



Clinical Evaluation of the Efficacy of Acne Vulgaris Laser Therapy

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Abstract: this article summarizes the study for the treatment used a medical device based on a copper vapor laser Yakhroma-Med, which emits two wavelengths - green and yellow (511 nm and 578 nm), coinciding, respectively, with the absorption peaks of melanin and hemoglobin. Laser light is emitted in pulses of 20 nanoseconds, at intervals of the order of 100 microseconds. Yakhroma-Med has a mechanical shutter blocking the laser beam, so that the exposure time can be selected from 0.1 to 0.9 s. Using light filters, it is possible to irradiate the yellow wavelength, green, or both together. The objective of our work included the clinical evaluation of the effectiveness of laser therapy for Acne vulgaris.

Key words: laser therapy, acne vulgaris.

Introduction: Acne (from ancient Greek ἀκμή - point, height, flourishing), or blackheads, is a long-term inflammatory skin disease that occurs when dead skin cells and sebum clog the hair follicle [3].

Typical signs of this condition are comedones, pustules, oily skin, and possible scarring [4][5][6]. The disease primarily affects the skin with a relatively large number of sebaceous glands, including the face, upper chest and back [7]. As a result, the manifestations of the disease can lead to anxiety, low self-esteem and, in extreme cases, depression or suicidal thoughts [8][9].

In 80% of cases, the main cause of acne is genetics [5]. The role of diet and smoking is unclear, and neither cleanliness nor exposure to sunlight play a role, according to experts [5][10][11]. In both sexes, hormones called androgens appear to be part of the underlying mechanism causing increased sebum production [12]. Another common factor is the overgrowth of Cutibacterium acnes bacteria, which is present on the skin [13].

There are treatments for acne that include lifestyle changes, medications, and medical procedures. Reducing the intake of simple carbohydrates such as sugar may help [14]. Commonly used drugs are applied directly to the affected skin, such as azelaic acid, benzoyl peroxide, and salicylic acid [15]. Antibiotics and retinoids are available in the form of drugs that are applied to the skin and taken by mouth to treat acne [15]. However, as a result of antibiotic therapy, antibiotic resistance may develop [16]. There are several types of oral contraceptives that help women fight acne [15]. Typically, healthcare professionals only use isotretinoin to treat severe acne due to the potentially higher risk of

side effects [15][17]. Part of the medical community recommends early and more intense acne treatment to reduce the overall long-term exposure of people[8].

In 2015, there were about 633 million people with acne worldwide, making it the eighth most common condition in the world[18][19]. Acne usually occurs during adolescence and affects approximately 80–90% of adolescents in the Western world[20][21][22]. Some rural societies report lower rates of acne[22][23]. Children and adults can become ill before and after puberty[24]. Although acne becomes less common in adulthood, it persists in nearly half of affected individuals in their twenties and thirties, and in a small proportion it persists beyond the age of forty[5].

Purpose: clinical evaluation of the effectiveness of laser therapy for Acne vulgaris (including diseases resistant to traditional methods of treatment).

Materials and methods: for treatment, a medical device based on a copper vapor laser Yakhroma-Med was used, which emits two wavelengths - green and yellow (511 nm and 578 nm), coinciding, respectively, with the absorption peaks of melanin and hemoglobin. Laser light is emitted in pulses of 20 nanoseconds, at intervals of the order of 100 microseconds. Yakhroma-Med has a mechanical shutter blocking the laser beam, so that the exposure time can be selected from 0.1 to 0.9 s. Using light filters, it is possible to irradiate the yellow wavelength, green, or both together. The laser beam is focused into a light spot with a diameter of 0.6 to 1.5 mm, depending on the selected nozzle, which also provides skin fixation and a constant laser power density. Laser radiation with such parameters can selectively destroy the vascular and pigment structures of the skin without damaging the epidermis. Focusing the laser beam into a small spot allows you to limit the area of influence to the pathological area, avoiding irradiation of normal tissue. The pulsed nature of the radiation and the laser shutter make it possible to dose the absorbed energy. There are four interrelated factors in the pathogenesis of acne: overproduction of the sebaceous glands, follicular hyperkeratosis, reproduction of *Propionibacterium acnes* and inflammation. Suppression of the vascular component of inflammation due to selective laser coagulation allows interrupting the pathogenetic chain at the stage of inflammation.

Results: for the period from October 2005 to June 2007, 28 patients with various forms and severity of acne, as well as post-acne phenomena were treated at the Yakhroma-Med laser unit in the salon. The study involved 18 patients with papulopustular form of acne with 2 (10-20 papulopustules) and 3 (21-30 elements) severity. Among the patients there were 12 women (67%) and 6 men (33%) aged 19 to 27 years. Nine patients (50%) with papulopustular acne were treated with the Yakhroma-Med laser system due to resistance to previously used methods, oral antibiotics, hormonal therapy, and topical treatment with keratolytic, antibacterial, and anti-inflammatory effects. Irradiation was carried out at a wavelength of 578 nm, the pulse power was 0.5–0.8 W, the pulse time was 0.2–0.4 s, and the light spot diameter was 1.5 mm. Produced local treatment of secondary inflammatory elements of acne (papules and pustules) with a frequency of 1 time in 7-10 days to 1 time in 1-1.5 months. The course consisted of 2–6 sessions of laser therapy. The number of treatment sessions performed directly depended on the severity of the disease. Long-term (more than 6 months) remission was achieved in 14 patients (78%), and 6 of them (33%) suffered from resistant forms of acne; improvement (reduction in the frequency of relapses and the number of rashes) was achieved in 4 people (22%), including 3 patients (17%) with resistant forms of the disease.

Conclusions: the obtained positive results allow us to consider therapy using the Yakhroma-Med laser device as an effective method for treating acne, including resistant forms of the disease.

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