# 18 Trichloroacetic Acid Combined with Jessner's Chemical Peel Safety

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**Abstract**
Trichloroacetic acid (TCA) is a versatile agent, efficacious in treating a spectrum of facial rhytids at varying concentrations. TCA is commonly used in a 30 to 35% concentration to achieve a medium-depth peel into the upper reticular dermis. The addition of Jessner's solution prior to the TCA peel application leads to partial removal of the 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.

*Keywords:* trichloroacetic acid, TCA, chemical peel, facial rejuvenation, skin resurfacing

## Key Points for Maximizing Chemical Peel Safety

- The type of chemical peel selected is based on the depth of penetration required to effectively treat a given condition as well as the skin type and skin thickness. As such, chemical peels are frequently classified based on depth of penetration (superficial, medium, and deep) (▶ **Table 18.1**).
- TCA is commonly used in a 30 to 35% concentration to achieve a medium-depth peel into the upper reticular dermis.
- A number of factors other than the concentration of TCA contributes to the depth of peel obtained, such as skin preparation, pretreatment skin type, and method of application.

▶ **Table 18.1** Types of chemical peels and depth of penetration

| | Depth of penetration | Peeling agent | Conditions |
|---|---|---|---|
| Superficial | Stratum corneum to papillary dermis (60 µm) | • Alpha hydroxyl acids<br>• Beta hydroxyl acids<br>• Jessner solution | • Mild photoaging<br>• Mild acne scarring<br>• Pigmentary disorders |
| Medium | Papillary dermis to upper reticular dermis (450 µm) | • TCA 35–50%<br>• TCA 35% + glycolic acid 70%<br>• TCA 35% + Jessner's solution | • Mild-to-moderate photoaging<br>• Actinic keratosis<br>• Fine rhytids<br>• Solar lentigines<br>• Pigmentary disorders |
| Deep | Mid-reticular dermis to 600 µm | • Baker-Gordon<br>• TCA > 50% | • Severe photoaging<br>• Pigmentary disorders<br>• Premalignant skin tumors<br>• scars |

## 18.1 Safety Considerations

- A careful history and physical examination allows for the clinician to determine the patient's candidacy (▶**Table 18.2**).
- The senior author's (R.J.R.) preference is to pretreat all patients for 4 to 6 weeks prior to chemical peeling.[1,2] 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 allows for the treated skin to heal 3 to 4 days faster due to increased cellular division and new collagen formation.[1,3,4]
- Safety and consistency are prioritized to ensure optimal results. In the case of 35% TCA peel combined with Jessner's solution, this begins with a set-up of four 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 (cleanser).
  2. acetone (degreasing agent).
  3. Jessner's solution (provides a uniform superficial exfoliation).
  4. 35% TCA acid solution.[1]
- The addition of Jessner's solution prior to TCA peel application leads to partial removal of the 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.[4]
- All patients are given 24 hours of prophylactic antibiotics. Acyclovir is initiated 2 days prior to chemical peel and continued 5 days after the peel in patients with a prior history of herpetic lesions.

## 18.2 Danger Zones and Clinical Correlations

- Safe zones include areas with thicker dermis and ample perfusion, including the central cheeks, forehead, and nose. Multiple passes of TCA may be applied to achieve optimal results (▶**Fig. 18.1**).
- Danger zones include areas with thinner dermis or areas that may have been undermined during surgery (i.e., a facelift or necklift) and include the neck, upper chest, eyelids, and periorbital areas. Caution should be exercised to control depth of peel in these regions.

▶ **Table 18.2** Indications and contraindications of chemical peel

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

*Relative contraindication


**Fig. 18.1** Safe zones for chemical peel (*green*) are areas with thicker dermis. Caution must be exercise in transition (*yellow*) and danger zones (*red*) which have thinner dermis.

## 18.3 Technical Points

- We use a three-finger technique to allow for a wide and consistent surface area to be covered (Video 18.1).[4]
- 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.[1]
- The margin of the area being peeled (typically the 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.

## References

[1] Herbig K, Trussler AP, Khosla RK, Rohrich RJ. Combination Jessner's solution and trichloroacetic acid chemical peel: technique and outcomes. Plast Reconstr Surg. 2009; 124(3): 955–964

[2] 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(3):1334–1342

[3] Johnson JB, Ichinose H, Obagi ZE, Laub DR. Obagi's modified trichloroacetic acid (TCA)-controlled variable-depth peel: a study of clinical signs correlating with histological findings. Ann Plast Surg. 1996; 36(3):225–237

[4] O'Connor AA, et al. Chemical peels: A review of current practice. Australas J Dermatol. 2017