

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

Approved
at the meeting of orthodontics department
«____»_____20____y.
protocol №____by _____
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 №1	Orthodontia. Diagnostic of dento-gnathic anomalies and deformations
The theme of the lesson №28	Methods of orthodontic treatment accelerating.
Course	III
Faculty	Preparation of foreign students

Poltava 2016

1. The relevance of the topic.

Methods of acceleration of orthodontic treatment showing significant reduction in treatment time compared to conventional methods. Also noticeably better results than using traditional approaches. Such methods greatly affects the condition of the bones, therefore the use of surgical, biological and prosthetic methods leads to more effective and favorable outcome of treatment.

2. Specific objectives:

To explain the methods used for the treatment of orthodontic patients.

To know the main methods of acceleration of orthodontic treatment.

To know the types of biological methods to accelerate orthodontic treatment.

To know the types of surgical techniques to accelerate orthodontic treatment.

To know the types of prosthetic methods to accelerate orthodontic treatment.

To define combined methods of treatment.

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

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 during preparation to the lesson and the lesson

4.1. A list of the main terms, parameters, characteristics that need to learn by the student during the preparation to the lesson:

Terms	Definition
1. Bone resorption	The process by which osteoclasts break down the tissue in bones and release the minerals, resulting in a transfer of calcium from bone tissue to the blood
2. Bone apposition	The process by which osteoblasts built up the tissue in bones
3. Mechanisms of osteoreparation processes	Include the following categories of measures: medicinal therapy, physiotherapy (massage, vacuum, application of different types of currents, magnetic and ultrasonic

	fields), surgical interventions in the area of transferred teeth.
4. Phonophoresis	Is introduction of medicinal substances into tissue with the help of ultrasound.
5. Magnetotherapy	Is the application of an alternating magnetic field of low frequency with a therapeutic purpose.
6. Vibration stimulation	This is the applied method of curative low-frequency vibrating mechanical oscillation.
7. Electrofulguration (carbonization)	In a localized zone of affection provokes dry coagulation necrosis of tissues

4.2. Theoretical questions to the lesson:

1. Methods used for the treatment of orthodontic patients.
2. Methods of acceleration of orthodontic treatment.
3. Biological methods to accelerate orthodontic treatment.
4. Surgical techniques to accelerate orthodontic treatment.
5. Prosthetic methods to accelerate orthodontic treatment.

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

1. To study case report and plan acceleration measurements according to the clinic and age.
2. To make the impression of upper and lower dentition.

The content of the topic:

Stimulation of osteoreparation processes is a complex of measures directed at alveolar process bony tissue resorption and new bone layers formation in the places not subject to pressure.

At the first stage of orthodontic action stimulation processes are directed at the overcoming of host defenses barrier and the processes of destruction and bone resorption should prevail over the processes of new bone formation.

At the second stage the processes of destruction and tissue formation must be balanced, if it is possible.

At the third, final stage, stimulation processes are to be directed at the acceleration of the mechanism of new bone formation transformation into full-value bony tissue, i.e. regeneration processes must prevail over resorption processes. The stronger bony tissue is after orthodontic treatment, the less relapses take place, because relapses are caused by insufficient retentional period and unfinished treatment.

Mechanisms of osteoreparation processes stimulation may include the following categories of measures: medicinal therapy, physiotherapy (massage, vacuum, application of different types of currents, magnetic and ultrasonic fields), surgical interventions in the area of transferred teeth.

Functional action activators are a complex of orthodontic devices, each of which may be used in certain cases for functional influence on the orthodontic appliance, and via it — on the transferred tooth (teeth). Functional orthodontic activators may be located either in the oral cavity and be activated by the teeth of the opposite jaw, or outside the oral cavity and be activated in the mechanical or electromechanical way.

Massage

Massage is a mechanical irritation of tissues, used with therapeutic purpose.

Massage mechanically irritates surface and deep tissues, peripheral nerve receptors, which provokes different reflex phenomena leading to the change of organs and tissues functions. The degree of influence on the nervous system depends on massage maneuvers, intensity, and the time of carrying out the procedure. For example, rubbing and effleurage reduce excitability, which causes analgesia, and hachement, manual percussion and vibration, vice versa, increase it. As a result of mechanical irritation vessels of skin and deep tissues dilate, which causes the increase of the lymph and blood flow, metabolism, biochemical processes and protective functions of tissues intensity. In the skin due to the acceleration of albuminolysis and enzymatic activity biologically active substances appear (histamine, acetylcholine), exerting humoral influence on the vessels tone. Fatigue disappears in muscles due to the accelerated excretion of energy splitting products. Swelling reduces and metabolism is stimulated in tissues, which increases their contractile function and efficiency. Blood is redistributed in the massaged tissue, which influences cardiovascular system functions. Massage stimulates regenerative processes in tissues through microcirculation improvement, increases tissues mobility.

Vacuum Therapy

The method of dosed vacuum influence onto the mucous tunic and bony tissue was worked out under the direction of V.I. Kulazhenko (1960).

Vacuum therapy is the usage of low pressure with therapeutic purpose. In the focus of action local pressure lowering is created and affected tissues retraction takes place, vessels permeability increases, which at sufficiently low vacuum leads to tissues disruption and hematoma formation. Tissues and vessels affection leads to the activation of physiological processes, directed at the elimination of the formed focus. In the focus the enzymatic degradation of the necrotizing albuminous molecules takes place, as a result — formation of biologically active substances (histamine, acetylcholine etc.).

Immunobiological processes, metabolism, and phagocytosis are activated. In consequence of local hypoxia development cellular protective and adaptive processes are activated, spare capillaries are opened, new microvessels develop. In the mechanism of action of importance is also of nerve receptors irritation both by vacuum and by albuminolysis products, which stimulates repair process in the focus of affection by reflex. Humoral influence of biologically active substances, getting into the bloodstream and influencing different processes in the organism, also should not be excluded. Destroyed tissue structures and microvessels soon recommence, which favorably marks on their functional ability. In orthodontics

vacuum underpressure is used, equal to 40 mm Hg, which is created in the region of the transferred teeth roots. The course of treatment consists of 8—10 procedures, conducted when hematomas are resolved. At that, the proteoclastic enzymes, which have released from the tissue structures in the hematoma zone, accelerate reparative processes, which promotes shortening of treatment duration.

According to T.I. Kovalenko (1985), after vacuum stimulation orthodontic teeth transfer in adults accelerates by 1.3—1.5 times for sure.

Ultrasound

To accelerate teeth transfer with the help of orthodontic appliances R.D. Novoselov and A.N. Chumakova (1983) offered to influence the bone with ultrasound. The data, obtained by them, showed that ultrasound with 0.4 watt/cm^2 exerts evident local influence on the mineral component of bony tissue.

Mechanism of action: under the influence of ultrasound alternate squeezing and stretching of particles take place in tissues, which sets them in vibrating motion either along the direction of ultrasonic wave or perpendicular to it. At vibrating motions ultrasonic energy is transmitted from one particle to another, which provides rather deep influence, especially in homogeneous medium. On the border of separated media and tissues ultrasonic wave reflection might take place, which creates conditions for interference and formation of areas of high ultrasonic pressure. This process takes place particularly often on the border of such different by acoustic resistance tissues as bone—tendon, bone—muscle, where 60 % energy is reflected, which may become subjectively apparent by boring pain sensation.

Mechanical oscillations of tissue particles lead to “cellular massage”, physicochemical processes shifts, and warmth creation. At big ultrasound intensity the rupture of intermolecular adhesive forces, gravitation, and microcavities formation — cavitation, which breaks the cytoderm and destroys chemical substance molecules, may take place in the stretching phase. At cavitation much energy is released, especially on the border of media separation. Tissue media cells oscillation motions are accompanied by ionization and the change of bioelectrical process in cells, increase of the chemical activity of different processes, chemical substances formation.

Though physicochemical aggressivity of ultrasound is important in the mechanism of its action, at the influence on the organism the reactivity and adaptive resources of the nervous, endocrine, and other systems conducting homeostasis are chief.

Biologic activity of ultrasound depends on the dose and may lead to stimulation, inhibition, or even destruction of tissues. Presently ultrasound of small intensity is used in therapy (due to the works of A.P. Speranskyi, 1970; A.A. Obrosof, 1971, and other). At the influence of ultrasound of small intensity weak heating of tissues, vessels dilation, blood flow and metabolism acceleration take place. Phagocytosis, tissue membranes permeability, assimilation of oxygen from blood increase; regeneration processes improve, neuromuscular excitability and vessels tone normalize, endocrine glands functions change.

Ultrasound has antiinflammatory, analgetic, resolving, desensitizing, and fibrinolytic activity. Under the influence of small doses regeneration processes,

bony tissue differentiation are enhanced, collaterals develop quicker.

Phonophoresis

Phonophoresis is introduction of medicinal substances into tissue with the help of ultrasound.

Mechanism of action and application: has an inflammatory, analgetic, resolving, desensitizing, and fibrinolytic activity.

To accelerate orthodontic treatment a number of methods of influencing the skin, muscles, nerves, mucous tunic of the alveolar process and bony tissue have been applied lately. Phonophoresis with 10 % calcium chloride solution was successfully used by L.V. Sorokina (1974) to shorten the period of orthodontic treatment results retention.

Occlusion anomalies in children are connected with functional deviations in the activity of muscles surrounding the dental arches. Normalization of craniofacial muscles function allows shortening treatment terms and achieving stable results. Muscle strength increase happens due to multiple tractions, which leads to muscle weight increase at the expense of fibers thickening. Muscle tension may be provoked with the help of electric irritants. Their fatigue comes later than inhibition in the nerve centres. At electrostimulation the increase of muscle bulk happens sooner than at usual training.

Phonophoresis technique: gauze napkins are put onto the mucous tunic of gums in 4-6 layers, moistened with the pharmaceutical substance, which is to be introduced. The working part of the waveguide is covered with liquid petrolatum; the waveguide is fixed on the gums. The time of ultrasound action is 5 min; insonification intensity makes 0.2 watt/cm^2 in constant regimen. After ultrasonic influence the mucous tunic of gums is washed with a watered cotton pellet.

Magnetotherapy

Magnetotherapy is the application of an alternating magnetic field of low frequency with a therapeutic purpose.

Mechanism of action: at the influence of an alternating magnetic field of low frequency whirling currents appear in tissues in consequence of charged particles transfer. Physicochemical processes change because external magnetic field creates specific conditions for them. Such action promotes blood circulation, metabolism, tissue trophism improvement.

Under the influence of alternating magnetic field in the mucous tunic of gums microcirculation is increased, tissue permeability is decreased, peripheral tone of capillaries is increased, passive venous congestion is eliminated, fibrinolytic activity of the periodontal tissue and saliva decreases, the level of blood oxygenation increases.

Electrostimulation

The electrostimulation method is applied in stomatology at treating muscles atrophy in the craniofacial area, including cases arising as a result of long-term immobilization of jaws after their fracture, osteoplastic surgeries, myopathic paresises and paralyses.

N.A. Plotnikova applied the electrostimulation method in orthodontics clinical practice in combination with orthodontic appliances for the treatment of

prognathic occlusion.

For the stimulation of retained teeth eruption the application of hyaluronidase action preparations is limited because evident allergic reactions are possible. This was a premise to study in experiments and clinical picture the influence of current stimulations and introduction of some vegetotropic preparations on teeth eruption.

V.V. Halenko (1986) proved that teeth eruption speed may be regulated by the introduction of vegetotropic preparations. By means of exciting the vegetative nervous system, the preparations accelerate teeth eruption, by means of inhibiting – slow down the process. Stimulation with a cathode of liminal current with the power of 3 microamp accelerates teeth eruption by 36.7 %, and the stimulation with anode slows this process down by 36.7 %. Cathode and anode of supraliminal current inhibit eruption by 22.4 and 53.1 % respectively.

Clinical use of the ways of retained teeth eruption acceleration with the usage of electrostimulation and electrophoresis with adrenaline enhance the efficiency of treating the given pathology in comparison with instrument method by 2 times on average and shortens treatment duration by more than 3 times.

The method of accelerating retained teeth eruption by galvanic current consists in passing continuous current through the tissues of the alveolar process, in which retained teeth are located. Current density makes 0.1-0.2 microamp/cm², action duration 15-20 min; procedures are conducted daily during 15-20 days. V.V. Halenko recommends using pulse single-cycle undulatory current of 50 Hz frequency. The sending's period makes 8 + 1.4 s. The time of action 10-15 min, sessions daily during 15-20 days. Electrophoresis with adrenaline is carried out, watering the padding under the active electrode with 0.1 % adrenaline solution; in another case electrophoresis technique does not differ from galvanization technique.

Electrostimulation of tissues in the area of the retained tooth with galvanic or pulse current should be conducted at treating patients with teeth retention of the 1st-2nd degree, conditioned by the presence of supplemental teeth. At unfinished formation of the roots of complete and supplemental teeth the surgical removal of the latter is not advisable. Acceleration of retained teeth eruption with the help of electrophoresis with adrenaline is recommended at treating patients older than 12 years with teeth retention of the 1st-3rd degree, and also in case of unconditional application of electrostimulation. The mentioned techniques of treatment intensification are not complex, accessible for application in a stomatologic polyclinic if there is a physiotherapeutic room. Children endure the treatment easily, no complications are observed. Therapeutic efficacy of these techniques and treatment terms reduction allow recommending electrostimulation and electrophoresis with adrenaline in the region of retained teeth for treatment at their eruption delay.

Millimeter Microwave Resonance Therapy

In recent years untraditional methods of treating many diseases have become widely used. Painlessness, easy implementation, and accessibility make them especially urgent. Millimeter microwave resonance therapy (MRT) attracts special

attention.

When a living organism is influenced by electromagnetic millimeter waves with frequency equal or close to the individual frequency of electromechanical auto-oscillations of cellular microstructures, synchronous resonant oscillations arise in them. These cell oscillations are the signals for metabolism processes control, inadequate function restoration, organism persistence to unusual actions increase. Specialists have studied the zones of human body surface, where therapeutic action at local electromagnetic irradiation in the millimeter range is the most effective. Before MRT the position of maximal sensitivity on human skin is correlated with the classical scheme of acupuncture zones location, Zakharin-Ged's zones. At the irradiation of the acupuncture zones, responsible for the affected organ, the response reaction of the organ arises.

Positive results of MRT application have been obtained at treating various diseases. MRT is also used for treating orthodontic patients.

MRT has been conducted by the technique worked out at the chair (*The technique of applying MRT for the stimulation of the orthodontic treatment of patients with posterior occlusion*). To apply this technique the devices "Porih-1", "AMRT-01", "ARIYA" were used, offered by the scientific collective of the Ukrainian Cabinet of Ministers studying the physics of the living.

MRT was conducted on the preliminarily defined points on the skin: the 1st point – Shan-Yang-C1 (on the index finger), the 2nd point – Guang-Qiu-Tr (on the ring finger), the 3rd point – He-Gu-Chs-1 (between the 1st and 2nd metacarpal bones, closer to the radial edge of the 2nd metacarpal bone).

Preference was given to these distally located points as the resulting effect of influencing the points, located in the distal part of extremities, will be more evident than at the influence on the points of the trunk, stomach, and chest.

MRT technique is as follows: the patient is seated in an armchair, the cone of the device is set on the region of the selected point at the distance of 3-5 mm from the skin surface, and the device is connected up. The procedure is conducted during 10 min on each point. The course of treatment lasts for two weeks. On average, the patient gets 10 sessions of MRT during one course of treatment.

To make MRT results objective, noncontact distant registration of infrared radiation of human cutaneous coverings – the method of infrared thermography – was used. Thermography was conducted before and after MRT session. To process the thermography data there was used the function of "lapping" or "withdrawing" of two thermoimages, simultaneously presented on the display screen together with the result of such superposition, which enables to compare the patient's condition before and after MRT.

During thermograms analysis soft tissues warming in the regions of the upper and lower jaws – nasolabial, mental, and buccal – was brought to a focus. To compare thermograms the temperature landmarks, obtained on the thermograms, were used (the nose tip, auricles).

MRT is used during the treatment of patients aged 4-13 years. Orthodontic treatment terms shorten by 1.5-2 times under such condition. MRT application with the purpose of orthodontic treatment stimulation is the most effective in the

period of intensive jaw growth.

MRT technique application was proved to be effective with the help of thermal imaging technique, which reflects the momentary warming-up of soft tissues, which is the result of neuroreflectory connections in response to the irritation of nerve endings with the subsequent reaction of vessels (color insert, Fig. X).

Vibration Stimulation

This is the applied method of curative low-frequency vibrating mechanical oscillation. It has been proved that mechanical oscillations may give different vascular-motional reaction depending on oscillations intensity and frequency. Vasomotor reactions arise in response to vibrating irritation, and weak irritations mostly excite vasoconstrictive effect, strong irritations – vasodilating.

At low frequencies (20-50 Hz) vascular atony phenomena prevail, at greater (100-200 Hz) – angiospasm. In response to the general influence of vibration vessel dilation takes place in different parts of the microcirculation bed, and the venous vessels react more actively than arterial (N.M. Paranko et al., 1967; N.A. Arutiunians, 1973).

A number of authors cover in the works the questions of morphological and functional shifts, arising in tissues under the influence of vibration; the positive effect is explained by the fact that weak mechanical irritation evokes local reaction of inflammation type, which activates the processes of bony tissue reparation. Further on these data were confirmed in experimental investigations, dedicated to the influence of manual and vibrating massage.

There has been studied the influence of vibrating massage on the nerve endings and soft tissues of the oral cavity. Microscopic investigations have shown possible gums hyperemia and sometimes a certain increase of vessels permeability, epithelium changes, certain destruction of the horn layer in some areas, mechanical injury. As the quantity of massages increases, hyperemia in the connective tissue gradually changes to cellular infiltration, both from the direction of the vessels endothelium and from the direction of the connective tissue cells. Cellular proliferation is more evident under the endothelium, and less evident – in deep layers. This gave grounds to stating that proliferative processes in the connective tissues and also reactive changes in the nerve fibers are caused by the vibrating massage.

Vibration duration should be inconsiderable (0.5-5 min), amplitude – small (0.5-1.5 mm), 1-7 days' breaks are recommended between vibration action procedures, as there might arise habituation to the irritation, and at excessive duration of vibration its stimulating influence changes to the depression of metabolic processes

I.K. Rozumov (1975) offered a theory of the energy influence of vibration. The basic position of the theory is the principle of vibration influence on the organism. The energy principle is proved by the directly proportional dependence between the influencing oscillatory energy and the indices of the observed changes of the functions of adequate sensory systems. The author has proved that under conditions of different frequencies and amplitudes of oscillations the change of

perception thresholds at vibration influence keeps within the law of proportionally influencing oscillatory energy. This means that the oscillatory speed (vibration velocity) is an adequate physical criterion for hygienic evaluation of vibration, other things being equal.

The second basic position concerns the fact that at other conditions being equal (frequency and amplitude) the value of oscillatory energy is directly proportional to the duration of vibration influence. This conclusion is of great practical value for the determination of operating mode, i.e. the permissible duration of contacting the vibrating surfaces.

Cr.H. Kurz (1975) was the first to use vibration action for teeth transfer. The author points at the fact that the transferred tooth is to be influenced by discontinuous impulsive force. At each impulse from the device direction the tissue pressure in the periodontal and bony tissue increases, and at the influence of impulse tissue pressure decreases. The alternation of high and low pressure in the periodontal and surrounding tissues creates the effect of massage. In this connection cellular activity increases around the transferred tooth, which causes the increase of osteoclasts and osteoblasts quantity. Osteoblastic activity reaches its maximum and leads to osteogenesis activation. At vibration influence the weakening of periodontal fiber elements takes place, which accelerates tooth transfer.

The author offered a special device for applying the vibration action. Still, it has a number of drawbacks, of which the most important is the fact that the vibration action influences all the teeth and vibration is transferred in all directions, including the vertical ones, which is undesirable and traumatic for the neurovascular bundle.

In recent years vibration therapy has been applied in orthodontic practice. With the purpose of stimulating orthodontic treatment individual teeth and dental arches in children are influenced by the vibration action (S.I. Kryshtab et al., 1986; H.I. Liutik, 1987; Cr.H. Kurz, 1976, 1980; S.I. Doroshenko, 1991; N.V. Rashchenko, 1994; I.B. Tril, 1995).

At vibration stimulation the tissue pressure in the periodontium and bony tissue increases, after influence cessation the pressure decreases. The alternation of high and low pressure in the periodontal fissure and adjacent tissues creates the effect of pump – absorption of blood and interstitial fluid into a certain zone and then its expulsion in the course of every cycle. Owing to this, according to the authors, cellular activity increases around the tooth, which increases the number of osteoblasts and osteoclasts, fiber elements of the periodontal tissues weaken.

The influence of vibration on the hard tooth tissues and pulp takes place at the ultrastructure level, the vibration action does not influence the transferred teeth negatively.

In the pulp of the investigated teeth, right after 5 minutes' influence, the odontoblasts of peripheral parts, located in the lower third of the crown part of the tooth and its neck, are loose here and there. Lateral processes of the odontoblastic cells in these zones become serpentine, the long processes preserve clear linearity. Cells in the indicated zones not infrequently lose the regularity of their piriform

shape; basophilic staining decreases in the cytoplasm here and there. These changes are referred to violations, arising at minor irritation of the parenchymatous elements and are of reverse character.

In the intermediate and central pulp layers there are observed zones of clarification and insignificant loosening of its stromal elements, both fibrous and cellular. In these very zones focal hyperemia of small blood vessels of capillaries type and arterioles becomes evident. Here and there, in the lumens of such vessels, erythrocyte aggregation increases, but there have been no signs of their homogenization or lysis in any of the observations. Morphological signs of vascular wall continuity damage and blood corpuscles encroachment have not been detected. There are no anomalies in the enamel and dentin constructs. On the third day after vibration changes are not detected. Microcirculation and blood supply of the intermediate and central layers of pulp approach the norm. Rheology disorder in the microvessels is not found. In ten days trophism of different structures of the transferred tooth completely normalizes. In the marginal parts of pulp there remain congestions of the so-called “free cells”, which, according to modern ideas, are odontoblast precursors. The quantity of macrophages and histiocytes in the central parts of pulp is somewhat higher than normal. Morphological peculiarities testify to the fact that the processes of local activation of immunological changes are of prolonged character and are preserved up to ten days.

Taking into account the above-stated, it has been proved that low-frequency vibration does not provoke any substantial changes in the hard tooth and pulp tissues. The vibration action provokes, by the type of “micromassage”, reverse changes and promotes the amplification of the trophism of all the pulp parts, and also the activation of immunocompetent cells, which provide local immunity.

In our clinic this method has been applied by: H.I. Liutik (1987) for the treatment of individual teeth in children; N.V. Rashchenko (1994) for the stimulation of lower jaw growth in children with progenia; I.B. Tril (1995) for the rehabilitation of adult patients with dentognathic deformities.

Electrofulguration

Application of electrofulguration (carbonization) in a localized zone of affection provokes dry coagulation necrosis of tissues. As necrotizing tissues are rather dense, there develops no infiltration with exudate of perifocal unaffected tissues. This eliminates the conditions of secondary inflammatory processes development in tissues. Migration of a considerable quantity of cellular elements, taking part in the processes of necrotizing focus organization (leukocytes, macrophages, and fibroblasts), epithelial cells proliferation activation provide the acceleration of reparation processes. In clinical practice electrofulguration is used in the preparation of the oral cavity soft tissues for orthodontic and prosthetic treatment, diminution of the hypertrophic gums, tongue and lips frenula, mucous tunic at pericoronitis, fibroma. Hypertrophic gums diminution was being conducted with the purpose of evening the level of their being adjacent to teeth after orthodontic treatment, root part of tooth exposure, periodontal recess elimination, at subgingival root destruction, etc. The results of the conducted complex, experimental and clinical investigations have shown that

electrofulguration has a number of advantages over other types of soft tissues destruction, introduced in stomatological practice: it is conducted by means of contactless technique; does not require preliminary anesthesia; affection depth is easily regulated; allows obtaining rigorously focusing line of demarcation with tissue coagulation necrosis; provides reliable hemostasis; oxygenates tissues; has a pronounced antimicrobial bactericidal action; promotes the formation of sufficiently strong dentogingival connection and considerably decreases the terms of wound surface healing. The electrosurgical device "Electrofulgurator" allows conducting surgical intervention on the soft tissues in the hard-to-reach parts of the patient's oral cavity.

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.

Materials for self-control:

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

1. To draw in albums the scheme of orthodontic treatment acceleration methods.

B. Tasks for self-control:

1. What is the massage?

- a) mechanical stimulation of tissues used for therapeutic purposes
- b) dry tissue necrosis
- c) formation of aseptic inflammation
- d) destructive effect on soft tissue
- e) effect on acupuncture points

2. Vacuum therapy is?

- a) use of low pressure for therapeutic purposes
- b) the use of high pressure for therapeutic purposes
- c) mechanical tissue irritation
- d) destructive effect on soft tissue
- e) effect on acupuncture points

3. Ultrasound is?

- a) cellular massage
- b) massage of the skin
- c) massage of the mucous membrane
- d) acceleration of blood circulation
- e) mechanical tissue irritation

4. Magnetic therapy is?

- a) alternating magnetic field of low frequency
- b) alternating magnetic field of high frequency
- c) magnetic field of constant frequency
- d) effect of electromagnetic millimeter waves
- e) use of different magnets

5. Magnetic resonance therapy is?

- a) influence of electromagnetic millimeter waves
- b) mechanical stimulation of tissues
- c) alternating magnetic field of low frequency
- d) introduction into the tissues of drugs using ultrasound
- e) formation of aseptic inflammation

6. Vibrostimulation is?

- a) application of mechanical vibrations of low frequencies
- b) alternating magnetic field of low frequency
- c) destructive effect on soft tissue
- d) effect of electromagnetic millimeter waves with a frequency equal or close to the individual frequency of electromechanical oscillations of cellular microstructures
- e) mechanical tissue irritation

7. Child 7.5 years is the doctor-orthodontist. Objectively: the depth of the vestibule of the oral cavity – 4mm in the area of 3141 determined the recession of the gingival margin, crowded 31,32,41,42. In anamnesis – oral breathing. Which of the following should be done first?

- a) vestibuloplastics
- b) manual massage
- c) myogymnastic
- d) treatment of gingivitis
- e) teeth extracting

8. Compactosteotomy is used for?

- a) accelerate orthodontic treatment
- b) improve the fixation of orthodontic appliance
- c) extension of time of orthodontic treatment
- d) improving the fixing of orthodontic apparatus, extension of time of orthodontic treatment
- e) not used in orthodontics

9. What optimization method of active orthodontic treatment by Doroshenko?

- a) vacuum therapy
- b) magnetic resonance reflex therapy
- c) electrophoresis
- d) general health therapy
- e) massage

10. To the orthodontist came the patient K, 17 years with complaints on improper position of the canine in the upper jaw. Objectively: the bite is permanent, the ratio first permanent molars I class by Angle, 13 vestibular and above the occlusal plane, between 14 and 12 to 65 mm. In what period of orthodontic treatment can be used phonophoresis with lidas?

- a) active period
- b) retention period
- c) passive
- d) preparatory period
- e) not used in orthodontics

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

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

12.Decreasing of the efficiency of orthodontic treatment contributes to?

- a) prosthetics
- b) compactosteotomy
- c) electrical stimulation
- d) vacuum therapy
- e) ultrasonic effect

13.To optimize orthodontic treatment is used electrophoresis of 0.5-3% solution of Trilon B for such purpose?

- a) decrease in bone density
- b) anti-inflammatory action
- c) recovery of bone density in retention period
- d) anti-tumor properties
- e) restorative action

14.To improve blood supply and tropism of the bone tissue is used?

- a) vacuum therapy
- b) ultrasound exposure
- c) electrophoresis
- d) ufo
- e) amplipulse-therapy

15.To stimulate the eruption of impacted teeth (after creating space in the tooth row) is used?

- a) electrical stimulation
- b) vacuum therapy
- c) uhf therapy
- d) electrophoresis
- e) amplipulse

16.To consolidate the results of orthodontic treatment (relapse prevention) it is recommended to use electrophoresis with?

- a) 5-10% sol of calcium chloride
- b) 2% sol of chloramine
- c) 2% sol of chlorhexidine digluconate
- d) 1% sol of sodium fluoride

e) 3% sol of remodent

17. In the correction of abnormal position of individual teeth, narrowing of dentition is used?

- a) vacuum therapy
- b) electrophoresis
- c) laser therapy
- d) uhf therapy
- e) currents of d`arsonval

18. Vacuum therapy by the method of V. I. Kulazhenko promotes?

- a) improve blood supply and trophicity in the treated area
- b) stimulation of eruption of impacted teeth
- c) anesthesia
- d) increase mineral saturation of bone tissue
- e) decrease of mineral saturation of bone tissue

19. During orthodontic treatment electrophoresis with 10% sol. of calcium chloride promotes?

- a) increase mineral saturation of bone tissue
- b) reducing mineral saturation of bone tissue
- c) improve blood supply and trophicity in the treated area
- d) stimulation of eruption of impacted teeth
- e) anesthesia

20. During orthodontic treatment, which is complicated with inflammatory periodontal disease of the teeth that moved, it is advisable to use?

- a) laser therapy
- b) massage
- c) myogimnastics
- d) electrophoresis with 10% sol of calcium chloride
- e) vacuum therapy

21. Injection of medicinal substances in the bone tissue or mucous membrane by using of ultrasound is called?

- a) phonophoresis
- b) electrophoresis
- c) magnitophoresis
- d) lazerphoresis
- e) depophoresis

22. Injection of medicinal substances by means of the galvanic current through the skin and mucous membranes is called?

- a) electrophoresis
- b) magnitophoresis

- c) lazerphoresis
- d) depophoresis
- e) phonophoresis

23.The advantage of applying of vacuum therapy in complex treatment of dentofacial anomalies?

- a) increases the level reparative processes in the bone tissue
- b) reduces mineral saturation of bone tissue
- c) stimulates the eruption of impacted teeth
- d) promotes analgesia
- e) has anti-tumor effect

24.At what stage of orthodontic treatment used electrophoresis of medications?

- a) at all stages of treatment
- b) at the initial stage of treatment
- c) during the period of active orthodontic treatment
- d) retention period
- e) not applicable

25.At what stage of orthodontic treatment vacuum therapy is used?

- a) the period of active orthodontic treatment
- b) at all stages of treatment
- c) retention period
- d) at the initial stage of treatment
- e) not applicable

26.At what stage of orthodontic treatment applies laser treatment?

- a) the period of active orthodontic treatment
- b) at all stages of treatment
- c) retention period
- d) at the initial stage of treatment
- e) not applicable

27.At what stage of orthodontic treatment used electrical stimulation of the masticatory and mimic muscles?

- a) the period of active orthodontic treatment
- b) at all stages of treatment
- c) retention period
- d) at the initial stage of treatment
- e) not applicable

28.During the expansion of the dentition and the movement of individual teeth is used?

- a) electrophoresis with 2% sol of lithium chloride
- b) UHF therapy

- c) currents of D'arsonval
- d) amplipuls therapy
- e) Eelectrophoresis with 1% sol of sodium fluoride

29.Laser therapy during orthodontic treatment has an effect?

- a) anti-inflammatory, desensitizing
- b) reduces mineral saturation of bone tissue
- c) stimulates the eruption of impacted teeth
- d) increases the mineral saturation of bone tissue
- e) speeds up the movement of teeth

30.To stimulate the process of eruption of permanent teeth during orthodontic treatment used electrophoresis with?

- a) lydasum
- b) 2 % sol of lithium chloride
- c) 1% sol of sodium fluoride
- d) 10 sol calcium gluconate
- e) 3% sol remodent

31.To stimulate the eruption of the tooth when there is enough space in the dental arch is used?

- a) massage of the alveolar process
- b) electrophoresis of 10% sol of calcium chloride
- c) myogymnastics
- d) amplipuls-therapy
- e) UHF-therapy

32.In the treatment of patients with impacted teeth I - II degree, due to the presence of supernumerary teeth, apply?

- a) electrical stimulation
- b) UFO
- c) UHF-therapy
- d) electrophoresis of 10% sol of calcium chloride
- e) amplipuls-therapy

33.What method of physiotherapy treatment improves blood supply and tropism of the bone tissue during orthodontic treatment?

- a) vacuum therapy
- b) electrophoresis of 10% sol of calcium chloride
- c) electrophoresis of 2% sol of lithium chloride
- d) UHF therapy
- e) UFO

34.To stimulate the timing of appliance treatment anomalies of position of individual teeth and narrowing of dentition, is used?

- a) ultrasonic effect
- b) UHF therapy
- c) currents of D'arsonval
- d) amplipuls therapy
- e) electrophoresis with 1% sol of sodium fluoride

35. To stimulate the tooth movement and eruption of impacted teeth applies?

- a) vibration impact
- b) laser therapy
- c) UHF therapy
- d) currents of D'arsonval
- e) amplipuls therapy

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