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Local Anesthetic Blocks: Techniques for the Upper and Mid Face

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Local Anesthetic Blocks of the Head and Neck for Cosmetic Facial Surgery, II: Techniques for the Upper and Mid Face

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The physician's ability to provide complete local anesthesia to the upper and mid face is important to both physician and patient. A physician can perform superior work on a comfortable patient, and a patient who experiences a pain-free procedure is a testament to the skill and compassion of the doctor. This article describes different local anesthetic techniques and reviews the neuroanatomy of the first and second divisions of the trigeminal nerve and how these nerves can be blocked effectively to provide optimal anesthesia to the upper and mid face.

Infiltrative Peripheral Anesthetics Versus Regional Nerve Blocks

Local anesthesia can be obtained effectively with infiltrations and nerve blocks. Infiltrative peripheral anesthesia is produced by the injection of a local anesthetic solution in the area of the peripheral innervation distant from the site of the main nerve. An advantage of using infiltrative peripheral anesthetics is that no specific skill is necessary to administer them; only the selected area of innervation is involved, and vasoconstrictors can improve local hemostasis. A drawback of using infiltrative peripheral anesthetics is the distortion of the tissue at or around the site of injection, which may obscure or hamper cosmetic procedures.

A regional nerve block involves placing the local anesthetic solution in a specific location at or around the main nerve trunk that will effectively depolarize that nerve and obtund sensation distal to that area. An advantage of regional nerve blocks is that a single accurately placed injection can obtund sensation of a large area without tissue distortion at the operative site. The disadvantages of regional nerve blocks include numbness in areas other than the operative site and the fact that the vasoconstrictor does not provide surgical hemostasis because it is distant from the operative site.

Regional nerve blocks sometimes have an unpredictable effect and incomplete anesthesia because of anatomical variances in individual patients. Foramina position, nerves crossing the midline, accessory innervation, and nerve bifurcation can all affect the predictability and success of regional nerve blocks. Nerves that supply sensation to areas close to the midline may receive innervation from the contralateral side and require bilateral blocks. Under these circumstances, some regional nerve blocks may require augmentative infiltrative local anesthesia to obtain adequate pain control.

Because many nerves are accompanied by corresponding veins and arteries, aspiration should always be performed to prevent intravascular injection.

Topical Anesthesia

A patient who experiences pain-free dental procedures more than likely receives a topical mucosal anesthetic prior to having a dental block. Although some of the effects of a topical anesthetic may be psychological, all patients appreciate the effort to provide extra pain control. Although topical anesthetic techniques are more effective and faster acting on mucosal surfaces than on skin, patients still appreciate the extra care taken for pain control. The use of a topical anesthetic agent on the lip mucosa will definitely augment injections of anesthetic in that area, regardless of the blocking

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techniques used. In my practice, when a patient presents for lip augmentation, the assistant immediately applies to the lips a thick coating of an aesthetic cream (20% benzocaine, 6% lidocaine, 4% tetracaine), which is in contact with the mucosa for at least 10 minutes before injection of an anesthetic. This produces profound local anesthesia in many patients and negates the need for further blocking techniques. Some patients will still require blocks, but a topical anesthetic can help patients both psychologically and physiologically. Many cosmetic surgeons also use topical agents for cutaneous anesthesia.

Blocking the Main Sensory Nerves of the Head

A rudimentary knowledge of the neuroanatomy of the head and face can enable the cosmetic surgeon to perform pain-free facial surgical procedures. In addition, when used concomitantly with general anesthesia or intravenous sedation, local anesthetic blocks can decrease the amount of intravenous or inhalation agents needed. Finally, using local anesthetic blocks with intravenous or inhalation agents can provide excellent pain control immediately after the surgery.

Scalp and Forehead Nerve Block

Within the orbit, the frontal nerve divides into the supraorbital and supratrochlear nerves. The supraorbital nerve exits the orbit through the supraorbital notch or foramen on the superior orbital rim approximately 27 mm lateral to the glabellar midline (Figure 1). The supraorbital notch or foramen is readily palpable in most patients. After exiting this notch or foramen, the supraorbital nerve traverses the corrugator supercilia muscles and divides into lateral and medial branches. The lateral branches supply sensation to the lateral forehead, and the medial branches supply sensation to the scalp. The supratrochlear nerve exits the orbit through a foramen approximately 17 mm from the glabellar midline (Figure 1) and supplies sensation to the middle portion of the forehead. The infratrochlear nerve (one of the 4 branches of

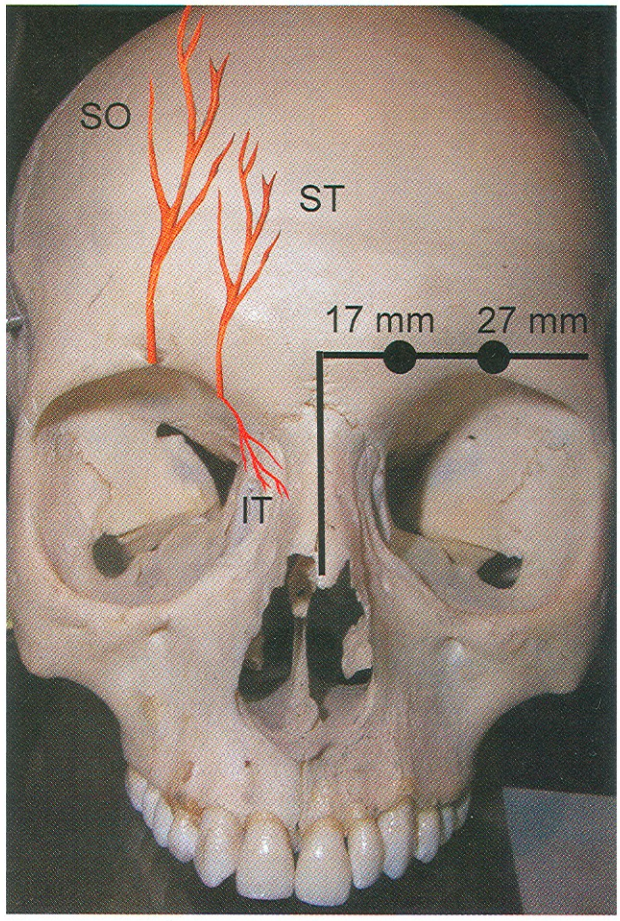

Figure 1. The supraorbital (SO) nerve exits the orbit about 27 mm from the glabellar midline and the supratrochlear (ST) nerve exits the orbit approximately 17 mm from the glabellar midline. The infratrochlear (IT) nerve exits the orbit below the trochlea.

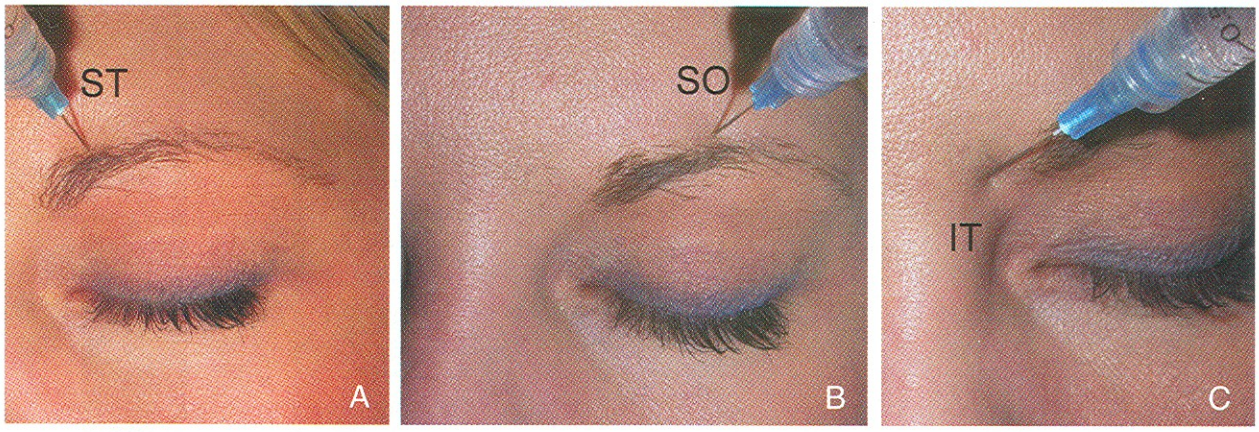

Figure 2. Forehead and scalp nerves are blocked by a series of injections from the central to the medial brow. Separate injections target the supratrochlear (ST) nerve (A), the supraorbital (SO) nerve (B), and the infratrochlear (IT) nerve (C).

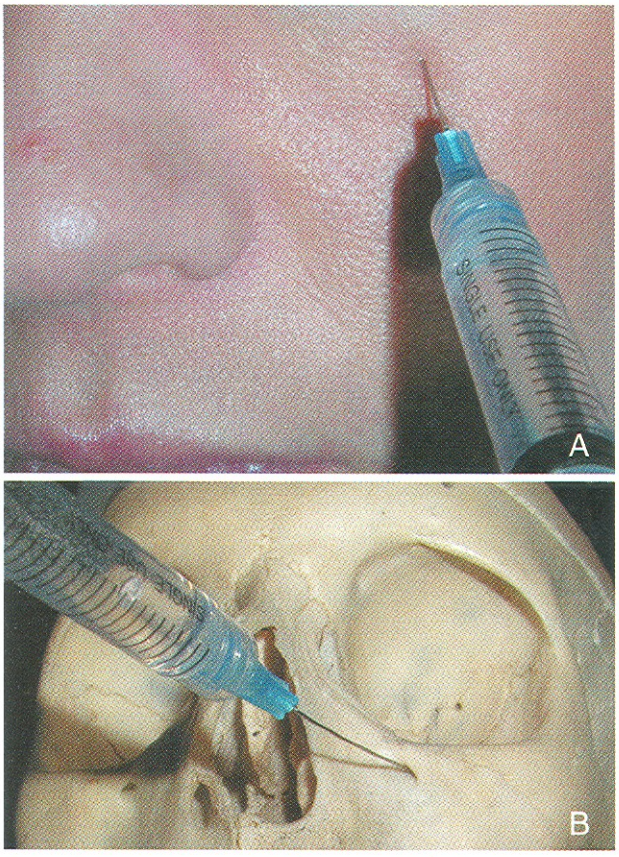

Figure 5. The extraoral or facial approach for local anesthetic block of the infraorbital nerve (A and B).

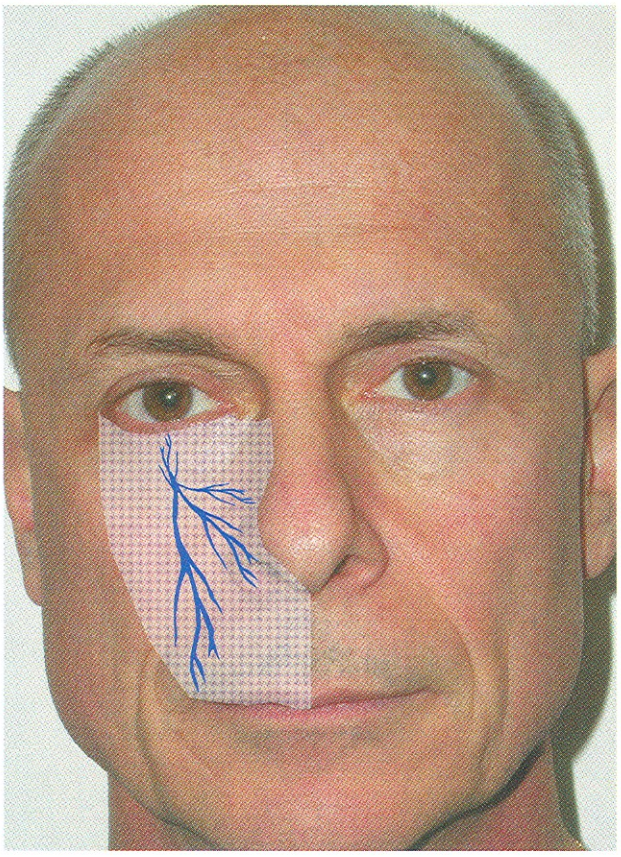

Figure 6. Area of anesthesia from unilateral infraorbital nerve block.

upper lip on the injected side. The infraorbital nerve can be blocked by intraoral or extraoral routes. To perform an infraorbital nerve block from an intraoral approach, topical anesthesia is placed on the oral mucosa at the vestibular sulcus just under the canine fossa (between the canine and first premolar tooth) and left for several minutes. The lip is then elevated and a 1.5-in 27-gauge needle is inserted in the sulcus and directed superiorly toward the infraorbital foramen (Figure 4). The needle does not need to enter the foramen for a successful block. The anesthetic solution needs only to contact the vast branching around the foramen to be effective. For the infraorbital block, 2 to 4 cc of 2% lidocaine with 1:100,000 epinephrine are injected. It is imperative for the physician to use the free hand to palpate the inferior orbital rim to avoid injecting the orbit.

The infraorbital nerve also can be very easily blocked by an extraoral or facial approach, and this is my preferred route. This route may also be preferred for patients who have a fear of dental procedures. A 0.5-in 27-gauge needle is placed through the skin and aimed at the foramen in a perpendicular direction, and 2 to 4 cc of local anesthetic solution are injected at or close to the infraorbital foramen (Figure 5). Again, the physician's free hand must constantly palpate the inferior orbital rim to prevent inadvertent injection into the orbit. A successful infraorbital nerve block will anesthetize the infraorbital cheek, lower palpebral area, lateral nasal area, and superior labial regions, as shown in Figure 6.

These techniques provide anesthesia to the lateral nasal skin but do not provide anesthesia to the central portion of the nose. A dorsal (external) nasal nerve block will supplement nasal anesthesia by providing anesthesia over the area of the cartilaginous nasal dorsum and tip. This supplementary nasal block is accomplished by palpating the inferior rim of the nasal bones at the osseous cartilaginous junction. The dorsal nerve (anterior ethmoid branch of the nasociliary nerve) emerges 5 to 10 mm from the nasal midline at the osseous junction of the inferior portion of the nasal bones (the distal edge of the nasal bones)(Figure 7). The dotted line in Figure 7B shows the course of this nerve under the nasal bones before emerging.

Augmentative Lip Anesthesia

In theory, a bilateral infraorbital nerve block should anesthetize the entire upper lip. Some patients may still perceive pain for various anatomical (or sometimes psychological) reasons, as previously mentioned. Anecdotally, I will inject 0.5 cc of 2% lidocaine with

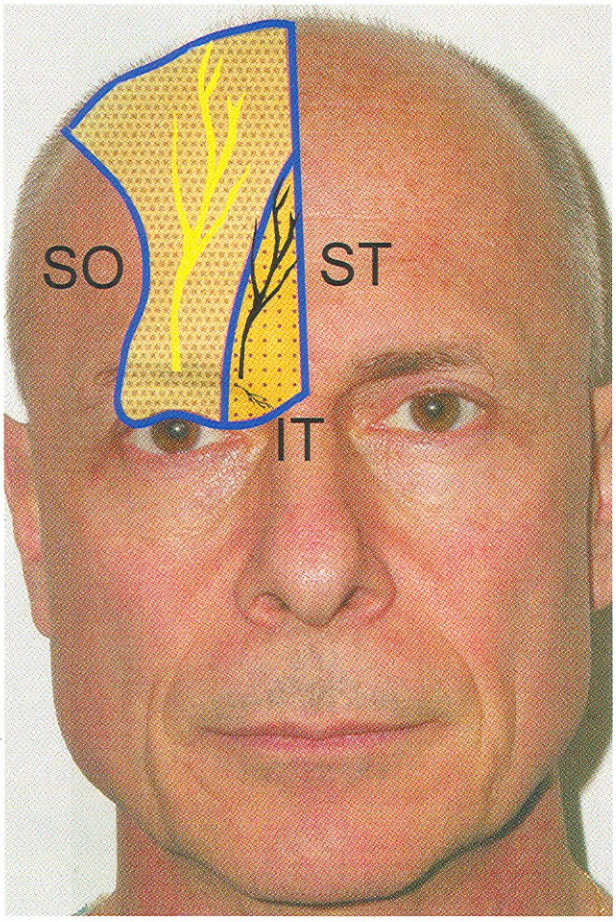

Figure 3. The shaded areas indicate the areas anesthetized with blocks of the supraorbital (SO) nerve, supratrochlear (ST) nerve, and infratrochlear (IT) nerve.

the nasociliary nerve) exits the orbit through a foramen below the trochlea and provides sensation to the medial upper eyelid, canthus, medial nasal skin, conjunctiva, and lacrimal apparatus (Figure 1).[1]

When injecting this area, it is prudent to use a free hand to palpate the orbital rim to prevent inadvertent injection into the orbit. To anesthetize this area, the supratrochlear nerve is measured 17 mm from the glabellar midline, and 1 to 2 cc of 2% lidocaine with 1:100,000 epinephrine are injected (Figure 2A). The supraorbital nerve is blocked by palpating the supraorbital notch (and/or measuring 27 mm from the glabellar midline) and injecting 2 cc of local anesthetic solution (Figure 2B). The infratrochlear nerve is blocked by injecting 1 to 2 cc of local anesthetic solution at the junction of the orbit and the nasal bones (Figure 2C). Alternatively, one can block all 3 of these nerves by simply injecting 2 to 4 cc of local anesthetic solution from the central brow proceeding to the medial brow. Figure 3 shows the regions anesthetized using the blocks described.

Infraorbital Nerve Block

The infraorbital nerve exits the orbit through the infraorbital foramen 4 to 7 mm below the orbital rim in an imaginary line dropped from the medial limbus of the iris[1] or the pupillary midline. The anterior superior alveolar nerve branches from the infraorbital nerve before it exits the infraorbital foramen; some patients will manifest anesthesia of the anterior teeth and gingiva if the branching is close to the foramen. Areas anesthetized include the lateral nose, anterior cheek, lower eyelid, and

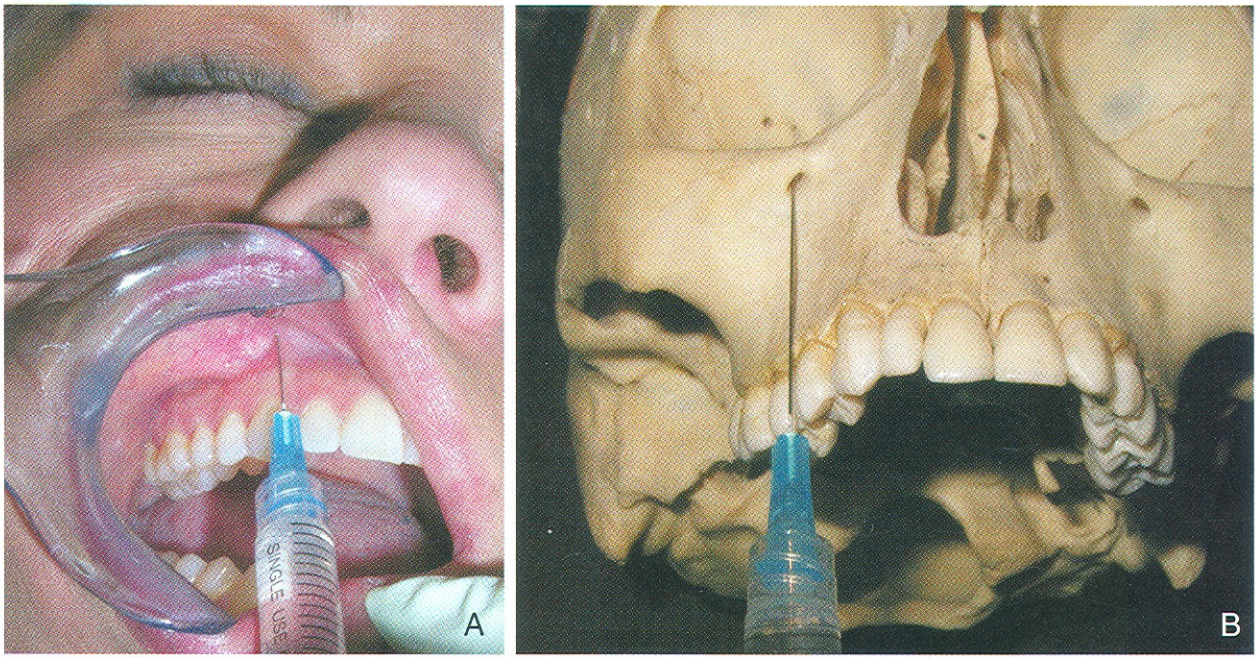

Figure 4. The intraoral approach for local anesthetic block of the infraorbital nerve (A and B).

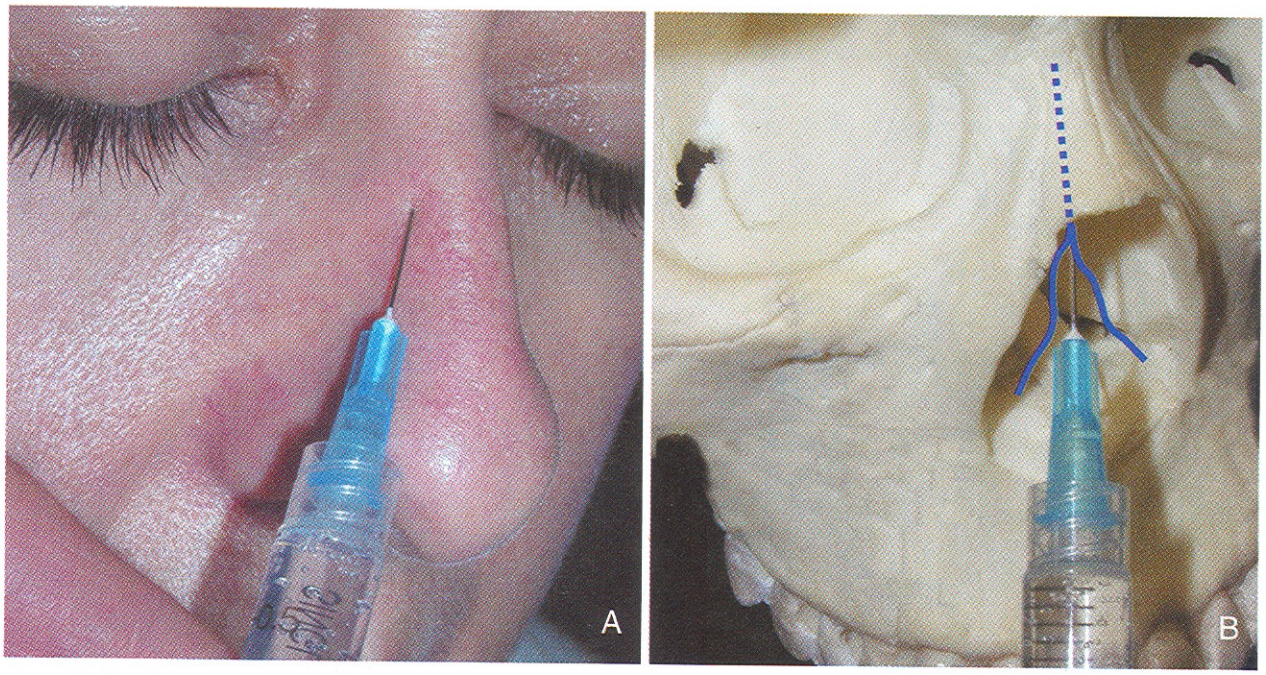

Figure 7. The dorsal (external) nasal nerve is blocked subcutaneously at the osseous cartilaginous junction of the distal nasal bones (A and B).

1:100,000 epinephrine in the maxillary labial frenum (Figure 8). For either psychological or physiological reasons, this seems to provide additional anesthesia. It is frequently possible to achieve adequate anesthesia of the upper lip by injecting 0.5 cc of local anesthetic solution into the maxillary vestibule at the frenum and laterally to the canine tooth on each side in 3 or 4 small injections. This can actually replace the need for infraorbital nerve blocks in many patients and has become the most common local anesthetic technique that I use for anesthetizing the lips for filler injection. This also can be performed in the lower lip labial frenum area to augment bilateral mental nerve blocks, as will be discussed in Part IV of this series. The combination of bilateral infraorbital and mental nerve blocks and infiltrative augmentation (when necessary) is an ideal technique for anesthetizing the lips for a filler injection or implant placement.

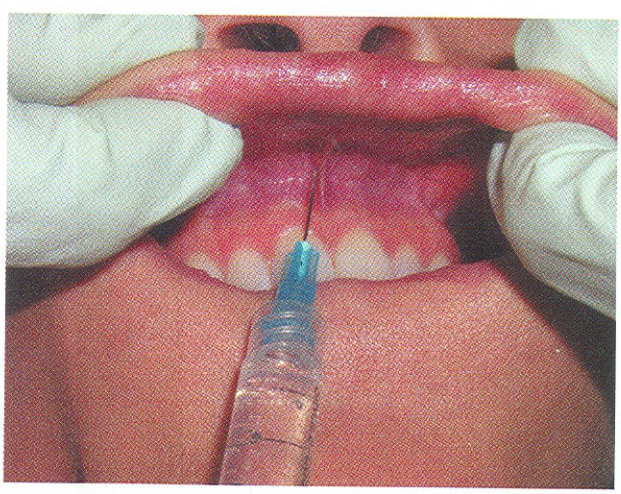

Figure 8. An augmentative injection of local anesthetic in the maxillary frenum can supplement inadequate anesthesia from infraorbital nerve blocks when the upper lip is anesthetized.

Comment

Upper and mid facial local anesthetic techniques are the mainstay of pain control for many cosmetic procedures. Although some practitioners inject the lips without local anesthetic augmentation, the experience for both the doctor and patient can be improved with the addition of simple local anesthetic blocks. These simple techniques will allow a more controlled treatment and provide positive marketing for the doctor and the practice.

Part III of this series will discuss the neuroanatomy and local anesthetic techniques of the lower face.

Reference

1. Zide BM, Swift R. How to block and tackle the face [published correction appears in *Plast Reconstr Surg.* 1998;101:2018]. *Plast Reconstr Surg.* 1998;101:840-851.