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Safe and efficacious use of the Q-switched alexandrite laser to treat traumatic tattoo

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Abstract

Traumatic tattoos result from the forceful implantation of foreign material into the skin and may present a significant cosmetic burden to patients. Long-lasting or permanent skin pigmentation in traumatic tattoo may arise from particles of numerous materials such as fireworks, metals, gunpowder, asphalt, and dust embedded within injured skin. Our aim was to demonstrate the appropriate and beneficial use of the Q-switched alexandrite laser to treat traumatic tattoos. The patient's pigmented scars were biopsied and processed using standard histological methods to demonstrate foreign material within the scars. Following patient consent and laser tolerance testing, pigmented scars on the face were treated on two occasions with the Q-switched alexandrite laser. Progress photos were obtained before and after each treatment. The pigmented lesions responded well to treatment with the Q-switched alexandrite laser and exhibited almost complete resolution of foreign body pigmentation after just two treatments. The Q-switched alexandrite laser was used safely and effectively to treat traumatic tattoos.

more, traumatic tattoos respond to QS lasers after fewer treatments than traditional, artistic tattoos. It is possible that this discrepancy relates to the smaller size of pigmentary particles and more superficial depth of implantation relative to traditional tattoos.⁴ This case demonstrates both the safety and efficacy of the QS alexandrite laser in treating traumatic tattoos that resulted from a cycling injury.

Case Synopsis

In 2021, the patient suffered a serious cycling injury, which resulted in multiple lacerations to the face, including the left upper and lower cutaneous lip, left nasal ala, and left lower eyelid. These injuries were repaired by a plastic surgeon, but the patient was left with blue-gray pigmentation once the scars healed ([Figure 1](#)).

The patient presented to the dermatology clinic approximately two years after the accident inquiring about treatment options for the pigmentation. A 4mm punch biopsy of the left upper cutaneous lip was performed to differentiate between vascular etiology and exogenous pigment. Results of the biopsy showed polarizable foreign material and graphite pigment with granulomatous inflammation ([Figures 2-3](#)). QS alexandrite laser treatment was recommended, consent was obtained, and three spot tests were performed to assess tolerance: 3mm spot size with fluences of 6J/cm², 7J/cm², and 8J/cm². The patient tolerated all test spots without complications and returned to clinic one month later to initiate treatment.

The QS alexandrite laser was used with 3mm spot size settings and 7J/cm² fluence. A second treatment was performed 6 weeks later with the settings 3mm spot size and 8J/cm² fluence.

The patient's skin demonstrated significant improvement of the blue-gray pigmentation after two treatments with the QS alexandrite laser ([Figure 4](#)) and showed no evidence of adverse reaction to the treatment.

Introduction

Traumatic tattoos can result from the forceful implantation of foreign material into the skin followed by the subsequent release of particles that permanently dye the surrounding tissue. Many foreign bodies can cause traumatic tattoo, including fireworks, dust, asphalt, heavy metals, graphite, glass, sand, and petroleum.¹ Although Q-switched (QS) lasers like the alexandrite, yttrium aluminum garnet (YAG), and ruby are sometimes used, their safety and efficacy have been questioned.^{2,3} Further-

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Figure 1. Pre-treatment: Blue-gray pigment visible in the left perioral, left nasolabial, and left periocular regions.

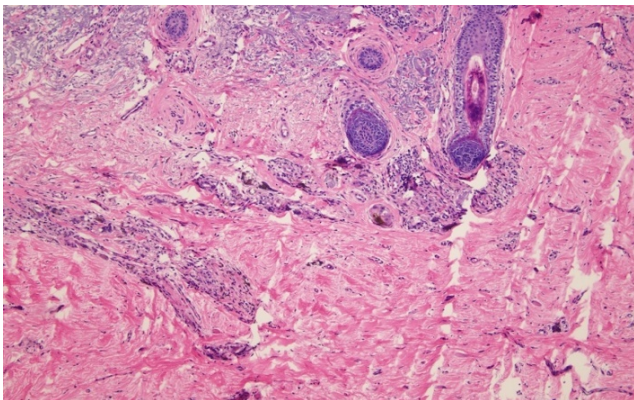


Figure 2. Hematoxylin and eosin stain, 10× magnification. Inflammatory granulomas containing foreign, pigmented bodies.

Case Discussion

This case supports the assertion that the QS alexandrite laser is safe and effective in the treatment of pigmented traumatic tattoos with near resolution of pigmentation in just two treatments. Further investigation involving a larger cohort of patients may be prudent.

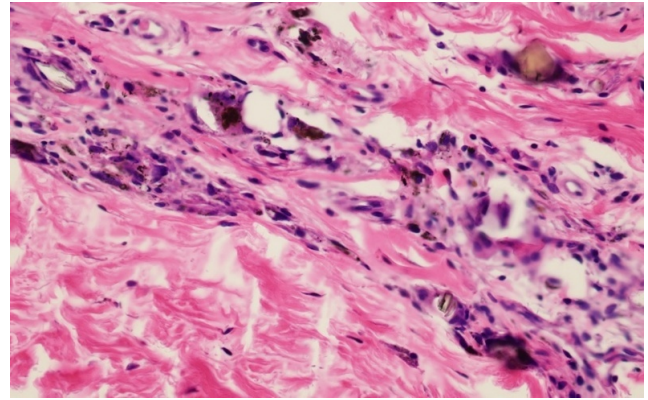


Figure 3. Hematoxylin and eosin stain, 40× magnification. Foreign pigment is easily visible at higher magnification.



Figure 4. Post-treatment: Perioral, nasolabial, and periocular skin shows significant reduction in visibility of foreign body pigmentation.

Conclusion

The QS alexandrite laser was effective and safe in the treatment of traumatic tattoos on the face resulting from a cycling injury.

Potential conflicts of interest

The authors declare no conflicts of interest.

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