

## Intense pulsed light therapy for the treatment of facial erythema and hypertrophic scar after phenol peeling

*Terapia de luz intensa pulsada para tratamento de eritema facial e cicatriz hipertrófica pós-peeling de fenol*

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### ABSTRACT

Facial erythema after phenol peeling is one of the expected effects of the healing process and collagen formation. Intense Pulsed Light (IPL) therapy is one of the forms used as a treatment accelerating recovery, reducing redness, inflammation, and itching symptoms that may occur after peeling. IPLT can also be used to treat hypertrophic scars, which is also one of the adverse events that can happen with deep peeling. We report a successful case of IPLT treatment in a patient who presented facial erythema and hypertrophic scarring after undergoing phenol peeling.

**Keywords:** Phenol; IPL treatment; Hypertrophic Scar.

### RESUMO

O eritema facial pós-peeling de fenol é um dos efeitos esperados do processo de cicatrização e formação de colágeno. A terapia de luz intensa pulsada (LIP) é uma das formas utilizadas como tratamento, acelerando a recuperação, reduzindo a vermelhidão, a inflamação e os sintomas de prurido que podem ocorrer após o peeling. A LIP também pode ser utilizada para tratar cicatrizes hipertróficas, um dos efeitos adversos que pode acontecer com o peeling profundo. Relata-se um caso bem-sucedido de tratamento com LIP em paciente que apresentou eritema facial e cicatriz hipertrófica após ter realizado o peeling de fenol.

**Palavras-chave:** Fenol; Terapia de Luz Pulsada Intensa; Cicatriz Hipertrófica.

## Case Report

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## INTRODUCTION

Facial erythema is one of the most common outpatient complaints in Dermatology. There are several causes of facial erythema, which can be physiological and transient or occur in diseases such as rosacea, lupus erythematosus, and dermatomyositis.<sup>1</sup> Facial erythema can also occur as an adverse event after phenol peeling, currently used to treat deep wrinkles and severe acne scars. Phenol is a deep peeling that immediately coagulates superficial epidermal and dermal proteins with a histological increase in collagen and elastic fibers.<sup>2</sup>

Prolonged post-phenol peel erythema is benign. It begins during the first week and peaks in the second week after the procedure. Erythema is a normal part of the healing process and is a sign of reticular dermal collagen formation. Patients typically present this condition within three to six months and up to a year during exercise.<sup>3</sup> The formation of hypertrophic scars can occur in specific areas, such as the zygomatic arch, pre-auricular region, medial upper eyelids, lower eyelids, and neck, where the peeling should be less vigorous.<sup>3</sup>

Intense Pulsed Light (IPL) therapy is a light device commonly used to treat these conditions of facial erythema and

hypertrophic scars.<sup>1,4</sup> This light emits wavelengths between 420 nm to 1400 nm. It emits the wavelength needed to target specific chromophores and improve penetration by using filters, thus minimizing energy absorption by other chromophores. Advantages of the IPL system include lower cost, versatility to target multiple chromophores, flexible parameters with less complexity, and fewer adverse events.<sup>5</sup> Incorrect patient selection, i.e., skin color or ethnicity, is a significant cause of burn injury as there are variations in melanin content in different people.<sup>1</sup>

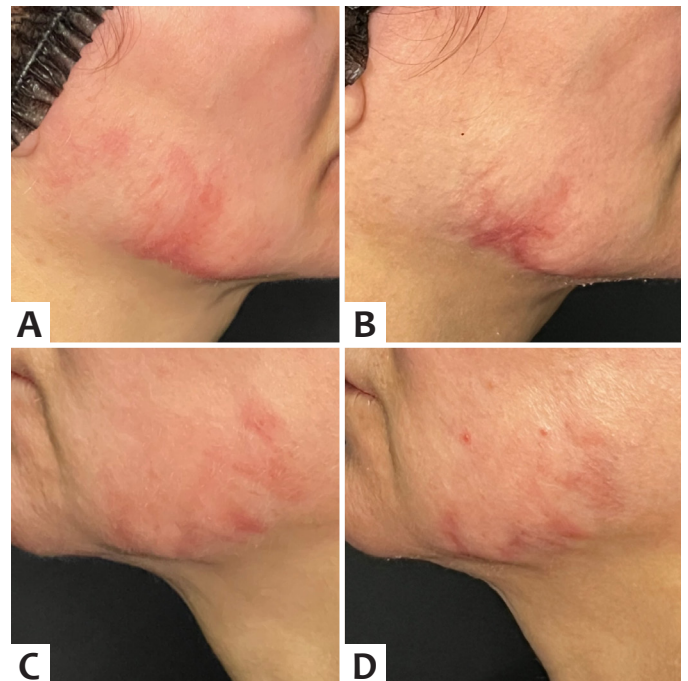
## METHODS

A 52-year-old woman, Fitzpatrick skin phototype II, presented facial erythema and hypertrophic scar after undergoing phenol peeling with Hett formula 1.2% to treat photoaging and periocular wrinkles. Three IPL sessions were performed on the entire face at monthly intervals, one month after the deep peeling, using parameters as shown in table 1 and photographic monitoring before and after each procedure (Figure 1).

During the laser sessions, the patient developed a hypertrophic scar in the mandibular region bilaterally, one of the most



**FIGURE 1:** Skin recovery after phenol peeling. **A** - Before peeling; **B** - Seven days post-peeling; **C** - 30 days post-peeling and before performing the first IPL session; **D** - After completing three IPL sessions



**Figure 2:** **A** - and **C** - Lateral photo of the face showing the appearance of the hypertrophic scar after 70 days of phenol peeling; **B** - and **D** - Lateral photo of the scar after two sessions of infiltration with 10% kenalog diluted with 0.9% SS in a 1:4 ratio, respectively, at fortnightly intervals, followed by three sessions of IPL, showing an improvement in the erythema and telangiectasias

**TABLE 1. Full face intense pulsed light therapy for erythema + infiltration (INF) in hypertrophic scar in the right and left mandibular region**

Session	Filter	J/cm	ms	Hz	Cooling
1st IPL	540 nm	13	15	0.50	maximum
1st INF	Kenalog 10% diluted with 0.9% SS in a 1:8 ratio, respectively				
2nd IPL	540 nm	15	15	0.50	maximum
2nd INF	Kenalog 10% diluted with 0.9% SS in a 1:8 ratio, respectively				
3rd IPL	540 nm	18	15	0.50	maximum



**FIGURE 3:** A - Right side photo of the face before performing IPL therapy; B - Right side photo after completing three IPL sessions; C - Left lateral photo before performing IPL therapy; D - Left side photo after completing three IPL sessions

feared complications of phenol peeling. Between IPL sessions we conducted two infiltrations using 10% kenalog diluted with 0.9% saline solution (SS) in a 1:8 ratio, respectively, with fortnightly intervals, always one week before the IPL sessions, resulting in improvement of erythema and telangiectasias (Figure 2).

## RESULTS

After the three IPL sessions, we observed a reduction in facial erythema and an improvement in the appearance and symptoms of itching in the hypertrophic scar in the mandibular region on both sides of the face through the photographic comparison. Although the patient had post-peeling adverse events, she obtained the desired improvement in her deep periorbital wrinkles, reporting that she was satisfied with the result after all the procedures (Figure 3 to 6).

## DISCUSSION

Phenol has been used as a deep peeling both alone and in association with other components that act as penetration and permeation promoters. These products result in an intense cell renewal process, normalizing skin pigmentation, reducing marks, and minimizing wrinkles.<sup>6</sup> Prolonged erythema may persist for a period ranging from three to six months after the deep peeling.<sup>3</sup> Furthermore, IPL can treat telangiectasias resulting from the dilation of capillary microvessels. In this case, its mechanism of action is based on photothermolysis, or thermal damage to the vessels, which induces intravascular coagulation.<sup>7</sup>

Scars can occur after peeling and can be permanent. They generally appear in regions such as lips, eyelids, and jaw.<sup>6</sup> The mechanism of action of IPL in hypertrophic scars is not fully understood, but it probably targets vascular proliferation essential for excessive collagen production. Wavelengths from 400 nm to 600 nm impact the vasculature directly, reducing its thickness and inhibiting its growth. It also heats the dermal collagen fibers, promoting their contraction and improving the texture of scars.<sup>7</sup>

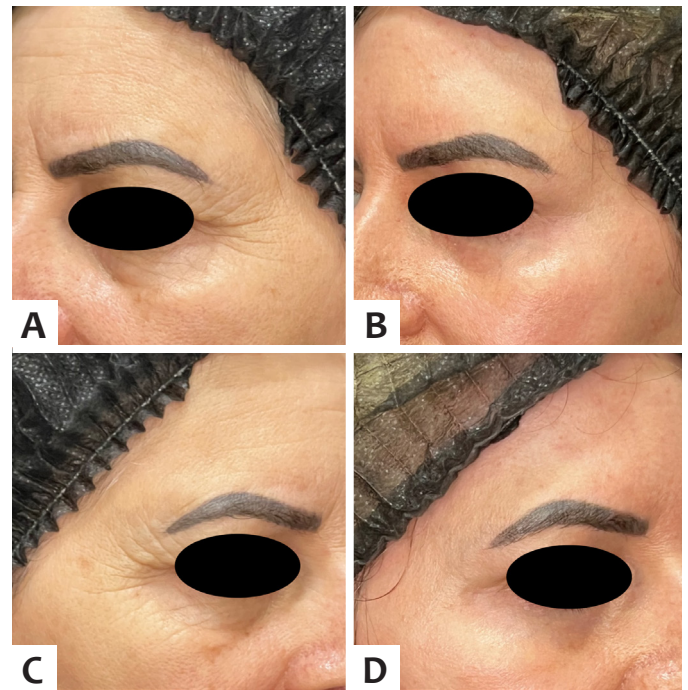




**FIGURE 4:** **A** - Right diagonal photo of the face before performing IPL therapy; **B** - Right diagonal photo after completing three IPL sessions; **C** - Left diagonal photo before performing IPL therapy; **D** - Left diagonal photo after completing three IPL sessions



**FIGURE 5:** **A** - Photo of the frontal position of the face before performing IPL therapy; **B** - After completing three IPL sessions



**FIGURE 6:** **A** - Right diagonal photo of the face before phenol peeling; **B** - Right diagonal photo after peeling; **C** - Left diagonal photo before phenol peeling; **D** - Left diagonal photo after peeling, showing an improvement in fine and deep wrinkles

In 2014, Meymand assessed the use of IPL associated with intralesional corticosteroids in the treatment of 86 patients with hypertrophic scars and keloids. The study held eight sessions every three weeks. According to the paper, the association between treatments accelerated results without presenting significant adverse events, with a degree of clinical improvement considered excellent in 73% of cases.<sup>7</sup>

## CONCLUSION

Complications from phenol peeling are a challenge for dermatologists, and it is necessary not only to identify them early but also to know how and when to intervene. Intense pulsed light (IPL) therapy is a proven effective technique to treat facial erythema and hypertrophic scars. Therefore, it is critical to deepening the knowledge of IPL to optimize the application techniques, keeping in mind that combining techniques results in greater comfort and requires a smaller number of sessions.<sup>7</sup> ●



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Statistical analysis; approval of the final version of the manuscript; study design and planning; preparation and writing of the manuscript; collecting, analyzing, and interpreting data; intellectual participation in propaedeutic and/or therapeutic conduct of studied cases; critical literature review; critical review of the manuscript.

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