Methodical Instructions  
for independent work of students  
during the training for the practical studies

<table>
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<tr>
<th>Academic discipline</th>
<th>Surgical stomatology</th>
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<td>Module №</td>
<td>6</td>
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<tr>
<td>The topic of the studies № 12</td>
<td>Benign odontogenic tumor of the jaws (ameloblastoma (adamantinoma), odontoma, cementoma.) Benign non-odontogenic tumors of jaws (osteoblastoma, osteoblastoclastoma, osteoma, osteoid-osteoma, chondroma, hemangioma, odontogenic fibroma, epulis): classification, histology, clinical manifestations, differential diagnosis, principles and methods of the treatment, prevention of complications.</td>
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<th>Course</th>
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<td>Faculty</td>
<td>Foreign Students Training, Stomatological</td>
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Poltava – 2020
1. Relevance of the topic:
The number of cancer patients is constantly growing worldwide. The same picture is observed in Ukraine. The head and neck have a complex anatomical structure. Tumors and tumor-like lesions of the maxillofacial localization are very numerous and different in clinical course and histogenesis. These data determine the need for in-depth study of oncology by students. It is necessary to put into practice the methods of plastic surgery and modern achievements of reconstructive surgery.

2. Specific objectives:

2.1. To analyze the results of clinical examinations of patients with benign odontogenic and non-odontogenic tumors of the jaws. Explain the results of additional research.
2.2. To propose treatment plans for patients with benign odontogenic and non-odontogenic tumors of the jaws.
2.3. To classify benign odontogenic and non-odontogenic tumors of the jaws.
2.4. To interpret the etiology and clinical manifestations of benign odontogenic and non-odontogenic tumors of the jaws.
2.5. To analyze the basic principles of diagnosis and treatment of these diseases.
2.6. To make a plan for diagnosis and differential diagnosis of benign odontogenic and non-odontogenic tumors of the jaws. Curation of the patient.

3. Basic knowledge, skills, abilities necessary for studying the topic

<table>
<thead>
<tr>
<th>Previous disciplines</th>
<th>Acquired skills</th>
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<tbody>
<tr>
<td>1. Ethics and deontology.</td>
<td>To apply knowledge of ethics and deontology to establish psychological contact with the patient.</td>
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<tr>
<td>2. Social medicine.</td>
<td>To know the principles of organization of cancer care. To know how to draw up the necessary documentation.</td>
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<td>3. Pathological anatomy.</td>
<td>To describe the histological structure of the tumor.</td>
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<td>4. Pathological physiology.</td>
<td>To determine the etiology and pathogenesis of tumors.</td>
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<td>5. Propaedeutics of internal diseases.</td>
<td>To know the general principles of diagnosis and treatment of patients with oncological diseases.</td>
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<td>6. Topographic anatomy.</td>
<td>To know the topographic and anatomical location of the tumor.</td>
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<tr>
<td>7. Histology.</td>
<td>To know the histological structure of odontogenic and non-odontogenic tumors.</td>
</tr>
<tr>
<td>8. Propaedeutics of surgical dentistry.</td>
<td>To be able to conduct curation of a patient with benign tumors of the jaws.</td>
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4. Tasks for independent work in preparation for the lesson

4.1. The list of the basic terms, parameters, characteristics which the student should master at preparation for employment:

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tr>
<td>1. Tumor (according to WHO).</td>
<td>This is an abnormal mass of tissues with excessive growth, which does not correlate with the growth of normal tissue and lasts after the termination of the factors that caused it.</td>
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<tr>
<td>2. Clinical examination.</td>
<td>This is a system of medical measures carried out by medical institutions with the aim of timely diagnosis, treatment and prevention of diseases.</td>
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<td>3. Oncological alertness.</td>
<td>This is a medical tactic that aims at early detection of oncology. The main rule of this tactic: &quot;regardless of the reason for which the patient went to the doctor, the doctor must exclude his diagnosis of cancer.&quot;</td>
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</table>

4.2. Theoretical questions for the lesson:

1. What are benign tumors?
2. What are tumors?
3. To list the factors that contribute to the emergence of benign odontogenic and neodontogenic tumors of the jaws. Give the classification of benign odontogenic and neodontogenic tumors of the jaws.
4. To describe the clinical picture of benign odontogenic and neodontogenic tumors of the jaws.
5. Histological features of benign odontogenic and neodontogenic tumors of the jaws.
6. Etiology and pathogenesis of benign odontogenic and neodontogenic tumors of the jaws.
7. Diagnostic methods, additional research methods when jaw tumors are suspected.
10. Methods of treatment of benign odontogenic and neodontogenic tumors of the jaws.
11. To describe the clinical picture of ameloblastoma.
12. To describe the clinical picture of odontoma.
13. To describe the clinical picture of osteoblastoclastoma.
14. To describe the clinical picture of hemangiomas of the jaw.
15. Methods of diagnosis and additional methods of research of patients.

4.3. Practical work (task) that is performed in class.
1. To master the method of taking material for cytological examination:
   - the imprint method;
   - the scraping method;
   - the smear method.
2. To master the technique of diagnostic puncture.
3. To master the technique of preparing a smear on a glass slide.
4. To palpate the tumor of the maxillofacial area.
5. To carry out a diagnostic puncture.

THE CONTENT OF THE TOPIC:

Ameloblastoma (from the early English word amel, meaning enamel + the Greek word blastos, meaning germ) is a rare, benign tumor of odontogenic epithelium (ameloblasts, or outside portion, of the teeth during development) much more commonly appearing in the mandible than the maxilla. It was recognized in 1827 by Cusack. This type of odontogenic neoplasm was designated as an adamantinoma in 1885 by the French physician Louis-Charles Malassez. It was finally renamed to the modern name ameloblastoma in 1930 by Ivey and Churchill.

While these tumors are rarely malignant or metastatic (that is, they rarely spread to other parts of the body), and progress slowly, the resulting lesions can cause severe abnormalities of the face and jaw. Additionally, because abnormal cell growth easily infiltrates and destroys surrounding bony tissues, wide surgical excision is required to treat this disorder.

Adamantinoma of the long bones, or extragnathic adamantinoma, is an extremely rare, low-grade malignant tumor of epithelial origin. It is not related to adamantinoma or ameloblastoma of the mandible and maxilla which is derived from Rathke's pouch. Adamantinoma is a locally aggressive osteolytic tumor

Subtypes. There are three main clinical subtypes of ameloblastoma:

unicystic, multicystic, peripheral.

The peripheral subtype composes 2% of all ameloblastomas.

Of all ameloblastomas in younger patients, unicystic ameloblastomas represent 6% of the cases. A fourth subtype, malignant, has been considered by some oncologic specialists, however, this form of the tumor is rare and may be simply a manifestation of one of the three main subtypes. Ameloblastoma also occurs in long bones, and another variant is Craniopharyngioma (Rathke's pouch tumour, Pituitary Ameloblastoma.)

Clinical features. Ameloblastomas are the most common neoplasm’s of the jaws. They are usually first recognized between the ages of 30 and 50, and rare in children and old people. Eighty per cent form in the mandible; of these, 70% develop in the posterior molar region, and often involve the ramus. They are symptomless until the swelling becomes obtrusive.
Radiographically, ameloblastomas typically form rounded, cyst-like, radiolucent areas with moderately well-defined margins and typically appear multilocular. Lingual expansion may sometimes be seen, but is not pathognomonic of ameloblastoma. Other variants are a honeycomb pattern, a single well-defined cavity indistinguishable from a ridulcer or, rarely, a dentigerous cyst. However, differentiation from non-neoplastic cysts and other tumours or tumour-like lesions of the jaws is not possible by radiography alone.

The resected left half of a mandible containing an ameloblastoma, initiated at the third molar. Ameloblastomas are often associated with the presence of unerupted teeth.

**Symptoms and Presentation.** The site 90% of the time in the diaphysis of the tibia with the remaining lesions found in the fibula and long tubular bones. There is often a history of trauma associated with adamantinoma but its role in the development of this lesion remains unclear. The patient usually has swelling that may be painful. The duration of symptoms can vary from a few weeks to years.

Symptoms include: painless swelling, facial deformity if severe enough, pain if the swelling impinges on other structures, loose teeth, ulcers, and periodontal (gum) disease.

Lesions will occur in the mandible and maxilla, although 75% occur in the ascending ramus area and will result in extensive and grotesque deformities of the mandible and maxilla. In the maxilla it can extend into the maxillary sinus and floor of the nose. The lesion has a tendency to expand the bony cortices because slow growth rate of the lesion allows time for periosteum to develop thin shell of bone ahead of the expanding lesion.

This shell of bone cracks when palpated and this phenomenon is referred to as "Egg Shell Cracking" or crepitus, an important diagnostic feature.

Ameloblastoma is tentatively diagnosed through radiographic examination and must be confirmed by histological examination (e.g., biopsy).

Radiographically, it appears as a lucency in the bone of varying size and features—sometimes it is a single, well-demarcated lesion whereas it often demonstrates as a multiloculated "soap bubble" appearance.

Resorption of roots of involved teeth can be seen in some cases, but is not unique to ameloblastoma. The disease is most often found in the posterior body and angle of the mandible, but can occur anywhere in either the maxilla or mandible.

Ameloblastoma is often associated with bony-impacted wisdom teeth—one of the many reasons dentists recommend having them extracted.

**Histopathology** will show cells that have the tendency to move the nucleus away from the basement membrane. This process is referred to as "Reverse Polarization". The follicular type will have outer arrangement of columnar or palisaded ameloblast like cells and inner zone of triangular shaped cells resembling stellate reticulum in bell stage. The central cells sometimes degenerate to form central microcysts. The plexiform type has epithelium that proliferates in a "Fish Net Pattern". The plexiform ameloblastoma shows epithelium proliferating in a 'cord like fashion', hence the name 'plexiform'. There are layers of cells in between
the proliferating epithelium with a well-formed desmosomal junctions, simulating spindle cell layers.

**Histopathology findings**: on gross examination, adamantinoma is well demarcated and lobulated. The gray or white tumor is rubbery and may have focal areas of hemorrhage and necrosis. Bone spicules and cysts filled with blood or straw-colored fluid may also be present. Adamantinoma is a biphasic tumor with islands of epithelioid cells surrounded by a bland reactive fibrous stroma. The stroma consists of spindle shaped collagen producing cells. The nests of malignant cells are columnar and have peripheral palisading. Squamous differentiation and keratin production are rare. The tumor is positive on immunohistochemical staining with keratin antibody. The epithelial origin is confirmed when basal membranes, desmosomes and ton filaments are seen under the electron microscope.

**Variants**. The six different histopathological variants of ameloblastoma are desmoplastic, granular cell, basal cell, plexiform, follicular, and acanthomatous.

The acanthomatous variant is extremely rare.

One-third of ameloblastomas are plexiform, one-third are follicular. Other variants such as acanthomatous occur in older patients. In one center, desmoplastic ameloblastomas represented about 9% of all ameloblastomas encountered.

**X-Ray appearance and advanced imaging findings**: adamantinoma appears as an eccentric, well-circumscribed, and lytic lesion on plain x-ray. The anterior cortex of the tibia is by far the most common location. The lesion usually has several lytic defects separated by sclerotic bone which gives a "soap-bubble" appearance. There is cortical thinning but little periosteal reaction. The lesion may break through the cortex and extend into soft tissue. There may be multiple adjacent lesions with normal intervening bone. MRI helps demonstrate the intraosseous and extraosseous involvement. The differential diagnosis radiologically includes osteofibrous dysplasia, fibrous dysplasia, ABC, chondromyxoid fibroma and chondrosarcoma.

The **differential diagnosis** radiologically includes osteofibrous dysplasia, fibrous dysplasia, ABC, chondromyxoid fibroma and chondrosarcoma.

**Treatment**. Tracheal intubation is anticipated to be difficult in this child with a massive ameloblastoma.

While chemotherapy, radiation therapy, curettage and liquid nitrogen have been effective in some cases of ameloblastoma, **surgical resection or enucleation remains the most definitive treatment for this condition**.

**Treatment options for this tumor**: adamantinoma is treated by wide surgical excision. This tumor is insensitive to radiation and may metastasize to lungs, lymph nodes and abdominal organs by both hematogenous and lymphatic routes. Chemotherapy is not used.

**Outcomes of treatment and prognosis**: In 20% of cases there are metastases late in the course of the disease.

**Recurrence is common**, although the recurrence rates for block resection followed by bone graft are lower than those of enucleation and curettage. Follicular variants appear to recur more than plexiform variants. Unicystic tumors recur less
frequently than "non-unicystic" tumors. Persistent follow-up examination is essential for managing ameloblastoma. Follow up should occur at regular intervals for at least 10 years. Follow up is important, because 50% of all recurrences occur within 5 years postoperatively. Recurrence within a bone graft (following resection of the original tumor) does occur, but is less common. Seeding to the bone graft is suspected as a cause of recurrence.

The recurrences in these cases seem to stem from the soft tissues, especially the adjacent periosteum. Recurrence has been reported to occur as many as 36 years after treatment.

To reduce the likelihood of recurrence within grafted bone, meticulous surgery with attention to the adjacent soft tissues is required.

An osteoma (plural: "osteomata") is a new piece of bone usually growing on another piece of bone, typically the skull. It is a benign tumor.

When the bone tumor grows on other bone it is known as "homoplastic osteoma"; when it grows on other tissue it is called "heteroplastic osteoma".

Osteoma represents the most common benign neoplasm of the nose and paranasal sinuses. The cause of osteoma is uncertain, but commonly accepted theories propose embryologic, traumatic, or infectious causes. Larger craniofacial osteomata may cause facial pain, headache, and infection due to obstructed nasofrontal ducts. Often, craniofacial osteoma presents itself through ocular signs and symptoms (such as proptosis).

Treatment options for this tumor: treatment of osteomas is only necessary if they are symptomatic. Large osteomas should be evaluated to rule out other diagnoses.

Cementoma (pl. cementomas, cementomata)
Etymology: L, caementum + Gk, oma, tumor
any benign, cementum-producing tumor associated with the apices of teeth. It may be present as a mass of fibrous connective tissue, as fibrous connective tissue with spicules of cementum, or as a calcified mass resembling cementum. Examples are cementoblastoma and cementifying fibroma. Cementoblastomas are one of many mandibular lesions is a rare tumor of the cementum. The key to diagnosis, both radiologically and histologically, is an attachment to the tooth root. Cementoblastomas have been previously described in the literature as cementomas, true cementomas, sclerosing cementomas, periapical fibro-osteoma, and periapical fibrous dysplasia although "cementoma" is only mentioned as "periapical cementoma", a type of osseous dysplasia in the 2005 WHO histological classification of odontogenic tumors.

Cementoma a mass of cementum lying free at the apex of a tooth, probably a reaction to injury.

Median age is 20 years (range 8-44 years) with no sex predilection

Pathology. The usual location is around the apex of the premolars. These tumors originating from (i.e. in connection with) the tooth root and are usually slowly enlarging. It, therefore, obliterates the periodontal ligament space.
**Cementoma** (traumatic osteoclasia), an apical lesion associated with the apices of teeth. It may be present as a mass of fibrous connective tissue, fibrous connective tissue with spicules of cementum, or a calcified mass resembling cementum and having few cellular elements.

Cementum (cement) a specialized bony substance covering the root of a tooth.

Cementoma is an odontogenic tumor of cementum. It usually occurs after root development is finished but before the age of 25. It is found most commonly in the mandible in the region of the lower molar teeth. It causes distortion of surrounding areas but is a usually painless growth, at least initially. Considerable thickening of the cementum can often be observed. A periapical form is also recognized.

Five types of cementomas are described:
- Benign cementoblastoma
- Periapical cemental dysplasia
- Multiple apical cementomas
- Gigantiform cementoma

Cementoma reactive fibro-osseous lesion derived from odontogenic cells in the periodontal ligament. It is also known as periapical cemental dysplasia. It is usually an incidental finding, but may enlarge to the extent of being clinically palpable. Cementoma most often involves the mandibular incisor region. It tends to be multiple.

Radiographic features OPG
- It is typically radiodense or mixed-density with a rounded or sunburst appearance, and a relatively radiolucent rim. Loss of the periodontal ligament space along with root resorption/loss of root outline are common.

Treatment and prognosis. Recurrence is common with incomplete resection.

Differential diagnosis
- ossifying (cemento-ossifying) fibromas: very similar appearance
- osteoblastoma: very similar appearance but does not attach to root
- osteosarcoma

What is a **peripheral odontogenic fibroma**?
Peripheral odontogenic fibroma is an uncommon benign tumour of the gum and is the equivalent of a central odontogenic fibroma occurring outside of bone. It must be distinguished from the more common peripheral ossifying fibroma.

Who gets peripheral odontogenic fibroma?
Peripheral odontogenic fibroma has been reported in all age groups (age range 2-80 years), with a slight peak in the twenties. Both sexes are affected.
Clinical features of peripheral odontogenic fibroma
A peripheral odontogenic fibroma presents as a slow growing firm lump on the gum. It develops more commonly on the gum of the lower jaw (mandible) than the upper jaw (maxilla). It can be found on either the inner (lingual-palatal) or outer (labial-buccal) surface of the gum. It usually does not ulcerate.

How is peripheral odontogenic fibroma diagnosed?
This lesion can only be diagnosed on pathology following excision (when it is cut out). The tumour is not defined by a capsule or wall. It consists of interwoven connective tissue with islands of odontogenic epithelium. Sometimes there may be small areas with calcium deposits, or of bone or tooth-like material.

What is the treatment for peripheral odontogenic fibroma?
Peripheral odontogenic fibroma is best treated by simple surgical excision with clear margins on histology. Recurrences have been reported up to 4 years after the initial excision.

MATERIALS FOR SELF-CONTROL.
A. Tasks for self-control.
1. Radiographs of patients with benign odontogenic and non-odontogenic tumors of jaws.

2. Photos of patients with benign odontogenic and non-odontogenic tumors of jaws.

B. Tasks for self-control:

1. The patient, 25 years old, complains of a tumor on the mandible. He is ill 7 months. Objectively: swelling of the mandible near 36, 37, 38 teeth, the tumor has dense consistence. On the X-ray of the mandible destruction with precise contours of porous structure is defined. At a puncture of a tumor muddy whitish liquid is received. Put the primary diagnose.

(Adamantinoma of the mandible)

2. The man, 45 years old, has complaints to a neoplasm of mandible. Result of histological research: structure consist of a connecting tissue, parenchyma with epithelial tension bar and cylindrical and star-shaped cells. For what formation such microscopic picture is characteristic?

(Ameloblastoma of the jaw)

3. At X-ray of mandible degradation of bone with smooth clear borders is observed. It is not related to the roots of the teeth. Result of diagnostic puncture is brown exudate without cholesterol crystals. Put diagnose in this case?
C. Materials for test control. Test tasks with the single right answer (a=II):

1. Where is adamantinoma located more often?
   A. In the region of angle and ramus of jaw.
   B. In the region of a body of the mandible.
   C. Near the tuber of maxilla.
   D. In the sinus.
   E. In the palatal bone.
   (The right answer: A).

2. The main radiological attributes of cystic form of ameloblastoma:
   A. Presence of growth needle-shaped and a "peak" symptom.
   B. Loops of structure of a bone.
   C. Presence of one or several cystic cavities.
   D. The center of uniform radiological density and roundish forms which is connected with the apex of the tooth.
   E. Uniform osteolitic process in an alveolar process, body or branch of mandible.
   (The right answer: C).

3. During a puncture of ameloblastoma we receive a liquid:
   A. Brown liquid.
   B. Transparent yellowish liquid.
   C. Purulent liquid.
   D. Muddy whitishness or a yellow liquid, sometimes with single grains of cholesterol.
   E. Venous or arterial blood.
   (The right answer: D).

Atypical tasks

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(Osteoblastoclastoma)

**LITERATURE:**

**Basic:**


**Additional:**

Web source:


Methodological recommendations were prepared by Associate Professor Skikevych M.G.
LITERATURE

Basic literature:


Additional:


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