

ODESSA NATIONAL MEDICAL UNIVERSITY

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

METHODOLOGICAL RECOMMENDATIONS FOR STUDYING THE TOPIC:

"Radiation signs of traumatic damage of teeth and jaws".

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

Approved
at the methodical meeting of the department
"27" August 2021
Protocol 1/21
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ODESSA-2021

"Radiation signs of traumatic damage to teeth and jaws "- 2 hours.

1. Actuality of theme.

Numerous etiological factors contribute to the violation of the harmonious development of the maxillofacial area, which leads to the formation of abnormalities of individual teeth, each of which requires appropriate and timely treatment. Radiation diagnostic methods allow you to fully and quickly assess the severity of pathological changes and provide timely assistance to the patient. Knowledge of the features of the radiation image of each type of anomalies of individual teeth makes it possible to choose the right methods for orthodontic correction and achieve optimal functional occlusion.

2. Objectives of the lesson:

2.1 General objectives:

1. To study the features of radiation reflections of traumatic injuries of the facial skull.
2. To determine the appropriate timing and methods of radiation examinations of patients with traumatic injuries of teeth and jaws.

2.2 Educational:

1. Deontological - to provide information for conversations of students (future doctors) with patients about the potential dangers of ionizing radiation.
2. The guidelines of dentists are to optimize the methods of treatment and research of patients, reduce the impact of radiation and responsible allocation of health resources.
3. Responsibility - to report information that implies the responsibility of a physician who uses ionizing radiation for diagnostic or therapeutic purposes.
4. 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. Examine the symptoms of fractures of bones, teeth and jaws; learn to recognize dislocations of joints, teeth and jaws.
2. Make schematic sketches for the lesson according to Lefort's classification.
3. Know the types of displacements of fragments of long tubular bones in fractures (each in two projections).
4. Be able to understand the schemes of mandibular dislocation.

2.4. Based on theoretical knowledge on the topic:

- *master the techniques / be able /:*

1. Be able to interpret traumatic injuries of the facial skull according to Lefort's classification.

2. Be able to interpret traumatic damage to the jaws and teeth on radiographs.
3. Be able to justify the appointment in the patient's medical history and fill out referrals for examination.
4. Be able to explain to the patient the need for research and explain the results.

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

Names of previous disciplines	Acquired knowledge and skills
1. Anatomy	<ol style="list-style-type: none"> 1. Be able to describe the structure of the cerebral and facial parts of the skull. 2. Know the structure of the temporomandibular joint. 3. Identify radiation signs of traumatic damage to temporary and permanent teeth. 4. Draw a diagram of the damage of Le Four.
2. Histology	Ability to draw a diagram of embryonic development of the maxillofacial area and histological structure of teeth.
3. Medical biology	Be able to schematically depict the mechanisms of traumatic injury of the lower jaw depending on the direction of force.

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

1. Introduction.
2. Signs of fractures
3. Contents of terms.
4. Diagnostic criteria.

4.1. Introduction

Damage to facial tissues has been known to mankind since ancient times. They occur in both peacetime and wartime. The face is the least protected part of the human body, because here are the most important organs through which a person constantly perceives information about the world around him, communicates with him, and therefore, the face should be as open to this communication. Traditionally, injuries by etiology are divided into domestic, industrial (industrial or agricultural), transport and sports. Recently, criminal trauma has been singled out, which is important for assessing medical and social events in society. Currently, there is a significant increase in traffic accidents, criminal and industrial injuries, an increase in the number of combined injuries, their severity, and hence - disability and mortality. Domestic injuries (up to 90%) predominate among facial and jaw injuries, and most victims are injured in fights. The victims are mostly young and

able-bodied people aged 15 to 50. Therefore, given the long treatment time, a significant number of negative consequences of maxillofacial injuries and their complications, high complexity: the cost of treatment of such patients, mortality rate, it becomes clear the importance of improving treatment of this group of victims. The average incidence of maxillofacial injuries is 0.3 cases per 1,000 population, which tends to increase. In the maxillofacial departments of hospitals up to 30-40% are patients with facial injuries and their consequences. Among the non-gunshot mechanical damage to the tissues of the maxillofacial area are injuries: soft tissues, teeth and bones of the facial skull - lower and upper jaws, chin bones, nasal bones. On average, facial soft tissue injuries account for 1.5–14% of injuries, mandibular fractures for 71–80%, chin fractures for 12–15%, nasal bones for 3–4%, and maxillary fractures for 2.5–3%. , 5%, combined injuries - in 4.5–5.6%. In addition to mechanical damage to the maxillofacial area, thermal (burns and frostbite) are noted. Facial injuries can be isolated, combined (single and multiple) and combined, leading or concomitant. In addition to mechanical damage to the maxillofacial area, thermal (burns and frostbite) are noted. Facial injuries can be isolated, combined (single and multiple) and combined, leading or concomitant. In addition to mechanical damage to the maxillofacial area, thermal (burns and frostbite) are noted. Facial injuries can be isolated, combined (single and multiple) and combined, leading or concomitant.

4.2. Signs of fractures in dentistry.

1. At diagnosis of traumatic damages of bones, teeth and joints it is necessary to learn to see on radiographs the main signs of a fracture:

- fracture line (light when the fragments diverge and dark when wedged or superposed);
- displacement of fragments (length, width, angle, periphery).

The fracture line is a projection on the film of the fracture plane, so this line is clearly visible in cases where the direction of the central X-ray beam coincides with the fracture plane. Hence the need for radiography for fractures in at least two mutually perpendicular projections. This gives more guarantees to detect the fracture plane and judge the degree and direction of displacement of the fragments.

2. A sign of a fracture of a flat bone may be its deformation (for example, wedge-shaped post-traumatic deformation of vertebral bodies). In children with fractures of the periosteum due to its elasticity and strength can remain intact. In this case, the fragments are as if in a "clutch". A sign of such an axillary fracture is a roller-like deformation of the contour at the fracture site. A sign of bone fracture in children in the metaepiphyseal cartilage is the displacement of the pineal gland relative to the metaphysis.

3. A sign of traumatic dislocation of the joint is the mismatch of the position of the head of the joint in relation to the joint cavity. It is necessary to learn that the primary connective tissue callus, which is formed in 10-14 days after the

fracture, due to the absence of lime salts on the radiograph is not visible. The true callus on the radiograph is usually found on the 18th-20th day and is fully formed in 6-10 weeks after the fracture.

4. On the radiograph, a full-fledged bone callus should have a normal bone structure, against which you can clearly see the rough thickened bone beams, which have a parallel direction to the long axis of the bone. Excess callus is large, irregular in shape, and has many bony protrusions. In the array of such corns you can see the ends of the fragments and their location. The false joint is characterized by the absence of a typical callus around the ends of the fragments, rounding and polishing of the ends of the fragments in the fracture site, the appearance of a bone closing plate at the ends of the fragments. Timely detection of signs of post-traumatic osteomyelitis is extremely important for the provision of proper therapeutic care: the presence of destructive foci at the ends of fragments, near dental alveoli and in the peri-apical area of preserved teeth;

4.3. Classification of injuries of the maxillofacial area.

I. Mechanical damage to the upper, middle, lower and side of the face.

1. By localization:

A. Injuries to soft tissues with damage:

- a) tongue,
- b) salivary glands,
- c) large nerves;
- d) large vessels.

B. Bone injuries:

- a) the lower jaw;
- b) the upper jaw;
- c) chin bones;
- d) nasal bones;
- e) two bones or more.

2. By the nature of the injury:

- a) through;
- b) the blind;
- c) tangential;
- d) permeable: into the mouth, nose, maxillary sinus;
- d) not permeable: in the mouth, nose, maxillary sinus;
- e) with tissue defect - without tissue defect;
- f) basic - related;
- g) single - multiple;
- h) isolated - combined.

3. According to the clinical course of the wound process:

- a) complicated;
- b) uncomplicated.

4. By the mechanism of damage:

A. Firearms:

- a) spherical;

- b) fragmentary;
- c) ball;
- d) arrow-shaped elements.
- B. Non-flammable.
- II. Combined lesions.
- III. Burns (including electric shock).
- IV. Frostbite.

Mechanical damage tissues of the maxillofacial area in peacetime are classified as follows:

The nature of the damage

A. Isolated.

B. Combined:

- a) with traumatic brain injury;
- b) with damage to the soft tissues of other areas;
- c) with damage to other skeletal bones

B. Single.

D. Multiple.

Isolated injury is an injury to one anatomical area.

Combined damage - injury of two or more anatomical areas by one affecting factor (mechanical, thermal). These include simultaneous injuries of the maxillofacial area and ENT organs, eyes, skull and brain, other parts of the human body (limbs, abdomen, chest).

Single isolated damage- damage to one anatomical area by one wounding bullet, and multiple - by several traumatic bullets. The main damage determines the severity of the injury in several wounds.

Concomitant damage occurs simultaneously with the leader, but does not determine the severity of the lesion compared to the main. They can vary depending on the quality of treatment, the course of the disease. Combined damage is tissue damage under the influence of various damaging factors (mechanical, chemical, thermal, radiation, etc.).

3.4. Localization of damages.

1. Fractures of the lower jaw.
2. Fractures of the upper jaw
- . 3. Fractures of the chin bone and arch.
4. Fractures of the nasal bones.
5. Tooth injuries.
6. Multiple (simultaneous) injuries of the facial bones.
7. Soft tissue injury.

Fractures of the upper jaw are divided into two main groups: non-gunshot and gunshot. Clinical observations show that non-gunshot fractures of the upper jaw are usually typical. The Lefort classification (Le Fort, 1901) is used to determine the type of fracture of the upper jaw. The author described different types of fractures of the upper jaw, found by him experimentally (on corpses). There are three main types of fractures of the upper jaw. 1. Low transverse fracture (first type, lower, subnasal, Le For I), when the fracture line passes horizontally over

the alveolar process from the base of the pear-shaped process to the pterygoid. Occurs more often when hitting a blunt object on the upper lip. 2. Complete separation of the upper jaw with nasal bones (second type, middle, suborbital, Le For II), in which the fracture line passes through the nasal bones, lacrimal bone, fundus, between the zygomatic bone and the zygomatic process of the upper jaw and ends in the area of the pterygoid process. In this type of bone fracture is not displaced. Such fractures are more likely to occur when hitting a blunt object in the nose. 3. Complete separation of the upper jaw with nasal and chin bones (third type, upper, subbasal, Le For III) - the fracture line passes through the nasal bones, lacrimal bone, fundus and ends in the pterygoid process of the cuneiform bone. This type of fracture is called complete craniofacial dislocation. Occurs when striking a blunt object in the eye sockets or back of the nose, as well as a side impact in the chin bone. between the zygomatic bone and the zygomatic process of the upper jaw and ends in the area of the pterygoid process. In this type of bone fracture is not displaced. Such fractures are more likely to occur when hitting a blunt object in the nose. 3. Complete separation of the upper jaw with nasal and chin bones (third type, upper, subbasal, Le For III) - the fracture line passes through the nasal bones, lacrimal bone, fundus and ends in the pterygoid process of the cuneiform bone. This type of fracture is called complete craniofacial dislocation. Occurs when striking a blunt object in the eye sockets or back of the nose, as well as a side impact in the chin bone. between the zygomatic bone and the zygomatic process of the upper jaw and ends in the area of the pterygoid process. In this type of bone fracture is not displaced. Such fractures are more likely to occur when hitting a blunt object in the nose. 3. Complete separation of the upper jaw with nasal and chin bones (third type, upper, subbasal, Le For III) - the fracture line passes through the nasal bones, lacrimal bone, fundus and ends in the pterygoid process of the cuneiform bone. This type of fracture is called complete craniofacial dislocation. Occurs when striking a blunt object in the eye sockets or back of the nose, as well as a side impact in the chin bone. Such fractures are more likely to occur when hitting a blunt object in the nose. 3. Complete separation of the upper jaw with nasal and chin bones (third type, upper, subbasal, Le For III) - the fracture line passes through the nasal bones, lacrimal bone, fundus and ends in the pterygoid process of the cuneiform bone. This type of fracture is called complete craniofacial dislocation. Occurs when striking a blunt object in the eye sockets or back of the nose, as well as a side impact in the chin bone. the bottom of the orbit and ends in the pterygoid process of the cuneiform bone. This type of fracture is called complete craniofacial dislocation. Occurs when striking a blunt object in the eye sockets

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Firearms:

I. By direction and depth of the wound canal:

- 1) through (transverse, oblique, longitudinal);
- 2) the blind;
- 3) tangential.

II. By the nature of the damage:

- 1) without a significant defect of soft and bone tissues;
- 2) with a significant defect of soft and bone tissues;
- 3) impenetrable;
- 4) penetrating into the mouth, nose, maxillary sinus and skull;
- 5) with the displacement of fragments.

III. By functional feature:

- 1) without dysfunction;
- 2) with dysfunction;
 - a) tongue, chewing, swallowing;
 - b) breathing, hearing; c) vision.

Clinically close to Lefor's type 2 and type 3 fractures are Wassmund's variants, which differ in that the nasal bones do not participate in the movements, as the fracture line runs from the upper edge of the pear-shaped hole to the lower medial corner of the orbit. (the so-called "medial oblique line") and continues along the lines described for the second and third types of fractures of the upper jaw. That is, the nasal bones remain intact.

Wasmund 1 is a Lefor 2 type fracture, but without damage to the nasal bones.

Wasmund 2 is a Lefor 3-type fracture, but without damage to the nasal bones.

Another type of fracture of the upper jaw is the so-called sagittal (unilateral) fractures, when only one maxillary bone is broken off. The jaw seems to split from front to back. Externally, the fracture line passes in a typical place, and inside (medially) - along the midline (along the palatal suture, which connects both maxillary bones into one upper jaw). Such fractures occur under the action of blunt objects and the oblique direction of the force of impact from top to bottom in the upper lip. The previously mentioned three types of fractures of the upper jaw according to Lefort's classification can be combined with each other. On the one hand, one type of fracture can occur, and on the other - the second type. The combination of the second and third type is most often observed. Atypical fractures of the upper jaw are also observed, which are not described in the diagrams. There are fractures of the processes of the maxilla: alveolar (breaks off part of the process with several teeth), frontal (often unilateral) and hard palate (occurs when falling on a protruding object). A fragmentary fracture of the anterior wall of the maxilla may occur. For the separation of non-gunshot fractures of the upper jaw OO Timofeev (1998) proposes to use the following

classification of non-gunshot fractures of the upper jaw and their complications: frontal (often unilateral) and hard palate (occurs when falling on a protruding object). A fragmentary fracture of the anterior wall of the maxilla may occur. For the separation of non-gunshot fractures of the upper jaw OO Timofeev (1998) proposes to use the following classification of non-gunshot fractures of the upper jaw and their complications: frontal (often unilateral) and hard palate (occurs when falling on a protruding object). A fragmentary fracture of the anterior wall of the maxilla may occur. For the separation of non-gunshot fractures of the upper jaw OO Timofeev (1998) proposes to use the following classification of non-gunshot fractures of the upper jaw and their complications:

I. Isolated fractures of the upper jaw.

1. Fractures of the upper jaw:

- 66 unilateral (sagittal); typical (according to the classification of Lefort, Wassmund);
- combined;
- atypical.

2. Fractures of the processes of the upper jaw:

- alveolar;
- frontal;
- palatine.

3. Fragmentary fractures (body and processes).

II. Combined fractures of the upper jaw:

- with craniocerebral injuries;
- with damage to other bones;
- with soft tissue injury.

III. Complications of fractures of the upper jaw:

- early complications (injuries and displacement of the eyeball,
- damage to blood vessels and nerves,
- subcutaneous emphysema of the face, meningitis, etc.);
- late complications (paresis and paralysis of facial muscles, ptosis, osteomyelitis, sinusitis, facial deformity, etc.).

Typical fractures include midline fractures that pass through the alveolar margin and hard palate at the junction of the maxillary bones, as well as the so-called "Guerin fracture" described earlier by Guerin, so in the literature this type of fracture is called Guerin-Lefort fracture - separation of the alveolar process along its entire length, at which the fracture line passes at the base of the pear-shaped hole. Due to the close connection of the upper jaw with the skull base and its structure, fractures and cracks of the orbital bones, lattice bones, Turkish saddle, large and small wedge-shaped wings and stony temples (fractures of the skull base) are possible.

Depending on the level of fracture of the jaw, there are more or less pronounced clinical signs:

- 1) violation of the shape of the face;
- 2) hemorrhage in soft tissues, especially under the eyelids and eyelids;

3) occlusion due to displacement of fragments. Depending on the location of the impact and its force, one or both jaws can be broken, with a unilateral fracture, the part that is on the side of the impact is displaced. With a bilateral fracture, both jaws are displaced, they fall down to the teeth of the lower jaw and are displaced distally. In this case, in the anterior part of the upper jaw is lowered less than in the rear, even in cases where there is a "craniofacial separation". Recognition of non-gunshot fractures of the upper jaw is carried out on the basis of a survey and examination of the patient.

At the same time it is necessary to find out first of all whether:

- faint;
- nausea;
- vomiting;
- headache;
- flow of fluid from the nose and ears.

These symptoms are characteristic of a fracture of the skull base. In addition, fractures of the upper jaw are accompanied by local symptoms, among which in the first place the deformation of the face, hemorrhage into the subcutaneous tissue of the eyelids and subconjunctival, occlusal disorders due to displacement of fragments. Intense lacrimation indicates a fracture of the lacrimal duct. The most characteristic sign of a fracture of the upper jaw is its mobility. With a large displacement of the moving fragments, not only elongation but also flattening of the face is observed, in those cases when the chin and nasal bones are displaced together with the jaw. The eyeballs in bilateral fractures fall together with the lower walls of the orbit. In unilateral fractures, it occurs only on the injured side and is accompanied by diplopia. Sometimes with retrobulbar hemorrhage, the eye protrudes slightly. This symptom, especially in combination with hemorrhage in the conjunctiva, is characteristic of fractures of the skull base. The mobility of individual parts of the upper jaw (eg hump, lateral and anterior) or the entire upper jaw can be expressed in different ways. The most pronounced is the mobility, in which the upper jaw is freely lowered down when opening the mouth and rises up with the teeth of the lower jaw when closing the mouth, as well as when the jaw diverges to the sides. This mobility indicates a complete violation of the connections of the upper jaw with other facial bones and the base of the skull, as well as a violation of the connection along the palatal suture. The direction of displacement of the fragments of the upper jaw in direct injury depends on the strength and direction of mechanical impact. In addition, the weight of the fragments, the traction of that part of the external pterygoid muscle, which starts from the hump of the upper jaw, and the traction of some facial muscles that are attached to the upper jaw. In the case of fractures that occur indirectly, for example, when falling on the lower jaw, it is possible to drive fragments into the base of the skull. To determine the pathological mobility of the fragments, the doctor covers the resistant teeth with his thumb and forefinger and determines the presence of a fracture, as evidenced by the mobility of the teeth together with 67 fragments of the jaw. In addition, when pressing on the hard palate with the index and middle fingers ("symptom

of indirect load"), the victim experiences pain at the fracture site. One of the serious signs of a combined injury is a "spectacle symptom", which indicates a fracture of the skull base. In contrast to orbital hematomas resulting from direct trauma, the "spectacle symptom" appears due to the slow penetration of blood into the tissues of the anterior cranial fossa and along the optic nerve, in the tissue of the orbit. This bluish-purple "circle" does not go beyond the orbit and appears 8-16 hours after injury. In addition, the signs of combined trauma to the bone structures of the skull base are as follows:

- 1) "symptom of a double spot": after drying on a gauze drops of blood from the nasal passage, two circles are formed - blood, and on the periphery of pale pink brain fluid that has dried (cerebrospinal fluid);
- 2) "symptom of the handkerchief" - when drying secretions from the nasal passages in the presence of cerebrospinal fluid in them there is no "crunch" of the handkerchief.

Determination of one of these symptoms, even if the victim is conscious, is a contraindication to the use of locking and immobilizing devices that make it difficult to open the mouth. Transportation of such patients is carried out in a supine position or on the side to prevent aspiration of vomit or secretions from the wound. When transported by air or water, it is desirable to use anti-nausea drugs. Examination of patients with damage to the upper jaw. Find out complaints and circumstances under which the injury was received. In cases that are accompanied by shock, fainting and other symptoms of closed brain injury, it is not always possible to get answers to these questions. It is not necessary to limit oneself to recording the patient's complaints, but to find out with additional questions whether the victim sees and hears well. In the case of blind injuries, it is necessary to find out whether the foreign body was removed by the wounded themselves (this is possible with its superficial occurrence) or by any of the persons who provided assistance. The survey also needs to find out when, by whom and to what extent first aid was provided. History of the disease. It is necessary to clarify the circumstances and mechanism of trauma, determine the general condition of the victim and his consciousness (clear, confused, the patient is inhibited or unconscious), whether there was loss of consciousness, memory (amnesia - retrograde, episodic, etc.) and for how long. The so-called maxillofacial syndrome can be observed. At inspection of the patient it is necessary to pay attention to disturbance of the form of the person and a bite (connected with displacement of fragments), existence of bruises (hemorrhages in a thickness of skin or a mucous membrane) or bleedings, character and localization of wounds in which tissues. There is lengthening and flattening of the middle face (due to displacement of the upper jaw and chin bones down), "symptom of glasses" - hemorrhage into the eyelid tissue in fractures of the skull, which occurs immediately after injury and is common, and in isolated fractures of the bones skull - not earlier than 12 hours (usually 24-48 hours) after injury and does not extend beyond the circular muscle of the eye. With fractures of the skull base can be detected cerebrospinal fluid - leakage of cerebrospinal fluid due to a defect of the dura mater. Nasal cerebrospinal fluid -

cerebrospinal fluid in the nasal cavity due to a defect of the dura mater in the area of the lattice plate or at the fracture of the cuneiform bone. Ear cerebrospinal fluid - cerebrospinal fluid from the external auditory canal with a fracture of the pyramid of the temporal bone. Visually, this symptom is more difficult to detect due to concomitant bleeding. To diagnose the presence of cerebrospinal fluid use a double spot test - the blood forms a brown spot on a gauze napkin in the center, and on the periphery - a yellow corolla of cerebrospinal fluid. The symptom of a "handkerchief" is a clean handkerchief soaked in cerebrospinal fluid, which remains soft when dry, and if moistened with nasal secretions, it becomes hard ("starched"). In fractures of the upper jaw of the second and third type, there may be a syndrome of the upper orbit - ophthalmoplegia (paralysis of the eye muscles), ptosis (lowering of the upper eyelid), lack of sensitivity of the upper eyelid and forehead, dilation and fixed pupil position (Zachariades N. et al., 1985). Exophthalmos and diplopia are observed in hemorrhage into the orbit. When the chin bones are damaged, the chin syndrome occurs - 68 decreased sensitivity in the area of innervation of the chin-facial and chin-temporal branches of the II branch of the trigeminal nerve, paralysis of certain facial muscles. On palpation of the skin, you can determine the symptom of crepitation - a feeling of crunch or crackling, resulting from the penetration of air from the airways into the subcutaneous tissue. In the occipital region - a symptom of "steps" (in Lefort II fracture) due to bone damage at the junction of the maxillary process of the maxilla with the lateral surface of the chin bone, there is also mobility of the nasal bones, when fractures of the maxilla according to Vasmund . There is a violation of occlusion, so the central teeth on the upper and lower jaws do not close together, there is an open bite, which is most often observed in fractures of the upper jaw of the second type and is due to the fact that the connection of the upper jaw with the surrounding bones is broken, causing it to fall down, rotate around its transverse axis and throw back (under the influence of medial pterygoid which at one end are attached to the pterygoid processes of the cuneiform bone, and the other - to the medial surface of the angle of the mandible). N.M. Alexandrov (1985) believes that muscles do not affect the displacement of the upper jaw, but it depends on the force of the blow. At intraoral inspection it is possible to reveal hemorrhages under a mucous membrane and disturbance of integrity of bone tissue (a symptom of a step) in a site of a maxillary and maxillary seam (a place of connection of maxillary and maxillary bones). These symptoms occur in suborbital fractures. A positive symptom of Malevich - the sound of a cracked pot, which occurs when tapping on the teeth on the injured side (with fractures of the walls of the maxillary sinuses). A positive symptom of Guerin - pain in the course of the fracture fissure when pressing the index finger on the hooks (bottom up) of the pterygoid processes of the cuneiform bone. The mobility of the fragments can be determined by grasping the upper teeth with the fingers of one hand and carefully moving the jaw in the anteroposterior direction, and the fingers of the other hand are placed on the skin in the projection of the predicted fracture. Radiologically, the contours of the upper jaw merge with the contours

of other facial bones, so the diagnosis of fractures, especially without displacement of fragments, is quite difficult. To detect damage to the maxillary bones, it is necessary to take several X-rays of the bones in different layouts: nasolabial, lateral and axial. With incorrect styling, asymmetrical head position and incorrect direction of the central beam, X-rays are distorted and inaccurate. Features of jaw fractures in children. They occur when falling from a height, during a game, fight, swing, car accident, etc. Concussion in fractures of the upper jaw in children occurs in at least one third of victims. Initially, brain damage is asymptomatic. Later, patients develop objective neurological symptoms. The late onset of symptoms can be explained by the fact that due to the elasticity of the bones of the skull and the presence of open large and small temples, the increase in intracranial pressure is slow. Therefore, children with injuries of the upper jaw need to conduct an electroencephalogram for timely diagnosis of concussion. The peculiarities of fractures of the upper jaw in children are also due to the fact that the strength of the jaw bones is reduced due to the presence of permanent teeth, which is quite pronounced in children of preschool and primary school age. Fractures of the alveolar process are more common in children, namely in the area where the rudiments of permanent teeth are located, which causes damage, which can cause abnormal location of individual teeth, groups of teeth and occlusion disorders. In this regard, children who have had injuries of the maxillary bones, need dispensary observation until the formation of permanent occlusion in them. Fractures of the upper jaw heal within 30-45 days. Primary callus is usually not traced, but the fracture line (slit) is not detected radiologically after the 20th day. If you do not reposition the fragments, the deformation of the mandibular edge, the walls of the maxillary sinus or pear-shaped hole can persist for life.

5. Materials of methodical providing of employment.

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

1. Methods of radiological diagnosis in the examination of patients with impaired dentition.

2. Merged teeth.

3. Anomalies in the shape of the teeth. Microdentia, macrodentia. Differential diagnosis of them with anatomical variants of the norm.

4. Spiked teeth as harbingers of adentia.

5. The influence of fused teeth on the process of formation of dental arches and occlusion.

5.2. 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://www.slideshare.net/medumed/ss-8800317>
7. <https://stom.tilimen.org/izmeneniya-kolichestva-i-formi-zubov.html>

5.3.Orienting map for independent work with literature on the topic «Radiation signs of traumatic damage to teeth and jaws».

№	Task	Instructions for the task	Independent records of students
1.	What are the signs of damage to the maxillofacial area.	Write in a workbook signs of damage to the	

		maxillofacial area.	
2	Examine fractures according to the Le For classification.	Draw in a workbook a diagram of fractures according to the Le For classification	
3.	Provide a classification of injuries of the maxillofacial area.	Write in a workbook classification of injuries of the maxillofacial area.	

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

6.1 Questions for self-control.

1. Radiation signs of eruption of teeth.
2. Options for the structure of the jaw (uniform density, multi-mineralized, heterogeneous density).
3. Exostoses and endostoses.
4. Disorders of teething (persistent and retained teeth).
5. Violation of the number of teeth (supradentia, adentia).
6. Anomaly of size and shape (macro- and micro-dentia).
7. Anomaly of tooth location: vestibular and mesial dystopia, oral and distal dystopia, supraposition and infraposition, cake position, transposition.

6.2 Tasks for self-control.

1. A 25-year-old patient went to the trauma center with complaints of pain in the right half of the face, limited mouth opening. Objectively: moderate edema and hematoma in the right chin arch. Palpation in the area of the right chin arch determines the depression of bone tissue, moderate pain. The bite is not broken. Mouth opening - 1.5 cm. While trying to open the mouth further, he experiences mechanical obstruction and increased pain. What is the most likely diagnosis?

- A. Fracture of the right chin arch
- B. Fracture of the right chin bone
- C. Traumatic arthritis of the temporomandibular joint
- D. Fracture of the upper jaw by Le For III (upper)
- E. Fracture of the upper jaw by Le Four II

2. A 20-year-old patient complained to a doctor about the impossibility of lower jaw movements, difficulty speaking and eating. The condition is associated with trauma caused by biting an apple. Examination shows a half-open mouth, open bite due to single contacts of the distal humps of the last molars of the jaws, salivation, slurred speech, palpable articular heads of the mandible in front of the tracts. What is the most likely diagnosis?

- A. Acute anterior bilateral mandibular dislocation
- B. Fibrous ankylosis of the temporomandibular joint
- C. Exacerbation of osteoarthritis of the temporomandibular joint

- D. Traumatic bilateral fracture of the articular processes of the mandible
- E. Fracture of the articular processes of the mandible

3. A 32-year-old patient was taken to the emergency room with complaints of nosebleeds, severe headache, dizziness, facial deformity, difficulty breathing, inability to chew. He was injured about three hours ago in the mine. He did not lose consciousness. Objectively: elongation of the middle third of the face, significant hematomas and swelling in the root of the nose, eyelids of both eyes. The upper jaw is displaced downward, moving together with the nasal bones, chin bones and eyeballs. Palpation determines the deformation, pain and pathological mobility in the nose, the outer edges of the orbits, the pterygoid processes of the main bone. What is the most likely diagnosis?

- A. Fracture of the upper jaw according to Le-Four III (upper)
- B. Fracture of the upper jaw by Le For I (lower)
- C. Fracture of the upper jaw according to Le For II (middle)
- D. Fracture of the chin bones E. Fracture of the nasal bones

4. A 25-year-old patient suffered a facial injury. Objectively: significant swelling of the soft tissues of the left half of the face, hemorrhage in the sclera of the left eye, crepitation in the area of the nasal bones. Palpation: mobility of the upper jaw, with its percussion - tympanitis. On X-ray: there is a fracture line through the lower edge of the orbit on both sides of the chin-wing suture, which passes behind the hump of the upper jaw. What is the most likely diagnosis?

- A. Fracture of the upper jaw by Le Fort 2
- B. Fracture of the upper jaw by Le Fort 1
- C. Fracture of the upper jaw by Le Fort 3
- D. Fracture of the left temporal bone
- E. Fracture of the nasal bones

7. Practical work (tasks) performed in class:

1. Draw a diagram in a workbook dentition.
2. Draw in a workbook jaw structure options (uniform density, multi-mineralized, heterogeneous density). Give an explanation.
3. Draw tables in the workbook with the basic units of radioactivity. Give an explanation.
4. Draw a schematic exostosis and endostosis of the mandible.
 5. Schematically depict persistent and retained teeth. Give an explanation.
 6. Draw schematic principles of anti-inflammatory action of ionizing radiation. Give an explanation.

8. Topic of the next lesson: "Radiation semiotics of diseases of the teeth and jaws."

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

Eclipse and enlightenment. Local change in tooth density and structure. Caries. Periodontitis (classification by radiological manifestations). Radiation signs of chronic fibrous periodontitis. Chronic granulating periodontitis of different localizations. Radiation signs of periodontitis (images of mild, moderate and severe stages). Generalized periodontitis. Periodontitis. Staging by radiological signs.

Methodical recommendations were _____ as. Kaouk AS