# Prolonged Erythema After Facial Laser Resurfacing or Phenol Peel Secondary to Corticosteroid Addiction

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BACKGROUND. Prolonged persistent erythema postprocedure using phenol or carbon dioxide ($CO_2$) lasers occurs frequently and the reasons have not been fully ascertained.

OBJECTIVE. To describe patients whose postoperative care consisted of prolonged use of topical corticosteroids and to assess the outcome of cessation of this medicine.

METHODS. Twelve patients who underwent $CO_2$ laser resurfacing or phenol peels to their face are presented. All patients were seen between 3 and 30 months after the procedures were performed. All dressings, wound care, and other medicaments had been stopped prior to being seen. Most were patch tested to a wide variety of chemicals including corticosteroids, topical medications, and preservatives. They were observed during the poststeroid cessation period and the clinical response is described.

RESULTS. All patch testing showed insignificant results. All postpeel patients cleared within 6 months of steroid cessation, experiencing several flares of erythema before the end result. Three of the six laser resurfacing patients cleared fully within 12 months and three are still being followed. The erythema and severe burning in the patients that cleared stayed clear during long-term follow-up. No scars or atrophy were seen.

CONCLUSION. The use of topical corticosteroid preparations postoperatively in peel and resurfacing patients is believed to be a major cause of prolonged erythema, dermatitis, burning, and telangiectasias in these patients. The mechanism is believed to be one of vasoconstriction/vasodilatation secondary to the corticosteroids through a nonintact barrier.

EXPLANATIONS FOR prolonged persistent facial erythema that occurs after laser resurfacing or phenol peels have included multiple laser passes, infections (yeast, bacterial, viral), type of laser ($CO_2$, erbium), taping after phenol peels, and pre- and posttreatments with retinoids, hydroquinone, or glycolic acids. Short-term erythema usually clears with little difficulty and minimal therapy.

We suggest that often the problem occurs because of the chronic use of topical corticosteroids. Twelve patients are reported who underwent either of the above procedures and either during the preprocedure period had been using corticosteroids for atopic dermatitis or seborrheic dermatitis or immediately after the procedure were instructed to apply corticosteroid preparations to the face to ease the redness and continued to do so for long periods of time. We believe that facial skin became addicted to corticosteroids and a cure occurred many weeks to months later only after corticosteroid cessation and after many other remedies were tried and failed.

## Materials and Methods

All patients were evaluated with a detailed contact dermatitis history including cosmetic and occupational chemical exposure. All dressings and wound care preparations were stopped long before the patients were seen by the authors. All other topical preparations were discontinued upon the first visit. Patch testing was performed to rule out allergic contact dermatitis to any of the prior medications and also any lubricants or creams that were being used.

An expanded tray of 45 patch test chemicals was used for testing. For the last 10 years various corticosteroid preparations have also been tested. Initially creams of finished products were used, but in the last 5 years, four standardized preparations—tixocortol, budesonide, clobetasol, and hydrocortisone 17 butyrate—have been used. Readings were done at 48 and 72 hours with, on occasion, more delayed readings. When no culprit allergic chemical was detected by patch test, no systemic problem was demonstrated, and no other etiology for the redness was suggested by the workup, the patients were given the diagnosis of steroid addiction with erythema secondary to the corticosteroids. After total cessation of topical and systemic corticosteroid use, they were followed to total remission with continued follow-up for several months to years later with no recurrences.

## Case Reports

### *Laser Patients*

***Patient 1.*** A 28-year-old man had applied moderate-strength corticosteroids (desoximetasone) to the seborrheic dermatitis areas of his eyebrows, glabella, and sides of his nose for 7 years (initially two to three times a week and then after 2

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years applications were two to three times a day). An acneiform eruption occurred on his forehead eventuating into some acne pits. Eighteen months prior to being seen he underwent a resurfacing on his forehead with a $CO_2$ laser (one pass). He immediately resumed corticosteroid use after the surgery. Because of the persistent worsening erythema, he was given more potent topical corticosteroids (Temovate) in conjunction with oral steroids approximately 12 months ago and use continued for the past year.

Examination revealed a forehead that was red with some small acne papules. He complained of a severe continual burning sensation. He had mild seborrheic dermatitis on the sides of his nose. Patch testing was negative. When the steroids were stopped, he began having severe flares of burning erythema, not only on the forehead but on the temple areas, below the eyes, and down onto the preauricular areas. There were three flares of erythema, lasting 5–10 days each over the next 6 weeks. Therapy consisted of ice and cool water compresses. Because of the persistence of the acne papules, he was given 20 mg/day of Accutane for 2 weeks. The acne lesions cleared and Accutane was discontinued. The flares of erythema recurred, lasting shorter periods of time, with normal interphase times lasting longer. Finally, after 5 months of corticosteroid cessation, the erythema ceased completely. He has been followed now for 6 more months without any recurrences and no need for any medication.

***Patient 2.*** A 69-year-old atopic woman had intermittently been using weak to moderate-strength corticosteroid creams for a pruritic dermatitis on her neck, chest, upper lip, and right eyelid for 3 years. A more persistent rash occurred on the upper lip and superpotent corticosteroid preparations (Temovate) were prescribed 8 months prior. A $CO_2$ laser resurfacing (one pass) was performed on the entire face 4 months prior to being seen for the diagnosis of aging skin and sun damage. She used corticosteroids (Synalar) daily since the procedure because of flares of rash on the face and neck. There was a severe burning sensation associated with these flares.

Examination revealed patches of dermatitis on her lower face, neck, and cheeks. There was some minor itching, but mostly a burning sensation was described. Patch testing revealed a 2+ reaction to cinnamic aldehyde. Five episodes of erythema occurred lasting from initially 10 days then down to 2 days. Five months after the cessation of topical steroids, all flares of erythema and dermatitis ceased. She has been followed now for 6 more months and has experienced no recurrences. No medication is being used and all cosmetic creams and makeups are used and causing no rashes.

***Patient 3.*** A healthy 77-year-old woman underwent facelift surgery 2.5 years prior to being seen. During the surgical procedure, the nasolabial folds were also treated with the $CO_2$ laser (one pass) in an attempt to efface the shallow lines. Facial skin at that time showed little if any sun damage or aging. No telangiectasias were seen by the patient at that time. She was referred for aftercare to a dermatologist and was initially treated with Elocon cream three times a day because of the erythema from the laser treatment. When the eruption did not clear, and erythema persisted, other topical medications such as tolnaftate, metronidazole, sulfur, and capsaicin were used for short periods of time in addition to daily topical corticosteroids.

Her complaint when initially seen was the continual presence of a fierce burning sensation in the nasolabial and cheek areas. She slept with two running electric fans focused on her face throughout the night. She had expressed suicidal ideations. Examination revealed a severe atrophy of the skin with marked telangiectasia and severe erythema across both cheeks, less so on the nasolabial area. Patch test results were entirely negative. Initially, after the steroids were stopped, a severe flare occurred with erythema down the cheeks and onto the neck. She is now into her fourth month of steroid cessation and the erythema is markedly improved, although the burning sensation persists. Atrophy appears to be slowly improving. The redness is confined to the upper cheek areas only, where no laser treatment was performed.

### *Phenol Peel Patients*

***Patient 4.*** A 53-year-old atopic woman had a phenol peel performed on her face for the diagnosis of aging skin. Immediately postoperatively she was given oral prednisone and a superpotent corticosteroid cream (Temovate). Over the next 8 weeks she had intermittently used topical emollients, vitamin E, benzocaine spray, neomycin, erythromycin, Betadine, and gentian violet, in addition to Mycolog and Terra-Cortril. The superpotent corticosteroid was applied daily also.

She had had a recurrent and ongoing eyelid dermatitis for about 10 years prior to the peel. She had been using Diprolene cream intermittently, with increasing amounts in the last few years. In addition, she had chronic pruritic "yeast infections" vaginally, and Mycolog cream had been used continually for many years. Pruritus ani also had been steroid-treated for years. When seen, she had marked facial erythema and was experiencing a severe burning sensation. Some atrophy of the eyelid skin was evident. Patch testing revealed 2+ positive reactions to carba mix, cinnamic aldehyde, formaldehyde, and fragrance mixture. She had a 4+ reaction to Merthiolate and a 1+ reaction to imadazolidinyl urea. Repeat patch tests a few weeks later to all of the above positives with additional preservatives demonstrated only a positive to formaldehyde. Merthiolate was not repatched, but the original 4+ positive reaction reflared. This was in an area not under occlusive tape.

The use of all corticosteroids was stopped. Over the next 5 months she had repeated flares of erythema and burning on various parts of her face, including the eyelids. Finally, all of the flares including the vaginal and anal pruritus ceased. Follow-up is now into the sixth year with no facial rash recurrences.

***Patient 5.*** A 54-year-old woman had a phenol face peel with taping for the diagnosis of aging skin. There was a prior his-

tory of drug and alcohol abuse and hepatitis, now all in remission. After the face peel, both oral and topical corticosteroids (Synalar) were prescribed to help clear the erythema. In addition, Polysporin, sun screens, lubricants, and cover-ups were used during the 8-week postoperative period.

On examination she exhibited a telangiectatic erythema over both cheeks, forehead, and chin. There were no acneiform lesions. Patch testing revealed 2+ positives to fragrance mixture and potassium dichromate. These were felt to be clinically insignificant. Cessation of the steroids was begun immediately and she was treated with cool compresses and ice packs. After several flares, erythema and the burning sensation totally ceased in 8 more weeks. Follow-up for 6 months revealed no further flares and a clear nontelangiectatic skin.

## Results

*Clinical Response to Cessation of Topical Corticosteroids*

When all corticosteroids were discontinued, a flare of the dermatitis on the face usually occurred in approximately 5–7 days and was accompanied by marked erythema and a severe burning sensation. Treatment consisted of cool ice compresses, time, and fielding many "panic" telephone calls. This initial flare lasted anywhere from 2 to 10 days with resultant peeling and normalization of the skin. The skin did not tolerate any lubricating or medicinal creams, causing only more irritation and itching. All cosmetics were avoided. Within 2–3 weeks the patients experienced repeated flares of erythema in the same locations or with progression down the face and onto the neck.

The length of the "normal time" between flares increased and the redness became more short-lived. The patients required 2–6 months to clear completely, experiencing three to six flare episodes. The flares appeared to occur randomly with no antecedent event.

## Discussion

Laser resurfacing followed by the complication of erythema lasting 2–12 weeks and longer has been discussed in recent reports.[1,2] This postlaser erythema is usually divided into diffuse and focal types.

Focal erythema, especially on the mandibular angle or perioral skin, might mean impending hypertrophic scarring, and ultrapotent corticosteroid creams for 10–14 days is strongly suggested.[3] This focal persistent erythema can result in hypopigmentation about 1 year later.

It was suggested that the persistent erythema could be due to transoperative mechanical trauma by rubbing too briskly with wet gauze and also retinoid use pre- and postoperatively. Other authors[4,5] believe that the average duration of erythema is 4.5 months. In addition, focal atrophy has been reported in 1% of patients and occurred without evidence of infection or prolonged healing time at the affected sites. This scar formation seems to occur more frequently in the perioral and periorbital regions.[6] Mild side effects of resurfacing include prolonged erythema, edema, acne exacerbations, burning discomfort, eczematization, and intermittent pruritus.[7] Most of these complaints can be attributed to the use of corticosteroids.

Many laser surgeons advocate the use of topical corticosteroids, especially in the periorbital area, as routine care immediately after the resurfacing procedure and for several weeks later (personal communication).

Prolonged post peel erythema (PPPE) or prolonged erythema after chemical peel syndrome[8] was coined by the authors during the discussion of 236 chemical phenol peels on 196 patients. The patients experienced prolonged erythema, pain, pruritus, burning, and textural skin changes. These patients were degreased with acetone preoperatively and moist dressings were applied as opposed to taping postoperatively. Patients were routinely treated with systemic and topical corticosteroids. Hydrocortisone valerate or Westcort ointment was generally initiated on a three times a day basis. If the patient responded quickly, this was decreased over a period of a couple of weeks. If no response occurred after a week or sooner, or if there was an adverse reaction, another steroid preparation was selected such as triamcinolone or Aristocort cream. Mild cases that showed improvement initially were started on milder corticosteroid preparations such as desonide or DesOwen ointment. Systemic corticosteroids, when not medically contraindicated, generally consisted of intramuscular injections of Kenalog 60–80 mg in the gluteal region. The authors noted that 27 cases (11%) of the total number of peels had PPPE. The typical locations were the perioral area (55%), periorbital (26%), forehead (4%), and full face (19%). The authors searched for possible irritants such as hair spray, cotton balls, tissue papers, fragrances, make-ups, or household items that contained bleach. Even toothpaste with whitener or tartar control agents were felt to play a role in "sensitization." Routine patch testing was not performed. Concern was expressed about skin pretreatment with glycolic acids and topical retinoids, and that cosmetics, sun exposure, and sun screens before and after the peel might have played a role in the erythema. It was mentioned that all their patients cleared sometime between 6 weeks and 12 months.

None of the articles reviewed reveal whether the patients had the diagnosis of atopic or seborrheic dermatitis prior to being treated with either the phenol

peel or laser resurfacing. Prior use of corticosteroids on the face is not mentioned and it is interesting that 3 of our 12 cases had used corticosteroids for prolonged periods of time prior to the surgical procedures and continued to do so afterward.

Our recent article[9] describes 100 patients with periorbital erythema followed by the red face syndrome and then cure only after total cessation of corticosteroid use. In many instances the cure occurred only after 8–14 months. Flares of erythema, burning associated with telangiectasia, and skin atrophy were seen in many of those patients. All patients were very similar in their chronic use of corticosteroid preparations.

Other authors[10] have found corticosteroids to be a cause of allergic contact dermatitis supported by positive patch tests in patients with chronic rashes. It is our belief that these positive patches are due to the "angry back" syndrome, especially in irritable eczematous patients' skin. The burning sensation, which patients believe is associated with the burning of the peel or the laser resurfacing, has also been described as a cosmetic intolerance where patients cannot bear any preparation applied to their eyelids.[11,12] These patients also chronically use topical corticosteroids. Facial blanching and erythema, in addition to telangiectasias, have been associated with the long-term application of a topical corticosteroid not only locally, but also from a distant site, namely the scalp.[13,14]

In our cases, all of the phenol peel patients cleared in 2–6 months and have been followed up from 6 months up to several years. They have remained clear with no treatment (see Table 1). Three of the six laser resurfacing patients have been clear and have been followed for more than 6 months. The other three are still being followed. It should be noted that all of the patients had a burning sensation, and 9 of the 12 exhibited skin atrophy. Patch testing demonstrated insignificant results.

We suggest that the mechanism propelling this prolonged erythema in these patients is one of vasoconstriction/vasodilation that is totally corticosteroid driven. We believe that these patients have similar characteristics with syndromes such as the red scrotum syndrome, perianal atrophoderma, some cases of vulvodynia, status cosmeticus, and the red face syndrome. We strongly advocate cessation of the prolonged use of topical steroids in cases of chemical peel and laser resurfacing. Finally, it should be noted that there have been several instances of legal actions taken by patients who have had prolonged erythema after the procedures were performed very adequately and within the standard of care. Some of these patients were found to be chronic corticosteroid users (personal cases). Corticosteroid cessation might preclude some legal problems.

**Table 1.** Summary of Patients

| | *Laser* | *Phenol* |
|---|---|---|
| Number | | |
| Male | 1 | 0 |
| Female | 5 | 6 |
| Age range (years) | 28–77 | 43–63 |
| Atopic | | 2 |
| Seborrheic dermatitis | 1 | |
| Topical steroid range (months) | 4–30 | 3–12 |
| Systemic steroid range (months) | 0–6 | 0–4 |
| Burning | 6 | 6 |
| Atrophy | 5 | 4 |
| Patch test done | 4 | 3 |
| Significant patch positives | 0 | 0 |
| Clearing time (months) | 4–8 | 2–6 |
| Follow-up clear for >6 months | 3 | 6 |

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