ODESSA NATIONAL MEDICAL UNIVERSITY

Department of Radiation Diagnostics, Therapy, radiation medicine and Oncology

METHODICAL RECOMMENDATIONS FOR STUDYING THE TOPIC:

"Variants of development of the teath and maxillofacial region".

(for the 3th year students of the dentistry faculty)

Approved
at the methodical meeting of the department
"27" August 2021
Protocol №1
Head Department Sokolov V.M.

ODESSA- 2021

"Options for the development of teeth and maxillofacial area»- 2 hours.

1. **Actuality of theme.**

The choice of the optimal method of treatment of dental diseases depends on the correct diagnosis, which is based on understanding the problem and the use of additional methods of examination. In this regard, early, informative X-ray diagnosis of complications, diseases and injuries of the maxillofacial area, objective assessment of treatment results in the near and distant periods is an urgent problem of modern dentistry.

2. **Objectives of the lesson:**

2.1 General goals:

1. The student must know the features of the anatomical structure of the maxillofacial area in children of different ages and features of physiological processes in children.

2. The student must know the anatomical structure of the jaws and guidelines for determining target points during anesthesia in children of different ages

3. The student must know the anatomical structure, timing of teething and root resorption.

2.2 Educational:

1. Improving the use of modern methods of X-ray diagnostics in the practice of dentists, the introduction of modern methods of radiodiagnostics.

2. Legal representations - information on this topic allows the doctor to avoid unfounded accusations of complications during the disease after medical or diagnostic procedures.

2.3. Specific goals:

- know:

1. Features of methods of examination of patients in this group.

2. Be able to distinguish between "norm" and "pathology" in dental practice.

3. Indications and contraindications for the use of various methods of radiological examination.

2.4. Based on theoretical knowledge on the topic:

- master the techniques / be able /:

1. Be able to choose the appropriate method of radiological examination in their own dental practice in a specific clinical case.

2. Be able to justify the appointment in the patient's medical history and fill out referrals for examination.

3. Be able to interpret (evaluate) the results of the study.

4**.** Be able to explain to the patient the results of radiological examination.

3. Materials for classroom independent training (interdisciplinary integration).

Names of previous disciplines	Acquired knowledge and skills
1. Anatomy	The structure of the maxillofacial area, blood supply and innervation.
2. Histology	Ability to draw a diagram of embryonic development of the maxillofacial area and histological structure of teeth.
3. Pediatric therapeutic dentistry	Knowledge of the timing of bookmarking, formation and eruption of deciduous and permanent teeth. Features of histological structure of the oral mucosa.

4. Content of the topic (text or thesis), graph-logical structure of the lesson.

1. Age features of jaw development.
2. Options for mineralization of the jaws.
3. Classification of dental anomalies.

3.1. Age formation of dentitions.

The eruption of permanent teeth is characterized by order, parity and consistency. Sequence of eruption of teeth: - upper jaw: 6, 1, 2, 4, 3, 5, 7, 8 - lower jaw: 6, 1, 2, 3, 4, 5, 7, 8 Average terms of eruption of permanent teeth are as follows: first molars - 6-7 years; central cutters - 7-8 years; lateral incisors - 8-9 years, the first premolars - 9-11 years; canines - 10-12 years; second premolars - 11-13 years; second molars - 12-13 years. All teeth are the first to erupt on the lower jaw, except for the first premolars. Parity is expressed by the fact that the teeth of the same name on each half of the jaw erupt at the same time.

Permanent teeth are divided into 2 groups: replacement (incisors, canines, premolars) and additional (group of molars - the first, second and third). The first permanent molar needs to erupt the appropriate place, which is created by growth in the corner of the lower jaw and maxillary hump. Then cutters are cut, which are larger than temporary. Therefore, for the correct location of them in the dental arch requires the presence of physiological diastemas and three. The rudiments of the lower incisors are located behind the temporary teeth. Their correct installation in the dentition is carried out under the pressure of the tongue. Permanent canine more than temporary. Therefore, in violation of the sequence of eruption of permanent teeth and the absence of physiological tremors, canines can erupt outside the dental arch.

The second period- begins at age 9, is characterized by changes in canines, eruption of premolars and second molars. With the complete replacement of temporary teeth with permanent ones there is a III physiological rise in occlusal

height If the change of teeth occurs physiologically, the canines erupt after the first premolar, which is smaller than the replaced tooth by an average of 2.5-4 mm (upper) . Free space and the presence of three ensures the correct placement of the canines. The second premolars are also smaller than the second temporary molars. Therefore, after their replacement, a space is formed occupied by the first permanent molars, which tend to move mesially. Preparation of the site for the eruption of the second permanent molars begins immediately after the eruption of the first permanent molars. The space for them on the lower jaw is formed both due to the medial movement of the first permanent molars, and due to the resorption of the bone of the anterior side of the mandibular branch and tumors on the posterior surface. An alveolar sprout grows in length on the upper jaw. The growth of alveolar processes in width and the frontal part of the upper jaw in length is due to the formation of bone tissue on the outer surface of alveolar shoots and bone resorption on its inner surface. Bone formation is the result of osteoblasts, and resorption is the result of osteoclasts. These two opposite processes determine the formation and growth of the jaw bones. In the development of the jaw bones, especially their alveolar processes, the balance of antagonistic muscles (which raise and lower the mandible, move it back and forth) is essential, right and left). Facial muscles and muscles of the tongue play an important role in this process. If the muscles of the tongue are like a stimulator of the development of the jaw bones, the facial muscles act as their antagonists. Due to changes in the shape and function of the temporomandibular joints, the structure and relationship of dental arches change. If in the temporary occlusion the occlusal surface is horizontal, then in the variable occlusion compensatory occlusal curves are formed - sagittal and transverse. Their severity depends on the size of the articular tubercle. The sagittal occlusal curve ensures the contact of the dental arches during the movement of the mandible forward at a minimum of 3 points, which are located in the form of a triangle with bases on the molars and the apex on the front teeth. These three contact points are called the Bonville three-point contact.

Simultaneously with the sagittal, a transverse occlusal curve is formed, which provides contact of the dentition during transverse (lateral) movements of the mandible. The change of teeth on the upper jaw begins 6-9 months later than on the lower, after the increase of the frontal part of the lower dental arch. Therefore, there is a secondary formation of three or an increase in three that already exist, only on the upper jaw, which means its adaptation to the increased oval of the frontal area of the lower dental arch. If the permanent teeth erupted only in the vertical direction, the result would be their clustered position. But the rudiments of permanent teeth during eruption also move in the vestibular direction, thereby contributing to the expansion of the dental-alveolar arch. The

location of the rudiment of a permanent tooth is an important factor that determines the direction of its eruption. However, despite the fact that the location of the rudiment of a permanent tooth is genetically determined, it is affected by the environment. Proper functioning of the soft tissues outside and inside the mouth is especially important during this period. Permanent teeth before eruption are covered on the vestibular side with a very thin bone wall, sometimes resorbed. Therefore, increased pressure around the oral muscles during teething can interfere with the proper growth and formation of dental alveolar arches. At the same time, muscles can stimulate oppositional bone growth. The tooth that erupts is affected by: the growth of the jaws, the pressure of the muscles of the lips, cheeks and tongue, the pressure of the inclined planes of the tubercles of the crowns of the antagonist teeth. The growth of the jaws during the change of teeth is due to three factors: that the location of the rudiment of a permanent tooth is genetically determined, it is influenced by the environment. Proper functioning of the soft tissues outside and inside the mouth is especially important during this period. Permanent teeth before eruption are covered on the vestibular side with a very thin bone wall, sometimes resorbed. Therefore, increased pressure around the oral muscles during teething can interfere with the proper growth and formation of dental alveolar arches. At the same time, muscles can stimulate oppositional bone growth. The tooth that erupts is affected by: the growth of the jaws, the pressure of the muscles of the lips, cheeks and tongue, the pressure of the inclined planes of the tubercles of the crowns of the antagonist teeth. The growth of the jaws during the change of teeth is due to three factors: that the location of the rudiment of a permanent tooth is genetically determined, it is influenced by the environment. Proper functioning of the soft tissues outside and inside the mouth is especially important during this period. Permanent teeth before eruption are covered on the vestibular side with a very thin bone wall, sometimes resorbed. Therefore, increased pressure around the oral muscles during teething can interfere with the proper growth and formation of dental alveolar arches. At the same time, muscles can stimulate oppositional bone growth. The tooth that erupts is affected by: the growth of the jaws, the pressure of the muscles of the lips, cheeks and tongue, the pressure of the inclined planes of the tubercles of the crowns of the antagonist teeth. The growth of the jaws during the change of teeth is due to three factors: Proper functioning of the soft tissues outside and inside the mouth is especially important during this period. Permanent teeth before eruption are covered on the vestibular side with a very thin bone wall, sometimes resorbed. Therefore, increased pressure around the oral muscles during teething can interfere with the proper growth and formation of dental alveolar arches. At the same time, muscles can stimulate oppositional bone growth. The tooth that erupts is affected by: the growth of the jaws, the pressure of the muscles of the lips, cheeks and tongue, the pressure of the inclined planes of the tubercles of the crowns of the antagonist teeth. The growth of the jaws during the change of teeth is due to three factors: Proper functioning of the soft tissues outside and inside the mouth is especially important during this period.

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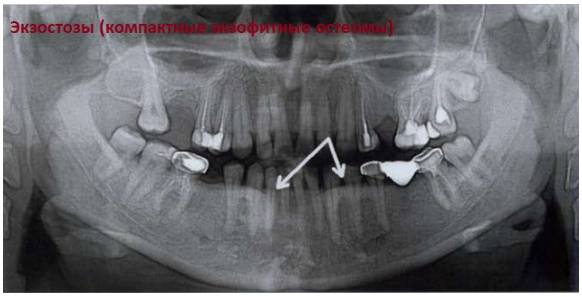
And the factor - the biological tendency to grow;

Factor II - eruption of permanent teeth;

Factor III is a normal function of the masticatory muscles, which becomes complete in a permanent bite.

3.2. Options for mineralization of the jaws.

339. Ортопантомограмма. Эндостозы нижней челюсти различных размеров



3.3. The World Health Organization (WHO, 1968) recommends the following classification of dental anomalies in the CBOY Systematization of Diseases:

A. Anomalies in the size of the jaws:

1. Macrognathia of the upper jaw (syn. Maxillary hyperplasia),
2. Macrognathia of the mandible (syn. Mandibular hyperplasia).
3. Macrognathia of both jaws.
4. Micrognathia of the upper jaw (syn. Maxillary hypoplasia).
5. Micrognathia of the mandible (syn. Mandibular hypoplasia).
6. Micrognathia of both jaws.

B. Anomalies in the location of the jaws relative to the base of the skull.

1. Asymmetry (except for hemifacial atrophy or hypertrophy, unilateral condylar hyperplasia).
2. Mandibular prognathism.
3. Maxillary prognathism.
4. Mandibular retrognathia.
5. Maxillary retrognathia.

C. Anomalies of the ratio of dental arches.

1. Distal occlusion.
2. Mesial occlusion.
3. Excessive overlap (syn. Horizontal overlapping bite).
4. Excessive overlapping bite (syn. Vertical overlapping bite).
5. Open bite.
6. Cross-bite of lateral teeth.
7. Linguo-occlusion of the lateral teeth of the mandible.

5. Materials of methodical providing of employment.

5.1. Tasks for self-examination of the ascending level of knowledge and skills.

1. Technique of obtaining intraoral X-rays.
3. Methods of radiological examination of teeth and jaws.
4. Projections in dental radiography: orthoradial, medial-eccentric, distal-eccentric, axial.
5. Features of X-ray picture of the upper and lower jaws of the child.
6. Features of X-ray picture of the upper and lower jaws of an adult.
7. Features of X-ray picture of the upper and lower jaws in old age.

8. Determination of the ratio of tooth roots and maxillary cavity on radiographs.

9. Normal X-ray anatomy of the upper and lower jaws.

5.2. Methodical instructions for performing an individual task in class:

Having received radiographs for analysis, the student must correctly place them on the negatoscope, as well as analyze them, following a certain sequence according to the scheme-algorithm:

1. Determine the study area (body part, organ).
2. Determine the method of research.
3. Find out what was the direction of the rays (projection).
4. Evaluate the image quality.
5. Recognize visible images of anatomical formations.
6. Find out the nature of the shadow of each anatomical formation and the existing deviations from the norm: position, shape, size, contours and intensity of the shadow.
7. To establish the presence of pathological changes in transparency (shadows and enlightenment) and conduct their X-ray morphological analysis.
8. Compare the detected changes in the images in different projections.
9. On the basis of the analysis taking into account clinical data to make a differential diagnostic conclusion. Using the scheme of sequence of the analysis of radiographs, the student should answer in writing each question stated in this scheme, and to make schematic sketches from radiographs. Then submit everything to the teacher for monitoring and joint analysis of the results.

5.3. The information necessary for the formation of knowledge and skills can be found in textbooks:

-main (basic):

1. Radiology (radiation diagnostics and radiation therapy). Kyiv, Book Plus, 2018. -721 p.

2. Radiology (radiation diagnostics and radiation therapy). Test tasks. Part 1. Kyiv, Book Plus. 2015. -104 p.

3. Radiology (radiation diagnostics and radiation therapy). Test tasks. Part 2. Kyiv, Book Plus. 2015. -168 p.

4. Radiology (radiation diagnostics and radiation therapy). Test tasks. Part 3. Kyiv, Book Plus. 2015. -248 p.

5. Smaglyuk LV Basic course in orthodontics / LV Smaglyuk, AE Karasyunok, AM Belous. - Poltava: Blitz Style, 2019. - P.151-152.

6. Tkachenko PI Clinical and morphological aspects of anomalies in the development of teeth / PITkachenko, II Starchenko, SO Bilokon, OV Gurzhiy. - Poltava: ASMI LLC, 2014.– 79 p. (Monograph).

-Auxiliary:

1. Abdelkarim A. Three-dimensional imaging for indirect-direct bonding could expose patients to unnecessary radiation. Am J Orthod Dentofacial Orthop. 2017Jan; 151 (1): 6. doi: 10.1016 / j.ajodo.2016.10.006. PubMed PMID: 28024783. Никберг И.И. Ionizing radiation and human health. K. Health, 1989, p. 6-13.

2. Educational edition Center for testing the professional competence of specialists with higher education in the fields of "Medicine" and "Pharmacy". Collection of test tasks for passing the license exam: Step 3. Dentistry. Kyiv. Center for testing the professional competence of specialists with higher education in the fields of "Medicine" and "Pharmacy" (in Ukrainian) 2018. - 24 p.

3. Possibilities of modern x-ray examination methods for diagnostics of hidden dental caries of approximal localization / I. I. Sokolova, S. I. German, TV Tomilina et all // Wiadomości Lekarskie. - Vol. LXXII, N 7. - 2019. - P. 1258–1265. (Scopus).

4. Radiographic studies in dentistry: recommendations for the selection of patients and limiting radiation exposure. Educational and methodical manual for interns in the specialty "Dentistry" and dentists / Sokolova II, Udovychenko NM, Herman SI and others. // Kharkiv KhNMU, 2020, p.4-37.

5. http://www.dentalexpert.com.ua/index.php/stomatology/article/view/200.

6. https://stom.tilimen.org/izmeneniya-kolichestva-i-formi-zubov.html

7. https://radiopaedia.org/articles/dental-caries?lang=us

8. https://radiopaedia.org/cases/dental-abscess-extending-into-the-submandibular-space?lang=us

5.4.Orienting map for independent work with literature on the topic: «Options for the development of teeth and maxillofacial area».

№	Task	Instructions for the task	Independent records of students
1.	Make schematic sketches before the rule of isomerism in the intraoral radiograph.	Draw in a workbook a diagram of the normal image of individual teeth in the X-ray image.	
2.	Make a schematic sketch of the trajectory of the focus in panoramic tomography.	Schematically draw in the workbook a diagram of the trajectory of the focus during panoramic tomography.	
3.	Find on the Internet radiographs of teeth and jaws on which artifacts are found	Sketch the radiographs found and explain why the artifacts appeared	

4.	To study the scheme of eruption of deciduous and permanent teeth.	Draw in a workbook the scheme of eruption of deciduous and permanent teeth.	

6. Materials for self-control over the quality of training.

Questions for self-control.

1. Name the radial signs of a normal tooth image according to the scheme: the shadow of the enamel cover and dentin crowns; enlightenment of the tooth cavity and root canal; lateral parts of the periodontal space; image of the interdental membrane.
2. Name the signs of teeth of the upper and lower jaws. How are they different?
3. Name the criteria for assessing adjacent teeth.
4. Describe the features of children's dentition in the beam image.
5. Describe the turn of normal tooth changes.
6. Describe the development of the jaw in an X-ray image.

7. **Practical work (tasks) performed in class:**

1. Students according to the algorithm from their own workbooks (which have from the previous lesson) under the guidance of the teacher is a systematic analysis of typical radiographs of different parts of the facial skull and teeth.
2. The student receives an individual task in the form of sets of radiographs of the facial skull and teeth in normal and pathology. Each student individually analyzes the X-ray picture presented in the pictures, reveals the reflection of individual anatomical structures and details and performs a schematic sketch.
3. The result of the individual task is analyzed in a group.

8. The topic of the next lesson: "Anomalies in the development of teeth».

9. Tasks for UDRS and NDRS on the topic of the next lesson:

Disorders of teething (persistent and retained teeth). Violation of the number of teeth (supradentia, adentia). Anomaly of size and shape (macro- and micro-dentia). Anomaly of tooth location: vestibular and mesial dystopia, oral and distal dystopia, supraposition and infraposition, cake position, transposition.

Methodical recommendations were _____ as. Kaouk AS