Med Lasers 2017;6(2):107-109
<https://doi.org/10.25289/ML.2017.6.2.107>
pISSN 2287-8300 · eISSN 2288-0224

Facial Scars after a Road Accident – Combined Treatment with Pulsed Dye Laser and Picosecond Neodymium:Yttrium-Aluminum-Garnet Laser

Jean S. McGee¹
Won Soon Chung²
Hannah Lee³
Hye Jin Chung⁴

¹Department of Dermatology, Boston University
School of Medicine, Boston, MA, USA

²Yonsei Star Skin & Laser Clinic, Seoul, Korea

³Lexington Christian Academy, Boston, MA, USA

⁴Department of Dermatology, Boston University
School of Medicine, Boston, MA, USA

A 34-year-old man presented with facial scars one month after a road accident. A physical examination revealed erythematous, minimally hypertrophic scars with bluish brown pigments from traumatic tattoos on the left cheek and left upper cutaneous lip. He was treated with combined laser therapy of a pulsed dye laser (PDL) and picosecond neodymium:yttrium-aluminum-garnet (Nd:YAG) laser. After three sessions of this combined technique, the patient showed significant clinical improvement without side effects. To the best of the authors' knowledge, this is the first case of traumatic scars after a road accident treated effectively and safely with combination laser therapy of PDL and picosecond Nd:YAG laser, targeting the traumatic scars and tattoos, respectively.

Key words

Scar; Road accident; Pulsed dye laser; Picosecond; neodymium:yttrium-aluminum-garnet laser

Received November 25, 2017

Revised December 21, 2017

Accepted December 21, 2017

Correspondence

Hye Jin Chung
Department of Dermatology, Boston University
School of Medicine, 609 Albany Street, Boston, MA
02118, USA
Tel.: +1-617-390-6620
Fax: +1-617-638-5575
E-mail: hyejin.chung@bmc.org

© Korean Society for Laser Medicine and Surgery

© This is an open access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

Sustaining injury from a road accident is a common occurrence. However, scars resulting from such injury tend to be challenging to treat due to the complexity of their shapes, depths, and pigmentations. In addition, these scars are often accompanied by traumatic tattoos. Therefore, the most optimal therapeutic approach should be of an individualized, combination laser therapy. Here, we report a successful case of a scar treated with a pulsed dye laser (PDL) and a picosecond laser (PSL).

CASE REPORT

We report the case of a 34-year-old male, who suffered a road accident 1 month prior that resulted in erythematous, minimally hypertrophic scars with bluish brown pigments from traumatic tattoos (Fig. 1A). We performed combination laser therapy using the PDL (Vbeam Perfecta; Syneron-Candela, Wayland, MA, USA) and the 1,064-nm neodymium:yttrium-aluminum-garnet (Nd:YAG) laser with the pulse duration of 450 ps (Picoway; Syneron-Candela). We started treatment with Vbeam

Perfecta (5.5-5.75 J/cm², 1.5 ms pulse duration, 10.0-mm spot size) concurrently with Picoway (starting at 1.2 J with 0.4 J increase at each subsequent session, 4.0-mm spot size). After just two treatments in 1 month, there was a significant improvement in erythema and hypertrophy, as well as the appearance of the traumatic tattoos (Fig. 1B). A total of three combination sessions resulted in an excellent cosmetic outcome without any reported side effects or complications (Fig. 1C).

DISCUSSION

Traumatic injuries can cause a wide array of scars; they can be erythematous, hypertrophic, atrophic, and/or pigmented. Scars after a road accident have been treated with various lasers. Martins et al. reported a case of traumatic scar successfully treated with combination of PDL and Q-switched (QS) Nd:YAG lasers.¹ They started treatment with five sessions of PDL 595 nm (8.0 J/cm², 1.5 ms pulse duration, 7.0-mm spot size) over a 10-month period. With the improvement of erythema, traumatic tattoos from the encounter with asphalt became more noticeable. Subsequently, they were treated with two session

Fig. 1. (A) Clinical photograph at presentation before treatment. (B) Clinical photograph after 2 sessions of pulsed dye laser and picosecond neodymium:yttrium-aluminum-garnet (Nd:YAG) laser in 1 month. (C) Clinical photograph after 3 sessions of pulsed dye laser and picosecond Nd:YAG laser.

of QS 1,064-nm Nd:YAG laser (4.0 J/cm², 10 Hz, 3.0-mm spot) over a 6-month period, resulting in complete clearance. In another case report, a facial scar after a road accident was successfully treated with combined therapy of fractional photothermolysis and alexandrite laser.² Initially, the patient was treated with QS alexandrite laser (6.0 J/cm², 3.0-mm spot), resulting in significant lightening of the traumatic tattoos. This was followed by three sessions of 1,550-nm erbium:glass laser monthly to achieve overall cosmetic improvement of the scars.

In this patient, the trauma resulted in erythematous and hypertrophic scars, along with traumatic tattoos from the encounter with asphalt. We performed combined treatment with PDL and picosecond Nd:YAG laser. The role of PDL in treating erythematous, hypertrophic scars is well established in literature.³ In addition to treating scar-associated erythema and telangiectasia, the PDL has been shown to reduce scar bulk by selectively destroying the microvasculature of the scar.⁴ Moreover, it has been shown to improve the scar texture and pliability.⁵ As for the treatment of traumatic tattoos within scars, both QS Nd:YAG and QS alexandrite lasers have been successfully employed to achieve complete clearance.^{1,2} These lasers with shorter pulse duration and longer wavelengths can effectively remove small tattoo particles and minimize interaction with epidermal melanin. In 2012, the picosecond laser technology was approved by the US Food and Drug Administration for tattoo removal. Theoretically, PSL with shorter pulse duration should destroy smaller tattoo pigments more effectively than the QS lasers. In clinical practice, PSLs demonstrated superior efficacy over QS lasers for tattoo removal.^{6,7}

Of note, there exists controversy over the use of high power QS lasers for the treatment of scars in the proliferative phase of wound healing, as it can induce superfluous inflammation. In our case, the scar was 1 month old

at the start of the treatment. Therefore, it was expected to be at the peak of the maturation and remodeling phase of wound healing. As such, we did not anticipate that our PSL to induce the inflammation. In this report, we demonstrated that traumatic scars can be effectively and safely treated with combination laser therapy of PLD specifically targeting scar erythema, telangiectasia, and bulk and the picosecond Nd:YAG laser targeting traumatic tattoos.

REFERENCES

1. Martins A, Trindade F, Leite L. Facial scars after a road accident--combined treatment with pulsed dye laser and Q-switched Nd:YAG laser. *J Cosmet Dermatol* 2008;7:227-9.
2. Lee HJ, Chung WS, Kang JM, Kim YK, Lee SJ. Facial scars after a road accident: combined treatment with fractional photothermolysis and alexandrite laser. *Med Lasers* 2013;2:33-5.
3. Wittenberg GP, Fabian BG, Bogomilsky JL, Schultz LR, Rudner EJ, Chaffins ML, et al. Prospective, single-blind, randomized, controlled study to assess the efficacy of the 585-nm flashlamp-pumped pulsed-dye laser and silicone gel sheeting in hypertrophic scar treatment. *Arch Dermatol* 1999;135:1049-55.
4. Reiken SR, Wolford SF, Berthiaume F, Compton C, Tompkins RG, Yarmush ML. Control of hypertrophic scar growth using selective photothermolysis. *Lasers Surg Med* 1997;21:7-12.
5. Alster TS, Nanni CA. Pulsed dye laser treatment of hypertrophic burn scars. *Plast Reconstr Surg* 1998;102:2190-5.
6. Ross V, Naseef G, Lin G, Kelly M, Michaud N, Flotte TJ, et al. Comparison of responses of tattoos to picosecond and nanosecond Q-switched neodymium: YAG lasers. *Arch Dermatol* 1998;134:167-71.
7. Herd RM, Alora MB, Smoller B, Arndt KA, Dover JS. A clinical and histologic prospective controlled comparative study of the picosecond titanium:sapphire (795 nm) laser versus the Q-switched alexandrite (752 nm) laser for removing tattoo pigment. *J Am Acad Dermatol* 1999;40:603-6.