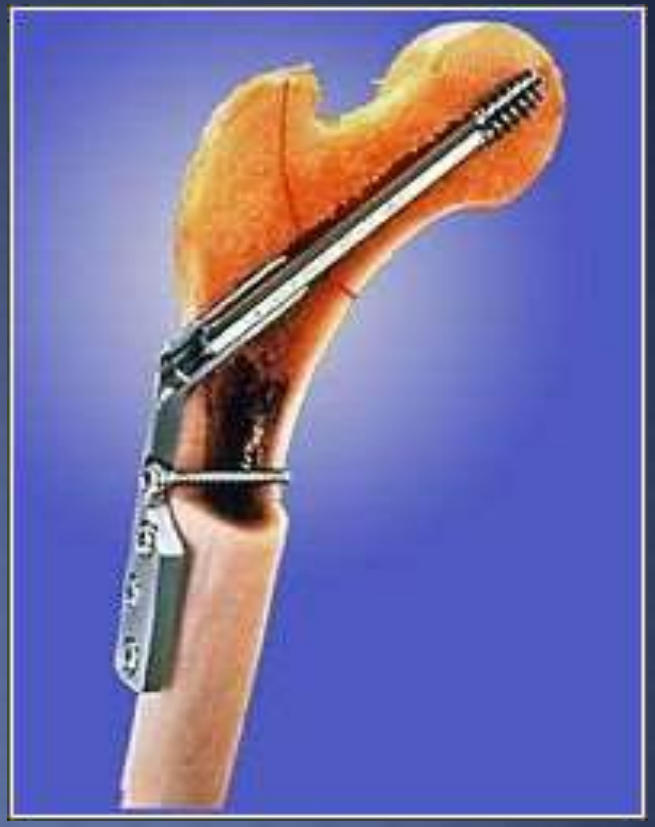
Poltava State Medical University (PSMU)
Department of Pediatric Surgery with Traumatology and Orthopedics

INTRODUCTION TO THE SPECIALTY. FEATURES OF EXAMINATION OF TRAUMATOLOGICAL AND ORTHOPEDIC PATIENTS. DAMAGE TO LIGAMENTS, TENDONS AND MUSCLES. TRAUMATIC DISLOCATIONS. MODERN PRINCIPLES OF FRACTURE TREATMENT.



Lecturer – PhD Iurii Piven.

Scientific – methodical study topic

DAMAGE MUSCULOSKELETAL HAS ALWAYS OCCUPIED A LEADING POSITION IN FREQUENCY AND DEVELOPMENT OF SEVERE CONSEQUENCES. IN BONE CONSTANTLY OCCUR TWO OPPOSING PROCESSES - AND NEW RESORPTION. THE RATIO OF THESE PROCESSES DEPENDS ON SEVERAL FACTORS, INCLUDING AGE. REBUILDING BONE IS SUBJECT TO EXISTING LOAD ON THE BONE.
REPARATIVE OR RESTORATIVE REGENERATION - IS THE RESTORATION OF CELLS AND TISSUES INSTEAD OF DEAD AS A RESULT OF VARIOUS PATHOLOGICAL PROCESSES. MECHANISMS REPARATIVE AND PHYSIOLOGICAL REGENERATION ARE ONE, REPARATIVE REGENERATION - IS ENHANCED PHYSIOLOGICAL REGENERATION. HOWEVER, DRIVEN BY PATHOLOGICAL PROCESSES, REPARATIVE REGENERATION HAS SOME QUALITATIVE MORPHOLOGICAL DIFFERENCES OF PHYSIOLOGY. SINCE BONE CHARACTERISTIC TYPE OF CELL REGENERATION, THE QUESTION OF SOURCES OF RENEWAL OF BONE IS VERY IMPORTANT.

Educational goals lectures

TO ACQUAINT STUDENTS WITH THE HISTORICAL ASPECTS OF THE FORMATION OF TRAUMA AS A SEPARATE MEDICAL SCIENCE.
¬ KNOW THE STAGES OF DOMESTIC ORTHOPEDIC AND TRAUMA SERVICES.
¬ TO LEARN THE DEFINITION OF INJURY AND ITS COMPONENTS.
¬ TO MASTER THE STRUCTURAL ORGANIZATION OF TRAUMA SERVICES.
¬ TO KNOW THE PRINCIPLES OF CARE AT DIFFERENT STAGES.
¬ TO ACQUAINT STUDENTS WITH THE PECULIARITIES OF BONE REGENERATION.
¬ KNOW THE CLASSIFICATION PHASE OF REPARATIVE PROCESSES IN PATHOLOGICAL PROCESSES OF BONE.
¬ KNOW THE CAUSES THAT RAISE REPARATIVE REGENERATION.
¬ TO MASTER THE MECHANISMS OF PHYSIOLOGICAL AND REPARATIVE REGENERATION OF BONE TISSUE.

Goal future personal development specialist

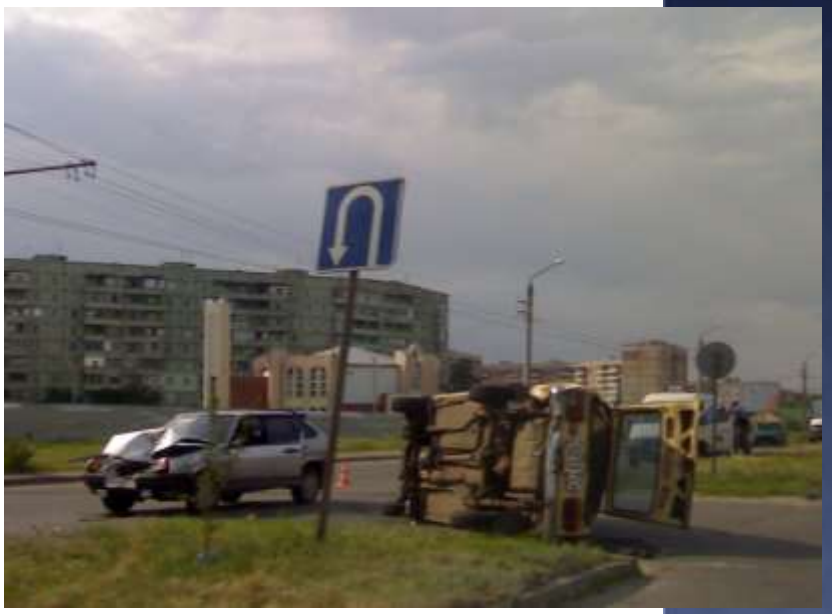
1. CONVINCE STUDENTS IN THE PRACTICAL SENSE OF THETOPIC.
2. DURING THE PRESENTATION OF LECTURES EMPHASIZE THE CONTRIBUTION OF DOMESTIC SCIENTISTS IN THE DEVELOPMENT OF SCIENCE.
3. DURING THE PRESENTATION OF LECTURES EMPHASIZE THE PRIORITY OF UKRAINIAN SCIENTISTS IN THE STUDY OF BONE REGENERATION.
4. CULTIVATE A SENSE OF PROFESSIONAL RESPONSIBILITY AND GENERAL ETHICAL AS FUTURE DOCTORS.
5. PROMOTE A HEALTHY LIFESTYLE, EXPLAIN TO STUDENTS HARMFUL USE OF ALCOHOL, SMOKING, ETC.
6. GENERATE IDEAS ABOUT THE NEED FOR PREVENTIVE MEASURES FOR THE DEVELOPMENT OF THE PATHOLOGY OF MUSCULOSKELETAL SYSTEM.

Plan and organizational structure lectures

THE MAIN STAGES OF LECTURES AND THEIR CONTENTS
THE OBJECTIVES IN THE LEVELS OF ABSTRACTION
MEANS OF ACTIVATING STUDENTS. METHODOLOGICAL SUPPORT MATERIALS
AVERAGE TIME
PREPARATORY STAGE
DETERMINING THE TOPICALITY, EDUCATIONAL LECTURES GOALS, MOTIVATION
THE MAIN STAGE
THE PRESENTATION OF LECTURES PLAN:
THEMATIC LECTURE
MEANS CLARITY:
1.MULTYMEDIA PRESENTATION
2. X-RAY.
3. SUBJECT SICK.
3.QUESTIONS, PROBLEM SITUATIONS, TASKS.
90%
1. THE DEFINITION OF "REGENERATION" CLASSIFICATION.
II
2. PHASE REPARATIVE REGENERATION.
3. THE DIFFERENCE BETWEEN A CURRENT REPARATIVE PROCESSES IN VARIOUS PATHOLOGICAL CONDITIONS.
4. PATHOLOGICAL MECHANISM OF REGENERATION.
5. FACTORS THAT STIMULATE REGENERATION.
II
3.
THE FINAL STAGE
1. SUMMARY OF LECTURES, GENERAL CONCLUSIONS
2. THE ANSWERS TO POSSIBLE QUESTIONS.
3. TASKS FOR SELF.

About 2 million injuries are annually

(≈ 5,000 per 100,000 population)



Accidents, injuries, poisonings and other external actions in Ukraine account for about 70 thousand deaths (8.95% of the total number of deaths).

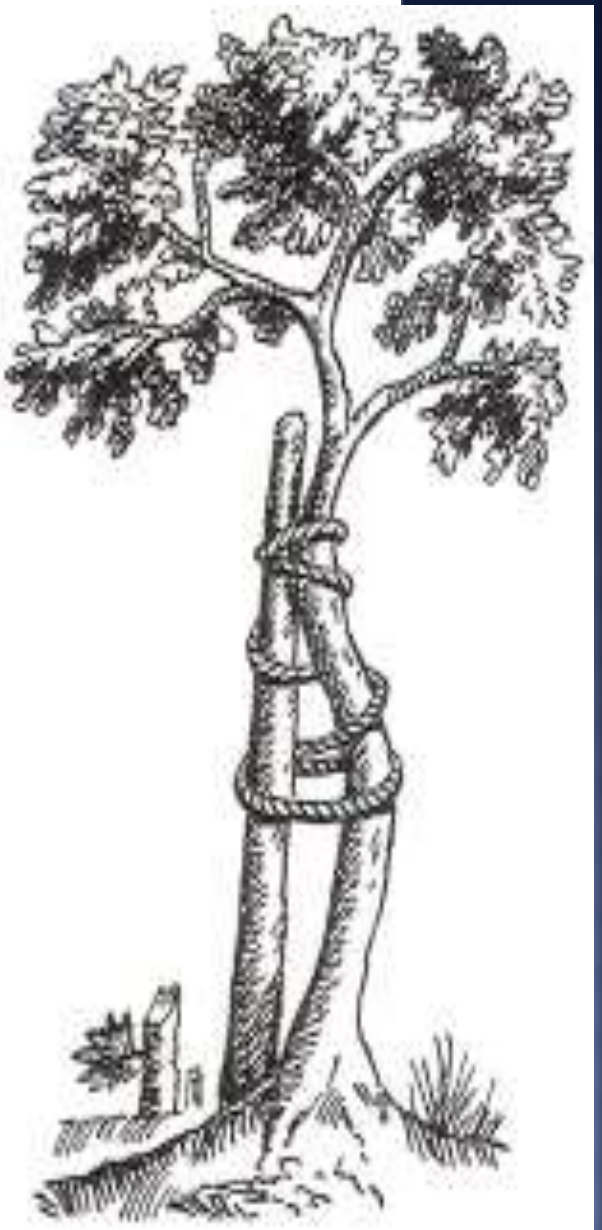
PATIENTS WITH POLYTRAUMA ACCOUNT FOR UP TO 20% OF ALL INPATIENTS.

MORTALITY AT POLYTRAUMA FROM 16 TO 50%.

Traumatology is a field of medicine that studies traumatic injuries, the diseases associated with them, as well as develops treatments for and prevention of injuries.

The term "Orthopedics" was first coined by Professor Nicolas Andrew of Paris in 1741.

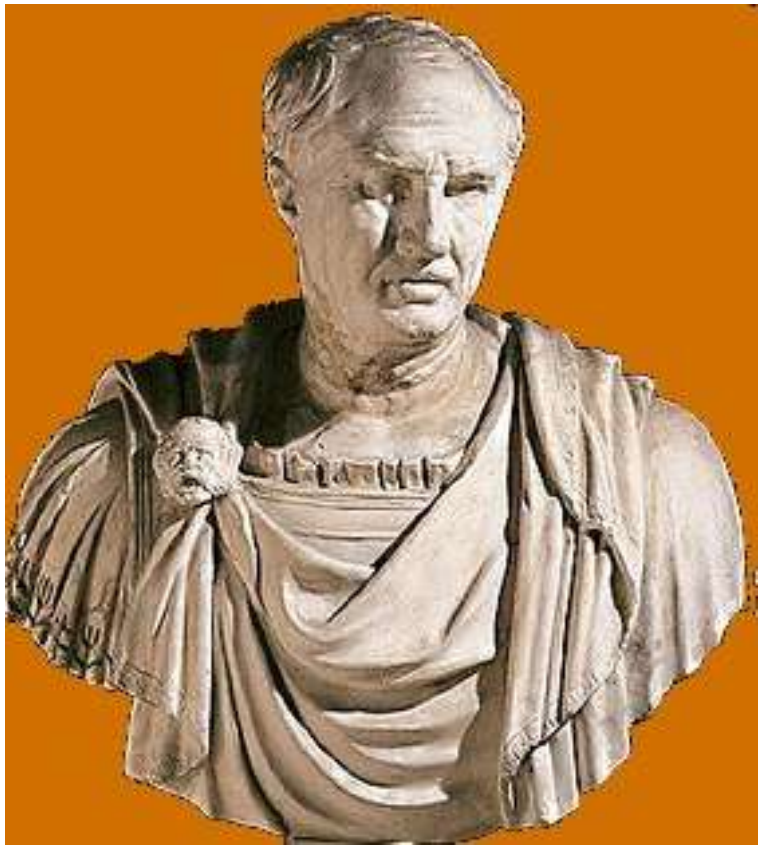
He expressed his observations of children with different body deformities in the two-volume manual "Orthopedics or art to prevent and correct deformities of the body in children by means accessible to parents, mothers and all those who have to raise children."



The main lesson of history is that humanity is uneducated. Winston Leonard Spencer Churchill

Not knowing history means always being a child.

Mark Tullius Cicero



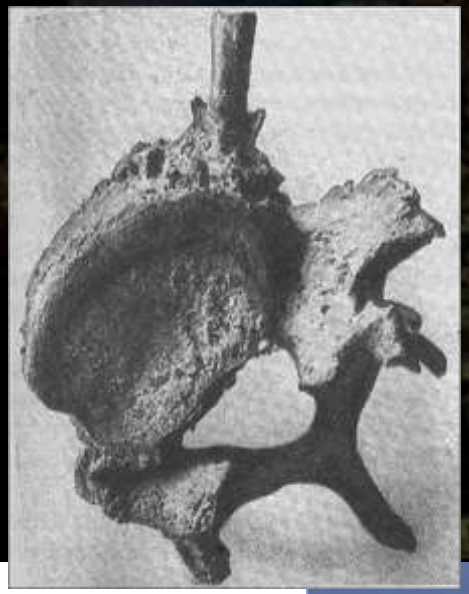
The left femur of the Pithecanthropus, which lived on the territory of modern day Java about 700 thousand years ago.

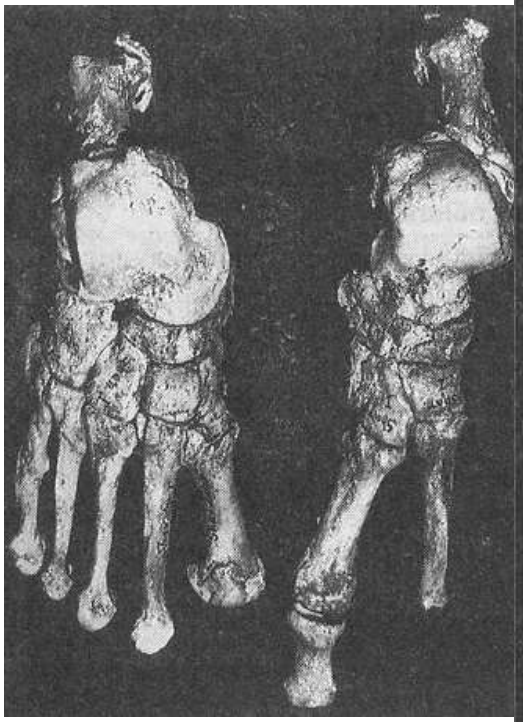
The skeleton of La Chapelle-au-Seine found a skeleton of a man who died at the advanced age of 45 years.

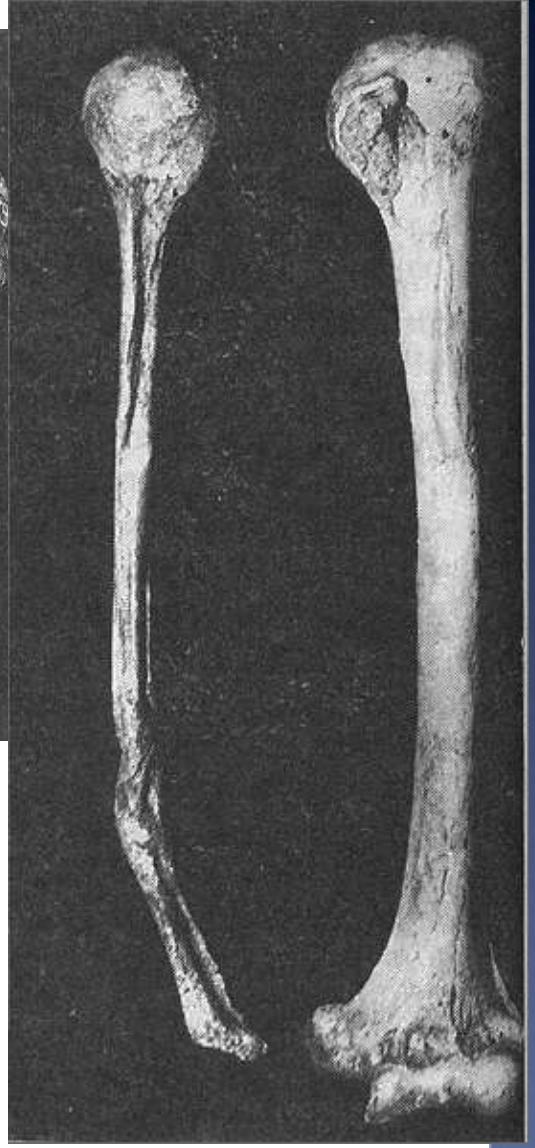
deforming spine arthritis;

hip fracture;

arthritis of the mandible.



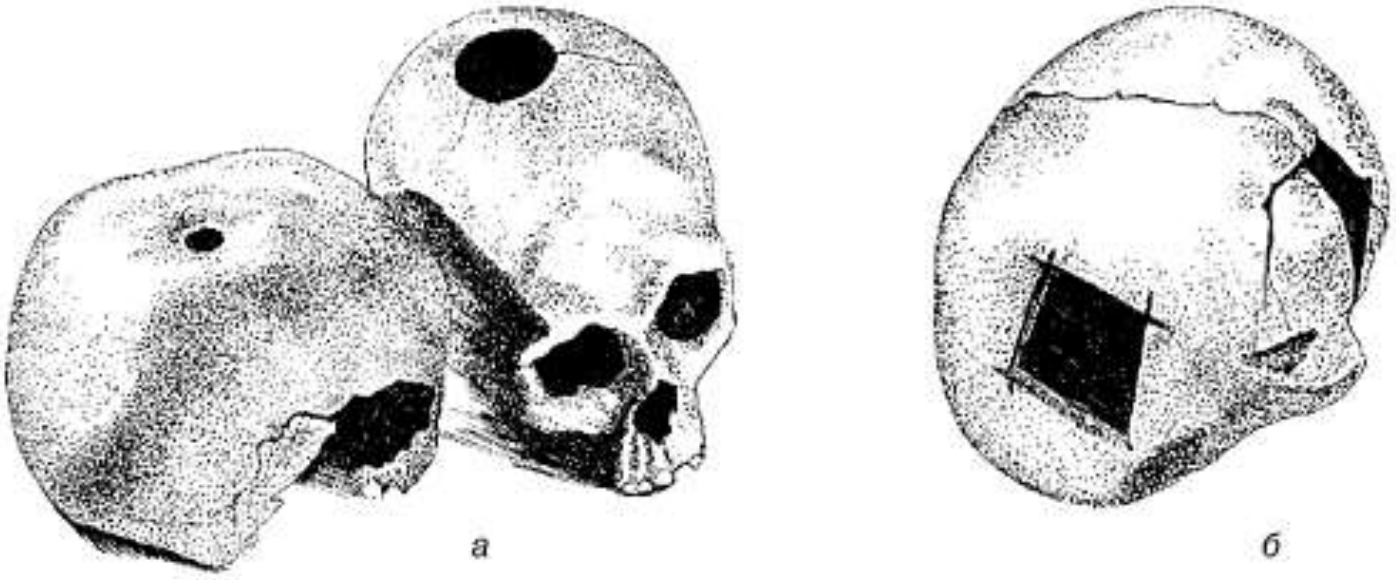


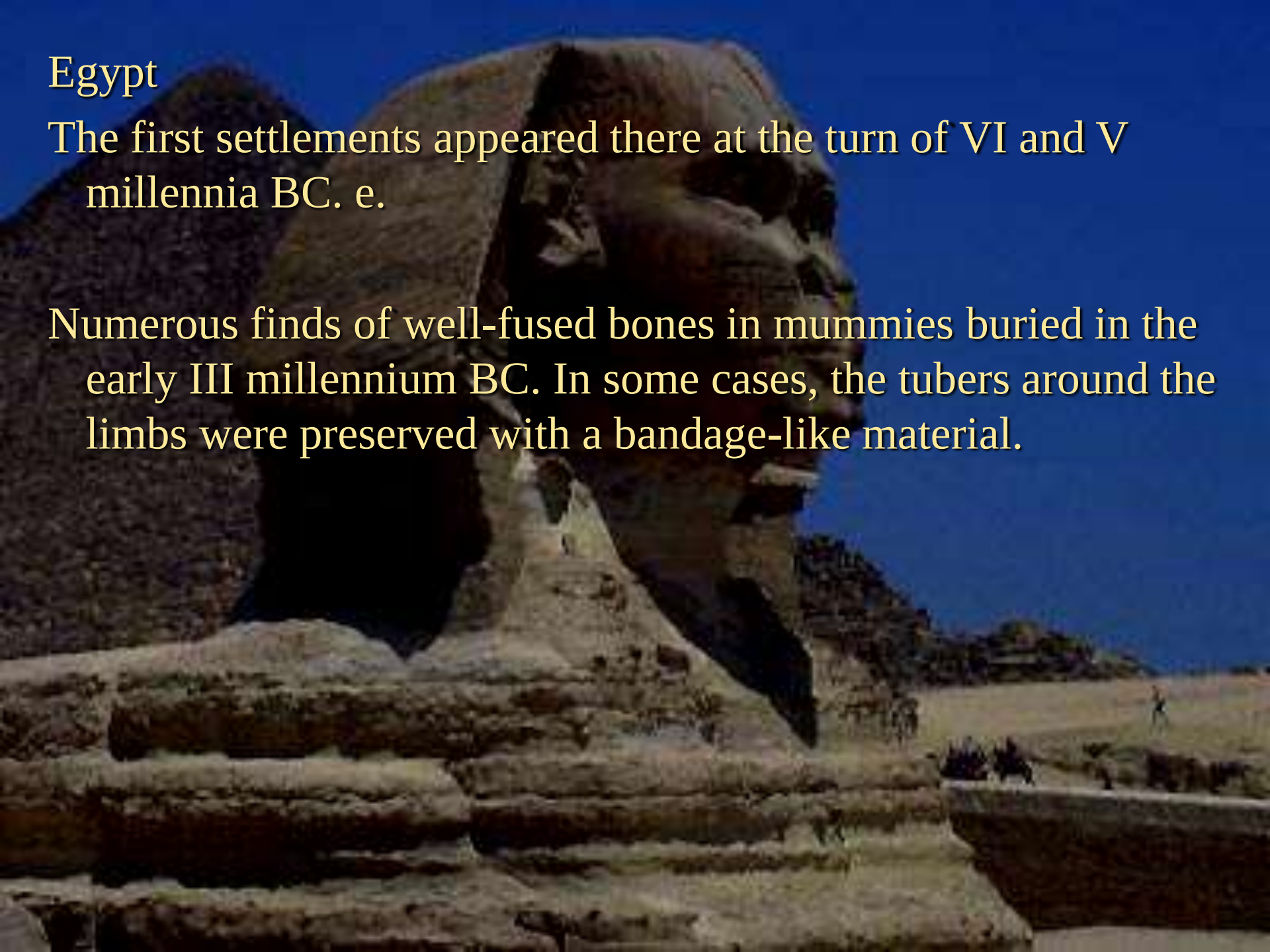


Shanidar Cave (Iraq)

- **The deformation of the wall of the orbit**
- **hollows - blindness on the left eye.**
- **Traces of healed fracture, arthrosis of the joints.**
- **Right shoulder bone dystrophy (amputated long before death)**

The most common are traumatic defects associated with skull damage. during hunting or as a result of trepanation which was performed for ritual purposes. Skulls with traces of trepanation were found in all parts of the globe, with the exception of Australia, the Malay Archipelago, Japan, and China.





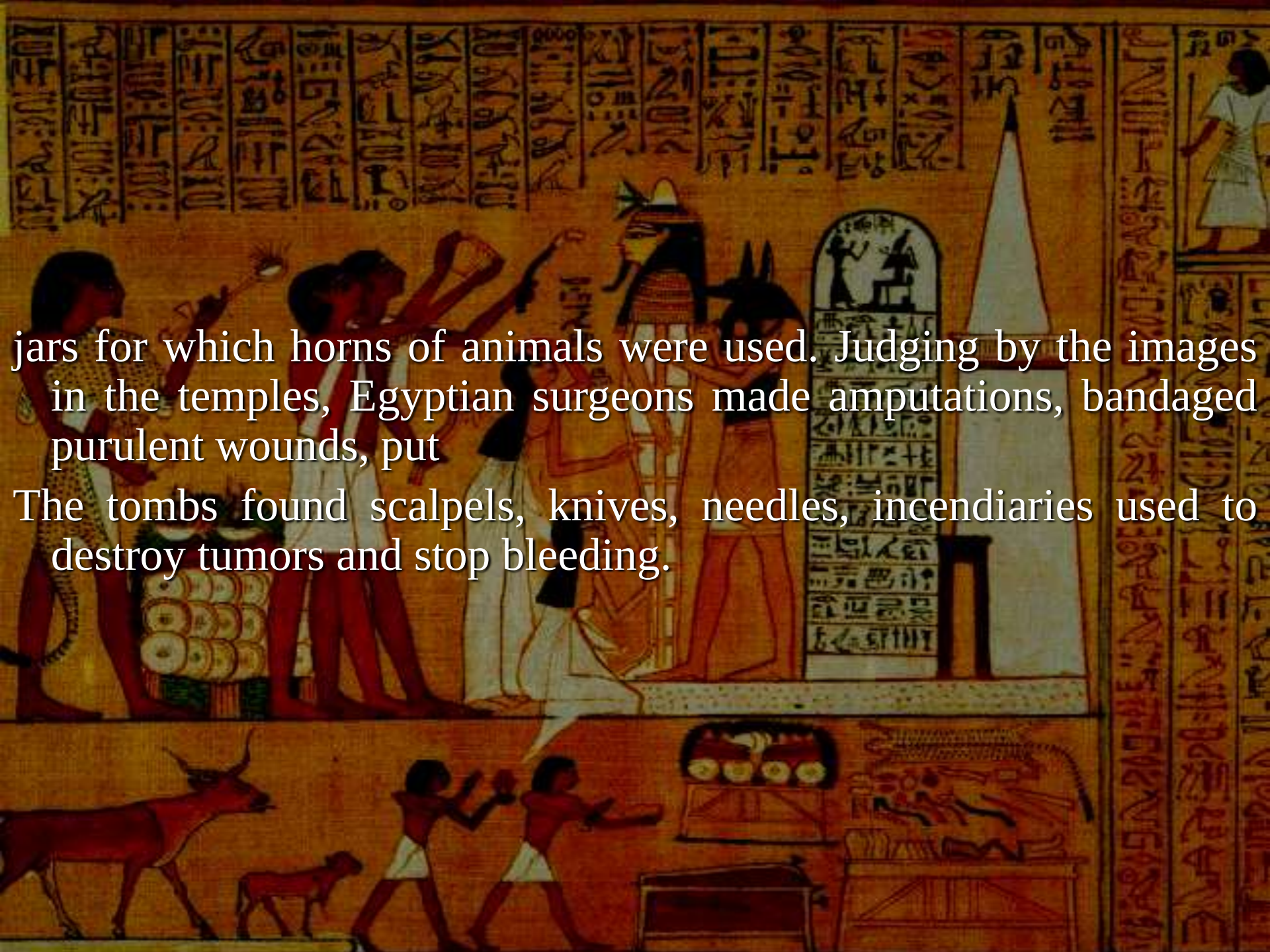
Egypt

The first settlements appeared there at the turn of VI and V millennia BC. e.

Numerous finds of well-fused bones in mummies buried in the early III millennium BC. In some cases, the tubers around the limbs were preserved with a bandage-like material.

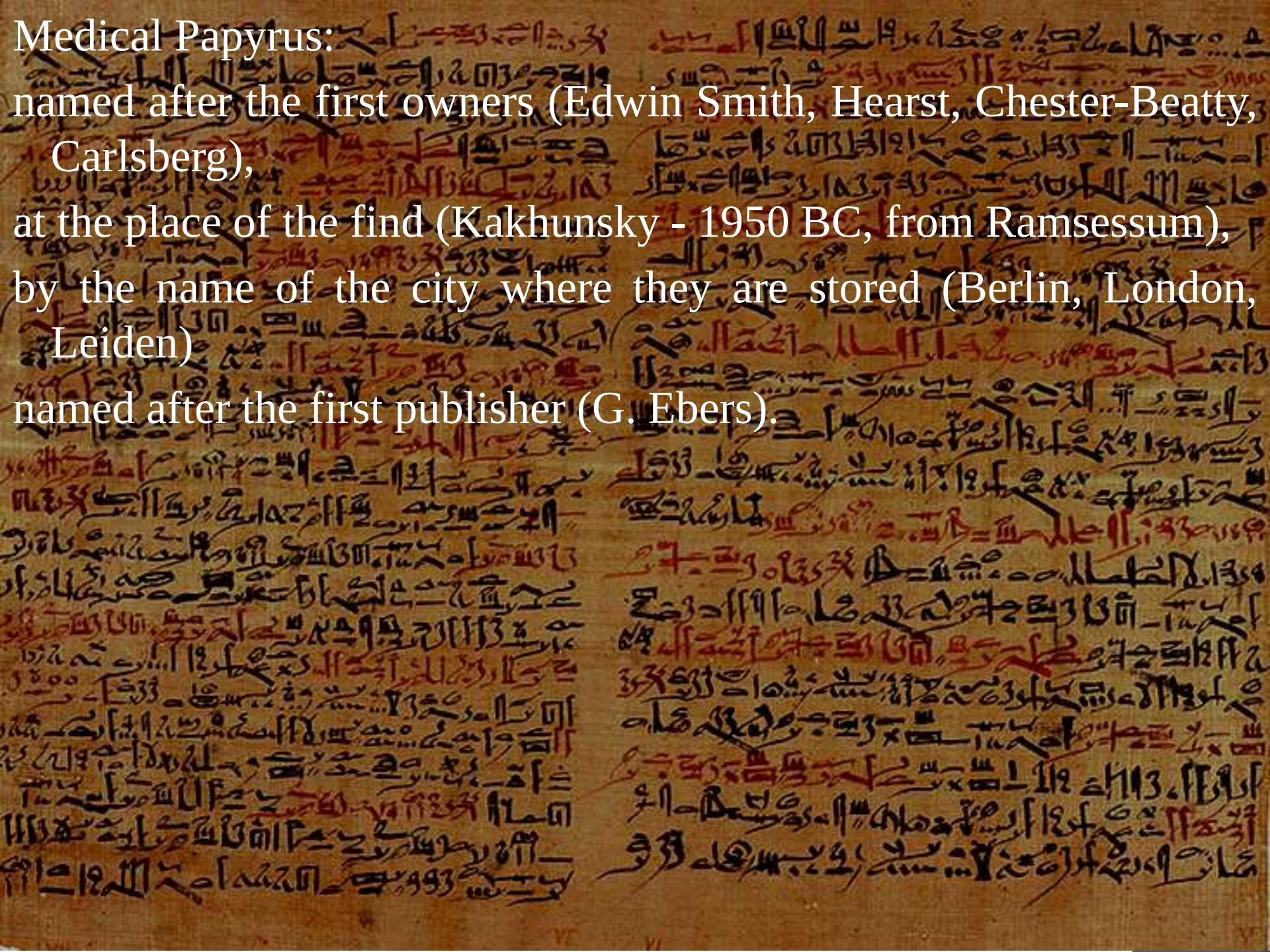
Imhotep (XXVIII century BC) is the first medical doctor to whom historical evidence has been preserved.

Contemporary to Pharaoh III of the Joser Dynasty. For almost 3000 years he was revered as a full-fledged god - a god of healing.



jars for which horns of animals were used. Judging by the images in the temples, Egyptian surgeons made amputations, bandaged purulent wounds, put

The tombs found scalpels, knives, needles, incendiaries used to destroy tumors and stop bleeding.



Medical Papyrus:

named after the first owners (Edwin Smith, Hearst, Chester-Beatty, Carlsberg),

at the place of the find (Kakhunsky - 1950 BC, from Ramsessum),

by the name of the city where they are stored (Berlin, London, Leiden)

named after the first publisher (G. Ebers).

Edwin Smith's Papyrus

The surgical treatise consists of sequential and interrelated descriptions of 48 different injuries. In style, these are clear instructions from the teacher to the student.

Each description includes
the name of the injury,
description of symptoms,
wording of the conclusion,
list of treatment prescriptions
an explanation of the first used phrases and expressions

The treatise is clearly systematized on occasions, starting with damage to the head, then the nose, throat, clavicle, chest, spine.

The treatment of traumas is mainly carried out by rational methods through surgery.

The appeal to magic receptions, to be more precise, to spells, is available in only one of 48 cases.

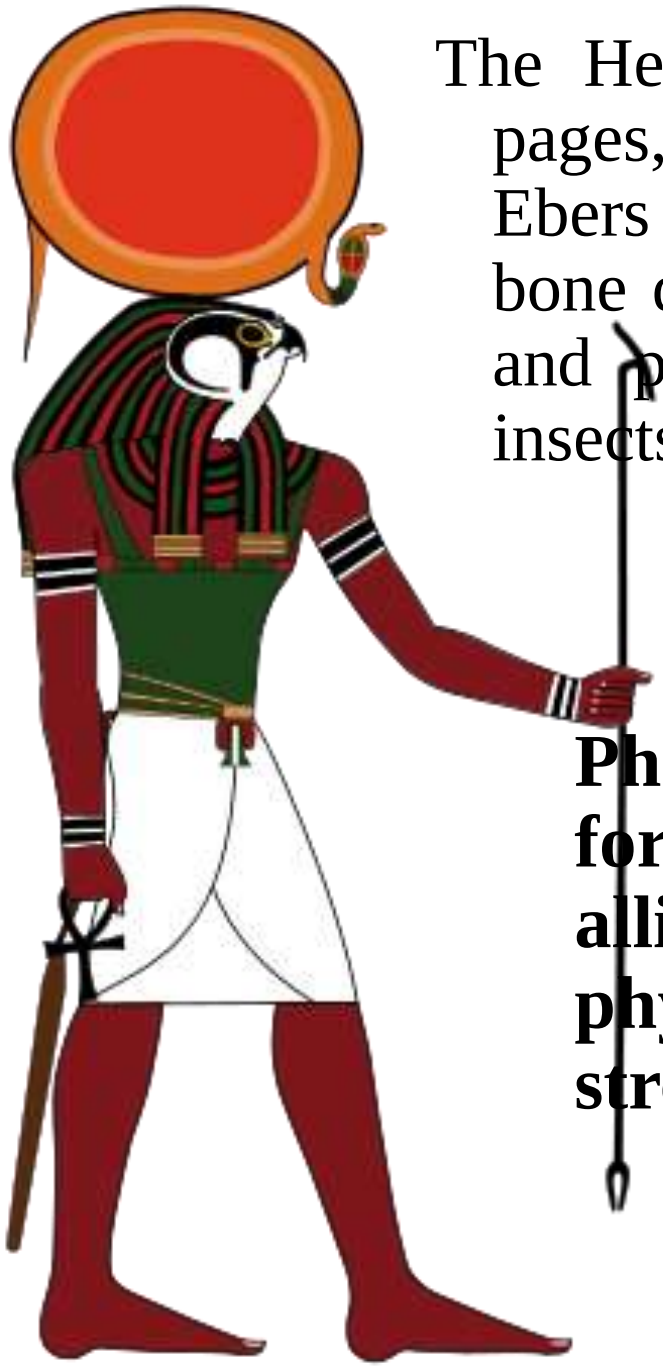
Each of the 48 injury cases is classified according to one of three verdicts:

favorable - "I will cure this disease",

indeterminate - "I will fight this disease"

unfavorable - "this disease is incurable."

The adverse verdict is handed down in 14 cases and constitutes a group of injuries that the doctor cannot cure and which are of scientific interest to him, speaking in modern language.



The Hearst papyrus, with 18 and a half pages, describes 260 cases of disease, (the Ebers papyrus mentions 96), a chapter on bone disease, treatment of limb fractures, and precautions for bites by poisonous insects.

Pharaohs sent their physicians to foreign countries to impress their allies with the art of their physicians, and thereby strengthen their prestige.

“Two adult slaves fell into a well. One broken clavicle, the second broke his head. Let the gentleman write to give oil for rubbing, to allow them to recover »

Address to the head of the temple

Mukallim is a temple physician from Nippur (Mesopotamia) who practiced in the fourteenth century BC. e.

..if the doctor successfully made a cut with a bronze knife in the eye area, the patient was obliged to pay him 10 shekels with silver, and the slave - only 2 shekels.

Broken bone or diseased joint - 3 - 5 shekels depending on the patient's social status ... (Code of Hammurabi Laws)

During the reign of Hammurabi, 5 shekels of silver was enough for one family to feed during the year.

Hammurabi - king of Babylon, ruled around 1793 - 1750 BC. e.

"Surgery is the best of all medical sciences, a precious work of the sky, a sure source of glory ..."

The treatise of the Sumutra Samhita of the 4th century BC.

The book describes about 300 operations, presents 120 surgical tools and 650 ways to prepare drugs.

The school in Taksashila, where he learned the science of the famous Indian doctor Jivak (VI - V century BC). According to legend, he treated the Buddha himself.

No more than 4 people studied in groups. Young men of noble origin, thin physique, with a normal psyche, modest and showed their abilities were admitted to schools.

The program of preparation of the physician included obligatory visit of patients, and also educational surgery which was made on wax boards, fruits and bulbs.

Trial operations were considered an important element in the preparation of the physician, because "the doctor, inexperienced with a scalpel, comes to the patient's bed in confusion, like a cowardly soldier, who first fell into battle."

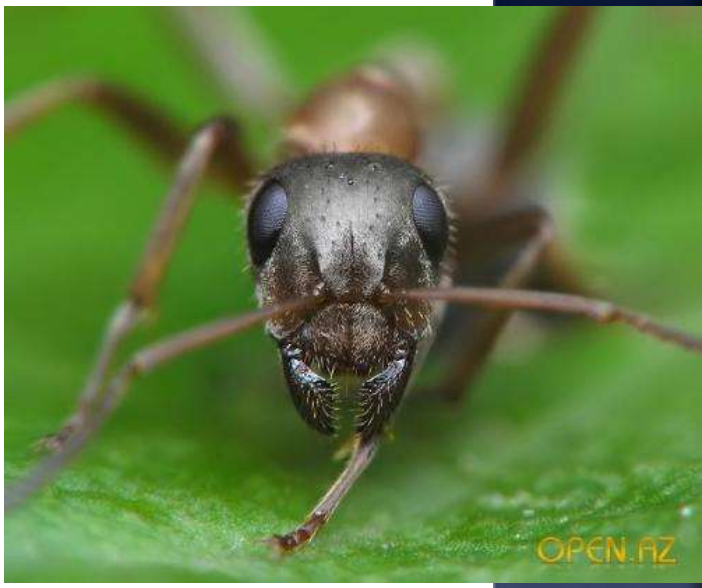
Rhinoplasty

The great Chinese surgeon Hua To (110 - 208 years) became famous as a skilled doctor of wounds, dislocations, fractures, tumors. For anesthesia using mafusan or mandrake.

The merit of Chinese doctors was the invention of tires, the creation of some types of prostheses to replace the amputated limbs.

The Inca surgical instrument is a tumi knife. Made of gold, silver, copper or obsidian.

Anesthesia - an infusion of cactus juice - plunged a person into sleep for several days.

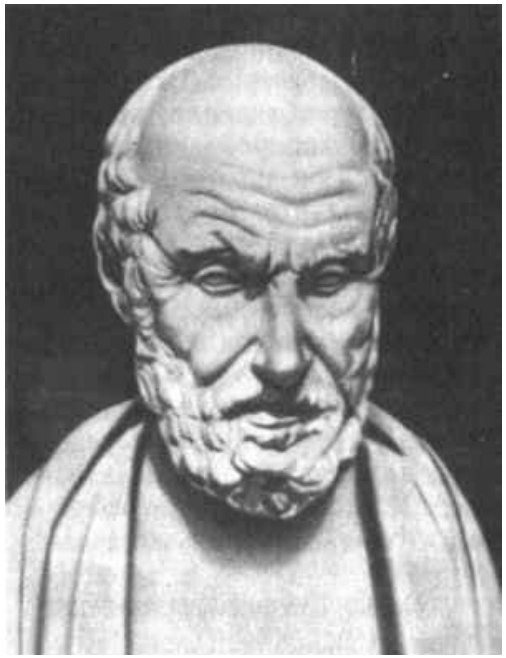


Suture material

bandage

Surgical instrument

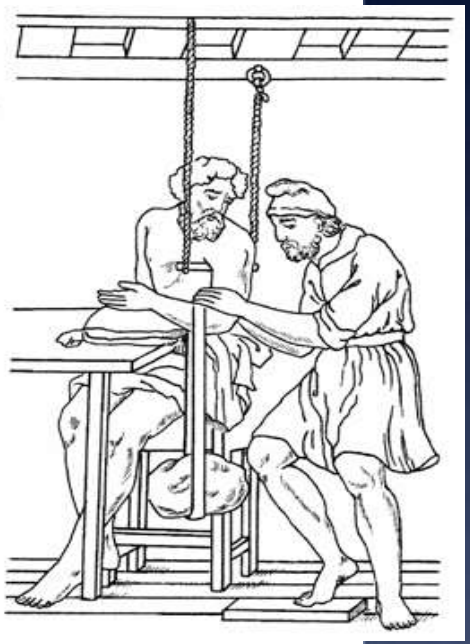
Not being a physician, Homer described 141 injuries to the trunk and limbs. Among them are superficial and penetrating wounds, bruised wounds, suppuration as a consequence of bites of poisonous snakes. Their treatment consisted in the removal of injuring objects, followed by extrusion of blood and the application of dressings.

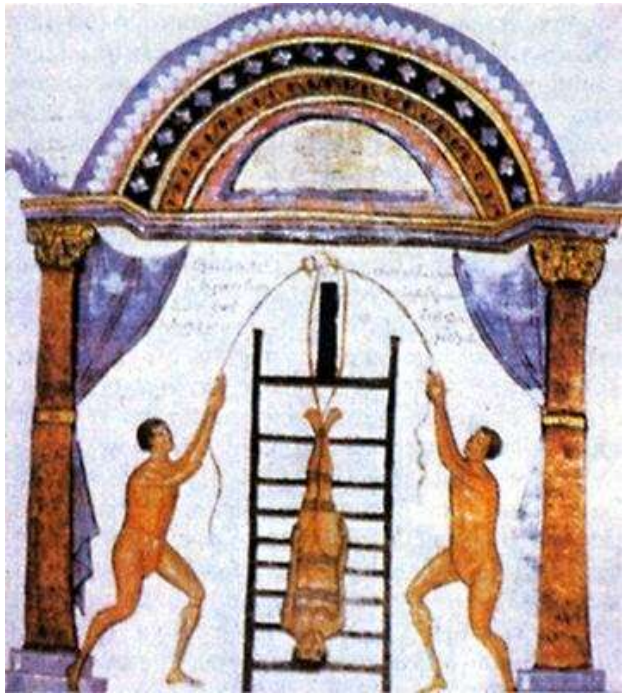


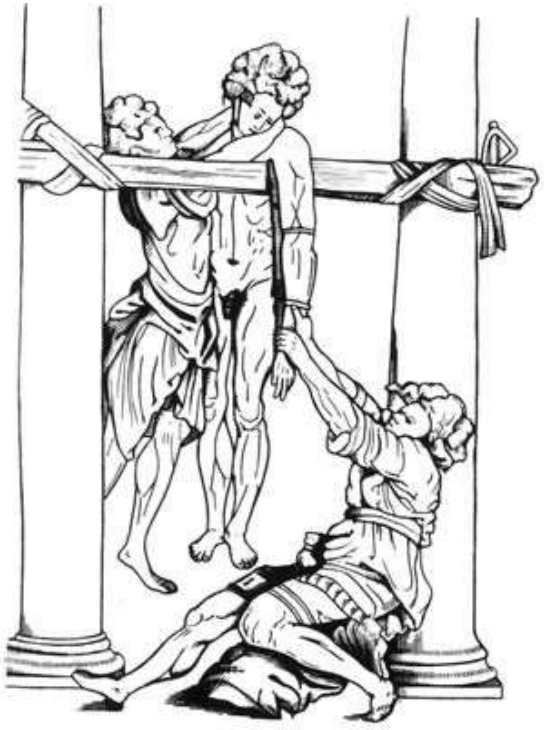
Hippocrates Books

"About fractures."

“On the reduction of joints”







ANCIENT ROME

Among the Romans, the medical profession was not respected. Treatment was considered an occupation incompatible with the dignity of a Roman citizen. Therefore, slaves often engaged in medical practice, and their patients were protected by law from medical abuse. The government guaranteed the poor residents of the city free consultations and medical assistance, and certain areas were served by public doctors.

In every legion there were 1000 soldiers

4 surgeons; could not be

without a doctor

Get out of the harbor not a single

ship.

Regimental medic supplied

warriors binding

dressing material

taught to use

bandages for the benefit of himself and wounded comrades.

In the sanitary teams (8-10 people), physicians who were physically healthy and physically strong called themselves deputati, which literally means “messenger”.

The work of Celsus included 20 books on philosophy, law, agriculture, military affairs and medicine. An impressive part of the work perished, but the treatise "On Medicine" was partially preserved.

Methods of treating wounds, bone diseases, necrosis that occur after fractures, methods of reposition of dislocations, amputation of limbs and trepanation are described; lists method for stopping bleeding and recommendations for ligation of blood vessels

Methods of treating wounds, bone diseases, necrosis that occur after fractures, methods of reposition of dislocations, amputation of limbs and trepanation are described; lists methods for stopping bleeding and recommendations for ligation of blood vessels

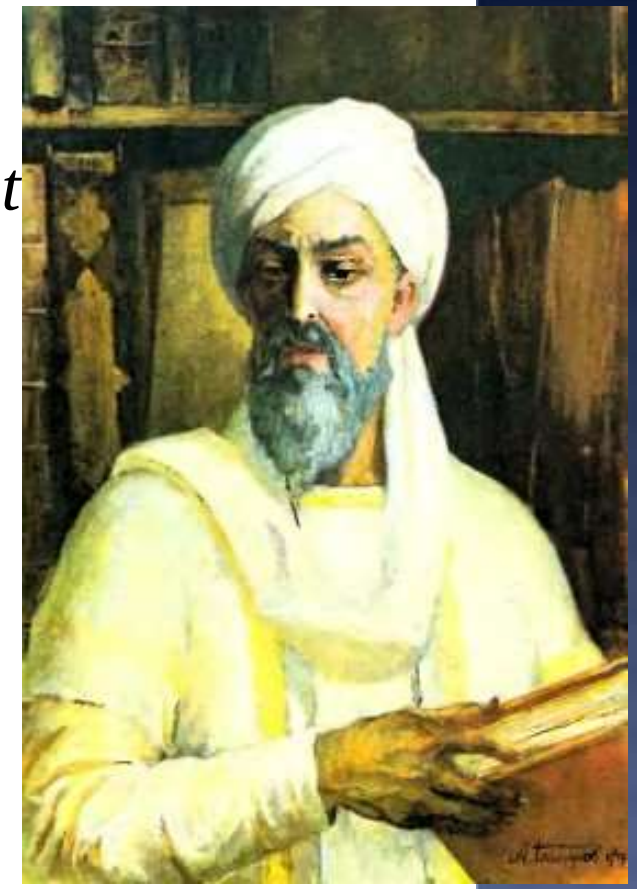
Byzantine physician Pavel Eginsky (625 - 690 years)

The Byzantine Empress Zoe (978-1050)

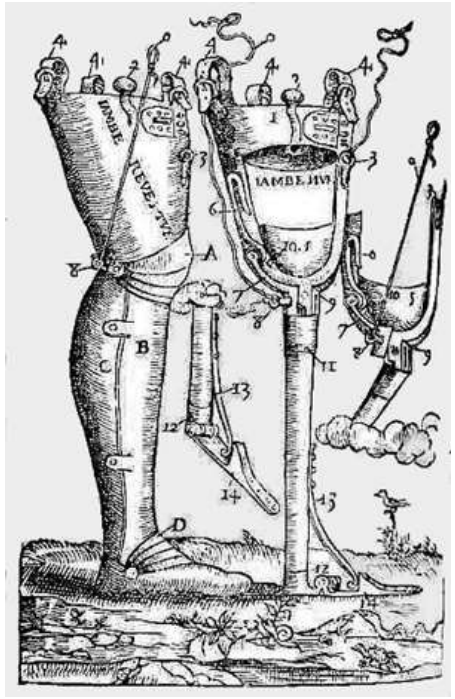
Anatomy forbidden of any kind, persecuted shedding of blood and knowledge of the secrets of the human body.

Abul-Qasim Khalaf ibn Abbas al-Zahravi (936 - 1013 years) - an Arab surgeon, recommended solidifying protein dressings or plaster.

El Hossein Abu Ali Ibn Sina (980-1037), Tajik scholar. He based his ideas about diseases on anatomical autopsies and set out in the "Canon of Medicine." A lot of space is devoted to fractures and dislocations. The use of plaster casts is indicated for the first time..



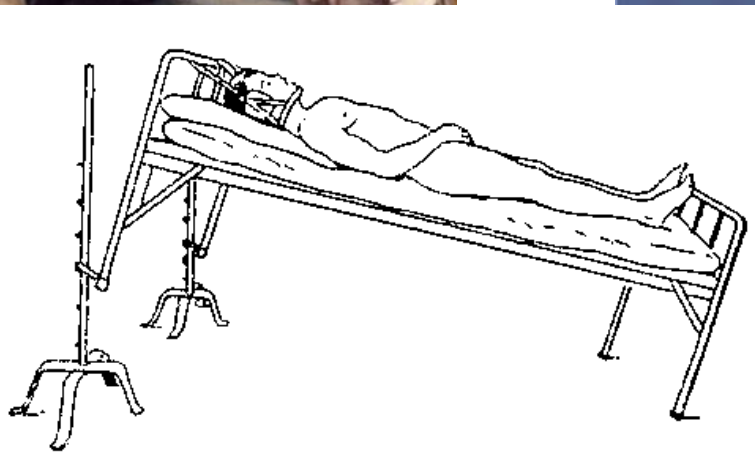
In the Middle Ages, the "Canon of Medicine" was published more often than the Bible.

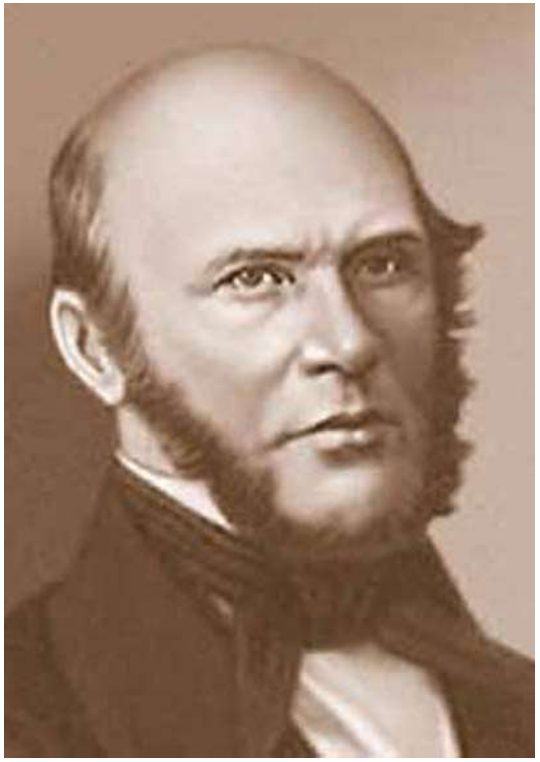


- Ambroise Pare (1510-1590) is a French doctor. He paid much attention to fractures and dislocations, deformations of the skeleton. For treatment, he used specially designed fixing tires.
- In 1564, he published drawings of prosthetic devices. Using the gears, the fingers of the hand were set in motion, which made it possible to hold the sword or shovel with the prosthesis.

Gaspar Talyakozzi (1546 - 1599)

Francis Glisson (1597-1677)





N. I. Pirogov
(1810—1881)

Mukhin Efrem Osipovich (1766 - 1850) ”The first principles of bone science”

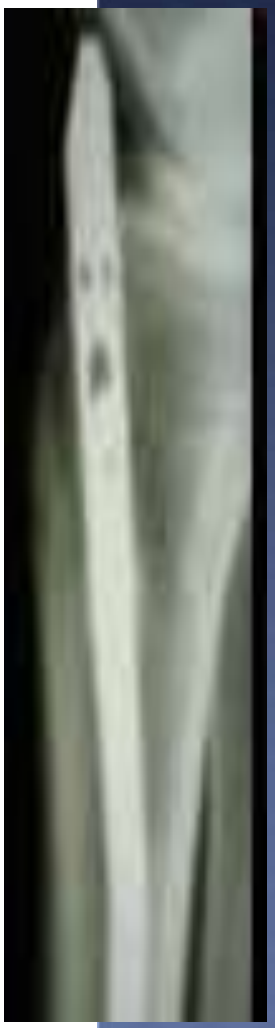
Larrey Dominic Jean (1766 - 1842) performed 200 amputations in one day.

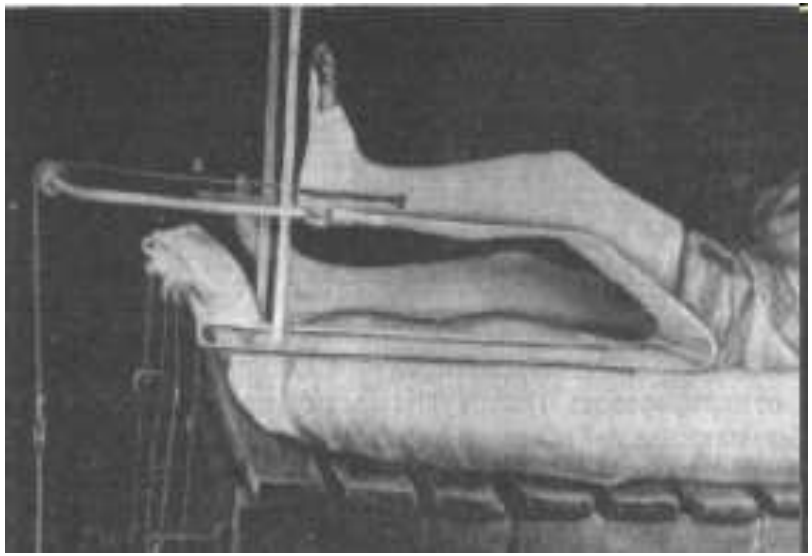
REYER KARL KARLOVICH (1846 - 1890) FIRST ATTEMPTS TO OPERATE ON FRACTURES

Sklifosovsky, Nikolai Vasilievich (1836 - 1904)

Kuzmin Valentin Petrovich (1893–1973)

Spizharny Ivan Konstantinovich (1857-1924)





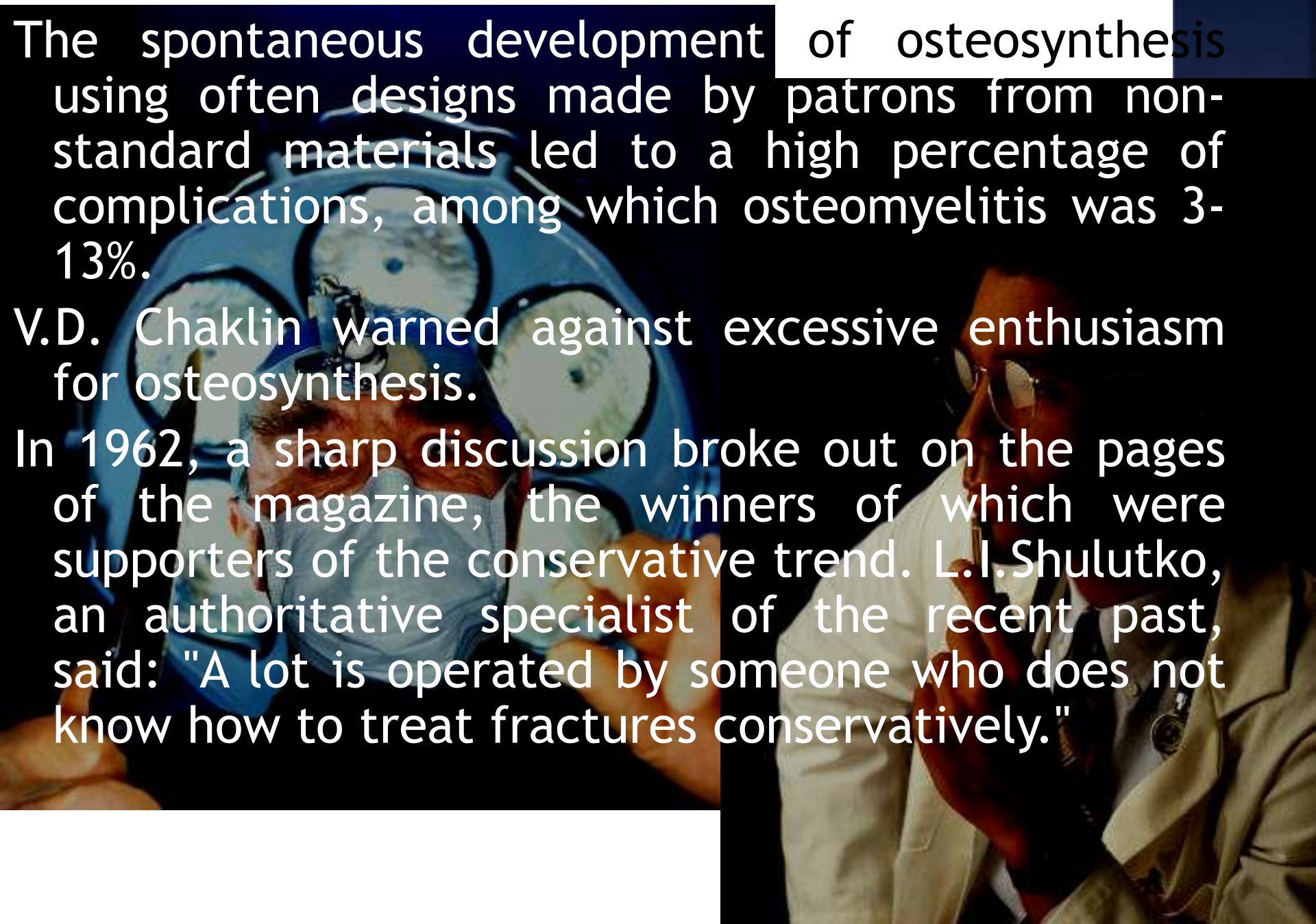
Malgen (Malgaigne) Joseph (1806-1865)

In 1903, E. Bergman, Bruns, and Mikulich, in the manual on practical surgery, reported the use of metal screws and brackets in the treatment of fractures.

The spontaneous development of osteosynthesis using often designs made by patrons from non-standard materials led to a high percentage of complications, among which osteomyelitis was 3-13%.

V.D. Chaklin warned against excessive enthusiasm for osteosynthesis.

In 1962, a sharp discussion broke out on the pages of the magazine, the winners of which were supporters of the conservative trend. L.I.Shulutko, an authoritative specialist of the recent past, said: "A lot is operated by someone who does not know how to treat fractures conservatively."

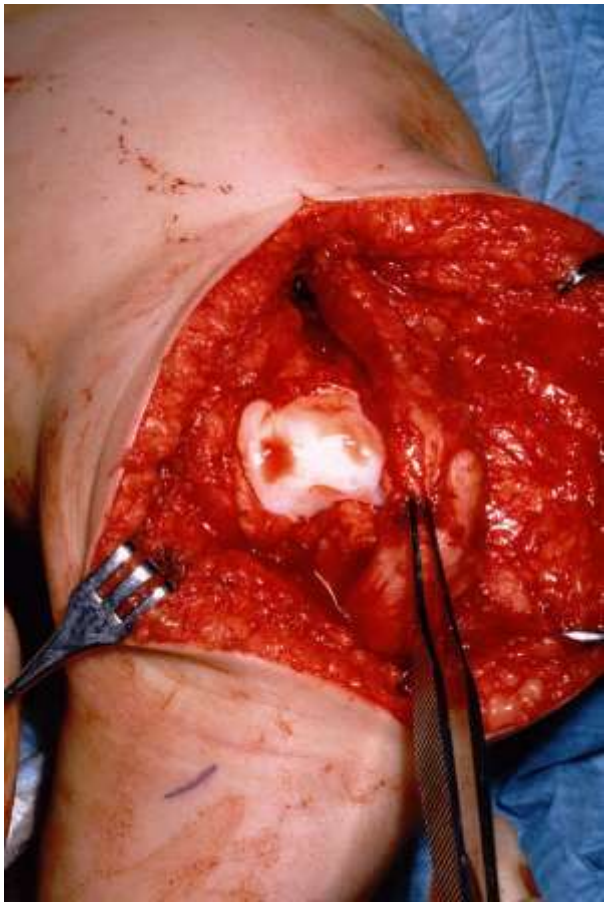


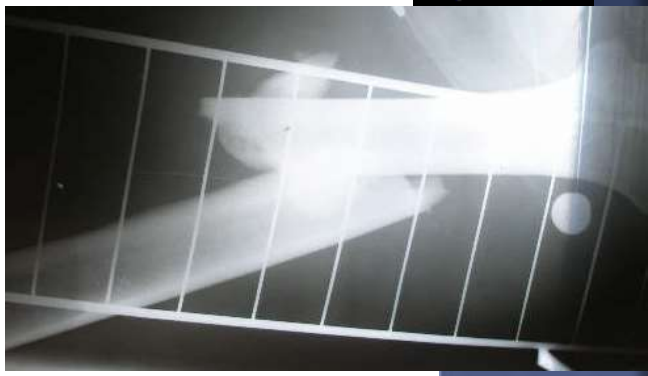
Kharkov school

In 1907, the Medical and Mechanical Institute was organized in Kharkov to treat miners who were injured at work.

Main directions of work of the clinic:

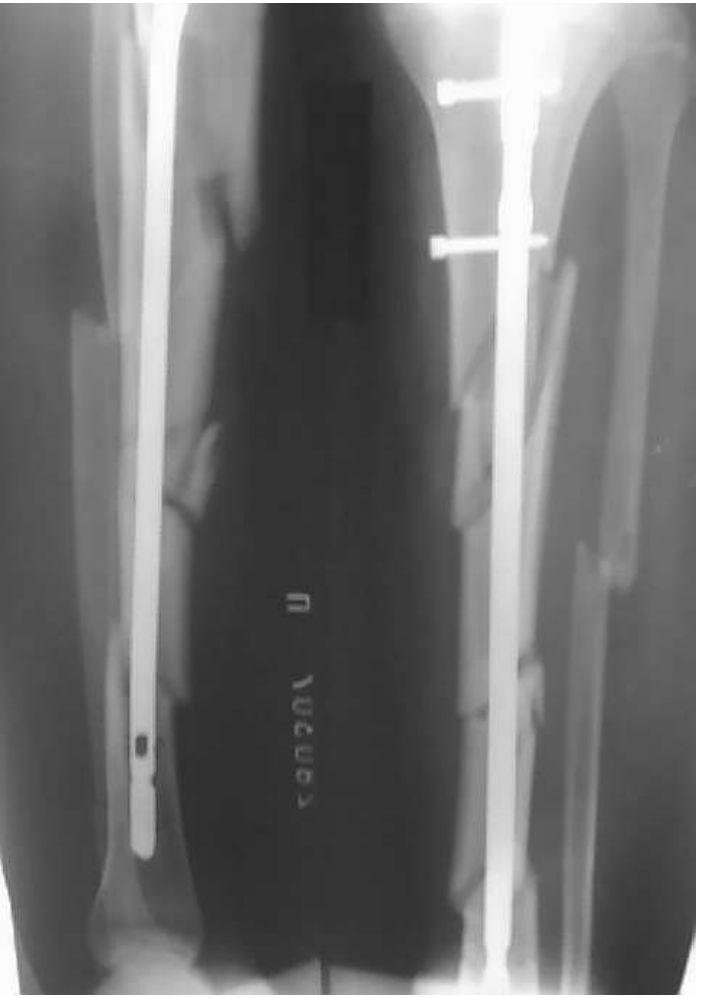
Urgent traumatic care for the victims.





Complex treatment of degenerative-dystrophic and inflammatory diseases of the joints

Modern methods of osteosynthesis (blocking, extracorporeal, minimally invasive)

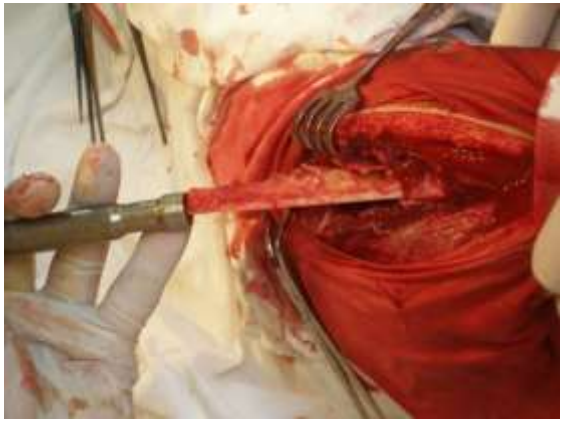


Functional methods of treatment of gerontological patients

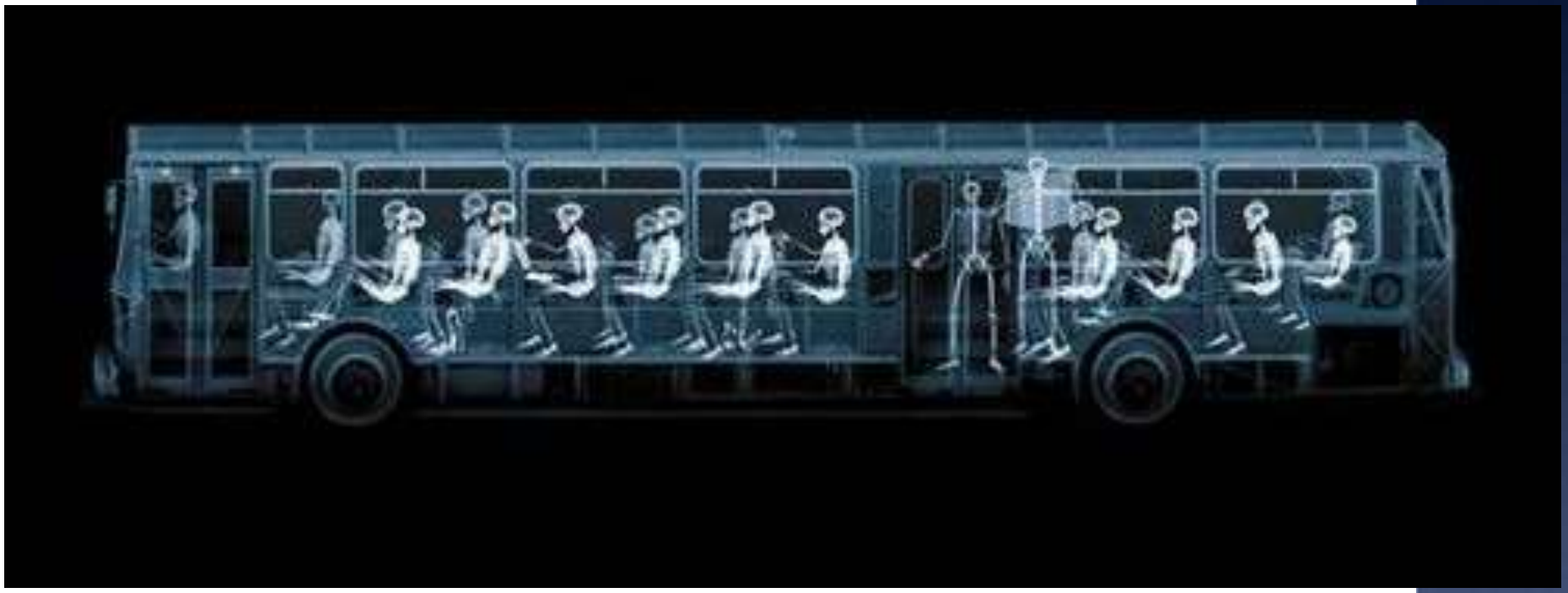
Arthroscopic interventions.

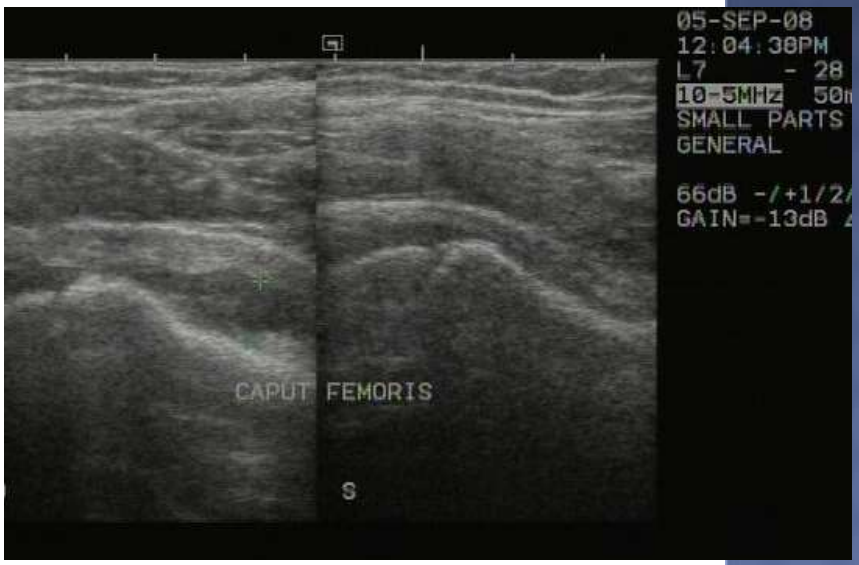
Surgery of a brush

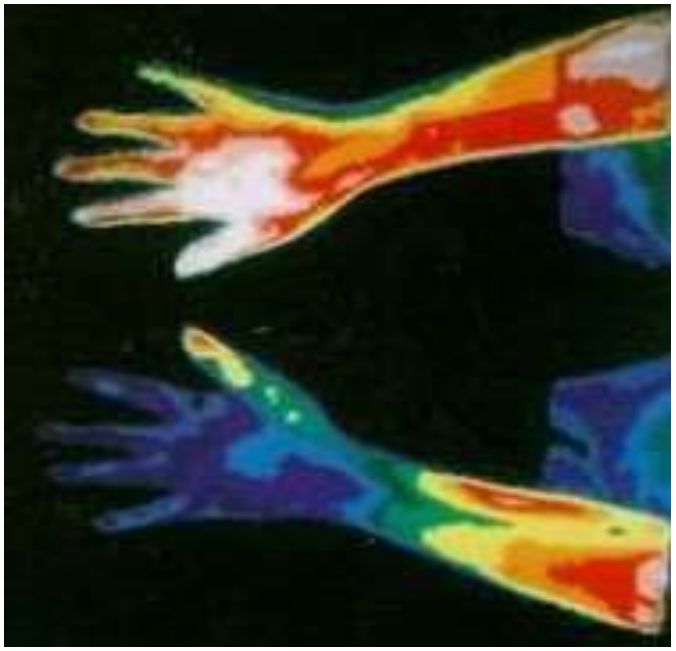
Osteoplasty of bone defects of tumor and purulent-inflammatory origin

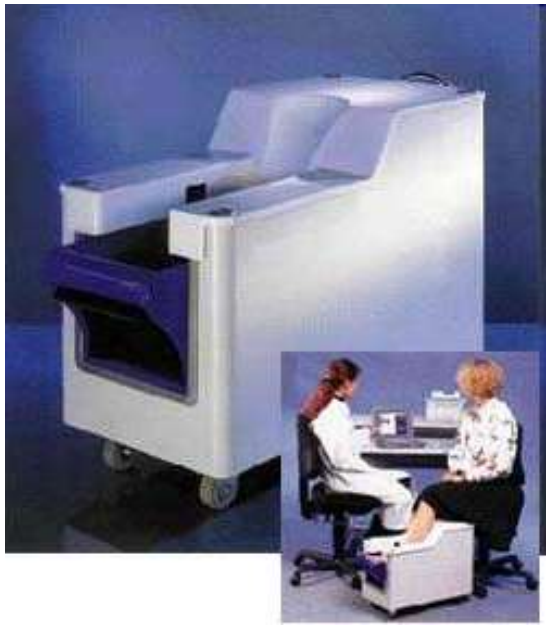


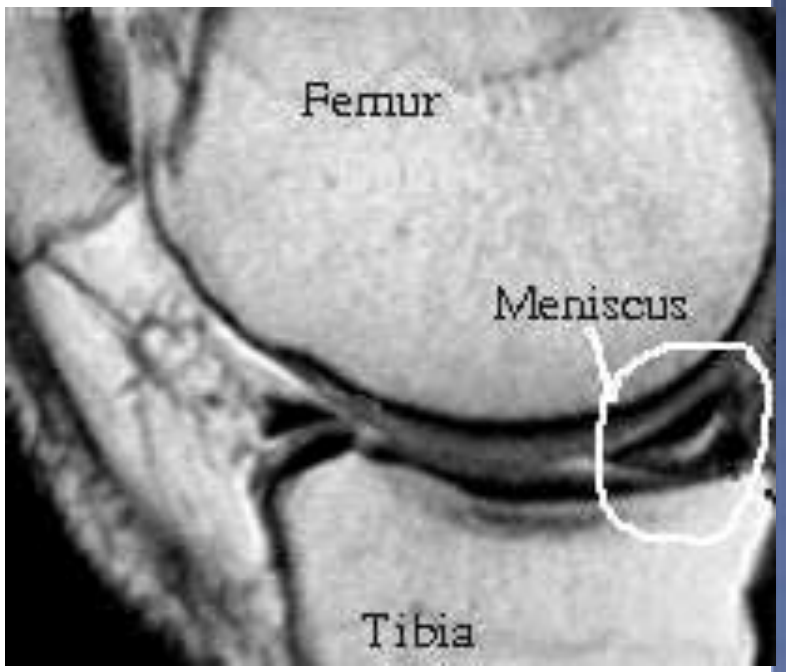
FRACTURE DIAGNOSIS




05-SEP-08
12:04:30PM
L7 - 28
10-5MHz 50
SMALL PARTS
GENERAL
66dB -/+1/2
GAIN=-13dB
CAPUT FEMORIS
S





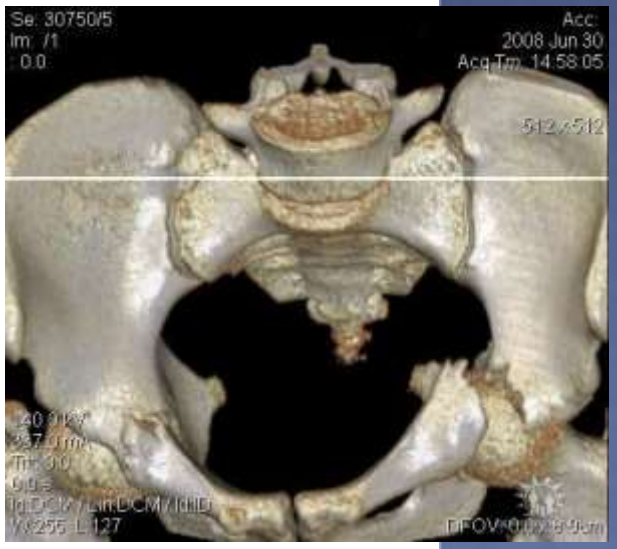

Femur
Meniscus
Tibia


R
L
140.0 kV
337.0 mA
Tilt: 0.0
0.0 s
Lin:DCM / Lin:DCM / Id:ID
W:1500 L:500
DFOV: 34.8 x 31.3cm

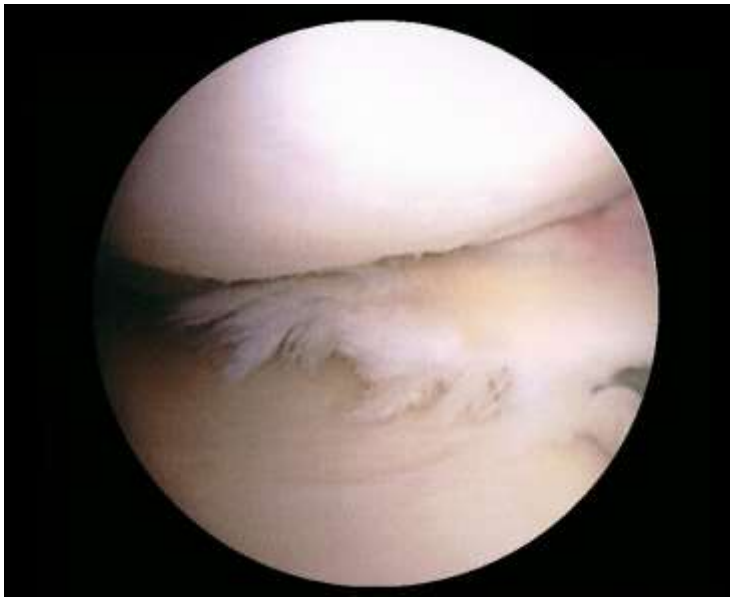

Se: 30752/5
Im: /1
: 0.0
1987 Jan 01 M 08930
Acc:
2008 Jun 30
Acq Tm: 14:58:05
512 x 512
140.0 kV
337.0 mA
Tilt: 0.0
0.0 s
Id:DCM / Lin:DCM / Id:ID
W:255 L:127
DFOV: 0.0 x 0.0cm


Im: /1
: 0.0
2008 Jun 30
Acq Tm: 14:58:05
512 x 512


Se: 30760/16
Im: /1
: 0.0
1987 Jan 01 M 08930
Acc:
2008 Jun 30
512 x 512
W:311 L:160
DFOV: 0.0 x 0.0cm


Se: 30750/5
Im: /1
: 0.0
Acc:
2008 Jun 30
Acq Tm: 14:58:05
512 x 512


S



Treatment of fractures

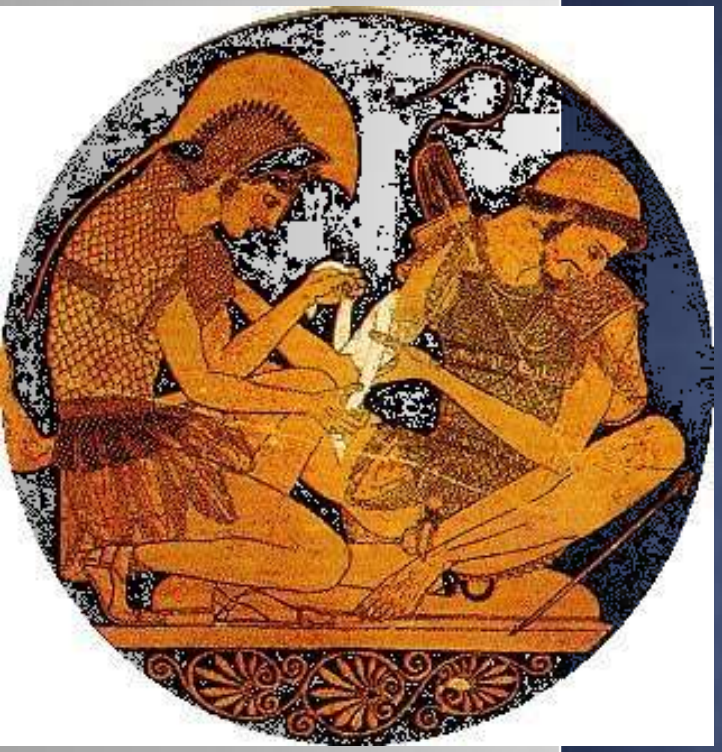
Principles of fracture treatment:

- emergency,
- anesthesia,
- repositioning of fragments,
- immobilization to consolidation,
- functional treatment,
- normalization of regeneration,
- rehabilitation.

The main methods of treatment of fractures:

- **closed reposition with overlay locking;**
- **skeletal traction, incl. damping;**
- **operative**

CLOSED FRACTURE TREATMENT:



Based on anatomy

physiology

knowledge of the biomechanics of fractures

This is a medical art.

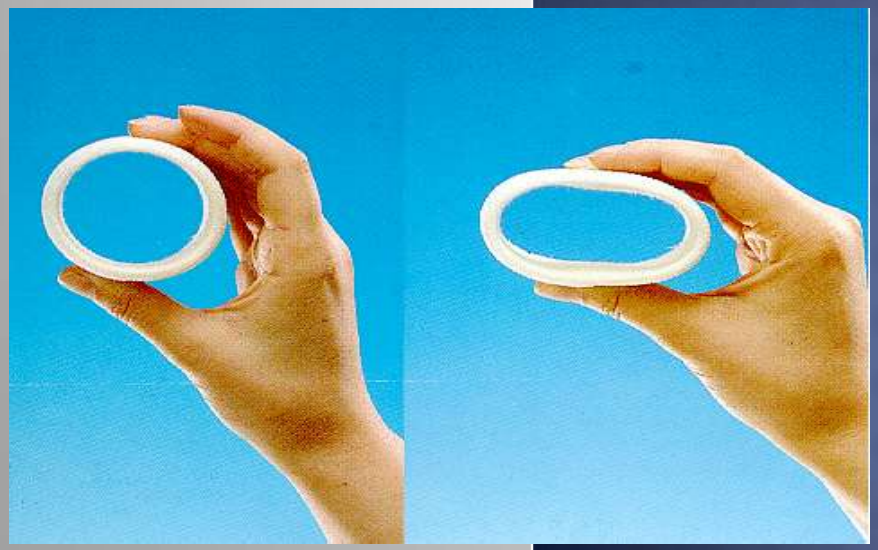
SCOTCH
SOFT

Lightweight, durable

It cures in 20 minutes

Waterproof

Easy to use



The negative effect of immobilization joint mobility:

16-17% decrease in 1 week.,
50% reduction after 3 weeks

SKELETAL TRACTION

Requirements for osteosynthesis:

- thorough asepsis,
- providing diverse
- designs to achieve
- firm fixation of the fracture,
- special training of surgeons -
- traumatologists.

The advantages of osteosynthesis:

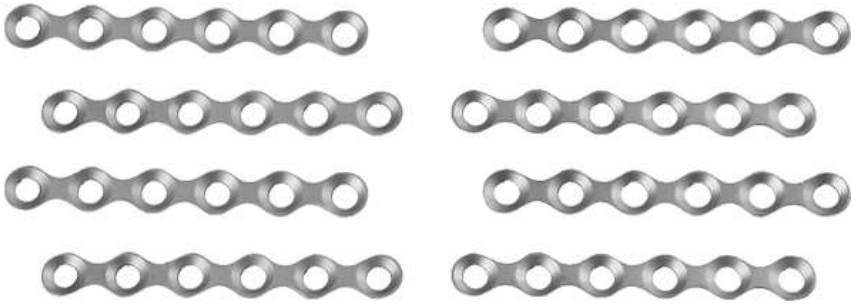
- the patient’s hospital stay is reduced,
- accurate adaptation of fragments and their immobility is achieved,
- primary fracture healing is provided.

Options for stable osteosynthesis.

- internal (submersible)
- outdoor (devices)
- Internal osteosynthesis is normal and compression.
- Intramedullary osteosynthesis with pins.
- Bone osteosynthesis - with plates, screws, wire.
- BWW with rod and spoke devices.

METHODS OF OSTEOSYNTHESIS

Накостные пластины



Ilizarov apparatus

bone plates

Bone osteosynthesis









LCP
Locking
Compression
Plate

BLOCKING INTRAMEDULLARY OSTEOSYNTHESIS

PATIENT M. 19 DS: CLOSED FRACTURE OF THE LOWER THIRD OF THE LEFT THIGH WITH DISPLACEMENT

The condition of the patient on the 6th day after surgery.

PATIENT K. 21 YEARS OLD DS: FALSE JOINT OF LEFT FEMUR AFTER OPEN FRACTURE

The condition of the patient on the 3rd day after surgery. Discharged for outpatient treatment on the 5th day

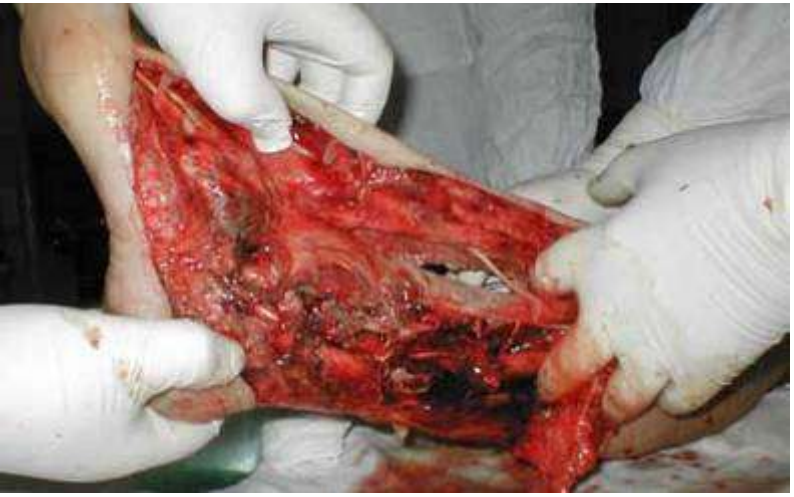
External (osseous) osteosynthesis.

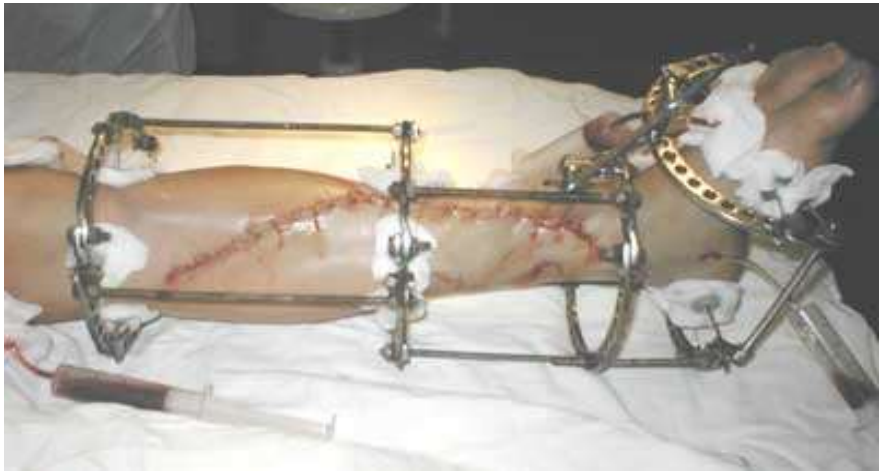
1907 - A. Lambotte - cross-screwed screws connected to the skin by two plates.

1917 - Rosen - T-shaped construction with two locking nuts, with the help of which the repositioning and fixation of fractures in two planes were possible.

In 20-30 years - a number of devices of external fixation (Anderson, Stader, Heinez, AS Pertsovsky, TE Gnilorybov).

1949 - R.Witmozer is a device with a cross-shaped needle insertion.

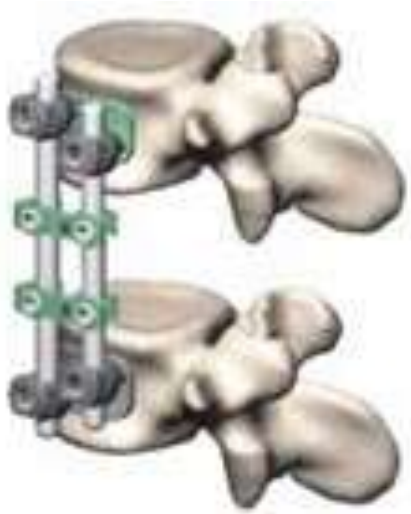


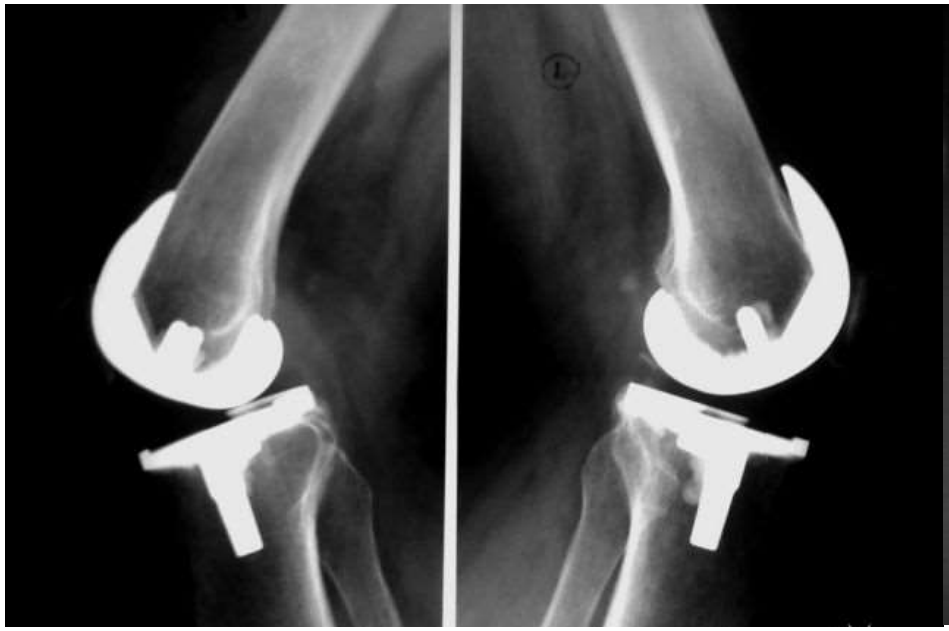


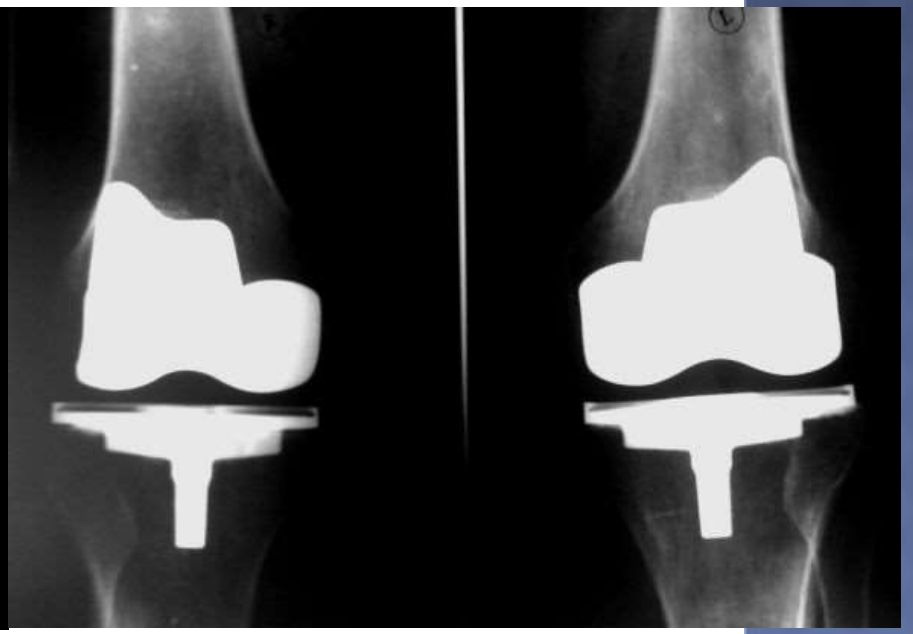
General view of an open fracture (IIIB Kaplan-Markov type). Accident as a result of an accident (the patient's leg fell under the wheel of the bus)

Patient K. suffered severe polytrauma during an accident, multiple fractures of both femur and tibia, fracture of the shoulder, forearm, and skull arch.

Fixation of both thighs and shins with external fixation devices enabled patients to move independently without crutches for the third week and in the future contributed to the full recovery of joint movements





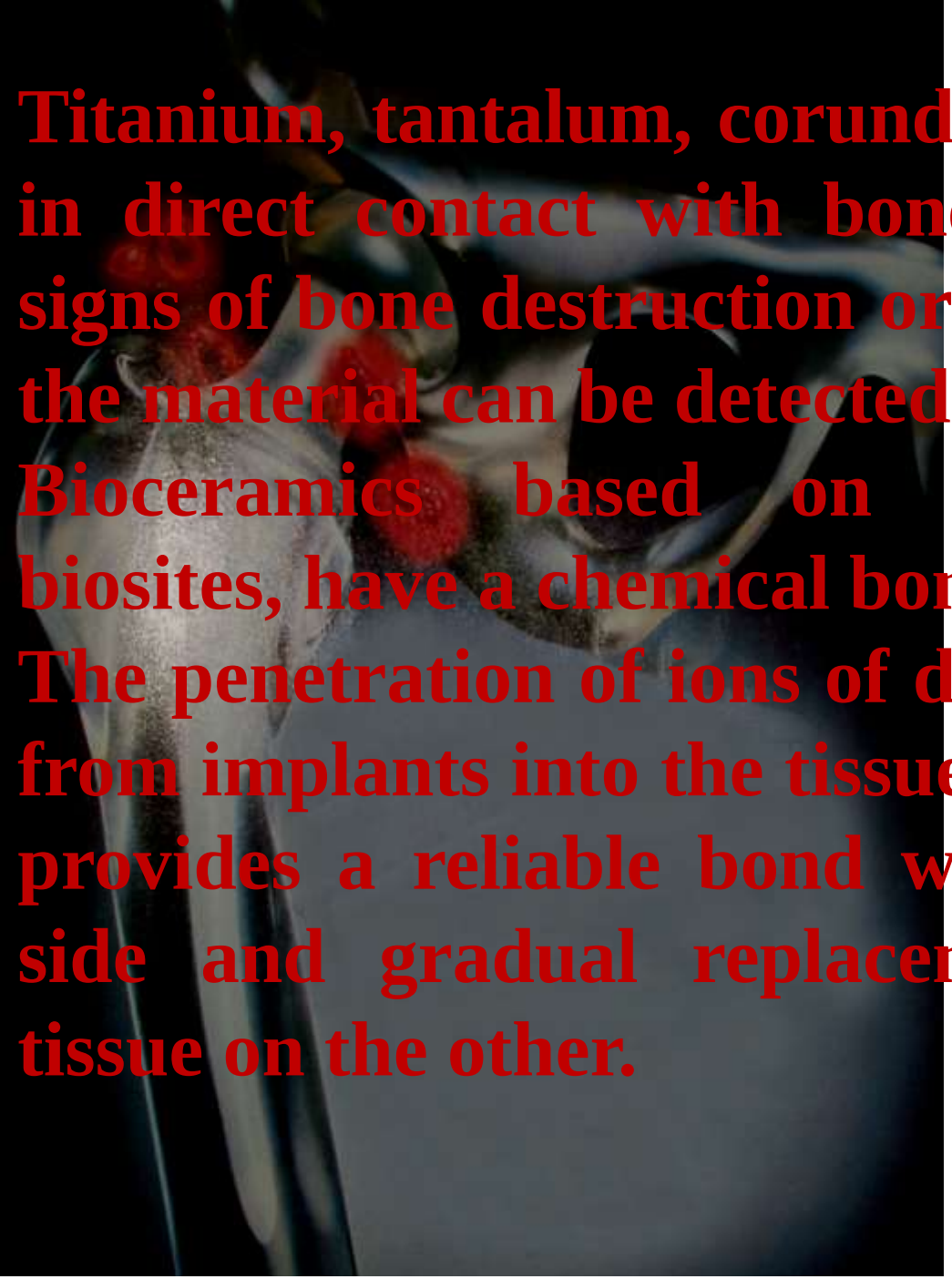


Causes of fracture consolidation disorders:

- short-term, incomplete or often interrupted immobilization;
- lack of repositioning of fragments, use of large loads during stretching, incorrectly performed osteosynthesis;
- irrational removal of viable bone fragments and resection of the ends of the fragments;
- circulatory disorders, incl. associated with soft tissue trauma;
- interposition;
- tropho-neurotic disorders;
- multiple fractures.

The reaction of bone tissue to the implant can be considered as a special case of reparative regeneration.

As orthopedic implants have different purpose, therefore different design and material from which they are made, the reaction of tissue to their presence will not be stereotyped.



Titanium, tantalum, corundum ceramics are in direct contact with bone tissue, and no signs of bone destruction or integration with the material can be detected at the border.

Bioceramics based on hydroxyapatites, biosites, have a chemical bond with bone.

The penetration of ions of different elements from implants into the tissue is shown, which provides a reliable bond with bone on one side and gradual replacement with bone tissue on the other.

If you don't run until you're healthy, you'll have to run when you get sick
Horace

Thank you
for your attention !!!!!!