

USE OF LASERS IN SURGERY AND DERMATOLOGY

Veselovskiy V.A., student

Scientific supervisor – Tsimafeyeva-Moran Yu.V., senior lecturer

English Language Department №1

Belarusian National University of Technology

Minsk, Republic of Belarus

A new chapter for surgeons has begun with the emergence of industrial lasers. At the same time, the advancements in laser metal processing have been invaluable.

The tissue must absorb this laser radiation, otherwise there is no effect. The most popular type of laser in surgery is carbon dioxide. An alternative type of laser that can be utilized is monochromatic, that is, it heats, destroys or welds certain biological tissues by using a specific wavelength of light. For example, the argon laser beam passes freely through the frosted vitreous body and gives off its energy to the retina, the wavelength used is a color which is close to red.

Carbon dioxide lasers are suitable for most applications, such as when you need to cut or weld fabrics of different colors to each other. However, herein raises another problem. Tissues saturated with blood and lymph, contain a lot of water, which causes laser radiation to lose energy. It is possible that increasing the energy the laser beam can resolve this issue, however, this leads to tissue burning. The creators of surgical lasers must resort to different techniques, which greatly increases the cost of the equipment [3].

One such technique is inspired by metal welders, who have long known that when cutting a stack of thin metal sheets, it is necessary that they fit snugly together, and when spot welding, additional pressure is needed the parts to be welded to come into contact.

This method was adapted to be used in surgery: Professor O. I. Skobelkin and his co-authors stipulate that when welding tissues, slight force must be applied to them to force out the blood. In order to perform this new method, a new array of instruments was designed and created, which are in use to this day in gastrointestinal surgery and operations on the biliary tract, spleen, liver, and lungs [1].

The use of lasers in dermatology is caused by the occurrence of allergic reactions to drug treatment. Nowadays, He-Ne lasers, argon, CO₂, neodymium and semiconductor lasers are used in dermatology. They are used to treat trophic ulcers, eczema, neurodermatitis, psoriasis, lichen planus, viral and benign skin lesions.

In practical medicine, laser radiation is used mainly for: stimulation of disturbed metabolic processes and tissue trophism, coagulation of the lesion.

Under the influence of radiation, the regenerative process is activated, pain in the lesions decreases and disappears, itching stops, and the exchange of cellular elements is activated. Along with local, general changes in metabolism and reactions in the body are also detected.

A feature of low-intensity laser irradiation is that gross destructive changes do not occur in the skin, activation of metabolic and regenerative processes is observed in the irradiated area and the body as a whole [2].

Laser therapy treatment reduces inflammation and analgesic effect in the patient's body, which leads to more active recovery. It should be noted what kind of reaction this treatment causes. It has been revealed that laser exposure does not have a negative effect on humans, but, on the contrary, stimulates the healing of damaged areas.

The biological effect of laser treatment is to enhance metabolism. Molecules that can absorb light give off the resulting energy to other molecules. This process creates a regeneration effect, which is noted in the treatment of many diseases.

Laser therapy has found wide application in medicine. It promotes a favorable course of pathological processes and accelerates the recovery process of patients.

References

1. Dobro, L. F. Lasers in medicine / L. F. Dobro, N. M. Bogatov, V. V. Suprunov. – Krasnodar: Kuban State University, 2011. – 80 p.
2. Petrishcheva, N. N. The use of semiconductor lasers in dermatology and cosmetology : a guide for doctors / N. N. Petrishcheva, E. V. Sokolovsky. – St. Petersburg : St. Petersburg State Medical University, 2001. – 125 p.
3. Shakhno, E. A. Physical foundations of the use of lasers in medicine / E. A. Shakhno. – St. Petersburg: ITMO University, 2012. – 129 p.