

# A minimally invasive approach to brown and white lesion removal

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Luke Hutchings presents his winning tooth whitening case from the Aesthetic Dentistry Awards 2016.

The patient presented at the practice, unhappy that her teeth didn't match as they were all different colours – she had obvious white and brown marks, which she disliked. She had seen two previous dentists for an opinion, so attended my surgery to discuss veneers, as she felt this was the only option for cosmetic improvement.

## Clinical presentation

The patient presented with a moderately restored dentition; she had no carious teeth and no periodontal concerns. Radiographic examination showed endodontic treatment evident in the UL3; this was well condensed and of good length and no apical pathology was noted.

Aesthetic evaluation showed mild anterior segment crowding and an acceptable smile line, with a reasonable midline and good incisor display. There were uneven gingival levels, especially associated with the UL3, which exhibited recession. A black triangle was present between UR1 and UL1, and UL3 and UL1 were both darker – UL3 as it was non-vital; UL1 proved to be vital on testing with an electric pulp test. Finally, mild fluorosis was evident with white patches UR1/UL1, and a brown spot, likely post-eruptive from extrinsic staining UL1 (Watts and Addy, 2001).

## Treatment discussion

The patient's complaint was about the colour of her teeth, so I discussed the option of trying to improve this in a minimally invasive way through the means of tooth whitening. Discussion followed that if she still wasn't happy with the improvement after whitening then we could consider a number of different options to remove the white or brown lesions if they were still present: micro/macro abrasion, resin infiltration (Icon, DMG), composite bonding or veneers. The patient felt happy to proceed with the whitening using a progressive smile design methodology.



Figure 1: Pre-treatment anterior smile view.



Figure 2: Pre-treatment close-up anterior view.

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Figure 3: UL1 matched to Vita shade A3.5 pre-treatment.



Figure 4: UR1 matched to Vita shade A3 pre-treatment.

I felt a combination of whitening techniques would be required to achieve an acceptable outcome for the patient, due to the non-vital UL3 and the lower value vital UL1. The process was complicated somewhat as the upper premolars were crowned with existing porcelain-fused-to metal crowns and the patient hadn't budgeted to replace these, so we wanted to attempt to whiten – but not to a point at which it made these more obvious.

We discussed the options to whiten and we decided we needed to carry out inside-out whitening on the UL3 (first described by Settembrini et al, 1997), some conventional tray whitening to the rest of the teeth and also some single tooth isolated whitening to the UL1.

Warnings were given that although it was likely the brown spot would be removed (Greenwall, 2001), it was unlikely the white spot would. In fact, we warned they would likely look worse before they improved as the white spots dehydrated – once rehydrated it would be likely they would look better as the contrast between the spots and the increased value tooth would be less.

### Treatment

At the initial treatment visit, upper and lower two-stage putty and wash silicone impressions (Aquasil Ultra, Dentsply) were taken with a foam spacer. These were then sent to the laboratory with instructions to make super-sealed whitening trays.

The return visit was deliberately set on Friday morning, as inside-out whitening very much relies on patient compliance and the patient felt this would be easier to achieve over a long weekend. Whitening trays were checked for fit. The access cavity in the UL3 was opened and care was taken to remove all remnants of the coronal resin-based restoration. Gutta percha was then removed to 1mm below the amelocemental junction and the gutta percha was sealed with glass ionomer.

The patient was then instructed on the use of the trays and the careful placement of 6% hydrogen peroxide into the access cavity and into the buccal reservoir of the UL3. This was also marked on the facial surface of the tray in marker to facilitate easy placement for the patient. The patient was instructed to replenish this gel every hour on the hour (Poyser et al, 2004). Careful demonstration and hygiene advice was given about how to clean the access cavity between applications using a Tepe brush and monoject syringe and water. The patient was also given a syringe of 10% carbamide peroxide to apply for nocturnal usage under the same guidelines.

The patient was reviewed after four days and the UL3 was whitened sufficiently. At this point, the access cavity in the UL3 was temporised with glass ionomer to allow for rehydration, thus allowing improved hybridisation of the resin definitive restoration. A period of two weeks is normally suggested after whitening has stopped to allow for better shade match, as there is evidence to show significant shade change in this two-week period (Deliperi, 2008).

The patient was then instructed to use the same whitening trays for two weeks of usage with 10% carbamide peroxide for nocturnal usage. Carbamide peroxide releases hydrogen peroxide slowly, so wear for at least four to eight hours is recommended, hence it is more suited for use at night time. Again, careful instruction in usage and hygiene were given.

### Post-treatment review

The patient returned for subsequent review, happy with the overall match and shade of her teeth but felt the UL1 was still slightly lower in value than her surrounding teeth. A single tooth whitening tray had been fabricated for this eventuality. Essentially, this is a super-sealed tray with the adjacent teeth removed to allow excess gel to be removed



Figure 5: Pre-treatment left lateral smile view.



Figure 6: Pre-treatment close-up left lateral view.



Figure 7: Pre-treatment right lateral smile view.



Figure 8: Pre-treatment close-up right lateral view.



Figure 9: Situation following whitening.

and not affect these teeth; hence over-whitening them. At a final whitening review, the patient was delighted with the whitening result and the brown spots had been removed well. However, the patient felt after going through the trouble of getting the whitening right she would like to explore the option of white spot removal.

Treatment modalities discussed were minimally invasive, as at this point the patient felt happy with her smile aesthetics and had moved away from her original thoughts of laminate veneers. Options discussed were microabrasion or resin infiltration technique (Icon, DMG); the patient felt happy with Icon treatment.

Icon is a resin infiltration system originally designed for minimally invasive restoration of interproximal cavities. It consists of Icon Etch (hydrochloric acid, silicic acid), Icon Dry (99% ethanol) and Icon infiltrant (methacrylate-based resin). Icon has been shown to have some promising result in masking white spot on smooth surfaces of teeth (Munoz et al, 2013); it achieves this by mimicking the natural refraction index of enamel, hence disguising the lesion. The technique steps are as follows:



Figure 10: Post-treatment anterior smile view.



Figure 11: Post-treatment left lateral smile view.



Figure 12: Post-treatment right lateral smile view.



Figure 13: Post-treatment anterior view in occlusion.



Figure 14: Post-treatment left lateral view in occlusion.



Figure 15: Post-treatment right lateral view in occlusion .

1. Thoroughly clean the surface and place rubber dam
2. Icon etch application for two minutes
3. Rinse and air dry with suction
4. Apply Icon dry to preview the effect
5. Repeat steps three and four as required – the patient required five cycles before the white spots were masked
6. Apply Icon infiltrant, allowing to set for three minutes
7. Remove excess with floss and cotton wool roll. Light cure for 40 seconds
8. Repeat steps six and seven
9. Polish with rubber point for surface polish.

### Reflection

The patient was delighted with the outcome and I am pleased with the overall aesthetic appearance. I feel that the shade of the teeth is much more consistent in the smile display. I am really pleased with the minimally invasive nature of the treatment, especially given that the patient attended requesting veneers.

Areas I could improve, and will probably do when I next see the patient, is improvement to the facial polish after the Icon treatment, as the 1:1.5 view shows a little bit of incorrect texture.



Figure 16: Post-treatment anterior view.



Figure 17: Post-treatment left lateral open view.



Figure 18: Post-treatment right lateral open view.



Figure 19: Post-treatment close-up view.



Figure 20: Post-treatment close-up left lateral view.



Figure 21: Post-treatment close-up right lateral view.

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