

The Application of Super Pulse Carbon Dioxide Lattice Laser in the Treatment of Facial Rejuvenation

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ABSTRACT. *Objective: to analyze the application value of ultra pulse CO2 lattice laser in the treatment of facial rejuvenation. Methods: from January 2018 to December 2019, 120 patients with facial rejuvenation were selected and analyzed retrospectively. Observe the clinical efficacy and complications of the patients. The clinical efficacy is evaluated by the indicators after treatment. Results: the results of this study showed that after treatment, the improvement of all indicators of the patients was relatively good, in which the total effective rate of capillary dilation was the highest, reaching 95.0%; the control of pigmentation with the lowest total effective rate was also 80.0%, which confirmed the therapeutic effect of ultra pulse carbon dioxide lattice laser on the patients. The difference of data results was significant ($P < 0.05$). In addition, no serious complications occurred in all patients, only slight persistent erythema. Conclusion: Ultra pulse CO2 lattice laser can play a significant clinical effect in the treatment of facial rejuvenation, and the incidence of complications is less. It is a relatively safe and effective way.*

KEYWORDS: *Ultra pulse co2 lattice laser; Facial rejuvenation; Application method*

1. Introduction

The aging phenomenon of human skin will appear because of time factor and light damage factor, including endogenous aging and exogenous aging. Among them, endogenous aging is a change process of natural aging of human body, that is, wrinkles and skin elasticity decrease, while exogenous aging is characterized by skin relaxation and pigment spot formation. At present, the extensive innovation of cosmetic surgery technology also makes laser technology play a significant role. The laser technology based on the super pulse carbon dioxide lattice laser has played a stable effect of skin tightening and speckle removal, and has an important value in the treatment of facial rejuvenation, which is also the main direction of this study. The detailed report is as follows.

2. Data and Methods

2.1 General Information

The subjects selected 120 patients with facial rejuvenation treated by ultra pulse CO₂ lattice laser in our hospital from January 2018 to December 2019, and analyzed the case data retrospectively.

Inclusion criteria: the clinical data of all patients are complete, and the requirements of facial rejuvenation are clearly put forward.

Exclusion criteria: Patients with skin injury caused by other factors are not suitable for treatment.

There were 11 males and 109 females with an average age of (45.4 ± 1.1) years. All patients received lattice laser treatment.

2.2 Method

JLT type digital human-computer interface hyperpulse CO₂ laser treatment instrument is selected for the equipment. The advanced hyperpulse laser technology in the China is used. The functional and technical indicators meet the domestic advanced level, and have the effect of "cold incision", which can meet different clinical application modes. The laser wavelength of the device is 10.6 μ m, the function is adjusted by 1-30w, and the input voltage is AC220V + 10% 50Hz.

After improving the preoperative preparation and confirming that the patients are in line with the lattice laser for facial rejuvenation treatment, the patients voluntarily sign the informed consent. The patient took the supine position, after the facial cleaning, the compound lidocaine cream was applied on the skin to be treated, and then the cream was wiped off after the anesthetic took effect about 30 minutes, and then the skin in the treatment area was sterilized. After wearing eye mask and adjusting the parameters of the equipment, the laser therapy instrument is aimed at the treatment site, and the scanning mode is selected. The dot matrix laser scans the skin area to be treated without omission. To know the change of skin wound and judge the treatment result. If the patient's skin becomes white, it means skin treatment; when the skin turns yellow, it means that the treatment depth reaches dermis; when the treatment skin appears punctate hemorrhage, it means that the papillary layer has been reached, and has played a good treatment effect. After the treatment, ice patches were applied to the skin area of the patients, and then combined with moisturizing mask, moisturizing cream and sunscreen. The recovery period is about one month, and then repeat treatment after one month, and then repeat treatment every other month, a total of 3 times of treatment.

2.3 Observation Indicators

According to the changes of capillaries, pigments, skin and other indicators after treatment, the therapeutic effectiveness was classified as significant, effective and ineffective. Significant effect: the telangiectasis of the patients improved significantly, the pigmentation recovered well, and the pore coarseness was controlled; effective: the telangiectasis, pigmentation and pore coarseness of the patients improved; ineffective: the indexes of the patients did not change significantly. The effective rate of treatment = significant + effective.

2.4 Statistical Methods

All the data in this study were analyzed by spss22.0 statistical software, in which the count data was expressed as a percentage, and X² was used for testing. When $p < 0.05$, the data difference was statistically significant.

3. Results

The results of this study show that the improvement of all indicators of patients after treatment is relatively good, in which the total effective rate of capillary expansion is the highest, reaching 95.0%; the control of pigmentation with the lowest total effective rate can also reach 80.0%, which confirms the therapeutic effect of ultra pulse CO₂ lattice laser on patients. The difference of data results was significant ($P < 0.05$). In addition, no serious complications occurred in all patients, only slight persistent erythema. See Table 1 below for detailed data.

Table 1 Comparison of Clinical Efficacy Data after Treatment

Post treatment indicators	Number of cases	Markedly effective	Effective	Invalid	Total effective rate
Telangiectasia	120	88	26	6	114(95.0)
Pigmentation	120	74	22	24	96(80.0)
Large pores	120	65	40	15	105(87.5)
Skin texture	120	55	47	18	102(85.0)

(Note: comparison of clinical efficacy of different indexes, $X^2 = 9.954$, $P < 0.001$)

4. Discussion

Aging is the inevitable process of cell changes. Skin plays a protective effect on human organs, so after aging, the characteristics are obvious. With the change of modern people's life style, the aging of skin has been highly valued by the beauty lovers. After skin aging, the possibility of dryness, wrinkles and dull skin color is significantly increased, which directly affects the aesthetic appearance of the face. In essence, biological aging is a kind of cell aging, which is manifested as body aging from a macro perspective [1]. We can divide the wrinkles of patients' face into natural, dynamic, gravity and mixed wrinkles. The purpose of facial rejuvenation

treatment is also to eliminate the dynamic wrinkles of skin. For example, the movement and relaxation of the face and neck are mainly due to the relaxation of the facial ligaments, resulting in muscle relaxation and the loss of elastic support of the soft tissue under the skin. Facial rejuvenation surgery can lift the sagging tissue to the original physiological and anatomical position. In recent years, the research also mentioned the relationship between facial aging and facial neck tissue atrophy, including hair atrophy, subcutaneous fat atrophy, etc., which will make wrinkles more obvious. As a result, the facial rejuvenation technology began to produce, making the aged skin smooth and compact again, and shaping the younger facial lines and contours.

Before the application of ultra pulse carbon dioxide lattice laser, it is mainly through surgical wrinkle removal to carry out minimally invasive treatment, including botulinum toxin injection, grinding with oral antioxidant vitamin E, vitamin C, etc., the defect is relatively large degree of trauma [2]. Taking grinding as an example, crystal particles are used to polish the skin, causing some “damage” to the shallow skin, stimulating the skin to secrete collagen, increasing the amount of collagen in the skin, and coping with rough pores and acne scars. Although the overall effective rate is relatively stable, but patients will have infection, bleeding and other complications, in recent years, the use of this method is also limited. Botulinum toxin injection is based on the secretion of *Clostridium botulinum*, let the toxin act on the presynaptic membrane, inhibit the release of acetylcholine, block the transmission of neurotransmitters, and inhibit muscle contraction. This technique is applied to ophthalmology in the early stage, to treat strabismus patients, and to facial muscle relaxation in the later stage, which has a good cosmetic effect [3]. This technology has certain technical requirements for doctors, which requires them to master the anatomical characteristics of facial expression and muscle direction skillfully, and the effect is not long, about half a year.

In recent years, lattice laser technology is a new type of skin beauty technology in the world, which belongs to minimally invasive surgery. According to the theory of lattice photothermal decomposition, it can quickly play the therapeutic effect and carry out non-invasive treatment, so the prognosis and recovery of patients are more convenient. For example, compared with the traditional laser treatment, the lattice laser can gather in a certain skin area to form a three-dimensional thermal injury as the treatment area, and all the surrounding tissues of the treatment area are normal tissues. The normal cells can repair the epidermis through migration, and become the lattice laser, and a part of the skin in each treatment area will be treated. From the perspective of tissue structure, in general, the epithelium can recover within 24 hours after lattice laser treatment, and the risk of infection in patients is relatively low. In this study, the improvement of all indexes of the patients after treatment is good, in which the total effective rate of capillary dilation is the highest, reaching 95.0%; the control of pigmentation with the lowest total effective rate can also reach 80.0%, which confirms the therapeutic effect of ultra pulse CO₂ lattice laser on the patients, and the patients do not have serious complications, only slight persistent erythema Phenomenon. But even if there are complications, they can be controlled by some technical means. For example, when the density energy is too high, it may

produce erythema or edema. After treatment, it can be improved to control the dark yellow skin color or other factors of adverse interference [4].

The peak energy of the ultra pulse CO₂ lattice laser is large, which shortens the recovery time of the patients. It can also be adjusted according to the patients' different disease needs, reaching to the deep layer of the skin and dermis, stimulating the dermis to produce more collagen to repair and play a tender effect. The natural tissue between the facula can heal by itself and will not cause serious bleeding, infection and exudation. The normal skin tissue between each facula also ensures that the skin of the patient can be repaired more quickly. It is worth mentioning that lattice laser can be used in combination with other methods. Some studies have pointed out that the combination of dot matrix laser and botulinum toxin injection can significantly improve the wrinkles of patients' skin, and play a synergistic role in the treatment. The control of some scars is also effective, and the color of scars is significantly improved, without serious permanent adverse reactions. Therefore, this kind of treatment can also make patients' satisfaction more significant.

5. Conclusion

The effect of dot matrix laser in the dermis area causes the increase of type 3 collagen and improves skin wrinkles. If higher pulse energy is used, it can act on the deeper dermis structure to improve skin wrinkles and texture. To sum up, the ultra pulse CO₂ lattice laser can play a significant clinical effect in the process of facial rejuvenation treatment, and the incidence of complications is less, which is a relatively safe and effective way.

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