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IMPLEMENTATION OF THE METHOD OF TEACHING X-RAY THERAPY IN HIGHER EDUCATIONAL INSTITUTIONS

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Abstract
The paper examines the concept of the term pedagogical technology, applying the training of students in the field of biomedical engineering of radiation therapy. The scope of application and properties of long-focus and close-focus X-ray therapy is shown. Also, the classification of X-ray therapy is given.

Keywords: X-ray therapy, educational technology, long-focus, close-focus, heel spur.

Introduction

At present, the teacher faces an important task: to teach students to learn. The student is an equal participant in the learning process, he is equally responsible for his successes, failures, and shortcomings with the teacher. Teachers should promote the development of his activity and independence at all stages of learning so that the student can accept the learning task, participate in choosing the means of solving it, and exercise self-control. He is given the right to choose the method and path of activity, participation in the learning process does not consist in accepting a ready-made model, but in expressing assumptions, choosing an alternative. Today, no one needs to be proven that a comprehensive mass introduction of modern pedagogical technologies in all areas of education is necessary [1-4].

The term "technology" is borrowed by pedagogy from the production sphere, however, like any professional activity, pedagogical activity is realized in certain actions aimed at solving

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the problems of development, education and formation of the individual. In the "Explanatory Dictionary" the term "technology" means "a set of techniques used in any business, art."
Pedagogical technologies are [1-8]:
N.V. Astashkina: “Pedagogical technology is the interaction of teachers and students in any field of activity, organized on the basis of clear structuring , systematization, programming, algorithmization, standardization of methods and techniques of teaching and education, using computerization and technical means.”
V. P. Bespalko: "A set of means and methods for reproducing theoretically substantiated processes of training and education, allowing for the successful implementation of the set educational goals ." His: "Pedagogical technology is a substantive technique for implementing the educational process."
V. I. Zagvyazinsky : “This is a systemic design activity that allows for programming educational situations, the activity of learning subjects with a significant degree of probability guaranteeing the desired results.”
V. M. Monakhov: This is a well-thought-out model of joint pedagogical activity in designing, organizing and conducting the educational process with the unconditional provision of comfortable conditions for students and teachers.
L. G. Semushkina , N. G. Yaroshenko: “This is a method of implementing the content of training provided by educational programs, which includes a system of forms, methods and means of training, thanks to which the most effective achievement of certain set goals is ensured.”
Analyzing these well-known concepts of the authors, we can identify the following characteristics that pedagogical activity must meet if it is carried out within the framework of one or another pedagogical technology:
a systematic view of the learning process – its content, methods and means are interconnected and interdependent;
The structural elements of pedagogical technology are: the goals and content of training, means of pedagogical interaction, organization of the educational process, teacher and student in interaction; the result of the activity;
organizing interaction between teacher and student within the framework of the learning process;
implementation of control over the process of students' cognitive activity.
According to the above, students in the field of biomedical engineering were trained in the concept of radiation therapy , which uses special types of electromagnetic radiation energy or beams of elementary nuclear particles capable of killing tumor cells or inhibiting their growth and division. Let's consider the effect and properties of the X- ray therapy procedure , it is carried out externally, targeted, that is, irradiation of the anatomical area with ionizing X-ray radiation of varying magnitude with a dose to obtain a certain therapeutic effect. All over the world, X-ray therapy is considered a dangerous procedure and has many contraindications and side effects [9-13].

1-Fig. Therapy using X-rays

Fig.-1 shows radiation therapy using X-rays, where with small doses of radiation (up to 3-5 Gray) it is possible to achieve a local analgesic, anti-inflammatory effect, for improve microcirculation and tissue regeneration, reduce their swelling. In large doses (up to 60-70 Gray) - which achieves the death of malignant tumor cells.

According to the indication, X-ray therapy is divided into two types: long-focus X-ray therapy, which is used for: dystrophic diseases of the skeleton, neuralgia, "heel spur", epicondylitis , sports injuries (bruises, sprains), trophic and purulent, fungal inflammatory skin diseases, burns, frostbite, osteomyelitis, panaritium, anastomositis , etc .; close-focus X-ray therapy for the treatment of tumor diseases of the skin: basalioma , squamous cell carcinoma. During irradiation, the patient's entire body is covered with a protective lead apron, leaving only the area of interest for irradiation. The procedure takes 5-10 minutes.

Fig. 2. External appearance of the SENSUS SRT-100 close-focus X-ray therapy device | Uromed M.

Fig.-2 shows the SRT-100 close-focus X-ray therapy device from the American company SENSUS used for non-invasive treatment of non-melanoma skin cancer and keloid scars. The treatment is absolutely painless, leaves no scars, does not require surgery or anesthesia. It can be used in patients with cardiovascular diseases or diabetes.

Fig. 3. X-ray therapy for heel spurs.

Fig.-3 shows the process of X-ray therapy for heel spurs. Heel spurs are characterized by rapid growth of bone tissue in the area of the osteophyte (spur), which compresses the nerve endings and injures the fascia. For this reason, severe pain occurs, the foot is deformed and the gait changes. Effective modern treatment of heel spurs is based on taking medications that reduce inflammation, unloading the sore heel and physiotherapy .

This method is used when other physiotherapy procedures , such as shock wave therapy for heel spurs , laser therapy , electrophoresis, have not produced the expected results. Physiotherapeutic treatment of heel spurs with X-rays is carried out on an outpatient basis using a special device that emits X-rays in the range of 20-400 kV. During the procedure, ionizing (radioactive) radiation acts pointwise on osteophyte , minimally damaging other tissues. Under the influence of small doses of radioactive X-rays, nerve endings are blocked, and the intensity of pain decreases.

Bone growth is not eliminated by radiation, but this type of therapy has the following positive effects:

Pain relief. The effect is noticeable after the first procedure, and a lasting result is observed after 4-5 radiation sessions.

Relief of inflammation. In the area of impact, blood circulation processes are enhanced, which leads to suppression of the production of prostaglandins, which cause tissue inflammation.

Regeneration. Small doses of radiation help speed up the restoration of damaged fascia cells.

Also, ionizing radiation enhances the effect of anti-inflammatory drugs, so when undergoing a course of X-ray therapy, the attending physician, as a rule, makes adjustments to the scheme. drug treatment of heel spurs .

Therapy using X-rays has its own classification – deep, superficial, local (when affecting a specific area or organ) or total (when affecting the entire body). It is determined by the depth and degree of its impact. The safest and causing minimal harm to surrounding normal tissues is the superficial method of X-ray therapy [10-13].

It can be used when there is a possibility to act directly on the tumor, with the possibility of access to it. In order to minimize damage to healthy surrounding cells, the boundaries of the malignant tumor are necessarily determined before performing X-ray therapy.

Use with other drugs: Often, X-ray therapy is used together with other drugs. A greater effect in treatment is achieved when treatment is carried out together with chemotherapy drugs. The use of X-ray therapy is not limited to the treatment of malignant tumors. It can be used to remove warts, while much smaller doses of radiation are used.

Although X-ray therapy is considered to be quite an effective method of fighting cancer, especially effective at the initial stage of their development, it cannot be used as a monotherapy , it must be used in combination with other treatment measures. The quality of X-ray treatment is increased when used simultaneously with chemotherapy. Often, in order to prevent cancer relapses, a course of X-ray therapy is indicated for patients who have had a tumor removed surgically.

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