

LVIV NATIONAL MEDICAL UNIVERSITY N.A. DANYLO HALYTSKY

Department of Physical Training and Sports Medicine

Approved at the methodical meeting of
the department of Physical training and sports medicine
Head of the department

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Protocol №1 from 30 of August 2021



GUIDELINES

in the discipline

PHYSICAL REHABILITATION AND SPORTS MEDICINE

for 3th year students

training of specialists of the second (master's) level higher education in the
field of knowledge 22 "Health" specialty 221 "Dentistry" for independent work
in preparation for practical classes

Topic 7 *"Physical rehabilitation for congenital anomalies of jaw development and
occlusion disorders in children."*

LVIV-2021

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Methodical guidelines are made in accordance with the requirements of the curriculum in the discipline "Physical Rehabilitation and Sports Medicine", compiled to train specialists of the second (master's) level of higher education in the field of knowledge 22 "Health" specialty 221 "Dentistry".

According to the curriculum, the study of physical rehabilitation and sports medicine at the medical faculty is carried out in the 3d year of study.

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1. Scientific and methodological substantiation of the topic.

Anomaly of the development of the dental-maxillary system is manifested by disorders of the development of teeth (eruption, their number, position, size, shape, structure) and jaws (congenital malformations, impaired growth of the jaws, their deformation, incorrect location of the jaws in the skull). Clinical deformities and changes in the dentition are characterized by changes in the sagittal, transverse, vertical directions (possible changes simultaneously in several directions).

At anomalies of a bite physiological balance of muscles of a peri-oral area, closing of lips, functional change of masticatory muscles, their tone, bioelectrical activity decreases, functions of muscles of language, normal communication between the form and function are broken up. Dysfunction of the muscles of the maxillofacial area in anomalies of occlusion is an important cause of the formation and progression of deformities. Impaired muscle coordination can also lead to disproportion in the growth of the jaws and other skull bones. At the same time there are changes in the nature of respiration (predominant nasolabial or oral type of respiration), which leads to diseases of the upper respiratory tract. The severity of external respiratory disorders depends on the nature of occlusion anomalies. Chewing disorders in occlusal anomalies negatively affect the function of the digestive organs. Depending on the type of anomaly, the nature and degree of functional changes of facial, masticatory muscles, imbalance of the muscles around the mouth, speech is disturbed. A characteristic feature of phonation is humming. At occlusion anomalies in 70% of cases the posture is disturbed, which is caused by a change in the position of the head and the movement of the center of gravity forward from the axis of the body, as well as poor physical development. Speech disorders, changes in the shape of the face, lag in physical development have a negative impact on the psycho-emotional state of the patient, make him less communicative.

The use of FR methods in orthodontics is due, on the one hand, to the targeted effect on the muscles of the maxillofacial area, which contributes to the normalization of both the shape and function of the dental system, on the other - the general effect on physical development, circulatory system function, respiratory and digestive organs, psycho-emotional sphere. FR drugs are most effective during periods of milk and variable bites, when there is an intensive growth of the dental-maxillary system. Without the use of FR, orthodontic and surgical treatment of patients with anomalies of the dental and maxillofacial system is impossible, because the elimination of only morphological changes does not contribute to the restoration of impaired functions. The cessation of FR classes leads to a decrease in the effectiveness of orthodontic and surgical treatment and the recurrence of anomalies.

The study of this topic in the educational process of the future doctor will form motivation, increase professional responsibility for the timeliness, adequacy and regularity of the appointment of FR as part of a comprehensive treatment of patients with disorders and anomalies of occlusion.

2. Learning objective

2.1. The student must know:

- clinical and functional substantiation for the appointment of FR for patients with occlusal disorders and anomalies.

2.2. Be able:

- to substantiate and independently appoint means of FR as a part of complex treatment of patients with disturbances and anomalies of a bite;
- describe and demonstrate special exercises to parents and sick children.

2.3. Master practical skills:

- independently conduct a general medical examination;
- collect a general history;
- be able to fill in the card of the exercise room;
- be able to issue a referral for treatment in a physiotherapy room;
- be able to determine the periods of various diseases;
- be able to determine motor modes. 3

-know the mechanisms of therapeutic action of FR and the peculiarities of their use in the complex treatment of patients with occlusal disorders and anomalies.

3. Student tips:

1. Normal bite - complete closure of the teeth

Physiological prognathism - the upper jaw is moderately protruding above the lower.

Physiological progeny - the lower jaw protrudes moderately above the upper.

Orthognathia - completely coincides with the upper and lower dentition (standard of normal occlusion).

Ontogeny, or direct occlusion, is the marginal closure of incisors and eponymous mounds of the upper and lower lateral teeth.

Biprogathia - simultaneous forward deviation of the upper and lower front teeth.

Opistognathia - simultaneous tilting back (orally) of the upper and lower front teeth.

2. Anomalies of bites - there is no complete closure of the teeth

2.1. Sagittal - a violation of the closure of the teeth in the anteroposterior direction.

Pathological prognathism (distal occlusion) - the upper dentition protrudes above the lower or the lower one moves backwards. Accompanied by disorders of biting, chewing, articulation

Pathological progeny (mesial occlusion) - the lower dentition protrudes relative to the upper, increased size of the lower jaw (true progeny). Accompanied by disorders of biting, chewing, articulation, breathing:

- frontal progeny - only the incisors of the upper jaw protrude above the lower, the upper lip noticeably sinks ("senile appearance");

- forced progeny - as a result of some inconvenience during the closing of the teeth the face becomes capricious

2.2. Transverse - with narrowing or widening of the dentition on one or both sides, lateral displacement of the mandible or a combination thereof (cross-bite):

- unilateral - reverse closure of the front and side teeth;
- bilateral - back closing of lateral teeth and correct - front;
- noticeable asymmetry of the face

2.3. Vertical - violation of the closure of the dentition relative to the horizontal plane:

- deep bite - front teeth significantly overlap the lower crowns, and in the lateral - alveolar processes are underdeveloped, their crowns are low, the lower part of the face is reduced;
- open bite - between the rows of teeth (often in front) a large gap, the lower part of the face lengthens, the tongue is contained in the gap between the teeth (especially during conversation)

3. Causes of violations and anomalies of occlusions

Artificial feeding, especially from a bottle with a long nipple and a large hole in it (sucking movements are sluggish, uneven in amplitude, the tone of the masticatory muscles and perioral muscle is reduced). Flabby, unclosed lips do not press enough on the upper incisors, which from the greater pressure of the tongue deviate forward, resulting in the development of prognostic occlusion.

Bad habits: sucking fingers, tongue, various objects, biting the lower lip, stamping the tongue on the front teeth of the upper jaw, sleeping on his back with his head down or leaning on his chest, on one side with his hand under his cheek, resting his chin on his hands.

Nasal breathing disorders with adenoid growths and tonsillitis

Congenital defects of the maxillofacial area: changes in the size of the tongue, its tone and position in the mouth, the tone of the muscles of the upper lip.

Acquired defects of the maxillofacial area: injuries, burns, inflammation, early surgery for cleft palate, tooth loss, rickets.

4. Functional disorders in occlusal anomalies

Disorders of nasal breathing, which is supplemented or replaced by oral.

Violation of the act of chewing.

Speech disorders, resulting in the development of lisp, bitterness, humming.

Hyperventilation of the lungs by increasing the frequency and depth of respiration.

Secretory and motor-evacuation disorders of the digestive organs, accompanied by morphological changes in them.

Posture disorders due to low level of physical development, changes in the position of the head and center of gravity relative to the axis of the body.

Overload of the neck muscles, resulting in impaired normal development of the trachea.

Disorders of psycho-emotional state and sociability.

5. Special tasks of FR

Restoration of nasal breathing.

Normalization of biting, chewing, swallowing.

Speech recovery.

Stimulation of growth of jaws at underdevelopment or its delay in case of their excessive development.

Strengthening of the perioral muscles, as well as muscles that extend and raise the lower jaw, palate, mouth, tongue.

Normalization of the position of the jaws.

6. General tasks of FR

Restoration of secretory and motor-evacuation function of digestive organs and prevention of structural changes of the gastric mucosa.

Normalization of the stereotype of respiration by deepening and reducing its frequency and preventing inflammatory processes of the respiratory tract.

Stimulation of respiratory capabilities.

Normalization of posture, strengthening the muscles of the neck, back, shoulder girdle.

Normalization of the patient's psychoemotional status, dynamic processes in the cerebral cortex and corticocerebral relationships.

7. Features of the use of physical exercises:

7.1. General developmental (it is necessary to take into account the level of physical and psychomotor development of the child):

- gymnastic, sports-applied, game, reflex, which develop strength, flexibility, speed and agility;
- in the form of therapeutic gymnastics, games (mobile and sports), swimming, bathing, massage;
- method of classes - mostly group and small group;
- load intensity - start with the maximum acceleration of the pulse during exercise to 110-120 per 1 min and gradually increase to 120-140 per 1 min;
- duration of classes - 30 minutes 2 times a day daily for 2-3 months to 1 year or more;
- termination of classes reduces the effectiveness of comprehensive treatment and the risk of recurrence of abnormalities

7.2. Special - perform a series of 4-6 exercises with repetition of each movement 10-15 times or more during classes.

General developmental exercises, under the supervision of adults (so that they do not become bad habits).

With pathological prognathism (distal occlusion) for:

- circular muscle of the mouth;
- cheek muscles;
- lateral pterygoid muscle;
- normalization of swallowing

With pathological progeny (medial occlusion) for:

- muscles of the tongue;
- normalization of swallowing;
- normalization of nasal breathing

With a deep bite in the vertical direction for:

- masticatory muscles;
- normalization of swallowing;
- muscles of the tongue

With an open bite in the vertical direction for:

- normalization of nasal breathing;
- circular muscle of the mouth;
- muscles of the tongue;
- masticatory muscles;
- facial muscles

8. Special exercises

8.1. To restore the nasal type of breathing (contraindicated in the presence of mechanical obstruction of nasal breathing: hypertrophy of the nasal sinuses, nasal polyps, adenoid growths, curvature of the nasal septum and performed only after surgery)

Inhale through one nostril, prolonged exhalation - through the other

Slow exhale through the nose to the back of the palm or a piece of cotton wool with a gradual increase in distance

Prolonged and intermittent pronunciation of the sounds "m", "mu", "well" with the mouth closed

Prolonged and rhythmically intermittent exhalation through the nose, pressing one thumb with one thumb and rhythmically pressing the index finger on the other

Intermittent breath (pushes) through one nostril

Self-massage of the wings of the nose

8.2. For the muscles of the tongue (especially important with open vertical bites)

Sticking out the tongue and licking the lips with the mouth half open and open

Lifting the tip of the tongue to the upper incisors and elastic conduction of it on the hard and soft palate

Giving the protruding tongue the shape of a tube, scapula and its maximum rotation in different directions

Strong support of the tip of the tongue on the upper incisors with clenched jaws

Rapid flexion and extension of the tongue, resting on the hard palate, its extension

Circular movements of the tongue on the lingual and facial surface of the teeth

Smacking the tongue, bending the tip up and back, that is, giving it the shape of a hook

Pronunciation of sounds "t-k", "rt-tr", "d-d-d"
Pressing the tip of the tongue alternately on each cheek
Slow movement of the tip of the tongue on the outer surface of the upper row of teeth (count teeth)
Sticking out the tongue in an attempt to get the tip of the nose
Swallowing saliva or small portions of water, lifting up the tip of the tongue and pressing it to the front of the hard palate

8.3. To strengthen the circular muscle of the mouth (especially necessary for distal occlusion, with low attachment of the bridle of the upper lip)

Pulling the corners of the mouth up and to the sides (actively and with your fingers)
Protrusion of the upper lip in an attempt to reach the nose during nasal inhalation
Inflating the space above the upper lip when protruding (protrusion) of the lower incisors
Massage of the circular muscle of the mouth
Inflating the cheeks with subsequent pressure on them with your fingers and slow release of air through tightly compressed lips
Squeezing the tip of the pencil with your lips and "drawing" it in the air of different letters and shapes
Tubing the lips and pronouncing the sounds "fu"
Rhythmic compression of a thin plate with the lips for 20-30 seconds
Holding the lips in a horizontal position of the ruler with a gradual increase in weight at the opposite end
Slow stretching of the corners of the mouth with the fingers with the lips compressed by the tube
Pulling one button with your hand from the other, compressed by the lips (buttons are connected by a cord)
Hold between the lips of the Friel disk for 15 minutes, folded in half paper - for 30-50 minutes

8.4. To strengthen the lateral pterygoid muscle, which provides extension of the lower jaw forward and sideways

Slowly push the lower jaw forward, trying to cover the upper ones with the lower incisors as much as possible, hold it in this position for 10-15 s, and then return to the initial position. Repeat 10-20 times, alternating with exercises for the circular muscle of the mouth
Perform the same exercise with the head turned to the right and left, sitting and standing
After mastering the above exercises, keep the lower jaw in the extended position as long as possible
Make movements to the right and left with the lower jaw
To increase the force of action on the pterygoid muscles to resist with your hands
Extend the lower jaw while watching TV (TV screen should be above face level, head tilted back)

8.5. To train the cheek muscles

Retraction of the cheeks into the mouth
Inflate the cheeks and move the air left and right with your mouth closed
Pulling the corner of the mouth left and right

8.6. For the muscles that raise the lower jaw

Opening and closing the mouth, clenching the teeth (control the force of muscle contraction with your fingers applied to the masticatory muscles)

The same exercise with finger resistance on the lower front teeth
Drying of the stick and its gradual movement along the dentition
Chewing rubber objects, chewing gum

9. Methods and criteria for assessing the adequacy of the use of physical exercises:

- anamnestic - no complaints, good mood;
- stomatoscopic - an expression of pleasure on the face, its moderate redness;
- pulsometric - the value of the pulse does not exceed the original

10. Methods and criteria for evaluating the effectiveness of comprehensive treatment:

- Gnathometric - increase in masticatory embossing on different teeth of the dentition.
- Mastication - increase the amplitude and frequency of wave-like movements of the curve, steeper downward curve.
- Electromyographic - increase in duration and amplitude of biopotentials of the restored muscles.
- Christiansen test - increase in the mass of sifted particles of chewed nuts.
- Rubinov test - reduction of swallowing time after chewing 0.8 g of hazelnut.
- Functional - restoration of nasal breathing, speech, normalization of biting, chewing, swallowing

4. Control questions:

1. Describe the normal bite.
2. What is an occlusion anomaly?
3. List the main occlusion anomalies
4. Describe the sagittal occlusion anomaly
5. Describe the transverse occlusion anomalies
6. Describe the vertical occlusion anomalies
7. List the main causes of occlusion anomalies
8. List the main functional disorders in occlusal anomalies
9. What special problems need to be solved by means of FR at anomalies of a bite?
10. List the special exercises for distal occlusion
11. List the special exercises for pathological progeny
12. List the special exercises for deep vertical bite
13. List the special exercises for open bite
14. What methods and criteria assess the adequacy of the use of exercise?
15. What methods and criteria assess the effectiveness of comprehensive treatment?

5. Literature

5.1. Basic:

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