

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 \_\_\_\_\_  
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**METHODICAL RECOMMENDATION**  
**for independent work of students during the preparation**  
**to practical lessons and on the lessons**

Academic discipline	Orthodontics
Module №1	Orthodontia. Diagnostic of dentognathic anomalies and deformations.
The theme of the lesson № 13	X-ray classification of malocclusions based on data cephalometric research. Basic forms of malocclusion: gnathic (skeletal), dento-alveolar and mixed.
Course	III
Faculty	Preparation of foreign students

**1. The relevance of the topic.** Relevance of the topic due to the need to know the X-ray classification of malocclusion, based on data of cephalometric studies for full diagnosis and planning of orthodontic treatment.

**2. Specific objectives:**

To know the features of a lateral cephalometric of human head making;  
To know the features of cephalometric of human head decoding;  
To know the X-ray classification of malocclusion;  
To know the basic forms of malocclusion;  
To know the features of gnathic forms of malocclusion;  
To know the features of dento-alveolar forms of malocclusion;  
To know the characteristics of the mixed form of malocclusion.

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

Name of previous disciplines	Skills
1. Anatomy	To find major bone and skin point
2. Roentgenology	To determine the type of radiographs. To identify landmarks of the skeleton and soft tissues.

**4. Tasks for independent work during preparation to the lesson and on 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. Cephalometric	Conducting a research at large focal distance that provides the minimum distortions of explored organ sizes.
2. The types of cephalometric	Lateral, strait.
3. The types of cephalometric points	The letters of skin points by small Latin letters, bone points – by large Latin letters.
4. X-ray forms of malocclusion	Gnathic, dento-alveolar, mixed forms.

4.2. Theoretical questions to the lesson:

1. The cephalometric method of research.
2. The essence of craniometrical study.
3. The main craniometrical parameters of the study.
4. The essence gnatometrics research.
5. The main parameters of the gnatometrics research.
6. The essence profilometric research.

7. The main parameters of the profilometric research.
8. The classification of malocclusion based on data of cephalometric studies.

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

1. To measure all angles and line sizes.
2. To determine the malocclusion form according to X-ray classification.
3. To determine the affiliation of angles to gnathic forms.
4. To determine the affiliation of angles to dento-alveolar forms.
5. To determine the affiliation of angles to mixed forms.
6. To detect deviation from the normal angular indicators for cephalometric;
7. To identify deviations from the normal linear indicators for cephalometric;
8. To determine the type of the face by Schwarz;
9. To decoding the cephalometric according to the method by Schwartz.

### **The content of the topic:**

**F.Y. Khoroshilkina (1976)** on the basis of cephalometric investigation data singles out dento-alveolar and gnathic peculiarities, macro-, normo-, or micrognathia, anterior, medial, or posterior location of jaws and their inclination relative to the cranium. According to studied lateral cephalometric of head and characteristic signs the author divides occlusion anomalies into three basic forms: dento-alveolar, gnathic, and mixed. This anomalies classification allows exact indication of pathology localization and choosing an efficient method of treatment.

**World Health Organization (WHO, 1968)** recommends the following classification of malocclusions.

#### **I. Anomalies of jaws sizes:**

Macrognathia of the upper jaw (synonym – maxillary hyperplasia).

Macrognathia of the lower jaw (synonym – mandibular hyperplasia).

Macrognathia of both jaws.

Micrognathia of the upper jaw (synonym – maxillary hypoplasia).

Micrognathia of the lower jaw (synonym – mandibular hypoplasia).

Micrognathia of both.

#### **II. Anomalies of jaws positions relative to the cranium base:**

Asymmetry (except of hemifacial atrophy or hypertrophy, unilateral condylar hyperplasia).

Mandibular prognathism.

Maxillary prognathism.

Mandibular retrognathism.

Maxillary retrognathism.

#### **III. Anomalies of dental arches correlation:**

Posterior occlusion.

Mesial occlusion.

Excessive overbite (synonym – horizontal overbite).

Excessive overjet (synonym – vertical overbite).

Open bite.

Cross bite of lateral teeth.

Lingvoocclusion of lateral teeth.

#### **IV. Anomalies of teeth position:**

1. Crowding (including imbricate overbite).
2. Transfer.
3. Rotation.
4. Spaces between teeth.
5. Transpositions.

#### **V. Unspecified bite's abnormalities**

**A. I. Betelman's classification (1956)** divides all malocclusions into the anomalies of individual teeth positions and articulation anomalies.

Articulation anomalies are viewed in three directions: sagittal, vertical, and transversal.

Characterizing of pathologic occlusions the author proceeds from morphologic peculiarities of orthognathic occlusion. Deviations in the relations in the sagittal, vertical, and transversal planes at orthognathia lead to the appearance of pathologic forms of occlusion in the same three directions. Therefore, according to A.I. Betelman, there is a necessity to differentiate three groups of pathologic forms of dental occlusion: sagittal, vertical, and transversal occlusion anomalies.

Sagittal occlusion anomalies include deviations from the norm in the mesio-distal correlation of dental arches: distal and mesial occlusions. Distal occlusion is characterized by the distal position of the lower jaw, and also the functional insufficiency of the muscles protruding the lower jaw and the orbicularis oris muscles. Besides, depending on the degree of jaws development A.I. Betelman singles out four forms of distal occlusion:

- the 1<sup>st</sup> form – lower micrognathia;
- the 2<sup>nd</sup> form – upper macrognathia;
- the 3<sup>rd</sup> form – upper macrognathia and lower micrognathia;
- the 4<sup>th</sup> form – maxillary prognathism with constriction in the lateral areas.

At mesial occlusion the lower jaw is located mesially, the protruding muscles are excessively developed, and retractors are insufficiently developed. Mesial occlusion has such forms:

- the 1<sup>st</sup> – upper micrognathia;
- the 2<sup>nd</sup> – lower macrognathia;
- the 3<sup>rd</sup> – upper micrognathia and lower macrognathia.

Vertical anomalies include cases of deviations from orthognathia, from the point of view of the degree of the upper frontal teeth covering the lower ones. The pathology has two forms: deep and open bites.

Deep (overbite) arises at the underdevelopment of the muscles protruding the lower jaw; open – at the underdevelopment of the muscles lifting the lower jaw, and also the orbicularis oris muscles.

Transversal anomalies include two forms of transversal occlusion: the first form – on one side teeth articulate as at orthognathic occlusion, and on the other side – the upper jaw is narrowed and the lower teeth cover the upper ones; the second form –

the whole lower jaw is displaced to one side and because of this on one side the palatine surfaces of the upper lateral teeth cover the buccal surfaces of the lower ones, and on the other side – the lingual surfaces of the lower lateral teeth cover the buccal surfaces of the upper ones, i.e. the teeth join not with mastication cusps but with smooth lateral surfaces.

### **Craniometry:**

Determination of jaws location – the main aim of craniometric researches is in relation to the plane of frontal part of the skull basis, i.e. determination faces type and determination of deviations from middle sizes that are characteristic for a normal bite to the same type of face.

Craniometry helps to define:

1) Location of jaws, i.e. gnathic parts of facial skeleton in sagittal and vertical directions in their relation to the plane of frontal part of skull basis:

1) in sagittal direction: anterior, middle or posterior location of gnathic part;

2) in vertical direction: inclination of gnathic part upward, middle location and downward inclination;

2) Location of TMG in relation to basis of skull the plane;

3) Length of frontal cranial fossae on which in the process of gnathometric research it is possible to define the individual norm of length of jaws bodies and existing deformation of sizes.

The innate variants of jaws location – we define according to the sizes of angles:

1) Facial.

2) Inclinal.

3) Horizontal.

**1. Facial angle (F).** We get it at crossing lines of N-Se and N-A (internal lower angle). The average size of facial angle is within the limits of  $85 \pm 5^\circ$ . His size characterizes the location of maxilla in relation to the skull basis: middle, displaced a little ahead in comparison with a face average (such location of jaws by Schwarz named “anteposition”), displaced a little back in comparison with a face average (this location of jaws Schwarz as named “retroposition”).

**2. Inclinal angle (I).** It is created by of crossing of lines Pn and SpP (internal upper angle). The average size is  $85 \pm 5^\circ$ . If angle I is more than average, then the jaws are inclined ahead more than at an average face, that was the author named “anteinclination”, if it is less, then jaws more inclined to back, this position is coned ”retroinclination”.

**3. Angle of horizontal line (H)** is created by crossing of lines H and Pn (internal upper angle). It determines the position of lower jaw head in relation to basis of skull that influences on the shape of face profile. In average this angle is  $90^\circ$ . According to Schwarz, there is interdependence of depth of middle cranial fossae and location of TMJ. The flatter the fossa is, the higher joints are, and vice versa.

With the change of orbital point (Or) location and arthral heads inclination plane H and size of H-Pn angle changes. If angle H is less then average, arthral heads are in position of “supraposition”, closer to basis of skull, if it is more there,

arthral heads are in position of “infraposition”, below skull basis, than at an “average face”. Inclination H plane combines with the change of outlines of face profile. At supraposition of arthral heads and normal development of lower jaw chin is displaced to the back, at infraposition – ahead. That is why supraposition of arthral heads influences on the form of jaw type, as retroinclination, and infraposition – as anteinclination of jaws.

As the form of lower jaw is concerned, here can be observed smoothing of chin location due to the change of growth of lower jaw ramus in length, changes of length of lower jaw base and size of its angles. The change of lower jaw form can hide the high or low location of TMJ that is defined by gnathometry.

### **Gnathometry:**

On the basis of data analysis of gnathometry it is possible:

- 1) To define the anomalies of the dento-facial system, which developed as a result of disparity of jaws sizes (lengths of jaws body, height of lower jaw ramus), anomaly of teeth position and alveolar process shape;
- 2) To find out influence of sizes and location of jaws, as well as anomalies of teeth position on the shape of face profile;
- 3) To define the degree of occlusal plane inclination to the plane of skull basis, that it is important for the aesthetically beautiful prognosis of treatment.

For the conduction of gnathometry analysis we use the following parameters:

**1. Angle of Pn-OcP** – (internal upper angle). By orientation on the position let 1<sup>st</sup> and 6<sup>th</sup> tooth (changeable bite) the average size of this angles more than by the orientation on the position of the 1<sup>st</sup> and 7<sup>th</sup> tooth (permanent bite). We choose the distal cusps of the last masticatory teeth located at central occlusion of a bite. If angles less than middle, then an occlusal plane is more up inclined in relation to skull basis, than at an “average face”, and it influences on the aesthetically beautiful prognosis of treatment of sagittal anomalies of bite. In particular, by treatment of distal bite, when the angle of occlusal planes less than 75°, the displacement of lower jaw ahead is not very effective. It is due to the fact, that the chin is displaced ahead insufficient in relation to the line Pn. If angle is more than average, after treatment of distal or a mesial bite we can expect improvement of face profile;

**a) Angle of SpP-OcP.** During the orientation at teeth 1-6 it is less, than during the orientation on 1-7 teeth. This angle reflects the vertical location of frontal and lateral teeth.

**b) Angle of OcP-MP.** By orientation on teeth 1-6, it is more than during the orientation at teeth 1-7.

**2. Angle of Pn-MP** is an internal upper angle. In average this angle is 65°. The size of this angle changes as a result of ante- and retroinclination of jaws, infra- and suprapositions of lower jaw arthral heads, and also at the anomalies of position or lower jaw development. By comparison of the craniometry and gnathometry measuring it is possible to determine the reason of this angle size changing.

**3. A basal angle (B)** is an angle of basis of jaws slope one to another (SpP-MP). Its characterized vertical position of jaws. It size is conditioned by the height of lateral teeth and size of mandibular angles. If this angle is more than average, the lateral areas of jaws are shortened, and the front ones are usually prolonged; the chin is displaced to the back, if this angle is less than average, there is an opposite correlation. The average size of angle is  $20 \pm 5^\circ$ .

**4. Mandibular angle (G)** is measured between the lines MT-1 and MT-2, e.g. by tangent to the lower edge of body of lower jaw and back surface of its branches. Its average size is  $123 \pm 10^\circ$ .

**5. Angles of teeth inclination to maxilla to the plane SpP:**

1|1 – Sp –  $70^\circ$ ,

3|3 – Sp –  $80^\circ$

4|4 – Sp –  $90^\circ$ .

The increasing of these angles sizes is marked at retrusion of upper incisors. It is characteristically for a mesial bite, underdevelopment of maxilla frontal area (shortening of frontal length, palatal position of incisors), and also at the cleft of maxilla. Diminishing of angles sizes is observed at the protrusion of upper incisors.

We distinguish 4 degrees of upper incisors protrusion by Khoroshilkina (1976):

**1 degree:** is size of angle 1|1 – Sp –  $56 - 61^\circ$ ;

**2 degree** –  $51 - 56^\circ$ ;

**3 degree** –  $46 - 51^\circ$ ;

**4 degree** –  $41 - 46^\circ$ .

**6. Angles of teeth inclination to lower jaw to the plane MP.**

1|1 – MP –  $85^\circ$ ,

3|3 – MP –  $90^\circ$ .

At the distal bite change of incisors inclination to the plane MP is poorly expressed. At a mesial bite the average size of this angle can increase.

**6. Inter-incisors angle (I - i)** this angle is created by the longitudinal axes of central incisors of upper and lower jaw. The average size is  $120-140^\circ$ .

The size of basal angle influences on the relation of incisors (B). If size of basal angle is  $40^\circ$ , then lower incisors seem to be inclined forward, an inter-incisors angle diminishes to  $120^\circ$  and there is an impression of protrusion. Such protrusion Schwarz called a false one, when not only the relation of upper and lower incisors is changed but also their inclination to the plane of basis of jaws. The sagittal anomalies of bite are sometimes combined with pathology of vertical plane (by the open bite) and large size of basal angle B that can be conditioned by the genetic features of development. In such cases prognosis of apparatus treatment is unfavorable.

At the protrusion of upper incisors in connection with distal position of lower jaw (prognathic distal bite) the inter-incisors angle diminishes, and at mesial bite – it increases.

**7. Angle of MM.** The important value at cephalometric research has the angle of MM that is created by crossing of lines APg – SpP. When measuring this angle, it is possible to define the location of chin in relation to the apical base of maxilla (point A). Line APg characterizes position of the lower jaw body; and the locations of alveolar process is determined by the size of angle AB – SpP. Equality of angles of APg-SpP and AB-SpP testifies to identical position of body and alveolar process of lower jaw in relation to the plane of basis of skull.

At the alveolar form of distal bite the line A – B on cephalometric is behind the line A – Pg. For differential diagnostics of alveolar process development anomalies and anomalies of lower jaw position we use a difference in the size of angles of APg – SpP and AB – SpP.

#### **Study of linear sizes:**

##### **1. Determination of length of lower jaw body:**

**N – Se + 3 mm = average length of lower jaw body**, jaw  $68 \pm 3$  mm in a variable bite and  $68 \pm 6$  mm in a permanent bite.

**2. Ratio of maxilla basis length toward length of skull front basis** is 7:10. Length of maxilla basis is measured from the intersection of perpendicular from a point A to SpP and to the point of PNS.

**3. Ratio of lower jaw base length toward length of upper jaw base** at orthognathic bite is **3 : 2**.

**4. Ratio of lower jaw body length toward length of its ramus** is 7:5. Length of lower jaw body is measured from the intersection of perpendicular to the point Pg on the plane of MT-1 (tangent to the body of lower jaw) to the intersection this line with tangent to the back surface of branches.

We measure the height of ramus from point-to-point crossing of MT-1 and MT-2 to point to crossing of MT-2 and plane of H.

The undevelopment of body and ramus of lower jaw in length results the form of lower face part supra position of arthral heads, and overdevelopment – as infraposition of.

**5. Determination of width of ramus to lower jaw.** For determination of degree of lower jaw ramus development it is necessary to take into account their width. The width of lower jaw ramus by Schwarz is 2/5 to the length of jaw body.

**Profilomhetry** enables to explore the form of face profile, define and specify the following:

1. Influence of craniomhetryc correlations on the form of type of person.
2. True face profile.
3. Peculiarities jaw profile that violates harmony of face (position of lips, chin, subnasal point, etc.).

At the profilomhetryc analysis of lateral cephalometric by Schwarz suggests to study the form of jaw profile by:

1. Position of lips in relation to the lines Pn and Po and to mouth tangent (line T), that connects the skin points of **sn** and **pg**.
2. Proportion of the face parts.
3. Profile angle T.



4. Taking into account the thickness of face soft tissues.

The field of jaw profile after Schwarz (KPF) is between the lines Pn and Po (nasal and orbital planes). In the jaw profile field Schwarz defines three parts of face: frontal (overhead) from the point of trichion (tr) at the edge of hairy part of the head to the point nasion (n) on a skin in the area of nose bridge; nasal or middle – from point nasion (n) to subnasale (sn); jaw (lower) from point subnasale (sn) to gnathion (gn) on the chin.

Proportion of the face is defined by correlation of its jaw and nasal parts (comparison in relation to nasal or middle), and also by width of biometrical profile field (a middle size is 15 mm). Jaw part can be a little bit more or less nasal one (within the limits of 10%).

Positions of lips determine according their attitude toward the line T – mouth tangent, which connects the skinning points of sn – pg. If this line divides the red framing of upper lip in half and runs into the external surface of the red framing of lower lip, positions of lips are called middle. If one or both lips are situated in one plane midposition, such position is called positive, if after the plane negative.

Position of lips in relation to the nasal plane, of Drejfus (Pn). In a norm the upper lip touches the line Pn, the lower lip doesn't touch line Pn (it lacks 2-3 mm) and the chin is between the lines Pn and Po.

The intersection of Line Pn and Po forms the angle T that is called profile angle. Its average size is  $10^\circ$ . At such size of angle T profile is ideal in the aesthetically beautiful relation according to Schwarz and is named straight. At the size of profile angle more than  $10^\circ$  the type of profile is named sloped back, less than  $10^\circ$  – sloped forward.

At small variability of sizes T angle harmony face features is violated insignificantly, but its expression changes. The increase of profile angle gives the face the tenderness, and decrease expression of energy and courage.

The size of profile angle T characterizes position of the chin in relation to subnasal point (sn) and determines the form of jaw profile, and consequently matters at planning of treatment at sagittal anomalies of bite.

The form of profile depends on the thickness of soft tissues. In the region (n – N) it is 6 mm in the average (true for a child and an adult), and in the region of sn – A – for children its size is 12-14 mm, and for adults –15-17 mm, i.e. the considerable increase of thickness is observed.

At the location of sn at the front mark Pn the distance is marked with a sign plus (+), at the location behind with minus (-). The thickness of soft fabrics in the region of point of pogonion (pg) matters too.

The location of lips, influences on the form of profile. A lip angle is created by the tangent connecting the most protruding points of lips with a nasal line. If this angle equals zero, both lips are on the same level, if it is situated to the left of nasal line it is considered negative, if situated to the right – positive.

The form forehead influences also the form of profile (vertical, protuberant or flat). The form of forehead matters for estimation of length of front basis of

skull. As we know, the distance **N – Se** grows up to the age of 9 in average according to Schwarz it makes 70 mm, for boys of 13 years – 73 mm, for girls of 13 years – 67 mm.

On the basis of cephalometric research information by Schwarz came to the conclusion, that it is possible to define, what is according kind of face profile is typical for, that is typical for this individual in accordance with skull formation.

If a patient has the size of angles **I and H** is more or less than average, then the difference between the average size of these angles and that is of a patient is added to the average size of profile angle **T**.

$T = 10 + (I_i - I_n) + (H_i - H_n)$ , where **I<sub>i</sub>** is the size of patient inclination angle a; **I<sub>n</sub>** is the normal size of angle of inclination; **H<sub>i</sub>** is the size of angle of horizontal line at a patient; **H<sub>n</sub>** is the normal size of angle of horizontal line.

Horoshilkina F. on the basis of lateral cephalometric of the head study specified the varieties of dento-alveolar and gnathic forms of anomalies of the bite. Sagittal, vertical and transversal anomalies of the bite can be resulted by violation of size and location of teeth; form and sizes of dental arcs; sizes of their apical bases; sizes and correlation of jaws bases; position of jaws in the skull, dislocation of lower jaw.

On the basis of study of the lateral head cephalometric according to characteristic data we distinguish three basic forms of anomalies of the bite:

1. Dentoalveolar.
2. Gnathic.
3. Mixed.

It allows to specify the localization of anomalies and to set the complex of orthodontic interferences.

After estimation of clinical information and the cephalometric inspections we give a diagnosis, determine a plan of treatment and its esthetical prognosis.

Depending on the size of facial and inclinational angles and connection of their sizes we select 9 types of the face by Schwarz.

The middle type of the face is characterized by the average facial angle – 85°, anteface (anteposition jaws) – facial angle is greater than average – 90 °, retroface (retroposition of jaws) – facial angle is smaller than average – 80 °. Each of these three sizes of facial angle (middle, bigger than middle and smaller than middle) can be reported with one of three sizes of angle of inclination. Middle size of inclination angle – 85 ° testifies a direct face. Inclination of gnathic part (anteinclination) results in the increase of this angle size to 90 ° and the type of jaws, mowed ahead. The lay-back of gnathic part (retroinclination) results in diminishing of angle to 80°, here the type of jaws is mowed back.

Direction of occlusal and mandibular planes, and also direction of incisors axes, changes at inclination (front or back).

### **Materials for self-control:**

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

1. Write down the X-ray classification of malocclusion;

2. Write down the main forms of malocclusion;
3. To draw in albums the angles of gnathic form of malocclusion;
4. To draw in albums the angles of dento-alveolar form of malocclusion;
5. To draw in albums the angles of mixed form of malocclusion.
6. Definition of the profile entity by Schwartz.
7. Definition of the face type by Schwartz.
8. The definition of dento-alveolar anomalies.
11. Definition of aesthetic treatment prognosis according to the decrypted cephalometric.
12. The choice of malocclusions treatment according to the decrypted and cephalometric.

B. Tasks for self-control:

1. Diagnosis mandibular prognathia is determined according to the classification:

WHO  
Kalvelis  
Grigorieva  
Katz  
Angle

2. The diagnosis of jaw's growth disorders (or excessive delay) is determined according to the classification:

WHO  
Kalvelis  
Grigorieva  
Katz  
Angle

3. The increase of the facial angle by cephalometry specifies:

maxillary prognathia  
mandibular prognathia  
mandibular retrognathia  
maxillary retrognathia  
micrognathia of lower jaw

4. Encoding of upper jaw micrognathia (K 07.00) considered in the classification:

MKH-10  
WHO  
Grigorieva  
Kalvelis  
Angle

5. The increase in the H angle by cephalometry indicates:

- Mandibular prognatia
- Maxillary prognatia
- Mandibular retrognathia
- Maxillary retrognathia
- Micrognathia of the mandible

6. The diagnosis of maxillary macrognathia according to classification by Betel'man is:

- increase the size of the upper jaw
- front position of the upper jaw in the skull
- rear position of the upper jaw in the skull
- violation of the structure of the cranial bones
- deformation of any division of the jaw

7. On the dental-alveolar form of anomalies shows an increase in the parameters:

- enter-incisor angle
- facial angle
- horizontal angle
- inclination angle
- profile angle

8. An increase in the basal angle on cephalometry indicates:

- gnathic form of anomalies
- dental-alveolar form of anomalies
- articular form of the anomaly
- profile form of anomalies
- combined form of anomaly

9. The diagnosis of the jaw's asymmetry is determined on the classification:

- WHO
- MKH-10
- Grigorieva
- Kalvelis
- Angle

10. Diagnosis maxillary hyperplasia is:

- increasing of the upper jaw size
- frontal position of the upper jaw in the skull
- rear position of the upper jaw in the skull
- violation of the cranial bones structure
- deformation of the jaw at any division

11. Reduce the inclination angle on cephalometry indicates:  
gnathic form of anomalies  
dental-alveolar form of anomalies  
articular form of anomaly  
profile form anomalies  
combined form of anomaly

12. The diagnosis of micrognathia of both jaws is determined according to the classification:

WHO  
Kalvelis  
Grigorieva  
MKH-10  
Angle

13. Anomalies of jaw's size are considered in classification:

WHO  
Kalvelis  
Grigorieva  
Katz  
Angle

14. Diagnosis incorrect positioning of the jaws in the skull "asymmetry" is determined according to the classification:

WHO  
Kalvelis  
Grigorieva  
MKH-10  
Angle

15. Diagnosis of the jaw deformity is determined according to the classification:

Kalamkarova  
WHO  
Betel'man  
MKH-10  
Kalvelis

16. The increase in the Go angle on the cephalometry indicates:

gnathic form of anomalies  
dental-alveolar form of anomalies  
articular form of anomaly  
profile form of anomalies  
combined form of anomaly

17. A frontal jaw position in the skull is determined according to the classification:

WHO  
Angle  
Betel'man  
MKH-10  
Kalvelis

18. Patient G., 19 years old diagnosed with posterior occlusion, the maxillary macrognathia. Anomalies of the jaws size is provided by the following classification:

WHO  
Grigorieva  
Kalvelis  
Katz  
Angle

19. Patient H. 20 years, diagnosed with class III malocclusion, maxillary micrognathia. Anomalies of the jaws size is provided by the following classification:

WHO  
Grigorieva  
Kalvelis  
Katz  
Angle

20. Patient V., 27 years, diagnosed with class III malocclusion, mandibular macrognathia. Anomalies of the jaws size is provided by the following classification:

WHO  
Grigorieva  
Kalvelis  
Katz  
Angle

21. Patient S. 17 years diagnosed with cross bite. Diagnosis incorrect positioning of the jaws in the skull "asymmetry" is determined according to the classification:

WHO  
Grigorieva  
Kalvelis  
Katz  
Angle

22. Patient N. 27 years old diagnosed with distal occlusion, mandibular micrognathia. Anomalies of the jaws size is provided by the following classification:

WHO  
Grigorieva  
Kalvelis  
Katz  
Angle

23. Patient N. 20 years diagnosed with distal occlusion, mandibular micrognathia. The diagnosis of mandibular micrognathia is:

reducing of the lower jaw size  
frontal position of the upper jaw in the skull  
rear position of the upper jaw in the skull  
violation of the cranial bones structure  
deformation of the jaw at any division

24. Patient H. 20 years, diagnosed with class III malocclusion, maxillary micrognathia. Anomalies of the jaws size is provided by the following classification:

Betel'man  
Grigorieva  
Kalvelis  
Katz  
Angle

25. Patient H. 20 years diagnosed with distal occlusion, the maxillary macrognathia. Anomalies of the jaws size is provided by the following classification:

Betel'man  
Grigorieva  
Kalvelis  
Katz  
Angle

26. Patient H. 20 years, diagnosed with class III malocclusion, mandibular macrognathia. The diagnosis of deformation is determined according to the classification:

Betel'man  
Grigorieva  
Kalvelis  
Katz  
Angle

27. Patient G., 20 years, diagnosed with class III malocclusion, mandibular prognathia. The diagnosis according to the classification:

WHO

Grigorieva

Kalvelis

Katz

Angle

28. Patient N. 20 years diagnosed with distal occlusion, mandibular micrognathia. The diagnosis of mandibular micrognathia evidence:

reducing the lower jaw size

frontal position of the upper jaw in the skull

rear position of the upper jaw in the skull

violation of the cranial bones structure

deformation of the jaw at any division

29. Patient V., 27 years, diagnosed with class III malocclusion, mandibular macrognathia. Anomalies of the jaws size according to the classification:

Betel'man

Grigorieva

Kalvelis

Katz

Angle

30. Patient T., 30 years old diagnosed with posterior occlusion, the maxillary prognathia. The diagnosis according to the classification:

WHO

Angle

Betel'man

MKH-10

Kalvelis

31. Patient D. 15 years old diagnosed with distal occlusion, the maxillary macrognathia. The diagnosis according to the classification:

Betel'man

Grigorieva

Kalvelis

Katz

Angle

32. Patient 20 years old, diagnosed with class III malocclusion, mandibular macrognathia. The diagnosis of mandibular macrognathia according to the classification of Betel'man is:



increasing of the lower jaw size  
frontal position of the upper jaw in the skull  
rear position of the upper jaw in the skull  
violation of the structure of the cranial bones  
deformation of the jaw at any division

33. Patient N. 30 years diagnosed with open bite, maxillary prognathia. The diagnosis according to the classification:

WHO  
Angle  
Betel'man  
MKH-10  
Kalvelis

34. Patient T., 25 years old diagnosed with a deep bite, maxillary prognathia. The diagnosis according to the classification:

WHO  
Angle  
Betel'man  
MKH-10  
Kalvelis

35. Patient N. 30 years old diagnosed with a deep bite, mandibular micrognathia. The diagnosis according to the classification:

WHO  
Angle  
Betel'man  
MKH-10  
Kalvelis

## **Literature**

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