

Esthetics and Function: Meeting the Patient's Expectations With a Straumann Pro Arch Maxillary and Mandibular Dental Implant Supported Restoration

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A 56 year-old female initially presented for evaluation with dental treatment goals focused on chewing function with a fixed, non-removable definitive restoration. Specifically, she would like the finished result to fill out her smile in a way that it fits her facial features. The patient has been working with upper and lower removable partial dentures where the supporting abutment teeth are beginning to show signs of structural breakdown. The loose lower right canine initiated the process for her to investigate the restorative possibilities. The patient reports a non-contributory medical history while confirming that she quit a pack-per-day smoking habit 5 years prior to our examination appointment.



Fig. 1 Pre Treatment Smile



Fig. 2 Pre Treatment Anterior Planning: Teeth drawn in proportion to visualize esthetic changes and identify challenges to the restorative treatment plan



Fig. 3 Pre Treatment Maxillary Arch



Fig. 4 Pre Treatment Mandibular Arch



Fig. 5 Pre Treatment Panorex



Fig. 6 Abutment Selection Day of Surgery: Mandibular Arch

Evaluating the patient's smile, the midline appears to be vertical and in a reasonable position for use as a landmark. The occlusal plane appears to be lower on the patient's right side, a feature that is exaggerated by the higher lip pull on the patient's right side on a full smile. The patient's lip mobility appears to be optimal with minimal display of the pink tissues. The posterior teeth appear to be tucked behind the anterior teeth in the smile resulting in a prominent space in the buccal corridor bilaterally although more prominent on the right side than the left side.

Structurally, in the maxillary arch, the upper right second premolar (5) is a pier abutment with class III mobility, a distal-occlusal amalgam and a mesial fracture visible as well as 60% loss of the supporting alveolar bone. The upper right canine (6) has a distal lingual composite; the upper right lateral (7) has a full coverage restoration with an open margin, teeth 8, 9, 10, & 11 have multiple direct resin restorations. The upper left lateral incisor (10) is found to have a class II mobility at the time of the examination. In the mandibular arch, teeth 20, 21 and 22 have direct resin restorations, tooth 23 is found to have a class I+ mobility, and tooth 27 is found to have a class III mobility although it is difficult to determine if the crown is loose or if the tooth has split at the time of the examination. The lower right canine (27) has a large full coverage restoration resulting in a poor crown to root ratio, and had treatment within the root canal space that includes a threaded "post". The diagnosis includes anterior tooth trauma due to lack of posterior tooth support due to the multiple missing posterior teeth in all 4 quadrants.

The restorative treatment plan focused on the options available to create a fixed, non-removable definitive restoration designed to provide a functional result while enhancing the overall appearance of her smile. The discussion during the presentation of the options included a special emphasis on either maintaining structurally sound and

restorable natural teeth or removing all of the remaining dentition. The planned position of the teeth in the final result were drawn to proportion on a clinical image to identify and discuss challenges and/or compromises that were important to help the patient in the decision making process in terms of how to proceed.

The Straumann® Pro Arch solution comprising of implants, screw-retained abutments and screw-retained bar became the choice to meet the patient's functional and esthetic goals and provided the flexibility required as a result of anatomic structure of the maxilla and mandible, specifically the relatively narrow "U" shaped arch form. The inherent flexibility in the Straumann Pro Arch process proved to be beneficial for the following reasons:

- The surgical planning to identify the appropriate position of the dental implants to optimize primary stability during placement and to minimize the need for augmentation procedures
- The transitional phase allowing for the conversion to a dental implant supported fixed hybrid prosthesis working with the Straumann Screw-Retained Abutments (SRA) to account for the angled position of the dental implants
- The opportunity to evaluate and identify the correct tooth position with input from the patient as she was functioning with the interim prosthesis and during the trial stage of the definitive fixed hybrid prosthesis
- The post-insertion flexibility in maintaining the teeth and acrylic base working with the Straumann® CARES® milled titanium bar allowing for changes, repairs and modifications as the need arises over time

The 4.1mm RC Straumann® Bone Level SLActive® dental implants were placed at the time the teeth were removed. The existing teeth served as reference points for the alveoplasty and position of the dental



Fig. 7 NC/RC Copings for Screw Retained Abutments: Maxillary Arch



Fig. 8 Denture Conversion: Holes in Maxillary Denture for NC/RC Copings



Fig. 9 Interim Hybrid Prosthesis: Maxillary Arch



Fig. 10 Smile with Interim Hybrid Prosthesis



Fig. 11 Maxillary Arch SRA Abutments: (17° #4, 30° #8, #10 & #13)



Fig. 12 Mandibular Arch SRA Abutments: (30° #20 & 29, 0° #23 & #27)

implants while supporting an overlay made to serve as a guide for tooth position. The dental implant lengths varied from 12 to 16mm depending on the site (sites 13 & 20 = 12mm, sites 4, 10, 23, & 27 = 14mm, and sites 13, 20 & 29 = 16mm). The overall goal was to place the implants to maximize surface area contact with native bone for optimal primary stability and to minimize augmentation procedures.

Regular Connection (RC) Screw-Retained Abutments 0°, 17°, and 30° (all D 4.6mm, GH 2.5mm Type A) were positioned to create access holes near the anterior teeth and within the posterior teeth in order to minimize the thickness of the definitive restorations. 8 NC/RC copings for screw retained abutments were placed and modified to facilitate the conversion to the dental implant supported interim hybrid prosthesis. A thermoplastic overlay was made using the immediate denture to serve as a guide to identify the dental implant position in order to transfer the location to the denture to facilitate the conversion to a dental implant supported interim hybrid prosthesis. The design of the NC/RC titanium copings with aggressive grooves proved to be beneficial in making the intra-oral conversion process efficient and effective.

The final impressions were made using an open-tray technique. The first step included connecting the individual sections of a resin “bar” including the Straumann impression abutments using GC Pattern Resin. The second step included working with an elastomeric impression material to pick up the anatomic landmarks of the maxillary and mandibular edentulous arch and the 3 dimensional positions of the connected dental implants. The position of the teeth in the interim prosthesis defined the parameters so that the Straumann CARES milled titanium bar for the maxillary and mandibular arch could be made to fit within the definitive restoration.

The milled titanium bar was evaluated on the working model and intra-orally for passive fit, teeth were added to the bar to evaluate the tooth position prior to constructing the definitive restoration. The teeth were processed under heat and pressure working with acrylic resin wrapping around the milled titanium bar. The definitive restoration was finished and evaluated intra-orally. In the initial post-insertion phase, the labial and buccal flange extensions will be evaluated and adjusted to facilitate hygiene maintenance. The abutment screw access holes will be covered in two layers, one to protect the abutment screw and the visible layer with composite resin bonded to the denture tooth and/or acrylic resin. The patient will be placed initially on a 3-month recall for evaluation of hygiene maintenance that will be adjusted as needed.

Brief Testimonial from the patient:

“This is exactly what I was hoping for – I couldn’t be more thrilled with the result. Thank you!”

Brief Testimonial for Straumann Pro Arch from Drs. Benting and Golding:

The surgical and restorative flexibility provided with the Straumann Pro Arch solution allows for minor adjustments to be made that become important details in achieving a result that meets the patient’s expectations. A patient is required to make a financial commitment and a time commitment and has taken the “Leap of Faith” to move forward with a treatment that involves a very personal space important in social interaction and chewing. Straumann Pro Arch provides a restorative treatment solution to create a successful outcome. The life-changing functional and esthetic result planned to meet the patient’s expectations creates a genuine testimonial helping to instigate others to explore their options for dental treatment.

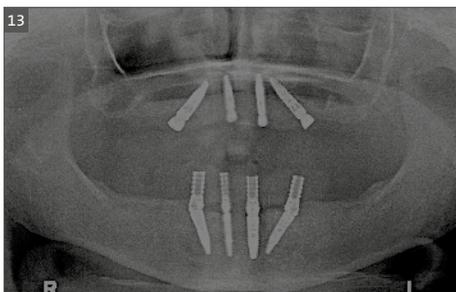


Fig. 13 Post Surgical Panorex: Maxillary and Mandibular Implants



Fig. 14 Smile Day of Insertion



Fig. 15 Anterior View Day of Insertion



Fig. 16 Anterior View Teeth Apart Day of Insertion



Fig. 17 Maxillary Arch Day of Insertion



Fig. 18 Mandibular Arch Day of Insertion