Interdisciplinary Therapy In Aesthetic Dentistry

Many cosmetic cases are often performed with a solitary approach to care where the sole provider of care is the general practitioner. However with more complex cases the interdisciplinary approach becomes critical to the overall success and longevity of the case aesthetically and functionally. The general practitioner is instrumental in the outcome of a case by orchestrating how the patient’s treatment will progress from start to finish along with potential implementation of dental and laboratory specialists. The general practitioner along with various specialists and the laboratory technician work as a team to create the ideal case sequencing and a seamless integration of treatment for a better aesthetic and functional outcome. Dental care can be compromised if there is a lack of communication or information transmitted between the dentist, specialist and laboratory technician. However with proper case sequencing along with photographs, digital mock-ups, models and diagnostic wax-ups the proposed final case can be discussed in great lengths prior to ever starting the actual treatment. This can allow for visualization of the outcome of a case prior to beginning. The ability for everyone involved including the patient to visualize the appearance of the final case along with any limitations in the case is crucial to obtaining a successful result and a satisfied patient.

In this case a twenty five year old woman presented for a comprehensive examination due to numerous areas of pain and cosmetic concerns. (Fig 1) The numerous missing teeth, poor function, rampant decay, failing restorations, periodontal disease, and infected root canals (one of which had a broken endodontic file embedded inside) would require numerous specialists to complete the case. (Figs 2-9) Upon completion of the comprehensive intra and extra oral examination along with a radiographic analysis, it was decided that the extensive decay and infections needed to be treated first to stop any further tooth destruction and pain prior to addressing any other issues.

The patient was seen by the endodontist first to treat the infected teeth. Five of her existing root canals were retreated due to the poor restorations that were failing. Additionally, the existing root canals were short filled and not shaped appropriately. The upper right first premolar was also a concern as it had a fractured file lodged in the canal that needed to be retrieved and retreated. The upper right first molar had extensive decay and missing tooth structure such that it would not be restorable and would need to be extracted.

Following the retreated root canals, the teeth needed to be definitively sealed until such time as they would be prepared for crowns. The extensive decay and failing restorations would all require the teeth to be built up to normal size and shape followed...
by indirectly fabricated fixed prosthetic restorations. However, rather than start preparing teeth for indirectly fabricated restorations it was more important to first stabilize the oral cavity by removing all the decay and getting the patient comfortable. The extensive tooth decay present in many teeth required caries control to arrest the decay. The decay was excavated and its removal was verified with a caries indicator. A glass ionomer buildup material (Equia Fil, G.C. America) was chosen and placed in all of the defects in the posterior teeth due to its caries resistance, high fluoride release, strength, lower interfacial shrinkage stress and remineralization. This caries control procedure enabled the patient to be free from sensitivity and eliminate any further destruction of tooth structure from the decay process. Additionally the buildups will restore her function until such time that the definitive indirect restorations can be placed. Furthermore we can test her occlusion as well as modify it quickly by adding composite onto the remaining tooth structure and buildups. Teeth #21 & #22 Cone Beam Corrected Tomogram (CBCT) of the joint. The patient’s CBCT showed both condyles appearing normal in shape and properly positioned within their respective fossae. The patient had no history of any jaw problems, myalgia, muscle splinting, or noise related to her temporomandibular joint (TMJ). The patient did have a small visible slide into centric occlusion from the first contact point which at this time appeared to be from her upper second molars. The discrepancy from her initial contact into centric occlusion would be addressed prior to the restorative care utilizing a hinge axis recording device.
The patient wore an occlusal orthotic for approximately eight weeks allowing for any minor joint stabilizations and jaw repositioning so that a centric relation could be captured. Due to the angulation of the molars and the slide into centric occlusion from the first contact point on closing the second molars were potentially going to need some adjustment to create a more stable occlusal stop, and to determine the proper coupling position of the anterior teeth. A hinge axis recording was taken and models were mounted prior to starting any tooth adjustment or definitive restorative treatment to facilitate more accurate occlusal changes.

The patient presented with the mounted models of the case as well as wearing the occlusal orthotic for a consultation with an orthodontist to discuss movement of the molars to either close space or make room for implants. The patient was more concerned with the aesthetic appearance of her smile over moving her back teeth so she chose not to undergo the time commitment for braces but thought she might move the molars in the future. Therefore a removable appliance would be fabricated to hold the molars in place until such time that the patient was ready to address their position in the future. It was important to evaluate the position and health of the teeth and condyles prior to restoring the case for the best level of function and longevity of restorations. Had this not been done the teeth may have been restored with the jaw in the wrong position such that it might start to illicit wear on restorations, tooth movement and or interferences that may predispose some patients to have TMJ symptoms and/or deterioration of the TMJ. Furthermore should the patient undergo orthodontic treatment before or after restorative dental treatment the jaw position should have been taken into account for aesthetics and final restoration position.

While the patient was wearing the occlusal orthotic the periodontium was also evaluated as to treatments needed due to periodontal disease. Scaling and
root planning was performed to reduce inflammation and arrest the periodontal disease. The upper right first molar (16) was also extracted due to periodontal disease and lack of restorative possibilities. The incisal position had been evaluated prior to repositioning the mandible some inaccurate conclusions could have been performed.

**Callout**

The periodontist and the laboratory technician were next to be consulted regarding the overall final appearance, gingival contours and bone position that was to be created. After discussing the shape and appearance for the teeth and gingiva a diagnostic model was fabricated. The diagnostic models were approved by the patient and were utilized to facilitate the fabrication of a surgical template to aid in the proper positioning of the tissues during periodontal surgery.

It was determined that the proper crown to width ratios for the anterior teeth would require some bone and tissue being removed gingivally because the incisal edge was already in a favorable position. This worked out to the patient’s advantage due to the excessive amounts of gum and bone that were apparent when she smiles. The patient was sent back to the periodontist for cosmetic crown lengthening treatment on both the hard and soft tissues of the upper anterior front teeth from the second premolars forward to the central incisors bilaterally. The surgical guide fabricated from the diagnostic models was utilized for accuracy of ideal bone removal and tissue placement. By performing cosmetic crown lengthening on the anterior teeth we were able to eliminate the gummy smile.
and create a more natural and aesthetic supporting structure for her teeth and smile while still maintaining her incisal edge position.

The gingival tissues and bone positioning were reevaluated after allowing approximately twelve weeks of healing. After determining the tissues were in a favorable position desired from the original diagnostic models we proceeded to move towards restorative therapy.

Three sets of new models were taken and mounted on the articulator, with the first set of models left untouched to document the case. The second set of models had been mock prepared for crowns and was then sent out to the laboratory to have full contour wax-ups for teeth #14 thru #24. (Fig. 16)

The wax-up was fabricated to recreate a favorable shape using smile design principles, smile guide books, patient input, and proportional harmony. The diagnostic wax-up model was then duplicated so that a headline provisional stent could be fabricated to utilize during the preparation appointment for precise duplication of the aesthetics and occlusion.

On preparation day the back molars were adjusted first to recreate the lingual of #8 which was left untouched as a functional stop to restore the same bite position that the patient had started with after equilibration. At this point three passive wax bite records (Delar Corporation) were taken along with the documentation of occlusal contacts using 8 micron shimstock (Almore). Polyvinylsiloxane bite registration was not used because it has the potential
for slight distortion during the mounting of the models that cannot be detected. The lingual of tooth #8 was then prepared after capturing the interocclusal wax records. Next was the placement made with Impregum impression material (3M/ESPE) using a full arch tray (HeatWave, Clinician’s Choice). A facebow was unnecessary as the mandibular model was already mounted on a semi mounted mandibular model via the Delar wax passive interocclusal records. Documentation of the stump shade was then performed to provide the laboratory technician with information pertaining to shade and to assist in the fabrication of the final all ceramic restoration. Provisionals were then fabricated using Fill-In (Kerr Corporation) provisional material and the beadline provisional stent technique. By using this technique there were less adjustments necessary to the occlusion and only minor esthetic modifications. The provisional was cemented with a clear dual cure antibacterial temporary ce-
ment (Kerr Corporation).

The impression was poured up twice with the first impression being set aside for the lab to use for fabricating the margins and the second model was set aside to be used on an articulator for occlusion and interproximal contacts. The case was then sent to the laboratory to start the ceramic fabrication process.

The laboratory technician built up the case to the same shape and occlusion as the initial wax-up utilizing stents and putty matrices. Two custom dowel cores fabricated out of pressed ceramic will be used on teeth #21 & #22 so that the final pressed ceramic crowns will be as aesthetically pleasing as possible without any show thru or opacity from an underlying core material. The ten Empress crowns (Ivoclar) would be pressed and then cut back to add porcelain for esthetics.

At the delivery appointment prior to try-in the occlusion was verified on the articulator and the aesthetics of the case were evaluated by the patient. Upon her approval the provisionals were removed and the restorations were tried in with a water based clear try-in gel and evaluated for marginal integrity, contacts, aesthetics and occlusion. The gingival tissues were also evaluated and measured to make sure the contact point to bone was 5mm or less to ensure that the papillas would grow incisally to the proper position so as not to have any black triangles. After evaluating and receiving approval for the aesthetics, the restorations were removed and steam cleaned in preparation for cementation. The Empress posts were cemented first utilizing Panavia (Kuraray Corporation). Then the Empress all ceramic restorations were steam cleaned, silanated and finally cemented using dual cured transparent Nexus III and Optibond XTR (Kerr Corporation) to the manufacturers specifications.

The mandibular anterior teeth that had class III interproximal cavities and existing composite restorations that were all restored with Optibond FL and shade A1 especialists can allow for potentially a less problematic, more aesthetic and functional final product that can be delivered with excellent predictability.

Callout

Premise nano-hybrid restorative material (Kerr Corporation).

For any case the diagnosis, planning, prognosis, and sequencing are critical for achieving an aesthetically favorable treatment outcome. However in larger cases it is even more important to utilize specialists in the initial diagnosis of the case, sequencing and treatment to achieve a more favorable outcome. The interaction with various specialists also brings about more conversations as to various treatment options and limitations on how to proceed that might otherwise be overlooked if a case were only evaluated by the sole practitioner. Ultimately the timing and sequencing of therapy in a case and utilization of the various spe-