

Aesthetic and restorative management of the anterior dentition: a simplified approach

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Management of the anterior dentition has been at the forefront of patient-led elective treatment for many years. Current trends offer many more options for both patient and clinician than ever before. As has always remained to be the case, it is case selection that forms one of the most important factors in clinical success. Consideration of risk factors is also a fundamental consideration when treatment planning prior to informed consent and execution of treatment¹. The main risk factors to consider when treatment planning for any restorative case would be:

1. Periodontal considerations
2. Biomechanical considerations
3. Functional considerations
4. Dento-facial considerations.

Once risk factors for all these groups have been reduced or eliminated, the pathway to planning and execution of treatment becomes much simpler. This will always be the case, even if a patient presents with what appears to be a mild

aesthetic complaint. It will be essential to consider these classifications with every case to avoid overlooking any factors that may otherwise compromise treatment or the quality of the outcome in terms of predictability and longevity. Consideration of the aesthetic factors has traditionally been related to ensuring that occlusal and orthodontic ideals are met. Facially driven diagnosis can be used to evaluate facial changes that occur with dental occlusal change.²

In other words, the aesthetic ideal may be seen as being determined by 'where the teeth fit in the face'. Assessing patients by order of risk analysis is a method by which treatment options can also be made simple by means of evidence-based modalities that will work in the clinical case being treated at that time. Such theories can be applied on a general practice level.

The following case shows how appropriate assessment and case execution resulted in a successful outcome from a biological, ethical

and clinical perspective. The illustrated patient who is a regular patient of the author presented at a routine examination commenting that after many years, she wished to improve her smile. The chief complaints of the patient were (*Figure 1*):

- Discoloured old veneers
- Gum recession and marginal exposure
- Small gap in between the teeth.

Full investigation and discussions with the patient revealed no issues from a periodontal or biomechanical basis. It was apparent from a functional perspective that there was insufficient clearance to allow the upper central teeth to be corrected orthodontically by means of retraction and de-rotation without corrective orthodontic therapy to the lower anteriors (*Figure 2*). Whilst evidence suggests the imbrication of the lower anterior teeth may worsen over time, the patient did not wish to consider orthodontics to both upper and lower teeth at this time. As a



Figure 1: a-c – Pre-operative Status Extra Oral

Figure 2: a-c – Pre-operative Status



result, clinical management needed to involve a strategy that allowed the patient the option of this in the future. A constricted envelope of function was diagnosed to have contributed to the mild incisal wear to the upper central incisors (Figure 3). As the incisal edge wear had been monitored over a number of years, it was felt that this was too mild to treat, as it did not concern the patient and was felt to be rather more inactive from a clinical perspective.

Clinical observations:

- Medium lip display (69% of the population)³
- Excellent levels of periodontal health
- Mild recession to 12, 22, 31, 41 – stable
- Moderately restored dentition
- No existing defective restorations
- Very low caries rate
- No erosive component
- Historically restored rotated upper lateral incisors (12 & 22)
- Minimal upper anterior frictional wear – Now adapted as stable

- Stable maximum intercuspation position (MIP)
- Upper central incisors mildly rotated
- Moderate lip mobility
- Upper midline coronal diastema approximately 1mm
- Intact but discoloured porcelain veneers to teeth 12 & 22
- Un-aesthetic axial inclinations of 12 & 22.

Once treatment was fully consented, a functional wax up of 12 & 22 was obtained using a facially driven approach.⁴ Shades were recorded at the beginning of the preparation appointment using photography, a shade guide (Vita 3D) and daylight lamp (Trushade, Optident). This avoided the issue of dehydration of the natural tooth tissues during preparation adversely affecting the judgement of the shade prescription. The existing porcelain veneers were then carefully removed. It was essential to ensure that the level of tooth preparation was kept to a minimum as a result of veneer removal (Figure 4). For this reason

and as part of the normal preparation protocol the teeth were prepared using a combination of diamond burs (KS1 Brasseler) and sonic handpiece with tips (NSK). The prepared teeth were also polished using a combination of sized and textured discs (Cosmedent). Complete removal of the old ceramic work resulted in slight marginal inflammation to 12 as this was more inset and had thicker ceramics to the cervical aspect. This was controlled using retraction cord (oo Gauge, Ultradent).

Given that the laterals were de-rotated in the original preparation, care was taken with the distal aspects to ensure sufficient clearance was gained whilst being conservative and ensuring no iatrogenic damage occurred to 13 & 23. This was achieved by placing a metal matrix strip between the teeth. This enables the clinician to retain as much enamel as possible for future bonding. Wedging was not preferred as it was felt this would affect tooth position at impression stage.



Figure 3: a-c – Preoperative Status illustrating mild incisal tooth surface loss

Figure 4: a-c – Preparations of 12 & 22



A full photographic and clinical prescription was given to the laboratory and matched shade provisional veneers were placed onto the teeth (Luxatemp – DMG) using spot etch (36% phosphoric acid – Henry Schein) and resin adhesive (Kerr Optibond 2FL). The provisionals were contoured and reviewed to ensure the patient felt functionally comfortable as well as being aesthetically pleasing. Given the adapted constriction that was present, it was important to ensure sufficient space existed in centric and functional movements to avoid interferences and subsequent debonding of the provisionals (Figure 5). Provisionals were confirmed by patient and clinician within 1 week. Accurate impressions and photos were then taken and sent to the laboratory for definitive fabrication.

On return the provisional restorations were assessed for occlusal stability and soft tissue health. They were then atraumatically removed using a red-

band composite finishing mosquito bur (Heraeus Kulzer) to carefully section and separate. The underlying preparations were initially cleaned using a soft silicone cup (Henry Schein) and aluminium oxide impregnated point bur (Heraeus Venus Supra – Pink) at slow RPM. This enables any adhesive to be removed from the preparation surface without affecting the morphology of the preparation.

The veneers were initially tried in on the master die model and assessed for overall integrity of fit and passivity of seat. They were then tried onto the preparations using water as an interface. Given the thickness of the veneers and the conservative nature of the preparation, the veneers were created using high value enamel shades thus being able to use the Hue and Chroma of the underlying prepared tooth to blend in with the surrounding natural tooth structure. It was felt that no colour adjustment was necessary and so no further chromatic try-in procedures were

required. The patient was then shown the passively seated restorations in the mirror for aesthetic evaluation and verification. Care was taken for the patient not to close her mouth at this stage. As the veneers and preparations had been contaminated during the try-in, the next process involved conditioning of the fitting surface of both restorations and preparations.

The teeth were isolated using rubber dam (Henry Schein heavy gauge latex dam) and retained using widgets, floss ties and a framework; no clamps were required. Retraction cord was carefully placed into the gingival sulcus (00 Gauge, Ultradent). The prepared teeth were isolated from the adjacent teeth by using PTFE tape and etched using 36% phosphoric acid for no more than 20 seconds. The teeth were then washed for 15 seconds and gently dried using sterile gauze. Translucent bonding resin was then applied liberally to the prepared teeth (I-bond, Heraeus Kulzer) and



Figure 5: a-c – Provisional restorations

Figure 6: a-c – Delivery of veneers note the dehydration of the natural teeth



cured for 30 seconds. The veneers were subjected to a protocol of ceramic disinfection, ultrasonic cleaning in 95% alcohol⁵ for 4 minutes and a 2-bottle silane application (DMG).

The veneers were seated using an achromatic heated composite (Inspiro Skin Tr, Optident) and cured for 60 seconds with a further 40 seconds once excess had been removed and air block placed (pharmaceutical glycerine). Once complete, it was clear to view the relative dehydration that had taken place. *Figure 6* illustrates the case at delivery of the veneers. Note the patient's oral hygiene strategy contributed heavily to the health of the tissues at the seat visit.

Two weeks were allowed for the tissues to settle and complete rehydration of the teeth to occur. At this point, no-preparation direct resin bonding using a freehand technique was carefully applied to infill the small midline diastema. Advice was given to the patient that

she must accept slightly wider teeth as a consequence and this was happily accepted. It was noted that crown-width might introduce an aesthetic discrepancy. This fact proved to be more of a concern for the author than the patient,⁶ as she was not concerned. Teeth 11 & 21 were cleaned using particle abrasion. This was in the form of 27micron alumina set at 4-bar pressure (Prep-Start, Danville Engineering). The mesial aspects of 11 & 21 were etched (36% Phosphoric – Henry Schein) before application of a translucent bonding agent (I-bond – Heraeus Kulzer). Care was taken to keep the area of etch localised to the site to avoid unnecessary demineralisation. Two shades of composite resin were applied in small quantities to create the diastema closure. Selection of these shades was based on a high value composite resin with matching translucencies to the natural dentition. High surface lustre was also taken into consideration for the proposed finish point. Care was taken to maintain within the line

angles to aid in blending margins so they appear minimally detectable. An opalescent translucent (achromatic) shade was used as well as a high-value enamel shade (Inspiro Skin Tr & Bl, Optident). A curved matrix strip was used to aid in correct morphology to close the diastema (Varistrip, Garrison) equally between the two teeth. The cured restorations were minimally adjusted using fine diamond strips (West-One) and diamond finishing paste (Enamelize - Cosmedent). The cured restorations had air blocker applied (pharmaceutical glycerine) for 60 seconds and were polished using a combination of coarse, medium and fine discs (Cosmedent) and goat-hair brushes (Micerium). Slight dehydration had occurred and the patient was made aware of this (*Figure 7*). As a result, a review appointment was scheduled for review and a final polish.

Upon review, the patient was very happy with the outcome. She reported having had no functional issues, indicating an acceptable



Figure 7: a-c – Immediate Post-operative result showing dehydrated natural teeth

Figure 8: a-b – Pre-operative compared to post-operative showing aesthetic integration



level of function. Final polish was completed using felt wheels (Micerium). Once complete, the functional and aesthetic result was evaluated and the patient shown in the mirror. Post-operative advice was given and the patient was discharged from this course of treatment.

One of the biggest advantages for the general practitioner is the ability to assess longevity. In this way, the profession is able to learn about what has the highest levels of predictability, using evidence-based science in terms of treatment planning together with anecdotal evidence once treatment has been executed. This provides us an effective backup when supporting cases in front of peers, patients and other such bodies.

This patient then attended for her 6-month examination as a routine. She continued to be very happy with the outcome and had experienced no issues. Clinical evaluation was carried out covering aspects such as occlusal stability, aesthetic integration and recession control, diastema closure maintenance and longevity of direct resin restorations. Short-term longevity evaluation showed predictable and consistent results with excellent tissue stability as well as consistent direct resin



Figure 9: a-b

Figure 10: a-c



Figure 11



Figure 12



Figure 13

polish and finish. Oral hygiene had been maintained to an excellent level indicating the patient's motivation and sense of perceived value in the treatment undertaken. Given the direct resin bonding was of such small quantity, particular note was taken of the predictability

of the result in a functionally high-risk position (*Figures 8-12*).

Conclusion

Treatment modalities vary hugely and this simple treatment plan could have been fraught with issues had

the comprehensive assessment and planning in terms of functional stability not been appreciated. Failure could have included loss of direct resin bonding, discomfort and fremitus to 12 & 22 as well as debonding or chipping of porcelain veneers. In this way, the treatment

has also proved to be simplistic and cost effective for the patient. It is noted that a degree of future-proofing has also been built in by placing the direct resin bonding onto unprepared teeth, as the patient could elect to have orthodontic treatment at any time. It is essential that further longevity evaluations of such cases be carried out by the general practitioner, so that correct treatment planning and execution can be backed up not only by science but also by anecdotal evidence from clinical practice.

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