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Letter to Editor

Effective management of post-inflammatory hyperpigmentation secondary to para-phenylenediamine contact allergic dermatitis using 755-nm alexandrite picosecond laser

Joana Vieitez-Frade[1], Dora Mancha[1], Isabel Correia-Fonseca[1], Paulo Filipe[1]

[1]Department of Dermatology, Hospital de Santa Maria, Unidade Local de Saúde Santa Maria, Lisbon, Portugal.

***Corresponding author:**
Joana Vieitez-Frade, Department of Dermatology, Hospital de Santa Maria, Unidade Local de Saúde Santa Maria, Lisbon, Portugal.

joanamvfrade@gmail.com

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Dear Editor,

Henna is widely used in body and hair art coloring. Para-phenylenediamine (PPD) is often added to improve its properties, creating the well-known "black henna." PPD is a potent allergen that frequently causes allergic contact dermatitis (ACD), which frequently leads to post-inflammatory hyperpigmentation (PIH), that can persist for several months, causing a significant psychosocial impact.[1] At present, treatments targeting PIH include depigmenting agents, chemical peels, and laser therapy. Few studies focus on laser treatment for PIH, in which the 755-nm Alexandrite Picosecond laser has demonstrated promising results.[2,3]

This article describes a case of PIH secondary to ACD effectively treated with a 755-nm alexandrite picosecond laser.

A 15-year-old teenager presented to the emergency room due to pruritic blisters on her right leg [Figure 1a] at the site of a "black henna" tattoo performed in Morocco the previous week. Treatment with oral prednisolone and topical betamethasone resolved the acute dermatitis, and patch testing confirmed strong PPD positivity. After 6 months, significant PIH persisted at the site of previous inflammation [Figure 1b]. The patient underwent two treatment sessions with alexandrite picosecond laser 755-nm (*PicoSure*®), using 2.34 J/cm^2 energy density, 3.1 mm spot size, 10 Hz frequency, and 750 ps pulse duration, at 2-month intervals. Post-treatment care consisted of avoiding sun exposure, emollients, and sun protection (SPF50+). Notably, PIH markedly improved without post-treatment complications [Figure 1c], and the patient expressed high satisfaction.

The 532-nm, 755-nm, and 1064-nm picosecond lasers have shown to be effective in the treatment of pigmentary disorders, acne scars, and photoaging. Unlike millisecond or nanosecond laser therapy, whose effect depends on thermal destruction, the picosecond laser uses the photomechanical effect to fragment the pigment, resulting in minimal thermal damage. This mechanism reduces inflammation and the risk of laser-induced hyperpigmentation, making them particularly advantageous in the treatment of PIH, especially in patients with darker phototypes.[3,4] The use of 755-nm Alexandrite Picosecond Laser on PIH has already been reported in the literature.[2-5] Zawodny *et al.* evaluated the efficacy of the 755 nm Alexandrite Picosecond

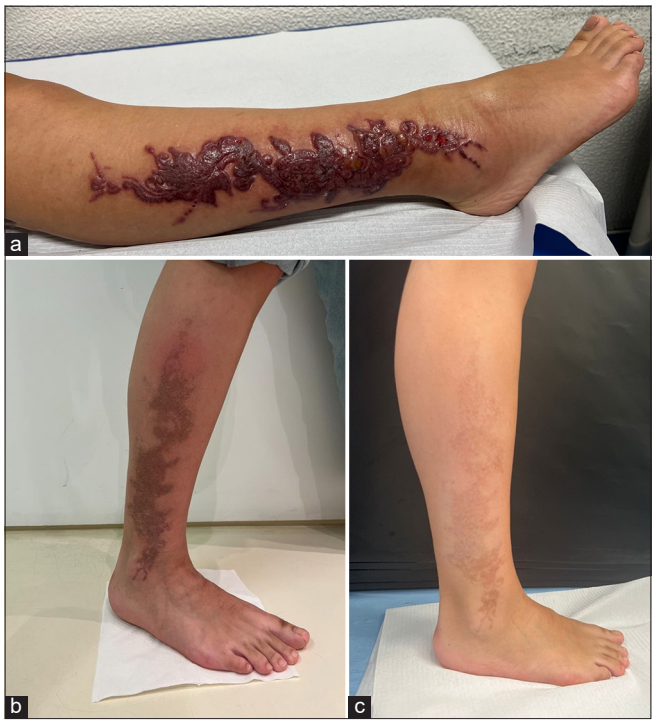

Figure 1: (a) Allergic contact dermatitis due para-phenylenediamine on right leg. (b) After 6 months, significant post-inflammatory hyperpigmentation persisted. (c) Significant pigmentation improvement after two 755-nm Alexandrite Picosecond Laser sessions with 2-month intervals.

laser in 109 patients with mixed hyperpigmentation, including 13 cases of PIH, using a 750 ps pulse width, 10 Hz frequency, 3.0–3.5 mm spot size, and 2.08–2.83 J/cm^2 energy density. This study reported efficacy in Fitzpatrick skin types I-III.[4] Similarly, Lee *et al*. documented significant improvement in a patient with lip PIH after seven 755 nm Alexandrite Picosecond laser sessions using a 2 mm spot size and a 7.25 J/cm^2 energy density.[5] Finally, Ren and Zhao also reported a case of PIH on the dorsum of the nose treated with 755 nm Alexandrite Picosecond Laser, using 750 ps pulse width, 1 Hz frequency, 3.2 mm spot size, and 2.49 J/cm^2 energy density, also with significant improvement after two sessions with an interval of 6 months.[2]

This case report highlights the potential of the 755-nm Alexandrite Picosecond laser as a safe and effective treatment for PIH, including ACD-induced cases. However, more studies are needed to define protocols as well as to establish their long-term effectiveness in comparison with alternative therapies.[3,4]

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