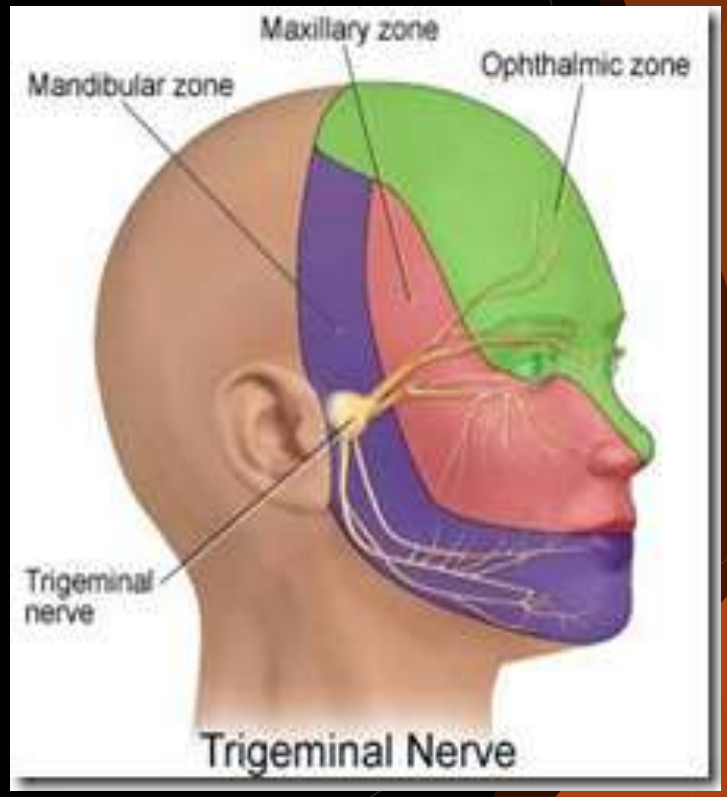
Mandibular Anaesthesia

THE TRIGEMINAL NERVE

- IT IS THE LARGEST CRANIAL NERVE
- CONTAINS BOTH SENSORY AND MOTOR FIBRES
- IT HAS THREE BRANCHES –
  - 1]OPTHALMIC NERVE
  - 2]MAXILLARY NERVE
  - 3]MANDIBULAR NERVE



TECHNIQUES FOR REGIONAL ANESTHESIA

- Pterygomandibular Block (IANB)
- Mandibular Nerve Block : The GOW GATES Technique
- Lingual nerve Block
- Long Buccal Nerve Block
- Vazirani-Akinosi Closed Mouth Mandibular Block
- Mental Nerve Block

Techniques of regional analgesia for mandibular nerve and its subdivisions

INTRAORAL TECHNIQUES

A]CLASSICAL INFERIOR ALVEOLAR NERVE BLOCK

1]NERVES ANESTHETIZED- Inferior alveolar nerves and its subdivisions

Incisive nerve

Mental nerve

Lingual nerve(commonly)

2]AREAS ANESTHETIZED

- Body of the mandible and inferior portion of ramus
- Mandibular teeth upto the midline
- Mucous membrane and underlying tissues anterior to the first molar
- Anterior two third of the tongue

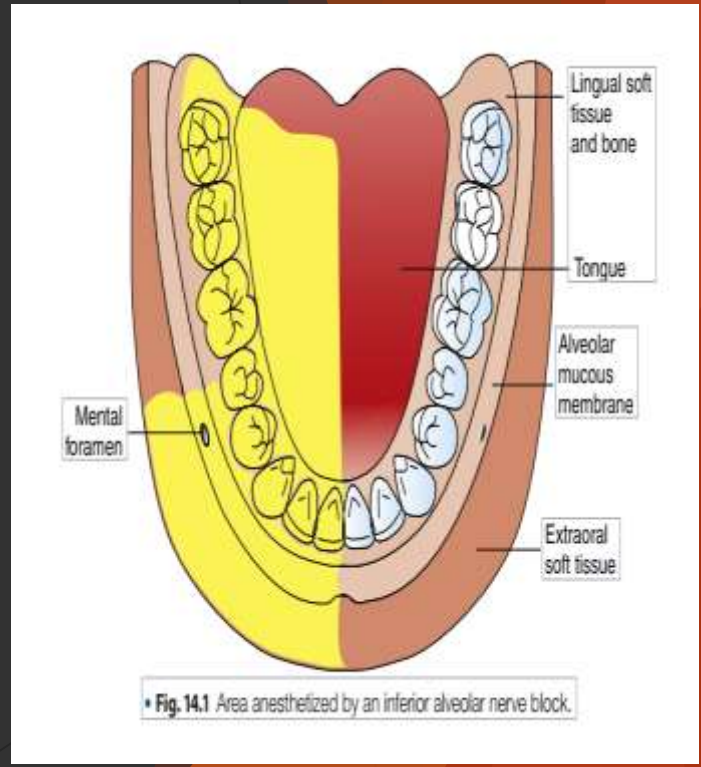


Fig. 14.1 Area anesthetized by an inferior alveolar nerve block.

- 3]ANATOMICAL LANDMARKS
- Mucobuccal fold
- Anterior border of ramus
- External oblique ridge
- Retromolar triangle
- Internal oblique ridge
- Ptyergomandibular space
- Buccal suckling pad
- Ptergomandibular space

4. INDICATIONS

a. Analgesia for operative dentistry on all the mandibular teeth

b. b. Surgical procedures on mandibular teeth and supporting structures anterior to the first molar when supplemented by anesthesia of the lingual nerve. This nerve is usually anesthetized at the same time that the inferior alveolar nerve is anesthetized.

c. Surgical procedures on mandibular teeth and supporting structures posterior to the second bicuspid when supplemented by in- esthesia of the lingual nerve and buccinator (long buccal) nerves

d. Diagnostic and therapeutic purposes.

5. NEEDLE PATHWAY DURING INSERTION. The needle passes through mucosa, a thin plate of the buccinator muscle, loose connective tissue, and a variable amount of fat

7. TECHNIQUE FOR RIGHT INFERIOR ALVEOLAR NERVE BLOCK

a.If the patient is in a dental chair, the head should be positioned so that when the mouth is open, the body of the mandible is parallel to the floor.

b. The operator stands to the right front side of the patient and with the left index finger or thumb palpates the mucobuccal fold.

c. The finger or thumb is then moved posteriorly until contact is made with the external oblique ridge on the anterior border of the ramus .

d. When the finger or thumb contacts the ramus of the mandible, it is moved up and down until the greatest depth of the anterior border of the ramus is identified. This area of greatest depth is called the coronoid notch and is in a direct line with the mandibular sulcus.

e. The palpating finger is moved lingually across the retromolar triangle and onto the internal oblique ridge

f. The finger or thumb still in line with the coronoid notch and in contact with the internal oblique ridge, is moved to the buccal side, taking with it the buccal sucking pad. This gives better exposure to the internal oblique ridge, the pterygomandibular raphe, and the pterygotemporal depression.
g. When palpating the intraoral landmarks with the thumb, the operator may place the index finger extraorally behind the ramus of the mandible. In this manner the anteroposterior width of the ramus may be assessed.
h. A syringe with a 1% inch, 25-gauge needle is then inserted parallel to the occlusal plane of the mandibular teeth from the opposite. side of the mouth, at a level bisecting the finger ,penetrating the tissues of the pterygotemporal depression, and entering the pterygomandibular space. One can best determine the depts of the needle penetration by estimating when the needle on been advanced half the distance between the palpating left thumb and index finger

i. During insertion, the patient is asked so keep the mouth wide open. The needle is penetrated into the tissues until gently contracting bone on the internal surface of the ramus of the mandible

j. The needle is then withdrawn about 1 mm, and 1 to 1.8 ml of solution is deposited slowly (1 to 2 minutes)

k. The needle is now withdrawn slowly, and when about one half of its inserted depth has been withdrawn, the remainder of the solution is injected in this area to anesthetize the lingual nerve.

• **Fig. 14.6** Placement of the needle and syringe for an inferior alveolar nerve block.

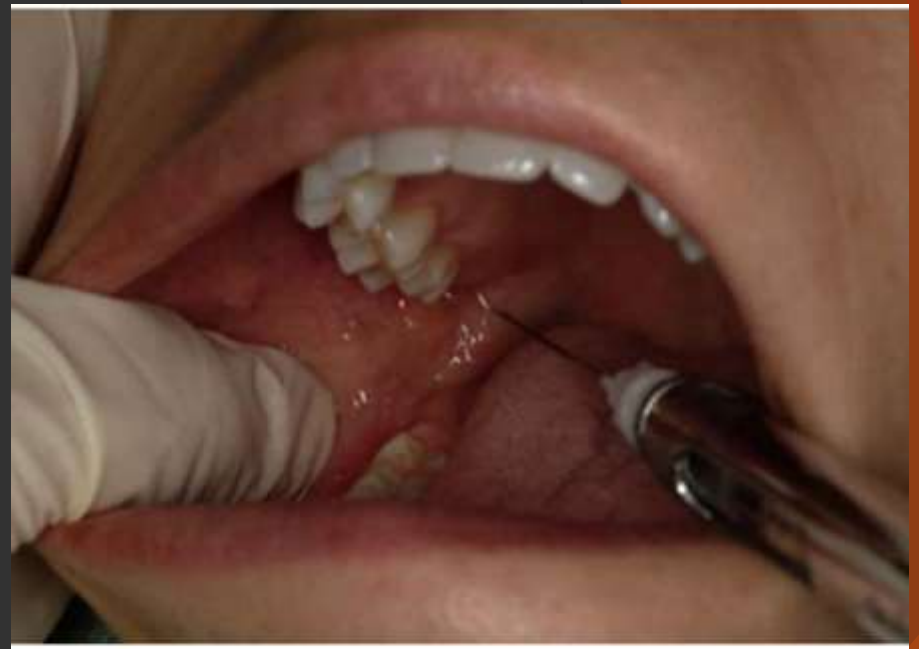
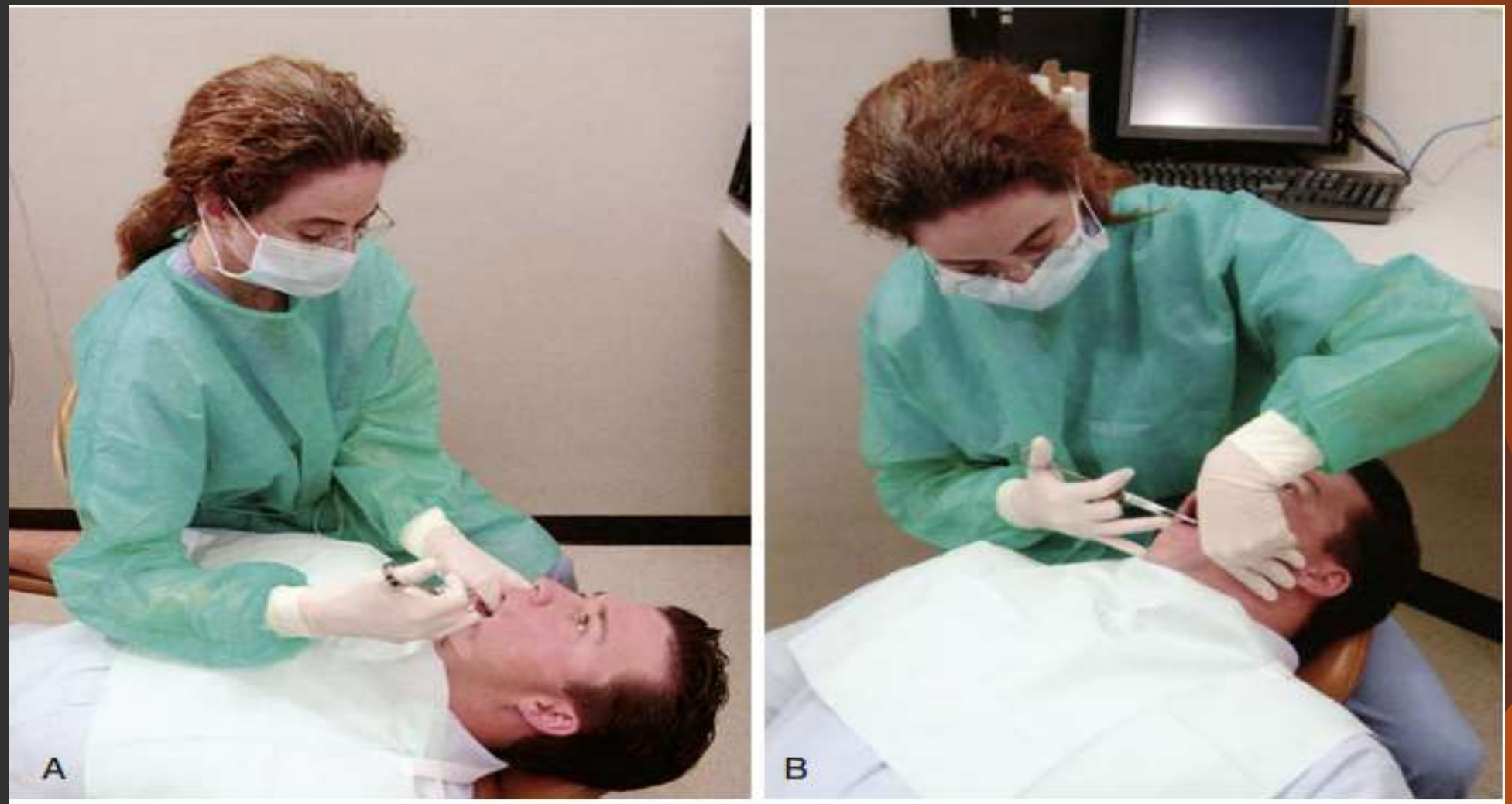
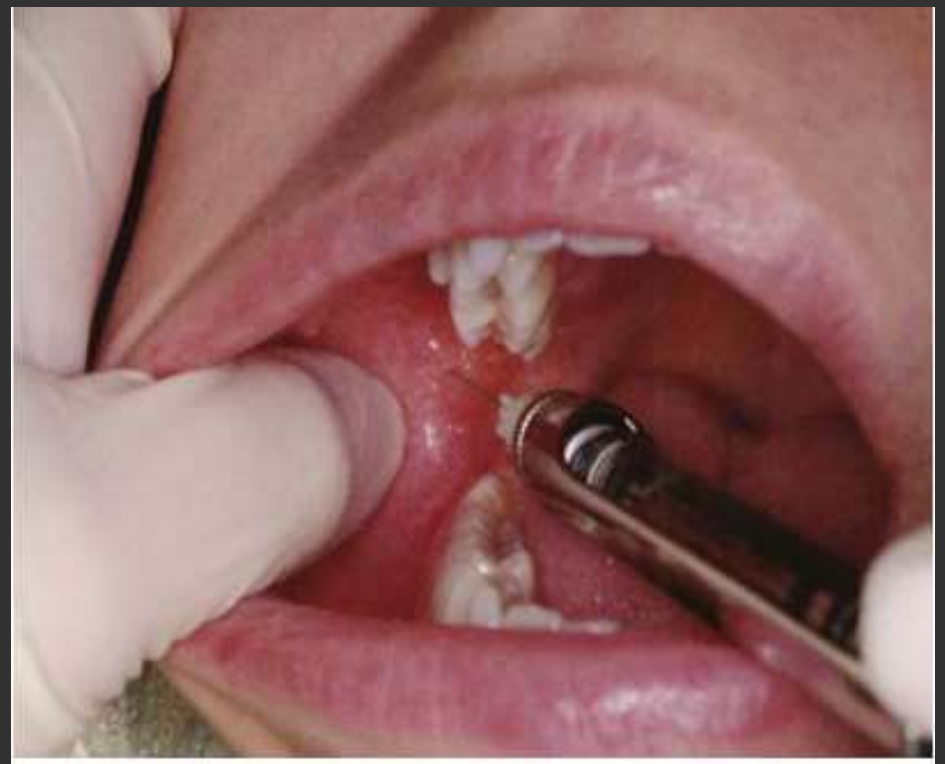


Fig. 14.5 Note the placement of the syringe barrel at the corner of the mouth, usually corresponding to the premolars. The needle tip gently touches the most distal end of the pterygomandibular raphe.



• **Fig. 14.4** Position of the administrator for a right inferior alveolar nerve block (A) and left inferior alveolar nerve block (B).



• **Fig. 14.8** Inferior alveolar nerve block. The depth of penetration is 20 to 25 mm (two-thirds to three-fourths the length of a long needle).

9. SYMPTOMS OF ANESTHESIA

a. Subjective symptoms Tingling and Numbness of the lower lip and half tongue
b. Objective symptoms. Instrumentation necessary to demonstrate absence of pain sensation.

Complications

1. Hematoma (rare): a. Swelling of tissues on the medial side of the mandibular ramus after the deposition of anesthetic. b. Management: apply pressure to the area for a minimum of 3 to 5 minutes.

2. Trismus: a. Muscle soreness or limited opening of mandible: i. A slight degree of soreness when opening the mandible is extremely common after IANB (after anesthesia has dissipated). ii. More severe soreness associated with limited mandibular opening is rare

3. Transient facial paralysis (facial nerve anesthesia): a. Produced by the deposition of local anesthetic into the body of the parotid gland, blocking cranial nerve VII (facial nerve), a motor nerve to the muscles of facial expression.

Signs and symptoms include an inability to close the lower eyelid and drooping of the upper lip on the affected side

Lingual nerve block

- 1. NERVES ANESTHETIZED : branches of the mandibular
- 2. AREAS ANESTHETIZED
- a. Anterior two thirds of the tongue and the floor of the oral cavity
- b. Mucosa and mucoperiosteum on the lingual side of the mandible
- 3. ANATOMICAL LANDMARKS. The landmarks are the same as those for the inferior alveolar nerve.
- 4. INDICATIONS. For surgical procedures of the anterior two thirds of the tongue, floor of the oral cavity, and mucous membrane on the lingual side of the mandible
- 5. TECHNIQUE: The technique is the same as that for the inferior alveolar nerve, as previously described.
- 6. SYMPTOMS OF ANESTHESIA
- a. Subjective symptoms. Tingling and numbness of anterior two thirdsof the tongue.
- b. Objective symptoms. Instrumentation necessary to demonstrate absence of pain sensation.

Buccinator (long buccal) nerve block

1. NERVES ANESTHETIZED. Buccinator nerve, a branch of the mandibular nerve.

2. AREAS ANESTHETIZED. Buccal mucous membrane and mucoperiosteum of the mandibular molar area.

3. ANATOMICAL LANDMARKS

a. External oblique ridge

b. Retromolar triangle

4. INDICATIONS. Surgery on the mandibular buccal mucosa and to sup-plement the inferior alveolar nerve block.

5. TECHNIQUE A 1-inch, 25-gauge needle is inserted into the buccal mucosa just distal to the third molar and 0.25 to 0.5 ml of solution is deposited in this area. An alternative technique is to insert theneedle and deposit the solution directly into the retromolar triangle

6. SYMPTOMS OF ANESTHESIA. No subjective symptoms; therefore, the area must be tested by instrumentation.

Mandibular nerve block or Gow gates

- In 1973 Gow-Gates described a true mandibular nerve or trigeminal division III block administered by means of the intraoral approach using Intraoral and extraoral landmarks to deposit the anesthetic solution at the neck of the condyle. A single anesthetic injection provides hard and soft tissue anesthesia of the mandible to the midline
- 1. NERVES ANESTHETIZED.

Mandibular nerve and its subdivisions, including the inferior alveolar, lingual, buccinator, incisive, mental, mylohyoid, and auriculotemporal nerves.

- 2. AREAS ANESTHETIZED.

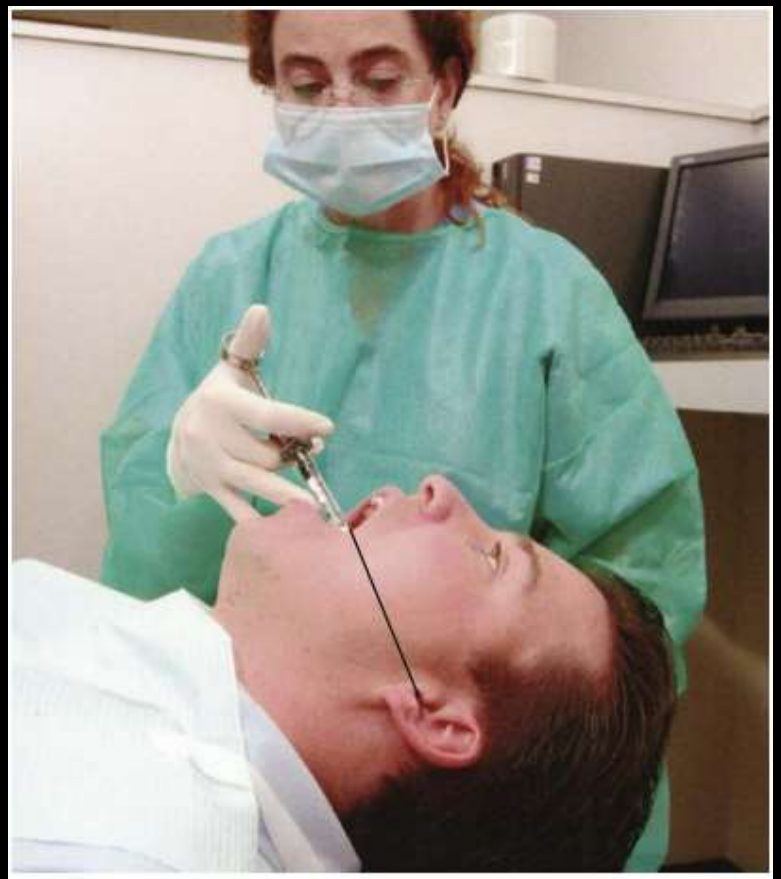
All mandibular hard and soft tissue to the midline, including the floor of the mouth and the anterior two thirds of the tongue, the lingual soft tissue and periosteum, the skin over the zygoma, the posterior portion of the cheek, the temporal region, and a portion of the external ear

3. ANATOMICAL LANDMARKS
a. Anterior border of the ramus
b. Tendon of temporal muscle
c. Corner of the mouth
d. Intertragic notch of the ear
e. External ear

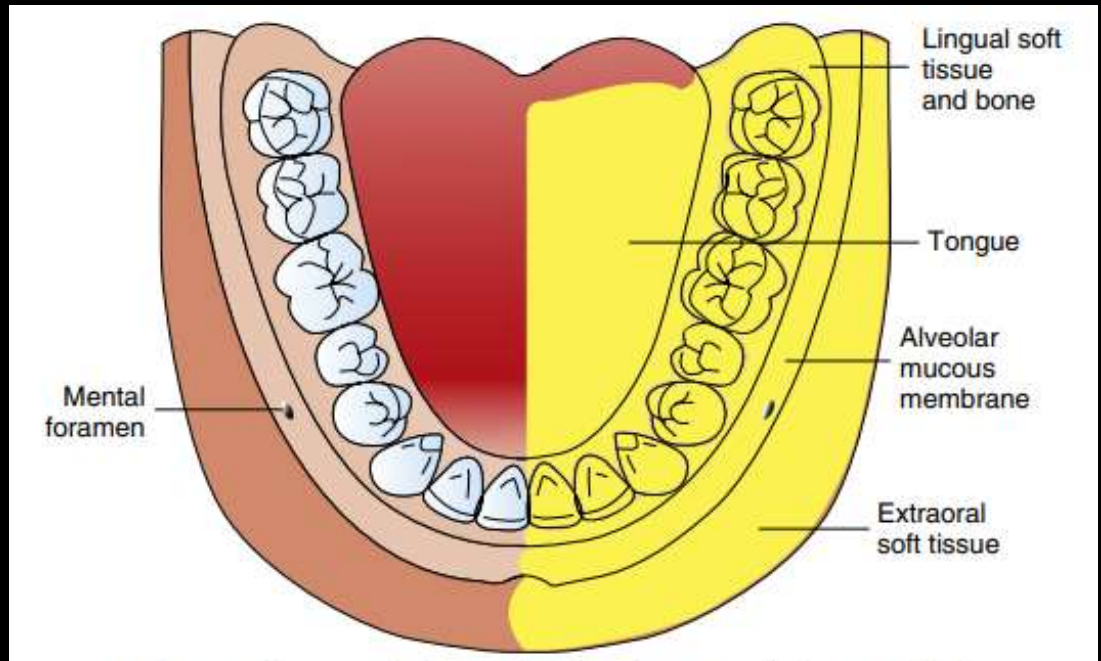
4.
INDICATIONS
a. Operative and surgical procedures on mandibular teeth.
b. When buccal and labial soft tissue anaesthesia from third molar to midline is necessary.
c. When lingual soft tissue anaesthesia is necessary.
d. Diagnostic and therapeutic purposes.

CONTRAINDICATIONS
1. Infection or acute inflammation in the area of injection (rare)
2. Patients who might bite their lip or their tongue, such as young children and physically or mentally handicapped adults
3. Patients who are unable to open their mouth wide (e.g., trismus)

5. NEEDLE PATHWAY DURING INSERTION. The patient's mouth is wide Open, and the needle is inserted at a point lateral to the pterygomandibular depression but medial to the temporal tendon on a plane from the corner of the mouth to the intertragic notch.

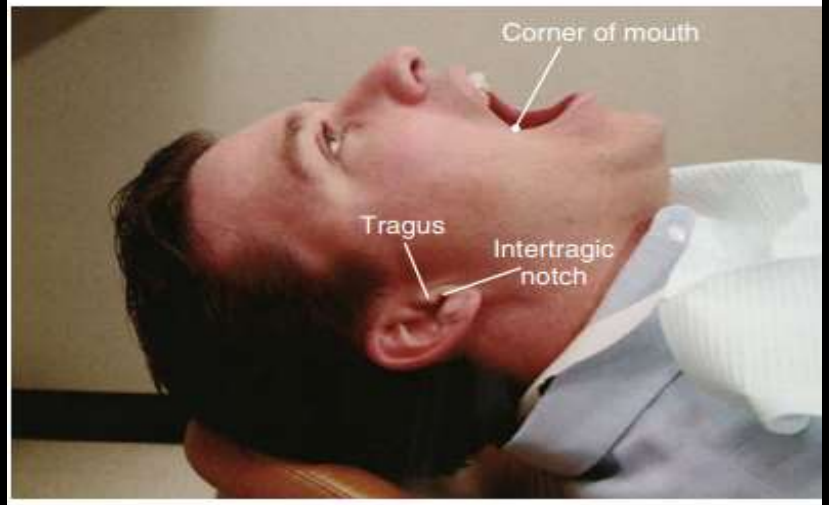


• **Fig. 14.21** The barrel of the syringe and the needle are held parallel to a line connecting the corner of the mouth and the intertragic notch.

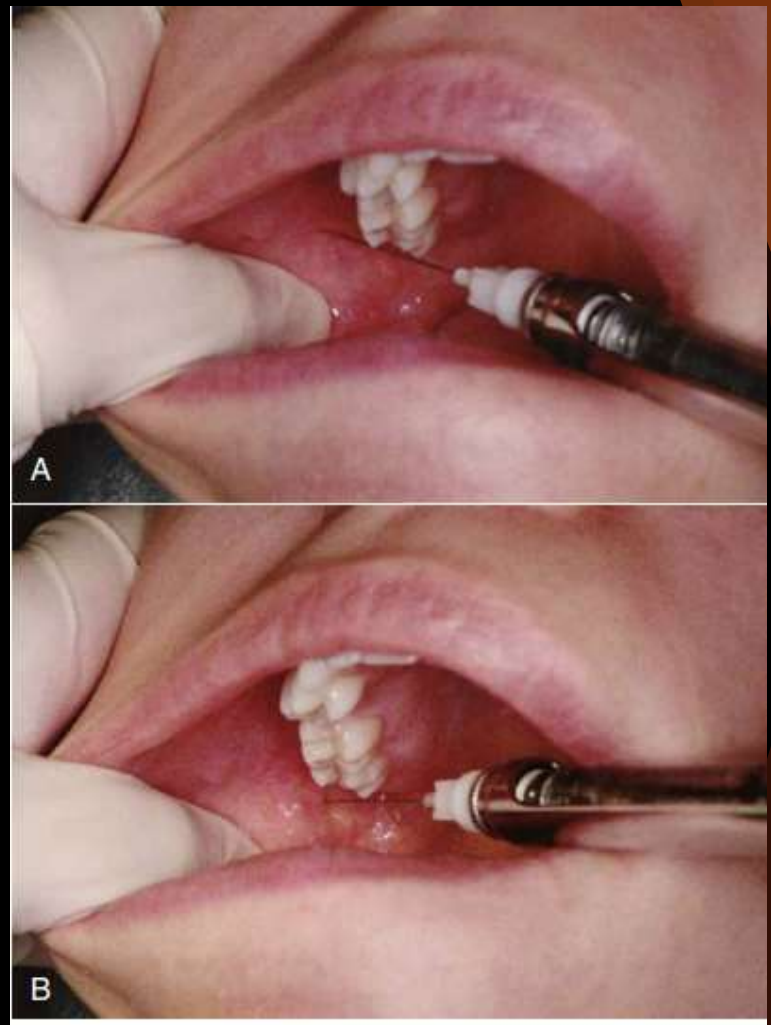


• **Fig. 14.16** Area anesthetized by the Gow-Gates mandibular nerve block.

• **Fig. 14.17** Target area for a Gow-Gates mandibular nerve block—neck of the condyle.



• **Fig. 14.18** Extraoral landmarks for a Gow-Gates mandibular nerve block.



• **Fig. 14.19** Intraoral landmarks for a Gow-Gates mandibular block. The tip of the needle is placed just below the mesiolingual cusp of the maxillary second molar (A) and is moved to a point just distal to the molar (B), maintaining the height established in the preceding step. This is the insertion point for the Gow-Gates mandibular nerve block.

7. TECHNIQUE FOR THE MANDIBULAR (GOW-GATES) BLOCK

a. Patient is placed in the supine position (although semi recumbent position may also be used.)
b. Operator is positioned to the right and slightly in front of patient.
c. Patient keeps mouth open widely and remains in that position until the injection is completed. This position moves the condyle anteriorly, thus facilitating the injection.
d. An imaginary line is drawn from the corner of the mouth to the intertragic notch of the ear.
e. The anterior border of the ramus is palpated, and the tendon of the temporal muscle is identified. Operator visually aligns the intraoral and extraoral landmarks, and the needle is introduced through the mucosa just medial to the temporal tendon and directed toward the target area on a line extending from the corner of the mouth to the intertragic notch. The degree of divergence of the external ear to the head is used as a guide to the lateral flare of the ramus. Needle insertion should parallel the degree of flare of the ear.
g. The needle should be advanced until the fovea region of the condylar neck is contacted. Depth of insertion should not exceed 25 to 27 mm.
h. If bone contact is not established, the needle should be withdrawn slightly and redirected after checking landmarks.
i. The entire contents of the dental cartridge should be injected only after establishing proper needle placement (for example, bone contact).

J. After the operator withdraws the needle, the patient is to keep the mouth open for 20 to 30 seconds to allow adequate bathing of the nerve trunk that has been straightened by opening the mouth.
k. Because of the large diameter of nerve trunk and distance from injection site (about 1 cm), onset of anesthesia will occur in 5 to7 minutes. A wavelike pattern of anesthesia starts in the ramus and progresses steadily forward to include the molars, premolars, and anterior teeth in sequence
L .Adequacy of aesthesia may be demonstrated by a tingling and numbness in the areas innervated by the mandibular nerve and its subdivisions as well as by the absence of pain on instrumentation.


Its primary advantage lies in the ability to produce anesthesia of the entire distribution of the mandibular nerve with a single needle penetration.


However, since the technique relies on soft tissue landmarks that may vary markedly from patient to patient, be easily distorted during the injections, or may be misinterpreted by the patient.

Signs and Symptoms	Subjective: Tingling or numbness of the lower lip, tongue
	Objective: Objective: no pain is felt during dental therapy
FAILURES	Too little volume. The greater diameter of the mandibular nerve may require a larger volume of anesthetic solution. Deposit up to 1.2 mL in a second injection if the depth of anesthesia is inadequate after the initial 1.8 mL.
	Anatomic difficulties. Do not deposit anesthetic unless bone is contacted.

Complications

1. Hematoma (<2% incidence of positive aspiration)

2. Trismus (extremely rare)

3. Temporary paralysis of cranial nerves III, IV, and VI. In a case of cranial nerve paralysis after a right Gow-Gates mandibular nerve block, diplopia, and complete paralysis of the right eye persisted for 20 minutes after the injection. This occurred after the accidental rapid intravenous administration of local anesthetic. The recommendations of Gow-Gates include placing the needle on the lateral side of the anterior surface of the condyle, aspirating carefully, and depositing local anesthetic solution slowly If bone is not contacted, anesthetic solution should not be administered.

4. Middle ear problems. Brodsky and Dower reported a case of transient middle ear problems following administration of the Gow-Gates mandibular nerve block. Over the course of 10 days, the patient complained of inner ear pressure, inability to equilibrate ear pressure, decreased hearing, pain, and severe headache before returning to normal without further complaints and complications. The cause of the complication was considered to be either hematoma, a technique problem causing trauma and inflammation, an anatomic variation, or any combination of these

Mental nerve block.

1.NERVES ANESTHETIZED. Mental nerve, a branch of the inferior alveolar nerve.

2. AREAS ANESTHETIZED

a. Lower lip

b. Mucous membrane in the mucolabial fold anterior to the mental foramen

3. ANATOMICAL LANDMARKS. Mandibular bicuspids, since the mental foramen usually lies at the apex and just anterior to the second bicuspid root.

4. INDICATIONS. For surgery on the lower lip or mucous membrane in the mucolabial fold anterior to the mental foramen when, for some reason, the inferior alveolar block is not indicated.

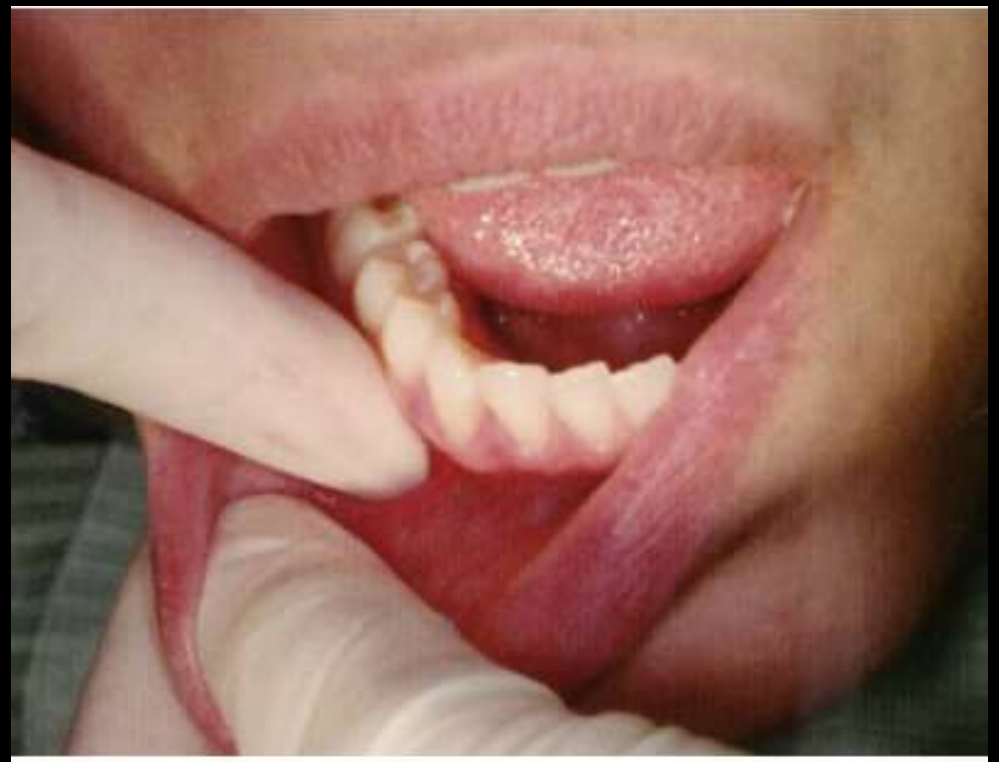
5. TECHNIQUE

a. The apices of the bicuspid teeth should be estimated

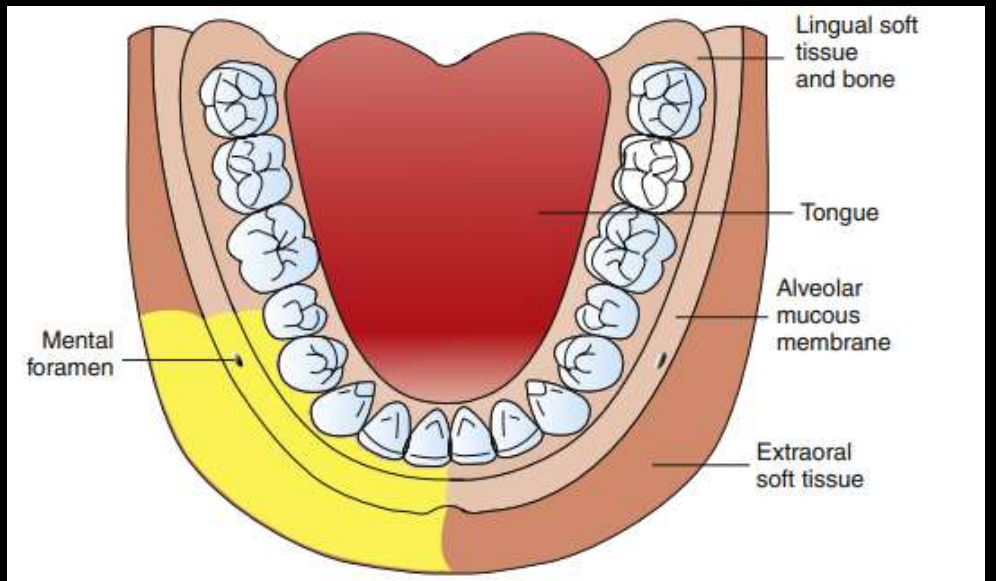
b. A 1-inch, 25-gauge needle should be inserted into the mucolabial fold after the cheek has been pulled to the buccal side The tissue is penetrated until the periosteum of the mandible is gently contacted slightly anterior to the apex of the second bicuspid

c. The solution, 0.5 to 1 ml, is slowly deposited in this area

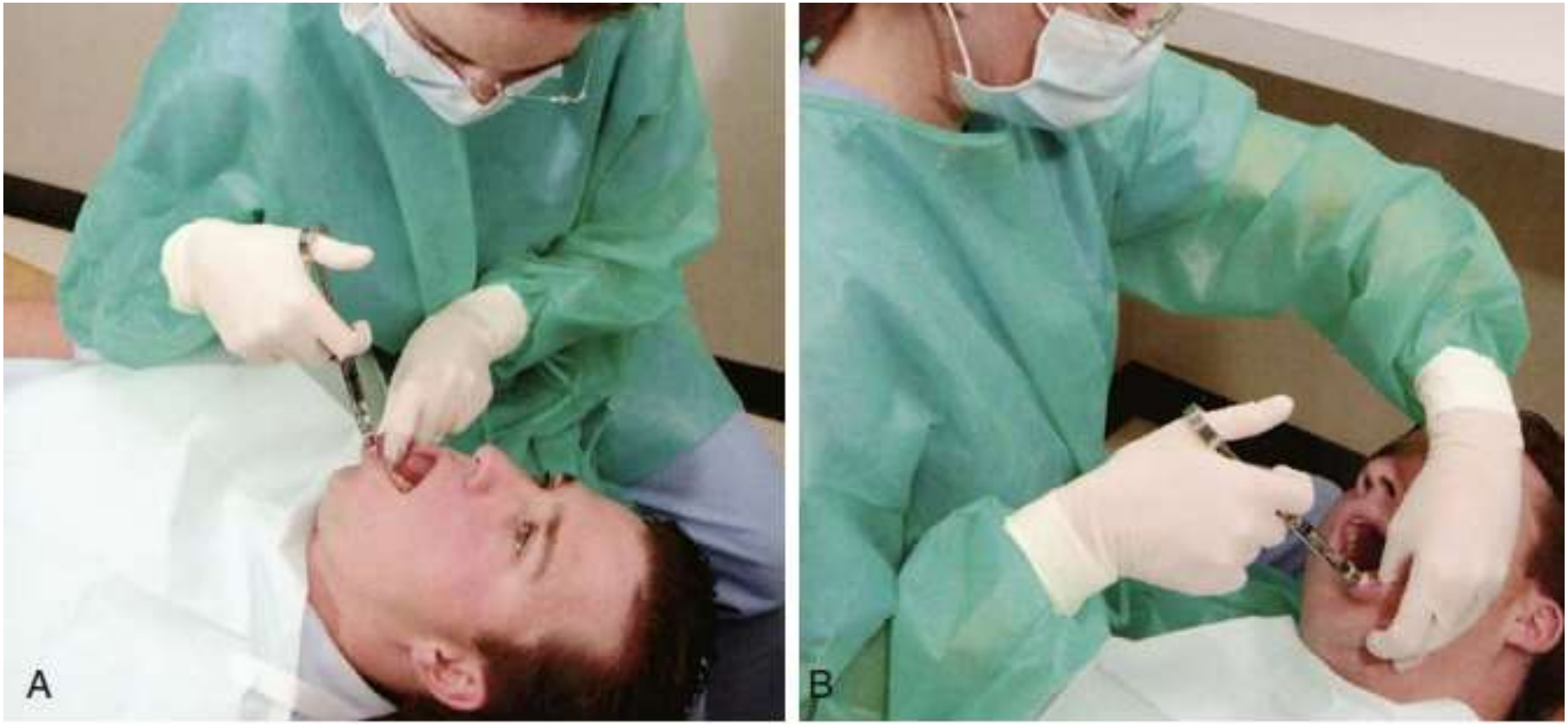
6. SYMPTOMS OF ANESTHESIA. Tingling and numbness of the lower lip on the injected side will resumeeritaks



• **Fig. 14.30** Locate the mental foramen by moving the fleshy pad of your finger anteriorly until the bone beneath becomes irregular and somewhat concave.



• **Fig. 14.28** Area anesthetized by mental nerve block.



• **Fig. 14.29** Position of the administrator for a right mental/incisive nerve block (A) and left mental/incisive nerve block (B).

COMPLICATIONS

1. Few of consequence.

2. Hematoma (bluish discoloration and tissue swelling at the injection site). Blood may exit the needle puncture point into the buccal fold. To treat this, apply pressure with gauze directly to the area of bleeding for at least 2 minutes

3. Paresthesia of lip and/or chin. Contact of the needle with the mental nerve as it exits the mental foramen may lead to the sensation of an “electric shock” or to various degrees of paresthesia (rare)

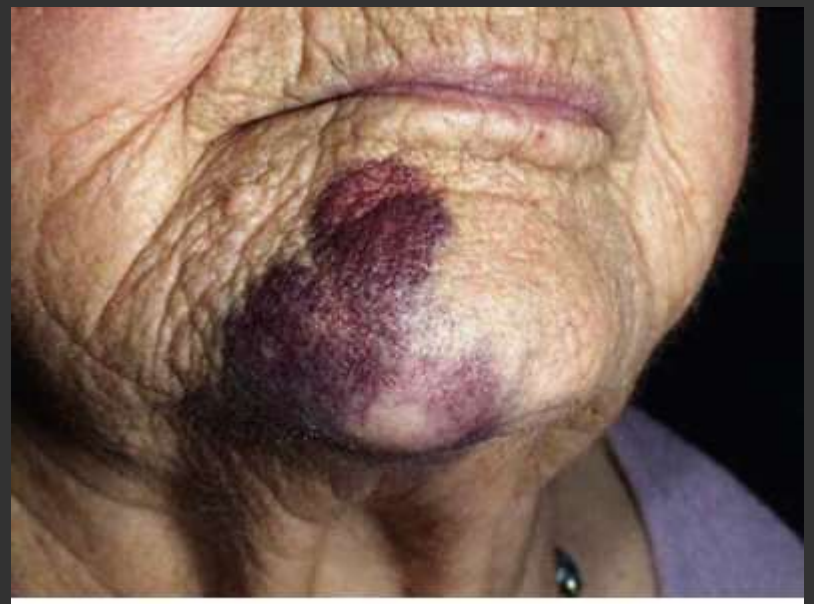


Fig. 14.37 Hematoma that developed after bilateral mental nerve blocks.

Vazirani-Akinosi Closed-Mouth Mandibular Block

In 1977, Dr. Joseph Akinosi reported on a closed-mouth approach to mandibular anaesthesia. Earlier, in 1960, Dr. Sundar Vazirani had published an article describing a technique that was quite similar to that of Akinoisi. Both are credited with this closed-mouth mandibular block technique, variously called the Akinosi-Vazirani technique or the Vazirani-Akinosi technique.

Its primary indication remains those situations where limited mandibular opening precludes the use of other mandibular injection techniques. Such situations include the presence of spasm of the muscles of mastication (trismus)

Other Common Names Akinosi technique

closed-mouth mandibular nerve block, tuberosity technique.

Nerves Anesthetized

1. Inferior alveolar nerve 2. Incisive nerve 3. Mental nerve 4. Lingual nerve 5. Mylohyoid nerve

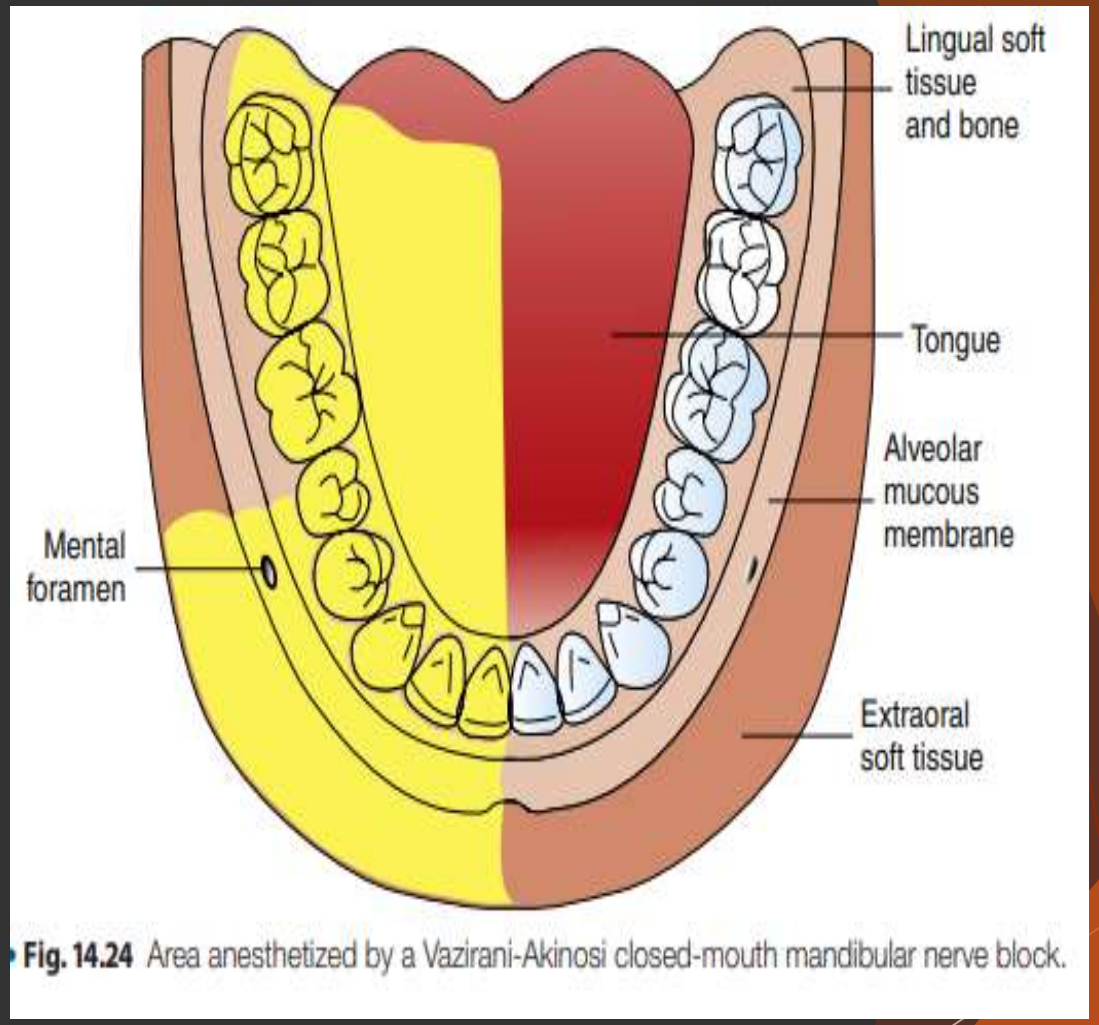


Fig. 14.24 Area anesthetized by a Vazirani-Akinosi closed-mouth mandibular nerve block.

Areas Anesthetized

1. Mandibular teeth to the midline

2. Body of the mandible and inferior portion of the ramus

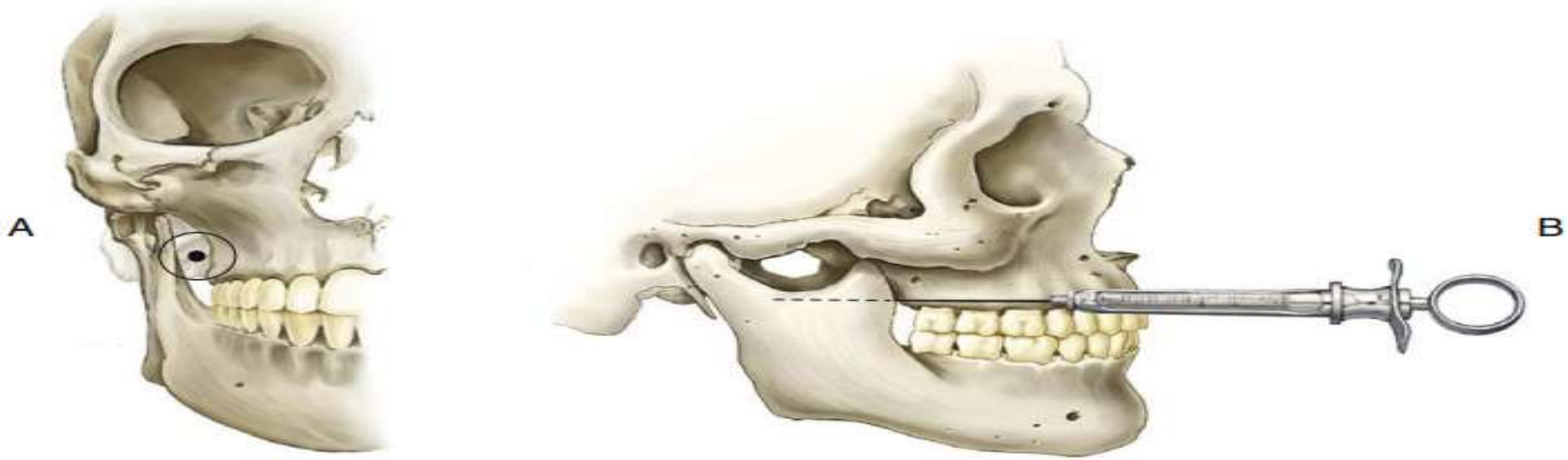
3. Buccal mucoperiosteum and mucous membrane anterior to the mental foramen

4. Anterior two-thirds of the tongue and floor of the oral cavity (lingual nerve)

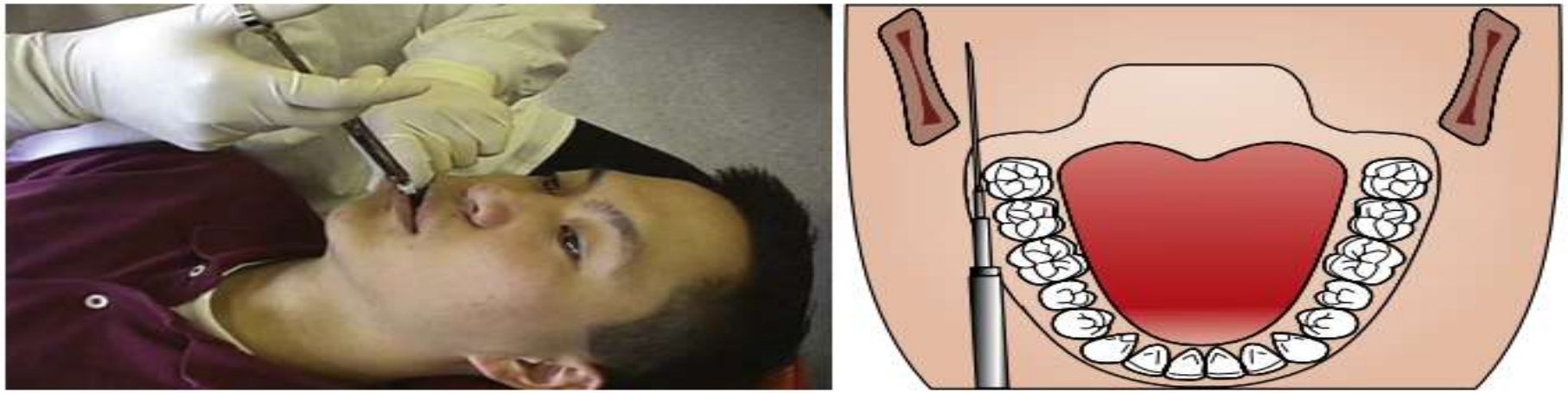
5. Lingual soft tissues and periosteum (lingual nerve)

- Indications 1. Limited mandibular opening 2. Multiple procedures on mandibular teeth 3. Inability to visualize landmarks for IANB (e.g., because of large tongue)
- Contraindications 1. Infection or acute inflammation in the area of injection (rare)
- 2. Patients who might bite their lip or their tongue, such as young children and physically or mentally handicapped adults
- 3. Inability to visualize or gain access to the lingual aspect of the ramus

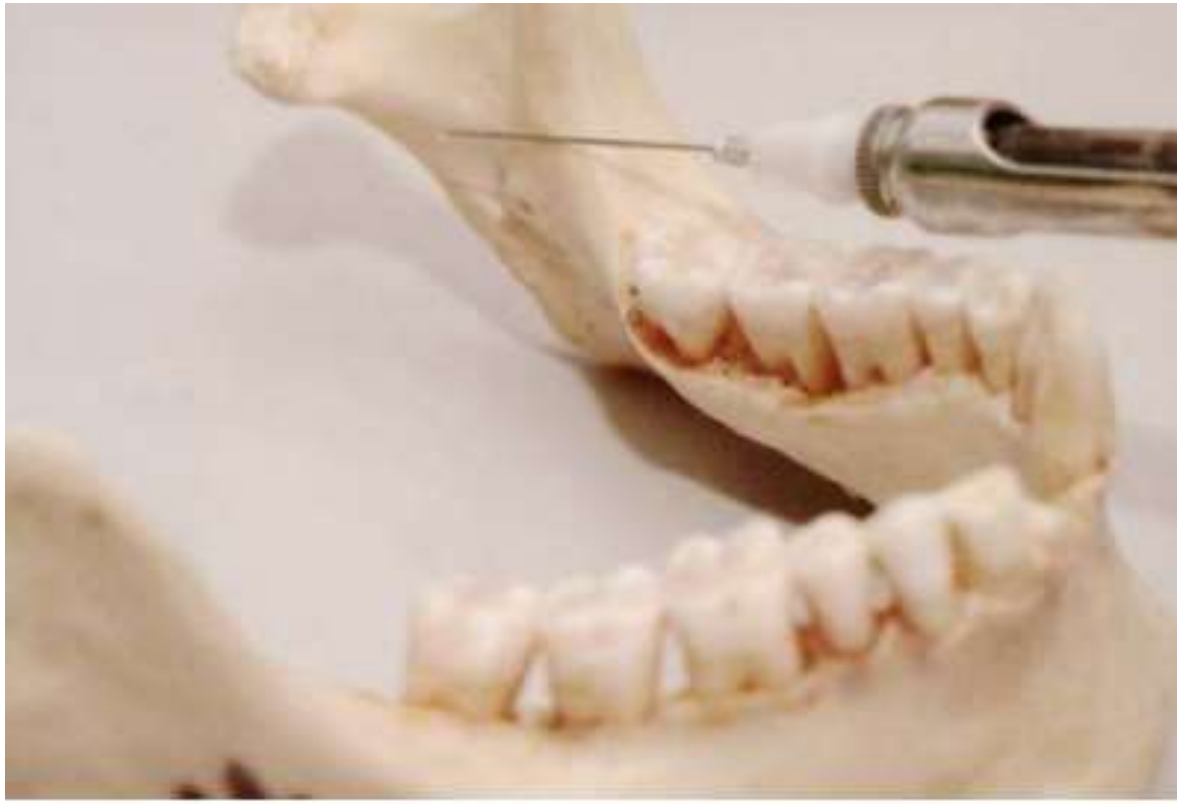
Technique 1. A 25-gauge long needle is recommended (although a 27-gauge long may be preferred in patients whose ramus flares laterally more than usual).
2. Area of insertion: soft tissue overlying the medial (lingual) border of the mandibular ramus directly adjacent to the maxillary tuberosity at the height of the mucogingival junction adjacent to the maxillary third molar
3. Target area: soft tissue on the medial (lingual) border of the ramus in the region of the inferior alveolar, lingual, and mylohyoid nerves as they run inferiorly from the foramen ovale toward the mandibular foramen (the height of injection with the Vazirani-Akinosi closed mouth mandibular nerve block being below that of the Gow-Gates mandibular nerve block but above that of the IANB).
4. Landmarks:
a. Mucogingival junction of the maxillary third (or second) molar.
b. Maxillary tuberosity.
c. Coronoid notch on the mandibular ramus.
5. Orientation of the bevel (bevel orientation in the closed mouth mandibular block is very important): the bevel must be oriented away from the bone of the mandibular ramus (e.g., bevel faces toward the midline



• **Fig. 14.25** (A) Area of needle insertion for a Vazirani-Akinosi closed-mouth mandibular nerve block. (B) Hold the syringe and needle at the height of the mucogingival junction above the maxillary third molar. (Redrawn from Gustainis JF, Peterson LJ: An alternative method of mandibular nerve block, *J Am Dent Assoc* 103:33–36, 1981.)



• **Fig. 14.26** **Vazirani-Akinosi closed-mouth mandibular nerve block.** The barrel of the syringe is held parallel to the maxillary occlusal plane with the needle at the level of the mucogingival junction of the second or third maxillary molar.



• **Fig. 14.27** Advance the needle posteriorly into tissues on the media side of the mandibular ramus.

6. Procedure:

a. Assume the correct position. For a right or a left Vazirani-Akinosi closed-mouth mandibular nerve block, a right-handed administrator should sit at the 8 o'clock position facing the patient.

b. Position the patient supine (recommended) or semisupine.

c. Place your left index finger or thumb on the coronoid notch, reflecting the tissues on the medial aspect of the ramus laterally. Reflecting the soft tissues aids in visualization of the injection site and decreases trauma during needle insertion.

d. Visualize landmarks: i. Mucogingival junction of the maxillary third or second molar. ii. Maxillary tuberosity.

e. Prepare the tissues at the site of penetration: i. Dry them with sterile gauze. ii. Apply topical antiseptic (optional). iii. Apply topical anesthetic for minimum of 1 minute.

f. Ask the patient to occlude his or her teeth gently with the cheeks and muscles of mastication relaxed.

g. Reflect the soft tissues on the medial border of the ramus laterally. If possible, use a mouth mirror to minimize the risk of accidental needlestick injury to the administrator.

h. The barrel of the syringe is held parallel to the maxillary occlusal plane, with the needle at the level of the mucogingival junction of the maxillary third (or second) molar .

i. Direct the needle posteriorly and slightly laterally, so it advances at a tangent to the posterior maxillary alveolar process and parallel to the maxillary occlusal plane.

j. Orient the bevel away from the mandibular ramus; thus as the needle advances through tissues, needle deflection occurs toward the ramus and the needle remains close to the IAN

k. Advance the needle 25 mm into tissue (for an average-sized adult). This distance is measured from the maxillary tuberosity. The tip of the needle should lie in the midportion of the pterygomandibular space, close to the branches of V3
l. Aspirate in two planes.
m. If negative, deposit 1.5 to 1.8 mL of anesthetic solution in approximately 60 seconds.
n. Withdraw the syringe slowly and immediately make the needle safe.
o. After the injection, return the patient to an upright or semi upright position.
p. Motor nerve paralysis develops as quickly as, if not more quickly than, sensory anesthesia. The patient with trismus begins to notice increased ability to open the jaws shortly after the deposition of anesthetic.
q. Anesthesia of the lip and tongue is noted to start in about in 1 to 1.5 minutes; the dental procedure can usually start within 5 minutes.
r. When motor paralysis is present but sensory anesthesia is inadequate to permit the dental procedure to begin, since the patient can now open his or her jaw, perform an IANB, Gow-Gates mandibular nerve block, incisive nerve block, PDL, or intraosseous injection or infiltrate articaine hydrochloride into the buccal fold adjacent to the tooth to be treated

Signs and Symptoms

Subjective: Tingling or numbness of the lower lip ,tongue
Objective: No pain is felt during dental therapy

Complications

1. Hematoma
2. Trismus (rare)
3. Transient facial nerve (VII) paralysis:
   a. This is caused by over insertion and injection of the local anesthetic solution into the body of the parotid gland.
   b. It can be prevented by modification of the depth of needle penetration based on the length of the mandibular ramus. The 25-mm depth of penetration is average for a normal-sized adult.


Thank you
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