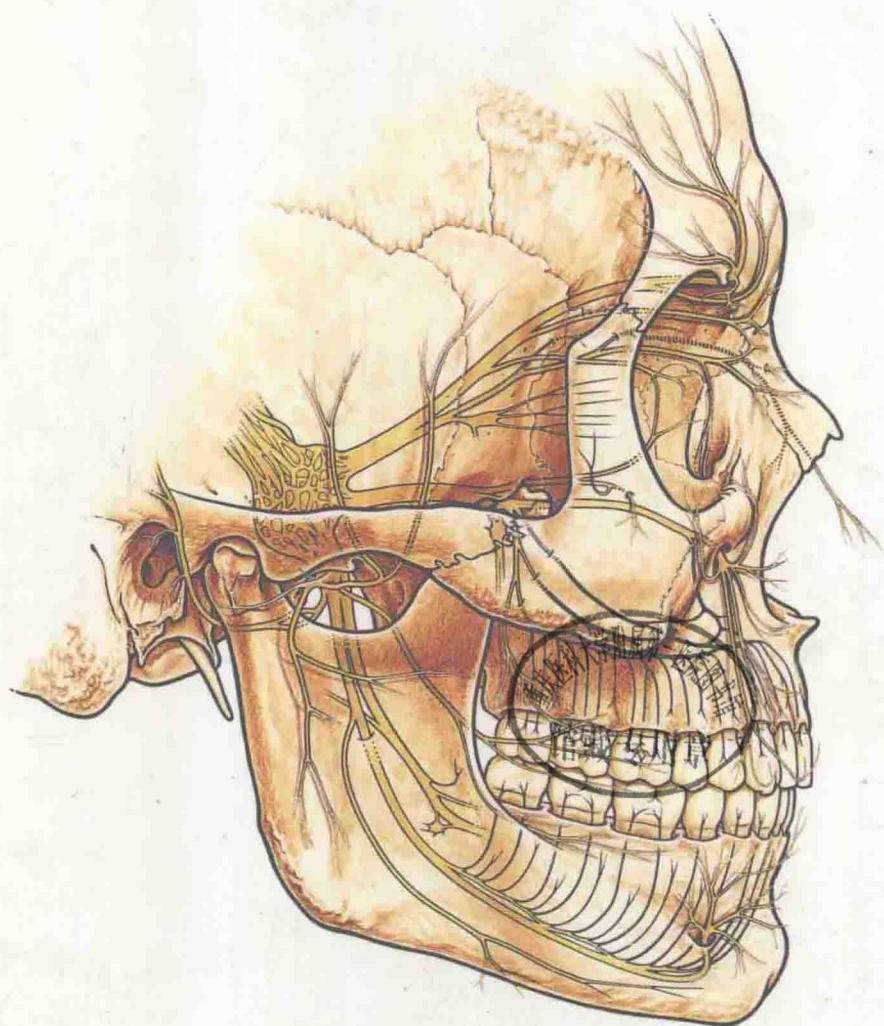


Introduction to Dental Local Anaesthesia

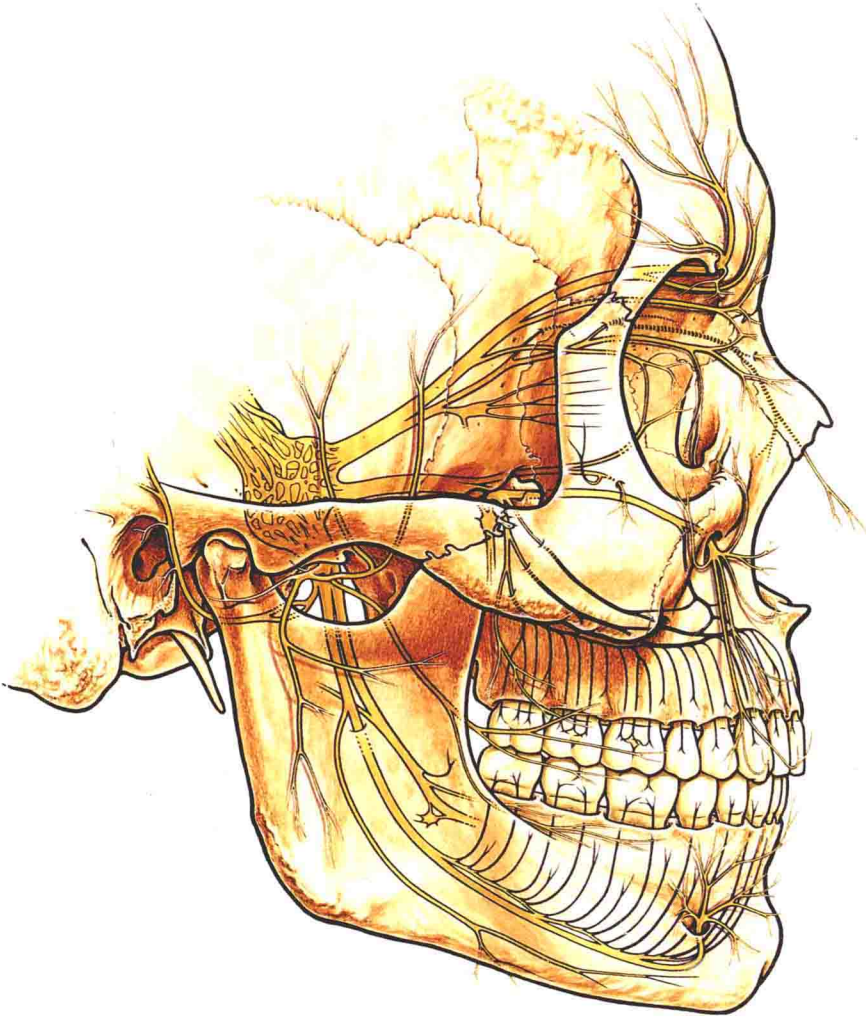


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+ Introduction to Dental Local Anaesthesia

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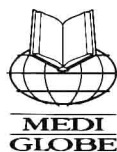
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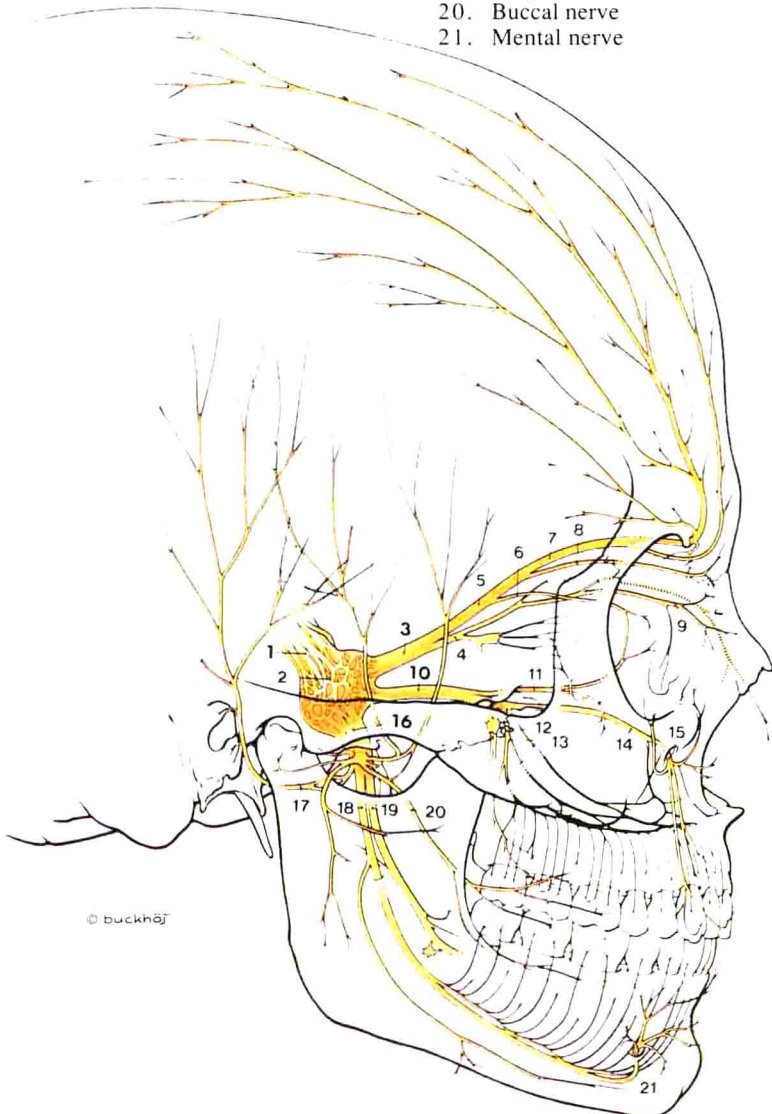
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Trigeminal nerve

The *trigeminal nerve* is predominantly sensory, and the cell bodies of these sensory fibres form the semilunar ganglion (the Gasserian ganglion), which lies in Meckel's cavity in the bottom of the middle cranial fossa. Three large trunks originate from the ganglion: the *maxillary nerve*, the *ophthalmic nerve*, and the *mandibular nerve* (*Inferior alveolar nerve*)(Fig 1).

Fig. 1.

1. Trigeminal nerve
2. Trigeminal (Gasserian) ganglion
3. Ophthalmic nerve
4. Nasociliary nerve
5. Supraorbital nerve
6. Lacrimal nerve
7. Frontal nerve
8. Supratrochlear nerve
9. Infratrochlear nerve
10. Maxillary nerve
11. Zygomatic nerve
12. Middle superior alveolar nerve
13. Posterior superior alveolar nerve
14. Anterior superior alveolar nerve
15. Infraorbital nerve
16. Mandibular nerve
17. Auriculotemporal nerve
18. Mandibular nerve (Inferior alveolar nerve)
19. Lingual nerve
20. Buccal nerve
21. Mental nerve



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Maxillary nerve

The *maxillary nerve*, exclusively sensory, passes through the foramen rotundum to reach the pterygopalatine fossa, where it gives off a number of branches. Two branches enter the sphenopalatine ganglion, and come to form the *greater palatine nerve*, the *nasopalatine nerve*, and *posterior nasal nerve* twigs. Just before it enters the infraorbital canal, the maxillary nerve trunk gives off the *zygomatic nerve* which passes anteriorly and laterally, and the *descending posterior superior alveolar branches* (Fig. 1).

Infraorbital nerve

Anterior superior alveolar nerve twigs leave the trunk just before the exit of the infraorbital foramen, and outside the foramen twigs to the skin between the nostril and the eye (Fig. 1).

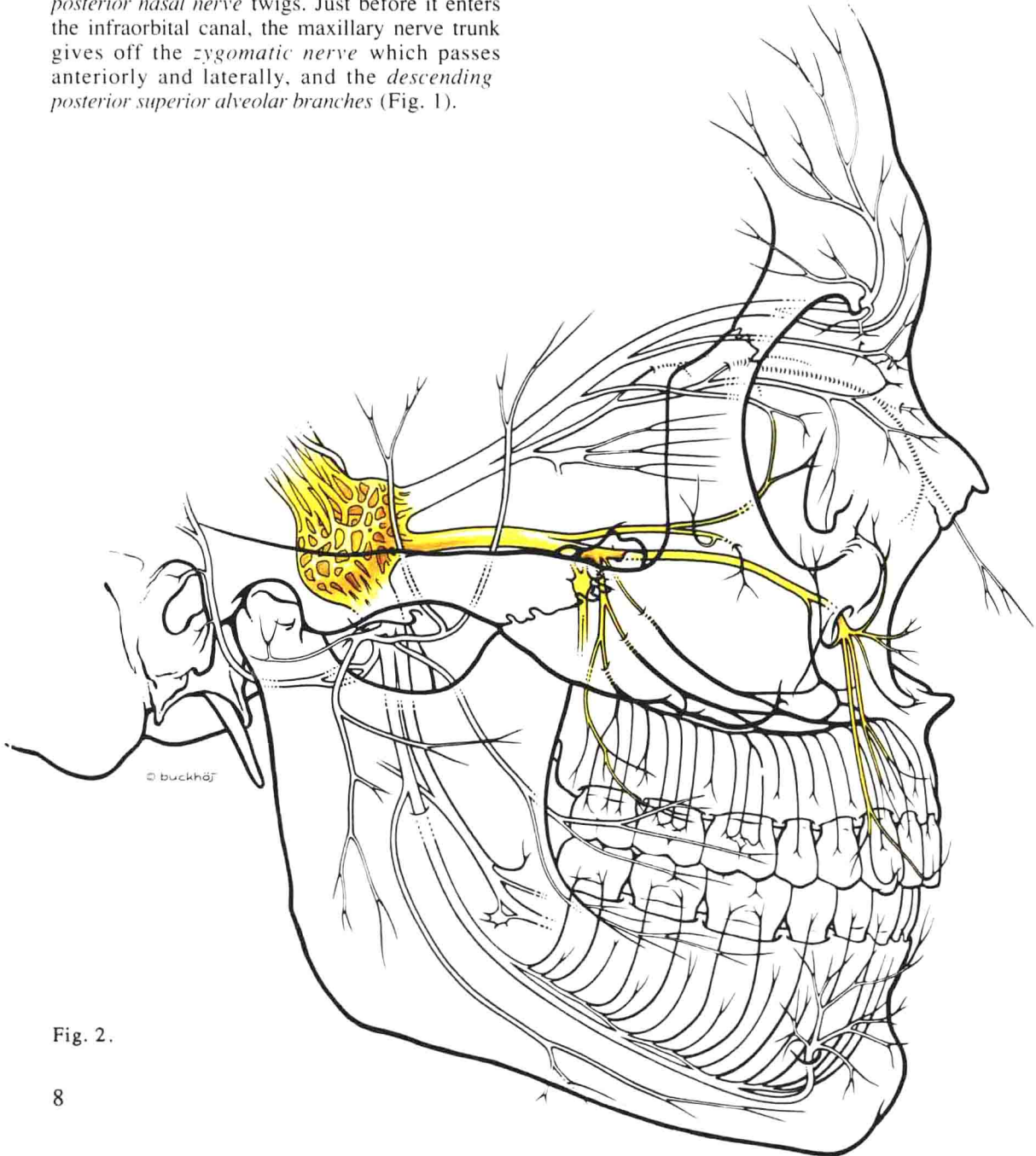


Fig. 2.

The superior dental plexus

The *superior dental plexus* is formed by the *superior posterior and anterior alveolar branches*. The teeth and the buccal gingiva of the upper jaw are innervated by this plexus. Sometimes an irregular branch - the *middle superior alveolar branch* - is also present (Fig. 2).

One of the *posterior alveolar branches* passes downward on the surface of the maxillary bone to the gingiva of the buccal side of the molar region. The posterior part of the mucous membrane of the cheek is also innervated by this branch (Fig. 3).

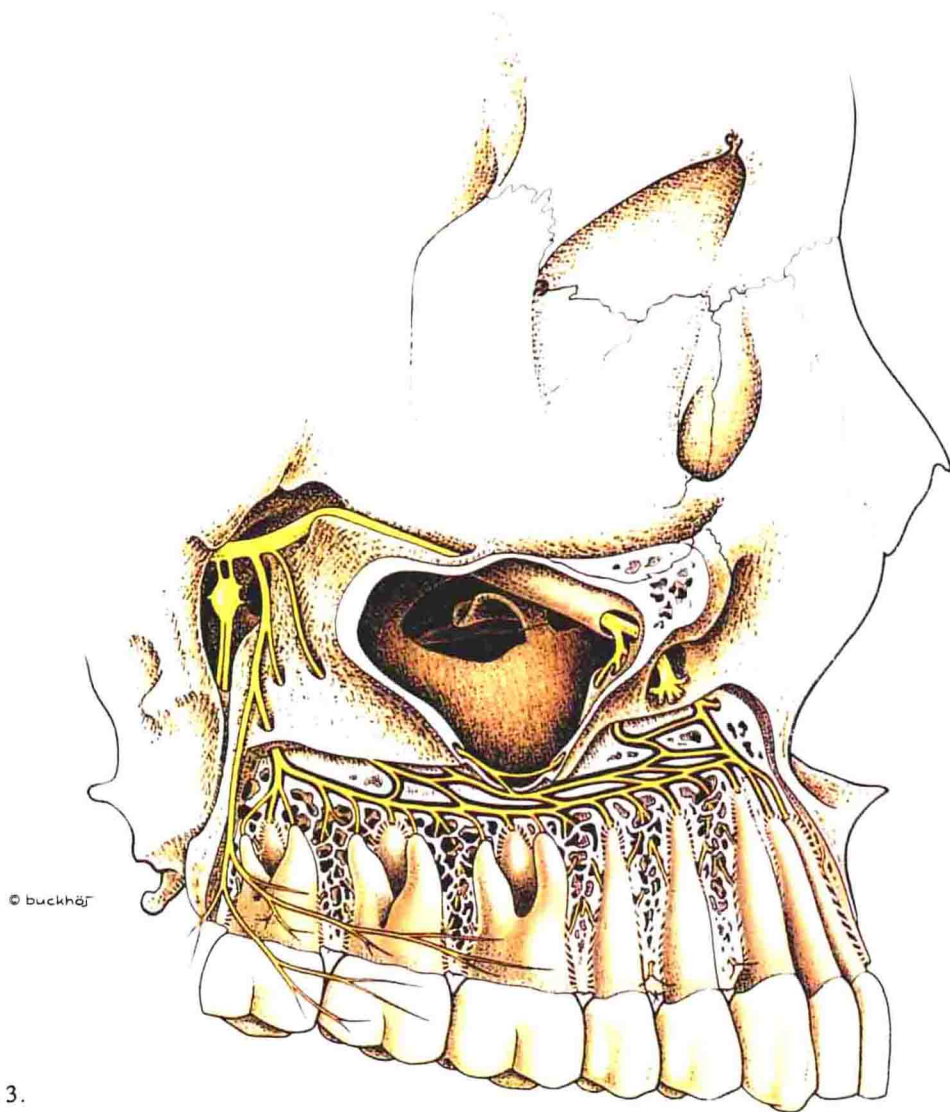


Fig. 3.

Superior gingival branches from the *superior dental plexus* penetrate the bone and supply the interdental papillae, the periodontal ligament and the buccal gingiva.

Nasopalatine nerve

The *nasopalatine nerve* leaves the *sphenopalatine ganglion* through the sphenopalatine foramen. It passes forward and downward on the nasal septum to reach the incisal canal, where it gives off its terminal branches. The mucous membrane and gingiva in the anterior part of the hard plate are innervated by the nasopalatine nerve (Fig. 4).

Greater palatine nerve

The *greater palatine nerve* leaves the *sphenopalatine ganglion* and descends through the greater palatine canal to emerge from the greater palatine foramen. The posterior part of the mucous membrane of the hard plate and the palatal gingiva are innervated by this nerve (Fig. 4).

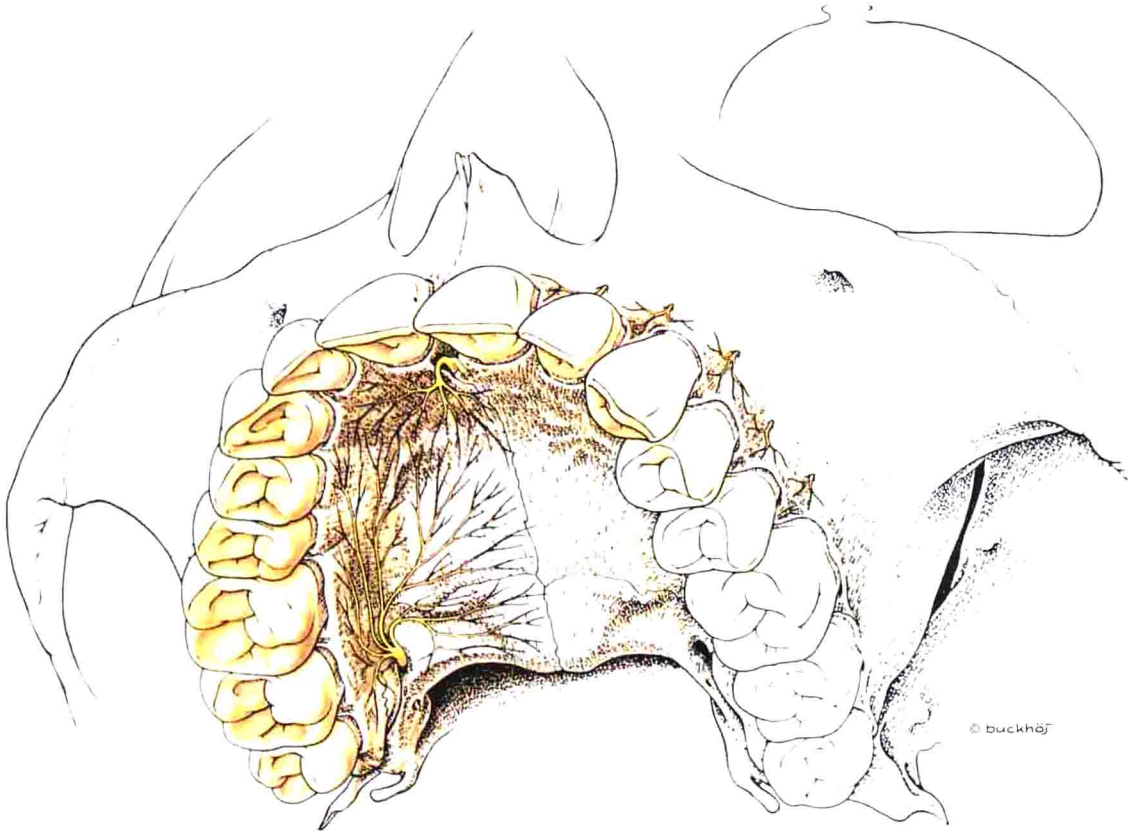


Fig. 4.

Zygomatic nerve

The *zygomatic nerve* enters the orbital cavity via the inferior orbital fissure. It runs along the lateral wall of the orbital cavity and divides into two branches. These branches penetrate the bone to reach the skin over the anterior temple and the lateral angle of the eye. The zygomatic nerve communicates with the *lacrimal nerve* (Fig. 5).

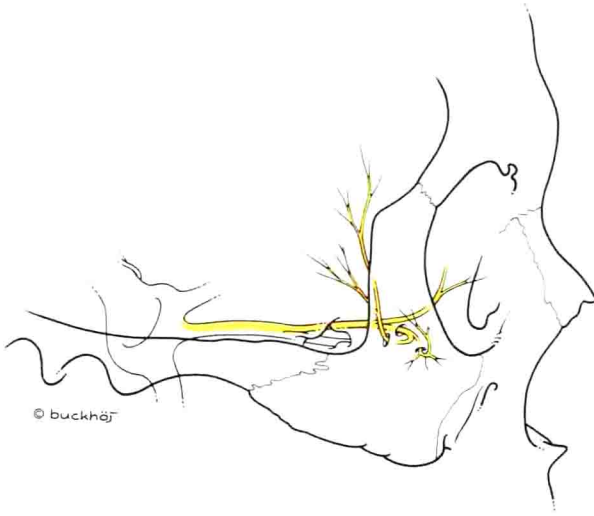
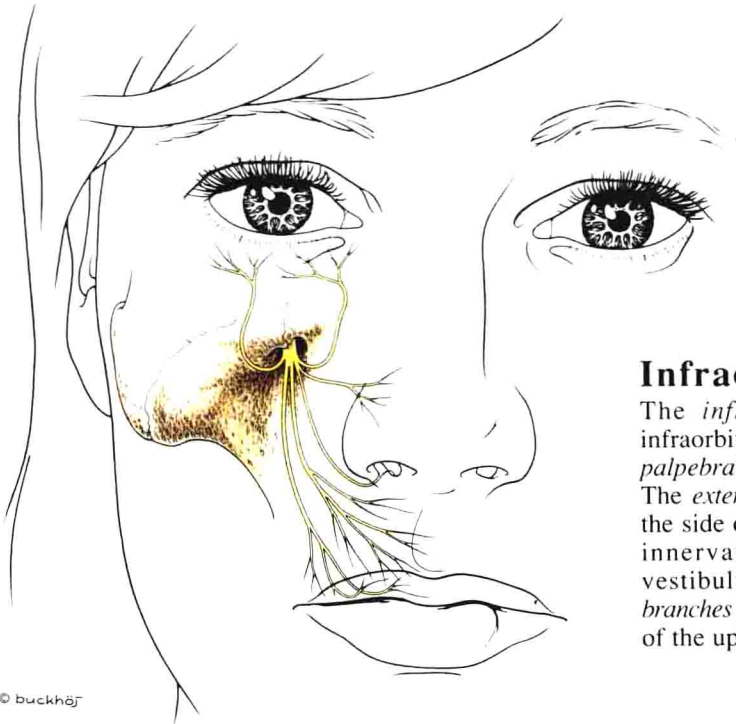


Fig. 5.

Fig. 6.



Infraorbital nerve

The *infraorbital nerve* emerges from the infraorbital foramen and ramifies. The *inferior palpebral branches* innervate the lower eyelid. The *external nasal branches* pass to the skin on the side of the nose. The *internal nasal branches* innervate the mucous membrane of the vestibulum of the nose. The *superior labial branches* pass to the skin and mucous membrane of the upper lip (Fig. 6).

Ophthalmic nerve

The *ophthalmic nerve* is purely sensory. It enters the orbit via the superior orbital fissure and then forms three branches, the *lacrimal nerve*, the *nasociliary nerve*, and the *frontal nerve* (Fig. 1).

Lacrimal nerve

The *lacrimal nerve* courses in an supero- anterolateral direction to reach the lacrimal gland. It also innervates the conjunctiva and the skin of the lateral angle of the eye (Fig. 7).

Postganglionic secretory fibres from the sphenopalatine ganglion reach the lacrimal nerve via a communicating branch of the zygomatic nerve.

Nasociliary nerve

The *nasociliary nerve* crosses the orbital cavity in an anteromedial direction toward the medial orbital wall. The *terminal branches* innervate the mucous membrane of the superoanterior part of the nasal cavity and the skin between the nose and the medial angle of the eye (Fig. 7).

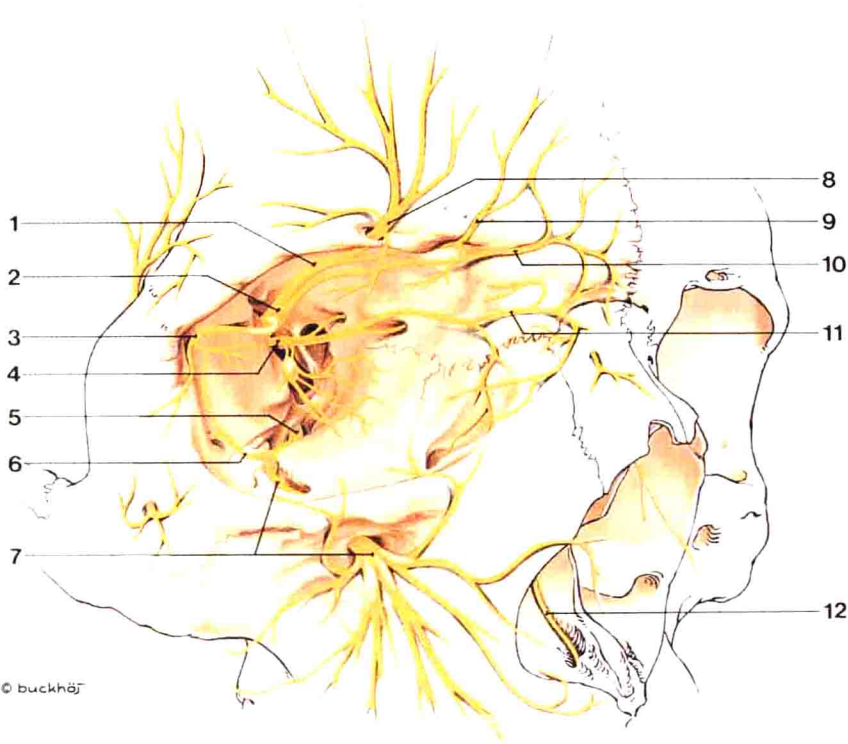
Frontal nerve

The *frontal nerve* continues in the direction of the *ophthalmic nerve trunk*. It divides in the orbital cavity. The largest branch (the *supra-orbital nerve*) the orbit to supply the skin of the upper eyelid, the forehead and the anterior scalp region. The *supratrochlear nerve* leaves the frontal nerve deep in the orbit and approaches the upper medial angle of the orbit and innervates the upper eyelid and the forehead (Fig. 7).

Fig. 7.

1. Supraorbital nerve
2. Frontal nerve
3. Lacrimal nerve
4. Nasociliary nerve
5. Maxillary nerve
6. Zygomatic nerve
7. Infraorbital nerve
8. Lateral branch of the frontal nerve
9. Medial branch of the frontal nerve
10. Supratrochlear nerve
11. Infratrochlear nerve
12. Nasopalatine nerve

Fig. 7.



Mandibular nerve

The *mandibular nerve* is a mixed nerve, though mainly sensory. It reaches the infratemporal fossa via the foramen ovale. Motor branches for the muscles of mastication leave the trunk in the fossa. The nerve then gives off several sensory branches (Fig. 8).

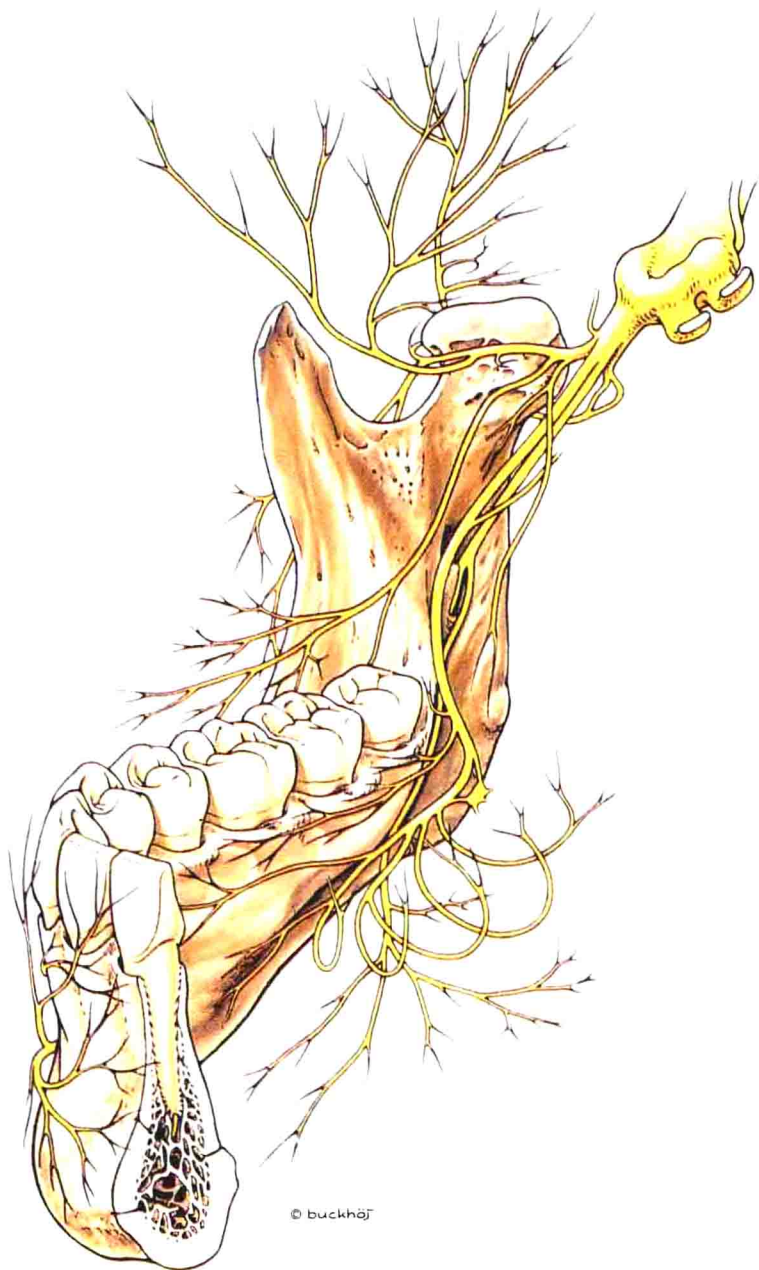


Fig. 8.

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Auriculotemporal nerve

The *auriculotemporal nerve* leaves the main trunk medial to the neck of the mandibular condyle, passes behind the condyle up to supply the external auditory canal and the skin of the anterior aspect of the temple (Fig. 10).

Buccal and deep temporal nerves

The *buccal nerve* and the *deep temporal nerves* leave the mandibular nerve together, and pass upwards to innervate the anterior and posterior aspects of the temporalis muscle (Fig. 10).

Masseter nerve

The *masseter nerve* passes in front of the temporo-mandibular articulation and enters the masseter muscle (Fig. 10).

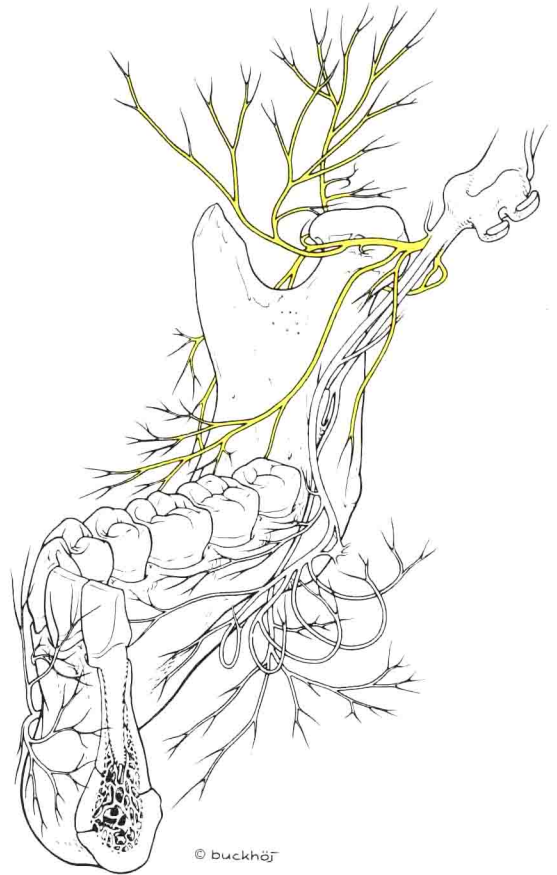
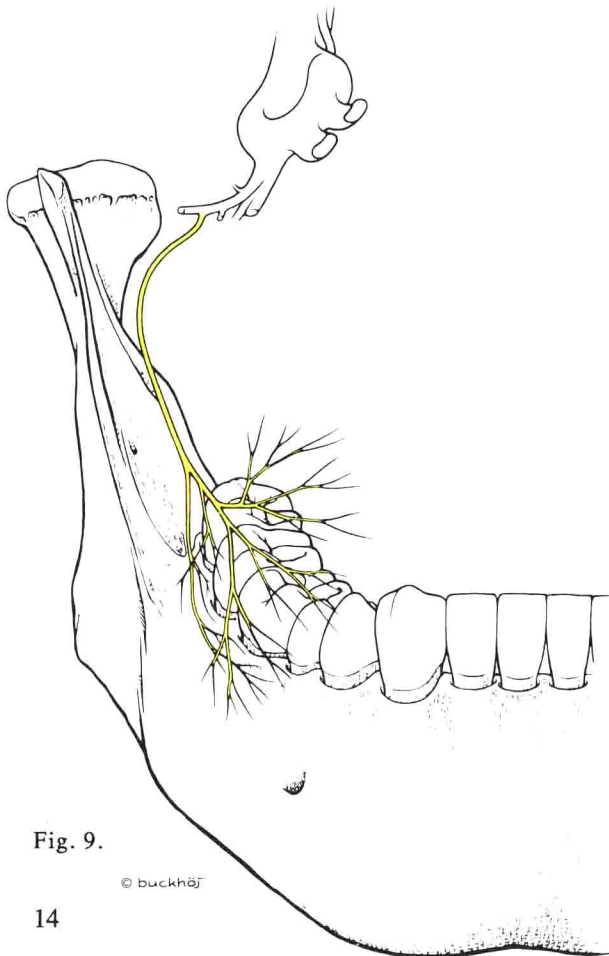


Fig. 10.

Buccal nerve

The *buccal nerve*, which is a sensory branch, passes along the medial side of the mandibular ramus anterior to the inferior alveolar nerve. It then crosses the anterior border of the mandibular ramus and ramifies. The branches innervate the buccal gingiva between the second premolar and the second molar.

Inferior alveolar nerve

The *inferior alveolar nerve* passes downward along the medial side of the mandibular ramus to the mandibular foramen. In the mandibular canal the nerve gives off branches which form the inferior dental plexus from which branches innervate the teeth and gingiva of the lower jaw.

Before the nerve enters the mandibular foramen it gives off the *mylohyoid branch*, which continues along the mandibular ramus. The mylohyoid muscle and the anterior belly of the digastric muscle receive motor fibres from this mixed nerve branch (Fig. 12).

Mental nerve

The *inferior alveolar nerve* gives off a branch in the mandibular canal - the *mental nerve* - which passes through the mental foramen to innervate the bucal gingiva between the midline and the second premolar, and the skin of the lower lip and chin (Fig. 11).

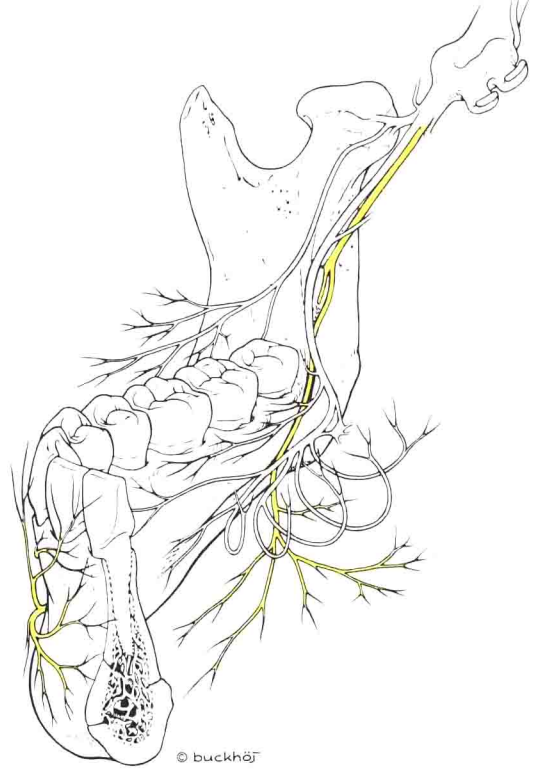


Fig. 12.

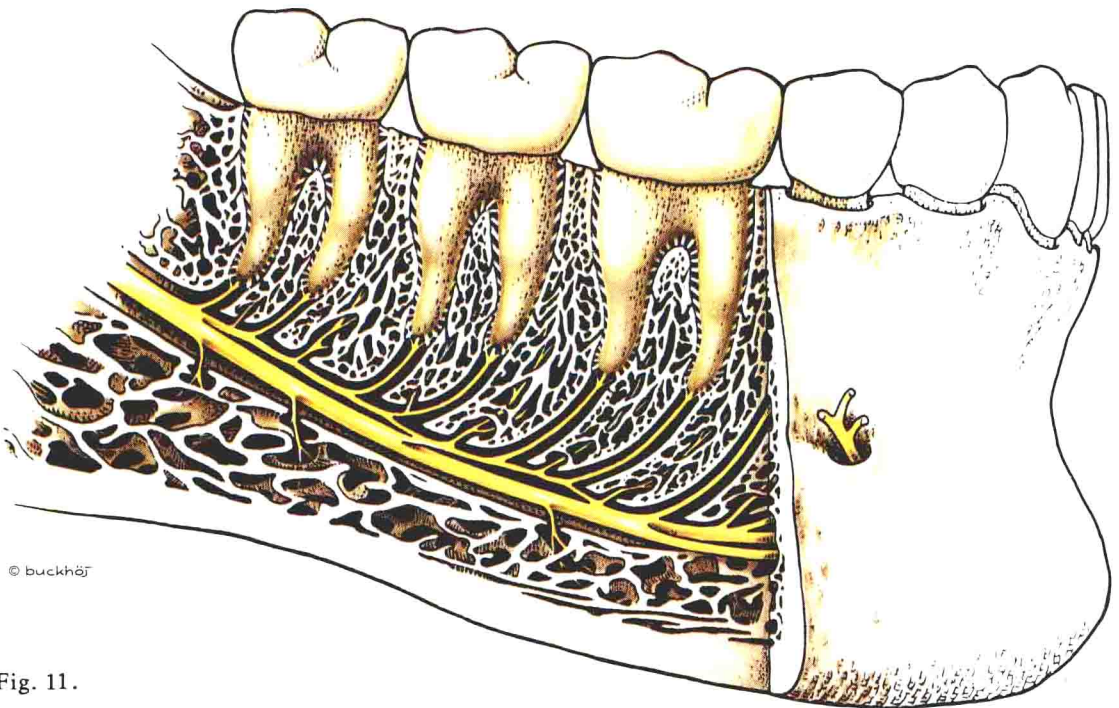


Fig. 11.

Lingual nerve

The *lingual nerve* passes downwards together with the inferior alveolar nerve, and communicates with the *chorda tympani of the facial nerve* just before reaching the mandibular foramen. This connection gives off secretory fibres to the submandibular and sublingual gland via the submandibular ganglion and special sensory fibres to the taste buds on the tongue.

The trunk of the lingual nerve gives off small branches to the lingual gingiva in the molar region. The lingual gingiva of the anterior aspect of the lower jaw, and the mucosa of the floor of the mouth are supplied by the *sublingual nerve*, a branch of the lingual nerve. The terminal branches of the lingual nerve enter the tongue and innervate the corpus linguae (Fig. 13).

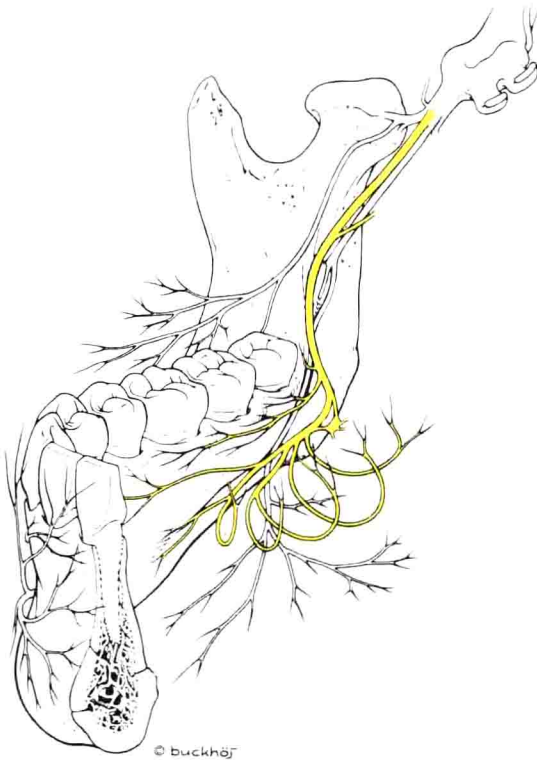


Fig. 13.