

Clinical Study on Feux Rouges to Promote Collagen Regeneration to Repair Striae Gravidarum

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Abstract: **Objective:** To analyze the effect of feux rouges on repairing striae gravidarm to provide guidance for the clinical treatment of striae gravidarm. **Methods:** 24 volunteers are screened from 33 volunteers who are treated for striae gravidarm to be treated with CY-1002C LED feux rouges. After three cycles, we analyze the total effectiveness of the volunteer treatment, the color score of the striae gravidarm before and after the treatment, the effects of different ages, different parities, different treatment times, and different postpartum times on the treatment. The results show that the total effective rate of treatment is 87.5%; the color score of striae gravidarm is (2.71 ± 0.112) after treatment is higher than that of striae gravidarm before treatment (1.750 ± 0.243) , and $P < 0.05$; the total score after treatment for women ≤ 30 years old is higher than that for women > 30 years old, and $P < 0.05$; there is no significant difference in total scores after treatment with different parities, different treatment times, and different postpartum times ($P > 0.05$); **Results:** The effect of using feux rouges to repair striae gravidarm is significant, and the improvement of the color score of striae gravidarm is obvious. The treatment effect is mainly related to the age of the female, and has nothing to do with parity, treatment time, and postpartum time.

Pregnancy striae belongs to swelling striae. It is mainly due to the influence of hormones during pregnancy and abdominal distention, which makes the elastic fiber and collagen fiber of abdominal skin break. In the early stage, the skin presents dark red or purplish red stripes. In the later stage, the pigment is lost, and finally the stable white or silver skin damage is formed on the skin surface. Pregnancy marks often occur in the abdomen, chest, thigh and buttocks of women, which greatly affects the beauty of women, so many women are very distressed about pregnancy marks after pregnancy. At present, there are many ways to improve the treatment of stretch marks, such as laser treatment, chemical peeling, skin grinding, etc., but stretch marks are still an important problem for many women [1]. According to the preclinical test, the application of cy-1002c LED red light therapeutic apparatus of Beijing chuangying photoelectric medical technology Co., Ltd. to repair the striae gravidarum can achieve satisfactory results. The details are as follows:

1. Materials and Methods

1.1 General Information

The subjects were 33 volunteers who received the pre clinical validation of cy-1002c red light therapy instrument for gestational striae from March 2018 to March 2019. All volunteers met the following inclusion criteria and exclusion criteria. (1) Inclusion criteria: ① clear diagnosis of abdominal stretch marks; ② informed consent of volunteers to this study, signing relevant documents. (2) Exclusion criteria: photoallergy; pregnancy (contraception should be used during preclinical verification); hypertension or poor blood pressure control; porphyria; cancer or suspected cancer; heart, lung, liver and kidney dysfunction and hemorrhagic disease or obvious bleeding tendency; chronic hemolysis; pacemaker carrier; recently used photosensitizer; autoimmune disease; albinism Patients; acute suppurative inflammation; occlusive vasculitis; severe arteriosclerosis; local sensory or circulatory disorders; hyperthermia; medical departments do not recommend the use of red light irradiation. There are two other excluded groups: those who are

participating in other clinical studies or preclinical verification; and those who are not suitable for the study according to the researchers. In this study, 24 volunteers were included in the study. The youngest was 24 years old, and the oldest was 37 years old, with an average of (28.48 ± 4.23) years old. The number of births was 18 in the first and 6 in the second

1.2 Method

All volunteers received red light therapy under the guidance of professionals. Before the treatment, volunteers were informed of the steps and precautions of the treatment. The instrument is cy-1002c LED red light therapeutic instrument of Beijing chuangying photoelectric medical technology Co., Ltd. Equipment condition: peak wavelength: 640 ± 10 nm; luminous surface area: 300 mm × 100 mm; form: flexible and wearable; irradiation mode: direct irradiating the treated part of abdomen without shielding.

Equipment operation steps: Volunteers clean the abdominal skin and wear equipment to ensure that the smooth surface completely covers the abdominal stretch marks or cesarean scar area; connect the input magnetic suction base and the control output connection line; turn on the power supply, press the controller button, the light source emits red light, and the treatment begins; when the single treatment is completed, the equipment automatically turns off; remove the abdominal belt, and the treatment ends. Treatment plan: 30 min / time, 2 times / day, every 4 weeks for a cycle. After 3 cycles, the efficacy of the volunteers was determined. All volunteers took photos before treatment, the second, the fourth, the eighth and the twelfth week of treatment to record the treatment points in different treatment periods.

1.3 Observation Indicators and Judgment Criteria

After 3 cycles, the efficacy of the volunteers is evaluated. And the observation indicators are color, area, bumpiness, abdominal elasticity, and abdominal firmness. The scoring methods for each dimension are as follows: (1) Color: it is sequenced in order of purple-red-pink-skin color. If it has no change, it obtains 0 points, and 1 point is added for each color reduction; (2) Area: 0 points stands for no change, 1 point is slightly improved, 2 points present markedly improved, 3 points is regarded as almost invisible; (3) Bumpiness: 0 points stands for no change, 1 point is slightly improved, 2 points present markedly improved, 3 points are basically eliminated; (4) Abdominal elasticity: 0 points stands for no change, 1 point is slightly improved, 2 points present markedly improved, 3 points is regarded as very satisfied; (5) Abdominal firmness: 0 points stands for no change, 1 point is slightly improved, 2 points present markedly improved, 3 points is regarded as very satisfied. According to the total score of the above five dimensions, the curative effect of stria gravidarum is evaluated as follows: 9 < total score ≤ 15 points: basic cured; 3 < total score ≤ 9 points: significant; 1 < total score ≤ 3 points: effective; 0 ≤ total score ≤ 1 point: invalid. Total effective rate of treatment = (basic cure + marked effect + effective) / total number of cases × 100% [2]. According to the color scoring method, the color scores of stria gravidarum before and after treatment are compared, and the effects of different age stages, different parities, and different treatment time on the total scores of stria gravidarum are analyzed.

1.4 Statistical Methods

In this study, SPSS 21.0 is used for statistics. Measurement data are described statistically as mean and standard deviation. Count data are described statistically with n and %, independent measurement t is used to test measurement data, and Chi-square test is used. The test results show the differences with P < 0.05, which is statistically significant.

2. Results

2.1 Analysis of Total Effective Rate of Treatment

After 3 cycles of treatment, 24 volunteers basically cured 0 cases, 8 cases were effective, the effective rate was 33.33%; 13 cases were effective, the effective rate was 54.17%; 3 cases were

ineffective, and the ineffective rate was 12.5%. As a result, the total effective rate was 87.5%.

2.2 Color Score of Stria Gravidarum Before and After Treatment

According to the statistics, after 24 cycles of feux rouges treatment, 24 volunteers have higher marks of striae gravidarum than before treatment, and the difference is significant ($P < 0.05$). Result can be seen in table 1.

Table 1 Comparison of color scores of striae gravidarum before and after treatment

Case (n)	Color scores of striae gravidarum before treatment	Color scores of striae gravidarum after treatment	T	P
24	1.750±0.243	2.71±0.112	17.573	<0.05

2.3 Comparison of Total Scores of Different Ages, Different Parities, Different Treatment Times and Different Postpartum Times

Statistics shows that the total score of women under 30 years old after treatment is higher than that of women over 30 years old, and $P < 0.05$, but there is no significant difference in total scores after treatment with different parities, different treatment times, and different postpartum times ($P > 0.05$). Details are shown in Table 2.

Table 2 Comparison of total scores of different ages, different parities, different treatment times and different postpartum times

Grouping		n	Total scores of treatment	t	P
Different ages	≤30 years old	17	4.120±2.342	2.726	<0.05
	> 30 years old	7	1.570±1.134		
Different parities	The first parity	18	3.560±2.640	0.649	>0.05
	The second parity	6	2.830±1.169		
Different treatment times	≤12 weeks	18	3.110±2.298	0.952	>0.05
	>12 weeks	6	4.170±2.563		
Different postpartum times	≤6 months	14	4.070±2.556	0.984	>0.05
	> 6 months	10	2.400±1.713		

3. Discussion

Pregnancy striae is a kind of linear skin damage of dermis in the process of pregnancy. Its early stage is mainly manifested as purple red or dark red stripes. With the progress of pregnancy, because of depigmentation, atrophy, relaxation and so on, it finally shows a stable appearance of silver or white wrinkle pattern. The striae gravidarum is mainly concentrated in the abdomen, and can also be seen in the back, chest and near extremities. Although stretch marks will not affect women's physical health, they will affect women's appearance, which will bring greater psychological burden and mental pressure to women and reduce their quality of life. Pathological analysis showed that the main pathological manifestations of striae gravidarum were thinning and

atrophy of dermis and epidermis, collagen fibers could not be separated from each other, leading to the disappearance of elastic fibers in the center and the appearance of clumps and curls at the edge; in the late pregnancy, there were regenerated straight collagen fiber bundles and thin elastic fibers, and no elastic fibers remained under this area. Pregnancy marks will have a certain impact on the beauty of women's abdomen, and it is difficult to disappear once it occurs. Therefore, many women are very distressed about pregnancy marks after pregnancy. In order to pursue beauty, more and more women begin to ask for the repair of pregnancy marks [3]. At present, in the treatment of stria gravidarum, external application of drugs or physical instruments are often used. Although the treatment will not cause great damage to the patients, the disadvantages are long treatment cycle, slow effect, and the treatment effect is difficult to ensure.

In this paper, we discussed the curative effect of red light therapy instrument in the treatment of stria gravidarum. After three cycles of treatment, the total effective rate was 87.5%. After treatment, the score of stria gravidarum color (2.71 ± 0.112) was higher than that before treatment (1.750 ± 0.243), and $P < 0.05$. The results showed that the total score (4.120 ± 2.342) after treatment was higher than that after treatment (1.570 ± 1.134), but there was no significant difference between the first and the second, between the first and the second, between the second, between the sixth and the sixth months ($P > 0.05$). It can be seen that the effect of red light on the treatment of stria gravidarum is significant, and the effect of red light on the treatment of stria gravidarum for women under 30 years old is due to women over 30 years old. In this paper, the cy-1002c LED red light therapeutic instrument of Beijing chuangying photoelectric medical technology Co., Ltd. can emit high-purity LED red light. Research shows that red light can stimulate cells, especially fiber cells, and repair tissues. By adjusting matrix metalloproteinases, collagen regeneration can improve skin quality, remove wrinkles and pregnancy marks, and remove "orange peel" phenomenon. Through this study, we found that: red light treatment of stretch marks, the younger the better effect. This may be because the younger the age, the stronger the repair ability of female collagen. However, due to the small number of samples in this study, there is a correlation between the actual effect of red light treatment of stretch marks and age, and more large numbers of samples are needed for further verification.

Red light is one of the visible light in nature. It is named because it causes red light in retina. The wavelength range is $600 \sim 750\text{nm}$. In the 1990s, NASA officially proposed that red light can improve skin tissue. It is found that red light has a very high penetration in the skin, can reach the dermis, and accelerate the metabolism of cells; moreover, red light can produce photochemical effect on organisms, which has important biological effect and therapeutic effect. Mitochondria of cells in the dermis can absorb a large amount of red light, in which the activity of catalase is enhanced, cell metabolism is accelerated, glycogen content is increased; protein synthesis and ATP decomposition are promoted, cell regeneration and collagen synthesis are accelerated, so as to achieve the effect of full and tight skin of epidermal cells [4]. Red light can penetrate human tissues directly, with a penetration depth of 30-50 mm. Its energy can be absorbed by mitochondria of the body, thus producing biological effects. At present, red light is widely used in the treatment of dermatological diseases. Common skin ulcers, acne, herpes zoster, etc. can be treated with red light. Compared with other light source photodynamic, it has the advantages of wide application and low treatment cost, so it is widely used in the treatment of clinical skin diseases [5]. The therapeutic mechanism of red light therapeutic apparatus is to produce photochemical effect on organism, which makes it produce important biological effect and therapeutic effect. In cells, mitochondria absorb the most red light. After red light irradiation, the catalase activity of mitochondria increases, which can increase the metabolism of cells; increase the content of glycogen, protein synthesis and ATP decomposition, so as to strengthen the regeneration of cells and promote the healing of wounds and ulcers; at the same time, red light irradiation also increases the phagocytosis of white blood cells, Improve the immune function of the body [6]. Therefore, red light irradiation can treat many kinds of diseases. According to the mechanism of red light, when red light is applied to the repair of stria gravidarum, the epidermis will selectively absorb red light and stimulate the damaged collagen cortex to continuously repair itself, so as to improve the texture and condition of the skin.

In conclusion, the treatment of stria gravidarum with red light therapy instrument is to stimulate the dermis of stria gravidarum and promote the regeneration of collagen to achieve the purpose of repairing stria gravidarum. The treatment method is simple and the effect is significant. However, as the application of red light in the repair of stria gravidarum is still in the preliminary stage of exploration and research, more experiments are needed to verify the therapeutic effect.

References

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