Rhodes’ Referrals – Case 4

The long, the thin and the curly

Sclerosed canals can raise many difficulties for the operator during root canal treatment, but don’t be put off by pre-operative radiographic appearance; often the canals are not as fine as they seem and you cannot be sure what you are dealing with until you are in there! The risk of blocking the canal during preparation is greater in sclerosed cases. Comparatively more dentine chips are created because the instruments machine a greater surface area of the root canal wall.

The volume of available irrigant is also reduced, resulting in smear “clumping”. Copious irrigation during preparation, chelating agents in gel and liquid form and recapitulation with a fine file can be used to avoid this.

If blockage occurs, never try to force the instrument apically as there will be a high chance of fracture, particularly with mechanised files.

Use a size 10 hand file with plenty of EDTA and a light picking action to loosen packed dentine chips into the irrigating solution where they can be flushed from the root canal.

A 38-year-old woman was referred for root canal treatment of her 46 as the general dentist had been unable to negotiate the sclerosed canals.

Intra-orally, there was no swelling, sinus tracts, visible cracks or increased periodontal pocketing. The tooth was restorable and non-vital to sensibility testing with cold (Figure 1).

Radiographic assessment showed that the restoration had poor marginal integrity. The distal canal had been located and contained some dressing material in the coronal third.

The mesial canals had not been located or negotiated and the roots were longer and thinner than average. There was no evidence of periradicular radiolucency.

The crown on tooth 47 had an overhanging margin on the mesial side and although there were no discernible signs of periodontal disease or caries, replacement could be justified for optimal interproximal contact and future interdental cleaning (Figure 2).

A diagnosis of a failed attempt at root canal treatment in a necrotic 46 was made.

Sensible treatment options in this case therefore include:
- Non-surgical root canal treatment, followed by placement of a cusps-coverage restoration.
- Extraction and replacement with an implant or bridge.

The latter option should be feasible, but the tooth was definitely restorable and a good root filling complemented with a well-fitting crown could be expected to function as well as an implant-supported crown, for significantly less cost and surgery time¹.

Non-surgical re-treatment

After discussing all the available options, the patient decided to have 46 root-filled. Non-surgical treatment of 46 was to be carried out in a single visit with immediate core fabrication.

Rubber dam was applied using a plastic molar clamp on tooth 47 and a wedge mesial to 45. This provided excellent isolation for root canal treatment and optimum moisture control during core build-up using a sectional matrix system. The existing restoration was completely removed.

Three orifices were located under the operating microscope, but gauging the distal canal with a size 10 Flexible file revealed a bifurcation approximately 3-4mm below the pulp floor (Figure 3).

All root lengths were estimated with a multi-frequency apex locator and as consistent readings were obtained, a diagnostic radiograph was not deemed necessary. A glide path and patency was confirmed to the full working length using a size 10 Flexible file. Tapering was completed with a Primary

Figure 1. Tooth 46 on presentation

Figure 2. Pre-operative radiograph; the canals appear sclerosed, roots thin and longer than average

Figure 3. Microscope view into the distal canal. The bifurcation is visible, highlighting the benefit of good illumination and magnification

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Wave. One instrument, always working through a puddle of sodium hypochlorite in the access and brushing into the bulkiest wall of the root canal.

It can be difficult to ensure adequate irrigant exchange at the apex of long, thin canals. The primary canals must be sufficiently tapered (not generally a problem with NiTi techniques) to allow sufficient volume of irrigant to be introduced into the root canal system.

Gutta percha pumping and passive ultrasonic irrigation (PUI) can be used to improve flow of irrigant and mechanical disruption of biofilm. In this case 3% sodium hypochlorite was the main irrigant with a rinse of 20% citric acid for smear removal.

The root canals were obturated using Gutta Core, a system-matched gutta percha carrier system. Carrier-based obturating techniques can be useful in long, thin canals as pluggers used at the extremity of the preparation during vertical compaction may bind or be at the limit of their reach. Carrier-based systems seem to provide adequate seal compared with other techniques.

The cavity was refined and washed. Two Palodent sectional matrices with V-wedges and rings were adapted (Figure 4) and a composite core fabricated using a bulk fill composite (SDR) and a nano-ceramic universal composite. This will provide the foundation for a crown at a later date (Figure 5).

A final radiograph of the completed treatment was exposed. The canals are all homogeneously obturated and the core material well adapted.

There has been some extrusion of sealer apically, which is not uncommon with carrier obturation techniques. This should not affect the long-term outcome as the material is generally absorbed (Figure 6).

References

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