More referrals after young tooth saved

DR MATTHEW HOLYOAK describes the replacement of a failed root canal treatment

A 12-year-old female patient consulted Dr Matthew Holyoak following problems with her LL6 molar. Ever since the tooth had been filled with a composite, she had experienced occasional pain and complained that it did not 'look like a tooth'. The patient's regular dentist had advised her to consider extraction. She had good oral hygiene and gingival health was excellent.

The tooth vitality was tested with ethyl chloride, and there was no reaction from the patient. A periapical radiograph confirmed that the tooth was non-vital. It showed radiolucency associated with the mesial and distal roots. Root canal treatment was poorly obturated with single gutta percha cones, which were short of the radiographic apex. (Fig 1)

Right and left bitewing radiographs were also taken, which showed good horizontal bone levels and no interproximal caries. The patient had a class 1 occlusion, with mild upper arch crowding and a normal overjet. Future orthodontic treatment was assessed with Dee Fox, Specialist Orthodontist, St Annes.

Dr Matthew Holyoak diagnosed a failing root canal treatment. The options were discussed with the patient and her parents. Dr Holyoak advised against leaving the tooth as it was, because the patient was experiencing intermittent pain. The alternatives were to have non-surgical re-root canal treatment, surgical apicectomy and retrograde root filling, or extraction.

Dr Holyoak describes the wider consideration: "If the tooth was extracted, then the residual space could be closed with orthodontic treatment. However, this would take many months and, with the existing malocclusion, the patient was unlikely to be eligible for NHS treatment."

Both the patient and her parents were keen to avoid an extraction. It was decided to proceed with re-root canal treatment and subsequent restoration with a direct composite filling, if at all possible.

The treatment took place over two visits, about one month apart. At the first appointment the old restoration was removed under local anaesthetic with rubber dam isolation. There was no sign of root fracture but there was suppuration around the three existing single point gutta percha cones.

The estimated working length was measured at 19-21mm using a Schick software programme. The access was refined and four canals were identified under 4x magnification. The disto-lingual canal had not previously been located or obturated. (Fig 2)

The site was irrigated with 5 per cent NaOCL solution and lubricated with Glyde 17 per cent EDTA gel. The existing cones were removed with Protaper retreatment files 1, 2 and 3 at 800rpm. Patency was achieved in all four canals.

Dr Holyoak decided to dress the canals with an intra-canal medication of non-setting Calcium Hydroxide paste, carefully extruding to the apex. A provisional dressing was then placed. The tooth was provisionally restored with PTFE tape over the dressing and glass ionomer. The rubber dam was removed and the occlusion checked with articulated silk. A post-operative radiograph verified the dressing was in place, just through the apex in the two distal canals.

Preparation of all four root canals was continued at the second appointment under local anaesthetic, with rubber dam. The canals were cleaned and shaped by hand with flexi-files to establish a glidepath for size 20 hand files. The working length was measured with a Ray-pex 5 electronic apex locator and then verified with a paper-point technique.

After irrigation and lubrication, the canals were filed using the Protaper system in an Endo-Mate torque control handpiece at 300rpm. The preparation was finished with an F2 master rotary file. Alternate reciprocation of size 20 hand files was used to maintain patency and avoid any apical plug of debris.

Final rinsing was completed with 17 per cent EDTA solution for one minute to remove any smear layer and 5 per cent NaOCl solution as the last irrigant. The canals were then dried with Protaper paper points and no seepage was evident. Obturation was achieved with F2 master cones and Tubiseal, after gauging to size 25 at the apex of each canal. The process was completed with cold lateral condensation using accessory B points (Fig 3).

The restoration was carried out at the same appointment. The excess of gutta percha cones was removed down to 1mm in each root canal and the enamel margins were bevelled. The complete cavity was etched with (A/E) phosphoric acid etch for 30 seconds for the enamel and 15 seconds for the dentine. A resin modified glass ionomer restoration was placed over the gutta percha on the floor of the pulp chamber, to about 2mm depth. The complete cavity was treated with iBond Total Etch bonding agent. It was then air dried, avoiding any pooling at the margins and light cured for 20 seconds. A second coat of adhesive was also placed.

The restoration of the tooth was completed with Heraeus Kulzer Venus Pearl, using incremental, oblique layering of less than 2mm. Simple stratification was achieved with Opaque Medium Chromatic (OMC) dentine and B1 enamel shades (Fig 4). Dr Holyoak explains, "Venus Pearl is ideal for anterior or posterior use. A superb appearance can be created using a simple, stratified, incremental layering technique. The material has a soft, creamy consistency that is easily sculptable. It provides durable restorations with excellent aesthetics."

The rubber dam was removed. The occlusion was checked in centric and all other excursions. A final post-treatment radiograph was taken which verified obturation of all four canals to ideal length, with no voids (Fig 5).

At the follow-up appointment, the patient had no pain and was pleased with the appearance of her tooth (Fig 6). No occlusal adjustment was required and the tooth was polished minimally. The re-root canal treatment avoided the more traumatic extraction option and the patient was absolutely delighted. This has resulted in an increase of family and friends referred to the practice.

Matthew Holyoak concludes, "On a patient so young, the longer an indirect treatment can be delayed, the better. A predictable, long-lasting direct restoration can be achieved with incremental build up of less than 2mm. This is accomplished by retaining as much enamel and dentine as possible, using modern bonding agents and a rigorous protocol with rubber dam isolation." ■

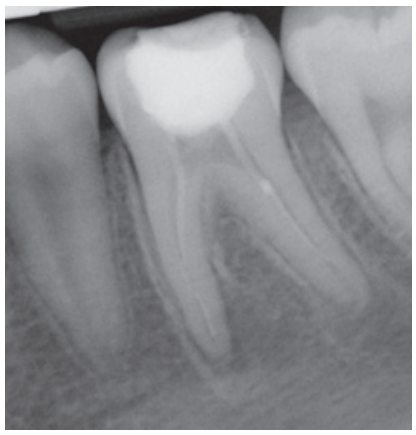

Fig. 1 The radiograph showed radiolucency associated with the mesial and distal roots, and inadequate root canal treatment

Fig. 2 The access was refined and four canals were identified under 4x magnification

Fig. 3 Final obturation was achieved with F2 master cones, Tubiseal and accessory B points

Fig. 4 Smple stratification was achieved with Opaque Medium Chromatic (OMC) dentine and B1 enamel shades

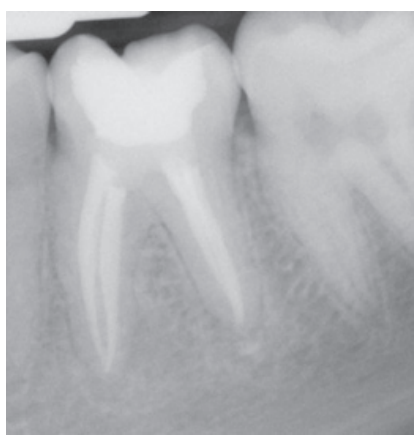

Fig. 5 Post treatment radiograph verified obturation of all four canals to ideal length with no voids

Fig. 6 At the follow up appointment, the patient had no pain and was pleased with the appearance of her tooth

About Matthew Holyoak

Matthew Holyoak is a senior lecturer in restorative dentistry at the School of Medicine & Dentistry at the University of Central Lancashire. He has an MSc in Restorative Dentistry and was awarded a Diploma in Restorative Dentistry through the RCS in 2007. He is a member of the British Academy of Aesthetic Dentistry and the Association of Dental Implantology UK.