INTERNATIONAL JOURNAL OF INTEGRATIVE AND MODERN MEDICINE

Digital X-Ray Suitable for Standard and Orthopedic Imaging

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Abstract: The study is carried out using medical X-ray machines. The X-rays they form pass through the human body and are recorded by the system. After that, analog devices produce an image on an X-ray film that needs to be developed. More modern digital X-ray systems are equipped with a sensitive detector that instantly transmits an X-ray image to a computer monitor.

Keywords: X-ray, treatment progress, radiography, trauma, traumatology. With the help of an X-ray of the extremities, it is possible to:

- Diagnose a fracture Limb X-rays are widely used to detect bone fractures. This allows doctors to accurately determine the location and nature of the fracture, which is the basis for developing a treatment plan.
- Evaluate deformations and anomalies X-rays can be used to diagnose deformities of the limbs, congenital anomalies and changes.
- Assess the condition of the joints X-ray examination of the limbs helps to assess the condition of the joints, including their structure and possible changes associated with arthritis or other joint diseases.
- Evaluate bone density X-rays can be used to assess bone density, which is important in the diagnosis of osteoporosis and other bone diseases.
- Monitor the progress of treatment X-ray images of limbs can be used to monitor treatment progress and evaluate the effectiveness of medical interventions.

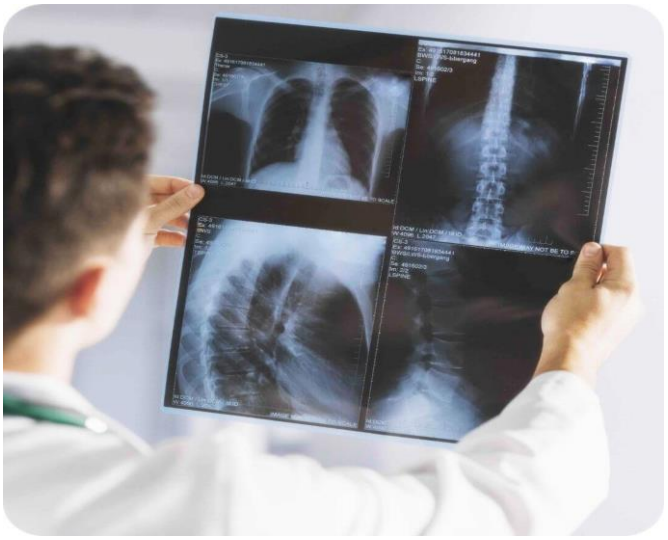
Low dose of radiation

Modern technologies of X-ray examinations used in the Medical Center "Medikom Kryvbas" ensure minimization of radiation dose for patients, making the procedure relatively safe.

Limb X-rays are a painless and quick procedure that provides important information for the diagnosis of various limb conditions. This method remains a key tool in the diagnosis of injuries, deformities, joint diseases and other conditions.

Radiography – what is it?

1. Definition and essence of the technique
2. What does the X-ray show?
3. Types of radiography
4. Where and for what is radiography used?
5. Indications and contraindications
6. Preparation and conduct of the procedure
7. Advantages and disadvantages of radiography Radiography has been used in medicine for more than 100 years. From the moment of its appearance to the present day, this diagnostic method is considered one of the most informative.



Definition and essence of the methodology

Radiography is the main method of X–ray examination, which consists in obtaining an X-ray image: a shadow image of organs on an X-ray film.

The study is carried out using medical X-ray machines. The X-rays they form pass through the human body and are recorded by the system. After that, analog devices produce an image on an X-ray film that needs to be developed. More modern digital X-ray systems are equipped with a sensitive detector that instantly transmits an X-ray image to a computer monitor.

What does the X-ray show?

On the X–ray, the doctor sees shadows of varying intensity: white areas in place of bones, gray areas in place of soft tissues; lungs look black on the X–ray. X-ray images are obtained in contrast, since different tissues capture X-rays differently: the denser the tissue, the lighter it will be on the X-ray image.

Radiographs are inherently negatives, so the lighter areas on them are called darkening. For example, a dense and light area of pneumonia against the background of "dark" airy lungs is designated by the doctor as a shadow. A bone fracture will be visible as a darker "fracture" on the light "field" of the bone.

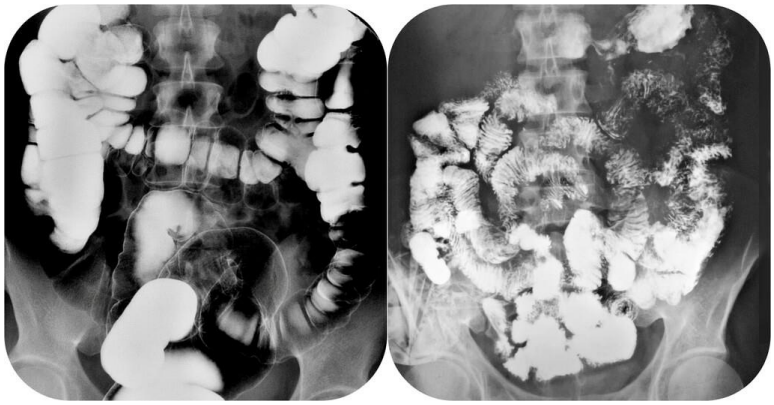
Shadow images obtained by radiography give the doctor information about the condition of various organs (lungs, heart, stomach, lymph nodes, bones, spine, etc.), and also allow you to identify various pathologies: areas of inflammation, destruction (destruction), dystrophy, tumor nodes, abnormalities of organ development.

Types of radiography

Depending on the purpose of the study, radiography is divided into 2 types:

1. Overview – allows you to examine a wide area, for example, the thoracic or abdominal cavity.
2. Sighting – used to study a separate organ or area: pictures of teeth, 1st and 2nd cervical vertebrae, ankle joint, etc.

In cases where conventional radiography is not enough for diagnosis, a contrast study is used. Contrast radiography is used to examine internal hollow organs such as the stomach, intestines, bronchi, vessels, bladder, etc. In this case, radiopaque substances are injected into the patient's body – orally, intravenously or by other means. The drug actively absorbs X-rays: filling the examined internal organs, it "colors" them from the inside, making the image clearer and more contrasting. Radiopaque substances are absolutely safe for the patient: they do not accumulate in the body and are excreted naturally.



Where and for what is radiography used? As mentioned above, radiography allows you to study almost all areas of the human body.

To date, the method is used in the following areas of medicine:

- Traumatology. An X–ray is a mandatory examination for bone fractures. It is used to diagnose dislocations of joints; suspected tumors, inflammation, degenerative-dystrophic changes, abnormalities and malformations of bones, joints, spine.
- Orthopedics. The doctor prescribes radiography to detect flat feet; scoliosis, lordosis and other posture disorders.
- Otorhinolaryngology. The study is used to diagnose inflammatory diseases of the paranasal sinuses (sinusitis, frontitis, sinusitis), to identify congenital malformations and injuries of the nasal bones, including the nasal septum.
- Urology. The doctor may prescribe an X-ray if nephroptosis (kidney prolapse), stones or tumors in the kidneys and urinary tract, rupture of the bladder are suspected.

- Gynecology. Radiography with contrast is used to assess the patency of the fallopian tubes and to identify intrauterine pathologies.
- Gastroenterology and abdominal surgery. Radiography without contrast of the abdominal cavity is prescribed for urgent conditions, suspected intestinal obstruction, tumor processes, the presence of foreign bodies, rupture of hollow organs. Contrast studies are used in diseases of the esophagus (ulceration, diverticula, stricture, cancer), stomach and intestines (cancer, polyps, diverticula, obstruction), gallbladder and bile ducts.
- Pulmonology. Chest X-ray is performed to detect pneumonia, pleurisy, tuberculosis, lung and bronchial injuries; if parasitic diseases are suspected, as well as to detect foreign bodies in the respiratory tract.
- Dentistry. Dental sighting and orthopantomograms (panoramic images of the upper and lower jaws) are used in the diagnosis of dental and periodontal diseases, deformities and malformations of the jaw area. Indications and contraindications for radiography Thus, the study is prescribed for a variety of diseases of the internal organs of the thoracic and abdominal cavity and almost always for injuries and fractures. Radiography allows you to confirm or refute the alleged diagnosis. In addition, the study is used in the treatment of pathology – to assess its effectiveness.

There are no absolute contraindications to X-ray examination. Pregnancy and childhood are relative. However, even in these cases, the study is conducted if the doctor believes that the potential health risk from radiation is lower than the risks from an inaccurate diagnosis of the disease.

Preparation and conduct of the procedure

In most cases, special preparation of patients for X-ray examination is not required. The exception is patients with severe flatulence and constipation – they are recommended to have a cleansing enema 2 hours before the procedure. If a large amount of fluid, mucus and food residues is found in the patient's stomach, he may be prescribed gastric lavage 3 hours before the examination.

Before the procedure, the patient must remove jewelry and take metal objects out of his pockets. In some cases, for example, when examining the spine, a specialist may ask the patient to undress. Next, the examinee takes the right position – an X-ray technician helps him in this. X-rays can be performed in a standing, lying or sitting position. To protect sensitive areas from radiation, the X-ray technician covers them with lead aprons. During the procedure, the doctor and the laboratory assistant are in the next room, protected from X-rays. From it, specialists remotely control the X-ray machine and monitor the condition of the subject. To make the images clear and "uncoated", the patient does not move during the procedure and holds his breath (for a short time when X-rays are applied).

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