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UNCOMPLICATED TRAUMATIC INJURY OF PELVIC BONE

Study Guide



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В учебном пособии дана классификация повреждений таза, описаны методы лечения переломов костей таза, клиника, диагностика и принципы лечения переломов костей таза. Описан физиотерапевтический курс восстановительного лечения больных с повреждениями таза.

Учебно-методическое пособие рассчитано на студентов медицинских институтов, врачей-травматологов, врачей-хирургов, врачей-интернов, врачей-анестезиологов.

In the tutorial the classification of pelvic injuries, the methods of treating pelvic fractures, clinical manifestations, diagnosis and principles of treatment of fractures of the pelvis. Physiotherapy course described reductive treatment of patients with pelvic injuries.

Teaching manual is designed for medical students, doctors and traumatologists, surgeons, medical interns, anesthesiologists.

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INTRODUCTION

Diagnosis, clinical and treatment of fractures of the pelvis with pelvic injury – one of the heavy species stated failures – more than 2 centuries are the focus of scientists and practitioners. Victims with pelvic injuries are among the most difficult and complex patients at all stages of treatment. Primary disability in injuries of the pelvis is significantly higher than for other fractures localization and is about 50%. Number of deaths in the first three days is about 75%. Most often mortality and disability result in damage to the B and C by AO classification. The number of associated injuries of the pelvis, according to various authors, does not exceed 100 cases.

In recent years, along with a reduction in cases of pelvic fractures growing share of associated injuries of the pelvis and lower urinary tract. Such a marked change in the direction of worsening pelvic trauma is explained in the introduction of production processes of powerful technical tools, as well as increasing the intensity of traffic on streets and highways.

Economic development of an area of the country, such as industry, the intensity of traffic in some extent determine the production, transport, agricultural and other types of injuries of the pelvis and intrapelvic organs. Cause of pelvic fractures with damage to the bladder and urethra, according to A.I. Vasiliev (1937), N.S. Sattarova (1957), V.S. Smirnitsky (1958), K.P. Drifter ion (1961), V.M .Tsodyks et al (1975), was mainly street and traffic injuries.

Domestic injury, according to A.I. Ahundova (1959), A.A. Ismailov and F.G. Kerbellaevoy (1969), is the second one less, and only the third – manufacturing.

According to E. Letournel, the share of damage in the structure of unstable pelvic fractures reaches 31% and is one of the reasons for poor outcomes. These figures are consistent with the domestic auto- ditch. So, V.N. Pasternak unstable damage observed in 30.9% of cases. Moreover, the proportion of unstable injuries increases with the severity of polytrauma. With isolated lesions they found in 12.9% of cases, the connection reaches 43.7%. The incidence of shock in the latter group is 95.4% and the mortality rate – 48.7%. Particularly high le thinking of a pelvis in severe damage observed in

acute trauma – 76.9%. While 73.3% came from the first three days. In cases of fracture of the pelvis, fractures connected to large segments of the musculoskeletal system, and lesion – s internal organs, the incidence of shock reaches 100%. Mortality in severe pelvic injuries remains significant even in countries with high financial ensured completely healing process.

Analyzing statistical documentation of the orthopedic department of the 1-st city hospital Sumy during the period 1998-2010. Was the greatest number of victims with pelvic fractures from age 21-40 years. Dominated transport trauma (51.7%), in second place – home (38.3%). Among patients 60% had associated injuries and traumatic shock, 40% – isolated damage to the pelvic bones.

According to the classification V.F. Trubnikova and S.I. Kovalev, the largest number of patients refers to groups "A" and "B" (33.3 and 38.3%, respectively). The most difficult to treat are violations of continuity of the pelvic ring. Mortality and disability in patients with pelvic trauma is high enough, in fact help improve the effectiveness of treatment is sufficiently urgent task.

CLASSIFICATION OF ACTIVITY IN THE REGION OF INJURED PELVIC

The significant progress that has been made in the surgical treatment of fractures of the pelvic bones, pelvic injuries or rather, calls for a detailed study of the situation, identifying the main semantic characteristics of this traumatic problem. This situation requires urgent construction of a general theoretical methodological concept, with the disclosure of the essence of the relationships between various internal and external factors that determine the various aspects of this complex disease. Indeed, without the general theoretical and methodological development of the prerequisites are not diagnostically effective treatment strategy (S.V. Meyen, U.A. Schrader, 1986; S. Rozov, 1986).

Particular importance in this context becomes a classification activity directed as in any other case, the formation of the general laws of complex issues, including pathology.

Classification as a guide to action, require special precision, clarity, certainty, incorrect, defective construction of classification practice throws.

Due to the fact that in the assumed classification studies show a small certificate of classification activities.

In an aspect of the disclosure of fact multifaceted problem of fractures of the pelvis (PF) special importance belongs to the classification of activities. This creative work, or purposeful, goal-oriented for the development, improvement and construction of classifications of certain phenomena, using it as a methodological apparatus of scientific knowledge and methodology as a practical activity. Classification, as well as terminology, activities – are inseparable structural parts of the system approach. Conceptual models – is essentially a classification is constructing.

Classifications known as:

- distribution of objects or events in accordance with their primary (mainly, classification) criteria;

- theoretical construct that covers not objects or natural phenomena (eg, fractures), and only the concepts of these objects (phenomena). Consequently, the classifications are defined semantic unit, and this is their basic essence;
- such an ordering objects, which acquires the status of a preferred system isolated from nature. This objective classification builds;
- obtaining the desired scientific product activity. In this situation, the classification becomes the result of scientific research;
- method of scientific research of empirical objects, etc. Any classification is the division, but not everyone is a division of classification. Any classification must meet the following formal requirements:
 - subclasses, which divides a set should not overlap (have common elements);
 - dividing the amount must be equal to the original set;
 - each element must be included in any class;
 - division into groups should be one common feature/

Distinguish classification:

- descriptive (also extensional, artificial, formal);
- semantic (also intentional, structural, essential);
- genetic.

Genetic classification of special interest for medicine in general orthopedics and traumatology, in particular. Their construction is possible only on the basis of theoretical modeling of the genesis (origin and development) of various phenomena which can not be achieved empirically.

Genetic classification: special type of theoretical studies when appropriate objects give genetic (causal) links the various stages of processes (eg mechano genesis pelvic fracture), with the active forces, intensity, direction, "phasing" the destruction of their combination, state authority, etc. Formed a complex chain of "genesis" or "origin and development" phenomenon (damage). Note that the genetic construct is often at odds with the morphological and, accordingly, we must distinguish between morphological and genetic classification.

Genetic classification – a new procedure for mentally-theoretical construction of the research object, a new ideology of possible objects of this

submission form, which appears as a fundamental shift certain scientific system as its fundamental change of methodological OSI (B.I. Simenach, 1998).

Many classifications are based on different principles of classification, forming classification systems. Consequently, classification, on the one hand, is the product of a certain – research activities, on the other – the method of cognition, reflection of objective reality.

The multiplicity of classification systems for fractures that is in its evidence of the relevance of the problem. Pelvic injury classification based on two groups of classification criteria:

➤ descriptive (symptoms, clinical and/or radiological symptoms, anatomical and pathological features of the classified object). These classifications include pelvic injury anatomical classification describing various injuries (fractures) of different locations and their combination;

➤ sense criteria, which are not directly available to the senses and in the thinking process are identified on the basis of conscious experience, system integration features described herein or on the basis of the characteristics of certain actions. These classification criteria include, for example, the mechanisms of fracture stability – instability of the fracture, more accurately, the damaged organ.

One of the first division came on pelvic injury: isolated, marginal, without rupture of the pelvic ring and its rupture. In the future, to build classifications pelvic injuries, various other criteria.

In Poland, according Dugello (1989) classification of fractures of the pelvis has not changed significantly. Pelvic fractures are divided into isolated, marginal, without violating the integrity of the pelvic ring and its breach. Gruca (1966) and Szulc (1997) describe the mechanisms of PI type compression and crush, as well as introduce pathological criteria characteristics damage.

Marczynski (1979), using the criterion of stability, pelvic damage divides into stable and unstable. This criterion is defining in next, many classifications of pelvic injuries.

Patryn (1973) in the pathomechanics of sacroiliac joints injury introduces a mechanism for abstraction and bring iliac wing

Dugello (1989) adhered to the classification Tile. In foreign literature classification of of the pelvis injuries is the subject of numerous studies, to complete the creation of new classifications and classification systems.

Classification pelvic injury based on different criteria:

- features of the location of the fracture (descriptive, anatomical);
- X-ray pattern (descriptive);
- the proposed mechanism of injury (sense);
- compression factor, with its orientation, etc. (fig. 1).



Fig. 1. Mechanisms of the pelvis fracture

There are classifications built on several criteria simultaneously. Thus, the classification criteria AO implies:

- type of fracture – stability and instability.
- species (groups) on fracture severity of injury;
- fracture subgroups;
- its detail.

Here are classic examples of classifications PF of interest for our study. Poigenfuerst (1979) introduces the concept of fracture: a rotary displacement arising from the action of twisting and shearing forces near the pubic symphysis.

Vasey (1979), taking into account the criterion of transfer forces divides fractures on:

- 1) boundary (avulsion) fractures of the pelvis;
- 2) pelvic ring fractures without disrupting the transfer of static forces from the roof of the acetabulum on the spine (fractures of the front of the pelvic ring, unilateral and bilateral);
- 3) pelvic ring fractures in which the structure of transfer forces violated (when the ring is damaged front and posterior, single-sided or both sides);
- 4) fractures mixed with single-or double-sided rupture of the pubis symphysis.

Classification of the pubic symphysis damage Poigenfuerst

Classification of some damage only describe one of the first pelvic ring. These include classification Poigenfuerst (1989), which describes a damage only symphysis (table 1).

Table 1

Types of injuries of the anterior pelvic ring Poigenfuerst

	Type of injuries
1.	discrepancy of pubic symphysis more than 14 mm
2.	Rupture of the pubic symphysis, a discrepancy of at least 14 mm with a concomitant fracture of both branches of the pubic bone
3.	Rupture of the pubic symphysis with shortening
4.	One-side fracture of both branches of the pubic bone

In this classification, the author distinguishes four kinds of damage.

Classification of Pennal, Tile

Pennal, Tile, Waddell et al. (1980) constructed a classification of fractures of the pelvis based on two criteria direction of the force, causing damage, and the extent destruction of the pelvis. Such damage may be the result of compression in the anteroposterior, lateral axis compression or damage in the vertical direction. This classification contains information relating to the fact of damage, possible complications, potential sites of pelvic ring fractures, the degree of instability of the pelvis and recommendations regarding the treatment (fig. 2, table. 2).

Table 2

Classification of the pelvis fractures Pennal, Tile

Types of pelvic injuries	
A	PF without displacement in the pelvic ring, caused by relatively small power impacts in the anteroposterior and lateral directions in which the divergence of the pubic symphysis is less than two centimeters. In such cases, according to the authors, rather put the patient in the position of Fowler, and followed by immobilization without loading side damage
B	Damage to the mechanism of pressure in the anteroposterior and lateral axis, the divergence of the pubic symphysis is greater than 2 cm, but with preservation of the ligaments of the sacroiliac joints and the integrity of the sacrum. In such cases it knows as anterior exterior stabilization
C	Unstable Fractures of the posterior pelvic ring. Those belong to a sacroiliac joint, or to back side of the ilium, or to its site adjacent to the sacroiliac joint. For this category of injury should consider with the necessity of external or internal (operational) stabilization

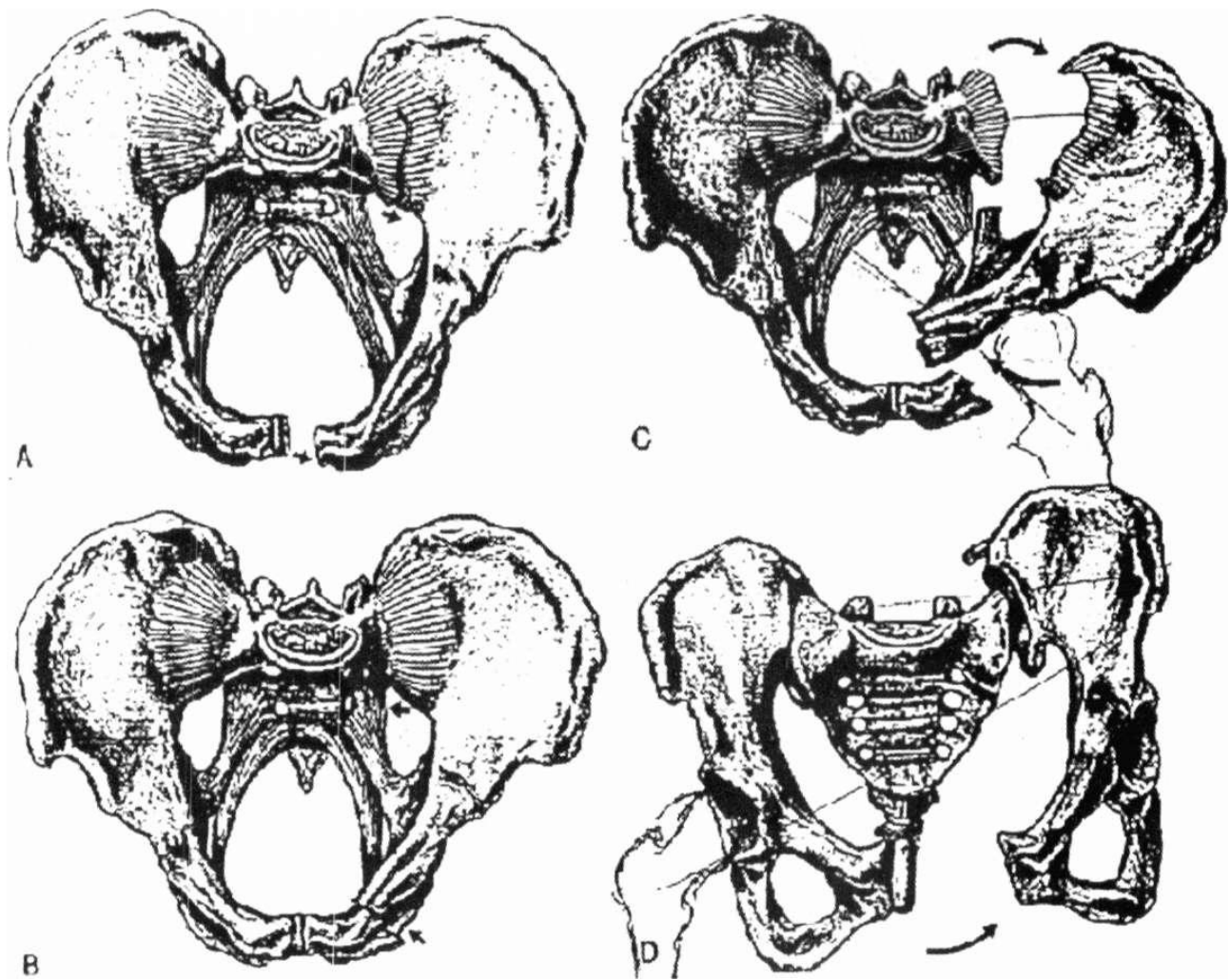


Fig. 2. Diagrams illustrating the classification

Pennal-Tile: A anteroposterior compression -of stable fracture

B -lateral compression – of stable fracture

C-unstable fracture in the lateral compression

D- unstable fracture of sacroiliac joint with vertical displacement

Euler, Betz, Schweiberer (1992) said that classification Pennal is a useful classification, as it describes the particular direction of the traumatic forces that is biomechanical characteristics of damage. According to the the three pillars of the forces, which provided by the classification: anteroposterior, lateral and vertical, the authors identify three types of damage: first, when the victim should be treated conservatively, and second and third types, which require surgical treatment. Numerous classifications of fractures of the pelvis both Polish and foreign authors are tailored pathmechanic damage, especially rotational mechanisms, vertical displacement, and combined mechanisms.

Table 3

Classification of the pelvis fractures Tile

Type	types of nonstability	notation	Type of injuries
A	Stable fractures with a slight displacement	A1	(avulsion) fractures
		A2	Pelvic ring fractures without displacement
B	Rotationally unstable, vertically stable fractures	B1	Fractures such as an open book with a break of the pubic symphysis, but with preserved vertical stability of the pelvis (the damaging forces act in the sagittal plane)
		B2	Fractures of the closed book type, unstable in internal rotation, but vertically stable with unilateral injury of the front pelvic ring
		B3	As B2, with additional bilateral pelvic ring injury (fractures butterfly style)
C	Rotationally and vertically unstable	C1	Unilateral breaking back sacroiliac complex and sacrospinous ligament
		C2	As C1, only bilateral
		C3	Fractures of the acetabulum

Classification Tile was one of classification, which doesn't change and has stood for along time, designed in 1980. It is characterized by easy and logic, primarily involving all kinds of lesions, and is the archetype for many subsequent classification. This classification of fractures of the pelvis based on referral criteria forces that lead to damage, and by step fracture of pelvic (table 3).

Such damage may be the result posteroanterior compression, compression of the lateral or vertical direction. This classification contains information about the features of damage possible complications, potential locations of pelvic ring fractures, on the degree of instability of the pelvis, as well as recommendations of the treatment plan.

Classification of the pelvis fractures Judet and Letournel

Letournel, Judet (1993) in 1981 proposed a classification, which is based on the criterion of localization of the fracture. Any damage is viewed as a combination of two or more types of core damage (table 4).

Table 4

Classification PI by Letournel, Judet

Type of fracture according to Letournel, Judet	
1.	The front vertical fractures that pass through the obturator foramen or the adjoining part of the pubic bone.
2.	iliac fractures that extend from the iliac crest to the greater sciatic notch, and sometimes also from the sciatic notch to the front edge of the wing of the ilium.
3.	Fractures passing through the sacrum, extending along the inner or outer side of the sacral foramina, but sometimes the fracture line runs obliquely through the sacrum from top to bottom. Such fractures are divided into involve: <ul style="list-style-type: none"> • divergence of the pubic symphysis; • divergence of the sacroiliac joint.

Such approach makes it possible to anatomically describe the place of fracture (s), but does not consider the mechanism of fracture, which, as a rule, according to the authors, "is poorly understood," it doesn't matter in the choice of treatment. The above Modification presented is the classification proposed by Mears, Rubash (1986), (table 5, fig. 3)

Table 5

Classification PI by Mears, Rubash

Type of fractures	
A	Wing of ilium
B	Fracture of the ilium, moving onto sacroiliac joint
C	Fracture sacrum bone
D	Unilateral fracture sacrum bone
E	Fracture of the sacroiliac joints with displacement
F	Petrochanteric fracture
G	Fracture of ramus of the pubis
H	Fracture of the ischium
I	The discrepancy between the pubic symphysis

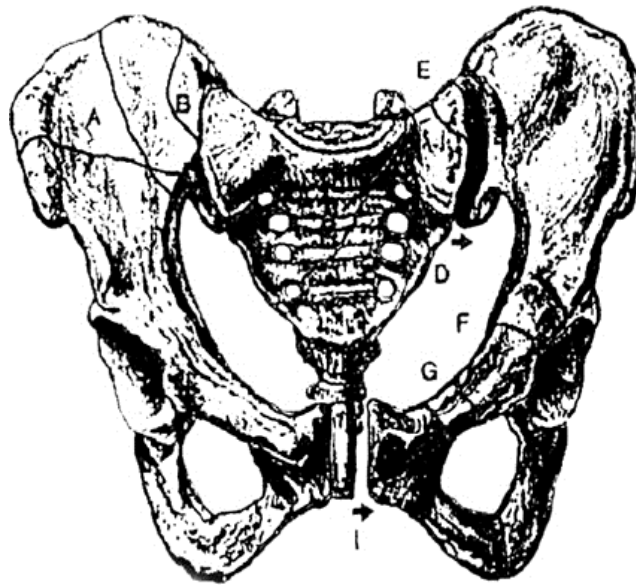


Fig. 3. Anatomical classification fractures of the pelvis:

- A – wing of ileum
- In – fracture of the ileum joint rolling number
- C – fracture sacrum bone
- D – unilateral fracture sacrum bone
- E – sacroiliac joint fracture with displacement
- F – acetabular fracture
- G – fracture of the upper branches of the pubic bone
- H – fracture of the ischial tuberosity
- I – rupture of the symphysis

Classification pelvic injury by Mears and Rubash

Classification Mears, Rubash built on the localization of the fracture criteria with the release of the nine types of fractures. Bucholz (1981) published a classification scheme based on autopsy evaluation victims with various concomitant injuries of organs which were identified and pelvic fractures. The authors divide pelvic fractures into three groups (table 6).

Classification PF by Bucholz

Groups	Type of fractures
1 group	Isolated damage to the front of the pelvis or divergence of the pubic symphysis, combined with damage to the ventral sacroiliac ligaments
2 group	More significant divergence of the pubic symphysis associated with avulsion fracture or cutting of sacrospinous, sacral crest and sacroiliac ligaments while maintaining dorsal ligaments of the sacroiliac joints. Closed recovery of pelvic is relatively easy to perform
3 group	Complete rupture of the sacroiliac ligaments with full three-plane instability of the sacroiliac joints. Radiographs in the AP projection and enter the pelvis is determined displacement corresponding pelvis or posterior cranial. Recovery of such a fracture should be surgically

Classification Pelvic injury by Bucholz

Bucholz (1981) proposed a scheme for dividing the fractures of the pelvis, based on autopsy assessment of multiple organ injury victims who have pelvic fractures. The authors divide them into three groups depending on the adjustable of posterior half ring of pelvic (table 6)

Classification AO/ASIF

Pay special attention to the classification of fractures AO/ASIF (more AO), which we use in the subsequent part of the research. AO classification represents a modification of his own, previous, built on an analysis of 283 patients with pelvic injuries that were treated at the University Hospital in 1973-1977. The routine use of the first classification to patients who were treated in subsequent years, allowed to draw definite conclusions, and uses them to build a new modification of the classification. The authors separately classify damage of pelvic ring front and back parts, that the overall fig. of fracture is a combination of these lesions of both sides of the pelvis. In the classification proposed allocation of three types of damage, each of which is

divided into three groups. After the definition of the group (fracture) recommended its further division into subgroups, and then their final specification (fig. 4).

This new version of the classification, which was developed on the basis of documentation SA between 1977 and 1987. Used by over 150,000 observations, given miniature radiographs performed immediately after admission, and after surgery in terms of 4 months after surgery in 1987 was published by the new modification AO fracture classification, built under the direction of E. Muller. It eliminated unnecessary detail, which when divided by the triad reached 27 species for each segment of fractures of the long bone. As a result, a new version with a binary system issues.

Classification keeps logical sequence of events. The criterion of fracture mechanism, with the division into: (1) with a torsional (2) bending force with effect on cortical bone, (3) bending force with effect cancellous bone, (4) a compressing force, (5) shear forces; (6) detachments.

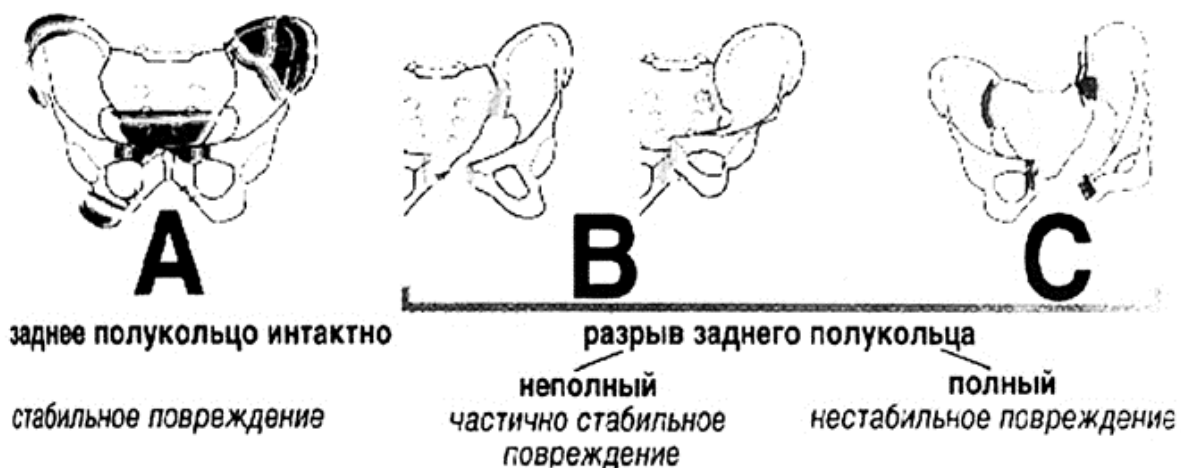


Fig. 4. AO. 61 – Pelvic Ring: 3 types

Classification of injuries of back side of pelvis Isler-Ganz

Modern features special surgical techniques and implant traumatic pelvic pathology require accurate determination of the nature of the damage. This contributes to the classification Isler, Ganz (1996), which is a logical development of AO classification and adapted to it. It is intended primarily to identify the most severe injuries assessment back of the pelvic ring. Ganz classification is based on data on the morphology and radiographic

pathomechanic injuries of the pelvis. Its features accurately reflect the interaction of the front and back pelvic ring injuries (fig. 7-9, Table. 9-14).

According to the authors, this classification makes communication and understanding promotes the correct planning of surgical interventions on the pelvic bones.

61 pelvic Ring: 3 types

Pelvic ring can be divided into two semicircles relatively acetabulum – the front and back. Semicircle is located behind to the back of the articular surface of the acetabulum. It includes the sacrum, the sacroiliac joint with ligaments and the posterior part of the ilium. This loadable part of the pelvis, providing load transfer along the axis of the skeleton on the lower limbs. Front half ring located anterior to the articular surface of the acetabulum. It includes branches of pubic bones and symphysis. Pelvic diaphragm, including sacroiliac tubercles and sacrospinous ligament connects Semicircle and engaged in their stability. Since the pelvis is a ring, in case of damage of type B and C, it is broken in at least two places, usually front and back, but the direct impact may break only the front half rings.

Type A. The integrity of bone and ligaments back half rings are not compromised. Stable injury pelvis. pelvic diaphragm is intact, the pelvis is able to counteract the usual physical activities without displacement.

Type B. Incomplete rupture back of the semicircle pelvis in which can occur around a vertical rotational instability, as well as around the transverse axis. Partially consistent with preservation of partial damage to the integrity of the bone and ligaments posterior half rings, and in some cases an intact pelvic diaphragm.

Type C. Complete rupture of back half rings of continuity with his bony or ligamentous elements and, as a consequence, a possible shift in three dimensions and rotational instability. Unstable pelvic injury with complete loss of integrity of the bone-ligament complex, pelvic diaphragm is always broken.

Table 9

Damage type A

Type	Description
Group A1	Marginal damage of pelvis
A 1.1	Avulsion fractures or muscle attachment sites themselves attachments resulting indirect effect forces. Most of these fractures are located in the anterior and anteroinferior iliac spines areas
A 1.2	Fractures of the iliac wing arising under direct forces
A 1.3	Ischial bone fractures resulting from both direct and indirect effects of power
Group A2	Low degree damage of pelvic
A 2.1	So-called "isolated fractures" branches of the pubic bone, with no noticeable damage to the rear part of the pelvic ring on ordinary radiographs. When more accurate research, especially bone scintigraphy often there noticeable collateral damage the rear of the pelvic ring
A 2.2	Fractures with mechanism of the lateral compression without displacement or with minimal displacement, compression mechanism in the wing of the ilium, visible on plain radiographs. A typical fig. of the sacral bone fracture on radiographs is a vague outline of the proximal edge of the sacral holes S1 (fig. 7). Not accompanied by a loss of symmetry of the pelvis
A 2.3	Injury in the compression in mechanism of the side of the pelvic ring without displacement or fracture with minimal displacement of the front ring and without displacement or incomplete vertical fracture of the back of the ilium. Not accompanied by a loss of symmetry of the pelvis
Group A3	Isolated transverse fractures of the sacrum and ischia bones
A 3.1	Fractures of the ischium
A 3.2	Transverse fractures of the lower part of the sacral is called bone below fractures S2. Usually the result of direct force and relate to the levels of S2-S3 and S3-S4. Often accompanied by neurological changes with impaired bladder and colon
A 3.3	Transverse fractures of the upper part of sacrum bone. In such fractures of the spine occurs together with S1 from the rest of sacrum bone and pelvic ring. In these cases, frequent neurological changes are due to damage of nerve roots

Injury type B

Type	Description
Group B1	Damage to internal rotation caused by lateral compression pelvic ring
B 1.1	Internal rotation of the pelvis on the side of the injury around the longitudinal axis passing through sacroiliac joints creates tension in sacroiliac ligaments that lie posterior to the axis of rotation and has a massive pressure on the wings of the ilium. Under the influence of these forces often injured bone elements, than the powerful ligaments. Consequence of this is a typical fracture compressed wing of sacrum, more pronounced in front of the bone, often relates to compounds of the wing to the body of the sacrum near the sacral foramina S1 and S2. On plain radiographs are typical fig. fuzziness cranial shape holes S1 and S2. CT scan marked decrease occurring in the normal conditions of convergence lines both sacroiliac joints, also notes a break or curvature of the front outline sacrum bone and spongy bone located between the wing and the body of sacrum, is compressed. Sometimes you can see the displacement of bone fragments in the lumen of the sacral foramina. Such injuries are clinically stable and tend to fused in a few weeks, although with symmetry breaking of the pelvis (fig. 8)
B 1.2	Damage of this group are the result of massive internal rotation followed by spontaneous wedging after termination of damaging forces. Wedging reserves space in the spongiform bone of the wing, which reduce the stability of the sacrum. These spaces are revealed most clearly in computed tomography
B 1.3	Depending on the direction of the damaging forces on the side of the pelvic bone fracture is exposed not only to internal rotation, but also additional rotation in flexion or extension. Asymmetry pelvis more increased and the stability depends on the degree of wedging. Fracture type bucket handle described Pennal in 1980 is a typical example of such damage

Group B2	Injury with the mechanism of external rotation In the direct force in the anteroposterior direction or indirect force acting through the lower limb on the side of injury, there is a forced internal rotation, with fractures of the «open book» (Pennal, Tile)
B 2.1	Outside rotary motion of the pelvic bone on the side of injury in the vertical axis causes progressive damage to the joint enterprise in the anteroposterior direction. If damage is exposed, only the front part of the joint, then the front portion of the pelvic ring discrepancy occurs symphysis, but not more than 2.5 cm
B 2.2	If the outer rotary motion of the pelvic bone on the side of injury continues, the subsequent rupture sacroiliac joint extends to between spine ligaments. Symphysis discrepancy reaches the size of greater than 2.5 cm. Altitude differences symphysis is disadvantaged sign of injury, but the very position of the patient can reduce the differences, especially in injuries with significant instability
B 2.3	Along with the rotation of the outer elements appears and second rotary component in the form of bending or unbending around the transversely extending axis through sacroiliac joint. In such cases there is a further compression of the dorsal sacroiliac ligaments, but some fibers remain intact. The last act as curtains or as a belt for pelvic sacrum, and this mechanism is manifested in reduction and stabilization of the fracture in the front.
Group B3	Bilateral Injury type B, the rear section (fig. 8)
B 3.1	Bilateral compression fractures of of sacrum
B 3.2	Unilateral fractures with external rotation, with incomplete rupture in sacroiliac joint
B 3.3	Compression fractures of the sacrum bone at one side and a change in the mechanism of external rotation with incomplete rupture sacroiliac joint joint on the opposite side

Type C fractures

Type	Description
Group C 1	Unilateral fractures of type C
C 1.1	Vertical fractures iliac bone such fractures with displacement of ilium or manual replacement, with different largest fragments back of iliac bone
C 1.2	Complete ligament rupture sacroiliac joint
C 1.3	Vertical fractures of sacrum bone. Arrangement fracture gap in such cases is described relative sacral openings both fracture on the side of the hole or holes through the middle from the holes. The incidence of neurological complications depends on the location of the fracture lines or slits of the fracture relatively the sacral holes and the degree of displacement. In cases where the fracture line is beyond the top of sacrum bone or the middle of the articular process of S1, each displacement of the pelvic bone is subluxation or dislocation of the joint L5-S1 on the side of the injury, and sometimes leads to more complex combinations, injury the joint enterprise.
Group C2	Bilateral fractures in the posterior part with different levels of severity
C 2.1	This combination fractures type C one side with a broken type B on the opposite side The compound vertical fracture of iliac bone or fracture with displacement in the joint enterprise (AS 1.1) on one side with a fracture on the inside (B1) or external (B2) on the opposite side of rotation
C 2.2	The combination of a complete rupture of the ligaments of the sacroiliac joint (C.1.2) on one side with a fracture accompanied by internal (B1) or external (B.2) rotation on the opposite side
C 2.3	The combination of vertical fracture of the sacrum bone (C1.3) on one side with a fracture accompanied internal (B1) or external (B2) rotation, on the back side
Group C 3	Bilateral back fractures type C
C 3.1	Sacrum and sacroiliac joints remain undamaged. This combination of fractures in the posterior part of type C 1.1/C.1.1.
C 3.2	Sacrum is not injured, and the injury is located on the rear portion of type C1.1-C-1.2 or C.1.2 C.1.2
C 3.3	Reaches the sacrum bone fracture. In the posterior part note the combination of fracture types C.1.1-C1.3, C1.2-1.3 or C1.3-C1.3

Classification injuries sacrum by Isler-Ganz

Damage type A (fig. 7). This boundary damage pelvis and the pelvic ring, do not lead to loss of stability of the pelvis or violate its symmetry.

Damage Type B (fig. 8). This group includes the pelvic ring damage caused by inducing a rotational moment on the side of the pelvis injury. Typical of such injuries are: partial destabilization of the back of pelvic ring, the displacement of the pelvis on the side of injury to its rotation and, as a result, the loss of symmetry of the pelvis.

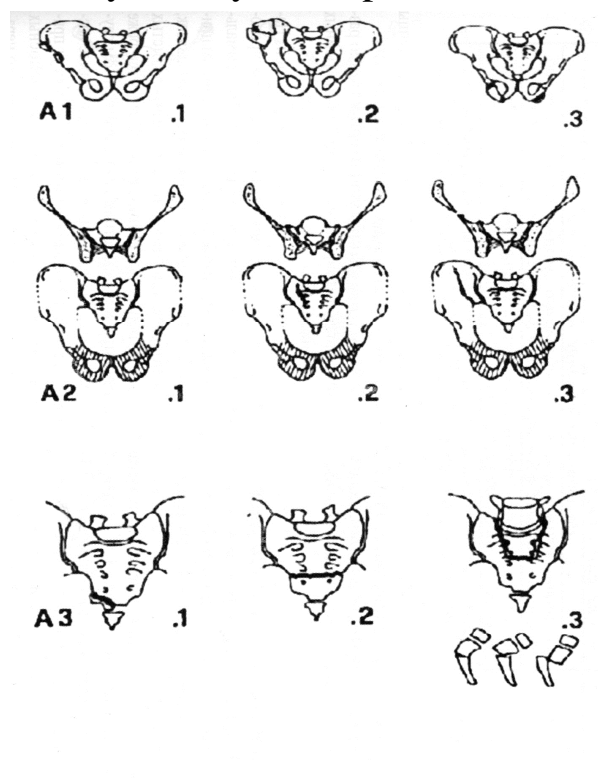


Fig. 7. Pelvic fractures type A

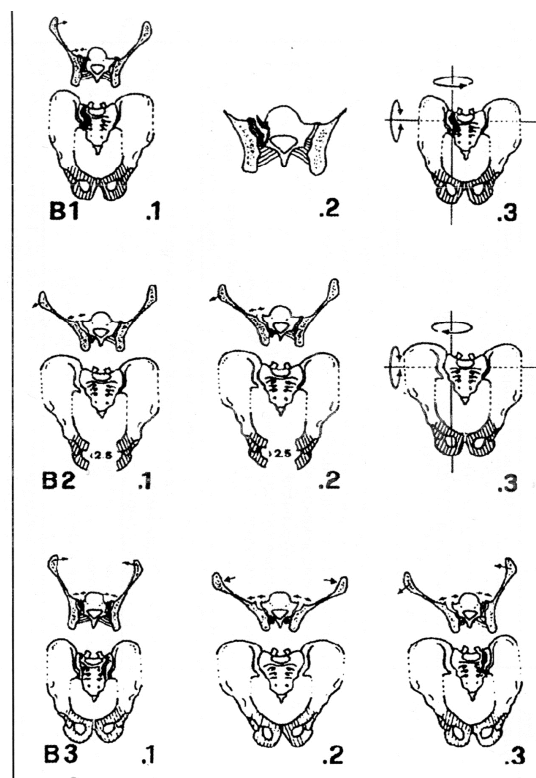


Fig. 8. Fractures of the pelvis

In such a situation the dorsal ligaments of the sacroiliac joint, though their bundles remain undamaged. This facilitates displacement of the pelvis of damaging and its rotation relative to the long axis and at the same time limiting its shear displacement. The long axis passes through or close to sacroiliac joint. Part of the pelvis to be along with a simple rotation of the rotary displacement outwards or towards the middle, as a rule, also undergoes rotation, the essence of which flexion and extension relatively an axis extending transversely across the sacroiliac joints. This leads to further injuries with ligaments of the dorsal further loss of stability. Range of destabilization in the back with injuries of type b – damage almost completely stable to unstable. If operative intervention is usually sufficient to compare and stabilize the front part of the pelvic ring. At

the rear of the remnants of the dorsal ligaments automatically provide reduction and fulfills the role of the mechanism of compressive zone (fig. 8).

Type C fractures (fig. 9). This pelvic ring fractures are caused by forces that cause tearing moments in the pelvic bone on the side of injury. Typical of these is the complete destabilization on the side of injury as a result of a complete rupture of the ligaments and bone disorders intact pelvic ring in the posterior part, the shift in the form of movement, followed by the asymmetry of the pelvic ring. Displacement is usually dorsal and cranial direction. However, other types of displacement.

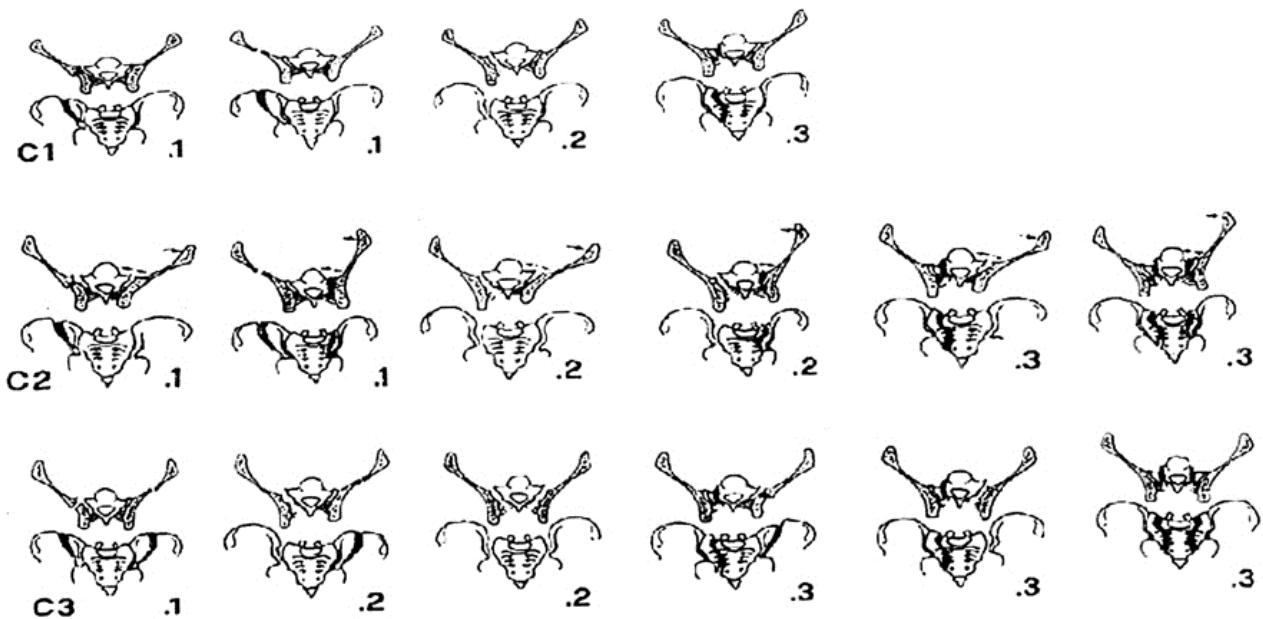


Fig. 9. Type C fractures of the pelvis

Sometimes it can reach full instability in the lower pelvis as a result of the actions of other powers, not only tearing. Such a situation occurs in the conditions of damage, accompanied by internal rotation, in which the sacrum resists compression forces. As a result there is a discontinuity in the sacroiliac joint ligaments posteroanterior direction. In such cases, manual breaks dorsal interosseous ligaments and ligament fractures avulsion take the form, with a margin of the iliac bone, located posteriorly from sacrum bone, or with a margin of the dorsal surface of sacrum bone. Conversely, damage with the mechanism of external rotation may continue until the sacroiliac joint ligament rupture along its entire length, up to the border of the vertebral surface of the sacrum. Particularly large external rotation leads to breaks in the bones and soft tissues in inguinal area and perineum. The most severe form of this injury is

traumatic hemipelvectomy. The essence of the rear of the fractures of the pelvic ring, caused by the forces acting on a break at:

- vertical fractures of the ilium;
- fractures with displacement sacroiliac joint;
- rupture of sacroiliac joint and vertical fractures.

Radiological signs of a complete rupture of the Posterior pelvic ring are breakaways sacroiliac and sacrospinous ligaments or detachments L5 transverse process by ilio-vertebral ligaments. In cases of type C fractures for surgical reposition should be remembered that it is obligatory to restore the pelvic ring in the front, and so in the posterior part.

Thus, the system Isler-Ganz is a further very significant development AO classification system. It makes significant additions to the representation of the mechanisms of damage pelvis, and most importantly, describe the relationship between the mechanisms, radiological and CT fig. of the injury. This is its scientific and practical importance.

We can not ignore another very interesting classification described as classification Young-Burgess (1986), which is further development of the Till'a classification.

Young-Burgess classification

Young, Burgess modified classification Tile, based on the concept patomechanic (Young, Burgess, Brumback, Rosa 1986; Burgess, Eastridge, Young et al. 1990). This classification made four groups of pelvic injuries: LC (lateral compression); ARS (anteroposterior compression); VC (vertical shear injuries); CM (combined mechanical injury). injury resulting from the forces of anteroposterior (APC) and lateral compression (LC), divided into three subgroups based on increasing traumatic forces.

The interpretation of different types injuries, provided by B. Odynskomu classification. LC – injury to the lateral compression, board-controlling force trauma injury occurs through the iliac bone and/or proximal femur. This mechanism leads to damage of the ventral ligaments sacroiliac and sacrospinous ligaments. Mostly they are extended, rarely broken. Blood vessels in this case or reduced. Sharp bone fragments ilium may cause damage to the large blood vessels. If bleeding occurs, the unbroken ligaments of the pelvis function as "tamponade". They prevent the spread of bleeding in the retroperitoneal cavity.

Front damage with side compression can act or that the party itself (Unilateral), or on the other side (contralateral), or on both sides, including one or both branches of the pubic bone, but always pubic rami fracture gap will extend horizontal stretched.

Rear pathology determined in individual subgroups depends on the strength and type of injury.

LCI – typical front damage with fractures of the sacrum bone injury action (usually impacted fractures). For the differential diagnosis is necessary to distinguish posterior fractures through the holes of the sacrum bone (fig. 10).

Catagory	Common characteristic signs	Differential Signs
LCI	Front transverse fracture (g.o pubic bone)	Compression fracture of the sacrum on the side of injury

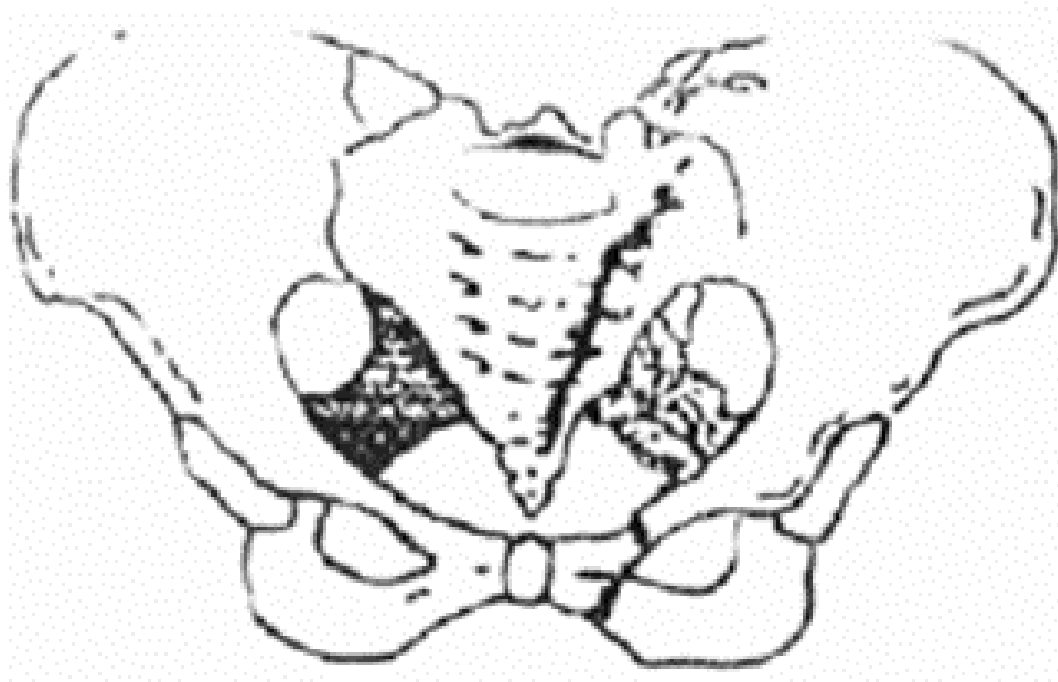


Fig. 10. LCI

LCII – typical front fractures, corresponding to a total sight LC injuries and type of injury "semilunar fracture" (crescent fracture) in the back of the pelvis (fig. 11).

This group includes fractures of the back of the ilium, reaching to the sacroiliac joint or running parallel to the joint. At the same anteroposterior iliac spine remains connected to the sacral bone by strong posterior ligament.

There is rotational instability of pelvis. Sacrociatic and sacrospinous ligaments remain undamaged. This type of fracture is held on back of sacroiliac ligaments, forming the basis of the compound of the sacrum bone fragment with an undisplacement ilium bone.

Table 12

Young-Burgess classification

Catagories	Common signs	Differential signs
LC I	The front transverse P (mainly the pubic bone)	Compression F sacrum bone on the side of injury
LC II	The front transverse P (mainly the pubic bone)	Type II «crescent» (the iliac wing)
LC III	The front transverse P (mainly the pubic bone)	Contralateral «open book» (APC-injury)
APC I	The discrepancy between the pubic symphysis	Slight divergence of the pubic symphysis or Sacroiliac joint, stretching the front and back of sacroiliac joint ligaments
APC II	The discrepancy between the pubic symphysis or vertical P	Discrepancy of sacroiliac joint, rupture of ventral ligaments, integrity of dorsal ligaments of the sacroiliac joint
APC III	The discrepancy between the pubic symphysis or vertical P	Separation of half pelvis, complete tearing of the ligaments, but without vertical displacement
VS	The discrepancy between the pubic symphysis or vertical P	Vertical anteroposterior displacement, full tearing of the ligaments
SM	Front and /or back vertical and /or transverse fracture	The combination of injuries type LC-VC or LC-APC

Described above appear in trauma injuries such as LC II, LC III.

Catagories	Common characteristic signs	Differential Signs
LC E	Front transverse fracture (GO pubic bone)	Fracture type "crescent"

Injury type VS sometimes make similarity with fracture "crescent fracture", but in these cases the ilium is always with displacement vertically in AP project.

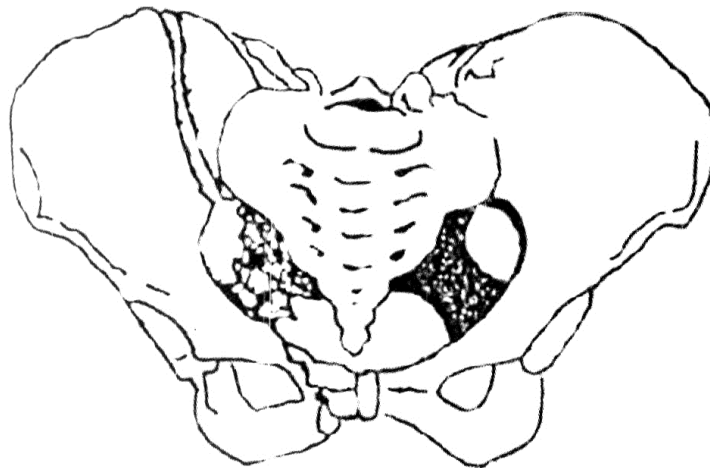


Fig. 11. LCII

LC III force damage on the side of the injury leads to internal rotation, as in fractures LC II ("crescent fracture"), and on the other side of the injury – to external rotation ("open book").

Fractures of this type may act together with the mechanism of "roll-over", when the person who is hited by the car, under the car rolls. This type of injury is sometimes described as "wind swept pelvis" – "pelvis, swept away by the the wind" (fig. 12).

Catagories	Common characteristic signs	Differential signs
LC III	Front transverse fracture (GO pubic bone)	Contralateral "open book" (trauma – APC)

ARS – damage characterize rupture of the symphysis pubis or the front horizontal fracture in the front half shells and in the back of fracture captures sacroiliac joint. Strength damage or acts as in front, or behind.



Fig. 12. LCIII

APC I – a small gap of the symphysis pubis (10–20 mm), which may lead to a small rotation of the ilium without disturbing the stability of the pelvis. sacroiliac ligament and ligaments of the pelvic floor may be slightly stretched, but not broken (fig. 13).

Catagories	Common characteristic signs	Differential signs
APC I	The discrepancy between the symphysis	Slight divergence of the pubic symphysis or Sacroiliac joint, stretching the front and back of sacroiliac joint ligaments



Fig. 13. ARS I

APC II – often force trauma front direction, at least the rear, which leads to an injury, called "open book" – "open book". At posterior pelvic ring occurs

expansion of sacroiliac joint. Ventral sacroiliac joint ligaments tear. Also tear sacrospinous and sacrotuberous ligament. Dorsal ligament sacroiliac joint remain intact, hence the effect of "open book." it require very large forces In order to such type of an injury has to occurred, so you need to keep in mind internal injuries, vascular damage (internal iliac artery and vein), and lumbosacral plexus (fig. 14).

Catagories	Common characteristic signs	Differential signs
APC II	The discrepancy between the symphysis, or vertical fracture	Expansion of sacroiliac joint, tearing of the anterior sacroiliac ligaments, kept back



Fig. 14. APC II

APC III – there is complete displacement of one of the ilium relative to the sacrum and ilium, second, a complete rupture sacroiliac ligaments and ligaments of the pelvic floor. There may be bleeding from the large inner and / or outer iliac arteries and veins (no tamponade due to a complete rupture of the ligaments). This leads to increased bleeding, penetration of the blood into the retroperitoneal space, it must be distinguished from bleeding into the peritoneal cavity (fig. 15).

Catagories	Common characteristic signs	Differential signs
APC III	The discrepancy between the symphysis, or front vertical fracture	Gap of half of the pelvis, but no vertical displacement, a complete rupture sacroiliac ligaments



Fig. 15. APC III

VS – rupture of the symphysis pubis, or vertical fracture in the pubic bones of the pelvis with vertical displacement. Front injury are in the area the pubic symphysis, posterior – in sacroiliac joint. The fracture gap can also pass through the iliac bone, through the sacrum or be mixed. The lesions may be single or bilateral. These injuries are the result of forces in the vertical direction (fig. 16).

Catagories	Common characteristic signs	Differential signs
VC	The discrepancy between the symphysis, or front vertical fracture	Front or posterior vertical displacement through sacroiliac joint or through the wing of the ilium, or through the sacrum



Fig. 16. VS

SM – a combined mechanism of injury is the result of different types of forces, such as APC + LC or part of LC + VS. Pathology in front of the pelvic ring is also diverse.

According to various authors, the classification system Jung quite accurately describes the results of the diagnostic process, As follows from the above, the classification rather active in the region of damage pelvic, progressive and different Aspect. According to systems AO classification, the most suitable for our research are used in our future research and practical activities as basic.

CLASSIFICATION ACTIVITIES OF THE PELVIC INJURIES IN UKRAINE

Once we were able to determine the characteristics of the evolution of the classification of activities in Poland and in the global aspect, there is a feasibility of such a study in Ukraine. Because Ukraine was less influenced by the world of science than in Poland, as a result it can be assumed that the classification and activities in Ukraine will have some of his features.

For this purpose, conducted a special study of the analytic-synthetic according to the literature, together with Academician AA NAUI AMSU Shortcakes (1979). Spotted a special role in this aspect of the Institute of Spine and Joint Pathology Medical Sciences of Ukraine (IPPS them. Prof. Sitenko M.I. Obtained results that deserve attention.

It is natural that the first attempts to classify fractures of the pelvis, as in Poland, were descriptions of the various fracture localization. First adopted in Ukraine was the classification Kuzmina 1890, according to which the pelvic fractures were divided into two groups, depending on the location Tochi (Space) application of the force. Obtained fractures located at the point of application of mechanical force, and fractures located at a distance from this point. Classification only historical value.

In 1935 F.E. Elyashberg proposed classification of fractures of the pelvis, built on the criteria for the continuity of the pelvic ring with the release of the two groups of pelvic damage:

- do not violate the continuity of the pelvic ring (isolated fractures baptize coccyx acetabular ilium, one of the branches of the pubic or ischial bone);
- discontinuously violation of pelvic ring (vertical fractures front semicircles; iliac bone fractures when the fracture line passes through the

acetabulum, oblique, vertical fractures front and rear half rings that-this; Vualeme type, multiple fractures and fracture).

The criterion of "pelvic ring" remained decisive for many years in the construction of classifications injury pelvic.

M.I. Bystritskiy (1960) distinguishes two groups of fractures on the basis of the same criteria the state of the pelvic ring:

➤ isolated pelvic injury that do not violate the continuity of the pelvic ring;

➤ pelvic bone injury which violate the continuity of the pelvic ring (both unilateral and bilateral – breaks the pubic symphysis, double vertical pelvic bone injury; sprains pelvic acetabular fractures, fractures with damage to pelvic organs).

In 1963 in the journal "Orthopedics, Traumatology and Prosthetics" was a discussion on article I.G. Herzen, V.D. Chabanenko (1963), which the authors have proposed their own classification pelvic bone injury built on clinical criteria such as the duration of treatment and its results. Classification provides for the allocation of the following types of pelvic bone injury:

➤ simple (isolated in which inpatient treatment lasts 1.5-2 months, disability does not happen);

➤ complex (oblique, vertical, Malgenya damage acetabulum without dislocation);

➤ complicated (open fractures with internal injuries vessels, nerves, fractures of the pubic symphysis with discontinuities, the acetabulum with dislocation of the femoral head). The discussion has not received the approval of classification, primarily due to the vagueness of systematization.

On the pages of of the same journal in 1983 was the second discussion on the classification of pelvic injuries, this time under V.F. Trubnikova, S.I. Kovalev, B.V. Chaychenko, A.G. Istomin (1983). The authors divide pelvic bone injury into three groups:

With partial violation of dynamic functions, but without significant violations of the support function of the pelvis. This fractures iliac spines, transverse fractures of one or both branches of the pubic bones, fractures of the pubic bone – the one and ischial – on the other hand;

With partial violation of the dynamic and support functions. This group includes single, bilateral fractures of the pubic and ischial bones, fractures of the pubic symphysis, without damaging of sacroiliac joints.

With a complete violation of the dynamic features and a partial violation of the support function. This fractures anterior and posterior parts of the pelvic ring without cranial displacement of half of the pelvis, acetabular fractures without displacement of the femoral head;

With a dynamic and complete violation of the support function of the pelvis. To this most difficult group of injuries attributed to damage the pelvic vertical displacement half of it, acetabular fractures with displacement of the femoral head.

According to the authors, this classification helps to build the correct treatment strategy and to some extent determines the prognosis of the disease. Thus, this classification is done in an attempt to use the functional characteristics (division criteria) to evaluate the severity of pelvic fractures. Classification is widely used and found no followers.

A notable event in terms of the evolution of our subjects was plenary session of the Scientific Society of Orthopedic Trauma, held in 1993 in Kherson, on which the problem of pelvic pathology was first discussed at such a high level in a free Ukraine.

Two events are noteworthy:

➤ for the first time in the report of S.V. Ryndenko (1993) and it was suggested that "in the case of damage based on a prognosis regarding the recovery of function of support and movement should be based on the concept of "stability";

➤ for the first time in Ukraine N.K. Thorns, B.K. Babic and others (1993) proposed a classification of pelvic injuries, built on the criteria of "stability".

Highlighted three types of pelvic injury:

a) stable pelvis injury (70%), which is characterized by a vertical fracture of the sacrum impacted bone and fracture without displacement in the sacroiliac complex;

b) unstable (18%), which is characterized by a shift of the pelvis cranial half, more than 0.5 cm, with sacroiliac joint diastasis in more than 1 cm, with a fracture of the sacrum or ischium, with displacement of more than 0.5 cm,

however, all these dimensions impossible to count without quantitative tomography;

c) an indefinite (12%) from the cranial half pelvis displacement of less than 0.5 cm, or sacral fracture ischium with displacement less than 0.5 cm.

This classification is a definite step in the implementation of the criterion "stable instability" to describe fracture of posterior pelvic ring.

Pasternak V.N. (1998) in his doctoral thesis offers a working classification of fractures of the pelvis, both built on three interrelated criteria, which has three vertices (section). These fractures pelvis (1), the mechanism of injury (2) and the locomotor system damage (3). In turn, pelvic fractures and damage by divides into four groups (possibly species).

1st – group – without breaking the continuity of the pelvic ring (stable fractures);

2end – group – in violation of the continuity of one of the divisions of the pelvic ring (as conditionally stable pelvic injuries);

3rd group – in violation of continuity both anterior and posterior parts of the pelvic ring (unstable fractures);

4th – group – acetabular fractures with dislocation (subluxation) and hip without it. In this, the fourth group, the author identifies two subgroups: with and without violation of continuity of the pelvic ring. Thus, the classification of Pasternak, like many others, is based on the criterion of "continuity–discontinuity" of the pelvic ring.

These classifications built in Ukraine, although not infallible, characterize the progress of ideas about traumatic call pathology pelvis and, ultimately, "agreed" with foreign governmental criteria on "stability-instability" pelvic fracture.

Most progressive and correct for our study see AO classification and so we use it in our subsequent studies.

Since Ukraine in 2006 developed a scheme of diagnosis and treatment of fractures of the pelvis in the protocol induced below.

PROTOCOL
DIAGNOSIS AND TREATMENT OF FRACTURES
PELVIC BONES

APPROVED
Order of Ministry of Health of Ukraine
N 521 from 26.07.2006

classification:

- Boundary (isolated) fractures of the pelvis, do not participate in the creation of the pelvic ring (ridge fractures and iliac wing (S32.3), anterior epiphysis, lowback Ostyaks ilium (S32.3 apophysis ischium (S32.8), fractures of the sacrum (S32.1), fractured coccyx (S32.2).
- Fractures of the pelvic ring without breaking its continuity (single or bilateral fractures of the pubic (S32.5) or sitting bones (S32.8), fractures of the pubic bone on the one hand, and on the other gluteal (S32.7).
- Fractures of the pelvic ring in violation of its continuity (single or bilateral fractures of the pubic and ischial bones, rupture of the symphysis (S33.4), longitudinal or diagonal fracture of the ilium, the gap of the sacroiliac joint (S33.6), vertical fracture of the sacrum (S32.1), double vertical fracture of the pelvis (Malgenya, Vualme Nor-dermis) (S32.7).
- Fractures swivels depression (depression fracture edge, its bottom, which may be accompanied by central dislocation of the hip) (S32.4)
- Fractures of the pelvis, combined with damage of pelvic organs (S37.7).

diagnosis:

1. History: Of injury occurs as a result of severe trauma (traffic accident, fall from height, etc.).
2. These objective research:
 - The patient can not stand up or walk because of the pain and biomechanical disorders of the pelvic girdle;
 - Deformation of the pelvis, the presence of local edema, hematoma;

- Positive symptom 'heel stuck';
- Pain on palpation, when movements in the hip Soest Islands, gentle compression (symptom Verneuil) or dilation of the pelvis on both sides of the wings of the iliac bone (symptom Larrey).

3. Radiographs in the front back and side projections. If necessary, special Laying radiograph or computed tomography.

4. Should consult a surgeon and gynecologist for suspected injury of the pelvic organs, as well as urinalysis, blood tests, ultrasound examination per rectum, per vaginum when possible).

treatment:

1. Conservative treatment is indicated for fractures without displacement and uncomplicated fractures and includes:

- Being on the board in a special hammock (at break symphysis) or in the "frog";

- In uncomplicated upper fractures used skeletal traction.

2. Surgical treatment is indicated in a significant displacement of bone fragments, symphysis fracture with significant displacement, rupture of the sacroiliac joint with a significant difference, pelvic fractures in violation of the integrity of the pelvic ring fractures swivels depression with central dislocation of the hip, connected to pelvic organ lesions.

Methods of surgical treatment:

- Open reduction with fixation screws, plates, rods, wire;
- External fixation devices.

Director of department

R.A. Moiseenko

CLASSIFICATION PELVIC FRACTURE

From a practical point of view it is convenient to use the classification of AV Kaplan – LG Shkol'nikova:

1. Boundary fractures – fractures of the iliac wing, the sacroiliac joint, coccyx, the ischial tuberosity, avulsion pelvic spines (fig. 17).

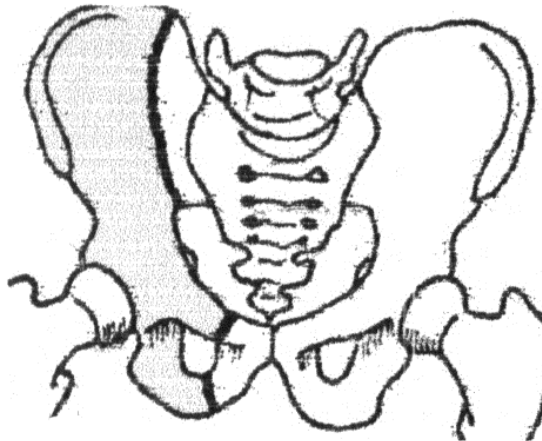


Fig. 17. fracture Malgenya

2. Fractures of the pelvic ring without breaking its continuity; fractures of one or both pubic and ischial bones, fractures of the pubic on the one hand, on the other hand – the ischium (fig. 18).

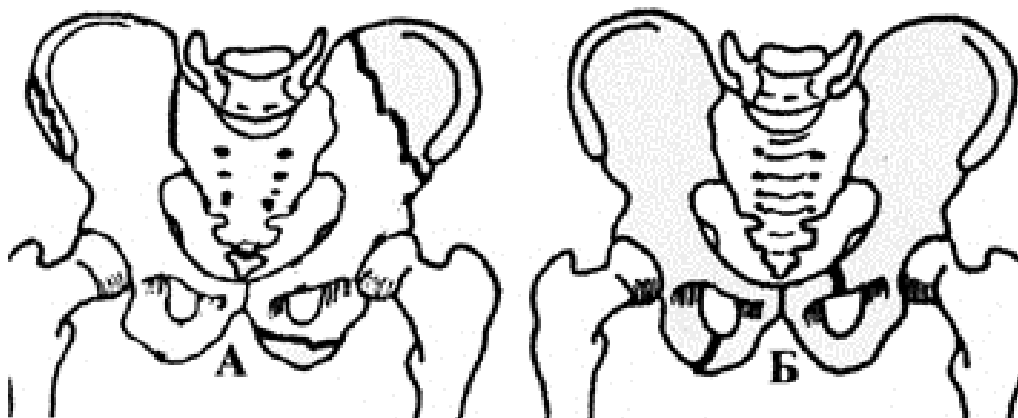


Fig. 18. A – boundary fractures of the pelvis, B – fractures without destroying the integrity of the pelvic ring

3. Fractures of the pelvic ring in violation of its continuity:

➤ front department – bilateral fractures of both branches of the pubic bone, and bilateral fractures of the pubic and ischial bones, fractures of the symphysis.

➤ posterior department – vertical fracture of the ilium or sacrum, the gap of the sacroiliac joint;

➤ fractures of the anterior and posterior parts of the pelvis of continuity only the front or only the posterior half-rings or both sections simultaneously. To this group belong fractures:

Malgenya fracture – fracture of the pubic and ischial bones on one side and a vertical fracture of the ilium on the same side (fig. 19):

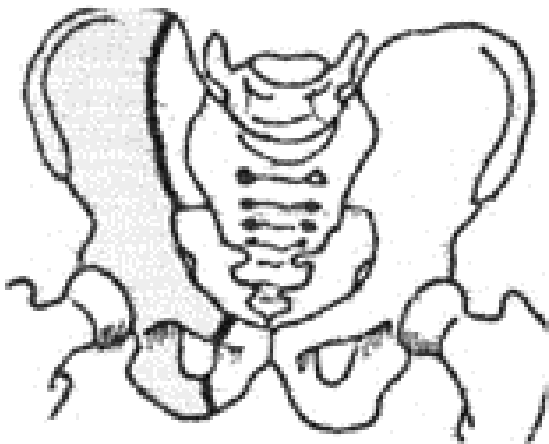


Fig. 19. Fracture Malgenya

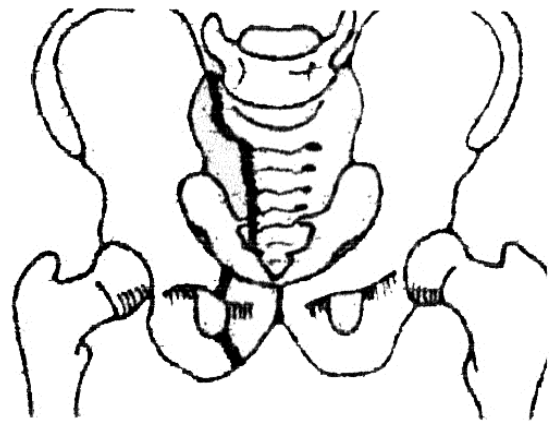


Fig. 20. Fracture Vualme

➤ fracture Vualme – vertical fracture of the sacrum and the pelvis front semicircles as fracture Malgenya, on the same side (fig. 20);

➤ fracture Niderle (diagonal fractured pelvis) – vertical fracture of the ilium on one side and in front of him, half rings – on the other (fig. 21);

➤ Dyuverneya fracture – fracture of the acetabulum (fig. 22).

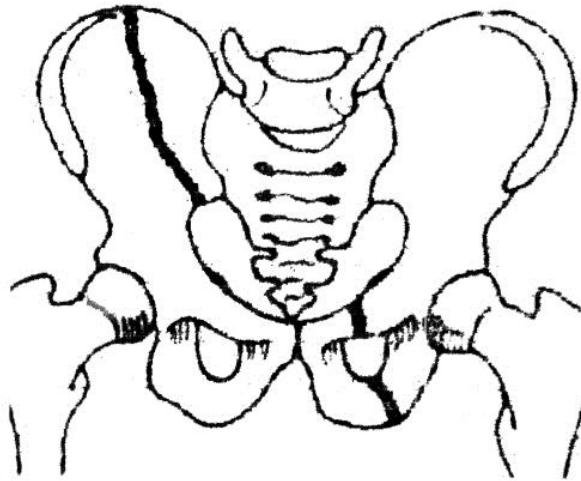


Fig. 21. Perelom Niderle

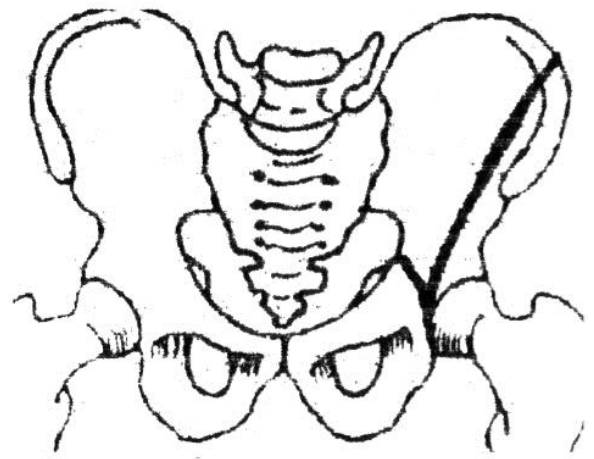


Fig. 22. Perelom Dyuverneya

4. Acetabular fractures – fractures of bottom edge trough, central dislocation of the hip (fig. 25).

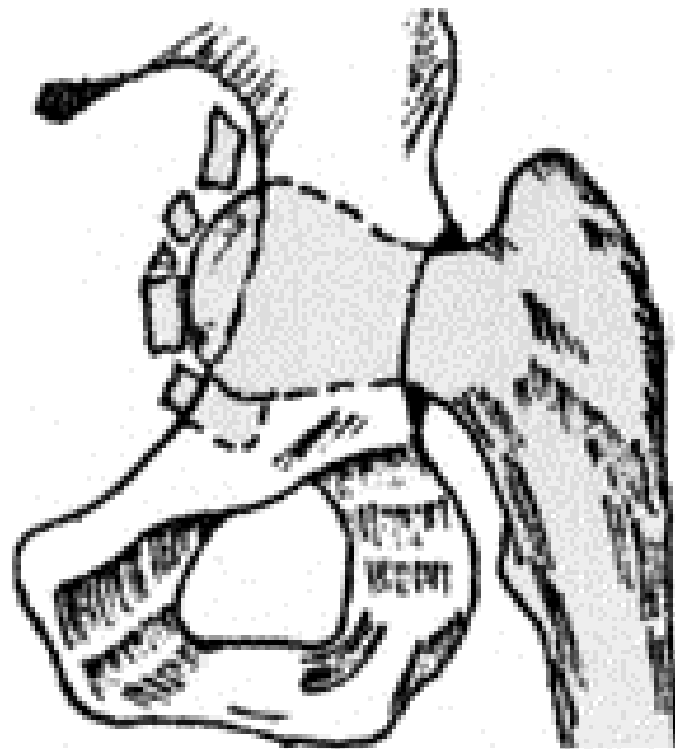


Fig. 25. Central dislocation of the hip

5. Pelvic fractures and damage to the pelvic organs.

6. Combined injuries.

INJURY OF PELVIC BONES

Patients with injury of the pelvic bones are from 5% to 10% of all trauma patients. Among patients with multiple fractures made up 3.3%, with 25.5% of associated injuries. Fractures of the pelvis are the most severe damage to the support of human movement and occur in men aged 20-50 years.

In Every third with pelvic injuries occurs traumatic shock. Combined with multiple fractures of the pelvis due to the plight of the patient not only neurogenic component of injury due to irritation extensive reflex zones, but also massive interstitial hemorrhage (2.5-3 liters of blood). Often clinical severity defined complications, which include damage of internal organs.

MECHANISM OF INJURY

Injury of the pelvic bones occur mostly in traffic accidents and during falls from a height. Mechanism violations intact pelvis and their compounds is mainly in compression of the pelvis in a lateral or anteroposterior direction of force against the case of a fall on the ischial tuberosity and the lateral surfaces of the pelvis. Along with the mechanism of injury to a certain extent the nature and localization of lesions determine age anatomical physiological features of children's pelvis. Have the values flexibility, elasticity and firmness of the growing bone; weakness ligamentous apparatus, bone and cartilage ongoing restructuring in the transition zones of both branches of the pubic bone in the sciatic where fractures occur most often. These include factors such as cartilage Y-shaped junction ilium, ischium and pubic bone in the acetabulum, the presence of cartilage germ layers along the iliac crest, in the ischial tuberosity, and pubic symphysis-sciatic synchondrosis.

Pelvic fractures occur during compression of it in the sagittal or coronal plane. These conditions are created by compression of the buffers between cars, wall and moving vehicles, and collapses under the rubble, falls, accidents (hitting a pedestrian vehicles), etc.

The most frequent fractures of the anterior pelvis. Pelvic ring compressed beyond the limits of its elasticity breaks down in the most delicate and weak points – the upper and lower branches of the pubic and ischial bones.

In most cases, there are unilateral fractures. For fractures of the pubic branches and ischial bone fragment is of the form "butterflies" and shifted posteriorly (fig. 26).

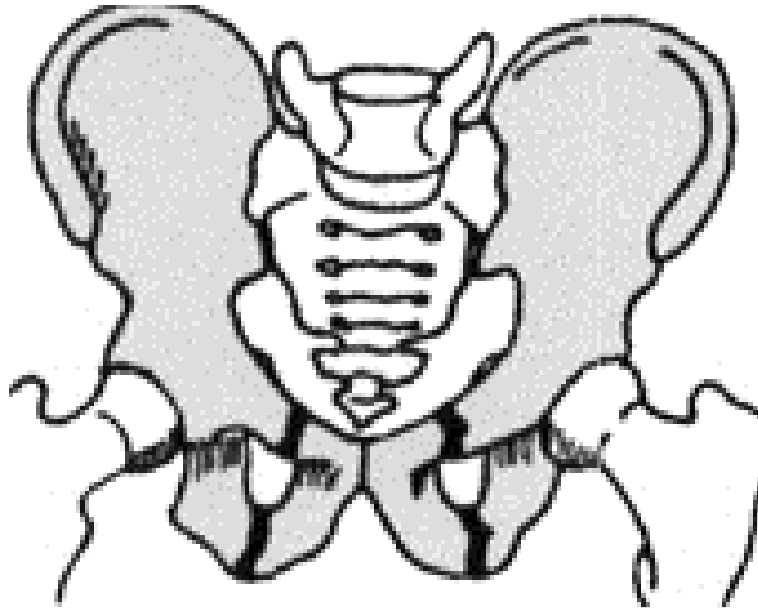


Fig. 26. Pelvic fracture type "butterfly"

If the injury is significant, and the force is applied not only to the region of the symphysis, but also to the iliac wings, there is a rupture of the ligamentous apparatus sacroiliac joint. In some cases, the posterior part of the pelvic ring fracture occurs ilium.

Under the influence of reducing iliopsoas muscle, quadratus lumborum and obliques with vertical fractures of the anterior and posterior pelvic outer semicircles ("tearing") part of the pelvis is shifted upwards. Compression pelvis diagonally causes a fracture of the pelvic ring on one side in the anterior – fracture of the pubic and ischial bones, on the other side of the back – vertical fracture of the ilium. Fall from a height on the ischial tuberosity can lead to unilateral or bilateral vertical fractures of the pelvis and buttocks comminuted fracture.

Fractures of the acetabulum and central dislocation of the hip occur during compression of the pelvic side, when falling on the greater trochanter, or as a result of strong direct beat. Avulsion fractures of upper anterior iliac spine, ischial tuberosity often occur when running, playing soccer and other cases of sudden and uncoordinated movements, causing a strong muscle contraction.

PELVIC FRACTURES WITH INJURY OF PELVIC ORGANS

In fractures of the pelvis can be injury of organs located in the pelvis – the bladder, urethra, rectum, rarely vagina, uterus and appendages. Most commonly observed damage to the urethra and bladder.

Damage to the urinary organs are accompanied pelvic fractures in 10-28% of adults and 7-8% of children.

Distinguish between extra-and intra peritoneal bladder ruptures.

Extra peritoneal ruptures often occur as a result of changes in the configuration of the pelvic ring and dramatic tension of ligaments that secure bubble. Rarely bladder wound bone fragments of the pelvis. In addition to clinical fractures of the pelvis at the victim no independent urination, although the urge to have it saved. Self urination possible. Thus it is characterized by polyuria and bloody urine.

With the development of urinary infiltration there are complaints of abdominal pain, burning sensation and severity "in depth" of the pelvis.

At this time, there are clinical signs of tissue infiltration pelvic: swelling (pastosity tissue) above the pubis and the inguinal ligament in the perineum and inner thigh; discoloration of the skin in these areas from marble to blue-crimson. Increases hospital intoxication: a temperature rise to 39 ° C and above with chills, tachycardia, a sharp deterioration in the general condition in the blood revealed leukocytosis with a shift formula to the left. Lack of timely assistance may lead to the development of uric cellulitis.

Intraperitoneal injury occur relatively rarely and mainly arise from the direct action of a, usually crowded bladder (kick, drop, transport trauma).

The most commonly tearing front and posterior walls, where the muscle layer is less developed. Simultaneously tearing of peritoneum covering the bladder, and its cavity receives a message with the abdominal cavity.

Damage to **the urethra** characterized by the following clinical signs: urinary retention, bleeding from the urethra attempt urination accompanied by burning pain, suprapubic bladder palpated crowded. Catheterization is contraindicated in these cases.

On examination, all the victims with pelvic injuries necessary to macroscopic and microscopic examination of the urine. In the case of an acute urinary retention, which may be a reflex, the bladder catheter is shown.

If in the urine found admixture of blood, then avoid of rupturing of the bladder wall and X-ray contrast examination should performed.

It is mandatory to make two shots: the filling and emptying of the bladder, as in cases of rupture of the posterior wall on the radiograph with contrast-filled bladder injury may not be identified.

Ruptures of the rectum associated with fractures of the pelvic bones much rarer. Distinguish between extra-and intra-abdominal damage to the rectum.

Extraperitoneal lesions may include the development of severe pelvic abscesses fiber. For intraperitoneal discontinuities characteristic rapidly developing symptoms of peritonitis. To exclude the pathology of the of the rectum with all affected pelvic trauma should be performed rectal investigation. For more accurate diagnosis can be used and recto-colonoscopy.

Doctor of any profile, assisting victims with fractures of the pelvis, must necessarily prevent damage to internal organs. Internal injuries in fractures of the pelvis will translate this kind of injury from heavy discharge in a life-threatening patient.

In case confirm the diagnosis of internal organ rupture shown urgent surgery involving specialist corresponding profile (surgeon, urologist, obstetrician-gynecologist).

CLINIC AND DIAGNOSTICS

Diagnosis of bone fractures of the pelvis mainly consists of clarifying the mechanism of injury, determining posing of the patient's in the time of injury, inspection and palpation of the injured pelvis. Unconscious patient, due to shock, internal bleeding and possible damage of internal organs, is difficult to diagnose. In some cases, difficulties may be related to the unavailability of some body parts for palpation. On examination, the patient should be remembered that the hematoma at the fracture site is not immediately visible, sometimes it appears on the surface of the body after a few hours or even days after the injury. The typical posture of the victim: the legs slightly bent at the knee and hip joints, and laid rotate outwards (the "frog").

On palpation of the accessible parts of the pelvis (pubic, ischium, ilium crest wing) strengthening of pain occurs.

Important in the diagnosis of pelvic injuries is positive symptom **Verneuil**: strengthening of pain at the fracture site during compression of the of the pelvis over the iliac wing (fig. 27 A).

In some fractures revealed positive symptom **Larrey**: pain occurs in deep-seated pelvic bones when you try to expand the pelvic bones in the anterior spine (fig. 27 B).

Symptom Gabay – passive motion in the hip joints cause a sharp pain at the fracture site.

Symptom Girgolava – a sign of intra-articular hip fracture: increased pulsation of the femoral artery under the crural arch.

Gorinevskoy symptom, the symptom of "adhering heel" – a sign of fracture of the upper branches of the pubic bone: the patient in the supine position can not raise outstretched leg and lifts it to the body.

Symptom "backstop" – separation front upper spine pelvis.

Symptom "open tap" – bleeding cancellous bone of the pelvic (linear wing fractures of the pelvis). Quantity the displacement of the pelvic fractures of continuity with the anterior and posterior half-ring is determined by measuring the distance from the top of the xiphoid process of the sternum to the anterior spine or pelvic to the top of one of his ankles.

In fractures of the pelvis, particularly the rear half rings formed retroperitoneal hematoma, which can give a clinical fig. of acute abdomen (psevdo abdominalny syndrome).

To reduce the pain and the differential diagnosis of abdominal organ injury with retroperitoneal hematoma should be done by intrapelvic anesthesia Shkolnikov-Selivanov. If after anesthesia stored peritoneal signs, it should be assumed injury of abdominal organs and make paracentesis.

Intrapelvic anesthesia to the patient is held in the "lying on his back." Palpate the anterior iliac spine. The skin in this location is treated with an alcohol antiseptic solution. Stepping 1 cm medially from the anterior spine, are anesthetized in a small area of skin. Long needle, put on a syringe with a capacity of 20 ml injected under the spine from front to back, all the time infiltrating tissue novocaine.

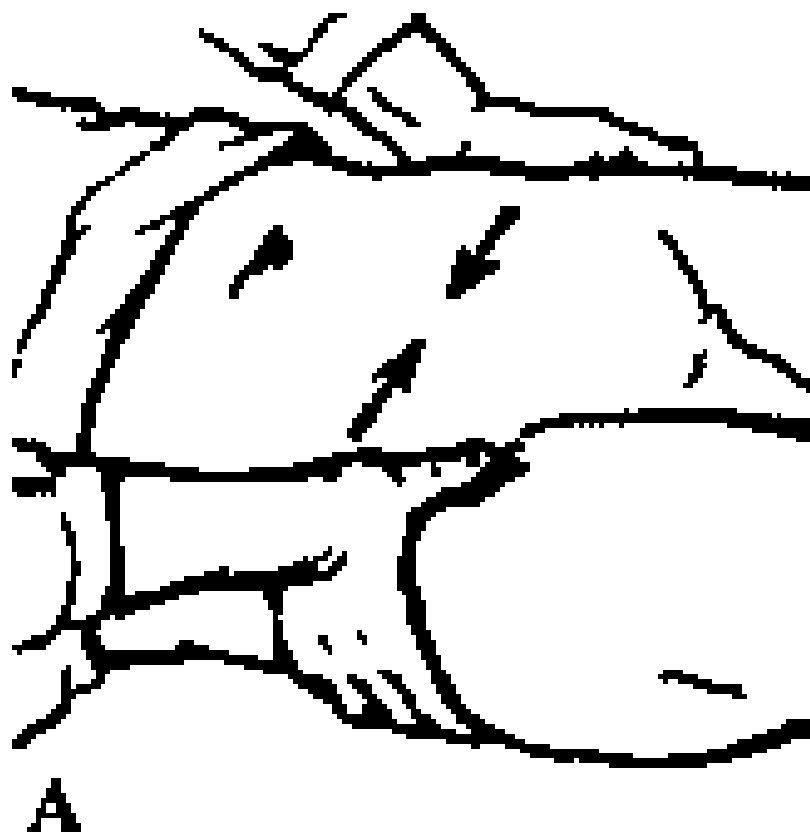


Fig. 27. A – a symptom of Verneuil, B – symptom Larrey

During the needle should always feel the closeness of the ilium. Reaching the hematoma at the fracture site, as determined by the appearance of blood in the syringe as the piston moves itself, when administered unilateral fracture of the pelvis 400-500 ml of 0.25% solution of novocaine.

When bilateral blockade imposed on 250-300 ml of novocaine on each side. (Maximum single dose dry matter novocaine is 1.25 g).

Diagnosis of pelvic fracture. The distance between the two horizontal lines is the magnitude of the vertical mixing. Distance less than 1 cm is considered as a small mixing, more than 2 cm as pronounced.

On radiographs of "entry into the pelvis" determine the amount of back mixing, which draw a line from the middle of the sacrum to the symphysis.

Then carried out perpendicular to the line from each of the ischium. The difference in distance between the two lines is estimated as the offset value. The accuracy of these measurements may not be enough correct for taper pelvis and ischial bone anomalies. Radiographs pay attention to the sacroiliac joints for the purpose of determining the place of the posterior of the pelvic ring fracture.

Computed tomography – the best method of investigating the stability of the pelvis, as the sacroiliac region is best assessed using this technique. Differential diagnosis of stable and unstable lesions produced by computed tomography.

Carefully conducted clinical and X-ray examination to determine whether the fracture is stable or unstable. This is crucial, as patients with unstable lesions are in much greater danger than patients with stable injuries.

Patients with unstable lesions complications total 3 times greater than v affected with stable lesions, they have significantly higher mortality and finally, the need for blood transfusion in these 3-fold greater than that affected by stable fractures. Radiographs pay attention to the sacroiliac joints for the purpose of determining the place of the posterior rupture of pelvic ring.

Furthermore, the diagnosis of stability is the definition of indications for surgery, including emergency stabilization using external fixation.

GENERAL PRINCIPLES OF TREATMENT OF PELVIC

The most important task of treatment of patients with unstable pelvic injuries – it's a quick definition of tactics and choice of method of surgical

stabilization. In patients with polytrauma treatment priority is to stabilize hemodynamics obligatory stop bleeding, emergency treatment related injuries of internal organs, the stabilization of the pelvic ring to stop the bleeding and facilitate care.

The general concept of treating pelvic injuries with hemodynamic instability seems to us next. The first task is to ensure access of air, for which the patient is placed in a position comfortable for breathing. If breathing has not improved, and the way the air is an obstacle, then produce a tracheotomy.

In the presence of hemo pneumothorax drainage performed by Byullau, with continuous bleeding from the drain – thoracotomy, at the same time compensate for blood loss due to blood albumin, plasma crystals with simultaneous correction excretory, and other organ functions.

If hemodynamics not stabilize, for diagnosis of intra-abdominal bleeding should be performed paracentesis or mini laparotomy, and the detection of blood in the abdominal cavity is necessary to perform a laparotomy.

If the blood in the abdominal cavity is not found, then allows for the retroperitoneal bleeding from vessels of the sacroiliac joint, on which stabilize the pelvis external fixation device.

If stabilization of the pelvis was ineffective and anemia progresses, if there is bleeding continues, produce angiography to identify a bleeding vessel. When in damage to the vessel caliber, for example, sheathe iliac, external or internal iliac artery, it is necessary to make their recovery.

If the damage is small-vessel should perform their X-ray embolization. In the absence of the effect of these manipulations shown in part of pelvecromy. Sequence of therapeutic interventions in severe pelvic injuries as follows:

1. Stop the bleeding.
2. Treatment of associated internal injuries.
3. Restoration of normal anatomic relationships.
4. Prevention of infection.
5. Rapid rehabilitation of the affected.

Practice shows that in some cases, treatment of associated injuries is a priority, and it is sometimes difficult to decide where to start: whether with forceps to stop the bleeding, whether with laparotomy or thoracotomy or craniotomy.

LAPAROTOMY IN CASE OF PELVIC FRACTURE. ABDOMINAL INJURY IN PELVIC FRACTURE

If using forceps hemostatic effect is not achieved, it is necessary to think of laparotomy, as it is more commonly produced to stop the bleeding.

Indications for laparotomy are:

- abdominal bleeding;
- abdominal organ damage;
- retroperitoneal organ damage;
- severe pelvic trauma from compression (moving vehicles);
- open fracture of the pelvis,
- hemodynamic instability that is not listed other methods (eg, pelvic forceps clamp, embolization)
- retroperitoneal bleeding;
- positive lavage;
- sonographic determination of free liquid.

Laparotomy enables simultaneous treatment with organ damage doped vessels for bleeding, tamponade or perform angioplasty. Indications for retroperitoneal hematoma opening debatable because of the risk of bleeding after the opening of the retroperitoneal space.

Indications for ethnography and interventional radiological treatment are the subject of discussion in the literature. It is recommended to perform at: detecting large retroperitoneal hematoma increasing during laparotomy, an open fracture of the pelvis.

Roentgen embolization is recommended by no later than 6 hours after injury, as otherwise sharply increases mortality.

Some authors advise primarily perform stabilization of the pelvis with the rapid imposition of external fixation device to reduce blood loss from the bones and venous vascular plexus, and then X-ray embolization. Embolic lesions in the pelvic ring used coagulants.

Abdominal injury – the second-most dangerous with concomitant injury the cause of the high mortality or severe complications in connection with what their treatment should be performed before or simultaneously with the stabilization of the pelvis. Symptoms associated abdominal injuries in fractures of the pelvis veiled. In patients with pelvic ring fractures sonographically

determined the presence of free fluid – the main feature of intraperitoneal organ damage, but isolation is not an unconditional indication for laparotomy. From this it follows that the decision "for" or "against" laparotomy in the presence of retroperitoneal hematoma that forms in most cases of unstable pelvic ring injuries, in each case to take very seriously.

Therefore we can not refuse of laparotomy for suspected presence of injuries requiring treatment.

Perineal tears and bodies anorectal area should be treated immediately by surgery. Identification of anatomical structures of the sphincter complex in a short time after the injury is extremely complex. Accordingly, the primary reconstruction gives better functional results than the secondary.

If urethral injury immediate elimination of urine is a primary therapeutic measure. Otherwise arises threat of uric cellulitis with the development of life-mental threat urosepsis.

There are basically two methods of treatment of urethral injuries: primary recanalization with the adaptation of the urethra by inserting a catheter and suprapubic bladder emptying and, depending on the circumstances, the secondary reconstruction of the urethra.

There are basically two methods of treatment of urethral injuries: primary recanalization with the adaptation of the urethra by inserting a catheter and suprapubic bladder emptying and, depending on the circumstances, the secondary reconstruction of the urethra.

Bladder injury requiring immediate surgery regardless of whether it is rupture or intraperitoneal. In rare cases, extraperitoneal rupture possibly conservative treatment. Rupture sutured primary suture bladder empties through the suprapubic tube derived.

Injury during vaginal pelvic fractures require early treatment, as untreated damage pose the risk of developing septic complications.

Nerve injury in most cases treated conservatively. Reduction of fractures, respectively shifted half pelvis can reduce the residual damage caused by compression or stretching harass them to a minimum.

When comminuted fracture of the sacrum and transforaminal sacral fracture line passing nerve roots may be decompressed using dorsal laminectomy and foraminectomy.

Prevention of infection and sepsis in complex of unstable pelvic ring injuries is the treatment of shock, urogenital and intestinal damage, stopping active bleeding, urine excretion, colostomy, removing dead tissue, surgical removal of coagulated blood of retroperitoneal space and pelvis, from-indoor treatment of wounds, antibiotics, immunization against tetanus.

For treatment of fractures of the pelvis begin after exclusion accompanying abdominal injuries and stop bleeding.

STOPPAGE OF HEMORRHAGES IN FRACTURES OF THE PELVIS. AND STABILIZATION OF PELVIC RING

The most serious complication of unstable pelvic injuries is bleeding, in connection with what is necessary to take urgent measures to stop it. Self tamponade retroperitoneal bleeding does not occur, due to the establishment of the wrong compartment boundaries and break the fascia, bones and ligaments.

When passing symphysis 3 cm pelvic volume increased by 2 times. According to Rieger (1995), retro-peritoneal space can accommodate 3-6 or more liters of blood.

Stopping methods of bleeding in the pelvis injuries include:

1. Stabilization of pelvic external fixation device, pelvic forceps or one of the methods of internal fixation.
2. Emergency laparotomy during the execution of which can be made selective stop bleeding, tamponade, compression of the aorta, aortic balloon blockade, ligation to the internal iliac artery.
3. Roentgen embolization – aortic balloon blockade through the femoral artery.
4. Hemipelvicectomy. Life more limbs, so to stop the bleeding in the most extreme cases when other methods are ineffective, for health reasons should perform hemipelvectomy.

To stop the bleeding must reduce waist size before the initial, which provides tamponad effect and immobilize fragments to the bleeding resumed.

Reduce the amount of the pelvis can be quickly and simply using pneumatic tires or "anti shock suit". The disadvantages of the use of tires or the suit include the difficulty of access to the stomach, decreased lung capacity, compartment syndrome. Contraindicated imposition of tires and dressing in

costume cardiovascular disease. When removing the tires should monitor your blood pressure, and any reduction in its more than 10 mm Hg. Art. a contraindication to remove the tire.

External compression using air tamponade "anti shock suit" is a subject of debate. In the German-speaking region, it is denied due to difficult-tion with patient care, worsening pulmonary ventilation and the risk of local damage due to compression and compartment syndrome of the lower limb up to possible amputation.

However, the Anglo-American publications give positive feedback and recommend the use of this method, especially in open fractures.

If you do not stop bleeding as a result of self tamponade or application "anti shock suit." the event is shown as an urgent reduction and the stabilization of the pelvic ring, especially when there is a massive injury of dorsal department.

The best method to stop bleeding and stabilization of the pelvis – the use of forceps antishock Satchel. The apparatus consists of a 75-cm rod and two side bars 40 cm long by moving core. At the end of the side bars has a through hole for holding the 8-mm screw length of 220 mm. Screw has a smooth part, so it can be carried through the bush, and the threaded portion of the pelvis to create compression.

The device allows you to pre-stabilize the pelvis and reposition it, which gives the opportunity to prepare the patient for X-ray examination and the final stabilization of the pelvis. The method is an alternative for patients with hemodynamic instability, with vertically unstable fractures, but the device is used only as a temporary method.

This technique is usually used overlay antishock forceps: palpate posterior superior iliac spine and conduct an imaginary line from them to the anterior iliac spine. Shantz screw is introduced on the above line 3-4 cross fingers anterior to caudineural iliac spine. Because of the risk of damage gluteal vessels can not enter the distal stem.

Produce cut-injection and through holes in the side rod screw introduced into the iliac bone to a depth of 0.5-1.0 cm Side bar before the end of the threaded rods promote opposite to each other, medial sliding on rods. Shantz screws tightening the threaded stabilizing the dorsal sector of the pelvic ring.

Correction of cranial displacement produce unilateral of the pelvis limb traction.

Adjustment of the posterior bias for manual traction T-shaped handle, introduced in the anterior iliac spine. This manipulation control radiographically The device is not recommended for use in breaking up the sacrum.

Immediately after application of antishock forceps conduct additional diagnostic and therapeutic measures. If laparotomy is shown, the frame rotating axis imposed bone rods to the hips, thighs if necessary osteosynthesis, the rotating frame to the stomach. The device is left to improve the patient's condition and to the final stabilization of the pelvic ring.

FIRST AID AND PRINCIPLES OF TREATMENT

Patients with fractures of the pelvis should be transported completely on "supine" and under certain conditions (presence of burn surface in the buttocks or back injuries, etc.) – on the abdomen. Covering stretcher should be tough. the patient should Transported in the position "on the back," the lower extremities should be given diluted or reduced slightly and flexed position. In the medium physiological position relaxes tight muscles, reduces pain, this situation serves as a measure to prevent possible secondary displacement of fragments. When a suspected fracture of the pelvis to transport the victim to a sitting position is strictly prohibited. Before transporting ambulance intrapelvic desirable to make anesthesia and immediately start fighting with shock or its prevention. Anti shock activities carried out in the way. The examination of the victim in the hospital, including radiographs of the pelvis, you should try the patient to shift as little as possible Patients 1st and 2nd groups classification Kaplan-Shkol'nikova general condition often isn't bad. Some of them may come to the doctor byhimself. Patients with anterior margin spine of the pelvis are going backward. It is so-called "fly back symptom." Most often, patients with these injuries do not require emergency medical care activities first.

The main method of treatment – conservative: produce anesthesia of the fracture and the patient is placed on a hard (wooden shield) bed on position of "frog". Bed rest is stored for 4-6 weeks. During this period, prescribed physical

therapy and FTL procedures for the rapid restoration of motor activity. Employability is restored after 8-10 weeks.

Patients 3-6 groups on admission to a specialized hospital almost always require urgent medical care activities, which are often carried out in the ICU.

Helping this group of victims should be initiated by holding antishock therapy and stop internal bleeding means available. Shock observed in 50% of patients with a fractured pelvis.

In these cases, blood transfusions, and plasma substitutes (up to 2.4 l 1 day) to stabilize blood pressure. While carefully watching diuresis. Good results are obtained intrapelvic novocaine anesthesia for Shkolnikov-Selivanov-Tsodyksu. For fractures of of the pelvis back semicircles used intrapelvic blockade by Selivanov-Shkolnikov (Novocain injected into the fascial space m. Iliopsoas, which is attached to a small trochanter hip). Question about the possibility of narcotic analgesics should be solved individually. If the patient revealed signs of respiratory failure, the preparations of opium should not be entered because they depress the respiratory center. After intrapelvic anesthesia reduced shock genicity manifestations. Within an hour after its implementation disappearing phenomenon false acute abdomen.

This eliminates the chance of damage to abdominal viscera. After removing the patient from a state of shock proceed to further treatment: reduction of fragments, restoring the integrity and shape of the bones of the pelvic ring, the normalization function. When choosing a method of treatment is very important classification V.F Trubnikova, S.I Kovalev, G.P Istomin (1969).

To reduce or stop bleeding from damaged pelvis some trauma recommend intraosseous administered in spina iliaca anterior superior to the damaged side of the gelatin solution or gelatin in an amount of 400.0 per mechanical closure of small bleeding vessels.

After removing the patient from shock and blood loss compensation begins treatment by permanent skeletal traction for supracondylar femoral region on the side of injury in fractures of the 3, 4 and 5 groups, as in the diaphyseal fractures of the hip, but the weight – 2-3 kg more. Due to the use of large cargo foot of the bed raised. After reaching repositioning confirmed radiographically 6-8 Weeks skeletal traction replace cutaneous and keep it for another 2-4 weeks. In 2,5-3 months patients allowed to walk with crutches

without a load on the leg with the damaged side of the pelvis. Capacity for work is restored depending on the type of fracture and the profession through 06/04/10 months. Sometimes these patients established disability group.

Patients with pelvic injuries group "A" virtually in a special orthopedic treatment is not needed. In cases of separation proper muscle attachment sites (anterior iliac spine) can be fixing them.

Patients with isolated fractures of the iliac wing, front upper spine, one of the branches or the ischial pubic bone without much displacements laid on his back on the orthopedic bed with a shield. And the roller placed under the knees.

Legs give easy breeding position and flexion of the knee and hip joints. Previously in the fracture is administered 20-30 ml of a 1% solution of novocaine.

Prescribe bed rest for 3-4 weeks, massage muscles of the lower limbs, physiotherapy and exercise therapy. After seam fragments of functional disorders are not observed. Allowed to go in 4-5 weeks. Capacity for work is restored within 5-7 weeks.

Fracture of the sacrum and coccyx are also accompanied by pain, so patients need local anesthesia. Prescribe functional massage and physiotherapy treatment.

At the turn of the coccyx with the displacement of the distal fragment anteriorly or posteriorly produce local anesthesia (administered 30-40 ml of 1% solution of novocaine) and fragments reduce a finger inserted into the rectum. From outside too, click on the proximal part of the coccyx fingers. If the displacement of the distal coccyx toward the rectum-stage reduction failed and continue to disturb the patient severe pain and violation of the act of defecation, then try to not stand to not worth it to avoid tearing of the rectum. In such cases it is advisable to perform a comparison of the open fragments using single-toothed hook elevators. Capacity for work while recovering in 5-7 weeks.

In the case of pelvic injuries "B" group must either appoint someone bed rest for a time sufficient to form the primary calluses, or in order to minimize movements in the sacroiliac joints and the site of injury of the pelvic ring to hold orthotics in damage to the pelvic ring and a special orthosis allow dosage load on the lower limbs soon after the injury time.

The first stage of treatment of patients with pelvic injuries group "B" should be to eliminate displacements in width, which is achieved by applying a

force on the iliac wing in the direction of the outside inwards and hold the fragments in position to reposition their seam.

This goal can be achieved using different methods: manual reposition the last plaster cast fixation, patient laying in hammock or belt according to

Hilferding overlay pelvic orthosis, skeletal traction for iliac wings, application of external fixation (Ilizarov Hoffmann) using open subsequent reduction and osteosynthesis.

If the damage or the bottom edge of the acetabulum without displacements shown adhesive traction with load of 2-4 kg or cuff traction bus Boehler, early physical therapy and massage. 1,5-2 months hip function is restored. Harder to achieve good functional results in fractures of the acetabulum edge, accompanied by dislocation of the head of the main bone.

In this cross-sectional recommend reduction of hip dislocation under general anesthesia with fixing limb medium physiological position using skeletal traction over the condyles of the femur weight for skeletal traction weighing 10-11 kg. To make the average physiological position it is placed on the limb orthopedic pillow. Shin applied adhesive traction, and on the foot cuff with load weighing 1.5-2 kg per rod.

However, cross-sectional fracture-elimination in the hip is not always successful, as the forced reduction eliminates the possibility of the gradual unfolding of a torn joint capsule and gentle repositioning shifted fragments edge of the acetabulum. As a result, the joint cavity may impair the capsule, and fragments of the edge of the acetabulum. In such cases, the head relegate skeletal traction to the level of the acetabulum and reduce a using traction loads weighing from 8-10 to 12-14 kg. Be sure to apply lateral traction in the upper thigh. For this purpose, impose a side reduce a loop in the groin with a thrust directed outwards and a weight of 3-5 kg. Tension on bursal ligament complex with gradual downgrade femoral head facilitates comparison of the fragments of the acetabulum.

Treatment, provides the most complete functional recovery of the pelvic ring in patients with pelvic injuries group "G" is the operative method – when under direct vision has the ability to accurately and reliably compare the seal fragments of the pelvic bones. Replacing diastasis between the pubic bone allografts or auto that is recommended by some authors for chronic ruptures of the pubic symphysis, incompetent, because while maintaining or even

compounded incongruence of the articular surfaces of the sacroiliac joints, which leads to pain, deforming arthrosis of the joints and mobility impairments and dynamic function of the pelvic ring.

With regard to the treatment of patients with damage to the acetabulum with displacement of the femoral head, here conservative methods of treatment in many cases can not give good or even satisfactory results. At the bottom of comminuted fractures of the acetabulum and central dislocation of the femoral head is removed from the head of the pelvic cavity via a terminal-Korzha Altukhova or needles passing through the greater trochanter with load of 3-4 kg, and terminal or spokes imposed on the femoral condyle or tuberosity tibia. The first is always preferable, since skeletal traction is applied, avoiding knee directly to the damaged segment. Load weight on skeletal traction is approximately equal to 10-11 kg. For a complete relaxation of muscles and the best effect on lower limb orthopedic pillows placed in flexion of the hip and knee joints. After reduction of the femoral head loads gradually reduced and by the end of the month on skeletal traction, superimposed over the femoral condyles, left a weight of 6-7 kg, and terminal-Korzha Altukhova – 2 kg.

Early active movements contribute to the creation of congruence of the articular surfaces after 1.5 months. skeletal traction replace glue and after 2-2.5 months. and removed. after 2.5-3 months. permitted walking on crutches, and after 5 months. – Full load.

For early surgical treatment (bone fixation pin or metal) resorted to if one of the fragments of the acetabulum turned around its axis and is not entitled to, and if after a permanent skeletal traction or simultaneous removal of the hip fracture-one of the fragments of the acetabulum infringe between the femoral head and the acetabulum. Its extract and record one of the methods mentioned. Too small fragments advisable to remove.

When you double-vertical fractures and fracture-of the pelvis fragments correlate with displacement by permanent skeletal traction.

Usually needle or wire plug on the femoral condyles. If this is not possible due to the presence of wounds, abrasions, inflammation, stretching is carried out at the tibial tuberosity. Depending on the morphology of the fracture, the degree of displacement of fragments, the patient's age and development of muscle mass loads can be from 5-7 to 12 kg, and the adhesive traction shin – 2 kg. On the opposite femur and tibia stretching adhesive applied

with a load of 2 kg mass to be held in the correct position undisplaced half of the pelvis. Foot of the bed should be raised to provide traction against the weight of the extremities. In addition, through the inguinal region healthy side carried a soft loop that is attached to the stationary head end of the bed.

In bilateral double vertical fractures of the pelvis are used skeletal traction over condyles both hips. Weight of Goods skeletal rods on both sides reaches 8-12 kg. 4-5 days after acute displacement along the length of the patient is suspended in a hammock in the pelvis, which contributes more than close contact surfaces of the fracture and a good attachment.

Do not put any victim in a hammock in the first days after the injury, that is relegated to displaced half of the pelvis to the normal level. Otherwise degrade damaged half will be very difficult, as there displaced fracture plane pelvic bones are pressed against each other hammock and skeletal traction on the axis of the limb will be ineffective.

To eliminate displacement fragments pelvis width used orthopedic pelvic corset (brace) Design Pipe-covariance Kovalev. From the first days imposition skeletal traction prescribed physical therapy for foot and quadriceps.

After matching fragments (after 2 weeks of the injury) a lot of load on the skeletal traction is gradually reduced and adjusted to the end of the first month up to 6-7 kg. After 1.5 months of skeletal traction replace the adhesive, and then (2-2.5 months) allow walking on crutches, prescribe massage.

Recommend physiotherapy exercises from the first days of treatment. The patient is allowed to walk alone after 4-5 months. Individuals engaged in physical labor, working capacity is restored within 10-12 months, persons of brainwork – 6-7 months.

Patients with rupture of the symphysis, the sacroiliac joint are treated in a hammock to 6 weeks (fig. 28).

Surgical treatment is indicated in avulsion fractures, failure of conservative treatment of fractures of the pubis symphysis and acetabulum. In recent years, the indications for surgical treatment of fractures of the pelvis significantly enhanced.

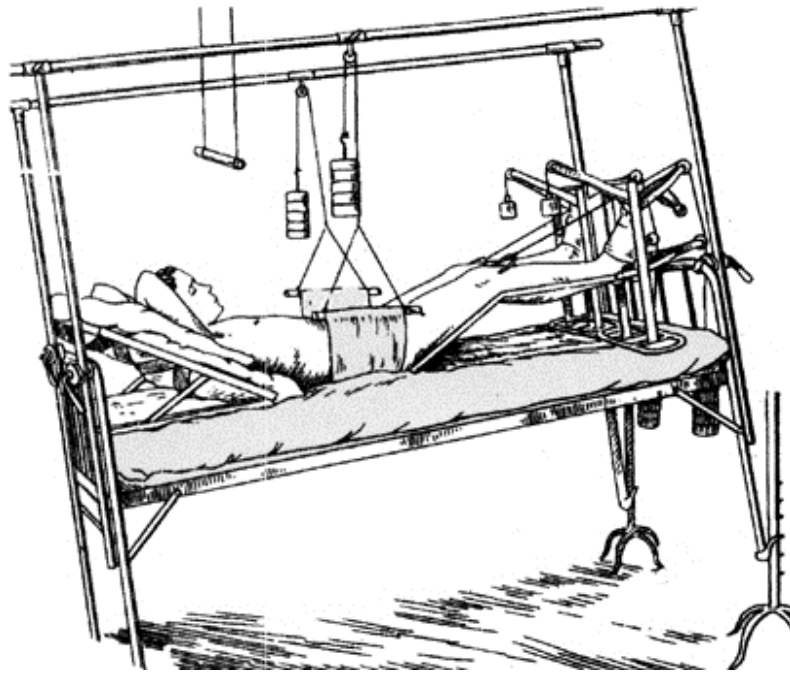


Fig. 28. Treatment of pelvic fracture in a hammock

A special section in the treatment of fractures of the pelvis is central dislocation of the hip. The main method of treatment of such fracture-conservative is using a double traction (fig. 29, 30):

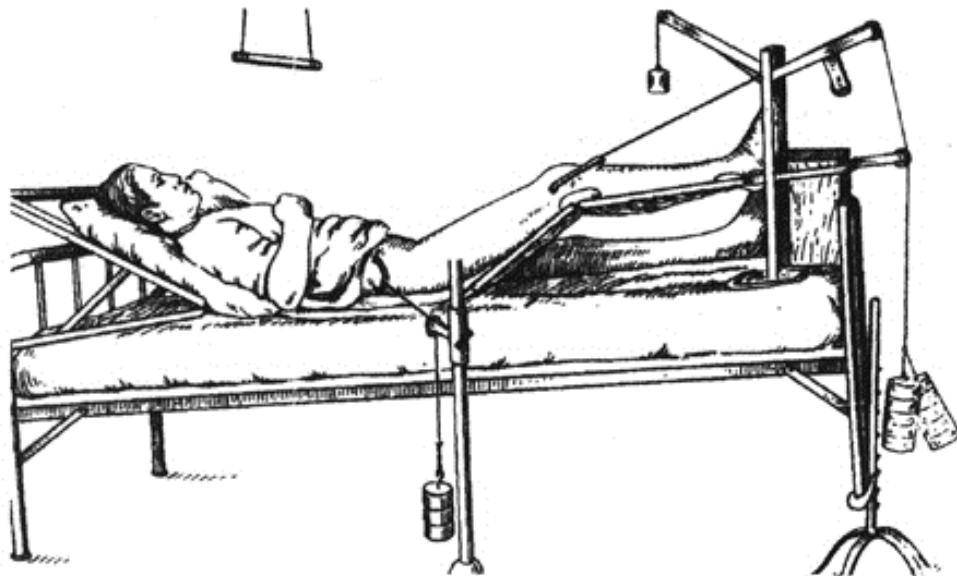


Fig. 29. Double extension with central hip dislocation

1. along the axis of the hip, as of its diatheses fracture;
2. along the axis of the femoral neck to retrieve the head of the pelvic cavity.

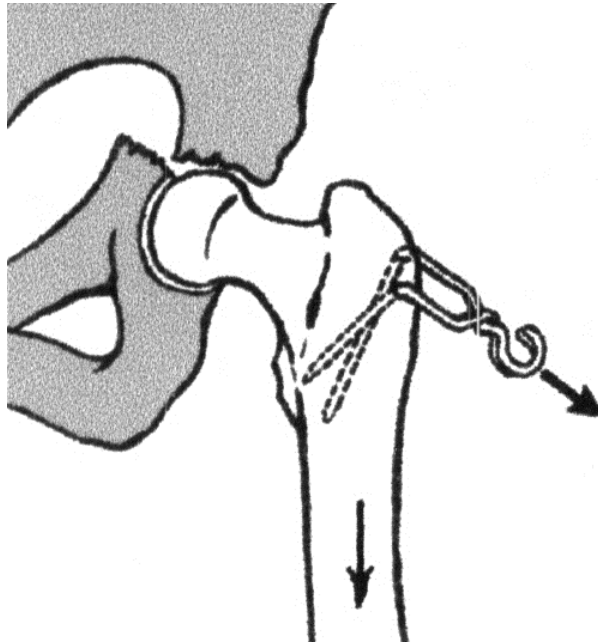


Fig. 30. Diagram double traction

Position of injured leg at the hip joint is attached, which it occupied at the time of injury. For example, if at the time of the injury the patient was in an upright position and the thigh at the hip was in position 0° , the leg with traction should be on the bed, holding the "0" - position of all the joints of the limb.

Conversely, if the injury occurred at the time of movement of the patient and the leg at the joint with flexion angle was $20-40^\circ$, the stretching should be this sick, placing his injured foot with Buhler splint. Upon expiration of the traction (at least 2 months) patients are allowed to walk with crutches without a load on the injured limb. Load allowed after 4-6 months.

Functionally, the rehabilitation treatment of fractures and fracture-pelvis begins with the first days after injury and ends dosage movements in free fixing joints with a gradual increase in the amplitude and duration of their performance when doing gymnastics. Displaying active isometric tension of the muscles of the trunk. After the treatment method used extensions gymnastics, massage, electricity and heat therapy, therapeutic qualities. Rational application of these techniques to speed recovery time and patient medical and vocational rehabilitation.

EVALUATION OF TREATMENT

In the complex treatment of patients with pelvic injuries important role played by the results of this treatment, especially in establishing working capacity of traumatologic physicians. VTEK

For an objective evaluation of treatment along with traditional clinical and radiological methods of examination of patients is necessary to use some biomechanical techniques: podography, research weight load factor for the foothold. If we take the normal rhythm performance factor of 1.0, 1.0, and the foothold the coefficient of the weight load factor of 50%, the decline in these indicators, respectively, to 0.05, 0.8, 40% should be regarded as sub compensation and reduce them to 0, 7, 0.7, and 30% as decomposition.

And be aware that the indicator coefficient of rhythm to normal at an earlier date than the performance coefficient of the reference and the weight load.

Application of the above techniques along with biomechanical clinical radiological observational methods will allow rationally employ patients avoid mistakes in the examination of ability to work in patients with pelvic injuries. Treatment with both rod and special devices has a powerful effect antishock, reduces the duration of bed rest and early intensify patient.

Emergency stabilization of the pelvic ring external fixator for acute injury is an effective therapeutic measure general and local values, gives a pronounced anti-shock and hemostatic effect, a positive effect on the state of the whole organism. Clinical effect more pronounced it than heavier injury of pelvic than before (with the injury) imposed apparatus, stabilizing the pelvic ring. Contraindications to the use of operational emergency stabilization pelvic external fixation device is not detected.

Perosseous fixation of pelvic ring can be used as an independent method or in combination with surgical correction of traumatic lesions as extra-and intra pelvic localization.

The combination of pelvic external fixation devices with plastic injured structures of the pelvic ring allows for adequate recovery of traumatic lesions and full recovery of function of the pelvis in almost all kinds of damage in patients with acute trauma, and in the case of chronic injuries and post-traumatic deformities.

THERAPEUTIC PHYSICAL TRAINING AT PELVIC FRACTURES

Therapeutic physical training used in the first days after injury. The length of individual periods therapeutic physical training (days) depending on the nature of fractures of the pelvis. Necessary to maintain the overall tone, prevention of possible complications from the respiratory system, cardiovascular system and gastrointestinal tract, improved metabolism.

Partial tasks of therapeutic physical training: improved blood circulation in the area of damage in order to enhance the processes of regeneration, prevention reduce muscle strength and endurance of the pelvic girdle and limbs, rigidity of joints.

Physical rehabilitation was developed under the guidance of prof S.N. Popova team of faculty "exercise therapy, massage and rehabilitation" of the Russian State University of Physical Culture – leading specialists in the field of physical rehabilitation. According to their method restorative therapeutic course of treatment consists of three periods.

The first period of therapeutic physical training last until the patient can raise straight legs up, roll up and turn over on his stomach.

Tasks of therapeutic physical training in the first period:

- improve overall tonus of the organism;
- promote relaxation of the pelvic belt for proper consolidation of bone fragments and relieve pain;
- eliminate bleeding and swelling;
- restore the muscle tone of the lower limbs (the patient can not raise a straight leg up above the roller);
- normalize the bowels, excretory organs and blood circulation, improve metabolism;
- strengthen the muscles of the shoulder girdle, back;
- Ensure prevention of joint contractures and muscle atrophy.

An instructor of therapeutic physical training (TPT) doing patient physiotherapy every day. After learning of the patient is recommended to perform special exercises their own 6-8 times during one session, 3-4 times a day.

A set of special exercises for pelvic fractures in the first period therapeutic physical training (starting position – lying on your back, legs straight on the roller):

1. Bend the toes, straighten (8-10 times).
2. Alternately, lifting the heel off the bed, raise leg up to the height of the roller. Then, the same, but both shins raising in the same time (6-8 times).
3. All kinds of movement in the ankle joints: bend over the foot, from himself, tilt it to the right (6-8 times).
4. Tighten the left foot to the stomach, bend it at the knee and hip joints, the same right foot (8-10 times for each foot).
5. Pull the left foot to the side, then return to starting position. The same – right foot (8-10 times for each foot). Exercise counter with rupture of the symphysis pubis.
6. Raise your right leg up, then left, then both at the same time (8-10 times).

Tasks therapeutic physical training of the second period:

- improve overall body tone;
- restore the muscle tone of the lower limbs;
- strengthen the back muscles and pelvic area;
- normalize the bowels, excretory organs and blood circulation, improve the body metabolism.

Therapeutic physical training this period strengthens the muscles of the lower limbs and pelvic girdle, thereby creating a sustainable position in the pelvic ring. The period begins with rotation on his stomach and lasts until getting up and walking. crossing from lying position on his back in position of lying on his stomach is as follows: lying on the back patient should move on the edge of the bed on the injured side; leg, which is closer to the edge of the bed, put on the other foot and quickly turn on the stomach.

Set of special exercises in fractures of the pelvis bone in the second period of therapeutic physical training: Starting position – lying on his stomach on a bed, the upper end of which is at the level of the iliac crests and the umbilical line, arms along your body, pushing feet on it.

1. Bend the knees, then straighten maximally (6-8 times).
2. Raise the right foot straight up, pull down, then the left (8-10).

3. Bend the right foot at the knee and straighten. And the same left foot (6-8 times each leg).
4. Legs straight, simultaneously raise your head, chest upwards, arms pull back, return to its original position (6-8 times).
5. Legs straight, toes pointed at the same time raise and down your legs (6-8 times).
6. Hands pressed to the body, simultaneously raise your legs, trunk, head, arms, pull back (6-8 times).
7. Leaning on forearm, arch the back, and then bend (8-10 times).
8. Stuck out and pull back inside stomach (8-10 times).
9. Straighten and raise your right leg up, return to the initial position, the same left foot (8-10 times).
10. Try to touch your Left knee to the left elbow, then straighten your left leg and lift up the back and return to its original position, the same right foot (6-8 times each leg).
11. Sit on your heels and return to the initial position (8-10).
12. Pull down the back, brought elbows and knees closer together, then return to the initial position (6-8 times).
13. Try to touch your Right knee to your right elbow, then left knee to your left elbow (6-8 times).
14. Sit on your heels, rise up your hands and return back to the initial position (8-10).
15. Move your left hand to touch your right knee and then return to the initial position, and the same left foot to the right hand (6-8 times each leg).
16. Pushing your knees and toes together and pull them with your hands (butterfly), pull it to right and then to the left (6-8 times on each side).
17. Raise his right hand to take it to the side and return to original position, and the same with your left hand (8-10).
18. "Step over" straight arms forward and back to the knee, straightening and turn rounding his back (8-10 times).
19. Raising his hands, head and trunk, to kneel, then return to the initial position (6-8 times).

Moving from a laying position to a standing position is allowed 4-8 weeks after injury, that the patient lying on his back can freely perform the following exercises: raise straight legs up and from knee its in hanging position

and pull it up to the abdomen, back extend it in hanging position, push them to each sides (this movement is not doing if there is fracture of pubis symphysis), put them together and then put them on the bed.

Rise from the bed from lying position is such: leaning on hands, pull both feet on the floor on your toes and move your hands to the edge of the bed, while down on the whole foot, and when the foot will be completely flat on the floor, straighten and move the hands on belt.

Tasks therapeutic physical training of the 3rd period:

- create conditions for the transition to the standing position;
- restore normal gait.

When the patient can lift his feet high from the floor (hands on belt), he begins slowly move the leg forward (first few days), gradually moving to walking at a normal pace.

For development of walking recommended exercises in a standing position: walking on the toes, on the heels, with the movement of hands in different directions, leant, sideways, backwards, cross steps.

Swinging motion of the legs in all possible directions; circular motion of the hip joints, flexion to the abdomen; gymnastic exercises on the wall (climbing, squats, push-ups).

Sit is allowed on condition that if after two hours of staying on the legs the patient does not feel heaviness and pain in the area of the fracture. In the sitting position perform exercises for the lower extremities, especially in the movement of hip joint in all directions. When you break the pubis symphysis abduction the feet away and squat with spread legs is contraindicated for 6-8 months after the injury.

Physiotherapy exercises continue to strengthen the muscles of the lower extremities, pelvic girdle, body, train the vestibular apparatus. Such exercises prepare the patient for getting up and walking, patients are taught correct gait, prepared to household loads and self-study at home.

In the third period for any fractures of the pelvis useful therapeutic exercises in the pool. Especially effective walking (regular, cross steps, leant) primaries and circular motion in the hip joints, feet to side diversion, bending them to the stomach, squats, alternating lifting straight feet in the water, stop turning the toes inside and out.

In addition to physiotherapy sessions at the final stage of the patient are recommended walks with a gradual increase in residence time on the legs. At discharge from the hospital the patient should continue to self-employment medical gymnastics. Complexes of physiotherapy (time period), patients with pelvic fractures learn at different times depending on the nature and severity of the fracture.

In complicated pelvis fractures with displacement of fragments patient impose traction. If a one-sided defeat – given a large variety of exercises for the legs on the opposite side injury: finger flexion, extension of the foot, ankle rotation, extension and flexion of the legs at the knee joint by block, static muscle tension across the legs and quadriceps by injury. If traction is imposed at the fracture of the acetabulum from the classes excluded special exercises in static muscle tension, and burn through the hip joint. This is done in order to save diastasis between the femoral head and the acetabulum.

At rupture the pubis symphysis, the patient should lie on a hard bed, put under his knees enclose roller or feet two Zito roller. In both cases, the feet are placed in parallel. At high diastase used Hilferding belt. For employment-based physiotherapy accepted above-described method with some modifications.

Added load: lying on his side, starting from the second period. Given a lot of exercises that help to strengthen the gluteal muscles. Immediately Breeding the feet to side is limited. Rehabilitation of patients with fractures of the pelvis in addition to therapeutic exercises, water exercises also consists of massage, physiotherapy and psychological adjustment if necessary.

Specially designed massage techniques does not exist despite this massage begins in conjunction with physiotherapy and conducted at two sites:

- segmental-reflex massage paravertebral zones held by the lumbar and sacral segments;
- massage of the muscles surrounding pelvic area – stroking, kneading and shaking, rubbing the joint elements bony protrusions.

PHYSIOTHERAPY REHABILITATION FACILITIES IN FRACTURES OF OF THE PELVIS

Physiotherapy effects in fractures is performed by the standard technique using mainly electricity, light and heat therapy. After immobilization to reduce pain in a patient with a slightly Erythemic ultraviolet irradiation above the fracture site, UHF weak thermal intensity through gypsum for 10-15 minutes. daily (10-12 procedures) at the fracture inductothermy 15-20 min. daily up to 12 treatments solljuks lamp irradiation or by electro-light bath (33-36° C). With 2-3rd week ultrasound prescribed by the fracture of 10 min. daily (12 treatments). electrophoresis provides Good action with calcium on the fracture in alternation with phosphorus 20-30 min. daily (15 treatments). The course of treatment – 2-3 months.

In addition, we recommend that in the complex treatment: magnetic therapy, assigned to 3-5 days after the injury of 20 daily (10-12 procedures). Treatment can be repeated after 2 months.

A month after the injury apply paraffin, (48-50° C) and mud (40-42 ° C) applications. After removing a plaster bandage performed electrostimulation functionally weakened muscles.

When joint stiffness as a result of prolonged immobilization before course of physical therapy prescribed DDT (Bernard currents) on the fracture by applying a modulated current – short periods of 4 min. (6-8 procedures). After 5-6 weeks in the medical complex include public baths: bromine, sodium chloride, sage.

After discharge from the hospital treatment should be continued on an outpatient or sanatorium conditions, systematically engaged in specialized physical therapy and restoring the adaptation to stress, identical to the principal activity of the patient.

SELF LEARNING QUESTIONS

1. Fractures of the pelvis occur when there is all of these mechanisms, except for?

- a) squeezing the pelvic bones;
- b) dilution of the pelvic bones;
- c) direct blow to the the pelvis;
- d) twisting pelvis;
- d) separated mechanism.

2. In avulsion fractures of the pelvic which bones are belonging?

- a) fracture of the pubic bone;
- b) fracture of ischium;
- c) fracture of the acetabulum;
- g) fracture of the lower crest anonymous bones;
- d) fracture of the sacrum.

3. A fractures which accompanied by rupture of the pelvic ring is include:

- a) fracture of the iliac wing;
- b) fracture of the pubic bone;
- c) fracture of the acetabulum lips;
- g) fracture of the pubic and ischial bones on the one hand;
- d) fracture of the pubic and ischial bones from different sides.

4. Not accompanied by rupture of the pelvic ring:

- a) fracture of the bottom of the acetabulum;
- b) rupture of the sacroiliac joint with one hand;
- c) the gap of the symphysis pubis and fracture of the ilium;
- g) fracture of the pubic and ischial bones on the one hand;
- d) rupture of the symphysis pubis and vertical fracture of the sacrum.

5. What is no refer in injury of the acetabulum ?

- a) fracture of the bottom of the acetabulum;
- b) a fracture of the upper lip of the acetabulum;
- c) fracture of the base of pubic bone;

- g) central subluxation of the hip;
- d) central dislocation of the femoral head.

6. What does include in combined fractures?

- a) an open fracture of the anterior part of the pelvis;
- b) fracture of the acetabulum and thermal burn crotch and buttocks;
- c) fracture of the pubic and ischial bones with rupture of the bladder;
- g) fracture of the pubic bone with rupture of the urethra;
- d) fracture of the ilium, and the gap of the small intestine.

7. What is Not a sign of pelvic fractures?

- a) a symptom of "adhering heel";
- b) symptom Volkovych – overlay "frogs";
- c) symptom Trendelenburg – lowering the inferior gluteal fold on the healthy side of the pelvis when standing on the affected limb;
- g) Larrey symptom – pain in the breeding wings of the pelvis;
- d) a symptom of Verneuil – pain during compression of the wings of the pelvis.

8. In the treatment of patients with severe pelvic fractures does not apply to?

- a) treatment and prevention of traumatic shock;
- b) replenishment of lost blood in trauma;
- c) early ambulation and revitalization of the victim – "functional cure", "preposition displaced fragments of the pelvis";
- d) prevention and treatment of complications arising.

9. Most often in fractures of the pelvis injured?

- a) the prostate in men and ovaries in women;
- b) the urethra, prostatic part;
- c) the distal portion of the urethra;
- g) the bladder;
- d) the vagina in women and penis in men.

10. What are not the main indicating symptoms for damage of the pelvic organs from the following?

- a) delay independent urination;
- b) peripheral blood from the urethral opening of the channel;
- c) the presence of blood in the urine;
- d) a symptom of deficiency in filling the bubble fluid bladder General and its removal;
- d) the availability of additional shade in contrast study of the bladder and urethra.

11. To boundary fractures include:

- a) fractures of the iliac wing,
- b) fracture of the ischium on the one hand;
- c) fracture of the coccyx

12. To fractures of the pelvis without violating its continuity include:

- a) fracture of the ischial tuberosity;
- b) a fracture of the pelvis peredneeverhney spine;
- c) turning on the one pubic side, on the other hand – the ischium.

13. To fractures of the pelvis without violating its continuity include:

- a) fracture Vualeme;
- b) a bilateral fracture of the pubic bone;
- c) fracture of the pubic and ischial bones with one hand.

14. Malgenya fracture – is:

15. Fracture of the Netherl – is:

16. Specify how the length of the lower limb in fractures of the pelvis with simultaneous violation of the anterior and posterior of semirings:

- a) increases;
- b) decreases;
- c) does not change.

17. Specify the methods of reduction and immobilization of isolated during ruptures of the symphysis:

- a) skeletal traction in the lower limb;
- b) fixation;
- c) in a hammock.

18. Identify variety of injury mechanism, forcing suspect that make possible fracture of acetabular?

- a) fall on the buttocks;
- b) compression of the of the pelvis in the frontal plane;
- c) knee strikes on dashboard of the car in its sudden braking.

19. Specify in which cases it is necessary to apply skeletal traction for lower limb fractures in of the pelvis:

- a) acetabular fractures;
- b) fractures of the "butterfly";
- c) the iliac wing fractures.

20. Which event, the most suitable for shock in patients with pelvic fractures:

- a) injection of morphine;
- b) careful immobilization;
- c) The blockade by Selivanov-Shkolnikov.

21. Highlight features significantly indicate the presence of intraabdominal rupture of the bladder:

- a) hematuria;
- b) blunting in sloping areas of the abdomen;
- c) contour deformation bladder contrast X-ray diffraction pattern.

22. Symptom, indicating the possibility of rupture of the bladder is?

- a) swelling in the perineum;
- b) separating the small amounts of blood from the urethra;
- c) obstruction of the urethra when trying cauterization

23. Specify fractures of the pelvis, in which the chance of rupture of the urethra.

- a) fractures of the ischium;
- b) fractures of the "butterfly";
- c) acetabular fractures.

24. Note the injuries that patients with pelvic fractures can be accompanied by symptoms of peritonitis:

- a) intraperitoneal rupture of the bladder;
- b) non abdominal rupture of the bladder;
- c) retroperitoneal bleeding.

TESTS AND ASSIGNMENTS
TO VERIFY SOURCE OF KNOWLEDGE

Task number 1

With a sharp muscle tension fractures occur:

- A. pubic bone.
- B. ischium.
- B. Upper anterior iliac spine.

Task number 2

A fall from a height on the legs may be broken:

- A. Rump.
- B. pubic bone.
- B. Bones trochanteric depression.

Task number 3

Symptom "heel stuck" occurs when fracture:

- A. ischium.
- B. pubic bone.
- V. ilium.

Task number 4

Symptom of "reverse" is characteristic of detachment:

- A. pubic tubercle;
- B. Sciatic hump;
- V. Osti iliac wing.

Task number 5

What is a symptom Gabay?

- A. Deformation of the pelvis.
- B. Violation of the functions of the pelvis.
- B. Support "healthy" foot while moving the body of the patient.

Task number 6

Larrey symptom – pain at the fracture site at:

- A. Breeding iliac wing.
- B. clenching iliac wing.
- V. palpation iliac wing.

Task number 7

Verney symptom – pain at the fracture site at:

- A. Breeding iliac wing.
- B. clenching iliac wing.
- V. palpation iliac wing.

Task number 8

With intraperitoneal bladder rupture urge to urinate:

- A. Frequent.
- B. Conventional.
- B. Missing.

Task number 9

When you break the urethra urge to urinate:

- A. Frequent.
- B. General.
- V. None.

Task number 10

Pelvic fracture type Malgani – is:

- A. Fracture of the pubic and ischial bones with one hand.
- B. Fracture of the iliac wing.
- B. Bilateral fracture of the pubic and ischial bones.
- D. fracture of the pelvic bones with impaired integrity rear semi-ring.
- D. fracture of the pelvic bones and in violation of the integrity of the anterior and posterior half rings.

Task number 11

Pelvic fractures occur when all these mechanisms, except for:

- A. Compression of the pelvic bones.
- B. Breeding pelvis.

- B. Direct blow to the pelvis.
- G. Curl pelvis.
- D. tear-off mechanism.

Task number 12

By avulsion fractures of the pelvic bones are:

- A. Fracture of the pubic bone.
- B. Fracture of the ischium.
- B. Fracture of trochanteric depression.
- G. Fracture of the lower ridge innominate bone.
- D. fracture of the sacrum.

Task number 13

For fractures of the pelvic ring with a gap include:

- A. Fracture of the iliac wing.
- B. Fracture of the pubic bone.
- B. Fracture lips spit depression.
- G. Fracture of pubic and ischial bones with one hand.
- D. Fracture of the pubic and ischial bones from different sides.

Task number 14

Not accompanied by rupture of the pelvic ring:

- A. bottom trochanteric fracture depression.
- B. Rupture of the sacroiliac joint with one hand.
- B. Break pubic connection and fracture of the ilium.
- G. Fracture of pubic and ischial bones with one hand.
- D. Break pubic connection and vertical fracture of the sacrum.

Task number 15

Does not apply to injury trochanteric depression:

- A. bottom trochanteric fracture depression.
- B. Fracture of the upper lip trochanteric depression.
- B. Fracture of the base of the pubic bone.
- G. Central subluxation of the femoral head.
- D. Central dislocation of the femoral head.

Task number 16

To combined fractures include:

- A. Open fracture of the anterior pelvis.
- B. Fracture of trochanteric depression and thermal burn crotch and buttocks.
- B. Fracture of the pubic and ischial bones with rupture of the bladder.
- G. pubic bone fracture with rupture of the urethra.
- D. fracture of the ilium and the gap of the small intestine.

Task number 17

For vertical fractures of the pelvis:

- A. The absolute shortening of the limbs.
- B. The relative shortening of the limbs.
- B. Elongation limbs.
- G. Shortening that appears.
- D. Extension, which seems.

Task number 18

Symphysis Rupture is characterized by:

- A. Symptomatic Volkovich.
- B. Symptomatic "stuck" heel.
- B. Forced position (hips flexed and rotated on the inside).
- G. Reducing the distance between the trochanter and symphysis.
- D. Soreness in the projection of the obturator canal.

Task number 19

Radiographic signs of pelvic fractures:

- A. Asymmetry of the pelvic ring.
- B. The line of fracture.
- B. Violation of the integrity of the cortical bone.
- G. Diastasis symphysis 1 cm and more.
- D. The asymmetry of the obturator foramen.

Task number 20

Indications for operative treatment methods:

- A long-standing gap of the symphysis pubis.
- B. Fracture Dyuverneya.
- B. Fracture bottom trochanteric depression.
- G. Coccyx bone fracture.
- D. Fracture of the posterior edge of the trochanteric depression.

Task number 21

For treatment of fractures of the pelvis are used:

- A. Skeletal traction.
- B. cast.
- V. Intramedullary osteosynthesis.
- G. extrafocal osteosynthesis.
- D. Regulation Volkovych.

Task number 22

To the bottom of the acetabulum fracture is characterized by:

- A. Asymmetry of the gluteal folds.
- B. The relative shortening of the limb.
- V. Stiff thigh muscles that lead.
- G. Inability of hip.
- D. Hematoma below umbilical folds.

Task number 23

Clinical symptoms of pelvic ring fracture:

- A. Symptom – Volkovych Lorreya.
- B. Shortening and violation of rotation of the thigh.
- B. Symptom "stuck heel".
- G. The asymmetry of the pelvic ring.
- D. Symptom cough shock.

Task number 24

Fracture type Malgenya use:

- A. Status Volkovych.
- B. Imposition koksitnoy dressing.
- B. Fixation ekstenzionny method.

- G. Nailing.
- D. derotation boot.

Task number 25

Clinical criteria accretion boundary fracture of the pelvis:

- A. Lack of pain.
- B. Painless axial load.
- V. Otsutstvie symptom "stuck heel".
- G. Absorption of subcutaneous hematoma.
- D. Lack of edema at the fracture site.

Task number 26

To isolated pelvic fractures include:

- A. Fracture of the horizontal branch of pubic bone.
- B. Vertical fracture of the sacrum.
- B. Fracture of the upper iliac spine.
- G. Wheels sciatic hump.
- D. fracture of the ascending branch of the ischium.

Task number 27

Symptoms of pelvic fracture type Malgenya is:

- A. Asymmetry of the pelvis.
- B. Symptom compression and stretching wings.
- B. Symptom "stuck heel".
- G. Inability of independent movement.
- D. Regulation Volkovich.

Task number 28

For treatment of fractures of the pelvis without violating the integrity of pelvic-ring is used:

- A. Situation in the hammock.
- B. Regulation Volkovich.
- B. Seam wire.
- G. Imposing cast.
- D. Skeletal traction.

Task number 29

For the treatment of trochanteric fractures of the bottom of the depression with by the Central dislocation of the femoral head:

- A. Single-step reduction with casting of.
- B. Skeletal traction along the axis of the femoral neck and the axis of the limb.
- B. Status of the hammock.
- G. Open reduction.
- D. Regulation Volkovych.

Task number 30

For the treatment of pelvic fracture in violation of the front and rear half-rings are used:

- A. Status Volkovych.
- B. Skeletal traction loads.
- B. Status of the hammock.
- G. Imposing cast.
- D. Emergency operation – fixation of bone fragments.

Task number 31

Not a sign of pelvic fractures:

- A. Symptom "stuck heel".
- B. Symptom Volkovych – the "frog".
- B. Symptom Trendelenburg – lowering the inferior gluteal fold on the healthy side of the pelvis when standing on the patient finiteness.
- G. Symptom Larrey – pain at a dilution of the wings of the pelvis.
- D. Symptom Verneuil – pain while squeezing the wings of the pelvis.

Task number 32

In the treatment of pelvic bones, who have suffered with severe fractures do not apply:

- A. Treatment and prevention of traumatic shock.
- B. Filling blood lost during injury.
- B. Early ambulation and revitalization of the victim – "functional cure".
- G. Reposition displaced bone fragments of the pelvis.
- D. Prevention and treatment of complications arising.

Task number 33

Most often in fractures of the pelvis are damaged:

- A. The prostate in men and ovaries in women.
- B. The urethra, back part.
- B. The distal portion of the urethra.
- G. bladder.
- D. The vagina in women and penis in men.

Task number 34

Of the following symptoms indicating damage pelvic organs, are major:

- A. Latency self urination.
- B. Blood in the peripheral opening of the urethra.
- B. The presence of blood in the urine.
- G. Symptom deficit in filling liquid urinary pu Zyryan and its removal.
- D. The additional shade in contrast study of the bladder and urethra.

Task number 35

Of these methods of surgical treatment of damaged deny the bladder and urethra are not applied:

- A. High intersection bladder.
- B. Inserting Surgical wounds of the bladder and urethra.
- B. Drainage of perivesical space and parauretral the art.
- G. Connection broken ends of the urethra at a constant cat-tere.
- D. The primary suture of the urethra.

ANSWER KEY INITIAL LEVEL

1-c	6-f	11-g	16-b	21-a,b,g,d	26-c,g	31-c
2-c	7-b	12-g	17-d	22-b,c,g	27-a,b, c,г	32-b
3-b	8-v	13-g	18-d	23-a,b,c,g	28-b	33-b
4-c	9-f	14-f	19-a-d	24-a,c	29-b,g	34-д
5-c	10-d	15-c	20-a,c,d	25-a,c	30-b,c	35-

SYSTEM OF SKILLS, TASKS TO VERIFY THE FINAL LEVEL

Task number 1

During a jump at the patient, 14 years old, there was a sharp pain in the left iliac wing. The patient can not tolerate foot forward and walk because of severe pain. However, taking a step back freely and without pain extends the leg back. OBJECTIVE: there swelling and bleeding in the anterior part of the left wing of the ilium, palpation in this area feels a sharp pain.

Your clinical diagnosis. Recommendations tactics and method of treatment. Terms resume performance.

Task number 2

The patient, 32 years old, downed a car, complains of pain in the right half of the pelvis. On examination found, no pelvic asymmetry expressed swelling in the right inguinal the field, bleeding. On palpation sharp pain. Clinical symptoms Gabay, Larrey "stuck heel" – positive. On radiographs of the pelvis fracture detected pubic and iliac bones without bias. Explain the mechanism of injury, make a treatment strategy, define the terms resume operability.

Task number 3

The patient, 42 years old, diagnosed with a vertical fracture of the right half of the pelvis of continuity of the pelvic ring in the front and rear sections with displacement of bone fragments (such Malgenya). Carried out intensive antishock therapy. Indications hemodynamics stabilized.

1. Basic principles of the subsequent treatment of orthopedic. Priority activities.

2. Terms of immobilization and resume operational state among.

Task number 4

The patient, 31 years old, fell from the balcony of the 4-th floor. The condition is very serious, adynamic, has pale skin, the pulse was 120 beats per 1 min., Blood pressure – 65/40 Hg. Art. belly moderately tense, painful on palpation in the lower parts of them. Palpation and axial load to the pelvis also

painful. On radiographs of the pelvis bone fracture conspicuous pubic and ischial bones on both sides of continuity with the anterior pelvic ring.

Specify a primary diagnosis. What additional tests be carried out to confirm the diagnosis? Therapeutic tactics.

Task number 5

The patient, 43 years old, was strangled between trolleys. When troubleshooting compression could not move independently. Complains of pain in the right groin and perineum, which intensified during movements of the limbs. Pelvic is not asymmetry. On palpation there is a moderate muscle strain in the right-hand groin and sharp pain. Upon compression of the pelvis on each side poorly marked increase in pain. Positive symptom "heel stuck" on the right.

Explain the primary diagnosis. Further examination for its refinement. Therapeutic tactics and timing of the resumption of performance.

Task number 6

The patient tried a running jump over the pit, but got scared and stopped abruptly. There was pain in his left groin. Could only move independently backwards. Examination revealed swelling and bleeding in the anterior part of the left ilium. On palpation – pain and crepitus. Establish a preliminary diagnosis.

Task number 7

Due to shock patient originated closed fracture of the upper iliac spine without displacement. Which method is the treatment appropriate to apply?

Task number 8

Patient hit by a car. Complains of pain in the groin, the inability to move. On examination: the configuration of the pelvis is not broken. Determined by swelling in the womb and left groin. Same place – tenderness, crepitus is absent. Positive symptoms Larrey, Gabay and "at-Lipschitz heel". Establish a preliminary diagnosis.

Task number 9

A patient diagnosed with a fracture of the horizontal branch of pubic bone. Which treatment is appropriate to apply?

Task number 10

Patient during a game of football made a sharp blow on the ball foot. Notes severe pain in the groin, and then moves each able-gatsya only backward. After examination diagnosed fracture iliac spine. What symptom is characterized by damage?

Task number 11

The examination of the patient, who was hit by a car, set the gap of the symphysis. Which treatment is appropriate to apply?

Task number 12

The patient was treated for 7 weeks with the help of a hammock over the gap of the symphysis. When you try to load dosage limb pain points in the womb. On control radiographs determined diastasis between lonnyimi bones to 2.5 cm What should be further tactics?

Task number 13

The patient complains of pain in the pelvis, lower limb dysfunction. Injury due to a fall on the buttocks with a height of 2-m on examination: the situation forced (symptom Volkovych), the asymmetry of the pelvis – anterior spine is located above the left. In the pubic area to the right – swelling, tenderness. Marked shortening of the right foot by 3 cm and positive symptom "stuck heel." Positive symptoms also Verneuil and Larrey. Establish a preliminary diagnosis.

Task number 14

In the casualty department of hospitalized patients about pelvic trauma. The examination is set vertical fracture Malgenya with displacement. Article II traumatic shock. Choose the method of anesthesia.

Task number 15

In the casualty department hospitalized patient, who was injured due to the accident of the pelvis. The examination is set broken bones ischial pubic and left without displacement. Choose the suitable treatment.

Task number 16

In the casualty department hospitalized patient, which due to a fall from a height originated vertical fractured pelvis type Malgenya left with displacement in length and 3 cm

What method of treatment is shown in this case?

ANSWER KEY FINAL LEVEL

Task number 1.

Closed fracture of the left upper front spine. Conservative treatment in the absence of displacement of fragments, with displacement of bone fragments operative (MOC) in the case of impossible reposition 6-8 weeks.

Task number 2.

Direct mechanism of injury. Treatment is conservative 8-10 weeks.

Task number 3.

Relegation system skeletal traction shifted half of the pelvis, followed by fixation of the pelvis hammock 4-6 weeks. Employability 2.5-3.5 months.

Task number 4.

Hemorrhagic shock 2 tbsp. Closed fracture of the pubic and ischial bones. Bladder injury. Produce cystography. Cupping shock, stabilization of fractures, fracture complications permission.

Task number 5.

Rupture of the symphysis. X-ray unit. Treatment and tactics depend on the specification of the diagnosis.

Task number 6.

Fracture of the anterior superior iliac spine.

Task number 7.

Limb position on the functional bus.

Task number 8.

Fracture of the horizontal branch of pubic bone.

Task number 9.

Position in bed for Volkovich.

Task number 10.

Symptom Lozinski.

Task number 11.

Locking in a hammock.

Task number 12.

Operative (osteosynthesis).

Task number 13.

Vertical fracture Malgenya right.

Task number 14.

Narcotic analgesics.

Task number 15.

Position in bed for Volkovich.

Task number 16.

Skeletal traction in the left leg.

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Study Guide

На английском языке

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