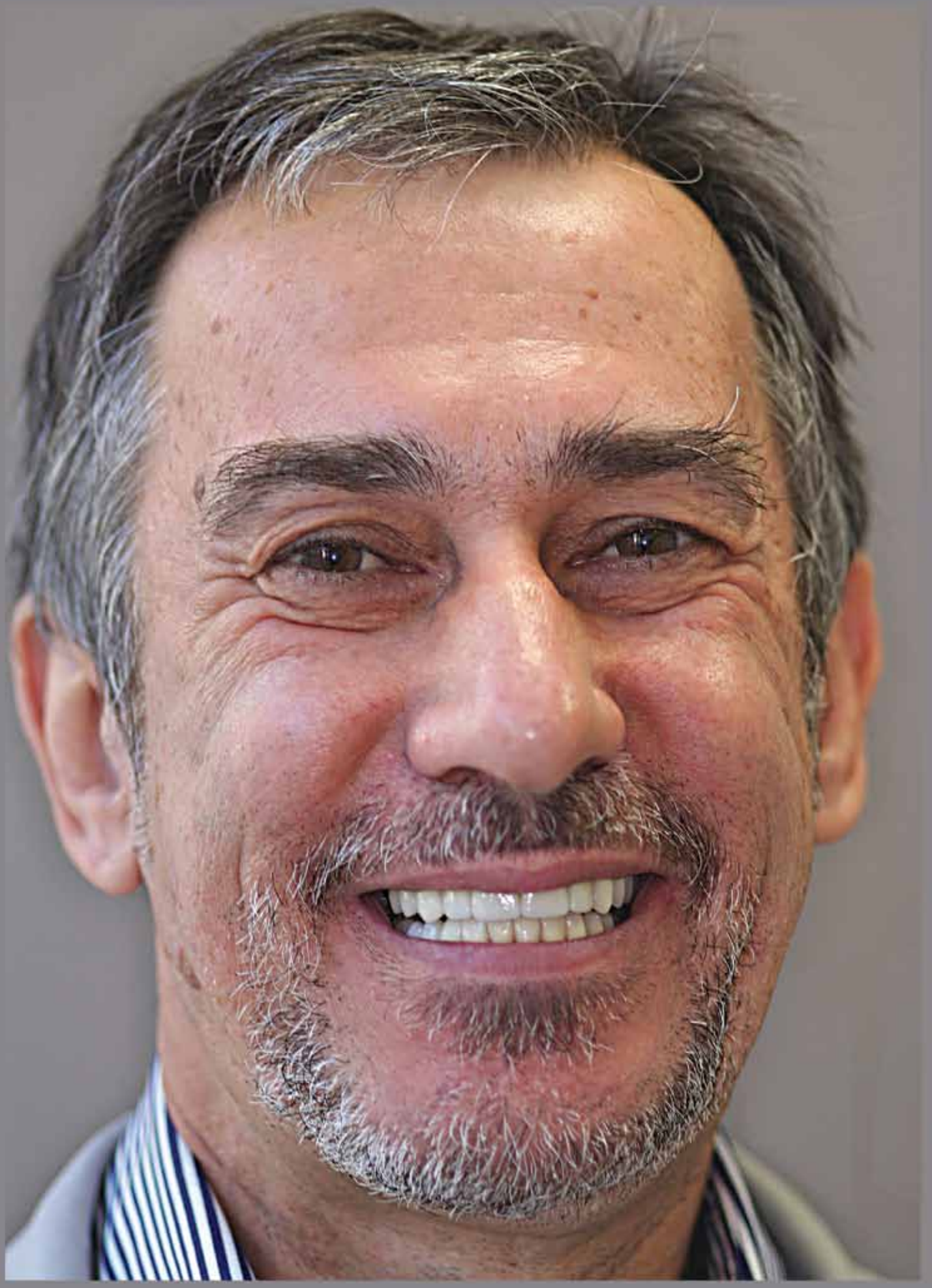

Predictable Strategies for the Baby Boomer Generation

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ABSTRACT:
Busy professionals are trying hard to make every moment count in their daily lives, keeping in mind that as they age (the first baby boomer turned 65 on January 1/2011) they want to keep their appearance youthful for a number of reasons. This could include appearing fresh in their employer's eyes or mindful of Generation X nipping at their heels. These professionals notice the changes in their appearance and are apt to make the corrections. As a recently aired segment on a daytime talk show, this case illustrates how a busy lawyer realized the need to enhance the appearance of his smile. Not just confined to females, males in increasing numbers are realizing the benefits of cosmetic dental procedures that turn back the clock to reveal confidence and wisdom in a rejuvenated package.

At 56 years of age, Brian, a family law lawyer, knew that his mouth was in need of rehabilitation. He was aware of posterior periodontal problems and was displeased with the appearance of his front teeth and overall look of his smile. Simply wanting to correct the functional deficiencies and vastly improve the appearance of his smile finally motivated him to seek out comprehensive care. Moreover, Brian was acutely aware of the "first impression" factor when meeting perspective clients as well as feeling comfortable in his social life.

As this makeover was ideal as a segment on a popular daytime talk show to highlight both, the benefits of reconstructive/cosmetic dentistry and the demographic factor indicating that males perceive the benefits and need to maintain a healthy mouth, co-ordination with filming was paramount. This case required significant input from a periodontist and master ceramist, as such, overall sequencing was vital.

In usual fashion, the process began with an in-depth medical history review which was found to be non-contributory. This would then be followed by a comprehensive examination consisting of a complete set of digital x-rays, an odontogram with a periodontal assessment, digital photographs, and upper and lower study models that are mounted on a John Kois Facial Analyser articulator based on the Kois registration system. With information gathered at the initial examination, a diagnostic wax-up is created from the existing mounted study models. This wax-up will form the basis of a go forward illustration for the patient, general dentist, periodontist, and master ceramist. Meetings with the periodontist and master ceramist were scheduled to provide a clearer picture of the proposed treatment plan prior to the final consultation with the patient. This office philosophy mirrors the second habit in Stephen Covey's book, *Seven Habits of Highly Successful People*, "Begin with the end in mind." In addition, as this case was highly publicized, complete informed consent, including

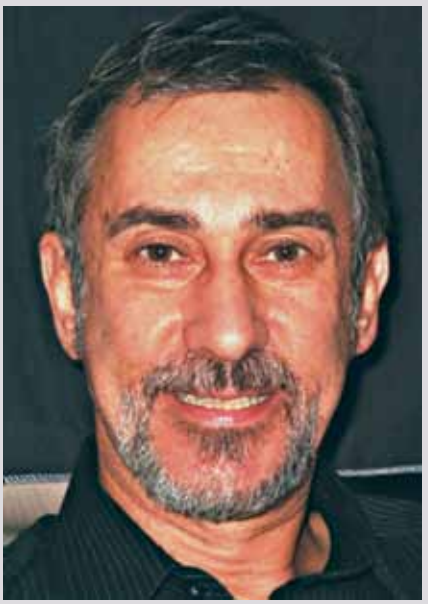

FIGURE 1

FIGURE 2

FIGURE 3

photographic release, had to be obtained on all the procedures. Proper scheduling also had to be determined to meet his busy professional schedule as well as the availability of camera crews.

DENTAL EXAMINATION

The dental assessment indicated a number of deficiencies from both a functional and cosmetic perspective. The initial examination revealed the following (Figs. 1-6);

— Missing teeth #'s 18, 16, 15, 25, 26, 38, 47, 48,
— Short clinical crowns #'s 12, 11, 21, 22,
— Bridge 17-(16, 15)-14-13 with poor bone support and short clinical roots at 17,
— Periodontal involvement with teeth #'s 36, 37,
— Short clinical root #24.

Based on the above gathered information the initial treatment plan that began to formulate was as follows;

— Sanative phase with our hygienist,
— Section bridge and remove #17 and remove #24,
— Assessment with the periodontist to correct bone deficiencies at #'s 36,37 and crown lengthening of teeth #'s 12, 11, 21, 22/32, 31, 41, 42,
— All ceramic crown on #12, splinted PBM crown 13,14 with cantilever on #15, veneer on #11,
— Veneers on #'s 21, 22, PBM bridge 23-27,
— Composite build up #'s 37, 36, all ceramic crowns on 35, 34, and veneers on #'s 32, 31,
— Composite build up on #46, all ceramic crowns on 45, 44, and veneers on #'s 42, 41.

To help visualize this, a diagnostic wax-up was prepared to illustrate the anticipated outcome, including the fabrication of a surgical guide stent for anterior crown lengthening (Fig. 7). The next step was for the patient to meet with the periodontist, Dr. Livia Silvestri, to do a complete periodontal assessment to verify that the clinical treatment plan could in fact be carried out with a high degree of predictability.

PERIODONTAL EVALUATION AND TREATMENT

The periodontal management of the anterior zone involves the consideration of aesthetic as well as functional principles upon diagnosis, which are relayed to the treatment phase.

A critical goal of treatment is long-term stability of the result. As such, much attention is devoted to the meticulous accumulation of diagnostic data prior to treatment in order to preserve the integrity of the dentogingival junction and ensure the harmonious existence of the prosthetic dentition and periodontium. The patient's medical history was non-contributory.

Upon intra oral examination, the gingival tissues surrounding teeth #'s 12 to 22 and 32 to 42 were pink and firm but asymmetrical and of non-ideal contour. This is important as abnormalities in symmetry and contour can significantly affect the harmonious appearance of the natural or prosthetic dentition. Clinical examination of teeth #'s 12 to 22 and 32 to 42 revealed shallow probing depths, no mobility and adequate amounts of keratinized attached gingiva. Radiographic examination revealed no significant findings. The crestal bone level of teeth #'s 12 to 22 and 32 to 42 was within normal limits. Teeth #'s 36 and 37 had been recently treated with periodontal surgery as was reflected in their bone anatomy.

In order to achieve the ideal teeth proportions and aesthetic result that the patient sought, aesthetic crown lengthening was recommended to allow a healthy, optimal relationship between the teeth and the periodontium.

As viewed in Figure 7, a wax-up of the anterior maxillary teeth was done to determine the incisogingival length, the mesiodistal width and the contour of the teeth

FIGURE 4

FIGURE 5

FIGURE 6

that would lead to a pleasing appearance and a surgical stent was made from the wax-up. The amount of gingival recontouring and ostectomy was guided by the stent.

The procedure began with the administration of local anaesthetic (three carpules in the maxillary region and two in the mandibular region of 2% lidocaine with 1:100 000 epinephrine). The initial inverse bevel incision was performed so as to achieve the ideal contour on the anterior teeth. This incision is carried out in a parabolic manner, with the most apical point or gingival zenith for the central incisors located just distal to the tooth axis and the gingival zenith for the lateral incisors coinciding with the tooth axis. The marginal gingival height for the maxillary central incisors is at approximately the same level as the height for the canines, whereas the marginal gingival height for the lateral incisor is slightly lower. The papillae were raised in a split-thickness fashion followed by a full-thickness flap apically. Thus, the papillae were kept intact palatally to avoid tissue recession. Osseous resection, performed only on the buccal surface, exposed 3mm of root surface from the restorative margin to the alveolar crest. The flap was apically repositioned and sutured with 5-0 chromic gut suture. The medications prescribed for the patient included: (i) amoxil, 500mg, 2 tabs stat and 1 tab T.I.D for 7 days, (ii) Chlorhexidine rinse 0.12% bid for 7 days and (iii) ibuprofen 400mg tid for three days. The patient was given appropriate post-operative instructions and was seen seven days post-operatively without any complications.

Once the periodontal treatment and post-operative evaluation was complete, the patient was placed on warm salt water rinsing B.I.D for eight weeks to allow complete healing of the gingival complex and the re-establishment of a probable sulcus. As the restorative appointments approached the patient met with master ceramist, Trevor Laingchild. This was to review the wax-up with respect to the shape and contour of the new teeth and begin to discuss the shading of the final restorations, as well as give input to the patient's ultimate goals. Once the patient had been placed in temporaries he again met with the master ceramist to review the appearance of the temporaries, which were fabricated from the wax-up, for a final discussion as to the appearance of the new restorations. Based on the formation of a probable sulcus, the patient was ready for the restorative phase of his treatment.

The initial post periodontal appointment began with the preparation of teeth #'s 27, 23 and the fabrication of a temporary bridge with Protemp Plus (3M Corporation, Saint Paul, MN). As the vertical height of dimension was not to be changed, the temporary bridge was adjusted to occlude with the existing lower arch. A post and core build up was prepared on tooth #12, followed by the preparation of #'s 13 and 14 splinted to support a cantilever #15. These teeth were also temporized with Protemp Plus. (3M Corporation, Saint Paul, MN) Subsequently, teeth #'s 12, 11, 21, 22 were prepared for veneers. To accomplish a predictable emergence profile, the veneer preparations were completed in the following fashion. Using the Strategic Esthetic Protocol Kit (created by Brassler USA and Soll J.) the contacts were removed using a

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FIGURE 7


FIGURE 8


FIGURE 9


FIGURE 10


FIGURE 11

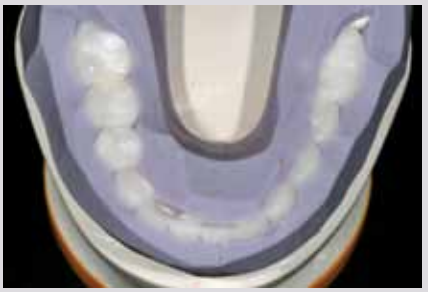
FIGURE 12A

mosquito burr (#8329-016). The surface and inter-proximals were prepared so that the margins finished on the lingual surfaces of the teeth giving the appearance of a ¾ veneer. This insured that the emergence profile appeared natural and free from staining.

Once all the preparations were complete, arrangements were made for the final impression. Non-impregnated "30" cord was placed in each sulcus followed by Traxodent (Premier Dental, Plymouth Meeting, PA) dispensed around the circumference above the sulcus to insure a dry field. After approximately two minutes the Traxodent was washed off and a complete maxillary polyether impression was taken with Impergum (3M Corporation, St. Paul, MN). To allow for mounting the maxillary arch to the John Kois Facial Analyser articulator, a Kois occulsal registration was taken of the prepared maxillary arch. The lower arch will be recorded and mounted once it is prepared. At this stage, the temporary crowns on 23-(24, 25, 26)-27 and 13, 14-(15) were passively seated and, using a clear matrix stent derived from the wax up, temporary veneers were placed on teeth #'s 12, 11, 21, 22 using the spot etch technique (Soll J. *Oral Health*, Dec.'08, page 9) (Fig. 8). After the temporary bridges were cemented with Rely X Temp NE (3M Corporation, Saint Paul, MN) and occlusal adjustments completed, the patient was scheduled for preparation of the lower arch.

At the following appointment, the lower arch was addressed. The amalgams in teeth #'s 37, 36 and 46 were updated with composite build ups, contoured and polished. Teeth #'s 34,35 and 44, 45 were prepared for full coverage all ceramic crowns with the temporaries fabricated from the wax-up stent using Protemp Plus (3M Corporation, Saint Paul, MN) The occlusion was balanced with the existing maxillary temporaries. To complete the mandibular arch, teeth #'s 33, 32, 31, 41, 42, 43 were prepared in the same fashion as the maxillary anterior veneers. Once all preparations were complete, the final impression was undertaken in the same fashion as the maxillary arch. Upon confirmation of the completeness of the final impression, occlusal registration of the lower arch to the top arch was achieved by way of using cross arch stabilization of the temporaries for the right and left sides. Once the occlusal registrations were achieved, the temporary crowns were cemented using Rely X Temp NE (3M Corporation, Saint Paul, MN) The lower anterior veneer preparations were temporized using the spot etch technique, as described above. The lower impression, occlusal registration and impressions of the maxillary and mandibular arches in temporary restorations, were sent to the laboratory for fabrication of the final restorations. As mentioned previously, at this stage the patient met with the master ceramist to review his progress to date and advise of any changes or improvements that he would like to see in the final restorations. Try in and finishing of the restorations was done in two stages. As a confirmation of fit of the PBM bridge 23-27 and the splinted 13, 14 with the cantilevered 15, they were initially returned for try in with check radiographs taken to assure the interproximal seal. Satisfied with the fit of the gold frameworks, they were sent back

FIGURE 12B

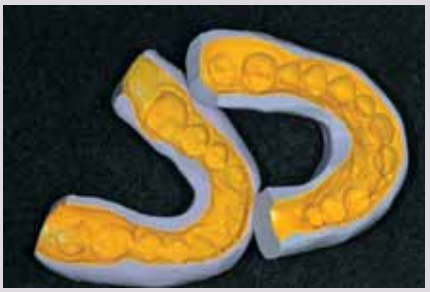

FIGURE 13A

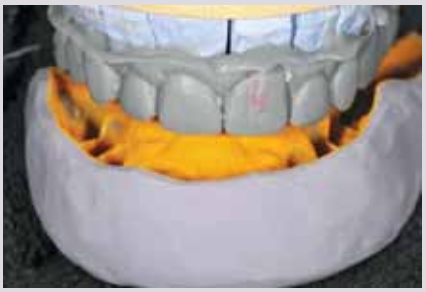

FIGURE 13B

to the laboratory for completion of the restorations.

LABORATORY COMMUNICATION AND FABRICATION

To insure that there was a predictable outcome of the reconstructive and cosmetic dentistry elements of this case, a clear and concise communicative endeavour between the Clinician, Patient and the Laboratory had to be established. As such, a precise protocol was to be adhered to. Failure to follow this protocol would jeopardize the outcome, both from a functional and aesthetic parameters.

At the outset of the ceramist/patient dialogue, is the mounting of the pre-operative study models on a reliable articulator such as the John Kois Facial Analyzer. It is critical that the patient's study models are mounted on the articulator in such a way that insures that the patient's dental anatomy is correctly represented when related to the horizontal plane. Any discussions relating to positioning and the long axis of any teeth have to include a standardization of the maxillary model position on the articulator to that of the patient's mouth. Once completed and a standardized set of approved photographs gathered, discussions with the patient to fulfill his aesthetic and functional requirements could begin.

With the knowledge that Brian's new smile would have a significant improvement in color and value, the parameters focused on the following;

- Facial Alignment
- Exposed Length of the Maxillary Teeth
- Gingival Architecture
- Width of Teeth
- Long Axis of Teeth
- Incisal Positioning of Teeth
- Incisal Embrasures
- Smile Curvature
- Overall Symmetry

Aware of the clinical boundaries of this case when relating to the above points of discussion, it was apparent that an absolute symmetrical design and an achievement of a total aesthetic ideal would be challenging. To provide the patient with a pleasing outcome that would honour our commitment to avoid incorporating a removal denture or implants at this time, a balanced approached was suggested to the patient what which would benefit him aesthetically with long term predictability.

Laboratory study models are fabricated in any color of choice, but should always differ in color from the duplicate. In addition, study models should not be adjusted or waxed on, but be a true representation of the patients pre-existing oral condition. This image shows the asymmetry of the gingival, facial alignment (especially of the canines) and the incisal embrasures (Fig. 9). Discrepancies in the ideal exposed tooth structure and a visible asymmetry in the length to width ratio, gave a smile which had considerable changes to be made, most notably, with his maxillary incisors. The unmounted model when placed on a black background, illustrates clearly the incisal asymmetry.

The mounted models, when related in discussions with the patient, show the functional issues and the minor long axis alignment, which can now be compensated for (Fig. 10). This image illustrates incisal positioning when related to the horizontal. Changes which are proposed to the incisal edge need to be related to a constant horizontal plane, or a given line in the case of additional facial discrepancies. With the completion of a diagnostic wax up, it can be seen that there has been a proposed improvement in many of the issues which were previously discussed (Fig. 7).

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FIGURE 14

FIGURE 15

FIGURE 16

Most notably:
- Improved Gingival and Incisal Architecture
- Improved Facial Alignment
- Improved Length to Width Ratio (though not ideal)

Functional considerations are assessed and implemented on a Sam III articulator. The mandibular and maxillary posterior teeth are waxed into the correct occlusal positions and checked for any interferences. Final checks are carried out prior to delivery to the dental office (Fig. 11).

The initial wax-up is considered only a preliminary diagnostic tool which can be used for many purposes. As such, in this particular case, it was used as a guide for the periodontal surgery, which assisted the Periodontist with the proposed new architecture.

An important tool for the clinician are the silicon matrixes that are fabricated to assist in the tooth preparations.

With all ceramic restorations the thickness can vary the color and the value of the final result. Consequently, a well constructed matrix will act as a guide during the preparation appointment to illustrate the external position of the final restorations. The clinical preparation can now be idealized within the shape of the proposed restoration (Figs. 12a & b).

To assist in the preparation of the final restorations, the diagnostic wax-up was used as an additional matrix which allowed the injection of wax onto the die-trimmed model to produce an accurate dimension of the intra treatment provisionals (Figs. 13a & b). Once done, the wax was trimmed and shaped to the ideal form in preparation of the ceramic pressing. The pressings were fabricated using IPS e.max lithium disilicate ceramics. The pressed full contour restorations were shaped and cut back as to allow the aesthetic ceramic layering, within the incisal and enamel areas. Recontouring, layering and polishing were completed on the solid models as to allow for optimum fit and adaptability.

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Once all the restorations were positioned on the models and examined for completeness, they were etched internally for 20 seconds, sterilized, packaged and sent back to the dental office for insertion (Figs. 14-16).

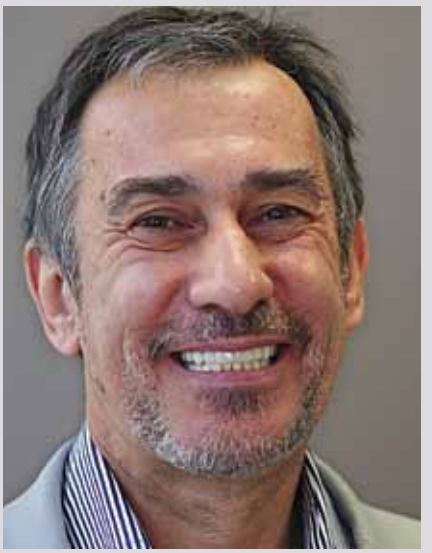

FIGURE 17

Upon arrival from the laboratory, and by way of a second check prior to insertion, the restorations were checked on the model for fit and contour. The temporary veneers were removed first by way of using a mosquito burr (#8329-016 Brassler USA) to section each temporary from each other and removed with assistance of a U15 scaler. The temporary crowns were removed with a haemostat and all abutments were scrubbed with a mixture of pumice and sodium hypochlorite. The maxillary and mandibular posterior sections were tried in first. 13, 14-(15)/44, 45 and 23-(24, 25, 26)-27/34, 35 with subsequent balancing of the occlusion. The veneers for teeth #'s 12, 11, 21, 22/33, 32, 31, 41, 42, 43 were tried in with try-in paste to confirm fit and contour. Once the patient approved the appearance of the veneers and the overall appearance of the smile, the veneers were

FIGURE 18

FIGURE 19

FIGURE 20

FIGURE 21

FIGURE 22

removed for preparation before the final cementation. To insure colour stability, the veneers were applied first, as the crowns could be adjusted, if needed to match the bonded veneers.

The veneers were etched, silanated, and bonded (without curing) while the abutments were scrubbed, etched and adhesive applied. The veneers were placed into position with Rely X Veneer cement (3M Corporation, Saint Paul, MN), excess material was removed and the veneers were cured for 10 seconds on both the buccal and lingual faces.

At this time the excess material was removed and the contacts were separated. The veneers were then completely cured and all remaining resin tags were removed with a #12 blade. Final occlusal corrections were done based on the posterior segments and when complete the lingual finish lines of the veneers were trimmed and polished.

With the completed veneers in place, the lower crowns 34, 35/44, 45 were cemented into place with Rely X Luting Cement (3M Corporation, Saint Paul, MN). Prior to the final insertion of the bridge 23-27 and 13, 14-(15) the colour was confirmed to match the veneers and patient approval obtained. In addition, final occlusal adjustments were made and the remaining PBM crowns were cemented with Rely X Luting cement (3M Corporation, Saint Paul, MN). The patient attended one week later for a follow up assessment, including inspection and removal of cement remnants, adjustment of occlusal interferences and final photographs (Figs. 17-21).

As the baby boomer generation officially reaches the age of "social security", as defined by North American governments, many simply do not feel the urge to stop working. There is vibrancy among this segment of the population that takes appearances far more important than the generation before them. To this result health clubs, the exercise industry and beauty rejuvenating aids are a multi-billion dollar business. Part of this consciousness is focused on facial appearance, including the restoration and enhancement of a worn dentition. As this patient can attest in his follow up visits, he feels that his confidence level has increased enormously, his mouth feels healthy, and he is motivated to maintain a daily oral care regimen, including three month visits to the hygienist. The willing participation as the focus of a dental makeover on national television only reinforced the patients delight with his result. **OH**

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Oral Health welcomes this original article.