

Addressing Vasculogenic Erectile Disorders through Targeted Narrow-Spectrum Infrared (IR) Radiation

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Abstract

The findings from a study examining the impact of far-range narrow-spectrum Infrared (IR) Radiation on the erectile function of 39 patients with Erectile Dysfunction (ED) of varied etiologies are presented. The use of long-range infrared emitters in ED treatment is demonstrated as an effective and secure therapeutic method. Key advantages include non-invasiveness, absence of side effects, rapid improvement in erectile function, and the potential for outpatient application.

Keywords: Erectile dysfunction; Treatment; Far-infrared radiation.

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Introduction

In recent decades, innovative approaches for treating erectile disorders, such as genetic engineering and stem cell utilization, have emerged. However, these methods are invasive, costly, and often tested primarily on animals [1,2]. Gene therapy, while a potential alternative to existing ED drugs, is more effective when combined with traditional treatments [3,4]. Low-intensity shock wave therapy has shown promise in addressing vascular issues in penile tissues, as demonstrated in initial clinical studies [5,6].

Conventional clinical shockwave devices create waves converging at one focal point, posing challenges for ED treatment due to the need to reposition the wave source along the penis. To address this, a linear shock wave therapy has been developed specifically for ED treatment, demonstrating long-term effectiveness and positive effects on penile angiogenesis [7].

In addition to acoustic waves, infrared (IR) radiation has a wave propagation pattern. Notably, IR radiation, transmitted by photons, is deeply penetrating and safe for the human body, unlike x-rays, ultraviolet, or gamma rays. Long-range infrared radiation falls between microwaves and optical infrared ranges, offering Molecular Emission and Absorption Spectra (MEAS) of various cellular metabolites [9].

Research indicates that infrared energy irradiation activates anabolic and transport processes in cells, enhancing protein synthesis, oxygen uptake, and metal ion transfer through cell membranes [9]. Long-range infrared radiation's effects depend

on the biological development phase and the object's initial state, with minimal impact on a healthy organism and regulatory effects during pathology [10-12].

Positive effects of long-range IR radiation on platelet functional properties and rheological parameters are observed during *in vitro* irradiation of animal blood. Additionally, there's evidence of restoration of initial rheological indices and platelet functional activity in white rats subjected to immobilization stress and irradiated with a long-range IR emitter.

Long-range infrared radiation, specifically in the terahertz range, exhibits promise in affecting pathogenetic mechanisms related to cardiovascular pathology [10]. It induces increased nitric oxide production by vascular endothelium, normalizing vasodilating activity and preventing endothelial dysfunction in animals subjected to acute immobilization stress. Prolonged exposure

to terahertz waves in stressed animals further enhances nitric oxide concentration while decreasing endothelin-1 levels, contributing to the balance of vasoconstrictor and vasodilator substances.

Materials and Methods

We conducted a comprehensive examination of 39 patients experiencing erectile dysfunction (ED) with diverse etiologies. The average age of the patients was 53.1 ± 13.8 years (ranging from 38 to 74 years), with 28 patients falling within the 38-55 age group and 11 patients aged 56 and above. Following the examination, which encompassed the International Index of Erectile Function -5 (IIEF-5) questionnaire and diplography

of the cavernous arteries of the penis, the patients underwent treatment using long-range narrow-spectrum IR emitters based on our protocol. This involved eight sessions lasting 15 minutes each, administered twice daily using GI and ZB series emitters of the "Chair" type. Additionally, the ZB series radiator (wavelength $22 \mu\text{m}$) was applied locally to the penis area for 3 minutes, twice daily, over an 8-session treatment course (Figures 1-3).

Control examinations involved the completion of the IIEF-5 questionnaire at 1- and 2 months post-treatment. Statistical analysis utilized the t-student test and Wilkison criterion, with a significance level set at $p < 0.05$.

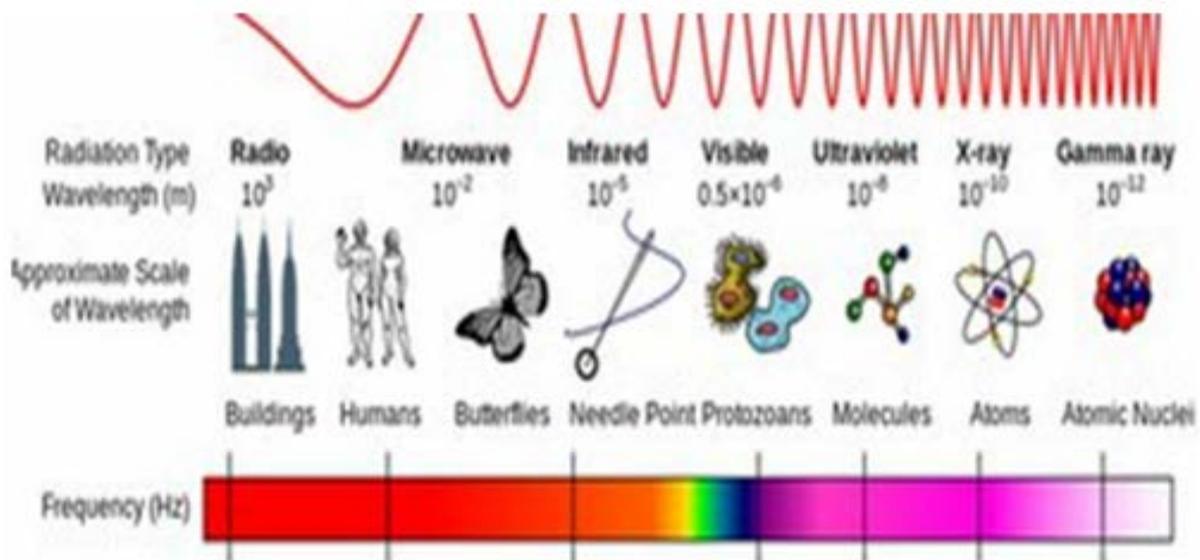


Figure 1: Human own radiation.

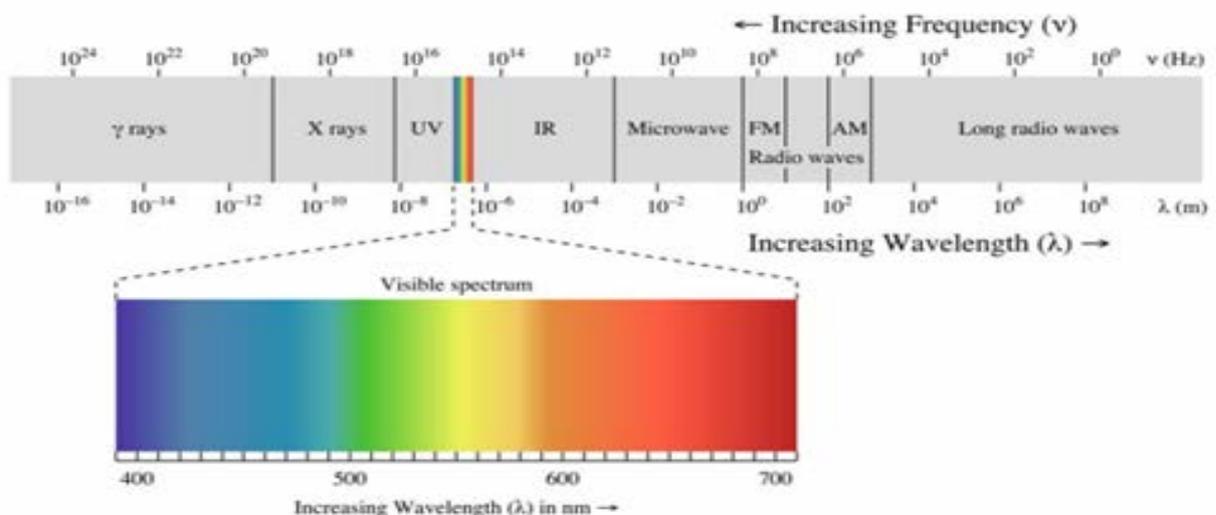


Figure 2: Spectrum of electromagnetic radiation.



Figure 3: Methods of exposure of IR emitter to cavernous arteries.

Results and Discussion

Analysis of the IIEF-5 questionnaire revealed the severity of ED as follows: mild in 5 (12.8%) men, moderate in 23 (58.9%) patients, and severe in 11 (28.2%). Etiological factors and their combinations included arterial hypertension in 27, diabetes mellitus in 13, and coronary heart disease in 11 cases. Most of the participants (87.1%) were classified as overweight or obese, and 30.7% were smokers. A gradual increase in ED signs was observed in most men (76.9%) [13].

Regarding concomitant diseases (antihypertensive drugs, anti-lipid, and hypoglycemic drugs), 79.4% of patients were regularly taking medications, and the dosage remained unchanged throughout the study. Based on the andrological examination, arthritogenic ED was prevalent in 36 (92.3%) patients, while veno-occlusive ED was observed in 3 (7.7%). The IIEF-5 questionnaire results at all treatment stages.

The tabulated data reveals a significant and reliable increase of 33.5% in the "Erectile Function" indicator post-treatment, with a subsequent dynamic rise of 20.9%. The cumulative improvement totaled 61.5%, affirming a progressively advancing therapeutic impact and the restoration of erectile function. Notably, patients reported subjective improvements in erectile function as early as the 2nd-3rd session with the utilization of narrow-spectrum long-range infrared emitters [14].

In total, a favorable outcome was achieved in 28 (71.8%) patients with the use of narrow-spectrum IR emitters for ED. Treatment efficacy for mild ED reached 80% (4 patients), moderate ED demonstrated a success rate of 82.6% (19 patients), and for severe ED, it stood at 45.4% (5 patients) [15]. Noteworthy is the improvement in erectile function observed in 13 (46.4%) patients

with mild and moderate ED, achieved solely using IR emitters, without additional forms of treatment.

Conclusion

Based on the comprehensive analysis of study results and clinical observations, it can be confidently asserted that narrow-spectrum IR emitters contribute to the enhancement of endothelial function in cavernous arteries. The positive trajectory of the "Erectile Function" indicator according to IIEF-5 supports this assertion. Long-range narrow-spectrum infrared radiation emerges as an effective, safe, and non-invasive approach for addressing erectile dysfunctions of vasculogenic origin. For patients with mild to moderate ED severity, the technique can serve as an independent treatment, while for severe ED cases, its incorporation into a comprehensive combination therapy scheme is recommended.

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