The middle mesial canal of mandibular first molars

Dr Paul McCabe addresses the less well known middle mesial canal, which can lead to endodontic problems in mandibular first molars.

Introduction

Root canal system anatomy plays a significant role in endodontic success and failure. A statistically significant percentage of failures are related to missed root canal systems. Missed canal systems potentially hold tissue, bacteria and related irritants that inevitably contribute to clinical symptoms and lesions of endodontic origin.

Several tooth groups have roots that notoriously hold additional canal systems such as the:

- maxillary first premolars,
- maxillary first molars,
- mandibular incisors, and
- mandibular molars.

Mandibular first molar anatomy

The mandibular first molar most commonly has three canals: two mesial canals (mesiolingual, mesiobuccal) and one distal canal (Figure 1). In approximately 30 per cent of mandibular first molars there is a second distal canal system (Figure 2). When two distal canals are present, they are called the distobuccal and the distolingual canals. A less well known but nonetheless important canal, the mid mesial canal system may also be present.

The majority of literature pertaining to the anatomy of the mandibular first molars overlooks the possible presence of a mid mesial canal system focusing instead on the possibility of two distal canals. This canal may be located anywhere between the mesiobuccal and mesiolingual orifices. The canal itself may be independent with a separate foramen or may join apically with either the mesiobuccal or mesiolingual canals.

In 1974 Vertucci and Williams as well as Barker et al described the presence of an independent middle mesial canal. More recently in 1989, Fabra-Campos in a study of 760 teeth found that the mid mesial canal was present in 2.6 per cent of the cases examined.

The purpose of this article is to highlight the presence of this mid mesial canal system and to assist in its identification during root canal treatment.

Armamentarium and techniques for identification of the mid mesial canal

Anatomic familiarity is a prerequisite and a good access cavity is essential. In the case of the mandibular first molar with three canals - mesiobuccal, mesiolingual, and one distal canal - the access cavity should be designed to accommodate the additional canal systems. This may involve the use of specialized instruments or radiographic aids to ensure complete cleaning and shaping of the canal system.

Figure 1: The classical access cavity outline for a mandibular first molar with three canals - mesiobuccal, mesiolingual, and one distal canal.

Figure 2: The classical access cavity outline for a mandibular first molar with two distal canals (distobuccal, distolingual).