

Esthetic rehabilitation

Using provisional restorations to improve results in complex restorative cases

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The esthetic rehabilitation of patients with a functionally compromised dentition frequently involves a multidisciplinary approach incorporating several different treatment modalities.

A correct esthetic 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 multi-disciplinary approach to recreate an esthetic smile in a female patient with a functionally and esthetically compromised dentition.

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

Treatment planning & procedures

The primary objective was to recreate an esthetic smile and to establish a functional occlusion. This would involve orthodontic, periodontal and restorative modalities.

Periodontal treatment. The patient underwent a preliminary treatment plan that included professional oral hygiene and reinforcement of oral hygiene practices.

Orthodontic treatment. In order to correct the tipped and drifted mandibular teeth that were a consequence of missing teeth.

Diagnostic wax-up. This allows the team to preview the desired esthetic appearance. The diagnostic wax-up provides guidelines of the desired treatment and a blueprint for the final restorations. This wax-up also allows the manufacture of putty keys for provisionalization and reduction guides for the preparation process.

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

Preparation. For all ceramic crowns it is recommended that an axial reduc-

tion of 0.8 mm to 1 mm and an occlusal reduction of 2 mm be made as these materials need a certain thickness to withstand masticatory and parafunctional stresses.

Finish lines are recommended to be chamfers or 90-degree rounded shoulders to provide sufficient bulk at the margins and allow the transference of stresses adequately around the margins.

To minimize stress concentration within the restoration, all line angles should be rounded, all sharp edges smoothed and boxes, and grooves and "butt" type shoulders are contra-indicated.

Impression procedure. The use of a double zero retraction cord (Ultrapack #00, Ultradent) was placed into the gingival sulcus as a first cord and then a retraction paste, Expasyl (Kerr), 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 (5M Imprint 5).

Maxillo-mandibular relations. The Kois Dento-Facial Analyzer System registers and transfers the patient's occlusal plane as well as 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 esthetic positioning of the anterior teeth in relation to the midline of the face and ensures correct orientation of the incisal plane.

Provisionalization. The provisional restorations are duplicated from the diagnostic wax-up that incorporates the proposed changes. It allows the patient a "test run" of the final result by allowing her to see a preview of the planned result. This is an essential step in the planning process.

The aims of provisionalization are as follows.

Health: pulpal protection and periodontal health and gingival stability.

Function: the provisional restorations can be used to assess and alert if there are 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.

Esthetics: the provisional restorations can be used to assess the basic shade to be chosen, incisal edge dis-



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



Fig. 2: Retracted frontal photograph.

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Fig. 3: Orthodontic treatment to upright tipped teeth and correct occlusal plane.



Fig. 4: Gingival recontouring completed.



Fig. 5: Crowns sectioned to allow insertion of Christensen crown remover for removal.



Fig. 6: Use of Expasyl for hemostasis and retraction.

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play, form and shape of teeth, dental midline location, lip support, parallelism of incisal plane to inter-pupillary line as well as the curvature of lower lip.

Evaluation of esthetics provided by the provisionals at this stage is crucial in guiding the patient to the amount of display necessary for an esthetic smile.

The provisional crowns were constructed with Protemp 4 (3M-ESPE), a bis-acryl resin composite. All contours were kept curvaceous and smooth with space made available for the patient to use interdental cleaning aids due to the provisionals being totally splinted together.

The patient is given instructions on oral hygiene during the provisional phase and is asked to return in two to three days time for final approval.

I recommend this delayed approach of assessing the provisionals as the patient is not pressured into deciding if she likes the provisionals on the day of preparation. The patient is often anesthetized with associated facial palsy and cannot adequately assess esthetics at this time.

Patients will also often ask friends and family about the proposed changes and the extra time allows the patients to accustom themselves to the new “look.”

If the provisional restoration requires modifications, the provisionals can be adjusted and an impression then made for communication to the ceramist of the additional changes.

Cementation. The crowns are received back from the laboratory and tried in the mouth. I prefer not to use local anesthetic for the patient to approve the final esthetics before cementation.

However, if local anesthesia is required, an alternative technique is to use the AMSA local anesthetic block technique so that the injection achieves pulpal anesthesia 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 — such as the Wand (Milestone Scientific) that delivers a virtually painless palatal injection.

Once the patient is happy and approves the final esthetics, the restorations are prepared for cementation. The patient returned to the office one week later to allow a final examination of the esthetics, phonetics and occlusion.

Conclusion

The esthetic rehabilitation of a patient with a functionally compromised dentition frequently involves a multidisciplinary approach. The proper sequence and planning involving periodontal, orthodontic, esthetic and restorative treatment is required with communication between the whole team, from the patient and ceramist to the treating clinicians.

The use of provisionalization is a significant factor in achieving a successful esthetic outcome for both the

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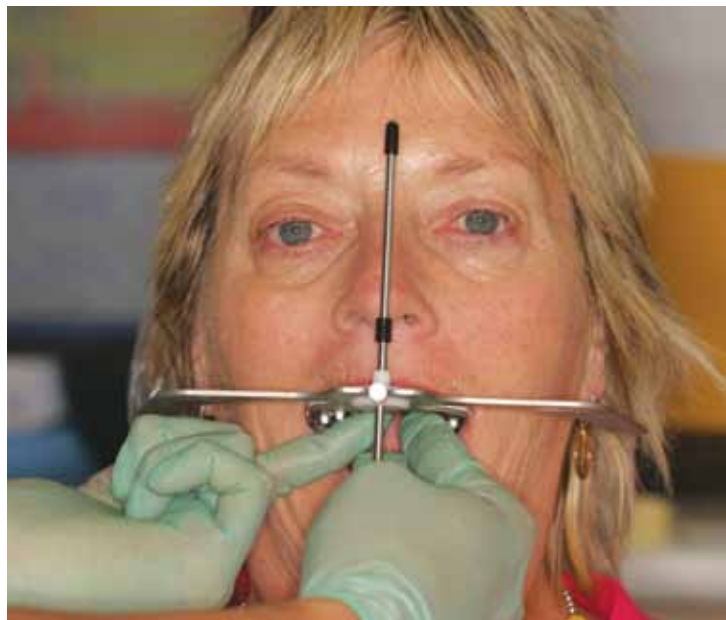


Fig. 7: Use of Kois Dentofacial Analyzer to align midline and incisal plane.



Fig. 8 (at left): Patient has returned after two to three days for review of provisionals to ensure approval of change in shape, color and other desired changes before final crowns are made.



Fig. 9: Palatal view of all-ceramic crowns



Fig. 10: Frontal view of completed all-ceramic crowns.

patient and dental team. Provisionalization allows patients to preview their future teeth, enabling them to assess the esthetic and functional changes.

Invaluable information can be learnt in regards to esthetic factors including incisal display, bucco-lingual position of teeth, smile line, shade, and in addition, functional criteria can be assessed with phonetic and occlusal changes. **CT**

About the author



Dr. Christopher C.K. Ho lectures on esthetic and implant dentistry in Australia and abroad.

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