The discoloured central incisor: a minimally invasive approach for maximum aesthetics

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Background
Historically, discoloured endodontically-treated teeth in the aesthetic zone were treated with post crowns, usually with sub gingival margins. This is a very destructive approach for teeth, which are often already significantly compromised, particularly in very young patients.

Case report
History and examination findings: Claire is a 21-year-old student (Figure 1) who attended the practice having concerns about the appearance of her upper front teeth (Figures 2-5); in particular:

1) Both upper central incisors were discoloured; the left central being grey in hue whereas the right had a more orange discolouration. 
2) The left central was fractured. This was as a result of trauma (bicycle accident as a child) and subsequent root canal therapy of the left central. The patient gave a history of the left central having been restored with composite resin on three previous occasions: all of which de-bonded in short order after placement.

Both teeth were currently asymptomatic. The patient had recently obtained an opinion from another practitioner, who suggested a post crown and veneer as a treatment plan.

On examination:
1) Upper right central exhibited an orange discolouration (Figure 6), was not tender to pressure and tested positive (although in the upper limits) to electronic pulp testing.
2) The upper left central showed a discolouration, which was more in the grey range, again the tooth was not tender to pressure and there were no obvious sinus tracts present.

A diagnosis of calcific metamorphosis was made.
An MID incisal edge fracture which exposed dentin was noted, alongside a palatal composite resin (Figure 8). A radiographic survey showed a well-condensed orthograde root canal filling which extended beyond the radiographic apex by some 2mm: there was no apparent apical pathology.

A diagnosis of discolouration secondary to endodontics and Ellis Class 2 dentin/enamel fracture was made. The loss in value of the left central is particularly evident in black and white imaging (Figure 9).

Treatment plan
After a second opinion from a specialist endodontist, a decision was made to accept the existing root canal filling and only retreat if it became symptomatic. A conservative treatment plan of internally bleaching the teeth, followed by a direct composite restoration of the left central incisor, was discussed and agreed upon.
A period of two weeks was allowed for all of the oxygen by-products to dissipate. The patient was recalled and the GIC/PTFE dressing was removed and the palatal access cavity restored with an opaque white composite resin (Figure 17).

The upper left central incisor was prepared with a small intra-enamel, supra-gingival 0.2mm infinity bevel on the facial surface, which was designed to mask the increased chroma of the discoloured tooth and create resistance form to retain the restoration. The ragged incise edge was conservatively smoothed with discs. The palatal stent was offered up to the tooth to give an impression of the degree of build-up required.

The palatal contour was established with a thin layer of milky white semi-translucent composite resin, a dentin layer was built into this to establish mammelon outlines: at this stage the discolouration remained, particularly at the mesial aspect (Figure 18). The adverse chroma was masked with a flowable opaque composite and the final enamel layer placed (Figure 19).

The restoration was then contoured with discs, diamond finishing burs and finally with pumice on a goats hairbrush and 1 micron alumina paste on a cotton wheel (Figures 20-24).