

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

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protocol № 1
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METHODICAL RECOMMENDATION
for independent work of students during the preparation
to practical lessons and the lessons

Academic discipline	Orthodontics
Module №1	Orthodontia. Diagnostic of dentognathic anomalies and deformations
The theme of the lesson №27	Surgical methods of orthodontic patients' treatment. Surgical methods used in the treatment of orthodontic patients: 1) intervention within the soft tissues of the oral cavity, 2) within the dentition, and 3) within the alveolar process, and 4) within the basal parts of the jaws and other parts of the skull.
Course	III
Faculty	Preparation of foreign students

Poltava 2016

1. The relevance of the topic:

Surgical orthodontics refers to the various surgical procedures carried out as a part of overall orthodontic treatment plan. Used as an adjunct or in conjugation with orthodontic treatment. Can be carried out before, during or after completion of orthodontic treatment. Surgical procedures are usually carried out: to eliminate the existing etiologic factor; as a part of treatment plan; facilitate correction of malocclusion by orthodontic techniques; stabilize orthodontic treatment results & prevent relapse; to correct severe skeletal discrepancies

2. Specific objectives:

Have an understanding of modern methods of surgical treatment of orthodontic patients.

To study the nature of surgical techniques used in the treatment of orthodontic pathology.

Having a clear idea of the indications for surgical treatment.

3. A basic level of training

Name of previous disciplines	Skills
1. Histology	Histological structure of the tissues of temporary and permanent teeth.
2. Anatomy	Structure of the facial and jaw bones, TMJ, teeth. The structure of the periodontal tissues. To determine the deviation from the normal structure of the facial bones, TMJ, the teeth in children of different ages.
3. Prevention of dental diseases	Time, order, sequence of eruption of temporary and permanent teeth.

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. Orthognathic surgery	Corrects dento-facial disproportions involving the maxilla, the mandible or both in all three planes of space. If neither growth modification procedures nor orthodontic camouflage provides solution
2. Single-Stage Tooth Torsion	Simultaneous rotation of a tooth along the axis
3. Serial extraction Hotz' method	Extraction of serial individual teeth or their groups includes the following measures: 1) temporary canine extraction 2) the 1st temporary molars extraction at the approaching of the 1st premolars germs to the surface of the alveolar process, which

	accelerates their coming out; 3) extraction of the 1st premolars, which have come out prematurely, promotes the change in the location of the permanent canine teeth germs and their correct establishment in the dental arch.
4. Gingivoplasty	Gum tissue correction. Improving the appearance of the gum tissue around the teeth.
Gingivectomy	Removing excess gum tissue

4.2. Theoretical questions to the lesson:

1. What are surgical methods used for in orthodontics and how are they classified?
2. How many types of the tongue frenulum does F.Y. Khoroshilkina differentiate?
3. What underlies compact osteotomy?
4. What are the types of compact osteotomy?
5. What is the essence of linear compact osteotomy?
6. Checkerboarded compact osteotomy, its characteristic features.
7. Tunnel compact osteotomy, its characteristic features.
8. What are osteotomy and osteoectomy?
9. What is the essence of Hotz' method?

4.3. Practical works (task) which are executed at the lesson

- 1 the depth of vestibule of oral cavity on the model and evaluate indications for surgical manipulation.
2. Determine the type of diastem on the model and evaluate indications for surgical manipulation.
3. Measure the teeth sizes, degree of crowding and evaluate indications for surgical manipulation.

Content of materials for learning.

Surgical treatment methods may be used both independently and in combination with an instrument method for the treatment of dentognathic pathology. The main factor, accelerating bony tissue rearrangement, is the intensity of enzymatic processes that develop after bone affection.

At sharply evident deformations or anomalies of dental arches and jaws development, and occlusion violation it is not always possible to cure the patient by means of orthodontic methods alone. In such cases a surgical method may be an additional or leading one, which allows achieving persistent results.

Surgical techniques, used during the treatment of dentognathic anomalies, can be divided into the following groups:

- *on soft tissues* – plastic surgery of the shortened frenulum of tongue; transfer of the place of lip frenulum attachment (of the upper or lower lip); plastic surgery in the region of mucous tunic bands; deepening of the mouth vestibule; evening of the supramental skin fold;
- *on teeth and dental arches* – retained tooth crown exposure; fused teeth

separation; single-stage tooth torsion; tooth replantation or transplantation; extraction of supplemental and individual teeth;

- *on alveolar processes* – compact osteotomy (the most widespread are line tunnel, and cancellous);

- *on jaws* – osteotomy and osteoectomy.

Oral Surgery and Orthodontics

1-Orthodontic Exposure of Impacted Teeth for Orthodontics

2-Gummy Smile

3-Operculectomy /Excision of pericoronal gingiva

4-Maxillary Frenectomy

5-Soft Tissue Grafting

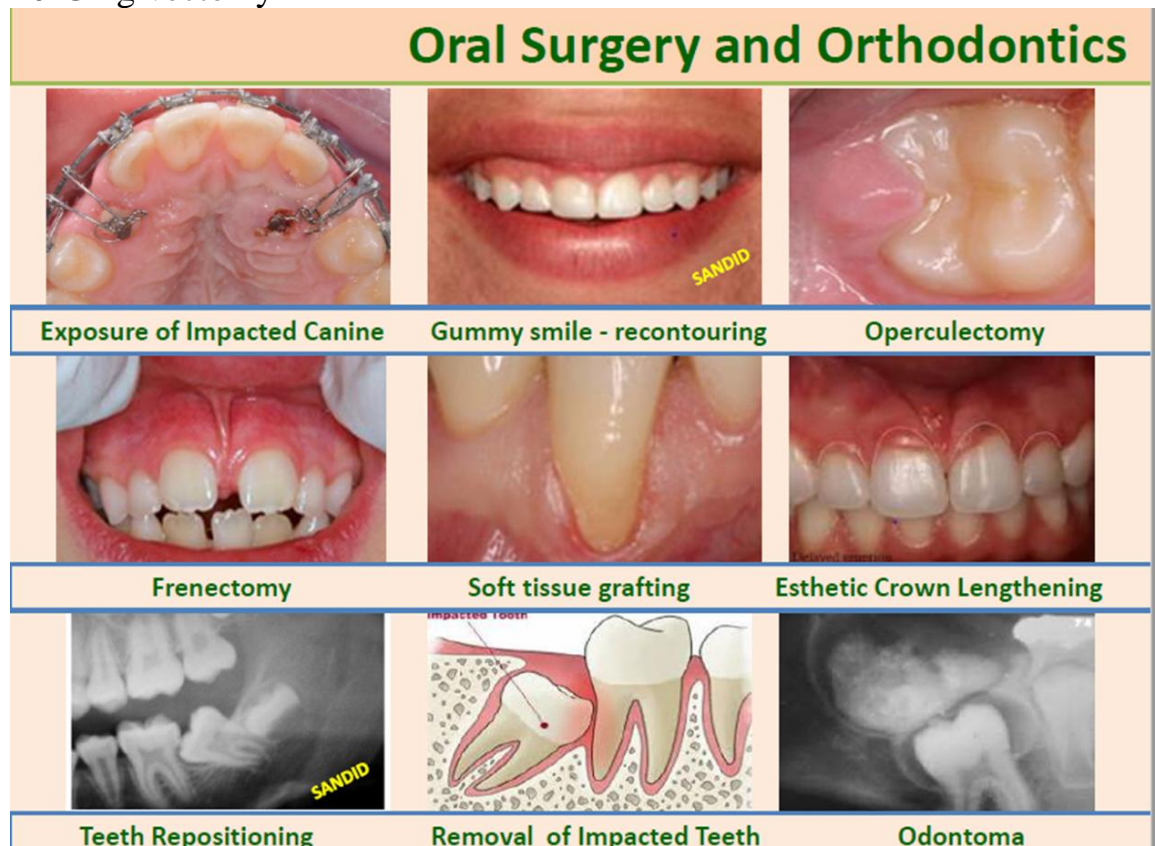
6-Esthetic Crown Lengthening

7-Odontoma-associated with tooth impaction

8-Repositioning -impacted lower second molar

9-Tooth impaction-Extraction

10-Gingivectomy



Tongue Frenulum Plastic Surgery

Restriction of tongue movement caused by the shortening of the frenulum or its movement close to the tongue apex is not infrequently the reason for occlusion anomalies. Tongue movement restriction hampers sucking movements in infants.

Mothers note that during sucking such children champ with their tongues, get tired quickly do not suck out enough milk, are restless. This makes some mothers resort artificial feeding. Insufficient tongue mobility may violate the process of swallows and sounds pronunciation. Under the influence of the

mechanical obstacle shortened tongue frenulum – atypical tongue movements arise during speech.

By the form and thickness, and also the peculiarities of their fibers attachment to the tongue muscles there are differentiated five frenula types, which limit tongue mobility (F.Y. Khoroshilkina, 1965).

The first type includes thin, almost transparent frenula, normally attached to the tongue but limiting its mobility because of insignificant extension.

The second type — also thin, semitransparent frenula, but attached close to the tongue apex, with inconsiderable extension. When the tongue apex is raised, a sulcus is formed in its centre.

The frenula of *the third type* are thick, short bands, attached close to the tongue apex. When the tongue is protruded, its apex is turned up and its back is bent because of frenulum tension. The lick of the upper lip is complicated, and sometimes impossible. Palpation of such a frenulum shows tongue mobility limitation, caused by its apex fixation with connective tissue band. Under the band, which has the shape of a cord, thin duplication of the mucous tunic is located.

The fourth type frenula are characterized by the fact that their band rises above, but is coalesced with the tongue muscles. Such frenula are often observed in children with congenital pathology of the lip and palate.

The band of *the fifth type* frenula is hardly noticeable; its fibers intertwine with the tongue muscles and limit its mobility.

At the shortened tongue frenulum there arise different variants of the child's adaptation to this anomaly, characterized by certain types of tongue movements, its laying between the dental arches during functioning and in quiescence. These adaptation variants cause typical occlusion anomalies formation. When the frenulum is normal, in freeway space the apex of tongue is adjacent to the palatal surface of the upper frontal teeth. When the frenulum is shortened, the tongue is raised insufficiently, and thus does not press the upper dental arch enough, does not resist the pressure of the lips and cheeks muscles. Under the influence of the lip the incisors may incline in the palatine direction; at that mesial occlusion develops at the expense of upper dental arch frontal part flattening.

Slow-moving tongue pressure is transferred onto the frontal part of the lower jaw and promotes its increase. At the limited mobility of the tongue apex its root muscles hypertrophied, which may hamper the passage of air flow through the nasopharyngeal space. Open bite at the shortened tongue frenulum may be both in the frontal lateral parts of the dental arches. In the frontal part it arises as a result of tongue apex location between the teeth because of the impossibility to lift it to the palatine surface of the upper incisors. In the lateral parts open bite develops because of constant spreading of the tongue between the lateral teeth, which hampers their closure. Occlusion anomalies, formed as a result of tongue dysfunction, are characterized by significant constancy. Even long-term usage of a retentional device after occlusion anomaly elimination does not always provide persistent results of orthodontic treatment. After the retentional device is taken off, recurrent anomaly can arise under the influence of the usual irregular function of

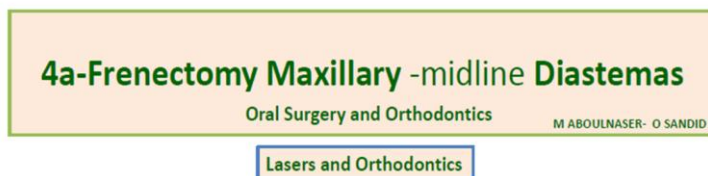
the tongue.

In a week after the surgery gymnastic exercises for the muscles elevating the apex of tongue are to be recommended. One of such exercises is suction of the tongue apex to the palate, and then quick opening of the mouth and tongue clicking. The patient is told to count the upper teeth with the tongue apex, reach the upper and lower lips, nose apex with the tongue. As a result of training and exercises with a logopedist children learn to raise the tongue.

Early plastic surgery of the tongue frenulum prevents violation of the functions of suction, mastication, swallowing, sounds pronunciation, and also formation of dentognathic anomalies. Orthodontic treatment of such children is combined with therapeutic exercises. Tongue muscles function normalization promotes constancy of orthodontic treatment results. Frenulum plastic surgery at older age and in adults improves the tongue function, promotes tongue position normalization.

Lip Frenulum Plastic

Low attachment of the upper lip frenulum is considered one of the reasons for diastemas on the upper jaw. But practice shows that despite this anatomic



peculiarity being wide-spread it does not always combine with diastem. In this connection the meaning of the low attachment of the upper lip frenulum as the main etiological agent of diastema is not completely confirmed and, thus, indications to its surgical transfer in the period of temporary occlusion are to be limited. To specify these indications the roentgenologic investigation of

the alveolar process is recommended in the region of central incisors roots.

If in the roentgenogram in the anterior part of the median palatine suture between the roots of the upper central incisors a thin line is detected, which testifies to the absence of bony tissue, it is the sign of upper lip frenulum fibers interweaving into the median palatine suture, which causes diastema. In such cases the upper lip frenulum should be transferred. For this simple surgical intervention transversal dissection of the frenulum is not enough; its fibers, which interweave into the median palatine suture, are to be excised, otherwise surgery results will be unsatisfactory.

Indications to lower lip frenulum transfer are chronic localized gingivitis and parodontosis. Lip frenulum attachment close to the apex of interdental papilla, especially on the lower jaw, at a shallow transitional fold of the mucous tunic may promote the development of periodontium diseases. Because of soft tissue tension during lips functioning the taking-up of the gingival margin from the incisors

necks takes place. A dentogingival recess forms, the circular ligament of tooth is destroyed, dental calculus deposit appears, and the alveolar septum apex is destroyed. Parodontopathies development in this region is also promoted by additional bands of the lip frenulum, which usually have the oblique direction. In such cases additional bands ablation is recommended with the purpose of deepening the transitional fold of the mucous tunic. Of course, abnormalities progress with age, especially at jaw size anomalies (mandibular macrognathia, reduced mandibular angles), dense location of the lower frontal teeth, poor oral hygiene, chronic diseases, endocrinopathies, etc.

Vestibule Plastic Surgery

R.Y. Pakalns considers low the transitional fold, at which the distance from it to the middle of the gingival margin of the lower central incisors at the horizontal location of the lower lip makes at least 5 mm, average – from 5 to 10 mm, the biggest – more than 10 mm.

Mucous tunic bands are considered most evident when they attach to the interdental gingival papillae and at the tension of lips or cheeks transfer them.

If the mouth vestibule is shallow and the dentogingival bands are overdeveloped, a couple of lengthwise incisions are made on the bands apexes. The band fibers are split in the place of its joining the jaw periosteum. Then it is checked whether lower lip mobility has improved, if the mouth vestibule has deepened. After that a removable forming orthodontic appliance is fixed. Tampons with iodoform are left in the formed mouth vestibule, a pressure bandage is applied. On the 3rd-4th day an orthodontic appliance is applied, on the 4th-5th day the treatment is supplemented with electrophoresis to avoid fibratization. Further observation is conducted by the parodontologist and orthodontist, the latter adjusting the forming appliance.

The shallow vestibule of mouth is a local traumatic agent for the gingival margin, which promotes appearance of periodontium diseases on a localized area or considerably *increases their* development.

The vestibule depth is measured in the area of the lip frenulum and the frontal group of teeth, taking into account the size of the least distance from the gingival margin to the beginning of the transitional fold – the edge of the moving part of the mucous tunic.

Vestibule plastic surgery aims at the elimination of the traumatic agent for the periodontal tissues, not by means of lengthening the mucous tunic in the region of the shallow vestibule, but by means of moving the transitional fold, increasing the area of the joined to the gums periosteum by the group of teeth or on the localized area.

The signs, indicating the necessity of deepening the vestibule, are subdivided into general clinical and special; general clinical signs begin with the symptom of tension, hyperemia of the mucous tunic within the transitional fold, continue with teeth roots exposure, which is confirmed by roentgenologically considerable resorption of the bony tissue of the alveolar process within the injure.

Mouth vestibule deepening on a localized or extensive area is conducted in

two cases:

1 - at a traumatic agent of the gingival margin or at a traumatic agent of the developed pathology of the periodontium;

2 - in patients before implant introduction on the similar area or with the purpose of increasing the prosthetic bed on the edentulous jaw before prosthetics for better fixation of the removable denture.

The effect of the deepened mouth vestibule is maintained at the expense of cicatrice junctions, which form in early postoperative terms; in the region of the formed vestibule a protective forming plate is made – postoperative resistance.

Gingivotomy

Gingivoplasty - Gingivectomy

Sometimes the teeth look too small because they are surrounded by too much gum tissue. A gingivoplasty or gingivectomy treatment can offer a solution. If this is the case the cosmetic dentist will increase the surface of your teeth by correcting the gum tissue.

- Gingivoplasty = gum tissue correction = improving the appearance of the gum tissue around the teeth.

- Gingivectomy = removing excess gum tissue.

2a-Gummy Smile

Oral Surgery and Orthodontics

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Gingival Sculpting - Reshaping Gum Tissue



Before

Laser Recontouring

After

Levelling of the Supramental Skin Sulcus

After the orthodontic treatment of sharply evident posterior occlusion in

teenagers is finished, despite obtaining regular interocclusal contacts between the dental arches, a deep supramental sulcus is sometimes preserved. In such patients at electromyographic investigation in the state of quiescence the increase of biopotentials, abducted from the chin muscles and lower lip muscles, is observed. This indicates not eliminated functional violations.

To normalize the shape of the lower part of face, lower lip lengthening, to improve its closure with the upper one a plastic surgery should be conducted in the anterior region of the alveolar process of the lower jaw from the side of the mouth vestibule. It consists in levelling the deepening on the alveolar process of the lower jaw by means of subperiosteal introduction of a bone, cartilaginous, or plastic implant. To shape the implant and select its form and size a mask is taken off the face, and after casting it in plaster the implant is shaped on it. Patients are operated in the in-patient department by the technique worked out for osteoplastic surgeries.

Retained Tooth Crown Exposure

Retained teeth are teeth located in the jaw after the terms of their normal eruption are over, and whose roots formation is finishing. Most often these are the

central incisors, canine teeth, 2nd premolars and 3rd molars, and also supplemental teeth. The abnormality is diagnosed on the grounds of clinical investigation, with its data confirmed by means of roentgenography. Deeply located retained teeth may stay in the jaw for a long time. If they do not press the roots of the neighboring teeth, do not cause their resorption or dislocation, do not cause neuralgic pains, they should not be exposed.

If a retained tooth is located close to the surface of the alveolar process in the direction of eruption, its crown is to be exposed and a cup must be fixed on it ~ a button, a side plate, a bracket — for further exteriorization with the help of an orthodontic appliance. Before the operation one should evaluate the presence of space for the retained tooth in the dental arch. If it is insufficient, it might be formed by means of shoving the neighboring teeth, dental arch dilation, or individual teeth extraction.

Individual Teeth Regrinding

In orthodontic clinical practice the tubercles and approximal surfaces of individual teeth are regrinded selectively: of temporary and permanent teeth in different periods of treatment. Indications to this treatment measure are:

- the presence of the temporary canine teeth tubercles, which have not worn down, in the period of mixed occlusion, more often on the lower jaw — they cause its dislocation forward, to the side, or hamper its protrusion;

- upper dental arch narrowing, uni- or bilateral cross bite. Partial regrinding of temporary canine teeth and molars on the side of cross bite is administered as it facilitates upper dental arch dilation;

- considerable difference of mesiodistal dimensions of the crowns of the upper and lower 1st and 2nd temporary molars; irregular closure of the 1st permanent molars;

- early loss of the 2nd temporary molars on one jaw; mesial dislocation of the 1st permanent molars on the same jaw; violation of occlusion contacts with opposite molars;

- violation of the permanent incisors or permanent canine teeth tubercles (more often on the upper jaw) as a result of partial enamel split, its hypoplasia, tubercles presence on the scalprum, at the acute angled shape of the tubercles in the canine teeth;

- the lack of place in the dental arch in the period of permanent occlusion. For individual teeth this place can be created at the expense of teeth shoving, eliminating diastema and spaces, lengthening or dilating dental arches, and also at certain indications by means of striping of the approximal surfaces of the permanent frontal and lateral teeth.

Regrinding of the approximal teeth surface is conducted with the purpose of creating space for setting teeth in correct position, improving teeth form, normalizing the correlation of dental arches length and width, providing the concordance of the median line between the upper and lower incisors, accelerating the orthodontic treatment.

Single-Stage Tooth Torsion

Simultaneous rotation of a tooth along the axis. Simultaneously it is possible to turn single-rooted teeth, usually the upper incisors or cutting teeth that have not curved roots. Simultaneous rotation of a tooth along the axis is recommended in the presence of a place for him in the dentition, rotation of 40° and a more, correct position of the teeth-antagonists. Before the operation make the impression of the jaws, cast their models, cut out the misaligned tooth, place it in the correct position and reinforce with glue. Then prepare retention devices – often a removable plate with a vestibular arch and clasps. After rotation of the tooth along the axis and set it in the tooth arc fitting the plate to the mouth.

A.Y. Katz and I.L. Zlotnik described a technique of single-stage tooth torsion (redressement force) with the help of forceps, whose grip is covered with rubber tubes. It is possible to apply single-stage torsion to single-rooted teeth, most often the upper incisors or canine teeth, which have even roots. After tooth torsion and setting in the dental arch the result is fixed with the help of orthodontic appliances. Attention is paid to the contacts of the tooth with the opposing teeth. If occlusion is elevated, the occlusive trauma is eliminated by means of selective teeth regrounding. The transferred tooth should not be excluded from occlusion, as its protrusion and injuring are possible at dental arches closure.

Tooth Replantation or Transplantation

The main conditions for this surgery are the presence of enough space in the dental arch for the correct setting of the tooth, the possibility of creating a socket for it taking into account the inclination and location of the neighboring teeth roots, and also providing regular interocclusal contacts. If the socket, created for the transplanted tooth, tightly wraps its root and the tooth contacts its antagonists correctly, a retention device is not needed.

Individual teeth extraction according to orthodontic indications is applied as an independent method of treating dentognathic anomalies and deformations, and also in combination with other methods. Correct choice of the teeth subject to extraction allows obtaining numerous constant contacts between the dental arches and normalizing dentognathic apparatus functions.

To detect indications to individual teeth extraction complex diagnostics is conducted, including clinical examination of patients, photometry, diagnostic models investigation, teeth roentgenogram, jaws orthopantomogram, and lateral ceph. The question concerning the choice of teeth subject to extraction is to be solved individually taking into account the periods of dentognathic system formation and development.

On the grounds of clinical examination and anamnesis data there are found out the reasons for dentognathic anomalies and deformities, the age, at which individual teeth were lost, bad habits and parafunctions presence, their duration. The doctor finds if close relatives had anomalies, if any signs (the size of teeth, jaws) were inherited. The teeth form, size and location, the jaws size of the patient and his/her parents are compared.

The most valuable information may be obtained by means of examining

children and their parents face and in profile and comparing the data. It is expedient to extract individual teeth according to orthodontic indications in the period of transitional dentition occlusion and at the beginning of permanent occlusion that is at the age of 7-13 years.

In case of congenital absence of individual teeth germs on one of the jaws (upper lateral incisors, 2nd premolars, 3rd molars) it is expedient to reduce the number of teeth on the opposite jaw. Such treatment measure is named leveling extraction.

The study of diagnostic models of jaws, especially gnathostatic, facilitates establishing indications to individual teeth extraction. Measuring of diagnostic models of jaws consists in finding dimensions of teeth, dental arches and palate area, different dimensions correlation.

Individual teeth extraction is indicated when at the tight location of the frontal teeth the central incisors are wider than 10 mm, and lateral — wider than 7.5 mm; when dental arch narrowing in the region of premolars and molars exceeds 6 mm, its apical basis narrowing — 5 mm; in cases, when the total width of the upper incisors crowns makes 35 mm or more. Still, if the face is narrow, the total width of the upper incisors exceeding 33 mm may be a sign of individual macrodontia, at which individual teeth extraction is indicated to eliminate occlusion anomalies.

Of big importance is the correlation of the dental arch width and its apical basis. Dental arch dilation at narrow apical basis leads to vestibular teeth declination, and so, to the violation of the regular transfer of mastication pressure on teeth, teeth articulation disturbance and further recurrence.

The choice of teeth subject to extraction may be done after dental arches and their closure evaluation in three mutually perpendicular directions.

In 1919 R. **Hotz** offered the method of **serial teeth extraction**. At first it is offered to extract temporary canine teeth to give space to and correct the position of the lateral incisors, and then the 1st premolars to correct the position of the canine teeth. Such measure was named "eruption control with the help of extraction".

Extraction of serial individual teeth or their groups includes the following measures:

- 1) temporary canine teeth extraction at irregular coming out of the lateral incisors. At that the auto regulation of the lateral incisors takes place as a result of massage application; their position and occlusion anomaly are corrected with the help of orthodontic appliances;

- 2) the 1st temporary molars extraction at the approaching of the 1st premolars germs to the surface of the alveolar process, which accelerates their coming out;

- 3) extraction of the 1st premolars, which have come out prematurely, promotes the change in the location of the permanent canine teeth germs and their correct establishment in the dental arch. If on the grounds of roentgenological control a 2nd premolar can be expected earlier than the 1st one, the 1st premolar should not be extracted, as after that takes place the undesirable mesial dislocation

of the 2nd premolar and the 1st permanent molar, as a result of which the space for the canine tooth in the dental arch reduces. In such cases the 1st premolar is to be extracted after the 2nd premolar is established in the dental arch and before the canine tooth comes out. If one can wait for canine tooth eruption before 2nd premolar eruption, the 2nd premolar should be extracted quicker to create conditions for the correct establishment of the canine tooth in the dental arch;

4) observation of canine teeth and 2nd premolars eruption and establishment in the dental arch.

Compact Osteotomy

To accelerate orthodontic treatment at sharply evident dentognathic anomalies and deformations, and also to obtain more effective and constant results of treatment preliminary surgical procedure — compact osteotomy — is indicated. This surgery has been known for a long time. It consists in the removal of the compact layer of bone, which weakens bony tissue resistance to orthodontic appliances mechanical action. The surgery used to be conducted in hospital and was rather traumatic.

There are known such corticotomy methods: linear or ribbon (Y.I. Havrylov, V.P. Nespriadko), checkerboarded or latticed (A.T. Titova, 1962), tunnel (M.S. Schwartzman, F.Y. Khoroshilkina), and combined (Y.I. Havrylov). Indications to conducting one of the techniques depend on the anatomico-topographic conditions and the direction of dentoalveolar shortening (Y.I. Havrylov, 1984).

A.A. Limberg reevaluated compact osteotomies. According to the scholar, the main thing is not bony tissue weakening but the biological reaction of inflammation, which arises in response to the trauma. As a result of the reaction bony tissue demineralization is observed and reparative processes are activated, which facilitates tissues rearrangement under the influence of orthodontic appliances.

Linear corticotomy consists in cortical plate scaling in the form of a band reminding the letter "U" with a drill from the vestibular and palatine sides from the dental arch. The compact plate is removed till spongy substance exposure.

V.P. Nespriadko offered linear compact osteotomy: after anesthesia the gingival papilla is dissected vertically to the alveolar crest. Then with the help of a smoother the papilla is scaled off together with the periosteum. Further on, the same instrument is used to scale the periosteum off along the line of the presupposed saw cut, so there is formed a space in the form of a tunnel for drill introduction, whose lateral surface is used to saw the cortical plate in the projection of the interalveolar septum.

Appropriate skills present, the periosteum may be not scaled off for drill introduction. It is enough, having moved the gingival papilla and periosteum aside, preserving the alveolar crest at the same time, to introduce the front part of the fissure drill into the thickness of the alveolar process, moving it at the edge of the spongy and compact substance. Simultaneously the cortical plate is sawn with outward drill movements. This stage is conducted under the control of the surgeon's finger, put on the mucous tunic of gums. Drill maneuvers are conducted

at low speed of the dental drilling machine; if the number of turns increases, one should work with breaks to let the instrument cool. According to V.P. Nespriadko, as a result of bone trauma there develops peripheral proliferative inflammation of the alteration zone, the compact layer loses its structure, demineralizes, which later facilitates teeth transfer.

Checkerboarded Compact Osteotomy

V.A. Dunayevskiy, D.V. Tiukalov, A.T. Titova, and Z.I. Chasovska on the basis of experimental investigations and clinical observations confirmed A.A. Limberg's idea and obtained positive results of treatment, having reduced the volume of surgical intervention. Instead of removing the bony tissue compact layer they recommend perforating in the region of interalveolar septa, teeth roots apices and counterforts.

R. Y. Tsalolikhin has offered his modification of compact osteotomy: through the sections of the mucous tunic and periosteum on the vestibular surface of the alveolar process there are made openings through the thickness of the interdental septa without injuring the mucous tunic of the palate. This method can be used at wide interdental septa (diastema, teeth protrusion). If teeth are densely located, it is unacceptable, as the possibility of injuring teeth roots increases.

Tunnel Compact Osteotomy

M.S. Schwartzman and F.Y. Khoroshilkina have worked out a technique of compact osteotomy by means of tunnelling. The surgery is conducted under local anesthesia. It consists of four steps: the first step — mucous tunic sections 4—6 mm long and sections of the periosteum on the vestibular surface of the alveolar process along or across the interalveolar septa of the transferred teeth at the level of their roots middle, and from the palatine side they recede by 3—4 mm from the gingival margin. Horizontal incisions are indicated for further dental arch dilation, vertical — for dentoalveolar lengthening. The second step is tunnelling: a tunnel is made with a thin smoother under the mucous tunic and periosteum upwards and down. The third step is drill introduction into the tunnel and compact bone layer derangement. The fourth step is the approachment of mucous tunic margins and periosteum (without suturing), management of the wound.

Upper jaw deformation is observed more often than lower jaw deformation. At sharp narrowing of the upper dental arch and corpus dislocation of the lateral teeth in the palatine direction the surgery is to be conducted both from the vestibular and oral sides of the jaw. One should take into account the degree and direction of the needed transfer.

Osteotomy and Osteoectomy

These osteoplastic surgical procedures are conducted in case of sharply evident deformations of occlusion and jaws, where instrument treatment possibilities are limited and do not produce positive results.

A characteristic limit of the surgical procedures is the partition of the alveolar process or a jaw into separate fragments with further establishment of them into correct position according to the occlusion and constant fixation in the new position with the help of splints.

Osteotomy is characterized by a certain configuration of the line of the bone saw cut, which allows dislocating the formed fragments relative to one another and fixing them in the needed position with the help of sutures and splints.

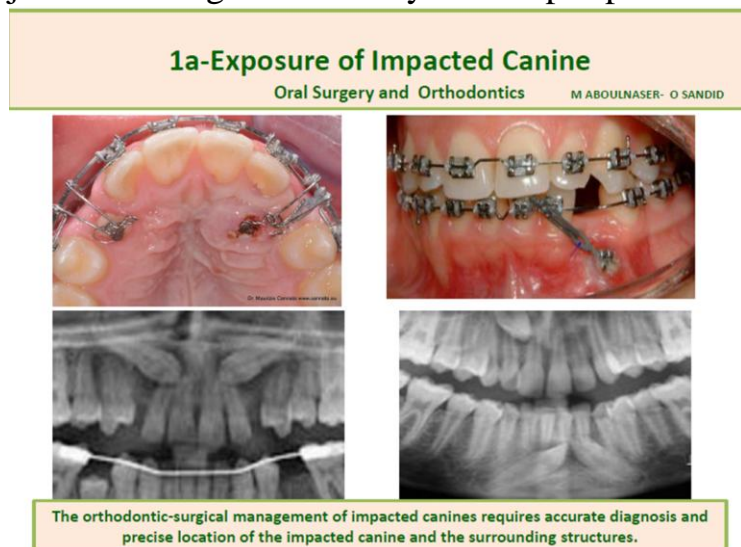
Osteoectomy, on the contrary, is additionally accompanied by resection of a certain part of the bone, which considerably increases the possibilities of osteoplastic surgery. Most osteoplastic operations, used for the correction of sharply evident dentognathic deformations, are conducted according to this very technique.

In some cases small instrument correction of the dental arch is carried out before the surgery.

Osteoplastic surgical procedures are conducted only in specialized hospitals by strict indications.

An integral component of combined orthodontic and surgical treatment of dentognathic anomalies and deformations are preparation interventions, most often compact osteotomies, conducted within the cortical layer of the jaw bone.

Exposure of the impacted tooth crown. Impacted teeth – is located in the jaw after the normal deadlines eruption, in which the root formation is completed. Most impacted teeth are the central incisors, canines, second premolars and third molars, as well as supernumerary teeth. The diagnosis is based on clinical examination, confirmed by X-ray. The underlying impacted teeth can remain in the jaw for a long time. If they do not put pressure on the roots of adjacent teeth, not



cause their resorption or displacement is not caused neuralgia pain, exposure of these teeth is not necessary.

The teeth extraction. Is applied as an independent method of malocclusion treatment, as well as in combination with other methods. The right choice of teeth for extraction to achieve the sustainable multiple

contacts between the dental arches and to normalize the function of the dentition. Extraction of teeth in the early period of the mixed occlusion allows you to place the teeth in the dental arc in a shorter time, reduce the duration of the orthodontic appliances use for correcting the teeth position without damaging the periodontal tissue, and when indicated can be recommended for orthodontic practices.

Surgical treatment for congenital malformations of the face and jaws. The treatment is most successful from the point of further development view the dentition, if there is continuity in the treatment of such patients with various specialists (surgeons, orthodontists, orthopedists, pediatricians, etc.). From the orthodontic point of view, the indications for plastic of the upper lip depend on the

type of clefts and the location of the upper jaw fragments. In the clefts of the lips and alveolar process, through unilateral or bilateral cleft of the lip, alveolar process and palate without disturbing of the upper jaw fragments location child can be operated on after birth. In violation of the upper jaw fragments location appropriate to the age of three months to correct the shape of the upper jaw by the method of Mac-Neal, and then make cheiloplasty. Orthodontic correction of the upper jaw shape, especially in unilateral and bilateral congenital cleft of the lip, alveolar process and palate, eases cheiloplasty in connection with the normalization of the upper lip position. The installation in the correct position shifted forward inter-incisor bones before the age of three and consolidate the results of orthodontic treatment create the conditions for more effective implementation of uranoplasty. If orthodontic treatment was not carried out in time, after the age of 3 maxillary bone shifted significantly forward due to the growth of the vomer, often rotated on the axis, which greatly complicates cheiloplasty. Under the pressure of the scarred upper lip after cheiloplasty growth direction and location inter-incisor bones changes. It shifted down and back. As a result of such violations dento-alveolar height increases, overbite deepens. Often the maxillary bone is displaced orally, which further causes improper eruption of the upper permanent frontal teeth.

Such violations are difficult at school age, can be prevented by timely provision of orthodontic care, the following cheiloplasty in childhood. Regarding age indications for plastic of palate from orthodontic point of view there is no consensus. The choice of the age period depends on the form of a cleft. In the case of soft, hard and soft palate cleft, shown veloplastic. In the case of cross-cutting single or double cleft of the lip, alveolar process and palate appropriate to apply a two-phase operation and orthodontic treatment aimed at stimulating of the upper jaw growth on the edges of the cleft by Mac-Neal.

Distraction Osteogenesis

- Based on manipulation of a healing bone
- osteotomized area is stretched before calcification has occurred in order to generate the formation of additional bone formation and investing soft tissue
- Patients with craniofacial syndrome are the prime candidates

Advantages of distraction are that arger distances of movement are possible than with conventional orthognathic surgery, and deficient jaws can be increased in size at an earlier age

Disadvantage is that precise movements are not possible

Materials for self-control:

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

1. To right down in album a scheme of surgical procedures on soft tissues according to orthodontic indication.
2. To right down in album a scheme of surgical procedures on teeth and dental arches according to orthodontic indication.
3. To right down in album a scheme of surgical procedures on alveolar processes according to orthodontic indication.

4. To right down in album a scheme of surgical procedures on jaws according to orthodontic indication.

B. Tasks for self-control:

1. At what age should begin the method of tooth extraction according to Hotz?

- a) 7-8 years
- b) 11-12 years
- c) 9-10 years
- d) 10-11 years
- e) 12-15 years

2. What is the method of Hotz mean?

- a) serial extraction of teeth
- b) frenulotomy of the tongue
- c) method of myogimnastics
- d) restorative therapy
- e) fracture of palatal suture

3. Compactosteotomy is used for?

- a) stimulation of orthodontic treatment
- b) improve the fixation of orthodontic appliance
- c) extension of time of orthodontic treatment
- d) expansion of dental arch
- e) fracture of palatal suture

4. Reconstructive surgery on the jaw bones are?

- a) not earlier than 14 years
- b) 10 – 23 years
- c) at any age
- d) not earlier than 25 years
- e) 5 years

5. Child 12 years with complaints of absence of a tooth in the upper jaw. According to parents: the temporary tooth was extracted at 4 years due to trauma. The bite is permanent. In the upper jaw is missing a tooth 21. The gap between the 11 and 22 - 4 mm. On the radiograph: tooth 21 is located at an angle of 45 degrees to the tooth 11. Select the best method of treatment?

- a) combined method of treatment (surgical and instrumental)
- b) instrumental
- c) surgical
- d) orthopedic
- e) physiotherapy

6. Child 6 years with complaints on incorrect position of teeth. On examination: the

face without features. Mixed bite. Teeth 31 and 41 erupted behind 71 and 81. What needs to be done in the first place?

- a) extract the temporary central incisors
- b) appoint a massage of the frontal area of dentition
- c) assign a myogymnastics
- d) expand the jaw
- e) stimulate the growth of apical basis

7. At 10-year-old child found a diastema and low attachment of the frenulum of the upper lip. What is your treatment strategy?

- a) plastic frenulum of the upper lip and orthodontic treatment
- b) plastic frenulum of the upper lip
- c) orthodontic treatment
- d) to assign a myogymnastics
- e) observation and clinical account

8. Normal or simple lip should be located at such the distance from the gingival margin?

- a) 5 mm
- b) 45 mm
- c) 30 mm
- d) 35 mm
- e) 40 mm

9. Child 75 years is a consultation with the orthodontist. Objectively: the depth of the vestibulum of the oral cavity - 4mm. In the field 41, 31 is determined the recession of the gingival margin, crowding of the teeth 42, 41, 31, 32. In anamnesis- oral type of breathing. Which of the following must perform first?

- a) plastic of vestibulum of the oral cavity
- b) finger massage
- c) the myogymnastics
- d) treatment of gingivitis
- e) to make a vestibular appliance

10. 5 years old child. There is no contact of incisors, vertical gap- 1-1,5 mm, nonabraded cusps of milk teeth. Tongue-frenulum is thin, almost transparent, normally attached to the tip, but limits its movement. What the tactics of treatment and preventive measures?

- a) plastic of a tongue-frenulum and grinding of cusps of lateral teeth
- b) gymnastics of mimic and masticatory muscles
- c) application of the vestibular shield
- d) massage of the alveolar processes
- e) physiological load

11.The child of 7 years, the crowding of the anterior teeth of 2 degrees complained with localized chronic catarrhal gingivitis. Select the best method of treatment?

- a) instrumental and physiotherapy
- b) physiological (biological)
- c) instrumental
- d) surgical
- e) physiotherapy

12.Specify permanent teeth, which are usually extract to create space in the tooth row when abnormal teeth location?

- a) first permanent premolars
- b) second permanent molars
- c) first permanent molars
- d) permanent second premolars
- e) central incisor

13.Removal of first premolars is indicated for?

- a) II-1 in adulthood
- b) narrowing of the dentition
- c) shortening of the dentition in the period of the mixed occlusion
- d) presence of a supernumerary tooth
- e) anomalies of the location of the fangs

14.The depth of the vestibulum of the oral cavity - the distance in millimeters from the middle of the gingival margin to the bottom of the vestibule of the oral cavity
The average depth of the vestibulum consider dimensions from?

- a) 5-10 mm
- b) 15-20 mm
- c) 5-6 mm
- d) 10-15 mm
- e) 3-7 mm

15.In a clinical study the proper attachment of the frenulum of the upper lip, its length and the strength check by?

- a) pulling lips forward when closed tooth rows
- b) pulling the lip down when closed tooth rows
- c) pulling lip down with open tooth rows
- d) the presence of a vertical gap between the lips as they are closed
- e) restricted mouth opening due to restricted movements of the upper lip

16.Timing of frenulotomy of upper lip are characterized by the following age limits?

- a) 7-8 years
- b) 11-12 years

- c) 9-10 years
- d) 10-11 years
- e) 5-6 years

17. Before the eruption of what teeth should be frenulotomy?

- a) lateral incisors
- b) first premolars
- c) first permanent molars
- d) central incisors
- e) permanent canines

18. What anomalies caused by a low attachment of the frenulum of the upper lip?

- a) true diastem of the upper dentition
- b) narrowing of the upper dentition
- c) lengthening of the upper dentition
- d) shortening of the upper dentition
- e) false diastema of the upper dentition

19. The method of surgical treatment is mainly applied in the period?

- a) permanent dentition
- b) temporary occlusion
- c) mixed bite
- d) reduction of temporary occlusion
- e) stable temporary bite

20. Specify clinical situations in which appropriate to make intersection of the frenulum of the upper jaw?

- a) the presence of diastema of a width exceeding 4 mm, the presence of local periodontitis
- b) the retention of canines of the upper jaw
- c) impacted central incisors
- d) the retention of the lateral incisors
- e) impacted canine

21. What is the sequence of the extractions according to the method of Hotz?

- a) III, IV, 4
- b) II, III, IV, 3
- c) II, III, IV, 4
- d) I, II, III, IV
- e) III, IV, V, 4

22. A teenager applied to an orthodontist complaining about tooth malposition. Objectively: the face is without peculiarities. Occlusion of permanent teeth is present. There are no abnormalities of jaw correlation in three planes. The 23 tooth

is vestibularly over the occlusive plane the space in the dental arch is less than 1/3 of crown size How is it possible to make room for the malpositioned 23 tooth?

- a) to extraction the 24 tooth
- b) to enlarge transversal jaw dimensions
- c) to enlarge sagittal jaw dimensions
- d) to remove the 23 tooth
- e) to enlarge vertical dimensions

23. Removal of first premolars is indicated for?

- a) individual macrodontia
- b) narrowing of the dentition
- c) shortening of the dentition in the period of the mixed occlusion
- d) presence of a supernumerary tooth
- e) anomalies of the location of the fangs

24. What is surgery with simultaneous elimination of defects of the hard and soft palate?

- a) uranostaphyloplastic
- b) staphyloplastic
- c) uranoplast
- d) interlaminar osteotomy
- e) frenulotomy

25. Premature removal of the second temporary molars likely cause of retention?

- a) second premolars
- b) first premolars
- c) central incisors
- d) third molars
- e) canines in both jaws

26. A child is 7 years old. He has early transitional dentition. There is overcrowding of the lower front teeth: the 42 and 32 teeth erupted orally with a complete lack of space. Make a plan of treatment?

serial consecutive extraction by Hotz method
extraction of the 42 and 32 teeth
extraction of the 41 and 31 teeth
extraction of the 83 and 73 teeth
extraction of the 84 and 74 teeth

27. Under what conditions is possible to create a place for the canines by expanding the dentition of a 13-year-old patient?

- a) lack of space is 2-3 mm
- b) the lack of space in the tooth row - 6 mm
- c) lack of space is 50% of the width of the canine

- d) lack of space — 5 mm
- e) full lack of space

28. Which of the following methods does not speed up orthodontic treatment?

- prosthetics
- vacuum therapy
- removal of teeth
- compactosteotomy
- vibration

29. For the treatment of dental crowding in a 9-year-old girl was the proposed method of system tooth extraction by Hotz. What was the indication for the selection of this treatment method?

- a) discrepancy between tooth size and jaw
- b) narrowing of the jaws, both sides
- c) mismatched sizes of the jaws
- d) elongation of the anterior sections of the dental arch
- e) presence of supernumerary teeth

30. A 5-year-old child removed 54,55,64,65 teeth. To what leads premature removal of these teeth?

- a) shortening of the dental arches
- b) elongation of the dental arches
- c) dentoalveolar elongation
- d) expansion of the jaws
- e) uneven growth of the jaws

31. What kind of pathological forms may have dentition in children with shortened frenulum of the tongue?

- a) flattened
- b) asymmetric
- c) saddle
- d) sharp (coracoids)
- e) v-shaped

32. During the examination of 13-year-old patient was established the final diagnosis: vestibular position 13 and 23 teeth with a complete lack of space, narrowing of the upper dentition, the rotation 12 and the teeth 22 around the axis. To eliminate this pathology it is proposed to extend the tooth row and teeth. What teeth are removed for orthodontic indications?

- a) first premolars
- b) upper canines
- c) second molar
- d) second premolars

e) first molars

33. The child at the age of 1 month, a congenital cleft of the upper lip on the left. What age is appropriate for cheiloplasty?

- a) 3-6 months
- b) first days of life
- c) 1-2 years
- d) 3-4 years
- e) 4-5 years

34. Parents 12 years with complaints of absence of a tooth in the upper jaw. According to parents: the temporary tooth was removed at 4 years of age due to injury. During the examination: the face without features. The bite is permanent. In the upper jaw is missing a tooth 21. The gap between the 11 - and 22- 4 mm. On the radiograph: 21 is located at an angle of 45 degrees to 11. Select rational method of treatment?

- a) combined method of treatment (surgical and instrumental)
- b) instrumental
- c) surgical
- d) orthopedic
- e) physiotherapy

35. Child 7.5 years is a consultation with the orthodontist. Objectively the depth of the vestibule of the oral cavity – 4 mm. In the field 41, 31 are determined by the recession of the gingival margin, crowding of the teeth 42, 41, 31, 32. History of the oral type of breathing. Which of the following must perform first?

- a) plastic vestibule of the oral cavity
- b) manual massage
- c) myogymnastics
- d) treatment of gingivitis
- e) vestibular plate

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