

## CLINICAL AID

# Avoiding the Mental Foramen during Periapical Surgery

Julian R. D. Moiseiwitsch, BDS

**Many endodontists avoid surgical procedures in proximity to the mental foramen. Although a healthy respect for regional anatomy is important, this should not be at the expense of failing to offer the most appropriate endodontic care. When correct preoperative diagnostic and surgical techniques are used, serious negative sequelae are rarely encountered. Three simple steps used during presurgical diagnosis, flap design, and surgery are presented to increase the practitioner's confidence and safety while performing mandibular periapical surgery.**

The mental foramen allows one of the terminal branches of the inferior alveolar nerve to exit the body of the mandible to supply sensory innervation to the lower lip. It is important, presurgically, to know the location of this foramen to prevent confusion with bony pathosis and avoid damaging the neurovascular bundle during invasive procedures in this region.

As a profession, we sometimes shy away when periapical surgery is indicated, especially in the lower premolar region (1). Less predictable treatment, such as intentional reimplantation, may be suggested for fear of paresthesia following surgery. Paresthesia should not be taken lightly, there are certainly situations in which discretion regarding the use of surgery should be used. However, as a complication of periapical surgery in this region it is probably not as common as is often suspected and while paresthesia following third molar removal and inferior alveolar nerve blocks are relatively common, few reports of paresthesia follow from periapical surgery (2).

The surgical treatment of an endodontic lesion has been divided into many clinical stages by different investigators (3, 4). Three of these stages during which the risk of mental nerve damage may be decreased are the preoperative diagnosis, flap design, and flap retraction.

This article presents several techniques to decrease the risk of an unfavorable outcome following periapical surgery in proximity to the mental foramen.

### PREOPERATIVE DIAGNOSIS

The use of a good periapical radiograph is a prerequisite for all endodontic procedures. For surgical treatment, knowledge of the periapical anatomy is particularly important. At present, the usual method for visualizing the mental foramen presurgically is to take a standard angled periapical film. Although this provides sufficient information for nonsurgical endodontics, it rarely shows the vertical position of the mental foramen. Therefore, it has been suggested that panoramic radiographs should be taken for mental foramen localization (5). Few endodontic specialists in private practice have access to such machines. Even when they are available these films produce parallax shifts because of the geometry of the technique, in addition to the well-documented blurring and magnification artifacts (6).

An alternative technique is to use a vertically placed standard periapical film in conjunction with a paralleling device. This provides detailed information of the vertical positioning of the mental foramen that is otherwise not available. The patient's discomfort associated with exposing such a film can be readily overcome by the use of a lingual or inferior alveolar nerve block at the time of diagnosis. The added inconvenience is insignificant compared with the increased information provided.



FIG 1. When using a standard periapical film for presurgical diagnosis the relationship of the periapex (the surgical site) to the mental foramen is often not clear.

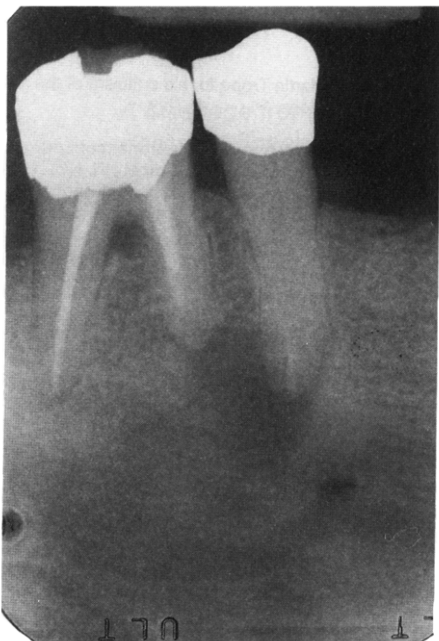


FIG 2. When the film packet is placed vertically, detailed information is available of the vertical distance of the mental foramen from the tooth apex.

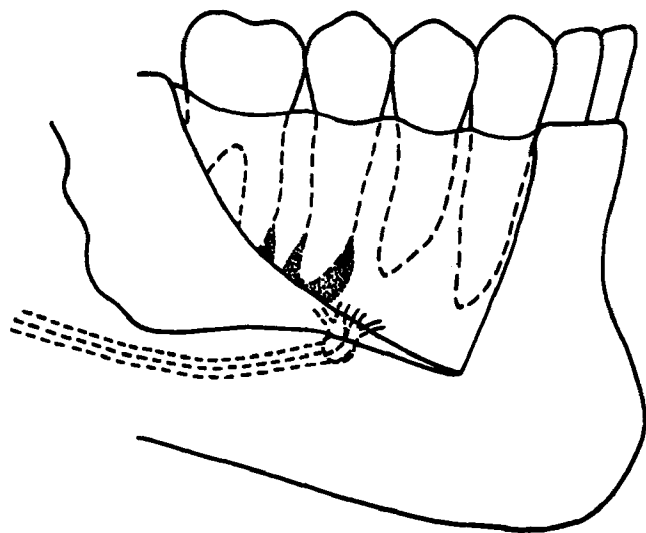


FIG 3. Usually the vertical releasing incision is placed mesial to the surgical site for posterior mandibular surgery. However, when working distal to the mental foramen the mental nerve must often be stretched to gain sufficient access for periapical surgery.

This point is illustrated by comparing Fig. 1 and Fig. 2. It is unclear from Fig. 1 whether the apical radiolucency associated with tooth 29 is a lesion, the mental foramen, or the two combined. However, Fig. 2 clearly shows the area of pathosis and the mental foramen apical to it. Now the operator is assured that, with judicious surgical technique, the risk of mental nerve damage will be minimal.

**FLAP DESIGN**

It is usually recommended that for ease of reflection the releasing incision for triangular flaps is placed mesial to the surgical site, at the mesial line angle of the canine (4) (Fig. 3). With this

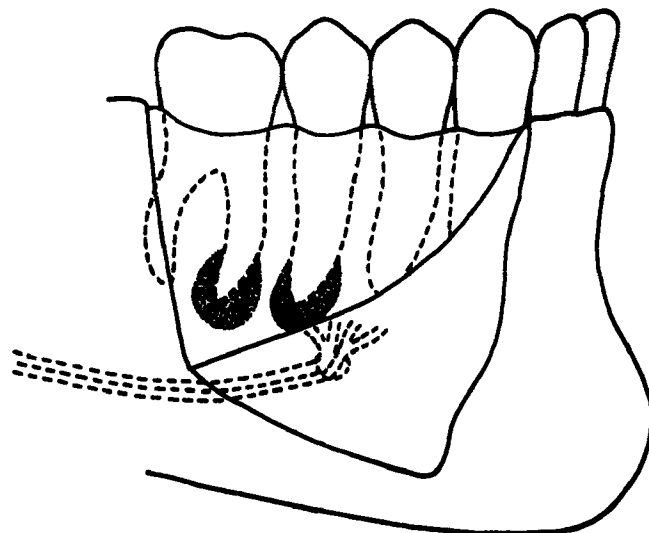


FIG 4. If the releasing incision is placed distal to the surgical site, excellent access can be achieved without stretching the mental neurovascular bundle.

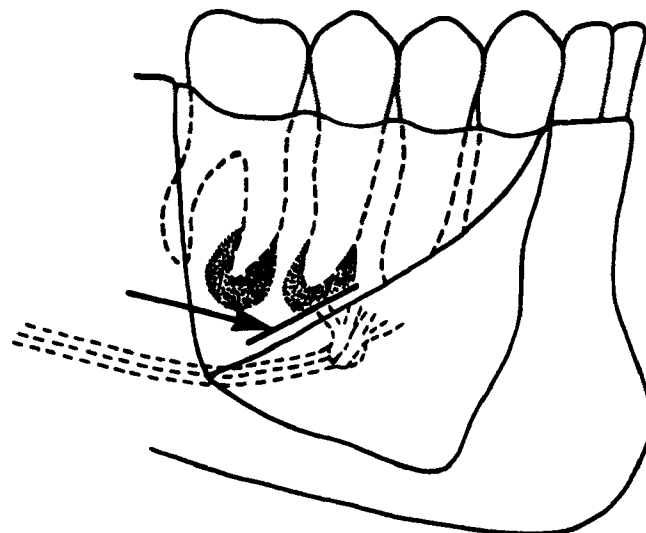


FIG 5. To prevent the retractor slipping during surgery, and perhaps crushing the mental nerve, a groove may be placed in the cortical bone to provide a firm, positive stop for retractor positioning. Arrow indicates the groove.

approach, when carrying out apical surgery on a tooth posterior to the mental foramen, the mental nerve will be stretched within the bed of the flap to achieve sufficient access for the surgical procedure. If the releasing incision is placed distal to the surgical site (Fig. 4) good access is achieved without reflecting the mental nerve at all. Indeed, the bundle will be protected within the bed of the flap. It must be remembered when using this releasing incision that the main arterial supply to the soft tissues of this region is from the distal by way of the inferior labial branch of the facial artery (7, 8). However, injury to this vessel will only occur if the incision is extended past the reflection of the buccal vestibule and even in the unlikely event of arterial involvement no long-term damage will arise because of the copious anastomoses in the region (7). Injury to the long buccal nerve is extremely unlikely as it pierces the

buccal fat pad at the anterior border of the ramus of the mandible, thereafter lying superficial to the buccinator muscle (8). It has been suggested that reflecting from the distal will reduce visibility to the periapex. In fact the reverse is true, as the major part of reflection is inferior rather than mesial or distal, placing the releasing incision distally improves visualization and access.

### SURGICAL TECHNIQUE

During surgical procedures, if nerve damage occurs it is rarely by a clean surgical cut, but usually by stretching or crushing of the neurovascular bundle with the retractor. Although stretching may be avoided by flap design as indicated above, crush injuries are often caused by impinging the retractor against the base of the flap in which the mental nerve is contained. Usually the retractor is held in position with positive pressure against the denuded bone. It is easy for the retractor to slip further against the base of the flap. This problem may be avoided by grooving the bone at the approximate level of the apex, but coronal to the mental foramen, giving a positive location for retraction, thus avoiding the risk of slipping (Fig. 5).

It is important to offer the most predictably successful result from endodontic surgical procedures. Three steps have been presented which, in the authors experience, result in successful apical surgery with maximal ease and confidence.

Dr. Moiseiwitsch is supported by NIH institutional dentist scientist Award DE00165.

The author thanks Dr. Martin Trope for his criticism of the manuscript and Teresa Volz for the illustrations.

Dr. Moiseiwitsch is a research fellow, Department of Endodontics, University of North Carolina, School of Dentistry, Chapel Hill, NC. Address requests for reprints to Dr. Julian Moiseiwitsch, Department of Endodontics, University of North Carolina, School of Dentistry, 405 Brauer Hall, CB# 7450, Chapel Hill, NC 27599-7450.

### References

1. Messing JJ, Stock CJR. Color atlas of endodontics. St. Louis: CV Mosby, 1988:194.
2. Loeb BF. Dental practice law. North Carolina cases and materials; Institute of Government, 1987. Chapel Hill: University of North Carolina at Chapel Hill.
3. Gutmann JL, Harrison JW. Part 2, Periradicular surgery. Surgical endodontics. Oxford: Blackwell Scientific Publications, 1991.
4. Arens DE. Pathways of the pulp. 5th ed, Chap 18. St Louis: CV Mosby, 1991.
5. Phillips JL, Weller RN, Kulild JC. The mental foramen: Part I. J Endodon 1990;16:221-3.
6. Langland OE, Langlais RP, Morris CR. Principles and practice of panoramic radiology. Chap 2, Philadelphia: WB Saunders, 1982.
7. Mathog RH. Maxillofacial trauma. Baltimore: Williams & Wilkins 1984: 34.
8. Hollinshead WH. Anatomy for surgeons, Vol 1: The head and neck. Chap 6. Philadelphia: Harper & Row, 1982.

### You might be interested

Up to age 34 the leading cause of death in the U.S. is motor vehicle crashes and 44% of all such fatalities are alcohol related. In fact as far back as 1990 alcohol related auto accidents cost \$46.1 billion per year (MMWR 43:759).

Yup, one for my baby and one for the road.

J. B. Korn