Optimizing restorative management of anterior discolored teeth with ceramic restorations

At present, we have at our disposal a set of techniques and dental materials that allow us an ultraconservative aproach when we try to optimize the color of dental substrats and close the remaining optical characteristics to natural tooth. As often as possible, the internal bleaching in case of discolored anterior nonvital teeth appears as the first treatment option in an aesthetic rehabilitation. However, it is necessary to take into account the stability of the color correction achieved by this technique is not predictable long term. Moreover, the use of ceramic restorations can mask the discoloration relapse as well as improve some aspects of the tooth shape which are desirable. Here we present a case where these dynamics were applied to solve an important aesthetic issue for a patient.
Fig. 1 – A healthy male patient, 35 years-old, presented at the appointment unhappy with the aesthetic appearance of his smile. A clinical and radiographic evaluation showed the presence of inadequate composite resin restorations in anterior teeth, a discoloration in 11 and 21 with unsatisfactory endodontic treatment.

Fig. 2 – Initial intraoral view
Fig. 3  Img. 3 – Initial view of occlusal relation in anterior teeth.

Fig. 4  Img. 4 – Color shade Vita A4 – A moderate to severe discoloration – orange-brown hue with intensive chroma – was the initial challenge to deal with on both central incisors.
Fig. 5  Img. 5 – Endodontic re-treatments were performed and the gutta-percha was removed to the desired level.

Fig. 6  Img. 6 – In order to calibrate the correct level of gutta-percha removal, a periodontal probe was used. The material was removed up to the level of the bone crest, about 3 mm below the gingival margin. This will allow space for the sealing material – glass ionomer to protect and minimize risk of resorptions – and bleaching to occur in the cervical area which is beneficial.
Fig. 7 – All the carious tissue was removed from the access cavity. 35% Hydrogen peroxide was used as the internal bleaching agent during 4 sessions, for periods of 3-5 days between each session. Initially a small conservative access cavity was performed to test the bleaching effect. In the areas that were more difficult to bleach – darkish tissue – more tissue removal was performed. However care was taken not to make the teeth excessively fragile.
Fig. 8 – A bonded interim restoration, with self etch adhesive, was used to try to maintain as much as possible the chemical ingredients inside the cavity.
Fig. 9 – The internal bleaching result, together with a full mouth external bleaching (16% Carbamide peroxide for 2 hours during 20 days) provided a satisfactory result except on upper right central incisor. This would certainly present an optical challenge to restore.

Fig. 10 – Existing discolored composite restorations were replaced two weeks after the bleaching process.
Fig. 11  
Img. 11 – Adhesive composite restoration were performed on upper right canine and upper right lateral incisor.

Fig. 12  
Img. 12 – Central incisor restorations were also replaced. No posts were used as the authors considered there was sufficient remaining tissue.
Img. 13 – Once the restoratin were replaced, a direct mock-up was done chairside to test the aesthetic contours of anterior teeth.

Img. 14 – The direct mock-up served as a guide for the Ceramist to do a wax-up.
Fig. 15 – The wax-up was tested in the mouth.

Fig. 16 – After testing and discussing with the patient the possible shapes and contours, it was decided to perform ceramic feldspatic veneers on both central incisors and upper left lateral.
Fig. 17 – Mock-up driven minimally invasive preparations.

Fig. 18 – Final view of prepared teeth. Note that the right central incisor did not achieve the optimal color.
Fig. 19 – Small Class III composite restorations were maintained in the preparations. And large Class III were minimized using a more aggressive preparation in the incisal-interproximal zone to avoid a reduced (and potentially fragile) volume of remaining dental tissue in those areas.

Fig. 20 – The Ceramist Oleg Blashkiv made relatively thin (0.3 mm) feldspathic ceramic veneers. More opaque, higher value and fluorescent porcelain was used on the cervical area of the right central to mask the optical deficiency of the dental substratum.
Fig. 21 – Ceramic try-ins with water, where the color integration is being tested.

Fig. 22 – Testing fit after rubber dam placement.
Fig. 23 – Ceramic preparation protocol – 9% Hydrofluoric acid etching for 90 seconds.

Fig. 24 – Ceramic preparation protocol – 37% Phosphoric acid for cleaning.
Fig. 25 – Ceramic preparation protocol – Silane application after the ultrasonic bath.

Fig. 26 – Ceramic preparation protocol – Adhesive application before the clinical bonding procedure.
Fig. 27 – Final result 4 weeks after bonding. Although the cervical area of the right central is not perfect it is still very natural. This situation is probably better than having a higher volume restoration that could create other problems such as dentin invasion, optical umbrella effect and a more aggressive subgingival margin.

Fig. 28 – The natural texture done by the Ceramist also provides a beneficial light reflection in the area.
The simultaneous use of internal bleaching and ceramic restorations, in the present case, proved to be a conservative treatment option with a pleasing aesthetic and functional result, giving back a natural harmony to the patient’s smile.

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