Topically-anesthetics play an important role in the dermatology clinic. Beyond the obvious minor surgical procedures for which topical anesthetics are clearly indicated, most dermatologic surgeons expand the use of topical or non-invasive modes of topical anesthesia for many cosmetic procedures, in order to minimize the need for nerve blocks. Use of topical pain interventions can decrease the time associated with procedures and increase patient comfort and convenience, whereas nerve blocks can be time-consuming and uncomfortable for patients. In addition, the very notion of an injection to create a nerve block often induces patient anxiety.

Although each patient’s threshold for pain is different, dermatologists should always take precautions to minimize any undue pain and enhance patient comfort. When elective cosmetic procedures are involved, patient satisfaction is directly related to the level of comfort and therefore an absolute necessity. Topical treatments and new innovative techniques can permit rapid and effective pain control in a noninvasive manner that is friendly both to patients and to busy clinicians.

Topical Anesthetic Drugs

Benzocaine was the first widely used topical anesthetic, but its current use in medical practice is limited due to concerns of allergic contact dermatitis. An ester of PABA and ethanol, benzocaine is metabolized by cholinesterase to its component parts. Its use is contraindicated in any patient with a known allergy to PABA, hair dyes, or sulfonamides.

Second generation topical anesthetics lidocaine and prilocaine are aminoamide preparations that are metabolized by the liver via microsomal enzymes. Because contact dermatitis is rare, these agents have surpassed the ester agents for use in practice.

EMLA cream (lidocaine 2.5% and prilocaine 2.5%, AstraZeneca) has been the gold standard of topical anesthetics since its introduction in 1984. It offers the practitioner some control over the degree of anesthesia, which increases in direct proportion to the amount and duration of drug application. Application of EMLA for one hour under occlusion is typical for most procedures.

Physicians must exercise caution when using EMLA in infants. Excess absorption of prilocaine in infants and small children has been associated with...
methemoglobinemia, though the use of combination lidocaine/prilocaine preparations for infants is considered safer than prilocaine alone. According to the package insert, 2 grams of EMLA to an area no greater than 20cm² is the maximum dose for children under 5kg, while children weighing less than 10kg may receive up to 10g to an area less than 100cm².

LMX-5 (Formerly ElaMax-5, 5% lidocaine, Ferndale) is another popular option for use in the clinic, offering similar anesthesia but with a more rapid onset of action and shorter application time—about 30 to 45 minutes—compared to EMLA.

Betacaine (lidocaine 5% with prilocaine, TheraDerm) is another topical anesthetic. Its dual-phase vehicle combines an alcohol-based gel for rapid delivery of the active ingredient and a self-occlusive petrolatum component. Sufficient analgesia can often be achieved 30 minutes after application. Additional occlusion with this product is not recommended, nor is use in children. Betacaine is distributed in a formulation with the addition of a vasoconstrictor, which has a result similar to epinephrine.

Lidocaine jelly 4% is also available and may be useful for specific situations. It can be quite beneficial prior to performing intraoral nerve blocks, since the jelly vehicle allows the lidocaine to effectively penetrate the oral mucosa with an onset of action within minutes, since there is no stratum corneum present.

In addition to marketed topical anesthetic compounds, some physicians order pharmacy-compounded formulations of lidocaine in concentrations as high as 20 to 30 percent. These higher concentration compounds can be useful for patients receiving facial fillers. While these compounds can provide efficient pain control with rapid onset, use of these off-label products must be carefully monitored and limited to small application sites due to the potential for cardiac toxicity, which can result from excessive systemic absorption.

High-dose lidocaine formulations should only be applied in the office, for limited durations, and to limited anatomic areas. The highly-publicized death of a North Carolina college student who reportedly applied a compounded lidocaine 10%/tetracaine 10% cream to both of her legs from her groin to ankles under occlusion has highlighted the dangers associated with irresponsible use and subsequent excess systemic absorption of these agents.

Finally, tetracaine warrants mention, though its application in dermatology tends to be limited. Tetracaine drops (two to each eye) are effective for procedures involving the conjunctiva, with a very rapid onset of action with anesthesia often resulting in less than one minute.

The S-Caine peel (lidocaine 7%/tetracaine 7%) described by Tina Alster, MD is an ideal choice for use in procedures involving the entire face, such as laser rejuvenation, and can be adapted for other applications, as well. The combination of agents is applied directly to the skin as a cream then permitted to dry for about 20 to 30 minutes. After this time, a film forms that easily can be peeled off. One trial found the S-Caine peel superior to EMLA for single pass CO₂ laser resurfacing, with side effects limited to some minor local skin reactions. Multiple reports demonstrate its usefulness for various dermatologic procedures with limited side effects (localize, transient irritation) that do not interfere with outcomes. It is ideally suited for use on larger treatment areas.

A Topical Boost

Lidocaine iontophoresis, which facilitates the transmission of lidocaine into the skin via electric current, has been shown to be both safe and effective for use prior to shave biopsies in both children and adults. The benefit of iontophoresis, which uses lidocaine 2% in combination with epinephrine (1:100,000), is more rapid anesthesia compared to topical application alone. Studies show lidocaine 4% iontophoresis is also effective but may not be superior to EMLA alone. Pain scores were lower for EMLA-treated sites compared to iontophoresis. Side effects are limited to local reactions from the electrode (such as itching or urticaria) and rarely burns. The primary drawback is that the process requires the availability of an iontophoresis device in the clinic.

Although each patient’s threshold for pain is different, dermatologists should always take precautions to minimize any undue pain and enhance patient comfort. When elective cosmetic procedures are involved, patient satisfaction is directly related to the level of comfort and therefore an absolute necessity.
**Cold Control**

Cryoanesthesia has become increasingly popular in association with non-ablative laser procedures. In many instances, either a cryogen spray or iced gel applied to the treatment site reduces the temperature of the skin to counteract the intense heating associated with laser energy deposition. Additionally, directed cold air can be used to cool the skin. While the cold sensation competes with and blocks pain signals, the lowered skin temperature also reduces risks of thermal injury and associated pain. Clinicians have begun expanding the use of cryogens, cooling gels, and or cold aid beyond laser procedures. Cryogen sprays similar to those used in laser procedures can be helpful in many situations. Frigiderm, though increasingly difficult to find, is a cryogen skin spray that is quite effective for use prior to dermabrasion.

Cool air anesthesia is a more “natural” intervention associated with no potential adverse effects or reactions, though some patients may find application of cold air uncomfortable around the nose and/or mouth. Cold air anesthesia has been reported to minimize discomfort associated with botulinum toxin and filler injections either alone or when applied in combination with topical lidocaine. In some instances, the combined use of topical anesthetics plus cool air can eliminate the need for nerve blocks when injecting dermal fillers. Reported indications for cold air include chemical peels, sclerotherapy, scissors excision of skin tags, intraleisional steroid injections, pulsed dye laser procedures, and photodynamic therapy, among others. Cold air machines, which blow at around –34°C, are effective for both small and larger treatment areas.

**Vibration Analgesia**

Vibration analgesia is another modern innovation in pain control, it has been described as useful for botulinum toxin injections for hyperhidrosis, injection of fillers, laser therapy for leg veins, and Q-switch treatment for tattoos, cauterity of facial warts, and nail-fold injections. In one case series, combined application of ice to the injection site followed immediately by application of either vibration or ice adjacent to the injection site eliminated the need for nerve blocks in a series of patients treated for palmar hyperhidrosis.

Kevin Smith, MD, who has published the vibration technique, has recommended the Hitachi Magic Wand medical massager for this indication. He has also reported that he does not use vibration when injecting Botox for hyperhidrosis any more, favoring instead the application of ice (rather than gel packs) alone before and immediately following injection. Apply ice to the injection sites for about five to 10 seconds before injection.

Some practices continue to use vibration for injections, and vibration remains useful for various other indications, including laser procedures. The vibration effect on pain control appears to induce anesthesia by alteration of the gate control mechanism for pain signaling. Use of vibration in the clinic typically requires the aid of an assistant. Vibration may be successfully used without the addition of other analgesics. The approach calls for application of the vibrator to a point about 2cm from the injection/target site about three seconds prior to injection/other procedure. The vibrator is held in place until injection is complete. Ice may be used in conjunction with vibration for a more powerful anesthetic effect.

**Patient-friendly Perspectives**

Without doubt, there is and likely always will be a role for nerve blocks...
in the dermatology practice. However, advancements in drug development coupled with impressive findings for non-medical interventions such as ice, directed cold air, and vibration, permit dermasurgeons to become less dependent on this time-consuming and often anxiety-inspiring anesthetic method.

In approaching pain control, it is important to assess the patient’s pain threshold, prior experiences, and preferences in order to identify the analgesic option or combination of options most likely to provide best effects with the highest levels of comfort and satisfaction. 

Dr. Schlam has no relevant conflicts to disclose.