ATLAS OF ACCESS & RECONSTRUCTION IN HEAD & NECK SURGERY

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We dedicate this book to our *patients,* who enable us to practice a noble profession with the satisfaction of helping others.

To my wife, *Jan Feldwisch Sessions,* artist, mother, and the best facilitator I know.—D.G.S.

To my wife, *Alice Crownover Weymuller,* with deep appreciation for 24 years of love and support and for her willing acceptance of the many hours I have devoted to this project.—E.A.W.

To my coauthors for their knowledge and dedication, and to my residents and colleagues; and to my family—my wife, *Jane Drake Cummings,* and my children.—C.W.C.

To my parents, *Don and Hildur Makielski,* for stimulating my interest in education and science; and to my husband, *Doug Wilson,* for his encouragement.—K.H.M.

To my supportive husband, Robert Cleveland.—P.W.

PREFACE

The purpose of this work is to facilitate surgeons in the treatment of tumors of the head and neck. The goal is to guide the surgeon in operative planning and recommend possibilities for reconstruction. To this end the head and neck region has been subdivided into specific anatomic areas, including the oral cavity and oropharynx; the nasal cavity, paranasal sinuses, and anterior cranial fossa; and the nasopharynx, the parapharynx, and the infratemporal fossa. Tumors of the larynx and hypopharynx are discussed in the *Atlas of Laryngeal Surgery;* primary tumors of the neck, cervical esophagus, ear, and skin are excluded from discussion.

The emphasis in this book is practical. The intent is to provide the reader with clear and concise descriptions of the routes of access to head and neck tumors with enough precision that a trained surgeon can expect successful results without major surprises along the way. Similarly, technical descriptions of various forms of closure and reconstruction are presented in detail. The indications for using a specific surgical approach or reconstruction are suggested for each anatomic area addressed. Disadvantages of these particular approaches are listed.

Specific preoperative planning, including the need for any specific instruments, is included. Pretreatment management for these procedures is presented to create distinctions for both the surgeon and the patient regarding appropriate considerations in the areas of risk, potential complications, benefits, and treatment options.

The technical procedures are illustrated so as to highlight required steps and warn against possible pitfalls during surgery. Many of the illustrations required multiple sets of drawings from fresh cadaver dissections. The illustrations are intended to lead the surgeon through technically difficult areas.

Finally, attention is given to recommending meticulous postoperative care, fundamental to successful tumor surgery. Care is taken to discuss the treatment of potential complications that may follow this type of surgery. Appropriate references follow each specific surgical description.

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Chapter 1

ORAL CAVITY

Oral cavity surgery can result in a myriad of separate and distinct functional and cosmetic problems. Because of this we recommend a team approach for management planning for both surgical access and reconstruction. Members include surgeon, radiation therapist, oncologist, dentist, prosthodontist, social worker, and language and swallow therapist. This will allow for pretreatment evaluation and planning regarding such possible sequelae as loss of sensation, salivary incontinence, chewing problems, trismus, loss of speech articulation, dysphagia with aspiration, as well as possible healing problems, including fistula or exposed bone, before they occur.

Surgical access for treatment of oral cavity tumors includes the use of several different types of retractors for exposure and utilization of several surgical approaches, including having the lip and mandible intact or splitting the lip and/or the mandible for adequate exposure. In most patients the lip does not need to be sectioned for satisfactory exposure of a tumor of the oral cavity. In some patients a temporary mandibular osteotomy is performed either ipsilateral or contralateral to the oral cavity tumor for improved exposure. When there is evidence of tumor invasion of the mandible, questions arise as to how much bone must be removed.

The purpose of reconstruction of oral cavity defects is to facilitate healing, prevent wound breakdown and fistula formation, cover exposed bone with full thickness tissue, and promote normal function as much as possible. To achieve these results the surgeon has a large number of reconstructive options available, including no reconstruction, primary repair with local tissue, and the use of local, regional, or distant pedicle or free flaps. Local tissue is much more likely to have motor and sensory function than more distant flaps.

In oral cavity reconstruction it is important to accomplish the repair of tissue so that neither wound breakdown nor fistula occurs. Equally important, the mobile tongue must be allowed to heal untethered by whatever reconstructive option is used. Also, it is mandatory that exposed mandible be covered by full thickness viable tissue. The current and ongoing question of the type and timing of mandibular reconstruction is still under legitimate study. Free flap bone grafts carrying their own arterial, venous, and nerve supplies have been most promising.

STANDARD INSTRUMENTS

NECK

- Clamps
  - Curved mosquito—30
  - Kelly—6
  - Curved Crile—6
  - Ochsner—2
  - Allis—6
  - Babcocks—2
  - Right angle (5-inch)—1
  - Right angle short Jarit blunt—1
  - Thyroid tenaculum Leahy—1
  - Burlisher—2
- Needle holder Mayo Hager—4
- Needle holder Webster—2
- Towel clips—12
- Forceps
  - Bayonet 5″—1
  - Debakey long—2
  - Debakey regular—2
  - Gold handle Walter Lorenz—2
  - Adson—2
  - Brown-Adson—2
- Elevator
  - Regular—1
  - Freer—2
- Skin hooks
  - Single—2
  - Double—3
- Trach hook—1
- Tracheal dilator—1
- Nerve hook dull—1
- Suction
  - Pencil—1
  - Mastoid—3
    - Frazier—#9, #7, #12
  - Pharyngeal (tonsil)—1
  - Pediatric—1
- Retractors
  - Ribbon—3
  - Cheek—2
  - Langenbeck—2
  - Tongue depressor—1
  - 4-Prong rake—2
  - 6-Prong rake—2
  - Army/Navy—2
- Baby Weitlander—2
  - Vein—2
  - Brain spoon—1
  - Richardson—3
    - Tiny—1
    - Small—1
    - Medium—1
  - Senn—2
  - Scissors
    - Face lift—1
    - Straight Mayo—1
    - Curved Mayo—1
    - Metzenbaum regular—1
    - Metzenbaum baby—1
    - Tenotomy—1
  - Knife handles #3—3

BONE TRAY

- Mallet—1
- Bone cutter
  - Large—1
  - Straight small—1
  - Curved—1
- Bone hook—1
- Bone holder (Lane)—1
- Rongeur
  - Straight Lempert—1
  - Olivekrona—1
- Bone lever—1
- Wire cutter—1
- Gigli saw handles—1pr
- Gigli saw wires—2
- Wire twisters
  - Short—1
  - Long—1
- Dingman wire passing needle—1
- Osteotome
  - Curved 6mm—1
  - Straight 4mm—1
    - 6mm—1
    - 9mm—1
    - 12mm—1
    - 16mm—1
- Assorted tooth pullers—4
- Wire
  - #25 gauge
  - #26 gauge
- Mandibular reconstruction and compression set—1

ORAL CAVITY AND OROPHARYNX

- Clamps
  - Allis straight long—4
  - Allis curved long—2
  - Burlishers—6
- Needle holders
  - Short Mayo Heger—2
  - Regular Mayo Heger—2
- Towel clips—12
- Forceps
  - Walter Lorenz—2
  - Debakey medium—2
  - Wilde—2
- Hurd pillar retractor
- Knife handle #7—1
- Dental mirror
- Scissors
  - Metzenbaum regular—2
  - Straight Mayo suture—1
  - Facelift—1
  - Metzenbaum Baby—1
  - Iris curved blunt—1
  - Iris curved sharp—1
  - Tenotomy—1
  - Kayes—1
- Bone curets
  - Small—1
  - Medium—1
  - Large—1
- Caliper—1
- Scissors
  - Upper lateral scissors Fomon long—1
  - Upper lateral scissors Fomon short—1
- Elevators
  - Freer
  - Periosteal
  - Palate
- Retractors
  - Cheek (Caldwell-Luc)—2
  - Weider tongue depressor—2
  - Jennings mouth retractor—1
  - Side-biting mouth retractor—1
  - Dingman mouth retractor—1
  - Crowe-Davis retractor—1
  - Blade
    - Solid—4
    - Slotted—4
  - Round mouth retractor—1
- Suction
  - Pharyngeal—1
  - Frazier #12—2
- Nerve hook dule—1
- Tonsil snare—1
- Adenoid curet—2
- Nasal speculum
  - Regular—1
  - Medium Vienna—1
- Palate knife—1
- Palate hooks—2
- Dural hooks—8

DRILL SETS

- Bien drill set—1
  - Burrs—8
- Micro Hall drill—1
- Oscillating saw—1
- Sagittal saw—1
- Burr guards
  - Short—1
  - Medium—1
  - Long—1

ANATOMY

The oral cavity (ICD-0 140-145*) extends from the skin-vermilion junction of the lips to the junction of the hard and soft palate above and to the line of circumvallate papillae below (Fig. 1-1). It is divided into the following specific areas:

- Buccal mucosa (ICD-0 140)
- Floor of mouth (ICD-0 144)
- Anterior two thirds of tongue (oral tongue) (ICD-0 141)
- Hard palate (ICD-0 145.2)
- Lower alveolar ridge (ICD-0 143.0)
- Upper alveolar ridge (ICD-0 143)
- Retromolar gingiva (retromolar trigone) (ICD-0 145.6)
- Lip (ICD-0 140) (see Chapter 5)

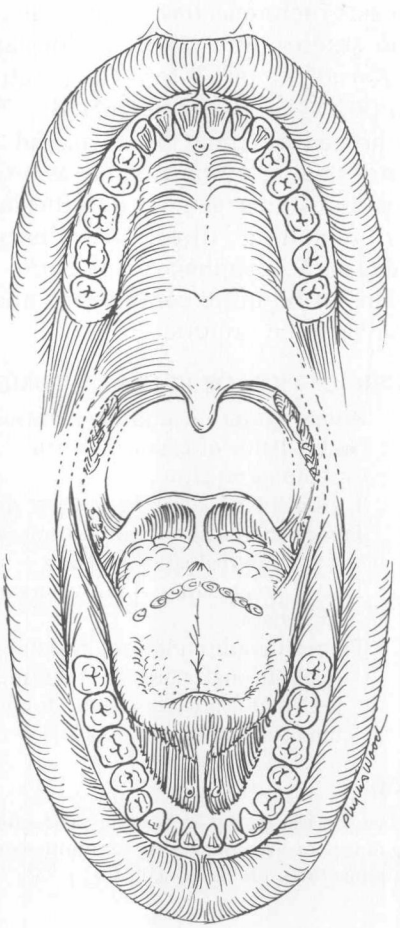

FIG. 1–1

*ICD-0 numbers are given as specified by the World Health Organization (1976).

STANDARD WORKUP AND CLINICAL STAGING

Assessment of the patient includes a complete history and physical examination of the head and neck, including nasopharyngoscopy and laryngoscopy. Palpation of the sites and neck nodes is essential. Neurologic evaluation of all cranial nerves is required. Imaging procedures should include panorex studies of the mandible and maxilla and dental films, and bone scans are helpful. Either computed tomograms (CT) or magnetic resonance imaging (MRI) can evaluate the site, size, and invasive characteristics of tumors in soft tissue, bone, and the neck. A coronal CT of the paranasal sinuses is done for tumors involving the palate. A drawing of the lesion in two dimensions is made on a standard anatomical diagram. Biopsy of the tumor supplies histologic confirmation. Examination for distant metastasis includes chest x-ray films, blood determination studies, and scans. Performance status using the Karnofsky or Eastern Cooperative Oncology Group (ECOG) scales is evaluated.

Several procedures may prove useful for future workup and staging system, such as examination with the patient under general anesthesia and panendoscopy including direct nasopharyngoscopy and laryngoscopy, esophagoscopy, and bronchoscopy. Studies of immune competence and flow cytometry may also be important.

TNM CLASSIFICATION OF PRIMARY TUMOR (T)

T_X	Primary tumor cannot be assessed
T_0	No evidence of primary tumor
T_{IS}	Carcinoma in situ
T_1	Tumor 2 cm or less in greatest dimension
T_2	Tumor more than 2 cm but not more than 4 cm in greatest dimension
T_3	Tumor greater than 4 cm in greatest dimension
T_4	Tumor invades adjacent structures (e.g., through cortical bone, into deep [extrinsic] muscles of the tongue, maxillary sinus, and skin)

REFERENCE

Beahrs OH, Henson DE, Hutter RVP, Myers MH, editors: Manual for staging of cancer, American Joint Committee on Cancer, ed. 3, Philadelphia, 1988, J.B. Lippincott Co., p. 27.

ANESTHETICS

Many biopsies and procedures of the oral cavity, oropharynx, sinuses, and face can be performed with the patient under local block anesthesia. The following general observations should be noted:

- Premedication with a short-acting barbiturate or benzodiazepam before injecting the local anesthetic minimizes excitatory symptoms of toxicity in sensitive patients.
- The ability to perform resuscitation, including endotracheal intubation, is essential.
- Monitored anesthesia control by an anesthesiologist is recommended.

Contraindications

- Infection or inflammation at the site of the proposed injection
- Patients too young to cooperate
- Known sensitivity to local anesthetic

Potential Complications

- Syncope (usually vasovagal in origin)
- Drug reaction
- Failure of anesthetic due to:
  Anatomical anomaly
  Carelessness, overconfidence, and indifference
  Beginning before action of the anesthetic is optimal
  Bad batch of anesthetic

Mandibular Nerve Block

Indications

- This block produces anesthesia of the ipsilateral mandibular teeth, buccal surface, floor of mouth, lower cheek, lower lip, and chin to the midline for biopsy or excision of a lesion in that area (Fig. 1-2, *A*). A single injection produces this extensive block.

Contraindications

- Trismus
- Sensitivity to local anesthetic

Potential Complications

- Failure of block
- Patient accidentally biting and/or pinching the lower lip
- Paresthesia of the lower lip secondary to direct trauma to the nerve trunk

Technique (Fig. 1-2, *B* and *C*)

The inferior alveolar nerve enters the bony canal of the mandible through the mandibular sulcus, which is centered on the medial surface of the ascending ramus of the mandible.

Initially the area above the retromolar trigone is topically anesthetized with lidocaine ointment. The leading edge of the ascending ramus is palpated with the index finger, and the needle of the syringe punctures the mucosa just above and medial to the apex. The needle is advanced along the lower aspect of the ascending ramus to the posteromedial wall of the mandibular sulcus. A total of 1.5 ml anesthetic is deposited around the inferior alveolar nerve.

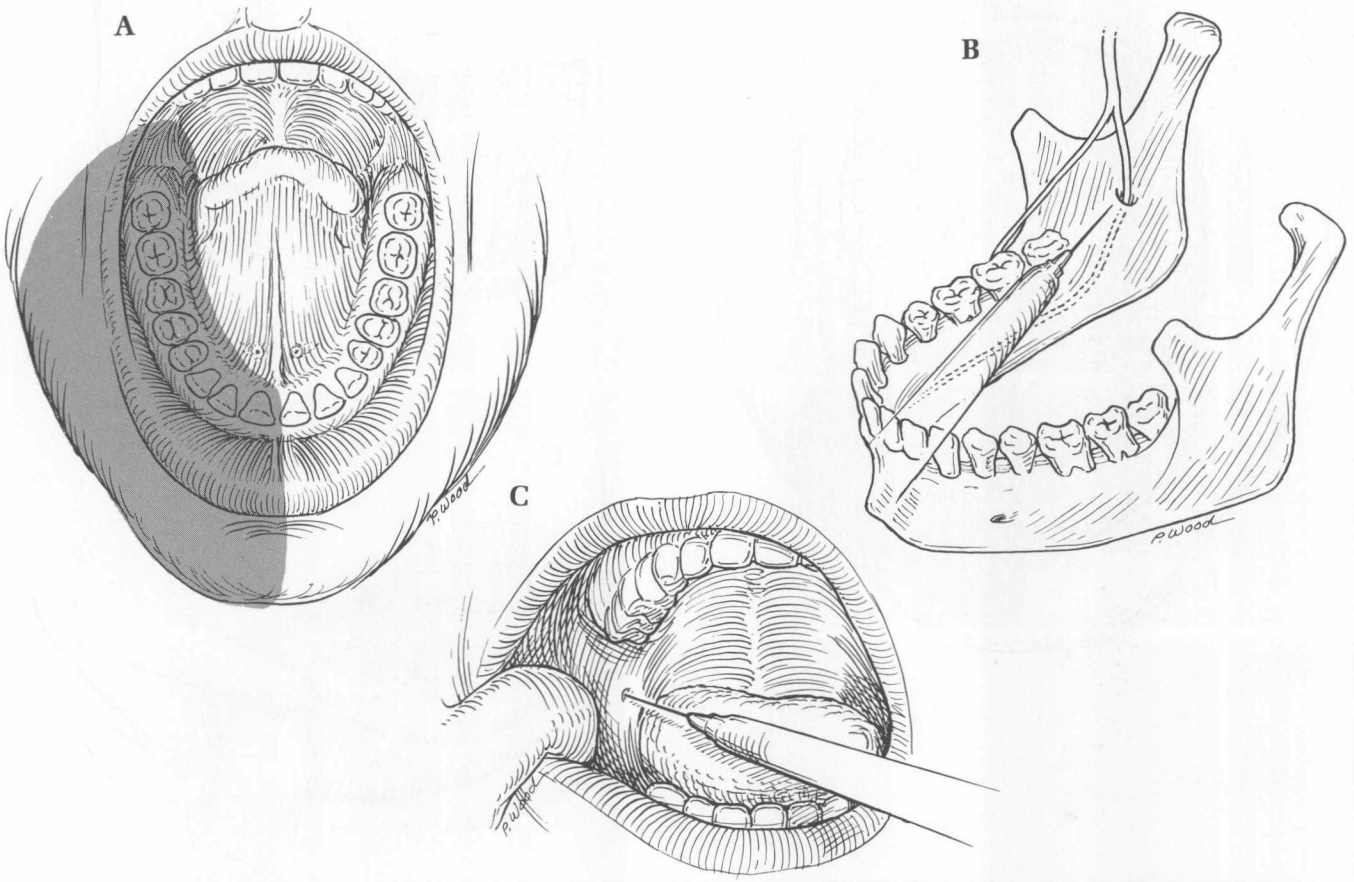

FIG. 1–2

Mental Nerve Block

Indication

- This block produces anesthesia of the anterior portion of the mandibular teeth, buccal surface, and lower lip to the midline (Fig. 1-3, *A*).

Contraindication

- Sensitivity to local anesthetic

Technique (Fig. 1-3, *B* and *C*)

The mental nerve enters the mandibular canal through the mental foramen. This foramen is generally close to the lower bicuspid teeth and can be found by extending a line inferiorly from the pupil of the eye.

Initially the area inferior to the ipsilateral second lower bicuspid is topically anesthetized with lidocaine ointment. The needle is inserted near the apex of the second lower bicuspid and 1 ml lidocaine is injected. The area is palpated with the tip of the needle until the opening of the mental foramen is identified; then 0.5 ml solution is slowly injected at the opening of the mandibular canal.

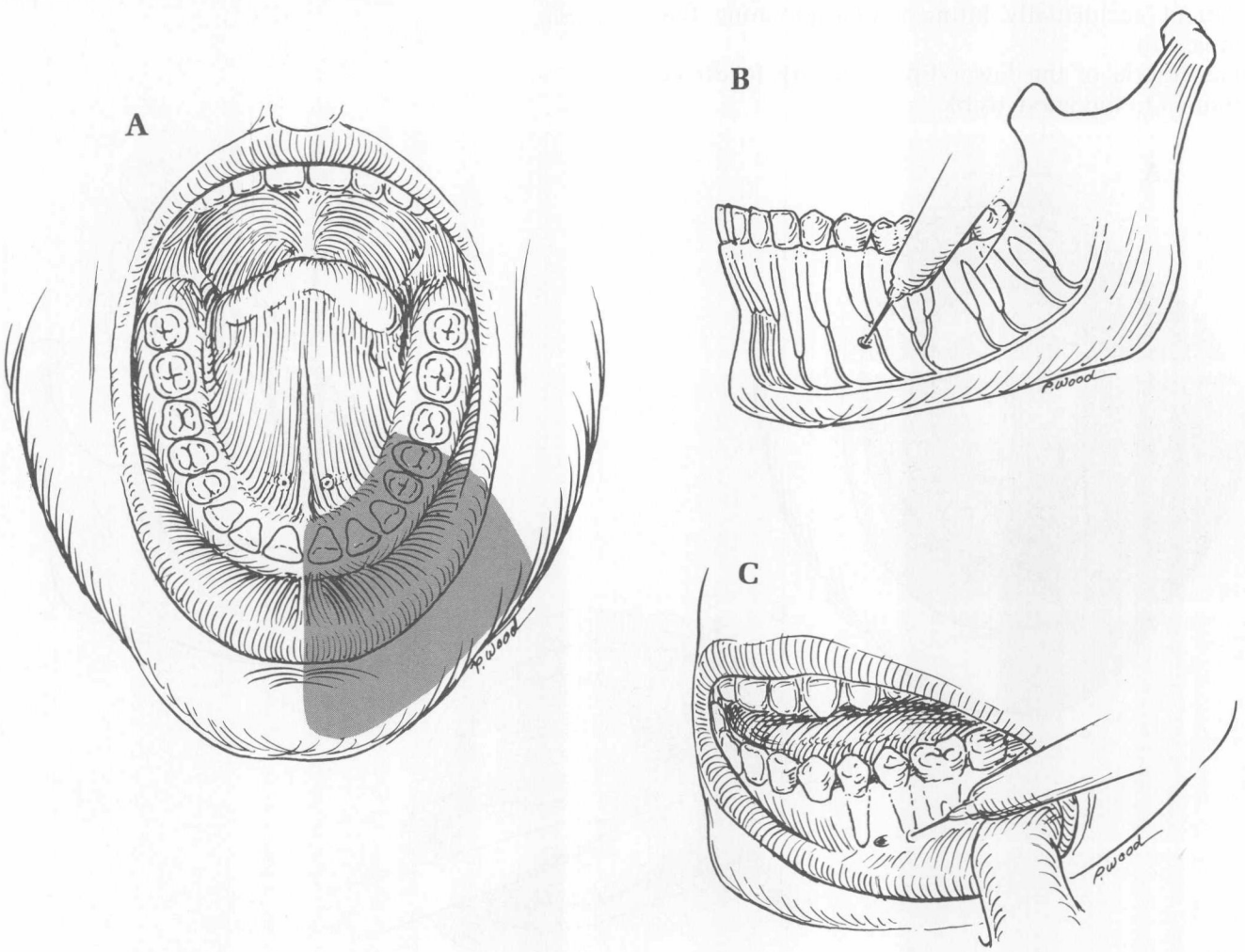

FIG. 1–3

Nasopalatine Nerve Block

Indication

- This block results in anesthesia of the anterior third of the hard palate to the level of the first bicuspid (Fig. 1-4, *A*).

Contraindication

- Sensitivity to local anesthetic

Technique (Fig. 1-4, *B* and *C*).

The mucoperiosteum of the anterior third of the hard palate is innervated by the nasopalatine nerve, which enters the anterior palatine canal in the midline, posterior to the upper central incisors.

The area immediately posterior to the upper central incisor is anesthetized topically with lidocaine ointment. The needle is inserted 0.5 cm posterior to the upper central incisors in the midline, and 0.5 ml of anesthetic is injected into the anterior palatine canal.

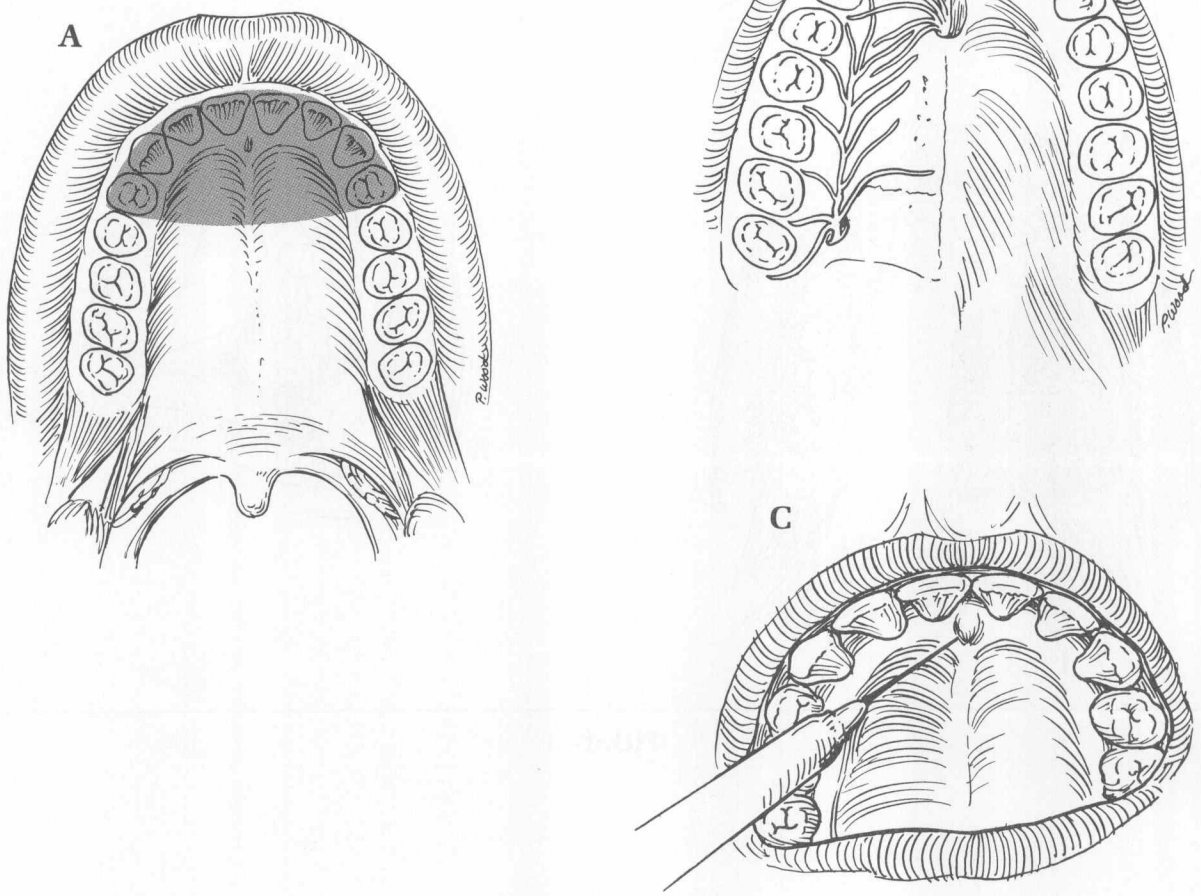

FIG. 1–4

Greater Palatine Block

Indication

- This block results in anesthesia of the posterior two thirds of the hard palate from the maxillary tuberosity to the cuspids anteriorly and from the midline to the ipsilateral gingival crest (Fig. 1-5, *A*). It is used for biopsy or excision of a lesion in this area.

Contraindication

- Sensitivity to local anesthetic

Technique (Fig. 1-5, *B*)

The posterior two thirds of the hard palate is innervated by the greater palatine nerve, which enters the hard palate at the greater palatine foramen.

The area medial to the maxillary third molar is anesthetized topically with lidocaine spray. The maxillary tuberosity is palpated with the index finger. The injection is made anterior and medial to the tuberosity at the greater palatine foramen, which is about halfway from the gingival border at the base of the third molar and the midline of the hard palate. The surgeon is advised to review the anatomical relationships of this foramen before performing this injection. The injection is made from the contralateral side, and 1 to 1.5 ml of anesthetic solution is laid down.

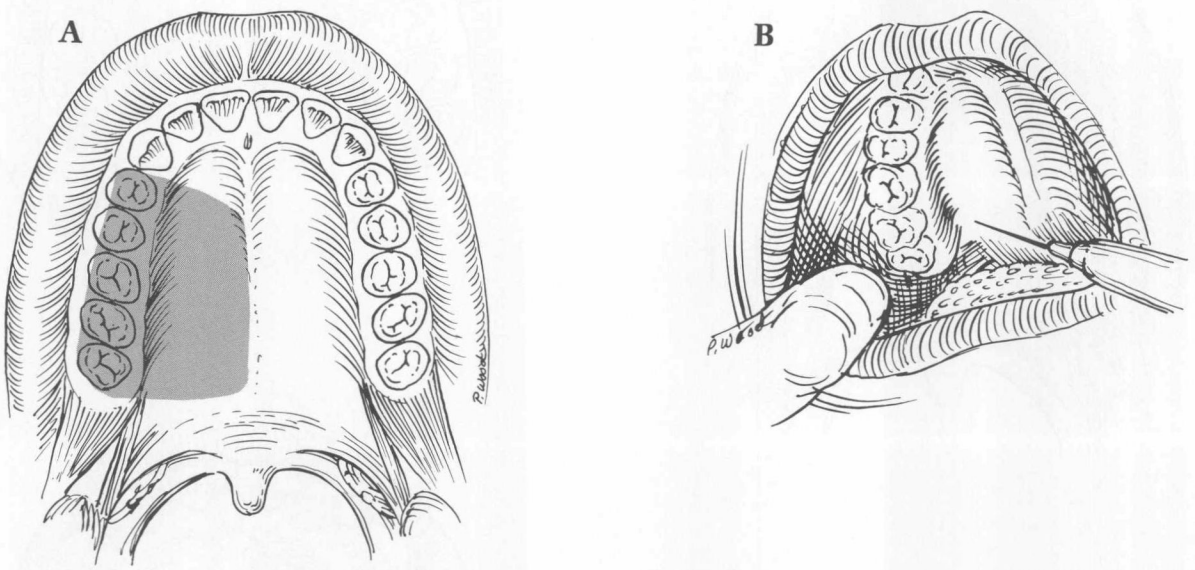

FIG. 1–5

Infraorbital Block

Indication

- This block results in anesthesia of the skin over the lower eyelid, the ipsilateral ala of the nose, the cheek and upper lip, the maxillary antrum, and the maxillary teeth from the central incisors to the mesiobuccal root of the first molar (Fig. 1-6, *A*). It is used for biopsy and excision of lesions in this area.

Contraindication

- Sensitivity to local anesthetic

Technique (Fig. 1-6, *B* and *C*)

Sensation in this area is obtained from the infraorbital nerve and its terminal branches, including the middle and anterior superior alveolar nerves. The infraorbital nerve enters the infraorbital foramen, located on a line dropped perpendicular from the pupil of the eye, and is inferior to the orbital rim. This line also passes through the mental foramen more inferiorly.

The needle is inserted into the superior aspect of the maxillary gingivobuccal sulcus and is directed superiorly toward the infraorbital foramen. The orbital rim is palpated, and the solution is laid down about 0.5 cm inferior to the rim, centered on an imaginary perpendicular line dropped from the pupil with the patient looking straight ahead. About 1 to 1.5 cm of solution is laid down.

REFERENCE

Manual of local anesthesia in general dentistry, ed. 2, New York, 1947, Cook-Waite Laboratories, Inc.

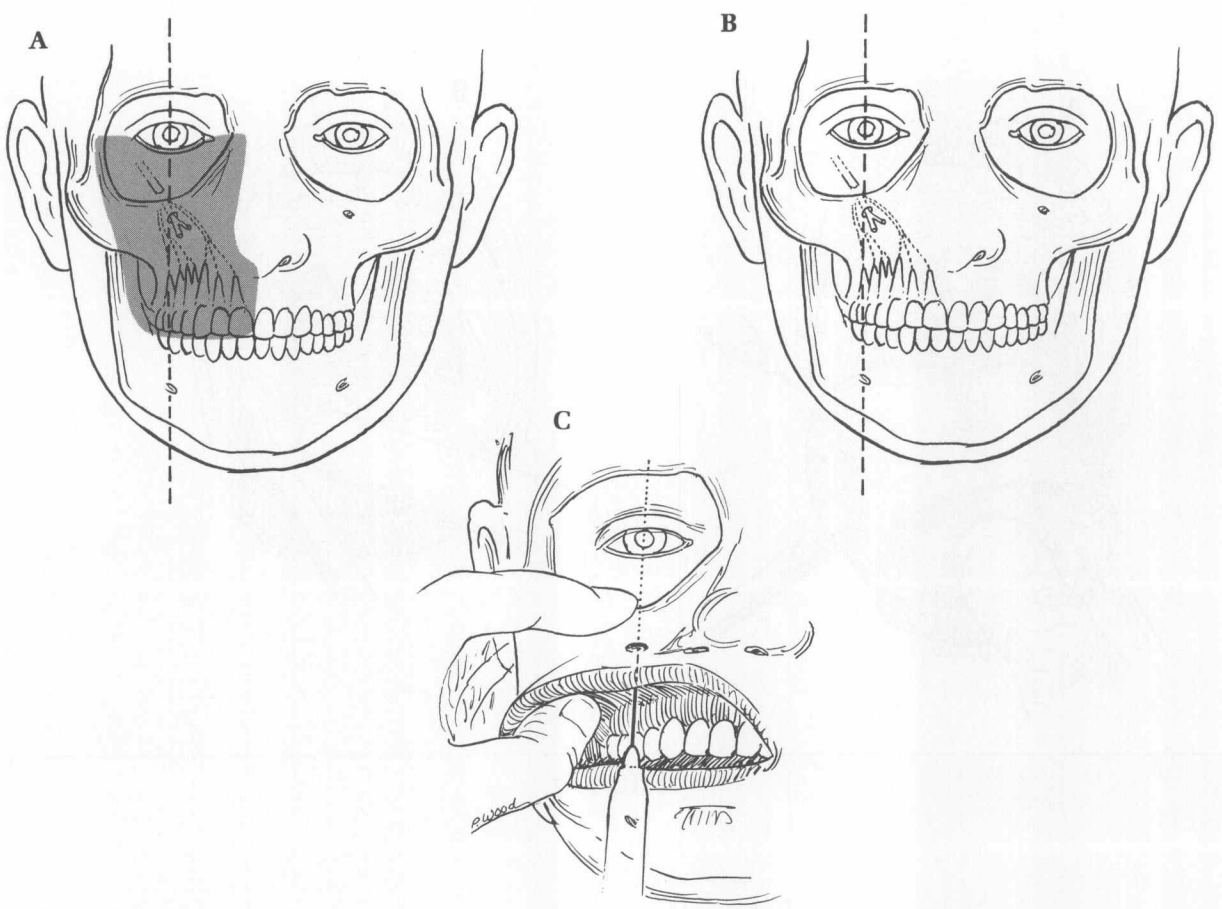

FIG. 1–6