

An unusual complication of an inferior dental nerve block: a case report

R. Paul,¹ R. Anand,² P. Wray,³ S. D'sa⁴ and P. A. Brennan⁵

IN BRIEF

- Presents a neurovascular complication of an inferior dental nerve block.
- Discusses the possible cause of this complication.
- Reassures dental practitioners about this type of complication and how to manage it.

Local anaesthetic drugs are commonly used in dental practice, with few complications. We describe an unusual complication of an inferior dental nerve block where, as the needle was advanced through the mucosa, the patient experienced profound numbness and skin pallor in the distribution of the infra-orbital nerve. We discuss the possible mechanism for this complication.

INTRODUCTION

Local anaesthetics are commonly used in dental practice, with few complications. Local complications may be due to direct nerve damage by the needle and include paraesthesia, trismus, haematoma formation and needle breakage.¹ The systemic complications are most likely to be related to toxicity as a result of excessive administration, and rarely allergy.²

We describe a previously unreported complication of profound, immediate numbness and marked pallor of the cheek in the anatomical distribution of the infra-orbital nerve, which occurred during the administration of an inferior dental block (IDB). Intra-orally the mucosa of the hard and soft palate also had some mild pallor. We discuss the case and propose some mechanisms for its occurrence.

CASE REPORT

A 44-year-old gentleman attended the maxillofacial unit for removal of a mandibular right third molar. His past

medical history was unremarkable. The dental panoramic tomogram (DPT) did not show any obviously unusual anatomy in the region of the lingula. An aspirating syringe with a 27 gauge long needle was used to administer the IDB. Prior to injection, the plunger of the syringe was withdrawn (the syringe was the barb type which was inserted into the solid silicone bung of the cartridge). The needle was advanced through the mucosa to the proposed injection site. Following aspiration and prior to injection of lidocaine 2% with 1:80,000 adrenaline solution, the patient experienced a sudden, sharp, shooting pain over the right infra-orbital area and the side of the tongue. The needle was withdrawn and the injection was performed again after a few minutes. Clinically, the skin over the distribution of the right infra-orbital area became markedly pale within 3-4 seconds of this shooting pain and the patient experienced profound anaesthesia in that area (Fig. 1) in addition to the right side of the tongue. The right buccal mucosa remained the same colour as before the injection but the hard and soft palate did show some pallor, although this was not as pronounced as the cheek skin. After a few minutes, the local anaesthetic took effect, and the tooth was surgically removed without complications. The infra-orbital symptoms and pallor of the cheek and palate resolved over the next 30 minutes.

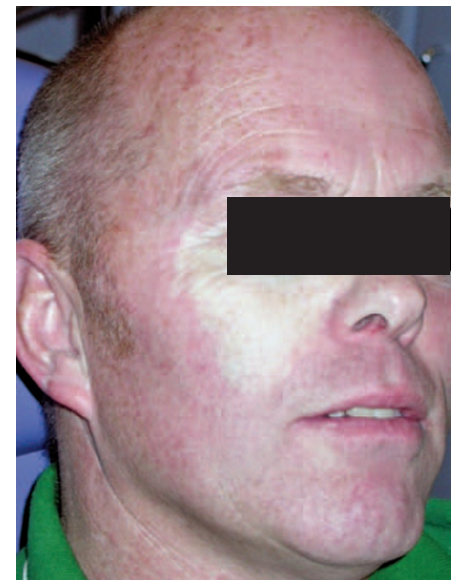


Fig. 1 Marked skin pallor in the distribution of the right infra-orbital nerve

DISCUSSION

To our knowledge, this reaction has not been previously reported. It is difficult to explain these findings, especially as no local anaesthetic solution was injected prior to the event. Two cases of abducent nerve palsy following an inferior alveolar nerve block have been reported before.^{3,4} This was attributed to the use of a non-aspirating syringe, and an intra-vascular injection may have occurred.³ In addition to altered nerve sensation, permanent loss of vision has been reported.⁵ A case of a high IDB (Gow Gate technique) was reported during which the patient experienced a burning sensation around the right eye and

¹Senior House Officer, ²Specialist Registrar, ⁵Consultant Maxillofacial Surgeon, Professor of Surgery, Maxillofacial Unit, Queen Alexandra Hospital, Portsmouth, PO6 3LY; ³General Dental Practitioner, Andover, Wiltshire

*Correspondence to: Professor P. A. Brennan
Email: hif1@btinternet.com

Refereed Paper

Accepted 22 September 2008

DOI: 10.1038/sj.bdj.2008.1120

©British Dental Journal 2009; 206: 9-10

the infra-orbital region.⁶ When altered sensation or even anaesthesia around the eye area does occur unexpectedly as in this case, it would be safe and sensible practice to test the conjunctiva (using a small piece of cotton wool) and document the findings. When reduced sensation is found (by comparing it to the other side), the patient should be advised to take care with the eye and should be provided with an eye patch until normal sensation is regained a few hours later.

The infra-temporal fossa is highly vascular and as well as the many branches of the maxillary artery, there are also a large number of venous networks. Intravascular injection of local anaesthetic solution into the maxillary artery itself would be one reason why the cheek might go pale during an inferior alveolar nerve block, although this would not explain the sudden pain and subsequent paraesthesia in the distribution of the infra orbital nerve found in our case.

The infra-orbital nerves and blood vessels run close together within a bony canal for much of the way through the maxilla (exiting through the infra-orbital foramen). It is possible that the vasa nervorum (the small blood vessels that supply nerves) underwent vasoconstriction as well, resulting in temporary ischaemia to the nerve trunk, which manifested as sudden pain and then numbness. The mucosa of the hard and soft palate on the same side as the injection also had some mild pallor. These areas are supplied respectively by the greater and lesser palatine arteries, which are branches of the maxillary artery. This finding is suggestive that the mechanism was due to vasospasm of the

maxillary artery and its branches. One possible explanation is that the needle tip touched the artery, and this provoked sudden and profound vasospasm.

When giving an IDB, it is important to aspirate before any solution is deposited in an attempt to confirm that the needle tip is not in a blood vessel. However, the needle tip may only have to move 1-2 mm to subsequently enter a vessel and there is evidence that the force required for subsequent aspirations may be higher than that at the first attempt.⁷ The thumb of the operator is usually placed on the plunger for control. It is therefore possible for a small amount of solution to be injected unknowingly as a result of gentle pressure on the plunger. Furthermore, although initial aspiration may suggest that the needle tip is not in a vessel, it is quite possible for this to change during the administration of the local anaesthetic solution. It is likely that this can be expected to occur far more commonly in dental practice than is given credit.

It is possible that the needle touched the lingual nerve and retrograde nerve conduction occurred, passing proximally to the trigeminal ganglion, followed by an anterograde response along the maxillary division. Vasoconstriction occurs following a sympathetic response, although these nerves run along the maxillary artery. It is possible there might be some neural connection between the trigeminal nerve and branches of the sympathetic chain although this is unproven. In any event, the symptoms and the skin colour in the infra-orbital region resolved in 30 minutes. The mandibular anaesthesia lasted a further two hours.

When faced with an unexpected complication during the administration of an IDB, the dental practitioner should immediately stop administration of the local anaesthetic and withdraw the needle. If pallor is noted in the distribution of the palate as well as the cheek, this would imply vasoconstriction of the maxillary artery, and that an intra-vascular (most likely an intra-arterial) injection has occurred. Fortunately, small volumes of dental local anaesthetic drugs generally have little or no adverse effects when injected into a vessel, and the incidence of this unexpected route of administration is probably far more common than we are led to believe.

CONCLUSION

Although these reactions to local anaesthetic are uncommon in dental practice, they are probably under reported. These signs and symptoms may be alarming for both the patient and dental practitioner, but reassurance is all that is required as they are self limiting with no long-term neurological sequelae.

1. Ethunandan M, Tran A L, Anand R, Bowden J *et al*. Needle breakage following inferior alveolar nerve block: implications and management. *Br Dent J* 2007; **202**: 395-397.
2. Malamed S F. The possible secondary effects in cases of local anaesthesia. *Rev Belge Med Dent*: 2000; **55**: 19-28.
3. Marinho R O M. Abducent nerve palsy following dental local analgesia. *Br Dent J* 1995; **179**: 69-70.
4. Dean M C. Diplopia following ID block. *Br Dent J* 2007; **202**: 237.
5. Walsh F, Hoyt W. *Clinical neuro-ophthalmology*, 3rd ed. pp 2501-2502. Baltimore: Williams & Wilkins, 1969.
6. Dryden J. An unusual complication resulting from a Gow-Gates mandibular block. *Compendium* 1993; **14**: 94-98.
7. Meechan J G, Ramacciato J C, McCabe J F. A comparison of the aspirating abilities of re-usable and partly disposable dental cartridge syringes in vitro. *J Dent* 2006; **34**: 41-47.