Regional Nerve Blocks of the Face

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KEYWORDS

• Peripheral nerve block • Regional nerve block • Facial anesthesia • Analgesia

KEY POINTS

- V1 nerve blocks anesthetize the forehead and much of the anterior scalp and are underutilized in repairs.
- V2 nerve blocks are quick and easy and are especially useful in this cosmetically high-risk area. Maxillary nerve blocks allow anesthesia without making wounds edematous and ease repairs.
- V3 nerve blocks are especially convenient in lower lip lacerations.
- Auricular blocks are vital in this dense low-volume area that makes local anesthesia especially difficult.
- Nasal blocks are useful in lacerations and relocations of fractures.

For repair of lacerations on the face, regional nerve blocks offer a multitude of benefits: longer-lasting analgesia, less discomfort because fewer injections are needed and they can be placed in less sensitive areas, and improved cosmesis because the wound margins are less distorted compared with the use of local infiltration. Patients understandably object to the multiple injections that are required to achieve sufficient analgesia through local infiltration. Additionally, anyone who has sutured a wound on a patient's face will recall the difficulties of aligning the margins of an edematous wound after injecting a local anesthetic. This article presents a review of the network that innervates the face and describes the induction of nerve blocks for specific areas.

The medications typically used to induce facial anesthesia are lidocaine, 1%, with or without epinephrine; bupivacaine, 0.25% to 0.5%, with or without epinephrine; and topical lidocaine, epinephrine, tetracaine (LET). In general, local infiltration of lidocaine provides 1 to 2 hours of analgesia, which can be extended to 2 to 4 hours with the addition of epinephrine. The maximum dose for plain lidocaine is 4.5 mg/kg (up to 300 mg total). For lidocaine with epinephrine, the dose increases up to 7 mg/kg (500 mg total). In practical terms, for a 70 kg patient, that translates into 30 mL of

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1% plain lidocaine, or 50 mL of 1% lidocaine with epinephrine. Bupivacaine provides 4 to 8 hours of analgesia; the addition of epinephrine increases the duration to 8 to 16 hours of relief.[1] When bupivacaine is used, a concentration of 0.25% is typical, with a 2.5 mg/kg safety limit in adults and a 2 mg/kg safety limit in children.[2] For large or multiple wounds, the total amount of anesthetic required if using local infiltration can exceed safe limits and lead to toxicity, making the use of nerve blocks essential.

LET is used predominantly in children, but it also has utility when suturing a wound in an adult, especially in areas that are difficult to anesthetize because they cross midlines and cutaneous nerve regions. In preparation for the repair of a small laceration across the nose, a quick smudge of LET can achieve a proper anesthetic level to allow wound closure without the discomfort of an injection.

Performing nerve blocks of the face is a skill that can be learned easily and quickly. Paoli and colleagues[3] trained dermatologists with no previous experience to induce nerve blocks through a 4-hour course consisting of video demonstration and hands-on training; all of the participants reported skill retention at 1- and 2-year follow-up.

ANATOMY OF FACIAL NERVES

The nerves that provide sensation to the face originate as cranial nerve (CN) V. Its main sensory nucleus is in the midpons, with extension caudally as the spinal nucleus and rostrally as the mesencephalic nucleus.[4]

CN V then divides into 3 main roots. Division 1 covers sensation from the upper eyes throughout the forehead and parts of the nose; division 2 covers sensation from underneath the eyes to the upper lip and laterally, and division 3 covers sensation from the chin to the lower lip, then up and around the face.[5] Each division of CN V has further subdivisions, where peripheral blocks are targeted to achieve proper analgesia.

The ophthalmic nerve (CN V_1) splits off the trigeminal ganglia, where its main branch, the frontal nerve, dives through the orbital cavity, producing 2 main sensory nerves of the face, the supraorbital and supratrochlear nerves.[6] The supraorbital nerve exits the frontal bone through the supraorbital foramen and provides sensation to the superior aspects of the eye and the forehead and, extending posteriorly, provides cutaneous coverage to a large portion of the scalp.[6] The supratrochlear nerve exits the skull medially to the supraorbital nerve and sensates more medial aspects of the forehead and anterior portions of the scalp. Lastly, the nasociliary nerve branches off the ophthalmic nerve, giving rise to the small infratrochlear nerve that provides sensation to the superior medial aspect of the eyelid inferior to the brow. The last sensation provided by CN V_1 is via the external nasal branch of the anterior ethmoidal nerve, sensating the medial portion of the nares.

The maxillary nerve (CN V_2) branches off the trigeminal nerve, diving through the foramen rotundum.[6] The zygomatic nerve branches off the main bundle, terminating in the zygomaticotemporal and zygomaticofacial nerves. The zygomaticofacial nerve exits the skull at its foramen laterally and inferior to the orbit, providing cutaneous sensation to its small local area. The zygomaticotemporal nerve extends along the temples, providing superior lateral sensation via CN V_2. The major sensation of CN V_2 is via the infraorbital nerve exiting its foramen and splitting in all directions. The infraorbital nerve sensates the lower eyelids, the lateral nares, and the superior lip areas.

The mandibular nerve (CN V_3) branches off the trigeminal nerve, traveling inferiorly through foramen ovale, where it splits into the anterior and posterior divisions.[6] The