Replacing a failing dentition with new technology

By Dr. Ara Nazarian, USA

Having the ability to take a patient from start to finish in a fewer amount of appointments within your practice allows you to position yourself as a provider that can fulfill your patient’s surgical and restorative needs. With the proper training, a dental provider may provide extraction, grafting, and implant placement within one appointment at one location. Not only does this allow you to reduce the amount of visits for the patient, but this type of service also helps maintain the cost to the patient since they are not seeing multiple dental providers. Most importantly, this enables the dental provider full control of the surgical and prosthetic outcome. Depending on the patient’s desires, the clinical conditions of the oral environment present and the skills of the provider, a dentist may choose to extract teeth, level bone, and graft with guided dental implant placement within his/her dental practice. A patient presented to my practice for a consultation wanting to restore her smile (Fig. 6). She complained of generalized discomfort in her entire dentition, probably due to the rampant caries and infection that was already present (Figs. 2–5). Having already visited her twice for an evaluation, she was very frustrated with conflicting treatment options offered. Either the suggested treatment would require multiple surgical and restorative visits that would extend for a very long time or dental treatment would require a team approach where little coordination by dentist and specialist was communicated to the patient. Since many of these options did not appeal to her, the patient decided to have me provide a comprehensive treatment that would include extractions, bone leveling, grafting, dental implant placement, immediate provisionalization and prosthetic rehabilitation within my own practice.

When presenting cases like this to my patients, I will always use the Digital Solution camera (Lester Dine). Not only is this camera convenient, it provides close-up photos as well as full face shots. Additionally, I will always offer my patients a third party payment option like the Lending Club (San Francisco, CA) for their treatment. Lending Club Patient Solutions provides patients great funding flexibility with very low rates and high approvals. Most of all, the support from their staff has been very professional.

Planning

A CBCT scan was taken to accurately treatment plan this case to make certain that no complications would arise from doing all the procedures (extract, graft and implant placement) within one visit. Since her entire dentition had rampant caries present, her treatment would require extracting teeth 82–9 and 18–31, as well as the impacted third molars (teeth 81, 16, 17, 52) to avoid any further complications in the future. To further develop a treatment plan, schematic models were forwarded to the dental lab and mounted on the articulator for further analysis in order to meet the patient’s aesthetic and functional needs. Instructions for a virtual wax-up were prescribed for increasing the patient’s vertical dimension due to a collapse in her bite from the severe wear in her dentition. As a result of the information gathered from merging the CBCT information with the STML files of the virtual wax-up, it was determined that aesthetics and function could be enhanced by restoring the patient’s entire maxillary and mandibular arches with implant supported restorations. All risks, benefits and alternatives of various treatment options were reviewed with the patient including dentures, over dentures and fixed restorations. Her treatment plan of choice would consist of screw retained fixed zirconia restorations in the upper and lower arches supported by six implants each. With the combination of their cork screw thread, built-in platform switching and apical design, the ET III SA (Ossium) implant system was utilized in this particular case. According to the manufacturer, the enhanced SA (sand blasted and acid etched) surface of this implant has shown a substantial quickening of gene expression, cell differentiation and proliferation that are essential to osseointegration meaning faster bone healing and earlier loading times. Other dental implant systems in the market with high initial stability may include but are not limited to: Biomedical Engage (ICOI), Nobel Active (Nobel Biocare), Seven (MBI) 5 (AB Dental USA), Conus 12 (Blue Sky Bio) and Any-Ridge (Megagen). Not only was the type and size of the implant selected because of CBCT planning, but also its relationship to the planned restoration and its proximity to vital structures determined before performing the surgery. Guided bone leveling, as well as immediate implant placement, would be accomplished as the surgical appointment by using CT-based bone leveling and implant drilling guides. Additionally, prefabricated screw retained fixed provisional restorations would be directly picked up with acrylic over dental implants in the maxilla and mandible in the key implant positions if adequate fixation was acquired.

When performing this many procedures in one visit, I will utilize IV sedation to make the procedure more efficient and comfortable for the patient as well as for myself! Since the patient is sedated, a mouth prop, Logibloc (Common Sense Dental Products), is used to keep her mouth open. Logibloc’s unique design stabilizes and comfortably supports the jaw while allowing unrestricted visual and physical access to the working area for the provider.

Once the patient was completely sedated and anaesthetised, the teeth were extracted in a systematic manner, working in sections at a time starting from the anterior maxillary teeth. Acting like a modified class I lever, the Physics Forceps (Golden Dental Solutions) were used toatraumatically extract the teeth with the goal of trying not to disturb the underlying bone. The bur of the forcepts was placed on the lingual cervical portion of each tooth, where the soft buccal portion was placed on the buccal alveolar ridge at the aponeurotic location of the mucogingival junction. During the extraction process, the beak grasps the tooth and the bumper acts as the fulcrum. Extractions were accomplished with only slight wrist action in a buccal direction taking about 40 to 60 seconds each depending on the tooth morphology and density of bone.

Once all the maxillary teeth were extracted, the alveolar crest was leveled 2-3 mm apically following the parameters set by the bone leveling guide with the AEU-7000 surgical motor/handpiece (Aseptico), so that the patient’s transection line from the ridge to the prosthesis would not be visible when the patient smiled. Once completed, the surgical drilling guide was inserted and the sites for the implants were initiated with the HuSson osteon Guided kit (Fig. 6). In the upper arch, six 4.0 mm diameter ET III SA dental implants were placed in the areas of teeth 84, 6, 8, 9, 11 and 13 to support an all on six restoration. The most distal implants were angled in order to avoid the maxillary sinus cavities and any augmentation in that area.

In the lower arch, several different
Approximately 16 weeks after implant placement, the patient returned for the prosthodontic phase of her treatment. The gingival tissue turned pink within 2 weeks for the prosthetic phase of implant placement, the patient returned.

The immediate provisional restoration was tried in to ensure a passive fit over the temporary abutments (Fig. 8). Once confirmed, block-out material was placed to avoid the restoration from locking on and chairside hard denture base material (Rebase II, Tokuyama) placed within recesses around the temporary abutments (Osstell) for immediate provisionalisation. Any residual areas around the implants or in the sockets were grafted with a purity blend of cortical mineralised and demineralised bone grafting material to optimise the area for regeneration. Primary closure was achieved by suturing the tissue with resorbable sutures.

The immediate provisional restoration was removed and any access material trimmed and polished with the Torque Plus (Kerr). A similar series of steps was utilised for the multi-unit abutments. The ISQ values were even higher due to the type and quality of bone present in the patient’s mandible. At this point, a Panorex was taken to confirm the placement and position of the dental implants with their corresponding multi-unit abutments and temporary cylinders.

Seven days postoperatively the patient returned with very little discomfort, swelling, or bruising. She was very pleased with her fixed provisional restorations (Fig. 9). Now that the patient was no longer anaesthetised, the occlusion was checked again to confirm there were no interferences in lateral and protrusive movements. The next step in her treatment would consist of impressions for the definitive upper and lower restorations approximately 4 to 5 months postoperatively.

Approximately 16 weeks after implant placement, the patient returned for the prosthodontic phase of her treatment. The gingival tissue was well integrated, impressions were taken for the definitive restorations. For both arches, impressions were taken using Instant Custom C&B Trays (Goodfit) with a heavy and light body vinyl polysiloxane impression material (Take I Advanced, Kerr).

Bite relations was accomplished by packing up clear duplicates of the provisional restorations (Fig. 9). Instructions for size shape and color for the definitive restorations was forwarded to the dental laboratory and any changes indicated easily communicated to the dental laboratory technician. A PTI prosthesis would be fabricated for the patient’s upper and lower restorations. The pink gingival areas of this prosthesis type were needed to reconstitute the maxillary and mandibular tissue contours, as substantial bone leveling was required to even out the patient’s smile.
With improvements in materials and advancements in CAD/CAM technology (Fig. 10), full-arch prostheses can now be precisely milled from monolithic zirconia, offering aesthetics and functionality with the added benefit of long-term durability. Exhibiting exceptional fracture toughness and flexural strength, Zirconia has the ability to withstand the functional stresses that full-arch restorations are subject to over time.

Unlike hybrid dentures, the entire body of the Zirconia Implant Prosthesis (Arrowhead Dental Lab) including the gingival and tooth areas is constructed from the same robust material. The strength and durability offered by Zirconia is complemented by lifelike aesthetics and excellent translucency. The teeth of the prosthesis exhibit colour that is similar to natural dentition, and advanced staining techniques are used to establish gingival areas that blend well with the patient’s soft tissue.

Within three weeks, the definitive maxillary and mandibular restorations were delivered from the dental lab (Fig. 11). Utilizing a right angled prosthetic driver, both provisional were removed and the definitive restorations inserted (Figs. 12 & 13). Care was given to tone the retention screws according to the manufacturer’s recommendations. A Panorex X-ray was taken to verify the restorations were completely seated. Once confirmed, a piece of Tefton tape was placed followed by composite material (Figs. 14 & 15).

The occlusion was checked and verified with the T-Scan (Tekscan) to ensure that all the proper points of contact were in their ideal positions to ensure longevity of the reconstruction. The patient did not experience pain and was very pleased with her new enhanced ‘whiter’ smile (Fig. 16).

Introduction

With the information now available to the general public through internet access, many patients often come to visit a dentist already armed with some facts they have researched. This also fuels the attitude of “I’m too busy to keep coming to see the dentist- I need it all done in one visit.”

This study shows how to achieve high quality long-lasting aesthetically pleasing restorations by using MyCrown technology.

Patient first contact

A 39-year-old woman attended our clinic complaining of increased discomfort coming from her two first molar teeth when biting. This had been increasing in intensity over the last few months but her busy work schedule had caused her to continue putting off making an appointment. Although the pain she was experiencing was only a mild irritation over the last week she had reported noticing a slight metallic taste also, which spurred her on to make the appointment.

On examination, teeth 16 and 46 had amalgam restorations, with defective margins and signs of corrosion of the metal into the surrounding dentinal tubules. Tooth 46 had a vertical fracture running from occlusal surface coronal to the gingiva on the palatal aspect. Neither tooth was tender to percussion and both scored positively with electric pulp testing. However, 46 did have pain on thermal testing. The base of the palatal cusps of the crack finder the patient confirmed this was the sensation she had been experiencing over the last few months. Two periapical radiographs confirmed caries under each amalgam restoration but no evidence of periapical pathology.

I suggested removing each amalgam restoration and any stained dentine and fractures and restoring the teeth with Inlays fabricated by CAD/CAM.

Conclusion

Computer generated 3D virtual treatment plans allow the dentist to accurately place dental implants efficiently and effectively. With a variety of different software and associated surgical instrumentation available, dental implant diagnosis and treatment has become more simplified. This development has created an inter-disciplinary environment in which better communication and precision execution leads to better patient care and outcomes.

Removal of leaking amalgam restorations and placement of ceramic CAD/CAM inlays in one-hour appointment

By Dr. Richard WH Pollock B.D.S.

Case characteristics

Age: 39 years old
Gender: Female
Area of restoration: Upper and lower first molars
Teeth numbers: 16, 46
Reason for treatment: Patient wanted a long-lasting aesthetic restoration in one visit due to busy work schedule (Fig. 1, 2)

Treatment with MyCrown

The amalgam restorations were removed with high volume suction. Swedish clean up suction tips, maximum water flow with High speed hand piece. Appropriate supple- ments were given to the patients to assist in detoxification and flushing the body of any amalgam particu- late which entered the throat and gut. The carious and stained dentine, and fractured weakened enamel was removed with slow speed and maxi- mum water flow.

A dry pad was used in the buccal mu- cosa to soak up saliva and keep a dry field. High volume suction with a saliva ejector ensured dry field to assist in scanning each of the teeth.

Having achieved a dry field, which is essential for every digital impres- sion, an OptraGate Lip retractor and HDONNA spray was used on the prepared teeth. Spray was applied on one tooth medially and distal and the buccal and palatal gingiva. Ensuring some gingiva is sprayed and scanned increases the ease of taking the digital impression and assists when it comes to taking the buccal scan for the camera to loc- ate and orientate.

The beauty of using this technology is both prepared teeth were designed at the same time which is a huge saving in clinical time.

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Restoration based on cusp height if the prepared tooth and those of the neighboring teeth.

Minor adjustments were made using the form tool which allowed me to add, remove and smooth small increments of tooth structure and volume to create a functional, non-traumatic occlusion with the re- torations. There are various tools available to easily and extremely accurately modify the size and shape of the restoration if desired.

The restorations have color coding where contacts in the occlusion are too heavy, which can be very traumatic to an occlusion in the sensitive patient.

Once satisfied with the adjustments, the manufacturing unit processed one restoration at a time (Figs. 7, 8).

Each restoration was manufactured in less than 7 minutes (Figs. 9, 10).

Having tried the restorations in and polishing off the remnants of the ceramic spine, the restorations were ready for cementation.

Using ceramic etch of 5% Hydro- fluorheic acid the fitting surface of the restorations were left for 20 seconds before rinsing this off and applying a viscous pentafluoride bond.

The tooth was etched and bonded with Scotchbond, and the restorations were bonded into place with flowable. The occlusion was checked with fit- ting result and patient said it felt good and the opposing arch was clos- ing fully.

The restorations were polished using brown, green and blue amalgam polishers with maximum water flow using the slow speed handpiece.

The patient was called the following day and reported complete satis- faction with aesthetics, no afterpains and said her ‘bite feels normal’ (Fig. 11).

Conclusion

This clinical case demonstrates the ease and efficiency of providing high quality aesthetically superior resto- rations with minimal inconvenience to the patient.

The patient was given the option of having composite resin placed in- stead of using MyCrown technology and this would have taken longer to provide a poorer quality restoration. It’s a no-brainer for the patient and for the dentist.

5 simple steps to ultimate quality

Dr Richard WH Pollock B.D.S.

He works in three practices in London practising cosmetic dentistry, implant surgery and soft removal of amalgam and detoxification- he has had a special- ist interest in CAD/CAM dentistry over the last 15 years. Having successfully placed over 10,000 restorations in many satisfied patients, using earlier versions of CAD/ CAM technology, he is delighted to now be a proud user of MyCrown technology which he finds to be superior in every as- pect of use, design and manufacture.

He qualified from the University of Dundee in 1999.