Improving the Past with the Economic Realities of Today

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ABSTRACT

With economic times as uncertain as many have seen in their lifetimes, it is becoming increasingly challenging to assist patients with 'want' dentistry. The obstacles can become magnified when balancing the ideal pathway with the realities of one's discretionary funds. As such, treatment recommendations can become an acceptable compromise while still insuring an improved outcome. In this specific case, achieving a blended result between full coverage and veneer restorations added to the aesthetic demands of a satisfying outcome.

CASE REPORT

The patient, a vivacious 26-year-old female who works in the cosmetics industry, presented with an attractive smile marred by four unattractive veneers (Figs. 1,2). These restorations were approximately ten years old and were characterized by stained margins, opaque in appearance and bulbous in nature with no suggestion of colour gradation. Teeth #'s 12 and 11 were previously endodontically-treated. When viewed from the incisal the existing individual veneers are not symmetrical, contributing to the bulbous contour (Fig. 3). The appearance is further compromised when examining the gingival zenith of teeth #'s 12, 11, 21, 22 and noting the lack of symmetry at the margins.

After viewing the initial study models and photographs it was evident that the gingival height of #13 and #23 were not on the same plane setting up further discrepancies among the four incisors. Moreover, a slight midline cant to the left was of concern to the patient. When considered as a sum, there were a number of issues to address and a decision had to be made as to obtaining a wish list vs. achievable priorities. Because the canines displayed a pleasing contour, it was suspected that there was a mild cant, which resulted in the appearance of teeth #'s 13, 12, 11 shorter than 21, 22, 23. To correct this appearance gingival surgery may have unnecessarily exposed cementum and may not have achieved the desired result. The ideal pre prosthetic treatment would suggest



FIGURE 1



FIGURE 2



FIGURE 3


FIGURE 4


FIGURE 5


FIGURE 6


FIGURE 7


FIGURE 8


FIGURE 9


FIGURE 10


FIGURE 11


FIGURE 12

orthodontics to level the gingival contours among the four incisors framed by the canines. As the patient was looking for a more immediate result, time and additional finances were a strong consideration in the final treatment decision. To help visualize the outcome a diagnostic wax up was completed so that the patient could better understand the anticipated result (Fig. 4).

From a technical procedure it was decided that teeth #'s 11 and 12 would be treated with full coverage restorations and #'s 21 and 22 would be maintained as all ceramic veneers. At this stage it is critical that you have confidence your ceramicist can deliver a "mixed media" that, when bonded, presents as a single type of restoration. Understanding the procedure and recommendations for two crowns and two veneers, the patient requested to proceed with treatment.

Treatment initiated with the removal and placement of the core restorations on #'s 12 and 11. Subsequently, these teeth were prepared for full coverage restorations. Teeth #'s 21 and 22 were then prepared for veneers. This preparation is accomplished by following the gingival contour past the sulcus with the finish lines ending at the mesial-lingual and distal-lingual line angles. This technique insures a predictable fit at seating, excellent emergence profile at the contact points, and restricting staining of the margins to the lingual where they can be easily accessed and cleaned. Care and attention is taken to insure the margins do not go further than 1/2mm into the sulcus, to respect that the biological width is not violated and tissue tone is preserved (Fig. 5). Once all the preparations were complete, the margins were inspected for visibility and the body of the preparation was inspected from the incisal to insure that there was sufficient reduction from the labial. Satisfied that the preparations were ideal, they were ready for the final impression procedure.

Prior to taking the final impression, the sulcus was not packed so as to avoid mechanical manipulation. Expasyl (Kerr-Sybron, Orange, CA) was placed on the sulcus to achieve haemostasis and retraction. The material was left on for two minutes then washed off with copious amounts of water and the teeth were then dried



FIGURE 13



FIGURE 14



FIGURE 15



FIGURE 16



FIGURE 17



FIGURE 18

(Fig. 6). The final impression of the maxillary arch was taken with a standard polyvinyl siloxane material. The impression, opposing arch, occlusal registration (Kois Dental Facial Analyzer) and laboratory script were packaged and sent to the ceramist.

As teeth #'s 12, 11 had to be temporized 360 degrees and #'s 21, 22 had to be temporized as veneers, temporary coverage was achieved in the following manner. Full crown temporary coverage was fabricated for #'s 12, 11. The occlusion was adjusted and the face of both temps were prepared for pseudo veneer restorations. The full coverage temporaries were then temporarily cemented. Spot etch was applied to the centre of teeth #'s 21, 22. The etch was washed off after 20 seconds and non filled bond was applied to the entire surface of the tooth and temporary restorations (Intro Bond, Clinical Research, London Ontario) (Fig. 7). A non-filled bonding agent was used so that removal of the temporary restorations would be straightforward. Using a clear silicone matrix fabricated from the wax up, the buccal surfaces were filled with a flowable resin, (Intro, Clinical Research, London Ontario) positioned in the mouth and cured through the matrix (Figs. 8, 9). Once the flowable resin was completely cured, the matrix was removed and a final cure was performed. Using aesthetic trimming burs, the excess flash was removed and the occlusion was adjusted (Fig. 10).The contour was fashioned and the surfaces were polished. By temporizing in this manner, with the temporary crowns acting as sleeves with the veneer overlay, there is consistency in the appearance of the temporaries (Fig. 11). The patient was dismissed and appointed to insert the final restorations.

The patient attended for consultation with the ceramist prior to commencement of her treatment, where her aesthetic demands, in order to establish parameters for the restorative treatment plan, were discussed. Communication with the patient was essential to assist with the diagnostic treatment plan. Pre-op photos were taken to facilitate the correct orientation for the blueprint to be established. This blueprint was used to set the restorative protocols for the complete treatment plan. The gingival asymmetry present between the two maxillary central incisors was considered a situation the patient could live with, especially as her gingival architecture did not visibly show under normal social circumstances. Based on the patient's wishes for increased length of tooth, enhanced facial symmetry and greater visibility of her maxillary incisors, the diagnostic wax up became an integral part of the planning process. With the assistance of the pre-op photographs for orientation of the pre-op models, and with the use of the Kois Dental Facial Analyzer, the duplicate models were cross-mounted on a Sam 3 articulator. In addition to the diagnostic wax up, which represented the patient's aesthetic demands and



FIGURE 19



FIGURE 20



FIGURE 23



FIGURE 21



FIGURE 22

function, a silicone matrix for the provisionals, and several diagnostic reduction stents to allow for correct tooth preparation and alignment, were used to assist in case planning. Ensuring the clinical preparation and marginal contours are idealised, and in harmony with the proposed treatment plan, will maximize the aesthetics and promote good occlusion and function. Following these principals will ensure patient satisfaction, which in turn will promote longevity for the provisionals and the final restorations.

A subsequent consultation with the patient in her temporaries to evaluate for shape, form and function, as well as additional photographs was required. It is extremely important that comparisons and evaluations are made with models of the provisionals and the photographs, especially the full-face images, where midline contacts, incisal plane curvatures, facial contours and any unwanted cants can be detected by referencing to the patients face. Failure to do so at this stage can create difficulty for the laboratory to establish all the noted parameters. In addition, discussions of shade requirements, value requirements and levels of translucency based on tooth preparation colors are discussed at this time.

It was decided that IPS Empress (Ivoclar, Amherst, NY) would be the material of choice for the crowns and the veneers. The restorations were wax injected from a silicone mould fabricated from the model of the provisionals. This wax up required minor adjusting following the patient consultation with the provisionals in place. On reaching a satisfactory shape and contour and developing the occlusal and functional pathways, the wax restorations were pressed into ceramics as per the correct protocol required.

The seated restorations were checked under 20X magnification for any marginal imperfections and the correct interproximal contact areas were established. Facial markings illustrating reflective and deflective facial surfaces of the restorations were incorporated (Fig. 12).

At this stage the restorations were inverted for visualization of the facial contours and the symmetry of the incisal negative space. After shaping, the facial developmental grooves were established along with the required surface texturing (perykramata).

This was also established with the use of articulating ribbon in order to visualize and confirm the required symmetry prior to any additional ceramic layering techniques (Fig. 13).

The incisal edge and arch form were established visually as identified in Figure 14. This view allowed the facial contours and the interproximal areas and contacts to be viewed collectively.

With the facial contours estab-

lished and confirmed visually, the incisal cutback was completed. The incisal cutback allowed for higher translucency ceramics to be applied to the more opaque substructure. It is important to ensure that the internal anatomy of the restorations are anatomically correct compared to the facial anatomy of the restorations. Internally, the higher translucency and opalescent ceramics were layered on to the cutback as to establish the internal window. The lower translucency opalescent ceramics were layered over this window as to mask the internal dentine forms, giving a more natural and anatomically correct incisal appearance with the presence of an incisal halo. This can be seen after final glazing and rotary polishing of the restorations (Figs. 15,16).

The restorations were checked for the appropriate chroma and value on custom composite aesthetic custom dyes as to closely resemble the intraoral and clinical situation as best as possible (Fig. 17).

Final checking on additional virgin solid models was carried out, as well as a thorough check with all the patient's documentation, as it is essential to confirm that the patient's desires are being met and the restorations are ready for insertion.

Upon receiving the final restorations from the ceramist, and prior to the patients insert appointment, the models were inspected to insure that the restorations were completed on dyes with clear, identifiable margins. At the insertion appointment, the patient was anaesthetized and removal of the temporary restorations initiated. To remove the temporaries in a non-traumatic fashion, slices were made between the teeth to remove the effect of splinting. As teeth #'s 12 and 11 are full coverage, they were removed with a haemostat. Teeth #'s 21 and 22 were gently sectioned and torqued apart. All four abutments were cleaned with a sodium hypochlorite-pumice paste to insure all debris is removed. The two all-ceramic crowns and two veneers were tried in with try-in paste from the Rely X Veneer Cement Kit (3M, Minneapolis, MN) to insure that the patient is pleased with the appearance of the new restorations. To avoid possible future patient dissatisfaction/buyer remorse, our office insists that the patient brings a spouse/friend/colleague to assess the appearance of their new restorations prior to insertion. Once the patient and companion have approved the new restorations and documentation is made in the patient's chart, then we are comfortable proceeding with final cementation process.

As teeth #'s 12, 11 and 21, 22 are of different mediums, their cementation protocol were also different. The teeth and underside porcelain surfaces for restorations #'s 21, 22 were prepared for veneer insertion according to manufacturer's instructions. To insure that tooth # 21 was seated correctly, #11 was placed passively for proper alignment. Excess bonding resin was removed and #'s 21 and 22 were bonded into position (Figs. 18,19). At this point, all the excess bonding resin was removed on the lingual, subgingival and interproximal. Subsequently, teeth #'s 12, 11 were cemented into position using Rely X luting cement (3M, Minneapolis, MN). (Fig. 20) At this stage, final cleanup and adjustments were completed insuring that all contacts were flossed. To return the surface gloss of the four restorations, they were polished with fine and extra fine polishing paste (Cosmadent, Chicago, IL).

At this stage, an upper alginate impression was taken for the fabrication of an Essex retainer to be worn at night. The purpose is to offer protection of the porcelain and act as a retainer preventing any movement. The patient was instructed to do warm salt-water rinses two times per day for the next week so that the gingival tissues would heal around the new restoration. The patient was then scheduled to return seven days later for dispensing of the Essex retainer, check of the new restorations — including removal of any left over resin tags and final photographs (Figs. 21-23).

Being able to meet or exceed a patient's expectations in this high demand, immediate gratification environment that is characteristic of current cosmetic dental practices, is proving more and more daunting. Adding to the challenges are the realistic financial realities of the day. To be able to create a treatment plan that follows clinical principles and standards of practice, that in the end benefits the patient while working within their boundaries, is clinical success in the new millennium. It is imperative when viewing these cases, whether complex or straightforward, you address the patient's concerns and deliver an ethical recommendation in a predictable fashion. **OH**

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Oral Health welcomes this original article.