Maximising aesthetics: tooth whitening and resin infiltration

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As has been reported on many occasions, the ability to improve a patient's smile can have profound effects on their confidence, which subsequently can also lead to improvements in oral health (Baldwin, 1980; Davis, Ashworth and Spriggs, 1998).

Regarding noticeable tooth/teeth discolouration, some have considered this to be a physical handicap that can impact a 'person's self-image, attractiveness and even employability' (Kelleher and Roe, 1999).

The principles as outlined by Banerjee (2013) regarding minimally invasive dentistry suggest that by minimising the amount of tooth preparation required to achieve a functional and aesthetic result, we can increase tooth survivability and longevity.

Home whitening has been considered a simple, staple and safe aesthetic treatment that can be carried out in the absence of the any dental disease (Kelleher and Roe, 1999). This implies that prior to any whitening, and even aesthetic treatment, the patient should be in stable oral health, free from any dental, periodontal or soft tissue disease.

Case presentation

A 16-year-old male patient attended. He had generalised discolouration since the eruption of the permeant dentition. Having been victimised as a child for 'not brushing his teeth properly', he and his mother were seeking a minimally invasive treatment strategy to improve his confidence and appearance.

Medically, the patient was fit and well, with no obvious caries, aberrant/pathological tooth surface loss. There was the presence of mild marginal gingival inflammation. The patient had previously always been a regular dental attender, with no history of caries.

The patient had routine screening bitewing radiographs for caries screening, which were also clear of any visible pathology.

Diagnoses

The patient was diagnosed with mild generalised gingivitis, and generalised hypomineralisation lesions attributed to fluorosis.

Treatment options

It was clear that the aesthetic compromise was attributed to the multiple discolourations present on the teeth. The presence of brown/yellow discolourations, amongst white spot discolourations, were creating this non-homogenous appearance of the enamel. The primary phase of treatment was to undertake tooth whitening, and supplement this with microabrasion/resin infiltration once the discolourations had homogenised to a white colour.

Treatment sequence/protocol

A full mouth supra and subgingival scale and polish was completed with the hygienist. The patient attended for an appointment for intraoral scans to be taken and customised, ultra-seal whitening tray fabrication.

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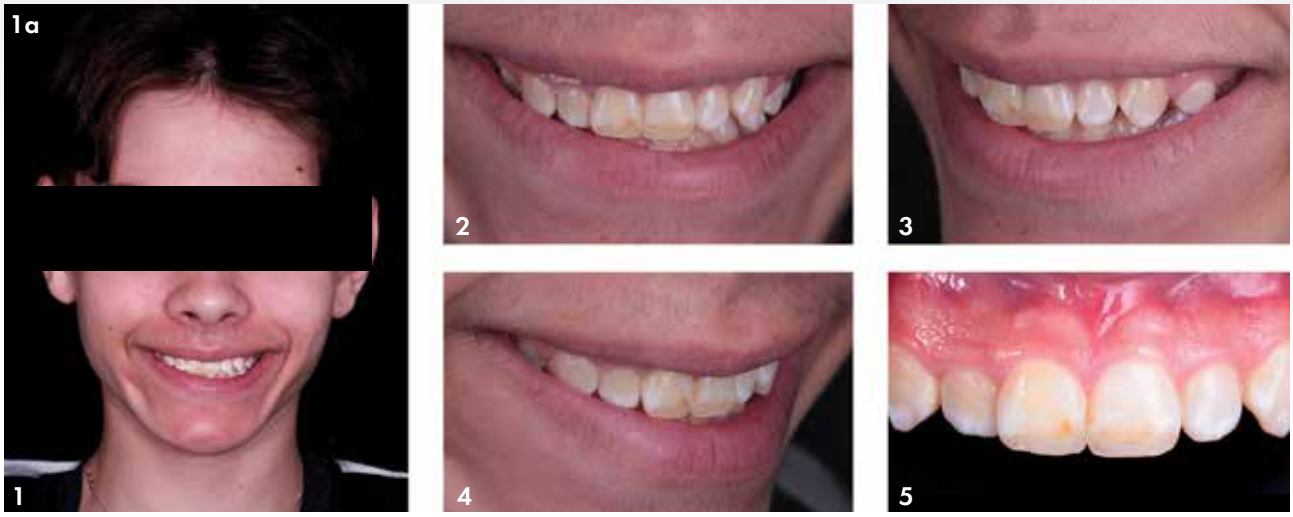


Figures 1 to 5: Initial presentation

The whitening protocol was slightly elongated to ensure as much whitening of the fluorosis lesions as possible. We completed four weeks of whitening with 16% carbamide peroxide (Lumiwhite by Night) as night-time whitening only.

As we are aware, bond strength can reduce by up to 20% if completed on the same day as the cessation of the whitening (Garcia-Godoy et al, 1993). This occurs due to thin, sparse and fragile resin-tag formation. A period of two weeks allows for any hydroxyl radicals to leach out of the teeth, and for the whitening result to stabilise. Therefore, the appointment for definitive palatal composite of the UL1 was to be completed two-weeks after completion of external whitening.The upper first molar to first molar were isolated using Unodent Heavy rubber dam.

The process of resin infiltration was as follows. Icon Etch contains 15% hydrochloric acid, which is applied for two-minute intervals. This translates to approximately up to 50um enamel removal.

The etch is washed for 30 seconds, and then Icon Dry – an 99% ethanol-based liquid – is placed over the teeth. This is the most significant aspect of any Icon treatment as it gives the opportunity to review whether the lesion will be adequately masked or not, a test-drive if you will of what the tooth will appear like after resin infiltration.

In this case, as can be seen by the severe hypoplasia, there will likely be a requirement for subtle enamel preparation to access the white spot. This was repeated for two cycles only.

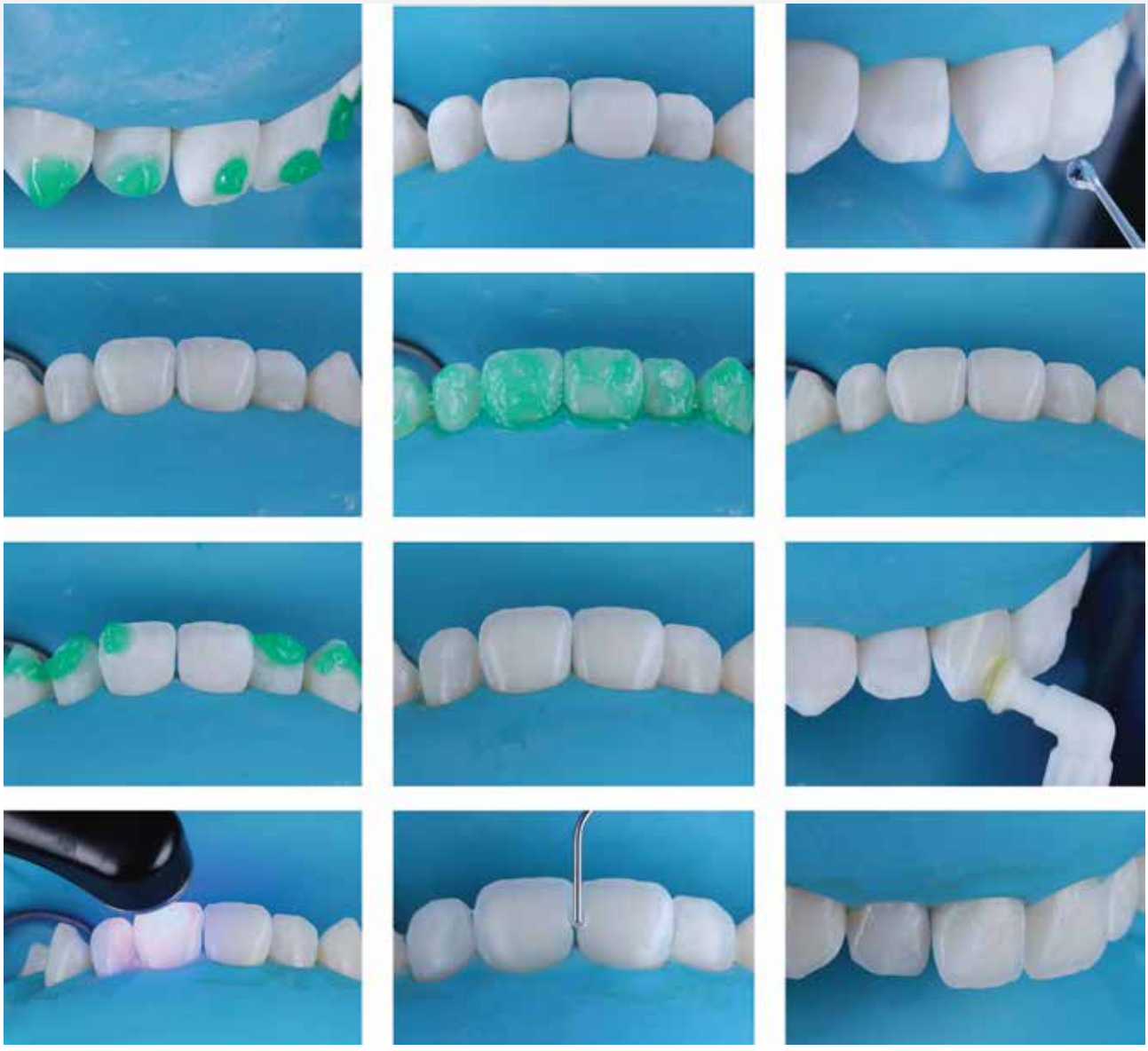
The Icon Dry showed satisfactory masking of the white spot lesion. Therefore, it was time to infiltrate with resin.

Icon resin infiltration requires a two-minute application and agitation on the teeth, followed by one minute for the resin to remain undisrupted on the teeth. This is followed by excess removal and teeth separation (using floss) and curing for 40 seconds on each tooth.

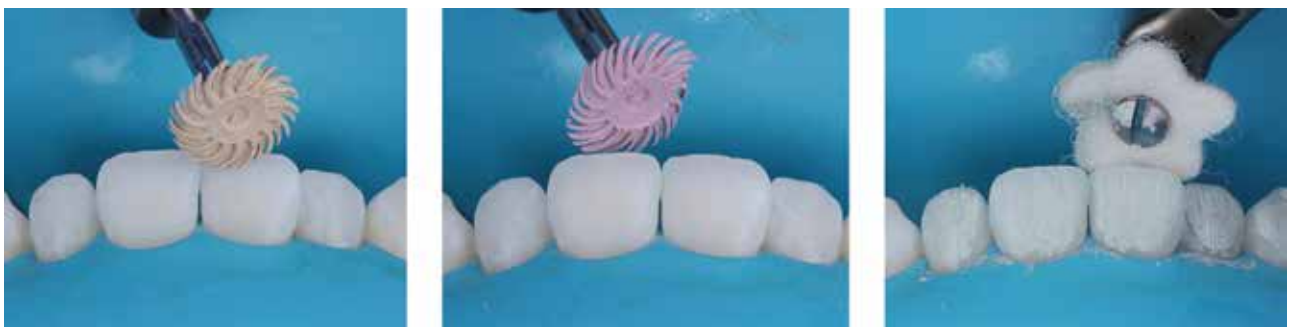
A second application is repeated for two minutes and cured to account for contraction shrinkage and is again cured for 40 seconds per tooth. Finally, for removal of the oxygen inhibition layer, we complete a final cure under

Figure 6: Result after four weeks of night-time whitening with 16% carbamide peroxide

Figure 7: Teeth were isolated with rubber dam



Figures 8 to 19: Icon resin infiltration



Figures 20 to 22: Polishing

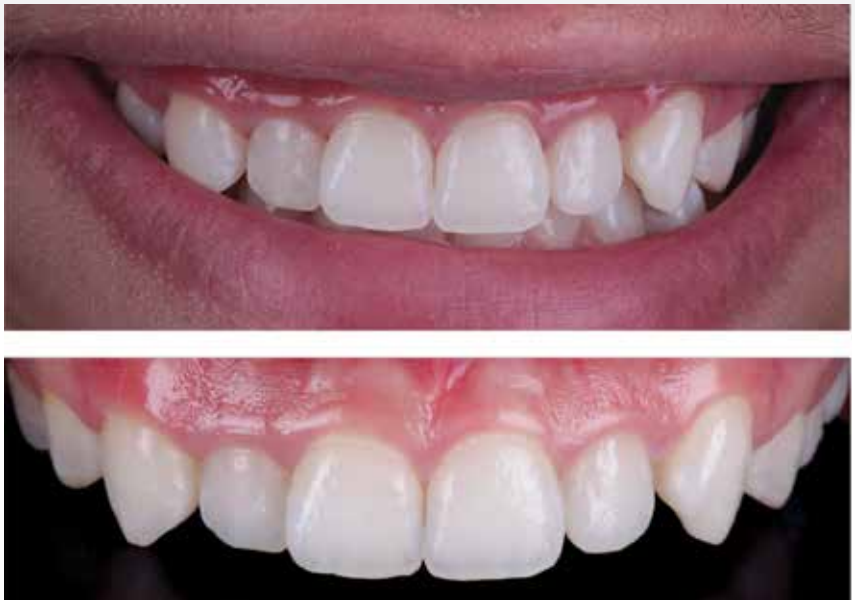


Figure 23 and 24: Final result

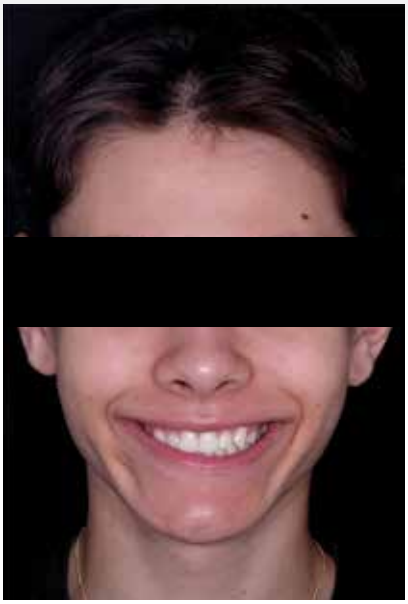


Figure 25: Final result, full face

glycerine gel.

The polishing protocol is critical in finalisation of such cases. This starts with Sof-Lex discs at very slow speed/revolutions, running through the sequence from coarse to ultra-fine.

This is supplemented with 3M enhanced polishing spirals, and finally with Flexibuff and diamond polishing paste.

The tooth is well hydrated during the polishing protocol to minimise the risk of overheating the freshly infiltrated resin.

Due to minimal nature of erosive etching cycles required, there was no visible concavity that was created because of the treatment.

Therefore, this case demonstrates the power of microabrasive and resin infiltration treatment to improve the appearance of such white spots. No supplemental composite was required.

Conclusion and reflection

The discussion process and valid consent are essential when undertaking all forms of treatment, but particularly with reference to elective or aesthetic treatment.

In the case presented in this article, the discussion process ensured that the patient and his mother clearly understood that whitening, although an elective procedure, is the most minimally invasive procedure that will significantly improve the patient's confidence and appearance (Davis et al, 1998).

As demonstrated in this case, a simple yet refined intervention created a suitable outcome without the need for restorative intervention.

The patient was ecstatic in this case as he was previously informed that the only method to create a reasonable outcome would require preparation of the tooth for a veneer.

With consent being a dynamic process, there is no need to assume that the patient would not still consider additional treatment after the whitening had taken place, but discussion of the options at each stage of treatment and appropriate documentation is an imperative element to informed consent.

The patient and his mother were delighted by the enhancement to his smile.

References

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