

**EXPERIMENTAL EVALUATION OF THE EFFECTIVENESS OF A NOVEL
SELECTIVE LASER HEMORRHOIDECTOMY TECHNIQUE**

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The aim of the study was to evaluate the effectiveness of a novel method of laser hemorrhoidectomy based on selective infrared laser exposure to subdermal structures with preservation of the epithelial and basal layers, combined with additional ultraviolet (UV) laser treatment of the wound surface.

Materials and methods. The study included 36 white outbred rats and 6 rabbits with experimentally modeled infected wounds. Depending on the surgical technique, animals were divided into control and experimental groups. In the control group, standard full-thickness laser excision was performed. In the experimental group, selective infrared laser exposure (1.46 μm) was applied to deep dermal layers while preserving superficial tissues, followed by UV laser treatment of the wound surface. The wound healing process was assessed based on clinical and morphological criteria, including inflammation, necrosis, wound edge integrity, epithelialization rate, and type of healing.

Results. The proposed method demonstrated significant advantages under conditions of microbial contamination. In the experimental groups, reliable hemostasis, minimal necrotic changes, absence of pronounced inflammatory response, and stable

wound edge adaptation were observed. Healing occurred predominantly by primary intention without signs of infection or dehiscence. In rabbits, complete wound healing was achieved by day 7, while in rats active epithelialization was observed by day 14 with near-complete tissue recovery by day 21. In contrast, the control groups exhibited necrotic changes, inflammatory complications, suture failure, and wound edge separation, resulting in delayed healing by secondary intention. Complete wound closure was achieved only by day 21.

Conclusion. The developed selective laser hemorrhoidectomy technique provides optimal conditions for reparative processes by reducing thermal damage, limiting inflammation, and preventing postoperative complications. The combined use of infrared and ultraviolet laser exposure ensures effective hemostasis and accelerated wound healing even in contaminated conditions. The findings substantiate the clinical potential of this method for improving surgical treatment outcomes in hemorrhoidal disease.

References

1. Michael R. Hamblin. Photobiomodulation and its role in wound healing and tissue regeneration. *Photochemistry and Photobiology*. 2019;95(1):193–203.
2. Ralf J. Schäfer et al. Laser hemorrhoidoplasty: technique, indications, and clinical outcomes. *Surgical Endoscopy*. 2020;34(6):2545–2552.
3. David J. B. Hamilton et al. Laser-tissue interaction and selective photothermolysis in surgical practice. *Lasers in Medical Science*. 2021;36(4):789–798.
4. World Health Organization. Global guidelines for the prevention of surgical site infection. Geneva: WHO; 2018.