Successful Treatment of Cosmetic Oral Mucosal Tattoos Using QS 694-nm Ruby Laser and 755-nm Alexandrite Picosecond Laser

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Background and Objectives: Q-switched (QS) and picosecond lasers can effectively and safely remove unwanted tattoo pigments. Cosmetic mucosal tattoos are rare and there are only a handful of cases of successful laser tattoo removal, all with QS 1064-nm neodymium-doped yttrium aluminum garnet (Nd:YAG) laser.
Study Design/Materials and Methods: A 19-year-old Fitzpatrick skin-type II female presented for treatment of a 6-month-old, black tattoo on the mucosal surface of her lower lip. She underwent six treatment sessions with a QS 694-nm ruby laser on months 0, 1, 3, 5, 7, and 12.A 30-year-old Fitzpatrick skin-type IV male presented for treatment of a 10-year-old black tattoo on his left buccal mucosa. He underwent one treatment with 755-nm alexandrite picosecond lasers.
Results: One month after last treatment, both patients demonstrated marked improvement to the treatment area without scarring or dyspigmentation.
Conclusions: Given the excellent results seen in the patients presented here, the authors recommend that lasers should be the first-line treatment for the removal of unwanted cosmetic mucosal tattoos, which are typically easier to remove than cutaneous tattoos and can be accomplished with various wavelengths in the picosecond and nanosecond domains. Lasers Surg. Med. © 2019 Wiley Periodicals, Inc.

Key words: tattoo removal; mucosal tattoo; Q-switched laser; picosecond laser

INTRODUCTION

Tattoos are becoming more popular in the United States [1]. With this, there has been an increase in the incidence of tattoo removal [1]. In 2011, the American Society of Dermatologic Surgery reported performing 100,000 tattoo removal procedures, up from 86,000 in 2010 [2]. Tattoo removal has long been a time-consuming and expensive process. In the past, cutaneous tattoos were treated with dermabrasion, salabrasion, cryotherapy, and surgical excision [3,4]. However, these methods all resulted in variable amounts of scarring and poor cosmetic outcomes [3,4]. With the invention of Q-switched (QS) and picosecond lasers, the practice of cutaneous tattoo removal was revolutionized based on the principle of selective photothermolysis. These lasers produced minimal scarring and superior cosmetic outcomes compared with traditional therapies, making them the standard treatment options for the removal of cutaneous tattoos [3,4].

Mucocutaneous tattoos are less common than cutaneous tattoos. However, tattooing of the inner lip or buccal mucosa has been practiced for generations in many cultures. QS and picosecond lasers have been used to successfully treat amalgam tattoos on the oral mucosa [1,5,6]. However, there are only a few reports of successful removal of cosmetic mucocutaneous tattoos using laser in the literature [3,4]. All of these case reports used a QS 1064-nm neodymium-doped yttrium aluminum garnet (Nd:YAG) laser [3,4]. Here, we present two cases of the successful treatment of mucocutaneous tattoos with a QS 694-nm ruby laser and a 755-nm alexandrite picosecond laser, the first to our knowledge.

Report of Two Cases

Case 1

A healthy 19-year-old Fitzpatrick skin-type II woman with no medical issues and on no medications presented with previously untreated black tattoo on the mucosal surface of

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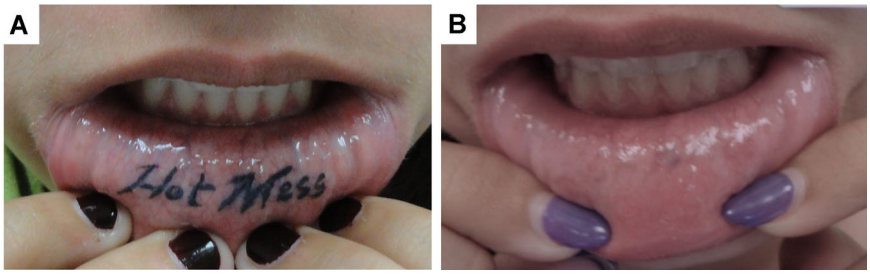

Fig. 1. Black tattoo located on mucosal surface of lower lip (**A**) before and (**B**) after six treatments with Q-switched (QS) 694-nm ruby laser.

the lower lip that was applied by a professional tattoo artist 6 months prior (Fig. 1A). The tattoo was treated six times with QS 694-nm ruby laser (Alma Lasers, Buffalo Grove, IL) with settings of 6-mm spot size, 20 nanosecond pulse duration, and 3.0–3.5 J/cm^2 on months 0, 1, 3, 5, 7, and 12.

Case 2

A healthy 30-year-old Fitzpatrick skin-type IV man with no medical issues and on no medications presented with previously untreated black tattoo on the left buccal mucosa that was applied by a professional tattoo artist 10 years prior (Fig. 2A). The tattoo was treated once with 755-nm alexandrite picosecond lasers (Cynosure, Westford, MA) with settings of 2.5-mm spot size, 500 picosecond pulse duration, and 3.36 J/cm^2.

Anesthesia was achieved with local infiltration using 1% lidocaine with epinephrine. The ideal end-point of whitening was achieved for all treatment sessions. Both patients experienced mild discomfort, erythema, and edema locally post-treatment, but no dyspigmentation, scarring, or textural changes. Significant improvement was noted 1 month after the last treatment (Figs. 1B and 2B).

DISCUSSION

While QS and picosecond lasers have been successfully reported in treating tattoos on the skin and amalgam tattoos in the oral mucosa from dental fillings [1,5,6], there is a relative paucity of published data using them to treat cosmetic mucosal tattoos. Kirby et al. [3] reported three cases of lower lip cosmetic mucosal tattoos and Tomov et al. [4] reported five cases of inner lip cosmetic tattoos treated with QS 1064-nm Nd:YAG laser. To the best of our knowledge, this is the first known report of using QS ruby and picosecond lasers to successfully treat cosmetic mucosal tattoos.

Although picosecond lasers deliver more photomechanical effects than QS lasers [1], it is unclear which modality is best for cosmetic mucosal tattoo removal. QS laser was used in Case 1 due to the available technology at the time. Even though we now use picosecond lasers for tattoo removals, as was the case in Case 2, QS lasers nonetheless remain excellent treatment modalities. Older tattoos respond better and quicker on the skin to laser treatments [7,8], and it is likely the reason why the buccal mucosa tattoo (10 years) resolved with a single treatment whereas the lower lip tattoo (6 months) required six treatments. Tattoos on the mucosa tend to respond better, faster, and with less unwanted side effects than tattoos on the skin. This may relate to the fact that mucosal skin is thinner, non-keratinized, well-vascularized, and contains less melanin content [4].

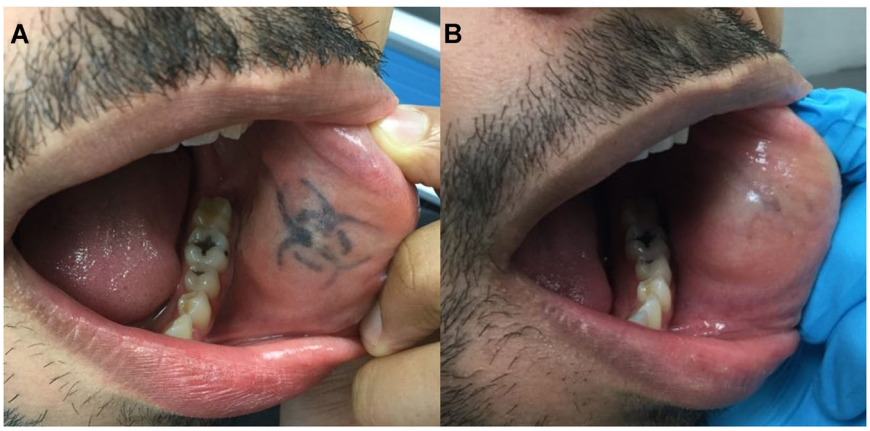

Fig. 2. Black tattoo located on left buccal mucosa (**A**) before and (**B**) after one treatment with 755-nm alexandrite picosecond laser.

CONCLUSION

Given the excellent clinical response combined with lack of scarring and dyspigmentation in our highly satisfied patients, it is the authors' opinion that laser treatment should be considered as the first-line treatment in removing unwanted cosmetic mucosal tattoos. This can be accomplished with various wavelengths in the picosecond and nanosecond domains.

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