

Provisional restorations in complex restorative cases

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Fig. 1 _ Smile photograph, showing asymmetry in smile, maxillary cant, slanted midline, negative buccal corridor and poor axial inclination.

Fig. 2 _ Retracted frontal photograph.

The aesthetic rehabilitation of patients with functionally compromised dentition frequently involves a multidisciplinary approach, incorporating several different treatment modalities. A correct aesthetic and functional diagnosis with an appropriate treatment plan, as well as careful material selection and application, are critical factors in the successful restoration.

The following case presentation demonstrates a multidisciplinary approach to recreating an aesthetic smile in a female patient with functionally and aesthetically compromised dentition.

Patients requiring prosthodontic rehabilitation often have multiple concerns (aesthetic, functional and health) and have avoided treatment for some time, owing to fear, cost and time constraints. It is the goal of treatment to provide aesthetic and functional dentition with minimal maintenance over the long term.

_Treatment planning and procedures

The primary objective was to recreate an aesthetic smile and to establish a functional occlusion. This involved orthodontic, periodontal and restorative modalities:

1. *Periodontal treatment:* The patient underwent preliminary treatment that included professional oral hygiene and reinforcement of oral hygiene practices.
2. *Orthodontic treatment:* The tipped and drifted mandibular teeth that were a consequence of the missing teeth were corrected.
3. *Diagnostic wax-up:* This allows the team to preview the desired aesthetic appearance. The diagnostic wax-up provides a guideline for the desired treatment and a blueprint for the final restorations. This wax-up also allows the manufacture of putty keys for provisionalisation and reduction guides for the preparation process.

Fig. 3 _ Orthodontic treatment in order to upright tipped teeth and correct occlusal plane.

Fig. 4 _ Gingival recontouring completed.





Fig. 5



Fig. 6

4. *Gingival recontouring:* A 940 nm diode laser (EZlase, Biolase) was utilised to improve soft-tissue aesthetics. Periodontal bone sounding was performed to ensure that biologic width was not invaded. Gingival tissues were then lasered to improve the gingival contour, symmetry and gingival zeniths.

5. *Preparation:* It is recommended that an axial reduction of 0.8 to 1.0 mm and an occlusal reduction of 2.0 mm be made, as ceramic materials require a certain thickness to withstand masticatory and para-functional stresses. Chamfers or 90° rounded shoulders are recommended for finish lines in order to firstly provide sufficient bulk at the margins and secondly allow the transference of stresses around the margins. In order to minimise stress concentration within the restoration, all line angles should be rounded, all sharp edges smoothed and boxes, grooves and 'butt' type shoulders are contraindicated.

6. *Impression procedure:* A double zero retraction cord (Ultrapack #00, Ultradent) was placed into the gingival sulcus as a first cord. A retraction paste (Expasyl, Pierre Rolland) was then placed over the first cord. The correct use of this retraction paste should see blanching of the gingival tissues as the paste is extruded into the gingival sulcus. An impression was made with a polyvinyl siloxane material (Imprint 3, 3M ESPE).

7. *Maxillo-mandibular relations:* The Kois Dento-Facial Analyzer System registers and transfers the patient's occlusal plane and tilts in the occlusal plane in three planes of space to the articulator related to an average 100 mm axis-incisal distance. This allows orientation for aesthetic positioning of the anterior teeth in relation to the midline of the face and ensures correct orientation of the incisal plane.

9. *Provisionalisation:* The provisional restorations are duplicated from the diagnostic wax-up that incorporates the proposed changes. It allows patients a 'test run' of the final result by allowing them to see a preview of the planned result. This is an essential step in the planning process.

The aims of provisionalisation are:

- a. *Health:* pulpal protection and periodontal health and gingival stability;
- b. *Function:* the assessment and indication of any occlusal and phonetic problems with the proposed changes—the pronouncing of 'V' and 'F' sounds should create a light contact between the central incisor and the wet-dry line of the lower lip;
- c. *Aesthetics:* the assessment of the basic shade to be chosen, incisal edge display, form and shape of teeth, dental midline location, lip support, parallelism of incisal plane to inter-pupillary line as well

Fig. 5 Crowns sectioned in order to allow insertion of Christensen Crown Remover (Hu-Friedy) for removal.

Fig. 6 Use of Expasyl for haemostasis and retraction.

Fig. 7 Use of Kois Dento-Facial Analyzer to align midline and incisal plane.

Fig. 8 Two to three days after provisionalisation, for review of provisionals to ensure approval of shape, colour and other desired changes before final crowns are made.

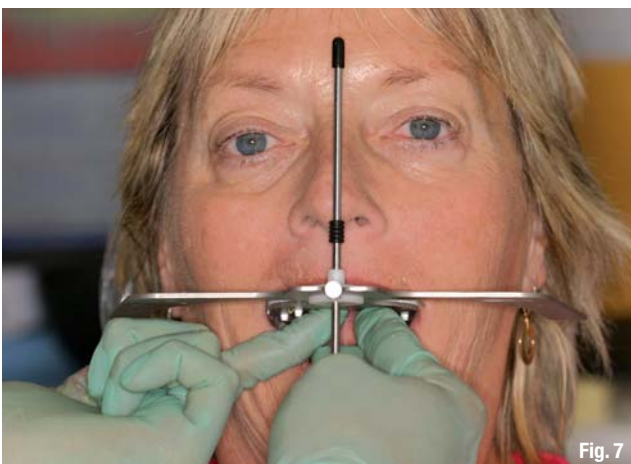


Fig. 7



Fig. 8



Fig. 9



Fig. 10

Fig. 9_Palatal view of all-ceramic crowns.

Fig. 10_Frontal view of completed all-ceramic crowns.

as the curvature of lower lip—evaluation of aesthetics provided by the provisionals at this stage is crucial in guiding the patient to the amount of display necessary for an aesthetic smile.

The provisional crowns were constructed with Protemp 4 (3M ESPE), a bis-acrylic resin composite. All contours were kept curvaceous and smooth with space made available for the patient to use interdental cleaning aids, owing to the provisionals being splinted together. The patient was given instructions on oral hygiene during the provisional phase and was asked to return in two to three day's time for final approval.

I recommend this delayed approach of assessing the provisionals, as patients are not pressured into deciding whether they like the provisionals on the day of preparation. Patients are often anaesthetised and suffer the associated facial palsy and cannot adequately assess aesthetics at this time. The patient will also often ask friends and family about the proposed changes and the extra time allows patients to accustom themselves to their new look.

If the provisional restoration requires modifications, it can be adjusted and an impression taken to communicate the changes to the ceramist.

10. *Cementation*: The crowns were received back from the laboratory and tried in the mouth. I prefer not to use local anaesthetic for the patient to approve the final aesthetics prior to cementation. However, if local anaesthesia is required, an alternative technique is to use the AMSA local anaesthetic block technique so that the injection achieves pulpal anaesthesia of the central incisors through the second premolar without collateral numbness of the face and facial muscles of expression. This is best achieved with a computer-controlled injection system (The Wand, Milestone Scientific) that delivers a virtually painless palatal injection.

Once the patient is happy and approves the final aesthetics, the restorations are prepared for cemen-

tation. The patient is asked to return to the office one week later in order to allow a final examination of the aesthetics, phonetics and occlusion.

Conclusion

The aesthetic rehabilitation of a patient with functionally compromised dentition frequently involves a multidisciplinary approach. Proper sequence and planning, involving periodontal, orthodontic, aesthetic and restorative treatment, is required with good communication amongst the whole team—the patient, ceramist, the treating clinicians.

Provisionalisation is a significant factor in achieving a successful aesthetic outcome for both the patient and the dental team. It permits the patient to preview their future teeth, allowing them to assess the aesthetic and functional changes. Invaluable information can be gained regarding aesthetic factors, including incisal display, buccolingual position of teeth, smile line and shade, and functional criteria can be assessed with phonetic and occlusal changes.

about the author

cosmetic
dentistry



Dr Christopher Ho received his Bachelor of Dental Surgery with first-class honours from the University of Sydney, Australia. He received a Graduate Diploma in Clinical Dentistry (Oral Implants) and a Master's degree in Clinical Dentistry (Prosthodontics) with distinction from Kings College London. Dr Ho is a sought-after lecturer on aesthetic and implant dentistry internationally and within Australia. He lectures at several universities in Australia and the UK. He is a faculty member of the Global Institute for Dental Education.

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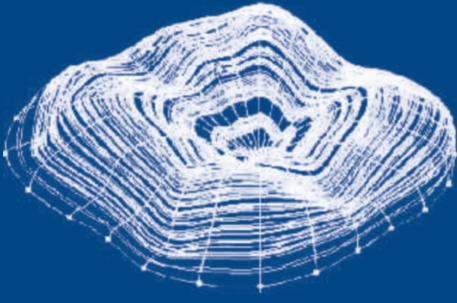


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