NOVATEUR PUBLICATIONS
INTERNATIONAL JOURNAL OF INNOVATIONS IN ENGINEERING RESEARCH AND TECHNOLOGY
[IJIERT] ISSN: 2394-3696 Website: ijiert.org
VOLUME 8, ISSUE 4, Apr.-2021

# THE USE OF EXCIMER LASER IN THE TREATMENT OF VITILIGO

Narzikulov R.M.
Samarkand state medical Institute, Department of dermatology and venereology

## ABSTRACT
The study of the pathogenetic mechanisms of depigmentation development and the search for adequate combined methods for the treatment of patients with vitiligo is one of the most relevant areas of modern dermatology; The study was conducted on the basis of the regional dermatovenerological dispensary. The study was conducted in the time period from 2019-2020. We conducted a randomized comparative study of seventeen male patients with extensive depigmented spots on the face, which were snow-white when examined by the Wood lamp, were clinically diagnosed with vitiligo, and they were examined in the regional dermatological dispensary of the city of Samarkand. These patients had chronic vitiligo, which remained stable for 3 to 10 years.

**Keywords:** excimer laser, vitiligo, treatment

## INTRODUCTION
Vitiligo is characterized by a sudden loss of pigment on any part of the skin. Depigmentation foci are prone to peripheral growth, occur due to a violation of the secretory function of melanocytes or their death. The development of the disease is not accompanied by subjective symptoms, does not pose a threat to life, but is an unfavorable factor that has a serious impact on the quality of life, the psychoemotional state of the patient, his mood and leads to violations of social ties and maladaptation. According to WHO, there are up to 40 million people in the world (about 2.8% of the world's population) suffering from this disease. Vitiligo occurs everywhere regardless of race, gender or age, occurs at any age, but most often from 8 to 25 years. Until now, it is unclear as a result of the action of what factors abruptly stops the synthesis of melanin and melanocytes die. Some exogenous factors may have a direct or indirect effect on melanocytes, infeonic, chemical and toxic agents, excessive ultraviolet radiation, and stress. At the same time, chronic liver diseases of infectious or toxic origin, helminthic invasion, combination with autoimmune diseases (autoimmune thyroiditis, lupus erythematosus, rheumatoid arthritis, focal alopecia, atonic diseases), can probably contribute to the appearance of vitiligo. Vitiligo is a multifactorial disease with a genetic predisposition. A significant number of genes involved in the pathogenesis of vitiligo have been identified, but it is not yet possible to name the key ones. Currently, several theories of the pathogenesis of vitiligo have been formulated, among which the most well-founded are the theory of immune disorders of the regulation of melanogenesis, the neurogenic theory and the theory of oxidative stress. Studies in the field of immunology confirm the crucial role of cell-mediated reactions in the development of the autoimmune process, as well as in the violation of the immune regulation of melanogenesis. At the same time, the results of numerous studies are often contradictory and conclude statements concerning both pronounced changes of a subpopulation nature and violations of the activation and synthetic ability of cells of the immune system in vitiligo. Therefore, research in this area is still relevant. Vitiligo, according to a number of researchers, can occur after suffering stress, in turn, the appearance of depigmented foci causes a stress-dependent state, which is expressed in the development of autonomic, neuroendocrine, immune, metabolic and trophic dysfunctions that form the picture of a psychoemotional disorder. The formation of affective disorders is accompanied by neurophysiological, neurochemical disorders; a vicious circle is created that contributes to the maintenance of the pathological process and the appearance of new foci of depigmentation. Results of the study of the causes and mechanisms of development vitiligo does not give a clear answer, and therefore the treatment of this disease is still one of the most difficult problems. Considering vitiligo as an autoimmune process, foreign researchers use immunosuppressive therapy, systemic corticosteroid drugs, cyclosporine, which cause inhibition of the activation of cells of the immune system. On the one hand, these treatments can be effective at the beginning of the disease; on the other hand, they cause serious complications and side effects. Insufficient effectiveness, and with the long-term existence of vitiligo, the lack of effect and high risks of complications and side effects, limit the widespread use of these methods of treatment. In modern medicine, in the complex treatment and prevention

of vitiligo, medical immunocorrective drugs are traditionally used. The chronic persistent nature of dermatosis with an immune component in the pathogenesis requires long-term use of this group of drugs. However, taking into account the need for their long-term use, there is a high risk of developing a wide range of side effects and a tolerance syndrome to the drug taken, as a result of which foreign researchers are currently studying the clinical effectiveness of non-steroidal inhibitors of pro-inflammatory cytokines pimecrolimus and tacrolimus, as a result of which the spectrum of side effects decreases, in various forms of vitiligo. Also, many autorotes emphasize the high effectiveness of the combination of treatment with ultraviolet physiotherapy. Therefore, to date, ultraviolet vitiligo physiotherapy is considered the safest and most popular method of treating various forms of vitiligo. Experimental studies have shown high efficiency of phototherapy using UVB rays of the UVB range (280-315 nm). It has been proven that rays with a wavelength of more than 315 nm (UVA) are ineffective in the treatment of vitiligo, and short-wave radiation of the UVC range causes mutations and is carcinogenic. UVB therapy is a relatively safe method of treatment, due to the minimal impact of radiation on the human body. The rays of this wavelength range are completely dispersed in the epidermis, initiating photobiological reactions that contribute to the improvement of the skin. Along with the spectral composition of ultraviolet radiation, an important parameter in the process of phototherapy, which has a significant impact on the effectiveness of treatment, is the level of the dose of ultraviolet radiation when irradiating the patient's skin. Optimal from the point of view of the effectiveness and safety of phototherapy in the treatment of vitiligo, as a rule, is the value of the minimum erythema dose (MED), which determines the level of sensitivity of the patient's skin to UVB radiation. To determine the patient's MED, there is a well-known technique. When using a UVB dose less than MED, phototherapy may be ineffective, and irradiation of the skin with a dose of a level higher than MED will lead to a burn of the patient's skin, which can provoke an exacerbation of the disease. Excimer lasers capable of generating coherent and directed radiation at a wavelength of 308 nm are often used as a source of UVB radiation. Laser radiation produced by the decay of an exciplex molecule has stable spectral-energy characteristics and is easily dosed, which is why excimer lasers are traditionally used in dermatology.

## AIM

Thus, the study of the pathogenetic mechanisms of depigmentation development and the search for adequate combined methods for the treatment of patients with vitiligo is one of the most relevant areas of modern dermatology.

## MATERIALS AND METHODS

The study was conducted on the basis of the regional dermatovenerological dispensary. The study was conducted in the time period from 2019-2020. We conducted a randomized comparative study of seventeen male patients with extensive depigmented spots on the face, which were snow-white when examined by the Wood lamp, were clinically diagnosed with vitiligo, and they were examined in the regional dermatological dispensary of the city of Samarkand. These patients had chronic vitiligo, which remained stable for 3 to 10 years. They were previously treated with a variety of topical medications, including topical steroids and calcipotriene, for at least two years (2 to 6 years) without significant repigmentation. For treatment, an excimer laser was selected in combination with vitamin D for topical application twice a day. Laser therapy was performed twice a week until patients developed significant repigmentation. Patients began using an excimer laser at a dose of 200 MJ / cm2, which increased by 10 percent per visit, until patients experienced phototoxic side effects, including severe erythema and blistering. Treatment dosages were then maintained or reduced by 10 percent, depending on the severity of the side effects. None of the patients stopped treatment due to the side effects of laser therapy. The total number of procedures, the duration of treatment, and the average dose of laser energy exposure were recorded. As in other studies, we had the percentage of repigmentation was selected as the main evaluation criterion with the ranges: <25, 25-50, 50-75 and> 75 percent.

## RESULTS:

All patients underwent the recommended course of treatment, including laser therapy with topical use of vitamin D. Table 1 shows the effect of combination therapy on patients. Seven of the sixteen patients achieved more than 75% repigmentation after 22 procedures or less. Nine patients achieved similar results, but after 40

treatment sessions. There was no correlation between the average dose of laser energy exposure and the percentage of repigmentation**.**

Table No. 1.

| Number of patients: | Age of patients | Duration of the procedures performed | The number of procedures performed. | Laser radiation dose. | Repigmentation % |
|---|---|---|---|---|---|
| 4<br>3<br>2<br>7 | 18-25<br>26-31<br>32-36<br>37-41 | 11 недель<br>10 недель<br>16 недель<br>20 недель | 22<br>20<br>35<br>40 | 220<br>308<br>350<br>380 | >75<br>>75<br>>75<br>>75 |

## DISCUSSION

Vitligo is a chronic, psychologically debilitating and difficult-to-treat condition. Many of the currently used treatments require treatment intervals of more than one year to achieve obvious repigmentation. In this study, patients achieved more than 75% repigmentation of facial injuries between 10 and 20 weeks.

There are many theories that explain the effectiveness of light therapy in the treatment of vitiligo. The data show that inactive melanocytes present in the outer membranes of hair follicles persist in people with vitiligo. Then, the initiation of therapy can cause the maturation of these latent melanocytes with an initial migration up the hair follicle with a final spread in the epidermis. In addition, those characterized by a reduced potential of the hairline have the most stable areas.

Seven patients in this series achieved excellent results (repigmentation> 75%) in a short time (5 months or less) compared to other treatments such as topical steroids, PUVA, and NB-UVB. These patients achieved rapid results with such excellent results due to the increased sensitivity of the facial hair follicles to the excimer laser. Further studies on the prognosis of the response to excimer laser therapy may provide additional insight into the disease process.

Some studies show that people in different age groups from 18 to 31 may respond faster to therapy and have better outcomes than the age groups from 32 to 41. Further research is needed with a large number of applications performed by skin type.

## CONCLUSION

The excimer laser has proven to be a useful tool in the treatment of vitiligo. Patients receiving excimer laser treatment achieve excellent results within a few months, rather than many months or years. More data is needed to determine whether the skin type, gender, or other characteristics of the hair follicles lend themselves to a greater response to excimer therapy. More broadly, there are very few estimates of relapse rates in patients undergoing any light treatment. This information will be critical to the patient's decision-making and deserves attention.

## REFERENCES

1) Yanfei Zhang, Jessini Soranambal Mooneyan-Ramchurn, Nan Zuo, Yiguo Feng, Shengxiang Xiao, Vitiligo nonsurgical treatment: a review of latest treatment researches, Dermatologic Therapy, 10.1111/dth.12143, 27, 5, (298-303), (2014).
2) Juan Jorge Manriquez, Sergio M. Niklitschek, Vitiligo, Evidence-Based Dermatology, 10.1002/9781118357606, (464-469), (2014).
3) Russell Wong, Andrew N. Lin, Efficacy of topical calcineurin inhibitors in vitiligo, International Journal of Dermatology, 10.1111/j.1365-4632.2012.05697.x, 52, 4, (491-496), (2013).
4) E.J. Nordal, G.E. Guleng, J.R. Rönnevig, Treatment of vitiligo with narrowband-UVB (TL01) combined with tacrolimus ointment (0.1%) vs. placebo ointment, a randomized right/left double-blind comparative

study, Journal of the European Academy of Dermatology and Venereology, 10.1111/j.1468-3083.2011.04002.x, 25, 12, (1440-1443), (2011).

5) Inflammatory Dermatoses, British Association of Dermatologists' Management Guidelines, 10.1002/9781444329865, (1-90), (2011).
6) Saeedeh Farajzadeh, Zahra Daraei, Iraj Esfandiarpour, Seyed Hamed Hosseini, The Efficacy of Pimecrolimus 1% Cream Combined with Microdermabrasion in the Treatment of Nonsegmental Childhood Vitiligo: A Randomized Placebo–Controlled Study, Pediatric Dermatology, 10.1111/j.1525-1470.2009.00926.x, 26, 3, (286-291), (2009).
7) S. Klahan, P. Asawanonda, Topical tacrolimus may enhance repigmentation with targeted narrowband ultraviolet B to treat vitiligo: a randomized, controlled study, Clinical and Experimental Dermatology, 10.1111/j.1365-2230.2009.03712.x, 34, 8, (e1029-e1030), (2009).
8) D.J. Gawkrodger, A.D. Ormerod, L. Shaw, I. Mauri-Sole, M.E. Whitton, M.J. Watts, A.V. Anstey, J. Ingham, K. Young, Guideline for the diagnosis and management of vitiligo, British Journal of Dermatology, 10.1111/j.1365-2133.2008.08881.x, 159, 5, (1051-1076), (2008).
9) D Fai, N Cassano, GA Vena, Narrow-band UVB phototherapy combined with tacrolimus ointment in vitiligo: a review of 110 patients, Journal of the European Academy of Dermatology and Venereology, 10.1111/j.1468-3083.2006.02101.x, 21, 7, (916-920), (2007).
10) SM Goldinger, R Dummer, P Schmid, G Burg, B Seifert, S Läuchli, Combination of 308-nm xenon chloride excimer laser and topical calcipotriol in vitiligo, Journal of the European Academy of Dermatology and Venereology, 10.1111/j.1468-3083.2006.02016.x, 21, 4, (504-508), (2007).
11) Bärbel Greve, Christian Raulin, Edda Fischer, Excimer laser treatment of vitiligo – critical retrospective assessment of own results and literature overview, JDDG: Journal der Deutschen Dermatologischen Gesellschaft, 10.1111/j.1610-0387.2006.05879.x, 4, 1, (32-40), (2006).
12) Thierry Passeron, Jean-Paul Ortonne, Medical Treatment of Vitiligo, Surgical Management of Vitiligo, 10.1002/9780470987568, (31-38), (2006).
13) Thierry Passeron, Jean-Paul Ortonne, Laser for Repigmenting Vitiligo, Surgical Management of Vitiligo, 10.1002/9780470987568, (255-258), (2006).
14) Somesh Gupta, Surgical Management of Vitiligo of Eyelids and Genitals: Special Issues, Surgical Management of Vitiligo, 10.1002/9780470987568, (220-224), (2006).
15) Thierry Passeron, Jean-Paul Ortonne, UVB Therapy for Pigmentary Disorders, The Pigmentary System, 10.1002/9780470987100, (1183-1187), (2006).
16) C-C.E. Lan, G-S. Chen, M-H. Chiou, C-S. Wu, C-H. Chang, H-S. Yu, FK506 promotes melanocyte and melanoblast growth and creates a favourable milieu for cell migration via keratinocytes: possible mechanisms of how tacrolimus ointment induces repigmentation in patients with vitiligo, British Journal of Dermatology, 10.1111/j.1365-2133.2005.06739.x, 153, 3, (498-505), (2005).