

# Treatment of Stretch Marks with Combination of Long Pulse KTP and Fractional Q-s Nd:YAG Laser

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## ABSTRACT

Stretch marks or striae (*striae cutis distensae*) are a form of scar that develops when the skin undergoes rapid stretching or shrinking. Although they are primarily an aesthetic concern, stretch marks often present psychological and emotional distress, particularly in younger patients, and can negatively influence quality of life.

Laser therapy is a widely accepted and effective treatment for improving the appearance of stretch marks, utilizing various types of lasers to achieve optimal results.

In this paper we report on a new minimally invasive approach for laser treatment of stretch marks, which combines two lasers – long-pulse 532 nm KTP and fractional Q-s 1064 nm Nd:YAG. Four cases are presented with stretch marks on various body areas, on which multiple laser sessions (3-6) were applied, achieving excellent results without adverse effects. All patients were very satisfied with the treatment outcomes.

The results of these cases suggest that the proposed approach of combined laser treatment for stretch marks represents a novel safe, effective and minimally invasive option for stretch mark therapy.

**Key words:** Stretch marks, striae, long-pulse 532 nm KTP, fractional Q-switched 1064 nm Nd:YAG, combination laser therapy.

*Article: J. LA&HA, Vol. 2024, No.1; onlineFirst.*

*Received: September 16, 2024; Accepted: December 16, 2024*

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## I. INTRODUCTION

Stretch marks result from rapid stretching of the skin due to different reasons, like rapid growth in puberty, obesity or pregnancy. The most common body sites are the breasts, forearms, abdomen, buttocks, and thighs. Approximately 90% of pregnant women, 70% of adolescent females, and 40% of adolescent males

have stretch marks. They are usually a cosmetic problem affecting the patient's quality of life. Stretch marks are generally divided into striae rubrae (pink/red) and striae albae (white). Red stretch marks are more recent, while the white are older.

The most common treatment options include laser skin resurfacing, dermabrasion, microneedling, chemical peels, retinol creams and others like tretinoin, glycolic and hyaluronic acid. So far there is no "best" treatment which would be effective in all cases [1].

Many different lasers are used for treatment of stretch marks, among them: 585 nm pulsed dye laser (PDL), 1064 nm long-pulse (LP) Nd:YAG laser, 1540 nm and 1550 nm Er:glass and Er:glass fiber lasers, 2940 nm Er:YAG laser and 10600 nm CO<sub>2</sub> laser, as well as the IPLs [2].

When using lasers to treat immature, red stretch marks, two components must be addressed – the redness, or the vascular component, and the scarred fibrotic tissue of the striae. The vascular component can be successfully treated with LP 532 nm KTP, 585 nm PDL and LP 1064 nm Nd:YAG lasers, while fractional treatments with 1540, 1550, 2940 and 10600 nm have been shown to be a good solution for scar revision of both red and white stretch marks.

In this paper we present a novel approach to the treatment of stretch marks, using the combined application of LP 532 nm KTP and fractional ablative Q-s 1064 nm Nd:YAG laser for red, and fractional ablative Q-s 1064 nm Nd:YAG only for white stretch marks.

## II. CASES

### a) Case 1

A 34-year-old female patient with immature red stretch marks on the abdomen (see Fig.1a) was treated with a combination of LP KTP and fractional Qs Nd:YAG in two phases. The first phase was dedicated to the reduction of redness using LP (VERDE) 532 nm KTP (StarWalker MaQX, Fotona, Slovenia) with a R58d handpiece and the following settings: spot 3 mm, pulse duration 20 msec, fluence 13.5 J/cm<sup>2</sup> and

frequency of 1 Hz. One pass along all stretch marks was performed with cold air cooling used for patient comfort. The end point was petechiae. The first phase consisted of three sessions executed with 30-45 day intervals. The second phase for improvement of scarred tissue was performed with fractional Q-s Nd:YAG from the same laser device (StarWalker MaQX, Fotona, Slovenia) using a fractional FS20Ad handpiece with 9x9 =81 pixels at a 9x9 mm footprint ("spot"). The setting used were: pulse mode MaQX-5, intensity 39 mJ/px and frequency of 2 Hz. Two passes were made across all stretch marks, cold air was applied, and the end point was petechiae. Three sessions with fractional Qs Nd:YAG with 30-45 days intervals were performed. The patient tolerated the treatment well, and aside from short-term petechiae, there were no adverse effects. The patient was very satisfied and assessed the improvement of her stretch marks as excellent (see Fig. 1b)

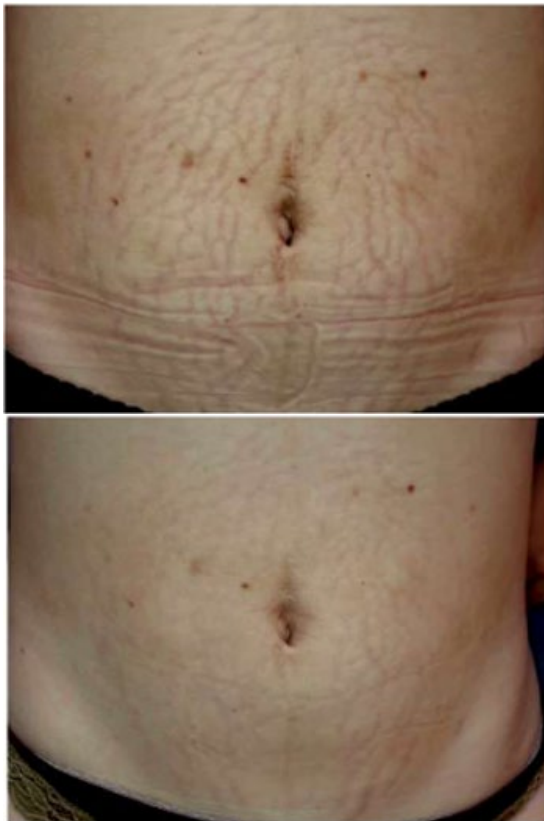


Figure 1: a) Red stretch marks before the treatment.  
b) 6 months after the last laser sesión

**b) Case 2**

A female patient, 42 years of age, with striae rubrae at the hips and thighs (see Fig.2a) was treated with the two-phase combined protocol as described in Case 1. The same settings and protocol were used, but there were only two sessions of VERDE (LP KTP) and two sessions of Qs Nd:YAG for a total of four laser sessions. This patient was also very satisfied with the

result (see Fig. 2b) and there were no adverse effects after the treatments.



Figure 2: a) Striae rubrae before the treatment.  
b) Result 6 months after the last session.

**c) Case 3**

A 32-year-old female with red stretch marks on the abdomen (see Fig. 3a) was treated with the combination of LP 532 nm KTP and fractional ablative Q-s 1064 nm Nd:YAG laser according to the protocol and settings described in Case 1. She received two sessions of VERDE (LP KTP) separated by one month and followed with two sessions of fractional Q-s Nd:YAG, also with a one-month interval. Cold air cooling was used during the laser irradiation for patient comfort. There were no adverse effects and the patient's satisfaction with the result (see Fig. 3b) was high.



Figure 3: a) Case 3 before the treatment.  
b) 6 months after the last laser sesión

**d) Case 4**

A 26-year-old patient with white stretch marks on the thighs (Fig. 4a) was treated with the single-phase protocol using fractional ablative Q-s Nd:YAG. The handpiece used was the FS20Ad with pulse mode MaQX-5, with intensity of 39 mJ/px and frequency of 2 Hz. There were two passes executed with cold air cooling. A total of three sessions were performed with 30-45 day intervals. The patient was happy with the treatment and result (Fig. 4b).



Figure 4: a) White stretch marks before the treatment  
b) After 3 laser sessions

**III. DISCUSSION**

Lasers have been used for treatment of stretch marks for decades, with the goal to improve their appearance, reduce redness, remodel fibrotic scar tissue and make them as similar as possible to the adjacent normal skin surface.

Long-pulse 1064 nm Nd:YAG laser has been shown to have very good efficacy for immature, red stretch marks [3], and also for white striae alba. Hendawy and colleagues showed that the clinical efficacy of non-ablative LP Nd:YAG for white stretch marks exceeded that of the ablative fractional CO2 laser, without the

adverse effects that CO2 had [4]. Moreover, ablative 2940 nm Er:YAG showed to be an efficient and safe tool for revision of various scars including stretch marks [5].

The use of fractional ablative Q-s Nd:YAG for treatment of various scars is a relatively new approach enabled with the introduction of fractionated and focused Q-s Nd:YAG microbeams that are strong enough to cause skin ablation in spite of the low absorption of this wavelength in non-pigmented skin.

Unlike classical ablative lasers such as Er:YAG and CO2, which use a photo-thermal effect, ablation with Q-s Nd:YAG laser is the result of cold photo-mechanical laser-tissue interaction. As was shown in recent studies by Mani [6] and McClean [7] on fractional ablative Q-s Nd:YAG treatment of acne scars, this kind of interaction achieves equally good results as with photo-thermal fractional treatments, but with much shorter downtime.

These findings motivated us to try the use of fractional ablative Q-s Nd:YAG also on stretch marks. To also eliminate the stretch marks' redness, it was necessary to apply a laser treatment that would produce a photo-thermal effect and coagulate the blood vessels, and for this component we tried LP 532 nm KTP, which showed to be a good solution.

As far we are aware, this is the first report about the combination of LP KTP and fractional Q-s Nd:YAG for the treatment of stretch marks.

**IV. CONCLUSIONS**

Our results have demonstrated that the combination of LP KTP and fractional Q-s Nd:YAG may be an efficacious and safe therapy for stretch marks. More cases and studies are needed to further elucidate the benefits of this therapy in comparison with other options on the market.

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