LECTURE:

"GUNSHOT, CLOSED AND OPEN INJURIES OF BONES AND JOINTS OF THE LIMBS. MODERN PRINCIPLES OF TREATMENT OF FRACTURES"

(for students of V course in medical faculties)
Lecture: "GUNSHOT, CLOSED AND OPEN INJURIES OF BONES AND JOINTS EXTREMITIES OF MODERN PRINCIPLES OF FRACTURE TREATMENT" – 2 hours.

1. Background.

Diagnosis of injuries and diseases of the musculoskeletal system is based on the principles and methods of clinical medicine: a careful study of complaints, medical history, mechanism of injury, the symptomatology. The main method of diagnosis of injuries and diseases of the musculoskeletal system is clinical, providing certain system of sequential actions of the student.

2. The objectives of the lecture:

2.1. Overall objective: to acquaint students with modern classification and clinical symptoms of injuries and diseases of the musculoskeletal system in order to establish a correct diagnosis;

2.2. Educational objective: the development of students' modern professional thinking; ensuring assimilation leading domestic clinical value of students and scientific and pedagogical schools. To be able to explain to the patient the need for consistent and thorough its survey to establish the diagnosis and first aid in case of damage.

3. Plan and organizational structure of the lecture.

<table>
<thead>
<tr>
<th>№. Number</th>
<th>The main stages of lectures and their contents</th>
<th>Objectives for the levels of abstraction</th>
<th>Type lecture, lecture equipment.</th>
<th>Distribution of time.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Preparatory stage</td>
<td>I</td>
<td>According to the publication, &quot;Guidelines for the planning, preparation and analysis of the lecture.&quot;</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Key learning objectives.</td>
<td>II</td>
<td></td>
<td>6%</td>
</tr>
<tr>
<td>3.</td>
<td>Providing positive motivation.</td>
<td>III</td>
<td></td>
<td>85%</td>
</tr>
<tr>
<td>3.</td>
<td>Plan of the lecture material:</td>
<td>I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>The plan of the main stage</td>
<td>II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>1. Traumatic dislocations</td>
<td>III</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>2. Damage to the upper limb</td>
<td>II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>3. Damage to the lower limb</td>
<td>I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>4. spine injuries</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>5. pelvic injuries</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>6. Principles of treatment of fractures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The final stage</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

References,
4. The content of the lecture.

Dislocations can be acquired as a result of an injury or because of a pathological process in the joint and congenital.

*Traumatic dislocation* - a persistent confusion of articular ends of bones, leading to a complete or partial disruption of their normal relationship. Distinguish complete and incomplete dislocations; fresh (first 1-3 days), intermediates (up to 3 weeks) and long-standing. Dislocations can be uncomplicated and complicated, as well as open, close and familiar. The name given by name dislocation of the bone that the joint is located distally. The exception is the spine, which is considered a dislocated proximal vertebra.

By frequency dislocations of the shoulder make up 40-58% of all traumatic dislocations and ranks first among all the injuries. Depending on the direction of the mixing dislocated segment distinguish dislocations "front", "rear", "rear", "palm", "central" and so on. N.

Traumatic dislocations accompanied by rupture of the joint capsule surrounding the joint and damage to tissues (ligaments, vessels, nerves and so forth.). An exception is the dislocation of the mandible, in which only the joint capsule is stretched. As a result of rupture of the joint capsule and blood vessels form a significant bruise. Blood soaks the surrounding soft tissue and poured into the joint. As a result of mixing muscle attachment points there is a violation of muscle synergies. Rapidly developing retraction resistant mouse that with each passing day makes it difficult reduction of dislocation, as a dislocated straighten impossible without a mouse relaxation. Sometimes dislocation complicated by intra-articular fracture, then it is called a fracture-dislocation. Timely detection of the fracture with a test of the joint radiography in two projections helps the
doctor to choose the right tactics for setting, as the reduction of dislocation when unrecognized fracture can cause serious additional damage.

*The clinical picture* of traumatic dislocations along with general symptoms (such as pain, deformity, dysfunction) has significant clinical signs, which are a kind of joint deformity and forced position of the limbs. If you have symptoms of a spring fixing dislocated limb segment in the unusual position of diagnosis is no doubt. Crucial in the diagnosis is required X-ray examination.

*Dislocation Treatment* includes basic principles: 1) adequate analgesia (small joints with local anesthesia, large - under the common); 2) reduction to be dislocated backwards mechanism; 3) the period of immobilization of the affected limb is dependent on the joint; 4) restoration of function (corresponding rehabilitation).

Reduction of dislocation is considered emergency operation due to the fact that soon after the injury, when there came a pathological retraction muscles reposition manage easily. The basis is a way to reposition overcome muscle retraction, which is eliminated by using a local or general anesthesia. When general anesthesia during reposition for complete relaxation of muscle relaxants are administered. Reduction of dislocation without anesthesia is strictly prohibited, as rough overcome muscle retraction leads to new additional damage. Reduction is performed carefully, slowly, without coarse manipulation. Sprained end of the bone has to go the same way as it was at the time of dislocation (in the opposite direction only), and stand in his place. Full reduction of dislocation leads to restoration of joint configuration, the disappearance of pain and muscle retraction, to restore joint movement.

After reposition dislocated limb is immobilized in a plaster splint middle position for a period of seam torn tissue depending on joint. After removing the splints performed functional treatment aimed at restoring joint function and extremity (physical therapy, massage, physiotherapy).

*Dislocation of the clavicle* - distinguish between two types: acromion (usually) and sternal. The mechanism of dislocation of indirect and direct trauma (falling to the one shoulder, stroke). At full dislocation of the acromial end of the clavicle there is a break-clavicular acromial and clavicular-coracoid ligament. On examination, marked
swelling, the presence of joint deformation, limiting shoulder function, local tenderness, step-like deformation of the acromion process. Running X-ray of both clavicles in the upright position of the patient. At full dislocation acromial end of the clavicle is displaced upward.

Treatment. By intraarticular analgesia with a 1% solution of Novocaine conduct pressure on the end of the clavicle dislocated downwards and anteriorly. It reduces a dislocation easily, but also can easily happen dislocation. To keep the acromial end of the clavicle in the reduction position, it is fixed or variable plaster bandage on the type of sword belts fastened under tension to the plaster corset, for 4 weeks. Then appointed massage, physical therapy, heat treatments. At relapse dislocation carried out surgical treatment, which is to fix the clavicle metal nail or a screw or in the creation of the torn ligaments of Mylar tape. After the surgery is needed shoulder immobilization bandage within 3-4 weeks.

**Dislocated shoulder** - most often caused by indirect trauma (falling allotted hand). In 80% of cases occurs front shoulder dislocation. Depending on the position dislocated head distinguished front, rear and bottom sprains.

The clinical picture - the patient complains of pain, supports the injured arm in a healthy position, abduction and external rotation; the head of the hummers is displaced forward. Anterior shoulder dislocation, which occurs most often characterized by the fact that the shoulders and tense. In the diagnosis of shoulder dislocation is very important definition of the head in the armpit. Rough joint deformation occurs due to the fact that the head of the hummers out of the glenoid cavity, deltoid muscle at the same time collapses, acromion process dramatically acts, the whole area step-shoulder takes shape. X-ray is done to confirm the diagnosis.

*Treatment.* Before treatment is necessary to prevent damage to the axillary nerve. In most cases it is possible Closed reduction of dislocation under local or general anesthesia intra-articular shoulder Immobilization after reduction is carried desalt bandage for 2-3 weeks. Chronic and habitual shoulder dislocation are subject to surgical treatment.
**Dislocation of the forearm** - found mainly in two versions - a posterior dislocation (usually) and the front, but they can be isolated and posterolateral dislocation of the radius and ulna, which give the greatest violation of the elbow joint configuration. They occur when falling on an outstretched hand.

**Clinic.** At the rear dislocation of forearm shortened and slightly bent, deformed elbow, olecranon posteriorly will stand. At the front shoulder dislocation marked shortening, elbow rounded, in the olecranon - ceasing. Significant deformation of the elbow joint is observed in dislocation of the radial head, which is often accompanied by fracture of the ulna (Montedzhi fracture).

**Treatment** of dislocation of the forearm is a timely and correct reposition under local or general anesthesia. In posterior dislocation Assistant produces traction and flexion of the forearm, and the doctor, grasped his shoulder with both hands and hold it with your thumbs, presses on the olecranon. After reposition dislocated forearm plaster splint fix the rear at an angle of 90 ° for 5-7 days, and then begin to exercise therapy; massage and physiotherapy treatments are not prescribed.

**Hip dislocation** - are rare, and only when a big traumatizing effect. Depending on the displacement of the head hip distinguish four types of sprains: low back, the anterior and inferior. Chalice occur neural sprains (80%).

**The clinical picture** neural dislocation: hip and bent a few shows, the whole leg is shortened, bent and rotated inwards. The greater trochanter is displaced upward while the head of the femur is behind from the acetabulum. Lumbar lordosis increased at the bottom and moves distally. Damage to the sciatic nerve.

**Treatment:** immediately anesthetized produce closed reduction of dislocation of the hip in a manner Dzhanelidze or Kocher-Kefer. Otherwise the possible ischemic necrosis of the femoral head. After reposition dislocated limb is fixed in the middle position on the physiological Belair bus via cutaneous extension for 3 weeks.

**Traumatic fractures** - is damage to the bone in violation of its integrity, which arose as a result of external mechanical factors. Fractures are accompanied by damage to the surrounding soft tissues: edema, bleeding into muscles and joints, tendon ruptures
and sprains, bruises, wounds or complete intersection of nerves and major blood vessels.

Classification

Traumatic fractures arise from bending, shear, torsion, compression, and as a result of separation and categorized as follows:

I. Closed and open fractures:
   1) Closed - fracture without disturbing the integrity of the skin;
   2) Open - fracture to produce a wound extending to the bone fragments.

Open fractures require emergency surgery due to the high risk of infection. Early surgical treatment reduces the likelihood of infection. When providing first aid to the fracture impose a sterile bandage and bus.

II. Intra-articular and extra-articular:
   1) Intra;
   2) Extra auricular:
      a) Epiphyseal;
      b) Metaphyseal;
      c) In upper, middle and lower third of the diaphysis.

III. Types of fractures:
   1) Simple - to form two bone fragments;
   2) The comminuted - to form three or more bone fragments;
   3) Multiple - a bone fracture in two or more places.

IV. According to fracture line are distinguished bone fractures of the transverse, oblique, helical, longitudinal and comminuted.

V. Depending on the nature of traumatic muscle force and traction fragments can be displaced relative to each other in width, length, angle, or axis, rotationally or circumferentially.

VI. Fractures in children have their own characteristics and can be:
   1) Sub preinstall of the type "green branches" - the bone fragments are held well-developed, flexible peristostum;
2) The growth zone line - there is a traumatic separation of the bone in the epiphysis (the so-called slipped capital femoral epiphysis).

*Diagnosis and clinical picture*

On examination, determined by local tenderness, subcutaneous hemorrhage, swelling, swelling, deformity segment extremity dysfunction. Palpation of the affected limb causes severe pain at the fracture site observed abnormal mobility, crepitation of fragments, disturbance of sound conduction, painful axial load. To confirm the diagnosis performed radiography in two projections: frontal and lateral. For the diagnosis of pelvic fractures, spine fractures and complicated intra-articular use of CT.

*Fracture of the clavicle* - from 5 to 15% of fractures of bones. In men, they are observed in 2 times more often than women. Collarbone fracture occurs when a direct impact on the collarbone (direct trauma) or during a fall on the elbow or shoulder (indirect trauma). Often breaks collarbone in the middle third, there is the typical displacement of the fragments. The distal fragment is due to the gravity of the upper limb is displaced downward, anteriorly and medially, and under the influence of the proximal thrust sternocleidomastoid muscle - up and backwards.

*Diagnosis* is based on clinical signs, expressed in pain syndrome, swelling and deformation typical angulate in the collarbone area. At displacement of fragments marked upper omission and violation of shoulder function, palpation palpable under the skin of the end of the proximal fragment and identifies abnormal mobility and crepitus of fragments. On plain film revealed a violation of the integrity of the clavicle.

*Treatment.* For fractures of the clavicle with no mixing of superimposed fragments soft bandage for 3-4 weeks.

Repositioning the fragments is carried out after the pre-anesthesia area 20 mL fracture of 1% solution of Novocain. In the armpit laid cotton-gauze roll and the shoulder it is reduced to the chest to eliminate the offset distal fragment length. The entire shoulder girdle with the distal fragment is displaced upwards and backwards, eliminating the offset peripheral fragments downward and anteriorly. To keep the fragments in position offered a variety of bandages and tires, but they are rarely kept in fragments mapped position. After desalt bandage, immobilizing the shoulder joint for 4-
5 weeks, it develops stiffness, on the elimination of which requires 3-4 weeks. However, trauma is often used this bandage, reinforcing its 2-3 rounds of plaster bandage.

In cases where the match and retain the fragments in position fails or there is a compression of the neurovascular bundle, operative treatment - intramedullary Osseo synthesis metal rod Bogdanova, which is removed after 3-4 months.

**Shoulder Fractures** - make up 2.2% of all fractures, and fractures are divided into upper, middle and lower third of the hummers. In turn, fractures in the upper and lower thirds of the fall in the intra-and extra-articular.

Fractures of the head and neck anatomical shoulder ( intra-particular) are uncommon and are characterized by the occurrence of pathogenic contracture after intraarticular hemorrhage, which is an indication for joint puncture and early physical therapy (with 2-3 days after injury). Intra-displaced fractures require surgical treatment.

Fracture of the surgical neck of the shoulder usually occurs in older people at the drop of a hand, while there is impacted fracture or a displaced fracture fragments.

For fractures of the neck of the hummers are often extensive bruising found on the inner surface of the shoulder, extending to the chest area. It is important to find out whether the shoulder movements are transferred to the head. When not impacted fractures turn movement at the head will not be transmitted, the pressure on the axis will cause a sharp pain. Impacted fractures are accompanied by mild pain in the fracture and restricted shoulder movement.

*Treatment* of impacted fracture is to immobilize the shoulder joint plaster splint for Turner in 5-7 days. Hand is fixed to scarf with freely hanging elbow, and armpit laid triangular wedge pillow, which is suspended for the healthy shoulder girdle. From the 2nd day of LFK is appointed. After 4-5 weeks the fracture heals, the motion of the shoulder joint are restored.

*Fractures* of the surgical neck of the shoulder to the displacement of bone fragments are divided into the abduction and adduction. Abduction fractures occur when falling on the abstracted hand, with a shoulder displaced fragments so as to form an
angle between them open outwards. Add fractures occur in the fall of the reduced hand, and the angle between the fragments opens inwards.

*Diagnosis* is based on history, complaints of pain in the area of the fracture, the presence of swelling; inspection: the shoulder is not a spring, as in the dislocation and hangs freely; marked crepitus fragments and tenderness to axial load; sound conductivity broken. Displacement of fragments is determined by the X-ray performed in two projections.

*Surgical neck fracture of the shoulder* Treatment with displacement of bone fragments begins with local anesthesia and repositioning of bone fragments. When adduction the turn to eliminate displacement of bone fragments in length and in width and traction spend shoulder abduction to 70 °, then go to the middle of the shoulder leads on to 35 °. The hand is placed on the receding bus, followed by traction of the skin. If the fragments are displaced, superimposed skeletal traction for olecranon. Reposition of bone fragments during abduction fractures - distal fragment is placed on the central, but the hand on the tire does not fit, since the shoulder abduction takes place even greater displacement of the fragments. It hung on the headscarf or dressing-snake with a roller in the armpit. On the 2nd day appointed by hand massage, exercise therapy for Dreving-Gorinevskoy, UHF. By the end of the month the fracture heals, the hand function and the ability to work are reduced.

When combined with fracture of surgical neck dislocation shoulder head operative treatment, but in older people who have a contraindication to surgery, treatment is based on the formation of a false joint.

*Fractures of the diaphysis* of shoulder arise from direct and indirect injury. shoulder fracture Diagnosis is based on clinical data (such as pain, deformity, swelling, abnormal mobility, crepitation of fragments, the shortening of the shoulder) and X-ray examination. At the turn of the middle third of the adduction is sometimes damaged by the radial nerve.

*Treatment of fractures of diaphysis of shoulder* held on the outlet (abduction) bus. Leverage is given to a right angle (90 °), and moves forward at an angle to 35 °. When fractures without displacement of fragments superimposed cutaneous traction, offset -
skeletal traction of the olecranon. From the 2nd day of LFK is appointed. Traction is removed after 4-5 weeks, and the bus - 6-8 weeks after fracture. In cases where it is impossible to impose abduction bus (old age, broken ribs, pneumonia and others.), Shoulder fragments immobilized in the bottom third of the U-shaped plaster splints and forearm suspended on the dressing-snake. From the first days of LFK is appointed. After 4-5 weeks of splint is removed and transferred to a hand kerchief.

*Surgical treatment* is carried out at the soft tissue interposition or damage the radial nerve. Open reposition fragments supplemented by intra- or extramedullary fixation using metal structures (rods, screws, bolts, plates, wire, metal strip). After surgery, a plaster splint is applied gymnastics performed with 2-3-th day. Fracture healing occurs in 3-6 months.

*The lower end of hummers fractures* are divided into Supracondylar (extra-articular) and trans condoler (intra). Supracondylar (extra-articular) fractures may be extensor or flexor. For intra-articular fractures are trans condoler, inter condoler (T and U-shaped), fractures of the condyles (indoor and outdoor), capitate eminence fractures supracondylar elevations.

*Extensor shoulder supracondylar fractures* occur more frequently in children when falling on an outstretched hand, and the fracture line goes upwards from front to back. The distal fragment is displaced posteriorly and laterally, and the proximal - anterior and medially. Olecranon posteriorly displaced, ceasing formed over it. Such a mixture of fragments can lead to compression of the neurovascular bundle and the subsequent development of ischemic contracture Volkmann. Signs of a developing contracture; severe pain, weakening or disappearance of the pulse at the radial artery (in the wrist), pale skin fingers. To confirm the diagnosis measured pressure in fascial compartment of the forearm. If the pressure reaches 30 mm Hg. Art., shows the urgent revision of the cubital fossa and broad fasciotomy. If the nerves and blood vessels are not damaged, shows the closed reduction, skeletal traction with the help of back Kirchner and the imposition of the cast. To prevent contractures need early diagnosis and treatment of injuries of nerves and blood vessels.
**Flexor supracondylar fractures** occur in the fall on a bent elbow, and the fracture line is a drill-down from front to back and distal fragment is displaced anteriorly.

*Treatment* of supracondylar fracture begins with local anesthesia and repositioning of bone fragments. Superimposed on the posterior plaster splint Turner at a right angle at the elbow. From the 2nd day of LFK is appointed. Movement of the shoulder joint start in 2 weeks, while in the elbow - 3 weeks, in children - a week earlier. Massage is not assigned, because it leads to the ossification of the para-articular tissue and contracture of the elbow joint.

From the first hours after the application of a plaster splint held control of the blood supply to the forearm and hand. When edema, cyanosis, violation of sensitivity plaster splint divorce and if the swelling does not decrease, producing skin and fascia incision on the forearm to prevent the formation of ischemic contracture. In cases where the fracture reduction is not possible or in a plaster splint is a shift of fragments (X-ray inspection is carried out immediately after the imposition of gypsum splints), skeletal traction is carried on the bus or at the outlet of the Balkan frame. After 2 skeletal traction pedal action is removed and superimposed U-shaped plaster splint on his shoulder or back plaster splint on his shoulder, forearm and wrist.

*Operative treatment* of supracondylar fractures held when neither hand nor using skeletal traction fracture reduction is not possible. Fixation of bone fragments is carried out by nails or screws.

*Trans condoler fracture* is intra-articular fractures, and is more common in children. Since the fracture line passes through the area of the pineal gland, a fracture can be called epiphyses. Due to the fact that the distal fragment is displaced posteriorly, the clinical signs of fracture remind extensor fracture, but trans condoler fracture broken Gyutera isosceles triangle formed by projecting the points shoulder and the olecranon. Radiography clarifies the clinical diagnosis.

*Treatment* does not differ from the treatment of supracondylar fracture of the extensor.
Intercondylar fractures, or T and U-shaped fractures, occur when falling on his elbow, and the olecranon as a wedge is introduced between the shoulder condyles and mix them apart.


**Treatment.** If there is no displacement of bone fragments superimposed U-shaped plaster splints and back, locking the elbow at an angle of 90-100 °, for 2-3 weeks. On the 2nd day appointed by the movement of the fingers and the shoulder joint. By moving the hand-made fragments reposition fragments or skeletal traction applied for olecranon. When failure of skeletal traction performed open reduction and fixation of bone fragments of their tie-bolts, needles or screws.

Fractures of the forearm bones - are common and account for about 25% of all fractures.

There are intra, extra-articular (diphase) fractures and fracture-dislocations of the forearm bones. For intra-articular fractures of the forearm bones include:

Fractures of the olecranon, which occur when the cup falls on his elbow. fracture line penetrates into the joint. Due to the traction triceps fragment shoulder often mixed up.

Clinically fracture expressed local tenderness, swelling and bleeding, movement restriction. Radiography specifies the degree of divergence of fragments.

Treatment. When the divergence of fragments, not exceeding 2 mm, is conducted conservative treatment. Superimposed back plaster splint for 3 weeks. From the 2nd day of LFK is appointed. When di Astasia between the fragments of more than 2 mm is carried out the operation, which is to fix the bone fragments elongated pin. immobilization period after the operation the same as that of the turn without differences fragments.

Fracture of the coronoid process occurs when the posterior dislocation of the forearm and is accompanied by local pain and swelling in the elbow. The turning point is determined on the lateral radiograph.
Treatment of fractures of the coronoid process is carried out without bias or casting of splints on the elbow at an angle of 100° for 2-3 weeks. In cases of large displacement process is carried out step-stitching fragments to his bed catgut sutures.

Fracture of the head and neck of the radius occurs when falling on an outstretched hand.

The clinical picture. There have been local pain, swelling, bleeding and limiting functions. Radiography clarifies the nature of the fracture.

Treatment. Impacted fractures and fractures without mixing fragments are treated conservatively. Impose a plaster splint in flexion of the elbow at an angle of 90-100 ° for 2 weeks. Then he appointed LFK. At displacement of fragments held close or open reduction.

The operation ends or the removal of the head in the case of fragmentation (adults), or fixation of bone fragments needle percutaneously trans particular. Postoperative management is the same as in the conservative treatment.

Diphasic forearm fractures can occur with direct trauma. Fragments are displaced in width, length, angle and the periphery. Particular attention is drawn to the rotation of the fragments of the radius.

Clinic pronounced local tenderness, deformity, swelling, abnormal mobility, crepitation of fragments and a violation of the functions of the forearm. In young children with fractures of the type "green branches" and sub parietal fractures clinical signs of fracture appear fuzzy. However, X-rays with the capture of adjacent joints will help to clarify the nature of the fracture.

Treatment is to compare the peripheral bone fragments on the central axis. Fractures without displacement of fragments, sub parietal, with angular or rotational mixing treated conservatively. Corrected axis and the position of the forearm, and two superimposed plaster splints (one on the back, the other - on the palmar surface) with the capture of adjacent joints for 1.5-2 months. The elbow joint is fixed flexion at an angle of 90 °, forearm - a position between supination and pronation, wrist - in light the rear extension. From the 2nd day of starting the movement of the fingers and wrist in the shoulder joint, is assigned to UHF.
With displaced fractures attempt is made to compare the fragments closed by hand on special machines or devices using external fixation rod or spoke-rod type. Control radiography performed immediately after the imposition of plaster languet or apparatus, and after the decay of edema. Appointed physiotherapy and exercise therapy.

Comminuted fractures, fractures, accompanied by damage to blood vessels and nerves, multiple fractures and fractures that can not be closed reduction, subject to surgical treatment. Open reposition ends intramedullary fixation of bone fragments with metal rods and external plaster splint immobilization or extramedullary fixation of different plates for a period of 8-10 weeks.

**Fracture-dislocation Montedzhi** - a fracture of the ulna on the border of the upper and middle third and dislocation of the radial head, occurs when a direct injury.

Clinically, a marked deformity of the elbow joint and the upper third of the forearm. Forearm shortened the elbow movement impossible. The head of the radius is determined by subcutaneous injection. Radiography in two projections with the capture of the elbow determines the fracture and dislocation.

Treatment consists in the reduction of dislocation of the radial head and ulna reposition bone fragments. Forearm stored flexion angle 50-60°. This position is fixed the back of a plaster splint or bandage for 4-6 weeks with the change it for another 4-6 weeks. Often under the bandage occur and secondary displacement of fragments. In this case, under local anesthesia produced by repeated reduction of dislocation and reposition of bone fragments. The head of the radius is fixed needle, percutaneous and trans particular. Dislocation and chronic fracture subject to surgical treatment. The ulna is fixed intramedullary metal rod conducted through the proximal fragment is retrograde, the head of the radius – trans particular needle. Spoke removed after 4 weeks, the plaster cast is removed after 2 months.

**Fracture-dislocation Galeazzi** - "reverse Montedzhi", since it is a fracture of the radius between the middle and lower third of the dislocation and the head of the ulna. There have deformation and shortening of the forearm at the wrist joint movement impossible. X-ray confirms the diagnosis.
Treatment is even more difficult than in Frakture Montedzhi. as the head of the ulna is very difficult to keep in position reduction. Declinator detected after removal of plaster cast. Therefore, when the diagnosis is assigned to the operation, the aim of which is durable fixation of fractures of the radius a metal rod and reposition the head of the ulna needle percutaneously. Plaster immobilization is carried out for 8-10 weeks. Conducted physical therapy and physiotherapy.

Fractures of the radial bone in a typical place occupied among fractures forearm first place and make up about 70%. There are at the drop of a straightened or bent brush. Most often it occurs extensions fracture, or fracture Colles, - fracture of the distal end of the radius offset peripheral fragment in the back side and outwards, ie in the radial direction, and the central fragment is rejected in the palm-side of the elbow. If you fall on a bent wrist flexion occurring Smith fracture Colles fracture or reverse, while the peripheral fragment shifts in the palm side and is in the position of pronation.

Clinic at the turn extensions characterized deformity of the forearm and hand. Marked local tenderness. Movements at the wrist joint is limited. Sometimes Colles fracture is accompanied by damage interosseous branch of the radial nerve. There is traumatic neuritis Turner, in which develops a sharp swelling of the hands and fingers, which leads to osteoporosis, the bones of the wrist. X-rays confirmed the clinical diagnosis.

Treatment begins with anesthesia the fracture site. If the fracture without displacement or impacted, superimposed rear length plaster from the elbow to the fingertips for 2 weeks. On the 2nd day appointed gymnastics and physiotherapy. At the turn of Collis offset fragments produced reposition of bone fragments by traction on the unit or manually Sokolovsky. In this position, giving the brush a small rear extension, applied deep back longer from meta capo phalange joints to the elbow joint for 3-4 weeks. Then, a control X-rays in the case of re-mixing of fragments and crushed fractures produced secondary reposition with percutaneous fixation of bone fragments spokes. The right is considered to be a position of bone fragments, in which radio cubical angle equal to + 30 ° in the "face" position and + 10 ° - in the "Profile".

Hip fractures localization are divided into three groups:
1) fractures of the proximal end of the femur - intra-articular and extra-articular fractures of the femoral neck;
2) diphase fractures - fractures of the sub fractures in the upper, middle and lower third;
3) fractures of the distal end of the femur - intra-articular and extra-articular.

Fractures of the proximal end of the femur is approximately half of all hip fractures.
Intra (medial), hip fractures are divided into, trans cervical and basal. Sub capital, trans cervical and basal. Depending on the mechanism of injury all medial hip fractures can be abduction (more likely to be impacted) or adduct - the divergence of fragments and reduced neck-shaft angle.

Abduct fractures hip fractures are more common in middle age and occurs during the fall in the allotted foot or trochanteric region. Traumatic force coincides with the direction of the femoral neck, and impacted fracture occurs. With such a fracture patients continue to walk, complaining of pain in the hip or knee joints. Even X-ray reveals no fracture. Only the X-ray control, produced in 10-14 days, reveals the fracture line. Often, by this time there is wedging fracture, the foot loses its reference and there are clinical signs of fracture fragments to the discrepancy.

Treatment of femoral neck fracture impacted reduced to prevent wedging and divergence of fragments. The foot is placed on the bus Belair with cutaneous or skeletal traction with a load of 2-3 kg for 2-3 months, after which the patient decreases solvable walk with crutches without a load on the injured leg. The load is allowed after 5-6 months. By this time impacted fracture must grow together. However, we can not exclude the occurrence of avascular necrosis of the femoral head.

Adduct fractures of the femoral neck are more common in older people, and there at the drop of the reduced leg. the fracture line may extend sub, trans capital - at the base of the femoral neck. The distal fragment is displaced upward, deflecting in the same direction of the proximal fragment is, so that the neck-shaft angle decreases.

Clinically determined rotation of the thigh outwards, the outer edge of the foot lies on a bed plane with respect to the limb is shortened to 2-3 cm, broken-line Roser -
Nelatona, marked positive symptom "stuck heel" tenderness to palpation of the axial load and under occlusive disease. X-rays confirmed the clinical diagnosis.

Treatment begins with intra-articular analgesia. Superimposed skeletal traction behind the tuberosity of the tibia, the patient is prepared for surgery. Patients with severe diabetes, cardiovascular failure, weakened and exhausted, in a state of senility surgery is contraindicated, and treatment is aimed at the formation of pseudo arthritis. Skeletal traction is removed after 2-3 weeks, and the patient learns to walk on crutches. In some cases, when patients need to be rotated from the first day until the pain subsided (2-3 weeks) imposed disciplinary denotation plaster boot with a cotton lining.

Adduct hip fractures are treated promptly. two types of surgery have been developed outdoor fixation of intra-articular and extra-articular Osseo synthesis of closed three-blade nail with the help of the guide, BA Petrova and EF Yasnova. Repositioning the fragments is carried out on the table before orthopedic surgery. Walking on crutches, with no load on the affected leg begins in 4 weeks, with the load - after 5-6 months after surgery.

Periodically control radiography. The nail is removed 1-1.5 years after surgery. Some elderly patients with hip fractures sub capital held arthroplasty. When non-united fractures and false joints of the femoral neck and the absence of contraindications for surgery are applied extra-articular Osseo synthesis with three-blade nail and bone grafting autograft or high oblique sub McMurray, hip arthrodesis, joint replacement and reconstructive surgery.

Extra-articular fractures of the femoral neck or trochanteric fractures are fractures of the hip localized base to sub line. They arise when falling on the greater trochanter, more common in the elderly due to the development of senile osteoporosis.

Clinically, these fractures are characterized by severe general condition associated with massive damage and a large blood loss. Significantly pronounced swelling and hematoma. Other symptoms trochanteric fractures are similar to the symptoms of cervical fractures.

Treatment of patients with resuscitation begins (good anesthesia, blood transfusions and blood products) and the imposition of skeletal traction with a load of 4-
6 kg. After 5-6 weeks (and with displacement of bone fragments - after 7-8 weeks) skeletal traction is removed and the patient is preparing to walking with crutches. Conducted LFK, massage, physiotherapy. The load on the affected limb is allowed after 3-4 months. Other treatments include Osseo synthesis metal clamps, an indication for which a young age.

*Diphase fractures* of the femur occur as a result of exposure to direct or indirect injury.

*Clinically* diphase femur fractures are characterized by severe general condition of the patient, the supporting leg function is impaired, hip deformed. There have abnormal mobility and crepitus of fragments, limb shortening and external rotation of the peripheral limbs, local tenderness and axial load, violation of sound conduction. The X-ray in two projections indicated violation of the integrity of the femur.

*Treatment* of patients with hip fracture begins with immobilization and transport anti shock measures. Then superimposed skeletal traction of the tuberosity of the tibia or femur epicondyles and gauze- shin traction. Sometimes after removal of skeletal traction applied hip cast for 2-3 months. Radiographic testing is carried out one month after the reduction. Conducted LFK. and massage. After 2.5-3 months the patient begins to walk with crutches.

*Operative treatment* of femoral diphase fractures is open reduction and fixation of bone fragments of a metal rod, plate, or external fixation device. Low fractures of the femoral shaft due to the difficulty repositioning of bone fragments are treated by operative.

*Diphase fractures* of the tibia fractures are divided into the upper, middle and lower thirds. Fractures in the upper one-third more likely to occur with direct trauma (bumps) in the bottom third - with indirect (bending, torsion). Often the tibia fracture in the lower third is accompanied by fracture of the fibula in the upper third.

*Clinical* fractures of the tibia: deformation, abnormal mobility, crepitation of fragments, local pain and axial load, violation of sound conduction. Radiography in two projections clarify the diagnosis and displacement of bone fragments.
Treatment. The hematoma introduced 20 ml of a 2% Novocain solution. If the fracture is not accompanied by the displacement of bone fragments, a plaster cast is applied or performed skeletal traction of calcaneus or distal metaphysis in the field with a load up to 6-8 kg for 3-4 weeks, followed by repositioning the displaced bone fragments on the bus Belair in the House. After the X-ray skeletal traction control is replaced by a plaster cast. At low fractures plaster cast is applied to the mid-thigh, with fractures of the upper third - to the gluteal fold.

With easily displaced fractures of the tibia, with interposition of soft tissue or bone fragments, with double fractures, non-united fractures and false joints made open (surgical) reduction followed by internal fixation of bone fragments with various metal structures. After fixation periods of immobilization plaster cast remains the same. Currently, the treatment of fractures of long bones are spreading compression-distraction by Ilizarov.

Fractures of the ankle account for about half of all fractures of the tibia. The mechanism of injury often indirect - when tucking of foot outwards or inwards. According to the mechanism of injury distinguish pronation-abduction and sup fractures.

Pronation-abduction fractures occur when the foot pronation and abduction. Torn deltoid ligament or torn medial ankle and foot moves outwards. This breaks down the external oblique ankle slightly above the ankle, often torn tibiofibular joint and foot mixed outwards (fracture Dupuytren).

Fractures occur when the displacement of the foot inwards. When it first breaks down the outer ankle at the level of the joint space, and then breaks down the inner ankle inwards under the influence of the shifting of the talus (fracture Malgenya).

Fractures of the ankle can occur when excessive rotation of the foot inwards or outwards, while the foot is in the folding position, the rear edge of the fracture of the tibia can occur, and the talus is displaced posteriorly (back fracture Destin); extensions at the foot breaks off the front edge of the tibia and the talus, mixed anterior (front fracture Destin).
Clinic. There have been local pain, joint deformity, swelling, bruising, abnormal function. The X-ray visible fractures ankle.

Treatment. One ankle fracture without displacement of bone fragments is treated on an outpatient basis. Before applying plaster splint for 4 weeks produced analgesia fracture site by introducing a 2% Novocain solution in an amount of 10-20 ml. Treatment of ankle fractures with a mixture of fragments is reduced to fragments repositioning under local or general anesthetics and immobilization of a limb plaster cast for 6 weeks - with two broken ankles, 8 weeks - three at the turn of the ankle, 10 weeks - at fractures with subluxation of the foot. After removing the plaster cast foot and leg bandaged with an elastic bandage. Held physiotherapy and functional therapy. Appointed wearing arch supports. Skeletal traction and surgical treatment of ankle fractures are used when manual reposition does not eliminate the displacement of bone fragments.

Spine injuries - occurs both in direct and indirect injury and at frequent in patients with multiple injuries. Particular attention is paid to transport immobilization: the victim gently placed face up on the board or rigid stretcher, thus avoiding secondary spinal cord injury. For the diagnosis may be necessary radiography, CT, MRI. Displaying a full neurological examination to rule out spinal cord injuries.

Spine Injuries are divided into fractures, fracture, dislocations, subluxations, damaged discs and distortion. These types of injuries can be combined, such as a fracture and dislocation, fracture and distortion. More often than not accompanied by spinal cord injuries spinal cord injury, but sometimes they are complicated concussion, contusion, compression or anatomic rupture of the spinal cord.

Fractures of the cervical vertebrae most often occur when indirect injury. Often the trauma of the cervical spine is prepared divers or fighters. There are four types of spinal injury mechanism: flexor, extensor, flexor-rotational and compression.

Clinic. There are local pain, forced position of the head (sometimes victims keep head in his hands), the tension of the neck muscles, restricted and painful movement. For fractures, followed by vertebral subluxation or dislocation, there is compression of
the spinal cord with the phenomena tetra paresis or tetraplegia, thus violated the act of urination and defecation. X-rays - a compression fracture of the vertebral body or arch.

*Treatment* of fractures and fracture without spinal cord damage is done in the hospital traction using Glisson loops or zygomatic arches with a load of 6-8 kg in a month. When flexion fractures of the vertebral bodies of the cervical traction is carried out by the head, thrown back backwards, with fractures of extension - his head tilted. After reposition that is controlled by the profile spindly grams impose crania thorax plaster bandage or plaster Schantz collar for 2-3 months, in more severe injuries - for 4-6 months.

Damage to the cervical spine, followed by neurological disorders, not eliminated during skeletal traction and single-step closed reduction, subject to surgical treatment, aimed at eliminating the compression of the spinal cord. Note that a closed reduction of dislocation of the vertebral arch fracture in the presence of (unstable damage) associated with a certain risk, since it is impossible to exclude additional spinal cord injury during reduction.

Decompressive laminectomy performed after the pre-imposed skeletal traction or zygomatic arch, or bones of the cranial vault. Audit of the spinal cord. The operation should be completed by the stabilization of the spine. With the help of the cortical bone grafts taken from the crest of the tibia, posterior spinal fusion is performed. Failure to stabilize the spine following laminectomy usually leads to a deterioration of the affected states. Immediately after the injury is difficult to determine the degree of spinal cord injury: whether it's a concussion, injury or spinal cord compression, or its partial or complete rupture. However, neurological symptomatology with concussion, contusion or not hemmer increases and decreases when the full break of the spinal cord neurological status remains unchanged, pressure sores are formed quickly. If disturbed urination, should promptly apply suprapubic fistula. The intestine is emptied or enema, or by mechanical means - manually. In those cases, when the diagnosis of "spinal cord compression" neurologically and radiologically confirmed, decompressive laminectomy performed.
Fractures bodies thoracic and lumbar vertebrae compression and more often have a flexion or compression mechanism fractures. These lesions are divided into the volatile and stable, as well as complicated and uncomplicated. In recognition of spinal injury, be aware that an injury can suffer both the front and the back of his department to help choose the most rational method of treatment of various types of damage.

Clinic. Pains in the area of damage, spinouts process overlying vertebra and an increase inter spinouts gap, kyphosis severity, depending on the degree of compression of the vertebral wedge. There is a strain of the back muscles. Sometimes there are pains in the chest or in the abdomen, which can be so intense that they resemble a picture of "acute abdomen". X-rays performed in two or three dimensions, revealed bony spine pathology.

In the treatment of uncomplicated compression fractures of the thoracic and lumbar vertebrae following techniques:

1) single-stage reduction is followed by immobilization with a plaster corset;
2) gradual (stage care) reduction and the imposition of a plaster corset;
3) functional method;
4) operational methods.

Immediate reposition wedge compressed vertebral body is performed under local anesthesia on the auger (hematoma in the body of the damaged vertebra injected 5 ml of 1% solution of Novocain). The patient is placed on two tables in the hyperextension position for 15-20 minutes. In this position, is superimposed plaster corset for 2-3 months, which is replaced by a removable another 10-12 months.

A milestone reduction is carried out gradually over a period of 1-2 weeks by placing under the waist- gauze or other dense rolls of different heights -. 2-3 to 10 cm Sometimes this method is combined with the simultaneous traction of the armpits on an inclined plane. After 1-2 weeks of superimposed plaster corset.

Functional method. In the process of stretching on the ramp and under the influence of therapeutic exercises for 2-2.5 months creates a "muscular corset" that holds the spine in the position of a hyperextension. After creating a good "muscular corset" plaster corset is not imposed. With significant compression of one or two or
three of the vertebral bodies is made detachable unloading brace that fits over while walking throughout the year.

By the operative methods of treatment of uncomplicated fractures of vertebral bodies include:

1) An integrated functional method using fixture- "tie" (in uncomplicated compression fractures of the wedge-shaped body of the lower thoracic and lumbar vertebrae);

2) Front fusion (closed uncomplicated fractures of vertebral bodies of the thoracic injury with end plate);

3) operation of the partial replacement of a vertebral body (with compression comminuted fractures of the vertebral body).

Fractures of the pelvic bones make up 5-6% of fractures of the musculoskeletal system, the most common cause of which is road accidents. Fractures of the pelvis are severe damage and occur when compression of the pelvis in the sagittal and frontal direction during car accidents or a fall from a height. Most break the most delicate bones of the pelvis - ischial pubic and. A more significant injuries or torn Pubic sacroiliac joints. Heavy blood loss and related injury, especially urinary tract and sexual organs, require emergency care.

Clinic. In fractures with significant displacement, a change in the configuration of the pelvis. When double fractures of the pelvic ring, you can find the typical position of "frog". At the site of the fracture occurs widespread hemorrhage. On palpation determined the fracture line and the places where it is possible to palpate bone. Are revealed crepitus and abnormal mobility of free fragments.

Damage to the deep-seated pelvic structures determined by special techniques, such as:

1) identification of soreness in transverse compression of the pelvis;

2) the symptom of eccentric compression of the pelvis (made grasping hands iliac crest near the anterior spines). Hands make while trying to expand the pelvis, pulling the front of the crest of the midline of the body;
3) vertical pressure in the direction of the ischium tuberosity to the iliac crest provides additional information about the localization of deeply located pelvic bone fracture;

4) The study of the pelvis through the rectum is extremely valuable, especially in cases of fracture of the bottom of the acetabulum with central dislocation of the hip and lateral fracture of the sacrum and coccyx.

To verify the location and nature of injury in the pelvic region are used in conventional X-ray projections and special techniques for fine diagnosis: computed tomography and magnetic resonance imaging.

Classification, clinical picture and treatment of pelvic fractures

All the bones of the pelvis fractures are divided into four groups.

I group. Isolated fractures of the pelvis.

1. Chunking front upper and lower iliac spines occur with direct impact and a sharp reduction m. Sartorius, m. tensor fascia late. Fragments will mix down.

   Clinic: local pain and swelling, a symptom of "reverse".

   Treatment: bed rest for 2-3 weeks.

2. Fractures of the wing and the iliac crest occur when falling from a height or car accidents.

   Clinic: fractures cause pain and hematoma formation.

   Treatment: lip shin traction bus Belair for 4 weeks.

3. Fracture of one of the branches of the pubic and ischial bone.

   Clinic: local pain and swelling, a symptom of "heel stuck."

   Treatment: bed rest for 4-6 weeks.

4. Fracture of the sacrum below the sacroiliac joint.

   Clinic: local pain and bruising.

   Treatment: bed rest is up to 6 weeks.

5. Fracture of the coccyx.

   Clinic: local pain, worse when changing position. X-rays - a mixture of the coccyx.
**Treatment**: fresh fractures repositioned in under local anesthesia, chronic treated Pre sacral alcohol-Novocain blockades or quickly.

**Group II.** Fractures of the pelvic ring without breaking the continuity of it.

1. Unilateral or bilateral fracture of one and the same branch of the pubic and ischial bone.

*Clinic.* This change is characterized by local pain, intensifying when turning on its side, a positive sign of "stuck heel."

*Treatment*: bed rest in the "frog" position for 3-4 weeks.

2. Fractures pubic branches on one side and the ischial - other. With this type of fracture of the pelvic ring integrity is not broken, clinic and treatment are similar to those in the previous form of the fracture.

3 **Group.** Fractures of the pelvic ring in violation of its continuity

1) front card:
   a) unilateral and bilateral fractures of both branches of the pubic bone;
   b) unilateral and bilateral fractures of the pubic and ischial bones (for "butterfly" type);
   c) break the symphysis.

*Clinic.* These types of fractures of pelvic anterior half rings are characterized by pain in the symphysis pubis and the perineum, the forced position - the position of "frog" (Volkovich symptom) and positive symptoms "heel stuck." Compression enhances pelvic pain at the fracture site.

*Treatment*: in fractures without displacement of bone fragments the patient is placed on the board to "frog" for 5-6 weeks. Conducted physical therapy, physiotherapy. For fractures of the type "butterfly" with a displacement of bone fragments described complementary treatment or adhesive skeletal traction for the feet. bed rest period of 8-12 weeks. When you break the symphysis treatment is carried out on a hammock for 2-3 months.

2) Rear of the department:
   a) longitudinal fracture of the ilium;
   b) rupture of the sacroiliac joint.
**Clinic.** Such fractures are rare. There local pain on palpation.

**Treatment** - in a hammock on board within 2-3 months.

3) Combined fractures of the anterior and posterior sections:
   a) single-sided and double-sided vertical fractures (fractures type Malgenya);
   b) a diagonal fracture;
   c) multiple fractures.

Clinic. As a rule, these fractures in patients with traumatic shock develops, local tenderness, limitation of active movements of the lower extremities. When one-sided vertical fracture half pelvis moves upwards. At the bilateral vertical fracture occurs extensive retroperitoneal hematoma and often - damage of hollow organs.

**Treatment:** anti-shock measures, including intra pelvic blockade by LG Shkolnikov and VP Selivanov with 0.25% Novocain solution of 300 ml on each side, skeletal extension of the lower limb in flexion and abduction for 8-10 weeks. Walking is allowed after 3 months.

**Group IV.** Fractures of the acetabulum.

1. Chinking the rear edge of the acetabulum.
2. Fractures of the bottom of the acetabulum.

**Clinic.** For fractures of the acetabulum without displacement of fragments of active movement in the hip joints are limited due to pain.

**Treatment:** Continuous skeletal traction for the femoral condyle on the bus with a load of 3-4 kg.

For fractures of the posterior edge of the acetabulum with an offset occurs rear upper hip dislocation. Treatment: anesthesia by intra-articular administration of 20 mL of 2% solution of Novocain, reduction in the skeletal traction or during an operation aimed at open reduction and fixation of acetabular fragment.

When the central dislocation of the hip performed reposition of bone fragments and the reduction of dislocation by skeletal traction for the femoral condyle and the greater trochanter with a load of 8-10 kg for 3 months. Walking is permitted after 3.5 months on crutches.
5. Materials activate students during teaching lectures.
   
   A. Questions to control absorption material
   
   1. The classification of fractures
   2. Common signs of fracture
   3. Classification of treatment methods
   4. Principles of simultaneous reduction and subsequent fixation plaster cast
   5. Principles of treatment of skeletal traction

6. Total financial and methodological support of the lecture.
   
   - Training room - conference room of the Department;
   - Equipment - computer, multimedia projector;
   - Illustrative material - multimedia presentation.

7. Literature, which is used in preparing of the lecture.
   
   - basic: