

ODESSA NATIONAL MEDICAL UNIVERSITY

**Department of Radiation Diagnostics, Therapy, radiation medicine
and Oncology**

METHODICAL RECOMMENDATIONS FOR STUDYING THE TOPIC:

**"Radiation signs of tumor (benign and malignant) lesions of the 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

"Radiation signs of tumor (benign and malignant) lesions of the maxillofacial system" - 2 hours.

1. Relevance of the topic

The urgency of the problem of diagnosis and treatment of patients with tumors of the maxillofacial system is due to the uncontrollable growth of morbidity and mortality from neoplastic processes of this localization. According to numerous studies, the neglect of cancer of the maxillofacial system is due to the incompetence of specialists to whom patients turn.

2. Objectives of the lesson:

2.1 General goals:

1. To study the radiological signs of pathological changes that occur in benign and malignant tumors of the maxillofacial system.
2. Learn to distinguish between radiological signs of benign and malignant tumors.
3. To study the classification of malignant tumors of the maxillofacial system by TNM.
4. To study the algorithm of examination of patients with suspected tumor processes maxillofacial system.

2.2 Educational:

1. Improving the use of modern methods of X-ray diagnostics in the practice of dentist allows timely diagnosis and implementation of modern methods of treatment of tumors of the maxillofacial system.
2. The study of this topic allows to implement modern methods of radiodiagnostics.

2.3. Specific goals:

1. Be able to distinguish between different forms of tumors in dental practice.
2. Features of methods of examination of patients with suspected tumors of the maxillofacial system.
3. Indications and contraindications for the use of various methods of radiological examination. Including radiological examination.

Learn to diagnose tumors of the maxillofacial system and oral organs using radiological methods. To study the features of the clinical course of benign, tumor-like, and malignant tumors of the maxillofacial system.

2.4. Based on theoretical knowledge on the topic:

- master the techniques / be able /:

1. Examine a patient with a tumor of the left ventricle, using a radiological method of diagnosis to establish the diagnosis.

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

Discipline	Know	Be able to
Physics	Physical bases of image acquisition	Be able to explain the physical basis of obtaining images
Anatomy and radiation anatomy	Features of structure and beam image of teeth and jaws	Be able to explain the structure and radiation image of teeth and jaws
Histology	Histological structure of cells and tissues that make up teeth and jaws	Explain the features of the histological structure of cells and tissues that make up teeth and jaws

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

For the correct analysis of the studied pathology it is necessary to understand and remember the following. Odontogenic tumors include neoplasms of the jaws that are built of tooth tissue. Radiological signs of adamantinomas are round or oval cavities (foci of enlightenment) with different sizes and clear contours. Cystic cavities meet and layer on top of each other and create a structure that resembles "soap foam bubbles". Odontomas are characterized by extreme polymorphism of histological structure. Dentin and cement or cement and bone elements without dentin, and also soft tissues of a tooth (pulp, periodontium) can take part in their formation. There are two types of odontoma, which are detected by X-ray examination: simple and complex. A simple odontoma is characterized by the presence of one deformed tooth or its rudiment, and a complex odontoma is characterized by the presence of several teeth or their rudiments. In the X-ray image, the odontoma has the appearance of a shadow of irregular round or oval shape, which sometimes has wavy contours.

Simple odontomas give shadows smaller than complex ones and are located closer to the alveolar process. A narrow light band is always clearly visible around the tumor, which is a reflection of its connective tissue capsule, which is actively involved in the growth and differentiation of the odontoma.

Signs of a radicular cyst in the X-ray image are the correct spherical shape, location at the apex of the root, smooth and well-defined contours and a thin strip of sclerosed bone around it. At the big sizes of a cyst spreading of roots of the next teeth and convergence of crowns is observed. In contrast sinusography, you can

determine the size, location of the cyst, the condition of the mucous membrane of the maxillary sinus, as well as its walls. Radiologically, a cyst that penetrates the maxillary sinus has the appearance of a round filling defect on the background of a uniform intense shadow of the contrast agent that fills the sinus. A follicular or coronary cyst is formed from the remnants of a dental germ and is essentially the result of an anomaly of development. Radiological signs of it are a defect in the bone of round or oval shape with clear, thin, sclerosed walls. In the cavity there is always a tooth germ at one stage or another of its development or a fully formed tooth. Follicular cysts often contain one tooth, but sometimes you can see several teeth in the cavity. Follicular cysts, in contrast to the root, are called coronary, ie located around the crown of the teeth. However, often the whole tooth is completely immersed in the cyst cavity. A cyst of the palatine canal is formed from areas of epithelium that have split off in the embryonic period. Radiologically, this cyst is characterized by the fact that it is located in the center of the anterior part of the upper jaw, has smooth clear contours with a corolla around. From the usual radicular cyst of the palatine canal differs in its middle position and lack of connection with any tooth. In the cavity there is always a tooth germ at one stage or another of its development or a fully formed tooth. Follicular cysts often contain one tooth, but sometimes you can see several teeth in the cavity. Follicular cysts, in contrast to the root, are called coronary, ie located around the crown of the teeth. However, often the whole tooth is completely immersed in the cyst cavity. A cyst of the palatine canal is formed from areas of epithelium that have split off in the embryonic period. Radiologically, this cyst is characterized by the fact that it is located in the center of the anterior part of the upper jaw, has smooth clear contours with a corolla around. From the usual radicular cyst of the palatine canal differs in its middle position and lack of connection with any tooth. In the cavity there is always a tooth germ at one stage or another of its development or a fully formed tooth. Follicular cysts often contain one tooth, but sometimes you can see several teeth in the cavity. Follicular cysts, in contrast to the root, are called coronary, ie located around the crown of the teeth. However, often the whole tooth is completely immersed in the cyst cavity. A cyst of the palatine canal is formed from areas of epithelium that have split off in the embryonic period. Radiologically, this cyst is characterized by the fact that it is located in the center of the anterior part of the upper jaw, has smooth clear contours with a corolla around. From the usual radicular cyst of the palatine canal differs in its middle position and lack of connection with any tooth.

Depending on the structure, there are the following types of osteomas: compact, spongy and mixed, and the place of origin - periosteal and enostal forms. A representative of the periosteal form of osteoma is exostosis of the jaw. It has an oval or elongated shape and develops mainly on the alveolar process. In most cases, periosteal osteomas consist of compact bone tissue, which gives an intense shadow in the X-ray image, which is easily distinguished from normal jaw bone tissue. Enostal osteomas are most often located deep in the bone mass of the jaw or

alveolar process and have a spongy or mixed structure. On the radiograph enossal compact osteoma of the jaw has the form of bone formation of different sizes and shapes with well-defined contours, which differs well against the background of the bone structure of the surrounding normal bone. At the central spongy osteoma there can be big difficulties in diagnosis as changes of structure in a bone can be insignificant. Sometimes characterized by a denser palette of bone beams of spongy substance, forming a kind of atypical bone pattern of the tumor. With mixed central osteoma radiologically on the background of weak bone structure of tumor tissue corresponding to the cancellous bone - different shapes and sizes of compact bone or inverse relationships. forming a kind of atypical bone pattern of the tumor. With mixed central osteoma radiologically on the background of weak bone structure of tumor tissue corresponding to the cancellous bone - different shapes and sizes of compact bone or inverse relationships. forming a kind of atypical bone pattern of the tumor. With mixed central osteoma radiologically on the background of weak bone structure of tumor tissue corresponding to the cancellous bone - different shapes and sizes of compact bone or inverse relationships.

Chondroma of the jaw is radiologically characterized by an area of enlightenment in the bone of various sizes and shapes. Against the background of such enlightenment you can see the deposits of lime or islands of bone tissue.

At a hemangioma of a jaw radiologically the expansion of bone marrow centers, resorption of bone beams comes to light, in this connection there is a peculiar "porous" drawing. In some areas around the vascular nodes there is a sclerotic rearrangement of the bone structure, as a result of which against the background of the "cellular" pattern on the radiograph you can see annular enlightenment, corresponding to the lumen of blood vessels and bordered by dense bone.

Osteogenic sarcoma in the vast majority of cases arises from the bone tissue of the alveolar process or the lower edge of the mandible. On radiographs it is always possible to see a picture of destruction of bone tissue without any inflammatory reaction. Destructive foci have an irregular shape and uneven contours, which indicates the presence of infiltrative growth, as a result of which the edges of the foci of bone destruction on the periphery gradually turn into a normal bone structure. Reticulosarcoma is localized in the body of the lower jaw. In the early phase of sarcoma, the radiograph shows a relatively large focus of destruction, around which are several small destructive foci, very poorly delineated, with uneven, blurred edges. In the future, due to tumor growth, the bone in the affected area appears slightly swollen, and the cortical layer is reduced due to the increase in the size and number of destructive foci. However, the inequality of the contours and the phenomenon of infiltrative growth are clearly preserved.

A distinction should be made between primary and secondary jaw cancer. Primary cancer is localized in the alveolar process and arises from the accumulation of epithelial cells of Manasseh scattered in the periodontium. Initially, the bone tissue of the jaw is affected. Secondary cancer arises from the

epithelium of the mucous membranes and glands of the maxillary cavity, oral cavity, soft and hard palate. At the same time soft tissues are affected first of all, bone damage is secondary. It should be remembered that X-ray examination in both primary and secondary cancer can reveal the involvement of bone tissue in the tumor process, the degree and depth of destructive phenomena in bone, tumor spread, as well as the presence of bone islands and calcifications in tumor tissue differential mark in favor of osteogenic sarcoma. The radiograph clearly shows the marginal

bone defect, the contours of which are smooth, well defined. Confident recognition of jaw cancer, identification of its histological structure is possible on the basis of biopsy data.

5. Materials of methodical providing of employment.

5.1. Tasks for self-examination of the ascending level of knowledge-skills / with the provision at the end of the block of tasks of the standards of answers - tasks of the II level; tests of 5 structural types also with standards of answers /.

5.2. The information necessary for the formation of knowledge and skills can be found in textbooks: / provides the main literature sources with the designation of pages /:

5.3. Orienting map for independent work with literature on the topic occupation.

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).

7. Radiation diagnostics: [In 4 vols.] / Koval G.Yu., Mechev DS, Miroshnichenko SI, Sharmazanova OP, Shcherbina OV etc. / Ed. G.Yu. Blacksmith. - Kyiv: Medicine of Ukraine, 2018. - Vol.1. - 302 p

-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 in 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. Westbrook K., Cout Roth K., Talbot J. Magnetic resonance imaging: a practical guide to the lane. with English - 3rd ed. M. : BINOM, 2015.
6. Kovalsky OV, Mechev DS, Danilevich VP Radiology (radiation therapy, radiation diagnostics). - Vinnytsia: "New Book", 2017.- 518 p.
7. <http://www.dentalexpert.com.ua/index.php/stomatology/article/view/200>.
8. <https://www.slideshare.net/medumed/ss-8800317>
9. <https://stom.tilimen.org/izmeneniya-kolichestva-i-formi-zubov.html>
10. EBS publishing house "Lan" Address: <http://e.lanbook.com/>
11. Base data of publications "Polpred.com Media Review" Address: <http://www.polpred.com/>

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

AND. *Questions for self-control*

1. Radiological signs of tumors of odontogenic origin.
2. Radiological signs of adamantinomas.
3. Radiological signs of odontoma.
4. Radiological signs of radicular cyst.
5. Radiological signs of follicular cyst.
6. Radiological signs of osteoma of the jaw.
7. Radiological signs of benign tumors of the facial skeleton emanating from the vessels. Radiological signs of osteoblastoclastoma of the jaws.
8. Radiological signs of malignant neoplasms of the jaws.
9. Possibilities of X-ray diagnosis of osteogenic sarcoma.

10. Radiological signs of cancer of the jaws.

7. Materials for classroom independent training:

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 X-rays and CT scans 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 (presence of malignant and benign changes). 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. According to the provided schemes describe the provided X-rays.

3. The result of the individual task is analyzed in a group.

8. Methods of work, stages of implementation.

1. Materials for self-control of mastering the knowledge, skills, abilities provided by this work are attached.

2. The topic of the next lesson.

Biological action of ionizing radiation. Radioactivity and dose. Dosimetry of ionizing radiation. Principles and methods of radiation therapy in dentistry.

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

1. Physical and technical bases of radiation therapy in dentistry;
2. Radiation therapy with high energy sources in dentistry;
3. Radiotherapy procedures in dentistry;

Methodical recommendations were made by the ass. ___Tamara LEVITSKA