Implant treatment planning on the medically compromised patient: A Case Report of full mouth reconstruction with dental implants.

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Abstract:

The benefits of implant supported prostheses for the edentulous arch is widely supported in the literature. When a patient is medically compromised, dental implant treatment must be curtailed to reduce invasiveness and surgical treatment time. This article explains the treatment planning, surgical treatment and prosthetic steps taken to deliver full mouth reconstruction with dental implants on a medically compromised patient.

Introduction:

The dental literature supports the many benefits of dental implant supported prostheses for the fully edentulous arch. These benefits include: increased chewing ability, bone preservation, increased phonetics, and an improved psychological outlook for an edentulous patient.

Treatment planning for dental implants is a multidisciplinary process that takes into account many areas of dentistry and medicine. Foremost in the treatment planning process is consideration of a patient’s medical history, and determination if a patient is a candidate for the surgical appointments needed for dental implant placement. The health benefits that a patient could gain from implant supported prosthesis must be weighed against the risks of surgical treatment.

This article explains in detail the treatment planning, surgical and prosthetic steps taken to reconstruct a medically compromised patient’s mouth with dental implants in the maxillary and mandibular arches.
Treatment planning:

An 86 year old male with ill fitting maxillary and mandibular dentures presented for dental implant treatment to replace his existing prosthesis. A review of his medical history indicated he had a pacemaker and was under the care of a cardiologist. He was on several cardiac drugs and had a stabilized but elevated blood pressure of 140/90. The rest of the patient’s medical history was unremarkable and the patient appeared to be in good health. The patient did not smoke, and maintained a healthy lifestyle.

The patient explained that he could not wear his dentures and they have been re-made numerous times. It was decided after a review of the study models and a Computerized Tomographic (CT), that a bar supported over denture on the maxillary arch and non-removable fixed prosthesis on the mandibular arch would be treatment planned.

It was explained the patient that there would be increased chewing ability, increased stability, and improved phonetics versus the existing tissue supported dentures. It was explained that clearance form his cardiologist and minimally invasive surgery would be required.

After reevaluation of the patient by his cardiologist and a review of the needed surgery for dental implant placement, clearance was given by the cardiologist. The pharmacological protocol consisted of 4 tabs of 500mg Amoxicillin one hour prior to the surgical appointments then 1 tab TID of Amoxicillin for 2 weeks, Ibuprofen 800mg one hour before the surgery then 1 tab TID for 7 days, and Peridex as directed.

In order to reduce surgical time and the amount of tissue reflection needed, a maxillary and mandibular CT scan was performed. The CT information was formatted in SimPlant, an interactive CT imaging program (Materiales Glen Burne MD) Through visualization of the maxillary and mandibular arches in SimPlant prior to surgery, the width, height, density, and angulation of the patients bone can be ascertained prior to surgery. (Figure 1, Figure 2)

Prior to the CT being captured, the patient’s present dentures were used to create a radiographic guide for visualization on the CT’s.(Implant Logic Systems Cedarhurst NY) (Figure 3, Figure 4) Although the patient couldn’t wear his existing dentures, the dentures did have good esthetics, and maintained the correct vertical dimension.

The CT taken with the radiographic guides in place allows for planning dental implant placement with respect to the final prosthetic position. The information on the interactive CT also allows for planning of the correct implant size with respect to available bone. The information on the CT’s showed the relationship of the final prosthetic position on the maxillary arch was not ideal for a fixed prosthesis. (Fig 5) A fixed prosthesis would have too large of a Buccal Lingual cantilever and not be supportive enough of the patient’s lips.

Due to the occlusal relationship and inter arch space, the mandibular prosthesis was planned to be screw retained with distal cantilevers. The patient favored this option over a bar retained over denture.
The final benefit of utilizing a CT would be seen during surgery when the data planned in SimPlant was turned into a surgical guide. (Implant Logic Systems Cedarhurst NY) This surgical guide allows for minimal of no reflection therefore reducing the invasiveness when the implants are placed.

Treatment Protocol

It was determined that two separate surgeries for the maxillary and mandibular arch would be done to minimize cardiovascular stress on the patient. The surgeries for the maxillary and mandibular arch followed the identical sequence with respect to pharmacological and surgical protocol. In each case the treatment room was surgically draped for asepsis, and the patient was anesthetized utilizing Carbocaine with Neocobfrin to reduce cardiac effects. Utilizing the surgical stents (Implant Logic Systems Cederhurst NY) created from SimPlant, initial osteotomy sites were started transmucosal with 2mm drills. These initial osteotomy preparations created the correct angulation, and depth as determined previously by the SimPlant study. Tissue punches were used to minimize trauma to the patient on the mandible. (Fig 6) Minimal reflection was used on the maxillary arch.

Following removal of the surgical stent, internal hexed dental implants were placed following the manufacturers osteotomy protocol. (Biohorizons Inc, Birmingham Ala) The companies included abutments can be seen at the time of surgery. (Fig 7) The left 3 distal maxillary implants required osteotome lifting of the sinus membrane as per the CT information.

After surgery on each arch, transmucosal healing caps were placed allowing a one stage surgery and proper tissue healing. (Fig 8) Excellent 3 month post operative healing was observed (Fig 9) This further reduced trauma to the patient, through avoiding a second stage surgery. The patient did not wear his dentures throughout the 3 month healing period. The inability of the patient to wear tissue borne dentures facilitated healing of the implants via reduced loading.

After a 3 month healing period, an open tray impression was taken on each arch. (Fig 10) A subsequent wax rim try in was followed by a wax tooth denture try in on the maxillary arch and lower arch. (Fig 11) Creating a denture prior to processing allows fabrication of the bar with respect to space considerations. The over denture bar is created based on functional and esthetic aspects of the case. Once the wax tooth try in was verified, an acrylic jig was tried in that represented the bar on the maxillary arch and the framework on the mandibular arch. (Fig 12) After verification the final maxillary bar and mandibular framework was created. (Fig 13) The final mandibular fixed prosthesis was also created. (Figure 14)

The final Maxillary and Mandibular prosthesis was delivered 4 months after surgical placement of dental implants. The post treatment panograph shows the maxillary and mandibular implant supported results. (Fig 15)
Conclusion:

Through planning full mouth reconstruction utilizing dental implants with an interactive CT program, minimally invasive surgery was performed on a medically compromised patient. The guidance of the case based on the prosthetic end result was the key. Through utilization of the patients existing dentures as a guide, the position of the implants and final result was facilitated. The end result was a satisfied patient with improved function and esthetics. (Fig 16)


Figure 1
Plan of maxillary arch in SimPlant interactive software

Figure 2
Plan of Mandibular arch in SimPlant interactive software
Figure 3 Maxillary radiographic stent so tooth position can be seen on interactive CT

Figure 4 Mandibular radiographic stent
Figure 5
Relationship of position of bone to final prosthetic position

Figure 6
Implant placement using tissue punches to minimize trauma to the patient on Mandibular arch
Fig 7 Minimal tissue reflection on maxillary arch

Figure 8 Transmucosal healing caps post surgery
Figure 9 3 month post operative healing

Figure 10 Open tray transfer impression of maxillary arch
Fig 11 Wax set up try in of maxillary and Mandibular arches

Figure 12 Try in of acrylic jig for verification of bar fit
Figure 13 Final bar to support maxillary bar over denture

Figure 14 Final Mandibular fixed prosthesis
Figure 15
Post treatment panograph
Figure 16
Satisfied patient