

Jessner's Solution with Trichloroacetic Acid Chemical Peel: Optimizing Outcomes and Safety

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Summary: Trichloroacetic acid (TCA) is a versatile agent, efficacious in treating a spectrum of facial rhytids and dyschrommias at varying concentrations. TCA is commonly used in a 30%–35% concentration to achieve a medium-depth peel into the upper reticular dermis. The addition of Jessner's solution before the TCA peel application leads to partial removal of epidermis, allowing for deeper penetration of the TCA. This combination is beneficial, as lower concentrations of TCA can be used for the same depth of peel, minimizing complications such as scarring. (*Plast Reconstr Surg Glob Open* 2019;7:e2250; doi: 10.1097/GOX.0000000000002250; Published online 17 May 2019.)

Chemical treatments to enhance facial appearance are among the earliest forms of aesthetic procedures, dating back to ancient Egyptians who used animal oils, salt, alabaster, and sour milk to improve the skin.¹ Today, a variety of formulations and concentrations are used to treat conditions such as dyschrommias, rhytids, actinic changes, and keratosis.² The type of chemical peel is often selected based on depth of penetration required to effectively treat a given condition. As such, chemical peels are frequently classified based on depth of penetration (superficial, medium, and deep) (Table 1).² Light peels resurface the epidermal layer and most commonly include alpha hydroxyl acids such as glycolic acid or Jessner's solution (resorcinol, salicylic acid, lactic acid, and ethanol). Medium peels include trichloroacetic acid (TCA) 30%–35% and reach the papillary dermis. Deep peels affect the deep papillary dermis and include the Baker Gordon phenol formula peel.^{3,4}

With the increasing popularity of laser skin resurfacing over the past 20 years, the art of chemical peeling is often discounted in plastic surgery training. This may lead to suboptimal results, as the clinician must have strong working knowledge on the type of solution, concentration, patient skin type, application technique, peri-procedural care, and repetition of treatment.⁵

TRICHLOROACETIC ACID AND JESSNER'S SOLUTION

Trichloroacetic acid is a versatile agent, efficacious in treating a spectrum of facial rhytids at varying concentrations.

TCA is commonly used in a 30%–35% concentration to achieve a medium-depth peel into the upper reticular dermis.⁵ Importantly, a number of factors other than the concentration of TCA contribute to the depth of peel obtained such as skin preparation, pretreatment skin type, and method of application. The depth of peel can be determined clinically based on the frost color as described by Dolezal (Table 2).^{6,7}

The addition of Jessner's solution before TCA peel application leads to partial removal of epidermis, allowing for deeper penetration of the TCA. This combination is beneficial, as lower concentrations of TCA can be used for the same depth of peel, minimizing complications such as scarring.⁵

Preprocedure Protocol

Consultation with the patient should be used to establish realistic goals and expectation as well as to educate the patient on important perioperative care instructions for optimal results. A careful history and physical examination allow the clinician to determine the patients' candidacy (Table 3).

The senior author's (R.J.R.) preference is to pretreat all patients for 4–6 weeks before chemical peeling.^{5,8} This regimen includes topical tretinoin (0.05%–0.1%), hydroquinone (2%–4%), sunscreen, and alpha hydroxyl acid (4%–10%). Pretreatment improves skin tolerance, regulates fibroblast and melanocyte function, improves dermal circulation, and

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Table 1. Types of Chemical Peels and Depth of Treatment

	Depth of Penetration	Peeling Agent	Conditions
Superficial	Stratum corneum to papillary dermis (60 µm)	<ul style="list-style-type: none"> • Alpha hydroxyl acids • Beta hydroxyl acids • Jessner solution • TCA 35%–50% 	<ul style="list-style-type: none"> • Mild photoaging • Mild acne scarring • Pigmentary disorders • Mild to moderate photoaging
Medium	Papillary dermis to upper reticular dermis (450 µm)	<ul style="list-style-type: none"> • TCA 35% + glycolic acid 70% • TCA 35% + Jessner solution 	<ul style="list-style-type: none"> • Actinic keratosis • Fine rhytids • Solar lentigines • Pigmentary disorders
Deep	Mid-reticular dermis to 600 µm	<ul style="list-style-type: none"> • Baker-Gordon • TCA >50% 	<ul style="list-style-type: none"> • Severe photoaging • Pigmentary disorders • Premalignant skin tumors • Scars

Table 2. Appearance of Skin for Given Level of Chemical Peel

	Skin Level	Appearance of Skin after Peel
Level 0	Removal of stratum corneum	No frost, skin appears slick and shiny
Level 1	Intraepidermal peel	Irregular, light frost with some erythema, creates 2–4 d of light flaking
Level 2	Full thickness epidermal peel	Pink/white frost, heals in approx. 5 d
Level 3	Superficial reticular dermis	Solid white frost, additional sign of “epidermal sliding” for papillary dermal peel.

Table 3. Indications and Contraindications to Chemical Peel

Indications for Chemical Peel	Contraindications
Superficial or deep rhytids/photoaging	Isoretinoin therapy within last 6 mo
Preneoplastic or neoplastic lesions (ie, actinic keratosis and lentigines)	Absence of pilosebaceous units on the face
Underlying skin disease (ie, acne)	Infection or open wounds (herpes and open acne cysts)
Pigmentary dyschromias	Medium or deep resurfacing procedure within 3–12 mo
	Recent facial surgery involving undermining
	History of therapeutic radiation exposure
	Fitzpatrick skin types IV, V, and VI

allows for the treated skin to heal 3–4 days faster due to increased cellular division and new collagen formation.^{1,5,9} Modifications to this preprocedure regimen (dosages and application intervals) are made as needed based on tolerance and skin types. A week before peel, patients are started on a cleansing and toning protocol and encouraged to maintain adequate hydration and moisturize of the skin. Acyclovir is initiated 2 days before chemical peel and continued 5 days after the peel in patients with prior history of herpetic lesions.

Procedure

Safety and consistency are prioritized to ensure optimal results (SDC1) (see video, Supplemental Digital Content 1 which displays 30% TCA peel with Jessner’s solution technique, <http://links.lww.com/PRSGO/B58>). This begins



Video Graphic 1. See video, Supplemental Digital Content 1 which displays 30% TCA peel with Jessner’s solution technique. This video is available in the “Related Videos” section of the Full-Text article on PRSGlobalOpen.com or available at <http://links.lww.com/PRSGO/B58>.

with a setup of 4 clearly labeled glasses ordered from left to right in the appropriate sequence of usage. The glasses are filled by the operating surgeon with: (1) 70% ethyl alcohol, (2) acetone, (3) Jessner’s solution, and (4) 35% TCA acid solution.⁵ In our practice, the Jessner’s solution is premixed by a pharmacist and contains 100 mg of 95% ethanol, 14g of resorcinol, 14g of salicylic acid, and 14ml of lactic acid. Also, available on this table are 2×2 gauze and cotton tip applicators.

The patient’s skin is anesthetized approximately 40–60 minutes preprocedure with topical anesthetic (Lidocaine/Prilocaine cream). The procedure begins with cleansing of the skin using 2×2 gauze soaked in 70% ethyl alcohol. Next, acetone is applied in a similar manner as a degreasing agent. Once this is complete, the skin is allowed to air dry. Jessner’s solution is then applied to exfoliate and peel the stratum corneum of the epidermis. The depth of the Jessner’s peel is controlled by number of applications.⁴ One to four layers of Jessner’s solution is applied to the face with the endpoint being uniform areas of erythema with slight areas of frost.^{4,5} In patients with thick sebaceous skin, more coats of Jessner’s may be required. After the Jessner application is complete, 35% TCA solu-

tion is applied. The application of Jessner's solution and TCA is similar; 2×2 gauze is saturated with the solution and wrung out to avoid any dripping. The senior author uses a 3-finger technique to allow for a wide and consistent surface area to be covered.⁵ A cotton tip applicator wrung with TCA is used to treat rhytids in the periorbital and perioral region. The skin in these areas is stretched to allow for the peel to reach the bottom of the rhytids. The wooden end of the cotton tip applicator can be used for selective application of the peel for deeper rhytids.⁵ The margin of the area being peeled (typically mandibular border for facial peel) is lightly feathered to allow for a natural and inconspicuous transition. These areas are all constantly reassessed for color changes to assess depth and efficacy of the peel.

Postprocedure Care

Once the peel is complete a thin layer of Bactroban ointment is applied to the treated areas. The patients are instructed not to moisturize the area, as this will impede desired sloughing.^{5,10} Typically, 7–10 days are needed for skin to slough and reepithelialize.¹ Dermal regeneration takes up to 6 weeks. Patient may wash their faces daily without scrubbing for the first 3 days. They are instructed to pat dry the area with a soft towel. Cold compresses and anxiolytics are used to minimize discomfort and oral narcotics may be used as needed. All patients are given 24 hours of prophylactic antibiotics. Once the skin reepithelializes (7–10 days) the aforementioned preprocedure regimen is restarted.⁵

SUMMARY

In select patients, combination of Jessner's solution with 35% TCA solution allows for a safe and effective resurfacing of moderate facial rhytids and dyschromias. Pre- and postprocedure skin care in addition to systematic

application of the chemical peel optimizes results while minimizing potential complications.

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REFERENCES

1. O'Connor AA, Lowe PM, Shumack S, et al. Chemical peels: a review of current practice. *Australas J Dermatol*. 2018;59:171–181.
2. Weissler JM, Carney MJ, Carreras Tartak JA, et al. The evolution of chemical peeling and modern-day applications. *Plast Reconstr Surg*. 2017;140:920–929.
3. Glogau RG, Matarasso SL. Chemical peels. Trichloroacetic acid and phenol. *Dermatol Clin*. 1995;13:263–276.
4. Matarasso SL, Glogau RG. Chemical face peels. *Dermatol Clin*. 1991;9:131–150.
5. Herbig K, Trussler AP, Khosla RK, et al. Combination Jessner's solution and trichloroacetic acid chemical peel: technique and outcomes. *Plast Reconstr Surg*. 2009;124:955–964.
6. Bridenstine JB, Dolezal JF. Standardizing chemical peel solution formulations to avoid mishaps. Great fluctuations in actual concentrations of trichloroacetic acid. *J Dermatol Surg Oncol*. 1994;20:813–816.
7. Dolezal JF. Stability study of trichloroacetic acid. *J Dermatol Surg Oncol*. 1990;16:489–490.
8. Pannucci CJ, Reavey PL, Kaweski S, et al. A randomized controlled trial of skin care protocols for facial resurfacing: lessons learned from the Plastic Surgery Educational Foundation's Skin Products Assessment Research study. *Plast Reconstr Surg*. 2011;127:1334–1342.
9. Johnson JB, Ichinose H, Obagi ZE, et al. Obagi's modified trichloroacetic acid (TCA)-controlled variable-depth peel: a study of clinical signs correlating with histological findings. *Ann Plast Surg*. 1996;36:225–237.
10. Collawn SS, Boissy RE, Gamboa M, et al. Ultrastructural study of the skin after facial chemical peels and the effect of moisturization on wound healing. *Plast Reconstr Surg*. 1998;101:1374–1379; discussion 1380.