children's discipline and parents' careful control of children.

Appliances of Combined Action

These appliances are used at combined pathology in most cases and comprise about 75 % of all removable appliances.

Functional appliances may be supplemented by separate active elements – screws and springs, used at the necessity to accelerate individual teeth transfer.

An important milestone in the development of orthodontics were the treatment method by Andresen and Haupl (1953) and their appliance named "activator", which promoted the recovery of the functions of mouth closure, breathing, mastication, and partially swallowing, activated the masticatory muscles and stimulated TMJ growth.



Soon there appeared Klammt's open activator, Bimler's occlusion shaper, Balters' bionator and their modifications. Andresen-Haupl's appliance was also modified for a couple of times, by Macary and Resting, Kurz, P.S. Flis, G.P. Leonenko.

These appliances consist of two plates – upper and lower, joined with basis material or wires. They may be supplemented by a vestibular arch, a spring, and a screw. In the plates, adjacent to the internal surface of alveolar processes, there is a bed for palatine and lingual surfaces of upper and lower teeth, into which teeth are placed at jaws closure. Their correlation is created with the help of wax rolls before making the appliance (usually it is recommended to set the lower jaw almost in direct ratio to the upper one). In the process of treatment the dental bed is sawed out according to the direction of teeth transfer. Depending on the clinical presentation and the aim of treatment dental arches of both jaws may be disconnected (growth takes place in the vertical direction) or their masticatory surfaces touch the biting platform. The action of such appliances is based on the contraction of the masticatory and expression muscles and the force of mechanical elements action. At jaws closure teeth undergo certain load, which stimulates tissue rebuilding.

Activators have been mainly used at night. Presently it is recommended to use them also during the day (as long as possible), as muscles activity is more evident at daytime and after food intake than at night.

Lately, the so-called elastic open Klammt's activator has won recognition. It almost completely consists of vestibular arches and springs, except for thin palatine plastic plates (1.2 mm thick), which begin from the canine teeth and end by the last molar. These plates might have directing surfaces or not. If it is necessary, it is possible to introduce supplementary wire elements, bandages, or modify the vestibular arches. Appliance's activity becomes apparent at tongue and lower jaw movements. The author recommends using the appliance in infancy, during the whole day and night.

Activators' drawbacks include their slow action, which almost excludes the possibility of using activators in young people and adults. Besides, at full-blown anomalies the desired effect is not always achieved, which makes it necessary to combine activators with other orthodontic appliances.

The idea of creating new constructions of activators was to try to lighten the construction's weight, reinforce its constructional inflexibility against the deforming action of mastication forces, increase the time of using the appliance (especially during the daytime), enable the patient to talk having the appliance in the mouth, etc.

Khurgina's appliance is the combination of Katz' biting platform and a dilating screw. It is used at treating prognathism and deep overbite at the presence of upper dental arch narrowing.



Khurgina's appliance

Guliyeva's appliance is a combination of Angle's sliding arch and an inclined plane. Crowns with horizontal tubes are put onto the 1st permanent molars, a steel arch is inserted into the tubes; in the region of canine teeth hooks are soldered to the arch. Rubber rings, which contribute to the arch's action, are fastened between the hooks and distal ends of the tubes. In the region of frontal teeth metal processes are soldered to the arch, and an inclined plane is soldered to the processes. This appliance is used for the treatment of posterior occlusion.

Bruckl's appliance consists of a removable plate for the lower jaw in the anterior region, a vestibular arch, and clasps. During dental arches closure the upper frontal teeth touch the inclined plane with their palatine surfaces and diverge in the vestibular direction; and as a result of vestibular arch activation the lower frontal teeth bend orally (the inclined plane from the lingual side and near the cutting edge should not be adjacent to them). Dental arches are disconnected in lateral areas. This appliance is recommended at any age at palatine inclination of the upper frontal teeth and forced progenia, if fusiform vestibular declination of the lower frontal teeth is observed, accompanied by diaereses and diastema, deep frontal overbite.



Bruckl's appliance

Balters' bionator. There are three types of the appliance:

- 1) for the elimination of dental arches constriction, protrusion of frontal teeth and deep overbite;
- 2) for the elimination of open bite;
- 3) for the elimination of mesial occlusion.

Bionators are made on models, plastered in constructive occlusion in the occluder or articulator. Their basic details are:

- lateral plastic shields, covering the lingual or palatine surfaces of the lateral teeth of both jaws to the distal surfaces of the 1st permanent molars, which join in the anterior part of the lower jaw from the buccal side for the increase of appliance's support;
- palatine clasp, bent backwards in the first two types of appliances for speech orientation; in the third type the palatine clasp is bent forward. Occlusive side plates for the upper milk molars, premolars, which go from oral lateral plastic shields, serve as supports in the bionators of the 1st-2nd type. In the bionator of the 3rd type occlusive side plates are made for the lower milk molars;
- vestibular dental arches with loops or arched bends-processes in the lateral parts of dental arches, distant from the teeth by 2 mm, are intended for cheeks alienation. Arches' ends are introduced into plastic shields between the canine teeth and the 1st milk molars or the 1st premolars.

At posterior occlusion elimination the vestibular arch is bent onto the upper frontal teeth, at mesial occlusion elimination – onto the lower ones. In the bionator of the 2nd type a plastic shield is made in the anterior part, it separates the tongue apex from dental arches at the pernicious habit, prevents laying the tongue between teeth and the pressure onto the frontal teeth. Plastic shields for cheeks or lips abduction or a removable shield in the form of a vestibular plane are connected to the bionator, which prevents cheeks and lips retraction between dental arches, promotes correct lips closure, normalizes tongue and teeth position in the lower jaw.

Elastic Bimler's shaper is an appliance of wireframe construction with elastic wire joining details, which are the acting force at lower jaw movements. There are three main groups of occlusion shapers: A, B, and C.

Group A – seven kinds for dento-gnathic anomalies elimination at neutral or distal dental arches correlation, combined with diaereses presence, dental arches constriction, frontal teeth congestion, their torsion, deep or open bite. The kinds of occlusion shapers of this group differ from one another by the presence of additional arches, screws, springs, which correct the position of upper incisors, canine teeth, and premolars.

Group B – five kinds of occlusion shaper for dento-gnathic anomalies elimination at neutral or distal dentitions correlation, combined with upper teeth retrusion and deep overbite. They differ from one another by the action of the orthognathic screw (dilation, narrowing), and by the presence, form, and location of springs.

Group C – six kinds of occlusion shapers for the treatment of dento-gnathic anomalies at neutral or medial dental arches correlation, combined with reverse over- bite, and elimination of mesial occlusion combined with the cross one. These kinds differ from one another mainly by the location and form of springs.

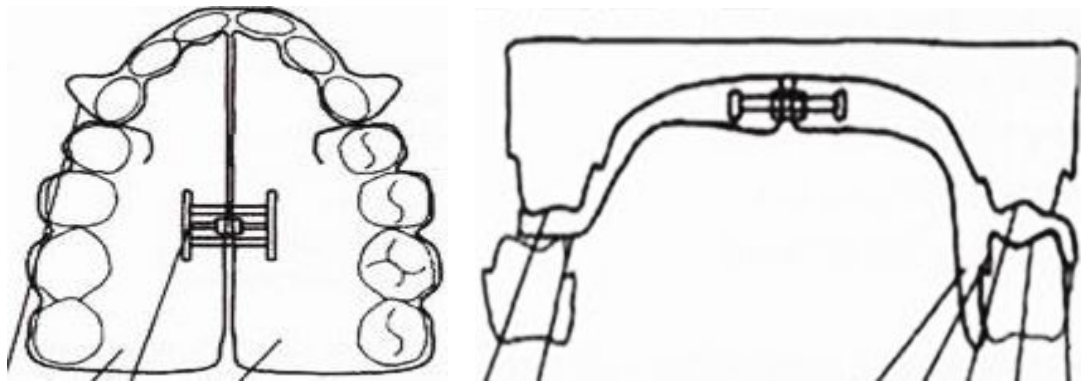
Appliances of combined action may include Khurgina's appliance, Robert's device – type 2, Dankov's appliance and others.



Dankov's appliance

At lower jaw underdevelopment accompanied by compression in lateral parts N.V. Rashchenko with co-authors worked out and offered appliances, which provide purposeful influence both on individual teeth and on the alveolar processes during teeth eruption and their roots formation. The essence of the appliances construction consists in the following: a dental-gingival splint of Weber's type is made and divided into 3 fragments – one frontal and two lateral, joined with one another with the help of spirals and fi-loops. Q-loops are bent using orthodontic wire 0.8 mm in diameter, located vertically from the oral side, closer to the lingual surface of the lower incisors and parallel to their long axis. Spirals are made of wire 0.6 mm in diameter (winding it onto a rod 1-1.5 mm in diameter) and welded from the vestibular side between fragments. Rubber rings or an expansive arch are the active elements of the offered appliances. The rubber rings are put onto hooks, which are welded on the vestibular surface of the frontal and lateral fragments. On the lateral fragments the hooks are welded distally open, on the frontal – medially. The frontal fragment, in contrast to the lateral ones, is made in the form of a vestibular shield. To use the Angle's arch cannula are welded into the lateral fragments, Q-loops may be not used at that. Activated arches are made by common technique. To incline the crown parts of masticatory teeth in the vestibular direction Adams' clasps are welded from the oral side. If a "block" is present, occlusion disconnection is performed with the help of occlusive side plates on one or both sides. If pressure should be excluded from one tooth, plastic is cut out in the region of the tooth. Different variants of appliance construction for lower jaw dilation can be seen in the.

For the distal transfer of individual teeth or a group of teeth S.I. Tril's appliance has been worked out and introduced into practice. The device works in the following way. Occlusive side plates are set into the oral cavity on teeth and fastened with clasps. With the help of the sector-like located screw the effort of the distal transfer of a dental arch part is created. The dental arch and opposing teeth serve a support at the transfer of the part. The arch directs the vestibularly located tooth into the dental arch to the place of the transferred dental arch part. Smooth surface of the occlusive side plate does not create obstacles to the distal transfer of teeth.



Tril's appliance

To treat unilateral cross bite S.I. Tril's appliance has been worked out. The device consists of the basis part, which is set on the unaffected dental arch part, and the part, set on its deformed part. The basis parts and are joined with an orthodontic screw and a vestibular arch. The part has imprints of the occlusal surface of the unaffected dental arch part and opposing teeth. Prolonged oral bandage rests on the lingual surface of the teeth of the opposite jaw and embraces their vestibular surface. The part of the basis, set onto the deformed dental arch part, has an imprint of the occlusal surface of this part and smooth occlusal surface, directed to the opposing teeth.

The device operates in the following way. Orthodontic appliance parts and are set in the oral cavity and fastened with the help of occlusal side plates and Adams' clasps built into them. The device is activated with the help of the orthodontic screw. The unaffected part of the dental arch, teeth-antagonists, elongated oral bandage, which leans against the lingual surface of the teeth of the opposite jaw serve as support at transfer. Wrapping teeth-antagonists from the vestibular side prevents their rotation under the influence of efforts needed for the transfer of the deformed jaw part.

Materials for self-control:

A. Tasks for self-control (tables, diagrams, drawings, graphs):

1. To draw the removable orthodontic appliances.

B. Tasks for self-control:

1. The elements of the mechanical actions do not include:
 inclined planes
 expanding screws
 expanding springs
 vestibular arcs
 hand-shaped pushers

2. The uniform narrowing of the dental arch are used screw the next design:
 bilateral (universal)
 U-shaped
 trapezoidal
 V-shaped
 three-dimensional

3. For shortening and narrowing of the upper dental arch treatment is used the next design of screws:

- three-dimensional
- V-shaped
- trapezoidal
- two-dimensional
- U-shaped

4. Vestibular arc is also called:

- retractional
- distalising
- mesialasing
- protracting
- positional

5. Location of vestibular arc on the surface of the tooth depends on:

- angle of the tooth vestibular inclination
- group of teeth
- direction of the teeth moving
- the number of floating teeth
- the availability of space in the dental arch

6. Hand-shaped spring with a loop used for:

- mesio-distal movement of the teeth
- vestibular displacement of the teeth
- oral movement of teeth
- extensions of the dentition
- lingual movement of the teeth

7. To expanding springs include:

- english pin-shaped
- fingerlike
- S-shaped
- oval
- hand-shaped

8. In the manufacture of laminar apparatus to the upper jaw, it is expedient to the following location of clasp lines:

- diagonally
- longitudinally
- transversal
- sagittal
- vertically

9. In the manufacture of laminar apparatus on the lower jaw in appropriate to the following location of clasp lines:

- transversaly
- longitudinally
- diagonally
- sagittal
- vertically

10. Fixation by M. A. Napadov used under the following conditions:

- low teeth crowns
- high teeth crowns
- well expressed equator
- when combining the malocclusion with a defect of dentition
- when a distal occlusion

11. To expansion of the lower dental arch, use the following screw:

- bilateral (universal)
- three-dimensional
- fan-shaped
- U-like
- triple

12. As a pusher it is possible to use the following design of the screw:

- U-like
- three-dimensional
- fan-shaped
- universal
- three-chamber

13. To eliminate the protrusion of the frontal teeth is used:

- vestibular arc
- palatal arch
- spring by Coffin
- protactive spring
- spring by Kalvelis

14. To eliminate retrusion of frontal teeth used:

- protactive spring
- english pin-shaped spring
- palatal arch
- vestibular arc
- lateral arc

15. For mesio-distal movement of teeth is used:

hand-shaped springs

oval spring

the pushers

vestibular arc

stoppers

16. To eliminate vestibular inclination of the lateral incisors is used:

vestibular arc with a pressing loops

vestibular arc with two semicircular curves

vestibular arch with M-shaped curves

vestibular arc by Doroshenko

vestibular arch with X-shaped bends

17. To correction of canines vestibular position used:

vestibular arch with M-shaped curves

vestibular arc by Doroshenko

vestibular arc with two semicircular curves

multi-unit vestibular arc

triangular vestibular arc

18. To correction the palatal inclination of one of the upper incisors used:

protactive spring

spring by Coffin

hand-shaped spring

vestibular arc with a pressure loop

arch with M-shaped curves

19. The mechanism of occlusal biting plane is:

correction of dentoalveolar height

the repositioning of the lower jaw relative to the upper

vestibular displacement of the teeth

stimulation of the jaw growth

lingual teeth movement

20. The springs for the teeth mesio-distal movement include:

hand-shaped spring

spring by Coffin

spring by Kalvelis

S-shaped spring

spring by Kaller

21. An inclined biting plane is simulated at a 45°angle in the case of:

oral inclination of the frontal teeth

correct inclination of the frontal teeth
vestibular inclination of the frontal teeth
in the presence of diastemata and three in the frontal portion
the presence of malocclusion in the frontal portion

22. The appliances of mechanical action include:
the appliance on the lower jaw with vestibular arch and a screw
the activator by Andersen-Goyple
the appliance on the lower jaw with occlusal overlays
the appliance by Brukl-Reichenbach
the regulator functions by Frenkel

23. Vestibular arch with two semicircular bends is activated:
once in two weeks
once a month
once in two months
every day
every 3 days

24. Each activation of the orthodontic screw is:
one turn
a half-turn
two turns
a quarter turn
three turns

25. S-shaped spring is activated by:
stretching
relocation
unwinding
compression
cutting

26. Vestibular arch with M-shaped curves are used for:
palatal inclination of canines, which were erupted of a dental arch
lateral displacement of the incisors
mesial movement of canines
distal movement of the canines
lingual canines' movement

27. Z-spring is used for:
oral inclined anterior teeth treatment
mesio-distal movement of the teeth
vestibular inclined of the teeth

expansion of the upper dentition
extension of the lower dentition

28. For the expansion of the upper dentition is used:

spring by Coffin
spring by Doroshenko
spring with a curl
spring by Collier
spring by Betelman

29. Spring by Collier applied for:

expansion of the lower dentition
expansion of the upper dentition
mesio-distal movement of teeth
vestibular-oral movement
oral inclination of the anterior teeth

30. For uniform expansion of the upper dentition is used:

two springs by Coffin, open in opposite directions
english pin-shaped spring open forward
spring by Coffin, opened forward
spring by Coffin, opened distally
springs by Betelman, opened in opposite directions

31. To distal movement of one or two molars are used:

skeletal screw II-like pin
Z-spring
spring with a curl
palatal arch
english pin-shaped spring, opened forward

32. Screw by Wize refers to the next group of screws:

entramaxillary action
changing of the dental arches transversally dimensions
changing the sagittal dimensions of dental arches
changing the location of the groups of teeth
changing the location of the individual teeth

33. Oral arc is used for:

fixation and vestibular displacement of the anterior teeth
fixation and oral inclination of the anterior teeth
fixation and medial displacement of the teeth
fixation of distal movement of the teeth
mesio-distal movement of the lateral teeth

34. Vestibular arc with a pressure loops is used:

abnormal inclination of one of the frontal teeth

anomalous position of all anterior teeth

abnormal location of one of the molars

protrusion of the frontal teeth

mesioclusion all of the frontal teeth

35. Frontal biting plane is designed for:

increasing of the pressure on the teeth and alveolar process in the anterior part and separation of occlusion in lateral areas

increasing of the pressure on the teeth and alveolar process in the lateral portions and separation of occlusion in the frontal part

stimulating of the jaws apical bases development in transversal direction

delaying of the jaws apical bases development in transversal direction

increasing of the pressure on the teeth and alveolar process in the lateral portions and without separation of occlusion in the frontal portion

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