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# The Appearance of Psoriasis as a Current Problem Today

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**Abstract:** Therapeutic and restorative measures for psoriasis include drug and non-drug interventions, among which the use of physiotherapeutic technologies based on the use of natural and preformed physical factors is very promising. The paper presents a review of modern literature on the use of physical methods in the treatment and rehabilitation of psoriasis. Therapeutic effects achieved by using various types of physiotherapy, in particular light, in patients with psoriasis are analyzed.

**Keywords:** psoriasis, physiotherapy, phototherapy, laser therapy.

For a long time, *ultraviolet radiation* (UV) has been used in clinical practice for the treatment of psoriasis, the positive effect of which on the skin of psoriasis patients has been known since ancient times. To date, ultraviolet therapy occupies a leading position in the treatment of psoriasis and extensive experience has been accumulated in the use of phototherapy in psoriasis, which is due to the pathogenetic orientation of UV radiation in this dermatosis and has been confirmed by numerous studies [2, 11]. The positive effect of ultraviolet radiation on psoriatic skin is due to anti - inflammatory, immunosuppressive and antiproliferative actions [6].

One of the most effective modern methods of phototherapy for psoriasis is photochemotherapy - (PUVA therapy), based on the combined use of long-wave ultraviolet rays (320-400 nm) and photosensitizers from the furocoumarins group . Its purpose is appropriate for moderate and severe forms of psoriasis, common vulgar and exudative psoriasis, persistent disease, severe infiltration. Treatment is carried out according to the method of 3- or 4-time irradiation per week, on average, the course is 20-30 procedures. The implementation of the therapeutic effect of PUVA therapy in psoriasis is facilitated by the suppression of parakeratosis and the proliferation of genetically modified basal keratinocytes, a decrease in the concentration of pyrimidine nucleotides in the - karyoplasm [2, 14]. One of the modern options for photochemotherapy are PUVA baths.

For the treatment of psoriasis, methods of medium wave therapy (broadband UVB therapy) with a wavelength of 280–320 nm using the method of five exposures per week, 20–30 procedures, have become widespread.

Scientific research in recent years has made it possible to isolate narrow wavelength ranges from a wide spectrum of UV radiation, in particular, medium-wave narrow-band radiation. And now, along with broadband UVB, narrowband UVB therapy with an emission peak at a wavelength of 311 nm is used to treat psoriasis, which is comparable in high therapeutic efficacy to PUVA therapy, but unlike it does not require the use of a photosensitizer [25]. Treatment is carried out according to the method

of 3-5 times exposure per week with a course of 20-30 procedures. The indication for its appointment is psoriasis, characterized by weakly infiltrated plaques.

Promising is the optimization of physical effects in psoriasis, which can be carried out in various ways, including through the use of combined methods or combined pharmaco-physiotherapeutic treatment [8]. To increase the effectiveness of treatment, PUVA therapy is combined with various drugs: retinoids (re- PUVA therapy), with methot rexate.

*Low-intensity laser radiation* (LILR) has the following therapeutic effects: anti-inflammatory, anti-edematous, regenerative, immunocorrective, antihypoxic, pain-soothing, improves blood microcirculation [4, 29, 32, 34, 37].

The available number of studies on the therapeutic value of low intensity laser radiation in psoriasis demonstrates its effectiveness in this disease and allows us to consider it as an important component of the rational therapy of psoriasis [27, 19].

It has been shown that *laser therapy* (LT) in the treatment of psoriasis has a number of undeniable advantages compared to traditional therapy, has a positive effect on the immune, neuroendocrine system, antiatherogenic, antiproliferative and anti-inflammatory effects on the body, proven in a number of studies [1, 5, 12].

In limited forms of psoriasis with moderate infiltration of plaques, as well as in the presence of on-duty plaques, the effectiveness of using local methods of laser therapy has been shown by local -action on the affected areas using helium-neon and semiconductor lasers generating radiation, respectively, in red (wavelength 0.63 μm) and the nearest infrared (wavelength 0.82-0.9 μm) regions of the optical spectrum [3, 10, 24]. At the same time, the treatment of psoriasis was accompanied by a faster resorption of infiltration in the lesions, more often there was a clinical recovery or a significant improvement. However, this type of laser therapy was not sufficient for multiple rashes.

With common forms of psoriasis, combined methods showed the best efficiency, in particular, the combination of local laser irradiation with segment-reflex laser effects or with other methods of physiotherapy treatment, which showed their undeniable advantages [1, 5, 10, 30, 31]. At the same time, the effectiveness of treatment increases significantly both due to cumulative effects and due to systemic neuroendocrine reactions in response to the reflex -segmental influence of LILI. Along with clinical improvement during RT, patients with psoriasis showed positive dynamics of immunological and oxidative parameters. In the process of laser therapy, a positive dynamics of lipid metabolism was noted, which was manifested by a significant increase in the level of high density lipoproteins, a decrease in the level of very low density lipoproteins and the level of albumins and fatty acids. Changes in the quantitative and qualitative composition of the lipid spectrum confirm the implementation of the antiatherogenic , antiproliferative and anti-inflammatory effects of the laser.

The possibilities of LILI, which has unique properties and multiple actions, have been demonstrated in patients with psoriasis with joint damage [27].

Important are the works devoted to the development of new effective therapeutic laser techniques for the treatment of psoriasis. There is information about the use of laser photophoresis in psoriasis - laser phoresis , laser photochemotherapy, laser puncture [10, 27, 28, 32, 35, 36, 42].

, *intravascular laser blood irradiation* (ILBI) showed itself well , showing a detoxifying effect that stimulates the functional activity of the immune system, accompanied by normalization of the number of total *7* -lymphocytes, the ratio of *G* -helpers and *7* -suppressors, a decrease in the content circulating immune complexes and complementary activity of blood serum [9, 27, 38]. Also noted is a corrective effect on microcirculation disorders, tissue hypoxia, lipid metabolism, blood glucose, indicator enzymes (alanine aminotransferase and aspartate notransferase ), activity of lipid peroxidation, pro- and antioxidant systems [9, 26, 39, 40], which is determined by the well-known activating effect of ILBI on the physiological mechanisms of sanogenesis with the normalization of life processes [4, 17, 18, 20].

The comparative effectiveness of the treatment of patients with psoriasis treated with ILBI, PUVA therapy, as well as a combination of these two methods showed that the inflammatory manifestations of psoriasis regressed faster in the case of LT, and a more active regression of infiltrative manifestations was observed with the combined effect of the two methods [26]. As a result of intravenous RT in the erythrocytes of patients, an increase in the activity of key antioxidant enzymes, which play an important role in cellular antioxidant protection, was found, while in the PUVA therapy group, there were no significant changes in the antioxidant status after treatment. The results of the studies performed have shown that the use of intravenous laser therapy in the complex treatment of psoriasis not only accelerates the regression of the main clinical manifestations of psoriasis, but also has a significant positive effect on microcirculation. According to thermography, in all groups, in the area of rashes, a decrease in skin temperature was noted during treatment, but more quickly and significantly (at the 3rd-4th procedure) in the case of laser therapy compared to PUVA therapy.

The combined use of ILBI and photochemotherapy is described, which contributes to the achievement of sufficiently high and, which is no less important for patients with psoriasis, stable treatment results due to the significant positive effect of LILI on the disorders of the microcirculatory and immune links present in psoriasis, the imbalance of the pro- and antioxidant systems, lipid metabolism disorders [24].

, a non -invasive variant of laser therapy, *supravenous laser blood irradiation* (NLBI), has become widely used in medicine . The inclusion of this type of low-intensity laser blood irradiation in the complex therapy of psoriasis is based on a pronounced sedative, detoxifying , anti-inflammatory, immunocorrective action , which contributes to an increase in the effectiveness of therapeutic measures.

A number of studies have shown a convincing clinical effect of the use of NLBI in the treatment of patients with moderate and severe forms of psoriasis using a gold vapor laser device (wavelength 628 ± 2 nm, radiation power > 1 W, pulse repetition rate 16 kHz, pulse duration 20 ns ) , monochromatic ATO-1-650 lamps with a wavelength of 0.63 μm, radiation power density 40 mW / cm $^{2}$ ), a serial apparatus of the " Magic " type with a constant and pulsed generation mode (wavelength 0.90-0.91 μm) [ 12, 21, 40].

Patients with plaque psoriasis were treated with supravenous light therapy on the area of the cubital vein in combination with local LILI treatment of large plaques [40]. The duration of one procedure for irradiating blood flowing through a vein is 20 minutes, the course consisted of 12-15 procedures.

We have obtained data indicating the prospects for the use of NLBI in combination with traditional therapy and Semax in patients with comorbid forms of psoriasis, in particular, in the presence of concomitant metabolic syndrome. The additional use of NLBI and Semax leads to a more significant decrease *in PASI* compared to traditional therapy, and improves the quality of life. Combination therapy helps to reduce the signs of oxidative stress, causes the correction of immune imbalance in patients with psoriasis, which are of great pathogenetic importance in this dermatosis. The use of NLBI is also justified in terms of the impact on the spectrum of anxiety and depressive disorders present in psoriasis. NLBI procedures and endonasal administration of Semax are well tolerated; according to clinical data, there were no adverse reactions .

In the field of RT, as a rapidly developing medical technology, broad prospects open daily due to the development of new light sources, optimization of RT regimes, and justification of new schemes and protocols for its implementation.

In recent years, in the treatment of limited plaque psoriasis in the stationary stage , the effectiveness of the excimer laser has been shown, which makes it possible to deliver high-intensity monochromatic light at a wavelength of 308 nm only to the affected area of the skin [22]. Unfortunately, the high cost of such treatment and the fact that only local forms of psoriasis are indications for it, in which the area of skin damage is less than 10% of the entire body surface, significantly limit the possibility of its use.

To date, clinical experience has been accumulated in the use of *photodynamic therapy* (PDT) for psoriasis [4, 41]. PDT is a treatment method based on the systemic or local application of photosensitizers in combination with light or LILI of various wavelengths. The interaction of a photosensitizer and a light quantum through a cascade of intermediate reactions results in the formation of reactive oxygen species, mainly singlet oxygen. Singlet oxygen, interacting with lipoproteins of the cell membrane or intracellular structures, triggers the mechanisms of lipid peroxidation, leading to disruption of the integrity of the cell membrane, destruction of intracellular structures, mitochondria, damage to the nuclear membrane and DNA fragmentation, which causes cell necrosis, triggering the mechanisms of apoptosis in some cells .

The use of PDT in psoriasis began after it became known that some photosensitizers selectively accumulate in proliferating tissues. A certain similarity in the occurrence of neoplastic changes and in the formation of the psoriatic process, as well as the results obtained in the treatment of oncological diseases by PDT, made it possible to count on the effective use of this method in the treatment of various forms of psoriasis.

The development of the PDT method in the treatment of psoriasis was carried out in two ways: using the application application of a photosensitizer, in which the latter is applied to the skin, after which the plaques are locally irradiated with laser light of the appropriate wavelength, and using intravenous administration of the photosensitizer.

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