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Case Report
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Ocular complications after posterior superior alveolar nerve block: a case of trochlear nerve palsy

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Abstract. Many intraoperative complications occurring during third molar surgery are described in the literature. Unilateral trochlear nerve palsy secondary to dental anaesthesia is a rare complication. We report the case of a 36-year-old healthy man, ASA I classification, requiring upper third molar extraction. Articaine 1:200,000 epinephrine for right posterior superior alveolar (PSA) nerve block was administered locally in the mucobuccal fold above the upper third molar. A few minutes after PSA nerve block the patient experienced double-vision. The patient was subsequently visited by an ophthalmologist and the condition was diagnosed as transient unilateral vertical diplopia due to temporary paralysis of the superior oblique muscle as a result of the anaesthetic solution involving the IV cranial nerve. The authors report this unusual case and discuss the possible anatomical pathways that might explain this rare phenomenon.

Key words: diplopia; local anaesthesia; anaesthetic injection; posterior superior alveolar nerve; third molar; trochlear nerve; palsy; ophthalmologic complications; ocular complications.

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Local anaesthetic drugs are routinely used for oral and maxillofacial procedures all over the world. Despite proper tissue preparation, careful patient evaluation, and appropriate anaesthesia techniques, local and/or systemic complications associated with local anaesthesia occasionally occur.

Among ocular complications, diplopia, amaurosis, ptosis, mydriasis, and loss of accommodations have been reported.

Such complications usually occur after an inferior alveolar nerve (IAN) block or posterior superior alveolar (PSA) nerve block.[1] The most common ocular complication, as reported by many authors, is probably diplopia, caused by involvement of the cerebral regions.[2] However, clinicians have only sometimes been able to precisely explain the route of spread of the anaesthetic solution. Abducens nerve involvement has been proposed as the aetiology of diplopia by some authors.[3]

We report a case of an iatrogenic palsy of the ocular superior oblique muscle that occurred following local anaesthetic injection for a maxillary third molar extraction. The possible pathways of the anaesthetic solution are discussed.

Case report

A 36-year-old white man, ASA I classification, referred himself to a dentist for maxillary right third molar removal. The tooth was exposed through the mucosa and the patient referred to mild pain in the area of the upper right third molar. After presurgery preparations and panoramic radiography, the patient was submitted to the surgical procedure. Right PSA nerve block was administered with one articaine 1:200,000 epinephrine cartridge in the mucobuccal fold above the third molar; a half-cartridge was used for the greater palatine nerve. A short time later the patient reported anaesthesia in the distribution areas of the right PSA nerve and described symptoms of 'double-vision'. The patient's vital signs were stable and

there was no shortness of breath, no blanching of the facial skin, and no cardiac palpitations. No signs of facial nerve lesions were present, and there were no signs of loss of sensation in the trigeminal divisions V1 and V3 bilaterally and V2 on the patient's left side. The surgical intervention was suspended. One hour later the patient was visited by an ophthalmologist who performed a full ocular examination.

The ocular examination revealed pupils equally round and reactive to light, with normal visual acuity and full extraocular movements in all directions. There was no evidence of ptosis, proptosis, conjunctivitis, or epiphora. A cover test was positive both on near and distant fixation, and the Titmus stereo test result was normal. Further physical examination of the head and neck revealed a compensatory position of the head of the patient, the Bielschowsky head tilt,[4] lowering of the chin with rotation and tilt of the head towards the healthy side. Hence a vertical diplopia due to right superior oblique muscle palsy caused by the anaesthetic solution involving the right trochlear nerve was assumed. The patient recovered within 2 h after the injection and was subsequently visited the following day and 7 and 30 days afterwards; no ocular motility dysfunctions were present on these control visits.

Discussion

Unilateral trochlear nerve palsy secondary to dental anaesthesia is a rare complication.

The diagnosis of unilateral trochlear nerve palsy is based on acute onset vertical deviation that increases in the contralateral side gaze, down gaze, and ipsilateral head-tilt, with excyclodeviation (outwards eyeball rotation). Both excyclodeviation and vertical deviation decrease in head tilt. To detect excyclodeviation the clinician must ask the patient whether there is a tilted double image in the down gaze.[5]

The trochlear nerve is the fourth cranial nerve that innervates the superior oblique muscle. Actions of this muscle are: eyeball intorsion in the sagittal plane, eyeball depression in the horizontal plane, and some abduction. The force of the tendon's pull has two components: a medial one that tends to rotate the top of the eyeball towards the nose (intorsion) and a forward one that tends to pull the eyeball downwards (depression).

Among cranial nerves, the trochlear nerve is the smallest in terms of the number of axons it contains, has the greatest intracranial length, is the only cranial

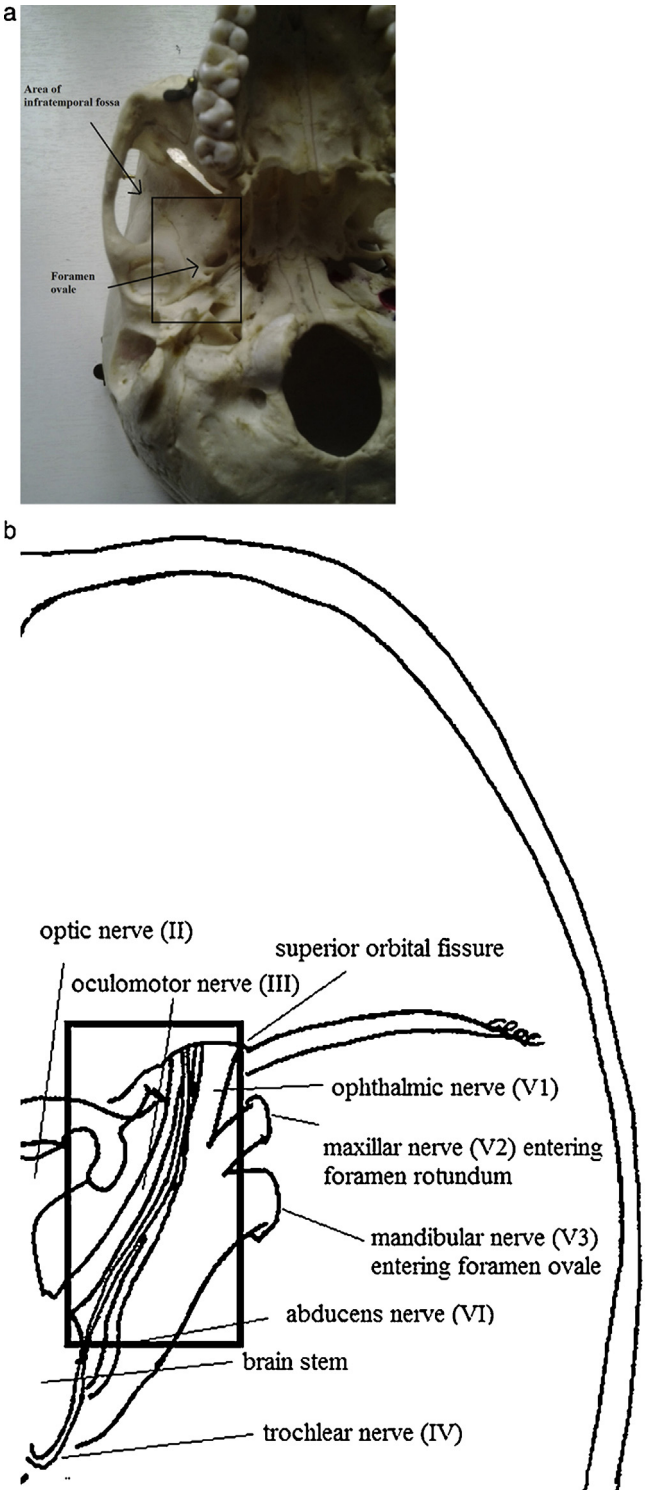

Fig. 1. (A) The rectangle approximates the infratemporal fossa, where the pterygoid venous plexus would be found; the pterygoid plexus may provide retrograde flow by the foramen ovale into the cavernous sinus. (B) The cavernous sinus is located in the middle cranial fossa (rectangle approximates its location) where it surrounds the described cranial nerves, including the trochlear nerve–the cranial nerve with the smallest diameter.