

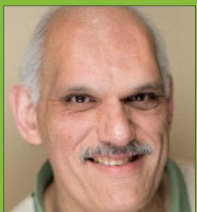
The Straumann Pro Arch Concept in Practice: Immediate Implants and Immediate Loading



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INITIAL SITUATION

A fifty- five year old female presented to our clinic with several aesthetic and dental complaints: missing posterior teeth, root sensitivity, and poor facial and dental esthetics. Her medical history was unremarkable. Her vital signs were within normal limits (WNL): Pre-operative blood pressure was 155/77, pulse was 60 b.p.m., and oxygen saturation was 97%, (ASA I).

Extra-oral examination revealed brachycephalic features, with a short, square face, and a small chin (Fig 1.). The Vertical Dimension of Occlusion (VDO) was inadequate, causing the lower 1/3rd of the face to appear collapsed, with a deep mentolabial fold. (Fig 2.)

Smile analysis revealed a pleasant, but unnatural smile due to the excessively wide maxillary incisors (Fig 3.) A straight facial profile was evident, with a deep over - bite (OB), and excess over - jet (OJ) (Fig 4.).

Examination of the Temporomandibular Joints (TMJ's) revealed a normal range of motion, with a maximum opening >40mm, with no history of locking. There was no history of Joint sounds, muscle pain, and all muscles palpated WNL.

Intra-oral examination revealed multiple missing posterior teeth, with three Fixed Dental Prostheses (FDP's): A maxillary anterior FDP replacing teeth #'s 7, 8, 9, with abutment teeth #'s 6, 10, and 11. Also, bilateral distal - cantilever mandibular FDP's: (29), 28, 27, and 22, 21, (20) (Fig's 5 & 6.).

INTRA-ORAL RADIOGRAPHIC EXAMINATION

Radiographic examination revealed multiple missing posterior teeth, with endodontic therapy on teeth #'s 4 and 13. Peri - apical (PA) pathology was evident on teeth #'s 5,13, 21, and 22. Marginal Bone Levels (MBL's) around existing teeth showed generalized moderate horizontal bone loss (Fig 7.).

Intra-oral examination revealed multiple missing teeth, and mucogingival (MG) defects around teeth #'s 4, 5, 6, 10, 11, 21, and 28 (Fig's 8 and 9.), and missing interdental papillae around teeth #'s 10 and 11.

DIAGNOSIS

Partial-Edentulism: (missing teeth #'s 2, 7, 8, 9, 14, 15, 18, 19, 20, 29, 30, & 31). Moderate, generalized, chronic periodontitis, with multiple mucogingival defects. Root sensitivity on the buccal surfaces of teeth with muco-gingival defects.

PROGNOSIS

A thorough discussion was conducted with the patient regarding her dental condition, and the possibility of saving teeth. She understood that there was a good prognosis for performing multiple connective tissue grafting (CTG) procedures, and implants in the following locations: #7, 9, 14, 19, 20, 29, and 30. This, in conjunction with a full - mouth rehabilitation would allow an increase in VDO, improve function with a 1st molar occlusion, and correct esthetic problems. The patient rejected this approach due to the complexity associated with a sinus lift for #14, multiple CTG's required, 7 implants in total, and sixteen crowns (eight / arch).

PLAN

Analysis of the CBCT revealed sufficient bone to place 4 implants / arch at the same time as extracting all remaining teeth. This required placement of two distal tilted implants (approximately 30°) anterior to the Maxillary sinus, and the Mental Foramina, and two axial anterior implants (Fig 10.). Pre-surgical planning determines the amount space required for an esthetic, functional prosthesis. Ideally, 15 mm is required, from the incisal edges of the teeth to the restorative platform (Fig 11.) Failure to create this prosthetic space leads to aesthetic and prosthetic failure. The use of Multi-unit abutments (MUA's) allows for compensation of non-axial implants, and a convergent path of insertion for the prosthesis.

Removable Prosthesis were fabricated prior to surgery based upon the need to restore the VDO, arrange the teeth ideally, and minimize prosthetic bulk. The intention was to use the prostheses to attach to the implants if primary stability was adequate.

SURGICAL APPOINTMENT

PRE-OPERATIVE

Antibiotics: Amoxicillin 500 mg PO q6hrs x 2 days given preoperatively, and continued for 5 days. Preoperative rinse with Peridex, and carefully wiped circumorally with Peridex rinse with no rinse contacting nasal cavity or orbital area.

INTRAVENOUS SEDATION

Intravenous (IV) sedation performed using 10 mg Midazolam and 200 mcg Fentanyl.

LOCAL ANESTHESIA

Local Anesthesia (LA) administered using 4.5 carpules of 2% Lidocaine w/ 1:100k epinephrine, 1 carpule of 0.5% Marcaine w/ 1:200k epinephrine; and 2 carpules of 4% Septocaine w/ 1:100k epinephrine (infiltration only)

A 27g Needle (Mandible) and 30g Needle (Maxilla) with 2 alternating syringes were used with aspirating technique; needles switched out after injection of infected area

MANDIBLE

Local anesthesia was administered via nerve blocks and local infiltration. Next, using a crestal incision, a full thickness mucoperiosteal flap (FTMP) was reflected buccal and lingual to the area between #19 to 30. All remaining mandibular teeth were then removed atraumatically without complications, taking care to remove as little bone as possible. All sockets were curetted and all diseased tissue was removed. The lingual plate was evaluated and intact throughout the arch. The inferior alveolar nerve was not visualized apical to any extraction sites. The mental nerves were then atraumatically isolated and visualized.



Approximately 2-4 mm of crestal bone was then removed. The bone reduction guide provided by the prosthodontic team was used to help determine appropriate bone reduction.

All implants were placed according to the Straumann protocol using sequential burs and saline irrigation, taking care to avoid the mental nerves. A depth gauge was inserted into the osteotomies to insure intact bony walls and that the mandibular canal was not invaded, with a positive apical stop.

- #20 Osteotomy, 4.1 x 12 mm Straumann SLA BLT, 35N torque, type 2 bone, 30 degree SRA torqued to 35N
- #23 Osteotomy, 3.3 x 12 mm Straumann SLActive BLT, 35N torque, type 2 bone, straight SRA torqued to 35N
- #26 Osteotomy, 3.3 x 12 mm Straumann SLActive BLT, 35N torque, type 2 bone, straight SRA torqued to 35N
- #29 Osteotomy, 4.1 x 12 mm Straumann SLA BLT, 35N torque, type 2 bone, 30 degree SRA torqued to 35N

Remaining autogenous bone paste was placed around any exposed implant threads and within extractions sites, prior to the gingiva being trimmed and closed. 3-0 chromic gut was then used in an interrupted fashion to obtain primary closure.

MAXILLA

A similar approach was used, with the following exceptions: apical infection was removed from the apex of # 13 and site irrigated with saline. There were no communications with the sinus apical to any of the extraction sites. All implants were placed according to the Straumann protocol using sequential burs and saline irrigation:

- #4 Osteotomy, 4.1 x 12 mm Straumann SLA BLT, 35N (throughout) torque, type II bone, 30 degree SRA torqued to 35N
- #7 Osteotomy, 3.3 x 10 mm Straumann SLActive BLT, 30N torque, type III bone, 17 degree SRA torqued to 25N
- # 10 Osteotomy, 3.3 x 8 mm Straumann SLActive BLT, 35N torque, type II bone, 17 degree SRA torqued to 25N
- #12 Osteotomy, 4.1 x 12 mm Straumann SLA BLT, 35N torque, type II bone, 30 degree SRA torqued to 35N

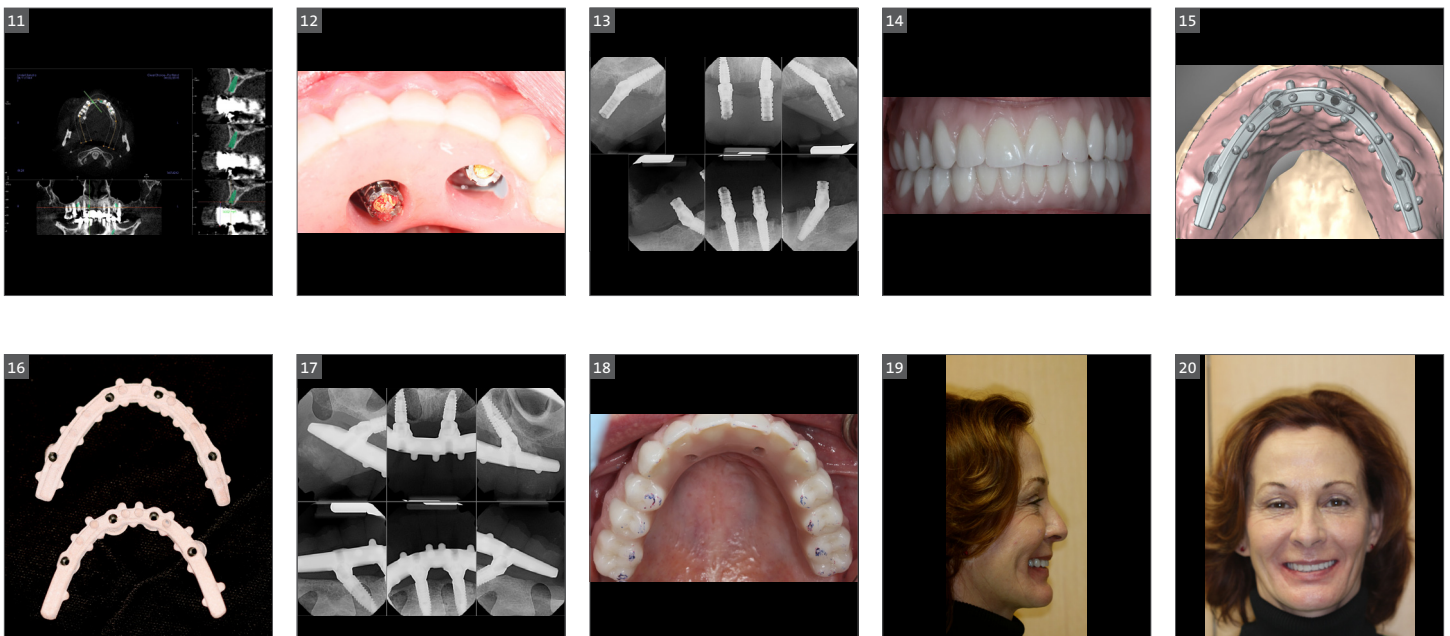
There were no complications and blood loss was minimal. The patient remained stable throughout the procedure and was alert and oriented at the completion of the procedure.

PROSTHETIC APPOINTMENTS

#1. PROSTHETIC CONVERSION

Healing abutments were removed, and Impression copings were attached to the MUA's to make an abutment level impression with splinted copings using orthodontic wire and GC pattern resin. A putty material was used in an open impression for maximum rigidity. After removal, impressions were checked for rigidity of all components. Impressions were poured up in the laboratory using appropriate analogues and vacuum - mixed die-stone to fabricate a master model.

A bite registration material was used within the dentures to index the position of the healing abutments within the prostheses at the correct VDO. Holes were drilled around abutment #'s 7,10, 23 and 26 to allow seating of the prostheses around the -temporary cylinders on these implants. Adequate relief was provided circumferentially for acrylic to be syringed around the temporary cylinders. Screw access holes were blocked with PTFE tape prior to this (Fig 12.). Acrylic was mixed and syringed, and the patient was guided into centric-relation at the



correct Vertical Dimension of Occlusion. After four minutes, prostheses were removed, and checked to ensure that the temporary cylinders were rigidly encased in acrylic. The prostheses were transferred to the laboratory, to undergo the conversion process from removable prostheses with flanges to fixed-detachable hybrid prostheses.

The prostheses were delivered that day, and prosthetic screws were torqued to 15Ncm. Peri-apical radiographs (Fig 13.) were taken to verify seating of the prostheses prior to occlusal adjustments etc. The patient was given written instructions regarding soft diet, swelling, and the use of NSAIDs for the first week.

2. TEN DAYS POST OPERATIVE

The patient was examined, and healing was unremarkable. Oral hygiene instructions were reinforced, and general questions answered.

#3. THIRTY DAYS POST OPERATIVE

The patient was pain free and adapting well. She was happy with the appearance of the teeth and lack of complications. Oral hygiene instructions were reinforced and general questions answered.

#4. NINETY DAYS POST OPERATIVE, FINAL IMPRESSIONS

The patient was re-examined and had been symptom free for the last sixty days. Peri-apical radiographs confirmed good bony healing around all implants. A new face-bow, and intra-oral CR records were made prior to final impressions being made. Prostheses were removed, and peri-implant soft tissues had healed well. All abutments percussed normally, and were torqued to 35Ncm without incident. Verification jigs were connected intra-orally, and final impressions were made in poly-vinyl siloxane. New master casts were poured, and the temporary prostheses were used to articulate the case. Esthetic and functional changes were noted at this appointment, and were communicated to the dental laboratory.

#5. WAX TRY-IN:

Prostheses were tried in, and Centric Relation and Vertical Dimension of Occlusion were verified. Tooth position, as well as shade and general appearance was confirmed (Fig 14.). The patient was satisfied that the new prostheses allowed more space on the palatal aspect.

#6. TITANIUM BAR AND WAX TRY-IN

A CAD-CAM program was used to plan for the Straumann® CARES® Titanium framework to optimally support the prosthetic teeth (Fig 15.) This included both horizontal and vertical diatoric support to increase the available surface area for bonding of the acrylic on the titanium frames (Fig 16.). A layer of pink opaque was applied, and a final full contour try-in was performed to verify passivity of fit, esthetics, occlusion, and general satisfaction with the prostheses. Peri-apical radiographs were taken to confirm passive seating of the metal framework (Fig 17.). Centric relation occlusion was verified (Fig 18.) prior to flasking and processing.

#7. INSERTION

Prostheses were delivered and oral hygiene instructions were reinforced regarding the use of SuperFloss® and a WaterPik®. Occlusion was refined, allowing a posterior bilateral maximum intercuspal position, with anterior disclusion. A soft night guard (NG) was provided. Fig 19. shows the esthetic improvement after the VDO has been restored, and the relative harmony between all 1/3rds of the face compared to the pre-operative profile picture (Fig. 2). Also, the arrangement of smaller maxillary incisors in an optimum position provided good lip support and a harmonious smile (Fig 20.).

#8. 30 DAY PO

The patient adapted well to the prostheses. Her speech was much improved, and she had been using the SuperFloss and a WaterPik. There was some cheek biting initially, but this improved. The patient was extremely satisfied, and is seeing a hygienist every six months for maintenance. Radiographs will be taken at the 1-year recall.

CONCLUSION

This patient demonstration illustrates the need for a dedicated TEAM concept. While some of our colleagues may argue that that the treatment plan was aggressive, many patients desire a single surgical procedure, with a more simple approach vs multiple surgical procedures for grafting (soft and hard tissues), followed by staged implant placement with removable provisional prostheses. This presents a paradigm shift for some practitioners. However, using a patient-centered approach when discussing treatment options allows us to provide predictable outcomes for patients who otherwise would require more complex and time-consuming treatment.