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«NORTH OSSETIAN STATE MEDICAL ACADEMY»
Ministry of health of the Russian Federation**

Department of Traumatology and Orthopedics

Hip and hip joint injuries

Educational and methodical manual for students

Traumatology and orthopedics

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«**APPROVED**»

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Lesson #8.

"Hip and hip joint injuries".

The purpose of the lesson.

To introduce students to the classification of hip and hip joint injuries, to teach students the clinical and X-ray examination of patients with hip and hip joint injuries, to be able to provide first aid in case of injuries.

After the practical lesson, the student should KNOW:

1. the mechanism of hip and hip joint injury.
2. classification of hip and hip joint injuries.
3. clinical symptoms of hip and hip joint injuries.
4. radiological semiotics of these injuries.
5. methods of treatment of hip and hip joint injuries.
6. principles of first aid for hip and hip joint injuries.

After the practical lesson, the student should BE ABLE to:

1. find out complaints and collect anamnesis in patients with hip and hip joint injuries.
2. conduct a clinical examination of patients with various injuries of the hip and hip joint.
3. interpret the radiological data.
4. formulate a diagnosis of hip and hip joint injuries.
5. provide first aid to patients with hip and hip joint injuries.

Lesson content:

Traumatic hip dislocations.

The anatomical and functional characteristics of the hip joint include a number of features that protect it from the occurrence of traumatic dislocations. These include •

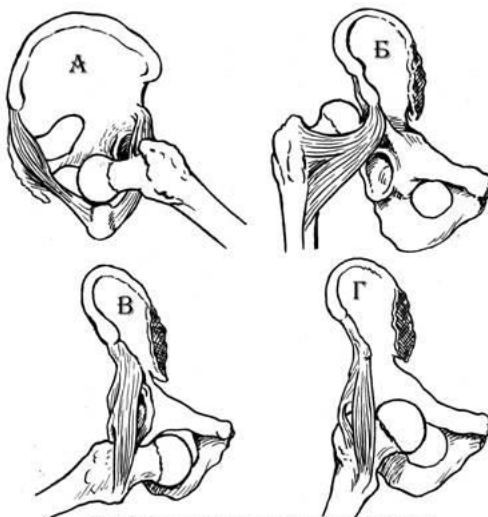
- * full compliance of the articular surfaces;
- * strong ligaments that strengthen the joint capsule;
- * powerful muscle layer surrounding the joint;
- * a large volume of possible movements with significantly less functional needs.

In connection with the above, dislocations in the hip joint are rare.

Traumatic hip dislocations (Fig. 67) are divided into anterior and posterior. In each of these groups, the displacement of the head occurs up or down, and depending on this, there are 4 types of traumatic hip dislocations:

- * posterior or iliac;
- * posterior or sciatic;
- * anteroposterior or supralateral;
- * front-bottom or lock-out.

The most common among all hip dislocations is the iliac (up to 85%).



Types of traumatic hip dislocations: 1-posterior-lower; 2-posterior-upper; 3-anterior-lower; 4-anterior-upper

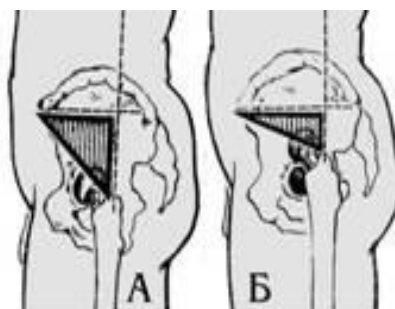
The mechanism of occurrence. Traumatic dislocations in the hip joint occur as a result of the indirect application of significant force. A prerequisite for the occurrence of dislocation is flexion in the hip joint, since when it is extended, the joint is blocked by the tension of powerful ligaments and further movements, especially rotation, are possible only together with the pelvis. The type of dislocation depends on the degree of hip flexion, the presence of adduction or abduction, external or internal rotation at the time of injury.

Posterior dislocation usually occurs with at least 45° flexion, adduction, and internal rotation of the hip. For the occurrence of anterior dislocation, flexion is also necessary, but in combination with abduction and external rotation. This damage is accompanied by significant destruction of the surrounding soft tissues.

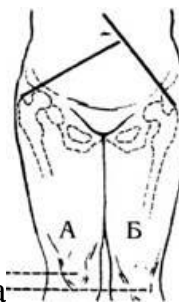
Diagnosis of dislocations. The patient's position is forced, any change in it is accompanied by an increase in pain. With all types of dislocations, hip flexion is detected, however, for each type of its degree is different. In addition, the posterior dislocations are characterized by adduction and internal rotation, while the anterior ones are characterized by abduction and external rotation. With all types of dislocations, there is a relative shortening of the lower limb. The greater trochanter is located above the line (Fig. 68) connecting the ischial tubercle and the anterior superior spine of the ilium (Roser-Nelaton line), the isosceles triangle of Briand is violated (Fig. 69), the Schumacher line runs below the navel (Figure 70).



Roser-Nelaton line is normal



Briand triangle is normal and with hip dislocation;



a-Hip dislocation; b-norma

Active movements in the hip joint are absent, passive-sharply painful, when trying to remove the limb to the mid-physiological position, the symptom of springy resistance is determined. A positive symptom of the "piston": a shortened leg after an injury is pulled on itself. The legs become the same length. As soon as the sick leg is released, it again becomes shorter than the healthy one.

Treatment. Hip reduction should only be performed under anesthesia. To eliminate fresh posterior and posterior dislocation, the Janelidze method is used. The patient is placed on the table with his stomach down, so that the damaged limb hangs over its edge. The assistant fixes the pelvis with both hands, pressing it to the table. The limb is bent at the hip and knee joints and slightly withdrawn. The doctor performs traction down to the sensation of moving the hip anteriorly, and then makes several rotational movements. The hip reduction is accompanied by a clicking sound and the restoration of passive movements in the joint.

With all stale and fresh nadlonnyh dislocations, the Kocher method is used for setting: the patient's position is lying on his back, the assistant fixes the pelvis, pressing it to the table. To eliminate stale posterior dislocations (iliac and sciatic) according to the **Kocher method**, the first step is to bring the leg as far as possible, bend it in the hip joint and perform traction along the axis, the head of the hip is removed from behind the posterior edge of the acetabulum. In the second stage, the hip is slowly rotated outwards, as a result, the head of the hip is placed opposite the hollow. The third stage: with continued traction along the hip axis, the leg is quickly extended, withdrawn and rotated inside. At this stage, the dislocation is eliminated.

After the dislocation is eliminated, a control radiograph is performed. If the dislocation could not be eliminated at the first attempt, make one or two more attempts to correct (no more!), however, each stage should be performed very carefully. If the closed removal of the dislocation is unsuccessful, an open reduction is performed. After the dislocation is eliminated, for the prevention of aseptic necrosis of the femoral head, the joint is unloaded for 4 to 6 weeks with the help of skeletal traction, in parallel, physiotherapy procedures, massage and physical therapy for the hip joint are prescribed. After that, up to 4 months from the moment of injury, the patient walks with the help of crutches without support on the damaged limb. In the absence of signs of avascular necrosis of the femoral head, the load on the damaged leg is allowed.

CLASSIFICATION OF HIP FRACTURES

Femoral fractures are severe injuries of the musculoskeletal system, often accompanied by traumatic shock and require hospital treatment. They account for between 3.5% and 13% of all types of fractures.

There are fractures of the proximal, diaphysis and distal femur.

Fractures of the head and neck of the femur are intra-articular or medial, and fractures of the trochanteric region refer to extra-articular or lateral injuries.

FRACTURES OF THE PROXIMAL END OF THE FEMUR

FRACTURES of THE FEMORAL HEAD are rare, mainly in traumatic dislocations.

HIP NECK FRACTURES

- * Medial fracture of the femoral neck (intra-articular).
- * There is a subcapital fracture — near the transition of the head to the femoral neck; transcervical — the fracture line passes through the middle of the neck; basal-in the area of the base of the femoral neck. Depending on the displacement of the fragments, they are divided into ADDUCTION or varus (not hammered) and ABDUCTION or hallux (always hammered).
- * Lateral or trochanteric fracture of the femoral neck. Varieties: intervertebral-the fracture line passes near the intervertebral scallop line; transvertebral-the fracture line passes through the array of the femoral trochanter; trochanter-subvertebral fracture.
- * Osteoepiphyseolysis of the femoral head (in childhood).

HIP TROCHANTER FRACTURES

- * Isolated fracture (in childhood osteoapophyseolysis) of the large trochanter.
- * Isolated fracture (in childhood, osterapophyseolysis) of the small trochanter.

DIAPHYSEAL HIP FRACTURES

- * Subtrochanteric hip fractures.
- * Upper third of the femoral shaft.
- * The middle third of the femoral shaft.
- * The lower third of the femoral shaft.

FRACTURES OF THE DISTAL END OF THE FEMUR

- * Supracondylar fracture.
- * Fractures of the femoral condyles (one or both, Y-and T-shaped).
- * Osteoepiphyseolysis of the distal end of the femur (in childhood).

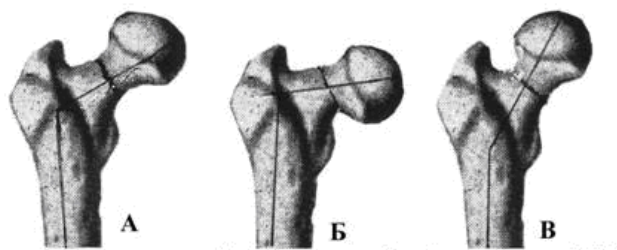
HIP NECK FRACTURES

Femoral neck fractures in women are 2.5 times more common than in men, the average age of victims is 63 years; 85% of patients are over 50 years old, 65% are over 60 years old.

Mechanism: falling on the area of the large trochanter with a sharp rotation of the leg outwards or inwards.

Adduction fracture

Adduction fractures of the femoral neck, depending on the direction of the fracture line, are usually divided into three groups (Fig. 1). Normally, the cervical-diaphyseal angle is $127-130^\circ$ (Fig. 2).

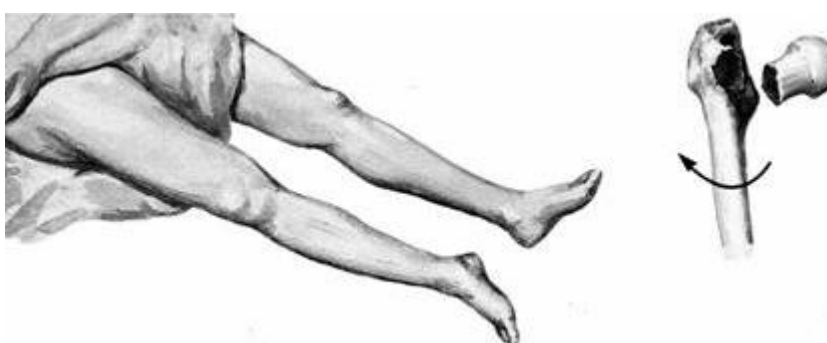


hip neck fractures: 1-no change in CDA, 2-varus: CDA reduced; 3-valgus: CDA increased

With an adduction (varus) fracture, the angle between the epiphysis and the diaphysis of the femur decreases (Fig. 3). With this displacement, the fragments are never driven in.

The clinic. The following clinical symptoms are characteristic of an adduction (varus) fracture:

- * Anamnesis typical: accidental fall, bruising of the large trochanter area.
- * Complaints of pain in the hip joint. At rest, the pain is not sharp, however, it increases with palpation under the Pupart ligament, pounding on the axis of the leg or on the area of the large trochanter, trying to make active or passive movements in the hip joint.
- * External rotation of the injured leg – the outer edge of the foot is adjacent to the bed.



External rotation of the injured leg

- * The swelling and hematoma in the area of the fracture are not pronounced.
- * Shortening of the leg by 2-4 cm.
- * A positive symptom of "stuck heel" - the patient is unable to lift and hold the leg straightened in the knee joint. When trying to lift the injured limb, the heel slides on the surface of the bed.

* The greater trochanter of the femur is located above the Roser-Nelaton line (the line connecting the sciatic tubercle with the antero-superior iliac spine).

* Positive symptom of Girgolav: increased pulsation of the vessels under the Pupart ligament.

* The isosceles of the Briand triangle on the damaged side is broken. Briand's triangle: in the patient's position on the back, two lines are drawn from the antero-superior iliac spine – one to the top of the large trochanter, the other perpendicular to the continuation of the femoral axis.



Roser-Nelaton line is normal

* The Schumaker line runs below the navel. The Schumaker line is drawn through the tip of the greater trochanter and the antero-superior iliac spine. Normally, this line crosses the midline of the body above the navel.

* Positive sign of Allis. In varus fracture of the femoral neck, the greater trochanter is displaced upward, resulting in relaxation of the middle and small gluteal muscles, as well as the muscle straining the broad fascia of the thigh. This allows you to press your finger more deeply on the damaged side than on the healthy side.

* Bone crunch is detected.

To clarify the diagnosis, X-rays of the hip joint are made in two projections.

First aid for an isolated fracture of the proximal femur consists of analgesia and immobilization of the injured limb with a standard Dieterichs splint or three Kramer splints.

Treatment. First aid consists in reducing pain by introducing promedol, applying a transport tire (metal, plywood, Dieterichs), fixing the entire lower limb and trunk of the patient. Such patients should be taken to specialized departments.

Analgesia: below the Pupart ligament, 1-1.5 cm outside of the femoral artery, pass a needle to a depth of 4-5 cm until it stops in the bone and inject 20 ml of a 2% novocaine solution into the fracture site.

Adduction (varus) fractures of the femoral neck practically do not heal independently. The consolidation of the fracture is possible provided that the fragments are accurately matched and fixed in a stable manner.

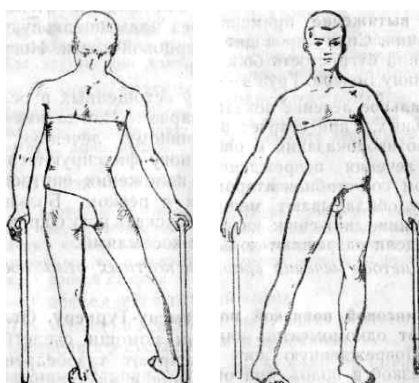
The process of fusion in the medial fracture of the femoral neck is **ADVERSELY** affected by the following points:

- * Absence of the periosteum.
- * Lack of soft tissue – the femoral neck is separated from the muscles by the joint capsule.
- * Washing bone fragments with synovial fluid, which slows down regeneration.
- * Damage to blood vessels during a fracture.
- In the elderly and senile, the vessels of the round ligament are obliterated or penetrate shallowly into the femoral head.

Functional treatment is indicated in emaciated and weakened patients, in senile senility, when there are serious contraindications to surgical treatment. In this method of treatment, the injured leg is fixed with a plaster boot with a stabilizer in the position of internal rotation. The leg is covered with sandbags. The patient is allowed to make early movements: sit, lower his leg from the bed. After 2-3 weeks, walking with crutches is allowed.

N. B.!!! With this method of treatment, the fusion of bone fragments does not occur.

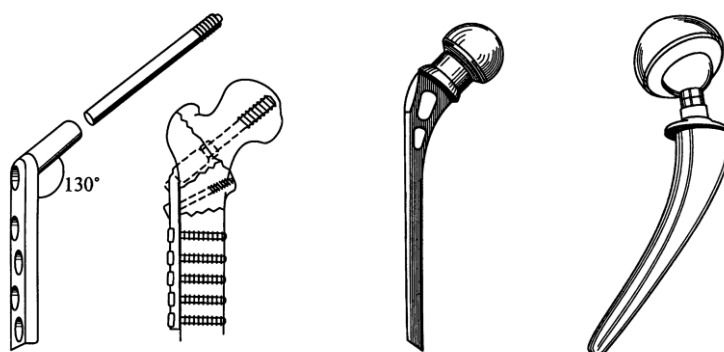
Whitman-Turner plaster cast treatment. The fragments are repositioned simultaneously or by skeletal traction. The injured leg is fixed with a hip plaster cast in the position of abduction and internal rotation (Fig. 4). The period of plaster immobilization is up to 6-8 months. After a month in a bandage, walking on crutches is allowed. After removing the bandage, a restorative treatment is prescribed-. massage, physical therapy, mechanical therapy, paraffin applications. Fusion can occur in young and middle-aged people (in 40% of cases).



Surgical treatment. Prior to surgery, immobilization is performed using skeletal traction for the tuberosity of the tibia or a derotation plaster "boot". The use of a coxist plaster cast and skeletal traction, as independent methods, is practically not used.

Surgical treatment, the purpose of which is an accurate reposition and strong fixation of fragments, is carried out on 2-3 days from the moment of injury. The arsenal of surgical treatment includes osteosynthesis of the fracture, as well as hip replacement. The

operation is performed under anesthesia. A large number of metal structures have been proposed to fix hip neck fractures. To date, the most popular for these purposes are compression screws and dynamic screws.



To determine the viability of the femoral head, radioisotope diagnostics (scanning), computed tomography and nuclear magnetic resonance studies are used. These methods allow you to get a clear idea of the degree of violation of the blood supply to the femoral head. If its blood supply is completely or almost completely absent, then the most rational in these patients is hip replacement.

Before the operation, bone fragments are reposed in a closed way according to Whitman or Leadbetter.

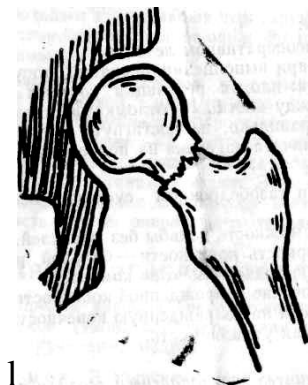
Reduction according to Whitman: produce traction of the lower limb along the length, slowly rotate inside, withdraw and fix the foot holder of the operating table.

Leadbetter reduction: the assistant fixes the patient's pelvis, the operator bends the knee, pulls the limb along the length and slowly bends it at the hip joint to an angle of 90° , then rotates the leg inside. Then the limb is gradually extended and withdrawn. In this position, the foot is fixed with a foot holder. Produce control X-rays in two projections.

In the postoperative period, for the immobilization of the limb, either skeletal traction for the tuberosity of the tibia with a load on the axis of 2-3 kg, or a derotation "boot" is used. For the prevention of postoperative complications, it is important to activate the patient in bed and breathing exercises prescribed to the patient in the first days after surgery. After removing the stitches (on the 12-14 day), the patient is taught to walk with the help of crutches without loading the operated leg. To step on the limb is allowed only after 5-6 months from the moment of surgery in the absence of radiological signs of aseptic necrosis of the femoral head. Working capacity is restored after 8-18 months.

Abduction fractures of the femoral neck.

The degree of insertion of fragments in abduction (hallux valgus) fractures can be different: easy insertion and mutual adhesion of fragments, the distal part of the neck is embedded in the spongy bone of the proximal part of the neck and neck, deep mutual insertion of fragments. The cervical-diaphyseal angle is greater than norma



The clinic. Unlike adduction fractures, impacted fractures are difficult to diagnose because:

- * Patients can walk.
- * No external rotation of the injured leg.
- * The large skewer does not move upward.
- * No shortening of the injured limb.
- * The pain in the area of the fracture is small.
- * Movements in the hip joint are possible.

The diagnosis is clarified by X-rays in two projections.

Treatment. After anesthesia of the fracture site, skeletal traction is applied for 2-3 months. The load should be small (3 kg) to prevent the splintering of the fragments.

Treatment with a hip plaster cast for 3-4 months. With this treatment, in 80% of cases, the fusion of fragments can occur. The load is allowed after 5-6 months. If in the course of treatment there was a splitting of the fragments, then osteosynthesis is performed with a three-bladed nail.

Uncrossed fractures and false joints of the femoral neck.

Reasons:

- * For non-surgical treatment.
- If technical errors are made during the operation: poor reposition of bone fragments; diastasis remains between the bone fragments; the three-bladed nail is inserted incorrectly; stable osteosynthesis is not achieved.
- * The load on the injured leg is started early.

Clinic:

- * Pain in the hip joint is constant or when walking.
- * Inability to walk without crutches.

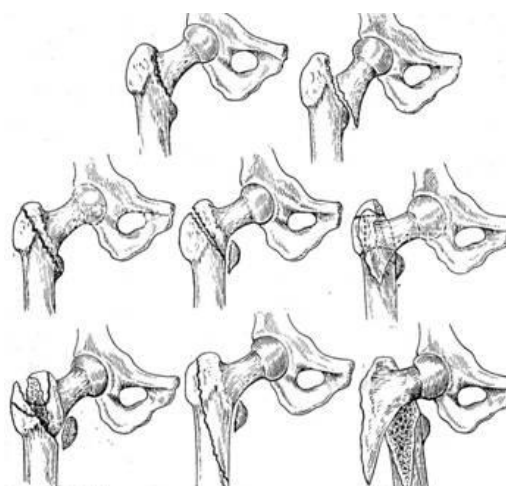
- * Immobility of the limb – the patient is either on bed rest, or walks only around the room.
- * Shortening of the injured limb.
- * Lameness on the injured limb.
- * Rapid fatigue.

Treatment:

- * Hip replacement.
- * McMurray subtrochanteric osteotomy-moving the femoral shaft under the head.
- * Hip arthrodesis-for aseptic necrosis of the femoral head and deforming coxarthrosis.

Trochanteric hip fractures

Unlike medial fractures, lateral or trochanteric femoral fractures heal well after both non-surgical and surgical treatment. This is facilitated by a good blood supply to the trochanteric region, a large array of soft tissues, and the presence of a periosteum.



Types of fractures of the trochanteric region of the thigh

Lateral or trochanteric fractures are more common after the age of 70, which is associated with severe osteoporosis of this area, especially in women, who have fractures 7 times more often than men. However, in recent years, according to the materials of our clinic, a tendency to "rejuvenate" fractures of the proximal femur has been revealed. These fractures occur in both women and men of working age (40□2). The mechanism of occurrence of these injuries is the same as fractures of the femoral neck.

Clinical manifestations in trochanteric fractures are similar to those in cervical fractures. Percutaneous fractures are often multi-comminuted with the separation of the small trochanter.

Lateral fractures, both with conservative and surgical treatment, heal much better than medial ones. This is due to the fact that the blood supply to the proximal fragment suffers

significantly less than in femoral neck fractures, the trochanteric region is covered by the periosteum, one of the main sources of reparative osteogenesis.

Treatment. The main method of treatment of fractures of the trochanteric region with displacement of fragments is the method of permanent skeletal traction and (or) osteosynthesis.

The choice of treatment method in each specific case should be strictly individual. In this case, the nature of the fracture, the age of the patient, the presence of concomitant pathology, the social status of the patient and the degree of probability of possible complications should be taken into account when choosing each of the treatment methods.



In fractures with a satisfactory standing of the fragments in young people, it is possible to use a coxist plaster cast, which fixes the damaged limb for 2-3.5 months. In a similar situation, the method of permanent skeletal traction is used in elderly and senile people. In fractures with displacement, the central fragment is in the position of withdrawal due to the impact of the gluteal muscle group. Therefore, skeletal traction is performed in the position of withdrawal of the injured leg. The value of the angle of withdrawal of the limb is equal to the angle of withdrawal of the central fragment. After the removal of skeletal traction (6 weeks from the date of the injury), patients are allowed to walk with crutches without loading the affected leg. Loading the limb is allowed after 4.5-5 months from the moment of the fracture after performing a control radiograph.

Treatment by skeletal traction, especially for elderly people, is an extremely painful procedure and is often accompanied by the development of bedsores, pneumonia and infectious complications of the urinary tract. In this regard, in recent years, more often preference is given to surgical intervention aimed at activating the patient and preventing the above-mentioned complications. Naturally, the risk of open reposition of fragments and subsequent osteosynthesis should not significantly exceed that when using other methods of treatment. The operation is performed on 2-5 days from the moment of admission, before the intervention, skeletal traction is performed and preoperative preparation is carried out. Most often, fragments of the thigh are fixed with an L-shaped plate.

From the first days after the operation, physical therapy classes are conducted, if the general condition of the patient allows, he is taught to walk independently with the help of crutches without loading the operated limb. The mortality rate in the early postoperative period is 6-12%.

Consolidation of the fracture, depending on its nature and method of treatment, occurs after 3 - 5 - 7 months since the injury. The load on the damaged limb is allowed after evaluating the results of the control radiograph, but not earlier than 4.5 – 6 months.

If it is impossible to use any of the above methods due to the weakened state of the patient and concomitant pathology, treatment with early movements is used. Consolidation of the fracture in this case, as a rule, does not occur, the mortality rate is about 30%.

Fractures of the large and small trochanter.

The cause of a large trochanter fracture is more often a direct injury, less often-excessive contraction of the muscles that divert the hip. There is local soreness, restriction or complete absence of active hip abduction. X-ray examination is crucial.

With a slight displacement of the fragments, which is often noted in the case of direct trauma, treatment is reduced to immobilization of the limb in the abduction position for 6 weeks. In case of detached fractures with displacement of fragments, an open reposition and fixation of the femoral fragments with screws is carried out.

Isolated fractures of the lesser trochanter are extremely rare and occur as a result of a sharp contraction of the iliolumbar muscle. Clinically, this injury is accompanied by pain in the projection of the small trochanter, which increases when the hip is bent in the hip joint at an angle of more than 90 degrees. Treatment is usually conservative.

Diaphyseal hip fractures.

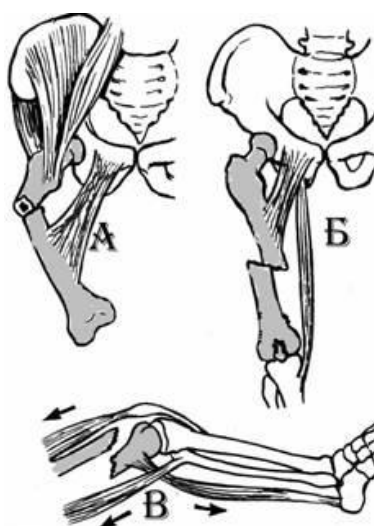
The mechanism. A fracture of the femoral shaft can occur as a result of both direct (bruising, compression) and indirect trauma (bending, twisting of the hip). They make up 20-25% of all fractures of the lower limb and are very often accompanied by the development of shock.

Types of fractures. Depending on the fracture line, there are transverse, oblique and helical hip fractures. There are also comminuted and double fractures.

The clinic. For a diaphyseal hip fracture, the following clinical symptoms are characteristic:

- * Sharp pain that increases when trying to move, palpate and load along the axis of the limb.
- * Shortening of the injured limb.
- * Deformity of the thigh shaft in the form of breeches.
- * Swelling and swelling of the thigh.
- * The leg below the fracture is rotated outward.
- * The outer edge of the foot is adjacent to the bed.

- * Active movements in the extremity are impossible, passive movements are sharply limited and painful.
- * At the level of the fracture, potological mobility and bone crunch are determined.
- In the case of a hip fracture in the lower third, compression of the neurovascular bundle by a posteriorly displaced distal fragment is possible. In such cases, there is swelling of the lower leg and foot, paleness and coldness, as well as loss of sensitivity of the limb below the fracture.
- * The level and type of fracture, as well as the degree of displacement of bone fragments, are specified by X-rays in two projections. Dislocations of fragments in diaphyseal fractures of the femur can be very diverse: in width, in length, at an angle, rotational. However, depending on the level of the fracture, typical dislocations of the fragments are observed:



In the case of a hip fracture in the upper third (Fig. a), the proximal fragment due to the contraction of the middle and small gluteal muscles is displaced outwards, and the traction of the iliopsoas muscle is shifted anteriorly; the distal fragment under the influence of the traction of the adductor muscles is displaced inwards.

Fracture of the femoral shaft at the level of the middle third (Fig. b) is accompanied by a significant displacement of the fragments along the length.

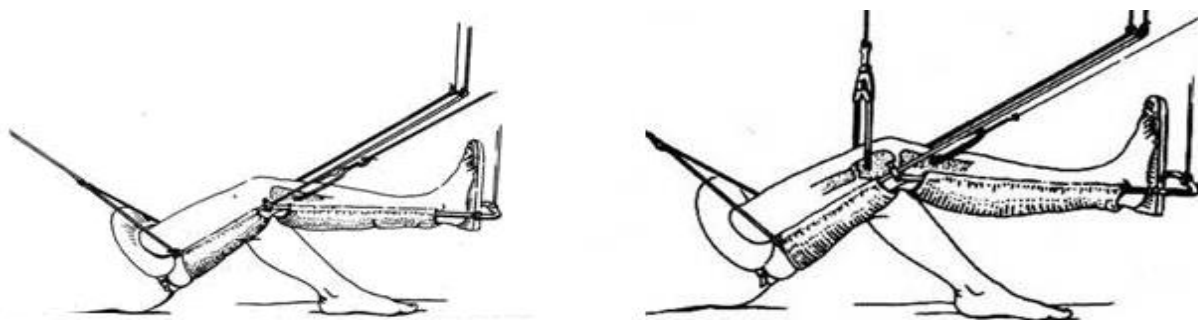
A hip fracture in the lower third (Fig. c) is characterized by a displacement of the proximal fragment inwards under the influence of the traction of the adductor muscles, and the distal fragment posteriorly under the influence of the traction of the calf muscle.

Treatment of fractures of the femoral shaft, if necessary, should begin with anti-shock measures. The choice of treatment method depends on the nature of the fracture and its location, the age of the patient and the presence of concomitant pathology.

The main method of treatment of diaphyseal hip fractures with dislocation of fragments in adults is the method of permanent skeletal traction (Fig. 9) with an initial setting load along the hip axis of about 15% of the patient's body weight. The individual setting weight is selected according to an X-ray taken 24-48 hours after the start of treatment.

The Kirschner spoke is held for the supracondylar region of the femur, and the adhesive traction is carried out for the lower leg (load 1-2 kg), the foot is held in a neutral position with the help of a podstopnik (load 1 kg).

In fractures of the femoral diaphysis in the lower third, supracondylar fractures, severe traumatic synovitis, penetration of cracks to the subchondral zone, skeletal traction is carried out for the tuberosity of the tibia. The treatment is carried out on a Beler tire. A healthy limb should be bent at the knee and hip joint and rest against a special support fixed to the footboard of the bed. The duration of such treatment is 6 weeks.



1. traction with a hip fracture in the upper and middle third;

2. traction with a hip fracture in the lower third

In particularly difficult cases of displacement of the fragments of the fracture of the lower third of the femoral diaphysis, skeletal traction should be used with two rods (Fig. 10):

1. For the supracondylar region of the peripheral fragment perpendicular to the axis of the femur.
2. For the tuberosity of the tibia along the axis of the thigh.

Absolute indications for surgical treatment include:

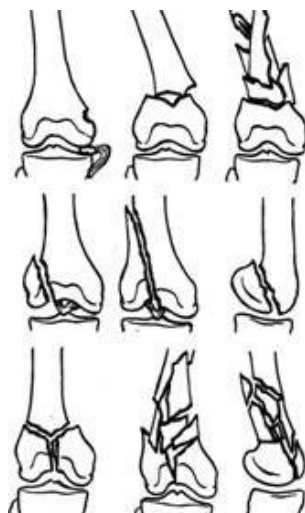
- 1) open fractures;
- 2) fractures with damage to the neurovascular bundle;
- 3) double fractures;
- 4) fractures with soft tissue interposition;
- 5) fractures in patients with mental disorders.

Relative indications include the presence of a transverse femoral fracture. In all cases of surgical treatment, one should strive to perform stable and functional osteosynthesis (bone osteosynthesis with plates or osteosynthesis with external fixation devices), which allows achieving the best functional results.

Fractures of the distal end of the femur.

Fractures of the distal femur are relatively rare. They relate to intra-articular injuries and occur due to the direct and indirect mechanism of injury. There are fractures of one of the condyles and both condyles of the femur (interstitial Y - and T – shaped). Isolated condyle fractures usually occur with a sharp deviation of the lower leg inwards (fracture of the

inner condyle) or outwards (fracture of the outer condyle). Fractures of both condyles often occur as a result of falling from a great height on an erect leg.

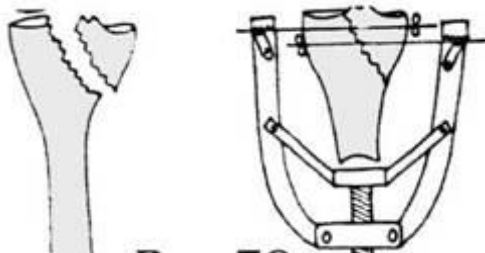


The clinic. With an isolated fracture of the external condyle with a displacement of fragments, a valgus deviation of the lower leg (genu valgum) occurs, with a fracture of the internal condyle with a displacement - a varus deviation of the lower leg (genu varum). In case of fractures of both condyles with displacement, anatomical shortening of the limb may be detected. In addition, the joint is sharply increased in volume due to hemarthrosis, the limb occupies a forced position: the leg is slightly bent in the knee and hip joints. Active and passive movements in the knee joint are sharply painful. With palpation - increased pain and a symptom of balloting of the patella.

For fractures of this localization, the following clinical symptoms are characteristic:

- * Pain in the knee joint and lower thigh, which increases with groping and pressure on the condyles.
- * Varus or valgus deformity of the knee joint.
- * The circumference of the femur in the area of the condyles is increased.
- * The contours of the knee joint are smoothed.
- * Fluctuation in the knee joint (hemarthrosis).
- * Patellar balloting.
- * Passive movements in the knee joint are possible, but painful.
- * Sometimes you can detect a bone crunch.
- * The diagnosis is clarified by radiographs made in two projections.

Treatment. Fractures of the distal femur without displacement of the fragments are treated by immobilization with a plaster cast (3-5 weeks) or according to I. R. Voronovich: lateral compression osteosynthesis with spokes with thrust pads is used (Fig. 79).



This method allows you to perform all 4 principles of treatment of intra-articular injuries:

- * Ideal reposition of the fracture (with an accuracy of up to 2 mm, since only with such a displacement of the articular surfaces, the regeneration of hyaline cartilage is possible).
- * Reliable fixation of fragments for the entire period of consolidation.
- * Early function (for the full function of the cartilage and its metabolic processes).
- * Late loading on the damaged joint.

Before fixation, a puncture of the knee joint is performed in order to evacuate blood and inject 20-30 ml of 1% novocaine solution into the joint. During the first 7-10 days after the injury, there is often a need for repeated joint punctures and blood evacuation, which is one of the ways to prevent post-traumatic arthrosis.

Under local infiltration anesthesia, a Kirschner needle is passed through the tuberosity of the tibia, the supra-ankle region, or through the calcaneus and traction is applied. The weight at a fracture without displacement is 2-4 kg, at displacement – 4-8 kg. The extension period is 6 weeks, the son-in-law's leg is fixed with a circular plaster bandage to the groin for a period of 6 weeks. After removing the bandage, they begin restorative treatment: baths, paraffin, massage, physical therapy, mechanical therapy. Restoration of working capacity for fractures without displacement of fragments in 3-3.5 months; with displacement of fragments - in 5-6 months.

Surgical treatment: it is indicated when the bone fragments are not matched in a closed way. The bone fragments are exposed, reposed, and fixed with either a plate or 1-2 metal rods. The operated leg is fixed with a plaster cast until the formation of a callus. Then proceed to restorative treatment. Surgical intervention allows you to more accurately reposition the fragments, hold them firmly and, thanks to this, start functional treatment earlier (2-3 weeks from the moment of surgery). The full load on the damaged limb is allowed no earlier than in 3.5-4.5 months.

Fractures of the tibial condyles.

Fractures of the condyles of the tibia are intra-articular injuries and occur most often when falling on straight legs or when the shin is deflected outward or inward. There are fractures of the outer condyle, the inner condyle, as well as T - and Y-shaped fractures of both condyles. Condylar fractures can be impressive and by the type of chipping. They may be accompanied by damage to the meniscus, ligamentous apparatus of the knee joint, fractures of the inter-condylar elevation of the tibia, fractures of the head of the fibula, etc.

The clinical picture in fractures of the condyles of the tibia corresponds to intra-articular damage: the joint is enlarged in volume, the leg is slightly bent, hemarthrosis is detected by the symptom of patellar balloting. The lower leg is deflected outwards with a fracture of the external condyle or inwards with a fracture of the internal condyle. The transverse size of the tibia in the area of the condyles is increased in comparison with the healthy leg, especially in T - and Y-shaped fractures. When palpating the fracture area, it is sharply painful. Characterized by lateral mobility in the knee joint when the lower leg is

bent. Active movements in the joint are absent, passive movements cause sharp pain. The patient cannot lift the straightened leg. Sometimes damage to the external condyle is accompanied by a fracture of the head or neck of the fibula. In this case, the peroneal nerve may be damaged, which is recognized by a violation of sensitivity, as well as motor disorders of the foot.

X-ray examination allows you to clarify the diagnosis and identify the features of the fracture.

Treatment. In case of fractures of the lower leg condyles without displacement, a joint puncture is performed to aspirate blood and inject 20-40 ml of 1% novocaine solution. The damaged limb is fixed with a circular plaster cast. From the 2nd day, exercises for the quadriceps of the thigh are recommended. Walking with the help of crutches without loading the affected leg is allowed after a week. The plaster cast is removed after 6 weeks. Loading the leg is allowed in 4-4.5 months after the fracture. With early exercise, the damaged condyle may be impressed.

In case of a condyle fracture with displacement, both conservative and surgical treatment is used.

In some cases, permanent skeletal traction may be used for dislocated fractures, especially for comminuted, T- and V-shaped fractures. In this case, the patient's limb is placed on a Beler tire, the spoke is passed through the heel bone, the load along the axis of the lower leg is 4-5 kg. The duration of treatment with this method is 4-5 weeks, after which the limb is fixed with a gonitic plaster cast. Further treatment is the same as for a condyle fracture without dislocation of the fragments.

A physiological method with good treatment results was proposed by I. R. Voronovich.

Surgical treatment is indicated with unsuccessful conservative treatment. The operation is performed on 4-5 days after the injury: open reposition of the fracture and osteosynthesis with metal structures. Sutures are removed for 12-14 days, and further management of the patient, as with condyle fractures without displacement.