INTRODUCTION

In cosmetic facial surgery practices, the majority of patients require regional anesthesia, topical or injected. The aesthetic physician and surgeon can do a better job on a patient who is comfortable, relaxed and confident. The reputation for excellence in amelioration of pain and discomfort serves as an extraordinary internal marketing enhancer. Conversely, even the most talented cosmetic surgeon can produce negative marketing effects if they have the reputation of causing unnecessary physical or emotional discomfort.

This chapter is designed to teach basic methods of pain control for cosmetic facial surgical procedures. It is impossible within the scope of this text to provide full details on each technique, but after reading this chapter the doctor should be able to understand the most basic techniques of local anesthesia as well as the neuroanatomy involved in anesthetizing specific dermatomes related to the injection of fillers in the face. In some cases the focal application of ice for 30–60 seconds prior to administration of filler substances or Botox for hyperhidrosis of the palms produces good anesthesia and is preferred by patients to the use of injectable local anesthetics.

In addition to the mechanics of anesthesia, it is important to understand and use ‘talkesthesia’ – which helps us to earn and maintain the confidence of our patients. A well-informed patient who is confident of your skill and your care usually needs less anesthesia and analgesia. ‘Talkesthesia’ starts with the patient’s first phone call to your office or visit to your website, and continues through to your final contact with the patient. ‘Talkesthesia’ includes all verbal and nonverbal communication by yourself, your staff, and your operating environment with the patient, and includes such things as music and art throughout your office and in your treatment rooms.

Pre-emptive analgesia can also reduce patient discomfort. The use of nonsedating analgesics and anxiolytics can greatly enhance patient comfort, and not interfere with their ability to drive home. For example, combination of 800 mg of ibuprofen (e.g. two 400 mg Liquid Advil GelCaps) and 2 g of acetaminophen (2 oz pediatric liquid Tylenol) can produce additive analgesia, because ibuprofen blocks cyclooxygenase types 1 and 2, while acetaminophen blocks cyclooxygenase type 3. The liquid formulation allows for a good blood level to be reached within half an hour.

Propranolol (Inderal 40–80 mg po 1–2 hours before a procedure) is an excellent nonsedating anxiolytic. Propranolol is a very lipid-soluble beta blocker, so it crosses the blood–brain barrier efficiently, and reduces anxiety by blocking the beta receptors in the brain, in particular at the amygdala.

Pre-treatment with propranolol has also been shown to reduce the emotional content of memories of painful experiences, so that the memory is less vivid and is mainly intellectual. The principal contraindication to propranolol is that it should not be given to patients who suffer from asthma, because members of this class of medication can exacerbate asthma.

PATIENT SELECTION

Patient selection for any aesthetic procedure includes an assessment of aesthetic needs and expectations within the traditional medical framework of an assessment of general health, allergy, and previous response to analgesic medications. It is often helpful to inquire about previous dental work and the response to injected anesthetic.

EXPECTED BENEFITS

The expected benefits for local anesthetic techniques are primarily focused on the subjective comfort of the patient. The physician will be able to more completely address the aesthetic concerns in a subject who is relaxed and comfortable. The safety profile and benefits of these techniques are high and the complication rate and risks are low.

Complications of anesthesia are related to individual patient susceptibility and to physician technique. The former can include allergic reaction, vasoconstrictor overdose, ineffective block, and extended anesthesia.
Technique-related complications are largely avoidable and include hematoma, nerve damage, bruising, and intravascular injection.

- **Sensory Dermatomes of the Head and Neck**
  The main sensory innervation of the face is derived from cranial nerve V (trigeminal nerve) and the upper cervical nerves (Fig. 9.1).

- **Trigeminal nerve**
  The trigeminal nerve is the fifth of the 12 cranial nerves. Its branches originate at the semilunar ganglion (gasserian ganglion) located in the temporal bone. Three large nerves, the ophthalmic, maxillary, and mandibular, proceed from the ganglion to supply sensory innervation to the face (Fig. 9.2).
  Often referred to as ‘the great sensory nerve of the head and neck,’ the trigeminal nerve is named for its three major sensory branches. The ophthalmic nerve (V1), maxillary nerve (V2), and mandibular nerve (V3) are literally ‘three twins’ (trigeminal) carrying sensory information of light touch, temperature, pain, and proprioception from the face and scalp to the brainstem. The main branches of the trigeminal nerve supply sensation to the well-defined and consistent facial areas (Fig. 9.2). The inset in
Figure 9.2 shows the trigeminal ganglion with the three main nerve branches.

**Ophthalmic nerve (V1)**
The ophthalmic nerve, or first division of the trigeminal, is a sensory nerve only. It supplies branches to the cornea, ciliary body, and iris; to the lacrimal gland and conjunctiva; to part of the mucous membrane of the nasal cavity; and to the skin of the eyelids, eyebrow, forehead, and upper lateral nose (see V1 on Fig. 9.2). It divides into three branches: the frontal, nasociliary, and lacrimal. The frontal nerve divides into the supraorbital and supratrochlear nerves providing sensation to the forehead and anterior scalp.

Anesthetizing branches of V1 has clinical significance for procedures in the forehead, brow regions, and glabella.

**Maxillary nerve (V2)**
The maxillary nerve or second division of the trigeminal is a sensory nerve that appears upon the face at the infraorbital foramen as the infraorbital nerve. At its termination, the nerve divides into branches which spread out upon the side of the nose, the lower eyelid, and the upper lip (see V2 on Fig. 9.2). Additional branches include the zygomaticotemporal, which supplies sensation to the skin on the side of the forehead and zygomaticofacial nerve, which supplies sensation to the skin on the prominence of the cheek (see V2 on Fig. 9.2). Anesthetizing branches of V2 has clinical significance for procedures in the temporal area, midface, nasolabial folds, and the upper lip.

**Mandibular nerve (V3)**
The mandibular nerve supplies the teeth and gums of the mandible, the skin of the temporal region, part of the auricle, the lower lip, and the lower part of the face (see V3 on Fig. 9.2). Sensory branches of the mandibular nerve include the auriculomandibular nerve, which supplies sensation to the skin covering the front of the helix, and tragus (Fig. 9.2). The inferior alveolar nerve is the largest branch of the mandibular nerve. It exits the ramus of the mandible at the mandibular foramen. It then passes forward in the mandibular canal, beneath the teeth, as far as the mental foramen, where it divides into two terminal branches, the incisive and mental nerves. The mental nerve emerges at the mental foramen, where it divides into three branches of which one descends to the skin of the chin, and two ascend to the skin and mucous membrane of the lower lip. The buccal nerve is a branch of V3 which supplies sensation to the skin over the buccinator muscle. Anesthetizing branches of V3 have clinical significance for procedures in the lower lip and perioral areas of the lower face.

**TOPICAL ANESTHESIA**
Despite the effectiveness of injectable anesthetics, the injection itself is often as painful as the procedure for which the anesthetic is used. This is especially true for minor procedures such as botulinum exotoxin injection and nonablative lasers. In these cases, topical anesthetics are useful to alleviate mild to moderate discomfort.

There are several commonly used topical anesthetics. Eutectic Mixture of Local Anesthetics (EMLA) is a 5% eutectic mixture of lidocaine (lignocaine) and prilocaine. One of the most widely used topical agents, it was briefly removed from the market recently due to a faulty child-resistant cap, but is now available once again with a redesigned child-resistant closure. EMLA provides suboptimal analgesia when applied for 30 minutes or less, but gives adequate dermal analgesia when applied under occlusive dressing for 60 minutes. Dermal analgesia continues for 15–30 minutes after its removal.

ELA-Max, which recently has been renamed LMX-5, is a 5% lidocaine (lignocaine) cream which uses a liposomal encapsulation system. Liposomes enhance the penetration into the skin, provide sustained release, and protect the drug from metabolic degradation. It appears superior to EMLA in providing analgesia when applied for 30 minutes.

Betacaine is also a combination of lidocaine (lignocaine) and prilocaine with an added vasoconstrictor, although the manufacturer has not revealed the exact proportion. The vasoconstrictive agent and the proprietary microemulsion delivery system speed the onset of the analgesia, and the petrolatum base makes the gel self-occlusive. The manufacturer recommends an application time of 30–45 minutes without occlusive dressing. This product is not approved by the FDA and must be purchased from the manufacturer.

Tetracaine gel, previously known as amethocaine in the UK, is a compounded, proprietary ester anesthetic with a recommended application time of 30–45 minutes under occlusion. Its advantage is the long duration of analgesia, up to 4–6 hours. A comparison study shows that tetracaine is more efficacious than lidocaine–prilocaine mixture when both anesthetics are applied for the same amount of time. However, unlike the amide anesthetics, allergic contact reactions to ester anesthetics are quite common.

The average time of application of topical anesthetics ranges from 30–60 minutes, which can be a frustrating rate-limiting step in clinical practice. S-Caine peel is a new development that may have a quicker onset. S-Caine peel is a eutectic lidocaine (lignocaine) and tetracaine (amethocaine) cream mixture that dries to a flexible film that easily peels off. This property precludes the need for extra time-consuming steps such as application of occlusive dressing and removal of the creams. Furthermore, adequate anesthesia is achieved in as little as 20 minutes of application. A recent double-blinded study concluded that S-Caine peel is superior to EMLA cream under occlusion for 30 minutes.
CRYOANESTHESIA

Cyroanesthesia refers to localized application of cold as a means of producing regional anesthesia. There are many sources of cold, but as a practical matter ice has turned out to be the most useful and safe source of cold when working on the skin. Because ice makes a transition to water at 0°C, the temperature of the tissue will not drop below 0°C, reducing the risk of excess cooling. The focal application of ice before and sometimes after painful procedures has been practiced for thousands of years – ice was one of the first forms of local anesthesia and analgesia.

Mechanisms of action of cryoanesthesia include:

1. Reduction in the sensitivity of pain receptors in the skin
2. Reduction in the rate of sensory nerve depolarization
3. Inhibition of both the release and the activity of:
   a. Inflammatory mediators, and
   b. Pain-mediating neurotransmitters such as substance P.
4. Activation of the gate control of pain mechanism at the level of the spinal cord.

One author (KCS) found the focal application of ice to be of particular value prior to the administration of filler substances. In areas other than the lips (e.g. the NLFs), ice is applied to an area which includes the intended needle insertion point, the path the needle will follow under the surface of the skin, and (very importantly) to a 1 cm margin of skin around those areas. The optimum size for the surface of an ice cube which is in contact with the patient is about 3 × 5 cm.

To improve the grip on the ice cube, it is helpful to remove the ice cubes from the ice cube tray, apply a folded 2 × 4 inch piece of gauze (made from a 4 × 4 inch piece of 4 ply gauze) to the rounded surface of the ice cube, then put the ice cube back in the tray and freeze it for several hours so that the ice will bond to the gauze. These ice cubes can then be put into individual paper cups and stored in the freezer until they are needed (Figs 9.3 and 9.4).

Ice is applied for at least 30 seconds (sometimes 45 seconds) – and adequate duration of icing is ensured by watching a clock in the treatment room. If there is a fine line to be treated, it can be marked by pressing the needle into the line (as shown) while ice is applied. After the area to be treated has been iced for an appropriate duration, the ice is moved to skin several cm away from the area to be treated (or sometimes is applied to the next area to be treated, on the contralateral side of the patient’s face). Application of ice nearby, during the injection, further reduces the patient’s discomfort, probably by maximizing activation of the neural systems responsible for gate control of pain at the level of the spinal cord, in a manner similar to that observed when vibration is used. A detailed discussion of the neurophysiology of the gate control of pain can be found at http://dermatology.cdlib.org/102/therapy/anesthesia/comite.html (accessed 15 July 2006).

The duration of high-quality cryoanesthesia is about 10–15 seconds after ice is removed from the area to be treated. It is helpful to rub ice on the treated area for about 5 seconds immediately after the injection is completed, to attenuate any residual discomfort.
When treating the lips with filler substances, ice should be applied for 60 seconds before needle insertion. The lips are usually treated in a series of six applications of ice: starting with each lateral third of the lower lip, then the middle third of the lower lip, then the lateral thirds of the upper lip and finally the middle third of the upper lip.

Patients who have previously been treated with local anesthetics before administration of fillers prefer cryoanesthesia with ice because:

❖ ‘Ice is more natural’
❖ No ‘pins and needles’ as the anesthetic wears off
❖ No ‘hyper’ feeling from adrenaline
❖ Total experience (anesthesia + treatment) hurts less
❖ Lower risk of bruising (as there are no injections of local anesthetic).

Both patients and the physician appreciate the fact that cryoanesthesia does not cause the distortion of facial features (either from volume of local anesthetic or from muscle relaxation secondary to regional anesthesia), which is seen so frequently with injectable anesthetics (Fig. 9.5).

COMPARISON OF LENGTH OF NEEDLES COMMONLY USED FOR ADMINISTRATION OF FILLERS

The author (KCS) has found that the use of long needles further reduces patient discomfort and anxiety. Patients report that needle insertion is the most stressful moment during the treatment process, regardless of the form of anesthesia. Advantages of long needles include:

❖ Long needles allow for a considerable reduction in the number of needle insertions, which also shortens the duration of the procedure.
❖ Because there are fewer needle insertions, there are fewer occasions when the needle passes through the vascular plexus in the papillary dermis, contributing to a reduction in the incidence and severity of bruising.
❖ The reduced number of needle insertions also helps to keep the needle tip sharp, reducing tissue trauma and associated discomfort.
❖ Long needles allow the physician to lay down a continuous bead of filler material, and to more precisely modulate the quantity of filler material delivered as the treated area is filled.

Figure 9.6 shows the area which can be treated with a single insertion of a 27 gauge 1.25 in needle.

Typical l-o-n-g needles (B-D PrecisionGlide) routinely used for various products include:

❖ Restylane: 30 gauge 1 in or a 27 gauge 1.25 in
❖ Perlane, Juvéderm 24 HV, Evolence, Radiesse: 27 gauge 1.25 in
❖ Artecoll: 25 gauge, 7/8 in

The routine application of firm, steady pressure for 5 minutes (as measured on the clock in the treatment room), starting as soon as possible after the needle is withdrawn from the skin, has greatly reduced the incidence and severity of bruising in the author’s practice (Fig. 9.7). Patients are pleased to participate in their care by holding pressure on the treated area.

Fig. 9.5 Comparison of length of needles commonly used for administration of fillers

Fig. 9.6 Illustration of the different areas treated with a long needle compared with a short needle
VIBRATORY ANESTHESIA

Vibration has been used for many years to reduce pain in disciplines such as dentistry and physiotherapy, and is now becoming recognized as a simple, safe, and effective form of anesthesia in dermatology. Vibration anesthesia can be explained by the ‘gate theory of pain control’ popularized by Melzack and Wall in the 1960s. Noxious nerve impulses evoked by injuries are influenced in the spinal cord by other nerve cells that act like gates, either preventing the impulses from getting through, or facilitating their passage. Without vibratory modulation, noxious impulses are carried through small C fibers uninhibited through a ‘gate’ in the spinal cord that ultimately sends the signal to the brain. When applied simultaneously, vibratory stimulation excites large A fibers, which activates inhibitory interneurons at the gate and mitigates the perception of pain in the brain.

A variety of vibratory massagers can be used to produce effective vibratory anesthesia. A study has shown that pain sensitivity gradually declines as vibration amplitude increases, but no specific frequency is more effective in interference with nociception. The vibratory massager should be applied within 1–2 cm of the site to be treated for approximately 2–3 seconds prior to the injection or laser application and, and continued throughout the injection or laser application. A detailed discussion of vibratory anesthesia, with video clips illustrating various procedures, can be found at http://dermatology.cdlib.org/102/therapy/anesthesia/comite.html (accessed 15 July 2006).

INTEGRATIVE PERIPHERAL ANESTHESIA VERSUS REGIONAL NERVE BLOCK ANESTHESIA

Local anesthesia can be effectively obtained both by infiltrations and nerve blocks. Intraluminal local anesthesia applies to the injection of the local anesthesia solution in the area of the peripheral innervation distant from the site of the main nerve. An advantage of infiltrative anesthesia is that no specific skill is necessary, only the selected area of innervation is involved and vasoconstrictors can improve local hemostasis. A drawback of infiltrative local anesthesia is the distortion of the tissue at or around the site of injection, which may obscure the tissue detail required in cosmetic procedures such as filler injection.

• Nerve blocks

A 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 in the area of sensory distribution of that particular nerve. Advantages of nerve blocks include the fact that a single accurately placed injection can obtund large areas of sensation without tissue distortion at the operative site. Disadvantages of peripheral nerve block include the sensation of numbness in areas other than the operative site and the lack of hemostasis at the operative site from the vasoconstrictor component of the local anesthetic injection.

Individual anatomic variation is responsible for the sometimes unpredictable effect of peripheral nerve block. Nerves that innervate areas close to the midline may receive innervation from the contralateral side and require bilateral blocks. Some nerve blocks may also require infiltrative local anesthesia to obtain adequate pain control.

Since many nerves are accompanied by corresponding veins and arteries, preinjection aspiration should always be performed to prevent intravascular injection. Using local anesthetics with vasoconstrictors will prolong anesthesia, which may be undesirable for most patients who want to return to normal activities after filler injection. Prolonged anesthesia makes speaking and normal lip posture difficult, so most doctors only prefer to use shorter acting anesthetics so that the anesthetic effect persists through the injection sequence.

ANATOMIC ARRANGEMENT OF THE FACIAL FORAMINA

Successful nerve block anesthesia is largely dependent upon knowing the positions of the nerve foramina. The surgeon can take advantage of the alignment of the major facial foramina as they relate to a vertical line through the midpupillary line with the eye in the primary position of natural forward gaze (Fig. 9.8).

BLOCKING THE SCALP AND FOREHEAD

The use of fillers has recently expanded beyond the lips. Multiple areas of all sensory dermatomes may be sites for
the use of dermal fillers. Using filler agents in the glabellar area and frontalis lines may require local anesthesia of the frontal nerve to anesthetize the forehead.

**Supraorbital nerve**
The supraorbital nerve exits through a notch (in some cases a foramen) on the superior orbital rim approximately 27 mm lateral to the glabellar midline (Fig. 9.9). This supraorbital notch is readily palpable in most patients. After exiting the notch or foramen, the nerve traverses the corrugator supercilii muscles and branches into a medial and lateral portion. The lateral branches supply the lateral forehead and the medial branches supply the scalp.

**Supratrochlear nerve**
The supratrochlear nerve exits a foramen approximately 17 mm from the glabellar midline (Fig. 9.9) and supplies sensation to the middle portion of the forehead. The infraorbital nerve exits below the trochlea and provides sensation to the medial upper eyelid, canthus, medial nasal skin, conjunctiva, and lacrimal apparatus (Fig. 9.9).

When injecting this area it is prudent to always use the nondominant hand to palpate the orbital rim to ensure that the needle tip is exterior to the bony orbital margin. To anesthetize this area, the supratrochlear nerve is measured 17 mm from the glabellar midline and 1–2 mL of local anesthetic are injected (Fig. 9.10A). The supraorbital nerve is blocked by palpating the notch (and/or measuring 27 mm from the glabellar midline) and injecting 1–2 mL of local anesthetic solution (Fig. 9.10B). The infraorbital nerve is blocked by injecting 1–2 mL of local anesthetic solution at the junction of the orbit and the nasal bones (Fig. 9.10C; Fig. 9.11 shows the regions anesthetized from the above blocks).

**Infraorbital nerve block**
This block is one of the most commonly utilized facial blocks in order to anesthetize the upper lip and upper NLF for injection of fillers. Obviously, a bilateral block must be performed to achieve anesthesia on both sides of the lip.

The infraorbital nerve exits the infraorbital foramen 4–7 mm below the orbital rim in an imaginary line dropped from the midpupillary midline. The anterior superior alveolar nerve branches from the infraorbital nerve before it exits the foramen, and thus 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 upper lip.
Soft Tissue Augmentation

Fig. 9.10 (A–C) The forehead and scalp is blocked by a series of injections from the central to the medial brow

Fig. 9.11 The shaded areas indicate the anesthetized areas from supraorbital nerve (SO) and supratrochlear nerve (ST) and infratrochlear nerve (IT) blocks

on the injected side. This 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 1/2 in 30 gauge needle is inserted in the sulcus and directed superiorly toward the infraorbital foramen (Fig. 9.12). Bending the needle at a 45-degree angle upward can facilitate the needle insertion (Fig. 9.13). The needle needs only to approach the vast branching around the foramen to be effective. It is important to use the other hand to palpate the inferior orbital rim to avoid injecting superiorly the orbit. For the infraorbital block, 2–4 mL of 2% lidocaine (lignocaine) are injected in this area and the palpating finger can feel the local anesthetic bolus below the infraorbital rim, confirming the correct area of placement.

The authors find it important to ask the patient to open their eyes and look straight ahead when performing the infraorbital block. This way, the injector can see the pupil and better appreciate the position of the infraorbital foramen, which is 4–7 mm below the infraorbital rim in the midpupillary line.

The infraorbital nerve can also be very easily blocked by the transcutaneous facial approach and may be the preferred route in dental phobic patients. A 32 gauge 1/2 in needle is used and is placed through the skin and aimed at the foramen in a perpendicular direction. Between 2 and 4 mL of local anesthetic solution is injected at or close to the foramen (Fig. 9.14). Again, the other hand must constantly palpate the inferior orbital rim to prevent inadvertent injection into the orbit. Care must be used in this approach to avoid superficial vessels that may cause noticeable bruising.

A successful infraorbital nerve block will anesthetize the infraorbital cheek, the lower palpebral area, the lateral nasal area, and superior labial regions as shown in Figure 9.15.

Anesthesia for aesthetic lip augmentation

Although in theory a bilateral infraorbital block should anesthetize the entire upper lip, some patients may still perceive pain for various anatomic (or sometimes psychological) reasons detailed earlier in this article. The author recommends the injection of 1.0 mL of local anesthetic solution in the maxillary labial frenum (Fig. 9.16). Whether for psychological or physiological reasons, this seems to provide additional anesthesia. This can also be performed
Fig. 9.12 (A and B) The intraoral approach for local anesthetic block of the infraorbital nerve

Fig. 9.13 Bending the 1½ inch 28 gauge needles at a 45-degree angle can facilitate the injection technique of the infraorbital nerve. Note the needle is shown outside the mouth for illustrative purposes only. The actual injection is intraoral.
Fig. 9.14 (A and B) The facial approach for local anesthetic block of the infraorbital nerve
in the lower lip labial frenum area to augment bilateral mental blocks, as will be discussed later in this chapter. The combination of bilateral infraorbital and mental blocks and the just described infiltrative augmentation (when necessary) is an ideal technique for anesthetizing the lips for filler injection or lip implant placement.

**Zygomaticofacial nerve**

Two often overlooked nerves in facial local anesthetic blocks are the zygomaticotemporal and zygomaticofacial nerves. This may assist the injection of fillers in facial rhytides on the lateral temporal and lateral canthal areas or in the malar areas. These nerves represent terminal branches of the zygomatic nerve. The zygomaticotemporal nerve emerges through a foramen located on the anterior wall of the temporal fossa. This foramen is actually behind the lateral orbital rim posterior to the zygoma at the approximate level of the lateral canthus (Fig. 9.16).

The injection technique involves sliding a 1 1/2 inch 27 gauge needle behind the concave portion of the lateral orbital rim. It is suggested that this area should be closely examined on a model skull prior to attempting this injection as it will facilitate understanding of the anatomy and make the technique simpler. To orient for this injection it is necessary to palpate the lateral orbital rim at the level of the frontozygomatic suture (which is frequently palpable). With the index finger in the depression of the posterior lateral aspect of the lateral orbital rim (inferior and posterior to the frontozygomatic suture), the operator places the needle just behind the palpating finger (which is about 1 cm posterior to the frontozygomatic suture) (Fig. 9.16). The needle is then ‘walked’ down the concave posterior wall of the lateral orbital rim to the approximate level of the lateral canthus. After aspirating, 1–2 mL of 2% lidocaine (lignocaine) is injected in this area with a slight pumping action to ensure deposition of the local anesthetic solution at or about the foramen. Again, it is important to hug the back concave wall of the lateral orbital rim with the needle when injecting.

Blocking the zygomaticotemporal nerve causes anesthesia in the area superior to the nerve, including the lateral orbital rim and the skin of the temple from above the zygomatic arch to the temporal fusion line (see ZT on Fig. 9.17).

**Zygomaticofacial nerve**

The zygomaticofacial nerve exits through a foramen (or foramina in some patients) in the inferior lateral portion of the orbital rim at the zygoma. If the surgeon palpates the junction of the inferior lateral portion of the lateral orbital rim, the nerve emerges several millimeters lateral to this point. By palpating this area and injecting just lateral to the finger, this nerve is successfully blocked with 1–2 mL of local anesthetic (Fig. 9.18). Blocking this nerve...
will result in anesthesia of a triangular area from the lateral canthus and the malar region along the zygomatic arch and some skin inferior to this area (see ZF on Fig. 9.17).

**MENTAL NERVE BLOCK**

The mental nerve exits the mental foramen on the hemi-mandible at the base of the root of the second premolar (many patients may be missing a premolar due to orthodontic extractions). The mental foramen is on average 11 mm inferior to the gum line (Fig. 9.19). There is variability with this foramen (like all foramina), but by injecting 2–4 mL of local anesthetic solution about 10 mm inferior to the gum line or 15 mm inferior to the top of the crown of the second premolar tooth the block is usually successful. In a patient without teeth, the foramen is often times located much higher on the jaw and can sometimes be palpated. This block is performed more superiorly in the denture patient. As stated earlier, the foramen does not need to be entered as a sufficient volume of local anesthetic solution in the general area will be effective. By placing traction on the lip and pulling it away from the jaw, the labial branches of the mental nerve can sometimes be seen traversing through the thin mucosa. The mental nerve gives off labial branches to the lip and chin (Fig. 9.20).

Alternatively, the mental nerve may be blocked through the skin of the cheek with a facial approach, aiming for the same target.

When anesthetized the distribution of numbness will be the unilateral lower lip to the midline and laterally to the mentolabial fold, and in some patients the anterior chin and cheek depending on the individual furcating anatomy of that patient’s nerve (Fig. 9.21).
The author after performing hundreds of facial blocks for filler injection now uses a simple infiltration technique. Instead of blocking the infraorbital and mental nerves, the author first places topical anesthetic on the maxillary and mandibular vestibule from the canine tooth no one side to the canine tooth on the other side. After several minutes, a 32 gauge needle is used to inject 1/4 cc of local anesthetic solution at the depth of the maxillary and/or mandibular vestibule. The vestibule is defined as the junction of the attached gingiva (gum) and the lip mucosa. These injections are made just above the periosteum in 4 or 5 spots between the upper or lower canine teeth. This technique provides remarkable anesthesia suitable for filler injection and is often easier for the doctor and patient than nerve blocks. This technique is shown in Figure 9.22. Figure 9.23 shows the approximate area of anesthetized tissue with this infiltration. Profound numbness (10/10 is seen in the central portion of the lips and the degree of anesthesia tapers off toward the oral commissures 7/10.

To increase the depth of anesthesia at the lateral lip, the injections need to be carried to the premolar area. An additional block of the anterior maxilla is one that is convenient for removing telangectasias or other lesions from the perinasal area nostrils. This is a common area for ectatic vessels and is very sensitive without anesthesia. Using a 32 gauge, 1/2 in needle, 0.25 cc of local anesthetic is injected into the junction of the columella and upper lip. The injection pain is mitigated by pinching the upper lip and columella with the noninjecting hand while injecting. Figure 9.24 shows this technique. This local anesthetic...
Soft Tissue Augmentation

Fig. 9.22 (A and B) Submucosal lip infiltration can be used to augment or in place of bilateral mental nerve block to treat the lower lip. Very small volumes will create adequate anesthesia. The solution is injected across the entire lip. The same technique can be used on the upper lip as well.

Fig. 9.23 Shows the approximate area anesthetized by this method. Numbness is profound in the midportion of the lip and tapers off laterally.

Infiltration will anesthetize the central portion of the upper lip, columella, nasal sill and the lower portion of the nostrils.

CONCLUSION

As advances are made in the science of facial fillers more products and indications will become available for these minimally invasive, highly effective aesthetic procedures. This chapter outlines some of the more basic anatomy and techniques for anesthetizing the common areas of the face amenable to injectible fillers.
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