Lost in the third dimension

A fit and healthy 25-year-old man was referred for endodontic assessment of his maxillary right lateral incisor. The tooth was associated with an abscess and a radiograph appeared to show a vertical root fracture.

On presentation he was concerned about a large, squishy lump that had appeared on his palate. There had been at least two flare-ups which had been managed with antibiotics.

Intra-oral assessment revealed what appeared to be a healthy-looking, unrestored lateral incisor tooth. There was a buccal sinus tract and the alveolar bone felt soft on palpation of the mucosa. There was an egg-shaped swelling on the palate behind the UR2, which extended approximately 2cm distally. The tooth had a deep cingulum pit.

The periodontium was healthy apart from an increased probing depth palatally, indicating a deep and narrow pocket.

Sensibility testing with Endo-Ice and an electric pulp tester revealed that the UR2 was non-vital.

Radiographic assessment showed a diffuse radiolucency lateral to the apex of UR2 and the periodontal ligament appeared widened. There was a dark line running the entire length of the root that looked like a crack. This was unlikely to be a root fracture but could be the result of an invagination in the root surface.

At this point it was not clear whether the lesion was the result of a primary endodontic problem or a periodontal defect extending along the length of an invagination resulting in pulp necrosis.

Invaginations such as this can be very difficult to manage because bacteria colonise the deep fissure leading to a periodontal pocket. This is difficult to debride and concomitant inflammation inhibits gingival re-attachment.

I felt a CBCT scan in this situation would provide much greater information on the three-dimensional morphology of the lesion and tooth root. Even high-resolution CBCT scans may not, however, be useful for identification of cracks. Following risk assessment and patient consent, a limited volume, high-resolution CBCT was exposed.

The CBCT image clearly showed a very large apical radiolucency that perforated the buccal cortical plate and palatal bone. There was an infolding of the enamel in the cingulum and an invagination of the palatal aspect of the tooth root, which extended almost to the apex. There was no other pathology noted on the scan.

A diagnosis of a primary endodontic lesion with secondary periodontal involvement was made. It seemed possible that the tooth had become necrotic as a result of microleakage through the cingulum pit; the sinus tract had followed the path of least resistance, which happened to be along the invagination.

Treatment options:
1. Root canal treatment
2. Extraction and replacement with an implant or Maryland bridge

If the diagnosis was correct, root canal treatment should have a good chance of success. Placement of an implant may require bone grafting as there had been significant bone loss.

A two-visit strategy was adopted to ensure that the root canal was thoroughly disinfected and that the sinus tract had healed before obturation.

After infiltration of local anaesthetic and placement of rubber dam, an access cavity was made in the palatal aspect. There was no vital pulp tissue in the root canal. Coronal flaring was completed with an SX file and the root length estimated with an electronic apex locator. The canal was shaped with a single large Wave. One instrument.

Disinfection was completed over approximately 30 minutes using warm 3% sodium hypochlorite agitated with an Irrisafe ultrasonic tip; the solution being replenished after each 20-second burst of ultrasound.

The canal was dressed with calcium hydroxide paste and a Lentulo spiral filler was used to ensure the material completely obliterated the root canal space.

After one week the sinus tract had healed and there was no evidence of the deep periodontal pocket on the palatal aspect of UR2.

The case was obturated with vertically compacted gutta percha and the access sealed with dual-cure composite.

A review at three months showed evidence of bony healing and the sinus tract had remained healed. A further review will be carried out in six months.

Conclusions
1. CBCT can be a useful tool in the diagnosis of complex endodontic problems.

Figure 1. The pre-operative radiograph appearing to show a vertical crack

Figure 2. The CBCT scan shows a deep cingulum pit with infolding of enamel and external root invagination

Figure 3. The invagination extends along the root. There has been significant bone loss apically, perforating the buccal cortical plate

Figure 4. An intra-oral photograph showing healed sinus tract (arrow) adjacent to the invagination. The access has been filled with composite
Common endodontic pitfalls covered in live webinar

John Rhodes is presenting the live webinar “What went wrong?” on Wednesday 4th March at 8pm on The Dental Channel. His presentation will cover common pitfalls during endodontic treatment. Case studies will be used to describe how to avoid them and how to correct things when challenges arise. If you enjoy reading John’s articles in Dental Practice you will find this an engaging and informative evening. Readers of Dental Practice should contact The Dental Channel on 020 8299 9742 to book a place for £10, saving £10 on the standard price. A certificate for two hours of verifiable CPD will be awarded. The course summary is available on The Dental Channel (www.dental-channel.co.uk).

Next month

With The Dentistry Show taking place on 17th and 18th April, next month will be our show issue (editorial deadline 13th March) and May will contain our review (editorial deadline 20th April). To take advantage of these editorial opportunities, contact the editor: derek@aemorgan.co.uk. For information on advertising in these or other issues, contact Patrick Murphy: patrick@aemorgan.co.uk.

2. Management of invaginated lateral incisor teeth can be difficult when there is established periodontal disease

For even more endodontics, tips and cases, follow on Twitter: @johnrhodesendo

References


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