

Compiled by Geoffrey M. Knight

## Trichloroacetic acid

Trichloroacetic acid (TCA) is one of the best astringents available to the dental profession and has useful clinical applications in reducing gingival exudate that will cause marginal staining during placement of either direct or indirect laminates. It is also a strong organic acid that chemically cauterizes soft tissues and must be treated with due caution whenever it is used in a clinical situation.

Heithersay has shown TCA burns to be self-limiting when applied in small amounts to the oral mucosa of rats and the white eschar that forms when applied conservatively to human gingival tissues will often have vanished within two hours of application with no evidence afterwards of scarring or tissue loss.

Unlike the reaction that is observed on oral mucosa, the inadvertent

application of trichloroacetic acid to skin causes an acute burning feeling after 10 seconds and the white eschar that forms will leave a scar that may last for many months.

Fortunately, sodium bicarbonate (Fig. 1), purchased from any supermarket, is an effective neutralizing agent for TCA and a solution can be readily made to have on hand whenever the acid is being used.

Fig. 1.



Place a teaspoon full of sodium bicarbonate ( $\text{NaHCO}_3$ ) into a proprietary chlorhexidine mouthwash. The antibacterial properties of the mouthwash prevents bacteria from colonizing the solution as would occur if tap water was used. The trichloroacetic acid exchanges a proton for a sodium ion from sodium bicarbonate to form sodium trichloroacetate and carbonic acid

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that immediately breaks down to carbon dioxide and water.

The effectiveness of this solution can be demonstrated as shown in Figure 2.

A drop of trichloroacetic acid was applied to three sites marked on the inside of the forearm of a reluctant volunteer and left for 20 seconds.

- The site marked 'B' was dabbed with a microbrush containing a sodium bicarbonate solution.

- The site marked 'W' was dabbed with a microbrush that had been dipped into water.

- The site marked 'C' acted as a control.

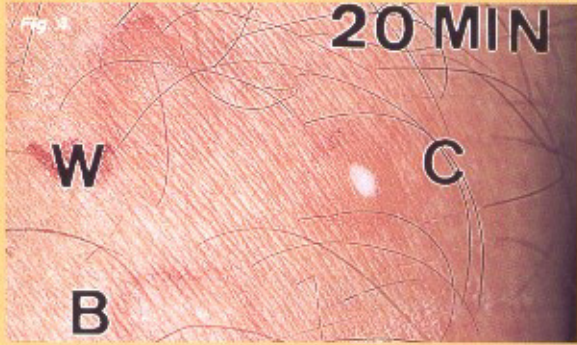
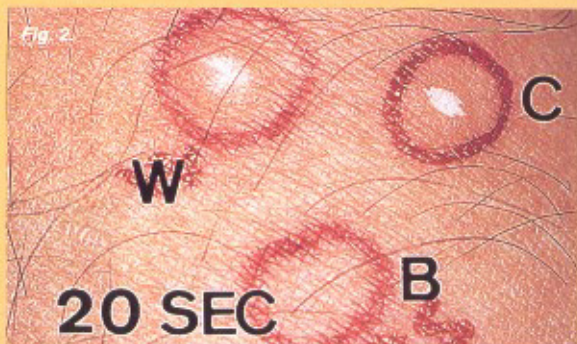
The acid was immediately neutralized at the site dabbed with sodium bicarbonate. There was a slight burn at the site dabbed with water and the control site shows the full effects on an early TCA burn.

Figure 3 shows the area after a further five minutes when the pain from the control site prompted a general swabbing down of the area with the sodium bicarbonate solution. The pain almost immediately disappeared and after a further 15 minutes (Fig. 4), there was no evidence of damage to the site that had been dabbed with water and a general softening of the margins of the control site.

However, it is noteworthy to add that the control burn was still faintly visible on the arm eight weeks after the acid was applied.

The more serious effects of a TCA burn can be observed in conjunction with an attempt to remove a small facial mole. Figure 5, 14 days after application of the acid the generalized ulceration of the area prompted a visit to a dermatologist who after admonishing the procedure, prescribed a corticosteroid cream that dramatically reduced the size of the lesion after a further seven days. Figure 6, the TCA failed to remove the mole.

It is not possible to apply TCA to gingival tissues if rubber dam has been previously applied, however the following technique summary will minimize the clinical risks asso-



ciated with the use of this material:

- Make sure that a sodium bicarbonate neutralizing solution is on hand whenever TCA is being used.

- It is essential that the patient, dentist and assistant all have adequate eye protection. **Do not apply sodium bicarbonate solution to the eye!**

- Cover the pathway over which the acid will traverse the patient's face

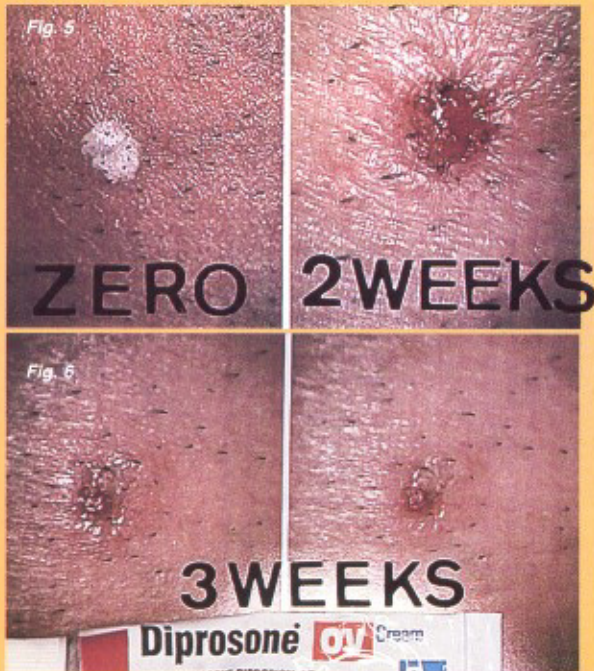
to the mouth, i.e., lower lip, with a tissue.

- Place two drops of TCA solution into the shallow end of a Dappen's dish.

- Caution the patient not to make any sudden movements. **TCA use is contraindicated for patients who cannot be relied upon to fully cooperate with this procedure.**

- I have the assistant hold the Dappen's dish as closely as practicable to ▶





the area that the TCA is to be applied.

- Place a periodontal probe into the TCA and transfer a small amount of solution on the end of the probe along the base of the gingival sulcus. This will optimize the reduction of gingival exudate.

- Wash the acid from the gingivae with a gentle water spray and evacuate.

Care must be taken when washing TCA from the gingivae. *Facial burns with TCA have occurred when the force of an air water spray from a triplex syringe has caused a drop of acid to fly from the gingival tissues onto the face.*

Many dental procedures have the potential to cause harm to patients if used incorrectly. Trichloroacetic acid has a number of useful clinical applications and there is no reason to avoid its use as long as adequate steps are taken to protect patients and dental personnel from accidental spillage, use the acid in very small amounts intraorally and always have the neutralizing solution of sodium bicarbonate on hand if an emergency should occur. □