CASE REPORT

Full mouth implant reconstruction for medically compromised patient with key hole access surgery

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ABSTRACT

Demographic trends indicate that clinicians will be treating more edentulous geriatric patients many of whom will be medically compromised. Many such patients seek implant therapy for the purpose of their oral rehabilitation. When a patient is medically compromised, it is a generalized notion that dental implant treatment must be avoided. But in reality, dental implant treatment for such a patient must be curtailed to reduce invasiveness and surgical treatment time. Today's guidelines of pre- and post-implant therapy of such patients have still not been entirely clarified and consequently are not completely clear to dental practioners. This case report emphasizes the importance of diagnosis and its impact on proper treatment planning of both surgical and prosthetic phase of full mouth reconstruction with dental implants in a medically compromised geriatric patient.

KEY WORDS: Dental implant, cone beam computer tomography, full mouth rehabilitation, medically compromised

INTRODUCTION

Treatment planning for dental implants is a multidisciplinary process that takes into account many areas of dentistry and medicine. Foremost in the treatment planning is consideration of a patient's medical history and to determine if the patient is fit for the dental implant placement.[1] The health benefits that a patient could gain from implant must be weighed against the risk of surgical treatment. This article explains in detail the treatment planning, surgical and prosthetic steps taken to rehabilitate a medically compromised patient with dental implants.[2]

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CASE REPORT

A 71-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 that he was a diabetic and a hypertensive for the past six years under medication. His ECG revealed sinus bradycardia and left ventricular hypertrophy. To be more specific, the patient was subjected to echocardiogram which showed hypertensive ischemic heart disease.[3]

Diagnosis and treatment planning

After a review of the clinical condition, analysis of the study models, and cone beam computerized tomography (CBCT) scan, an implant-supported fixed prosthesis was planned. Clearance was obtained from the patient's cardiologist and a minimally invasive surgery was planned.[4]

In order to assess the bone quality, quantity, as well as to choose the implant size, length and angulation CBCT scan was performed. The CBCT information was formatted in Bluesky bio software, an interactive CT imaging software [Figure 1].

Prior to CBCT scan procedure, the patient's present dentures were duplicated and used to create a radiographic guide for visualization on the CBCT scan

[Figure 2]. The CBCT taken with the radiographic guides in place allows for planning dental implant placement with respect to the available bone. Since the patient's lip support was good, a fixed prosthesis (without flange) was considered ideal.[5]

Biomechanical implication

Six implants were placed on each arch. In maxilla, the implants were placed in the canine, second premolar, and first molar of each side. In the mandible, implants sites were corresponding to that of canine, second premolar, and second molar of each side. Since the anterior cantilever was less than twice the anteroposterior spread, a cantilever was planned in the anterior maxilla with a split in the midline.[6] This is due to the biomechanical norms that there should never be more than three pontics with an implant prosthesis. Thus, the implant number and position chosen were justified [Figure 3].

Following the CBCT scan procedure, the radiographic guide was converted into surgical guide. This surgical guide was used with a tissue punch which allowed for minimal/no reflection, thus reducing the invasiveness during implant placement [Figure 4].

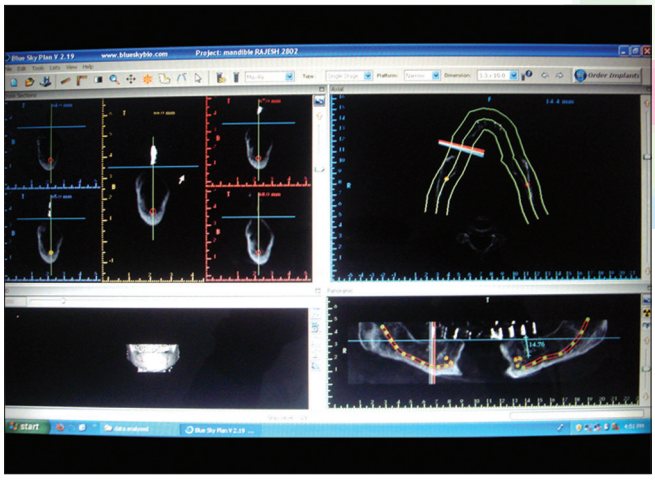

Figure 1: Plan for mandibular arch using blue sky plan software

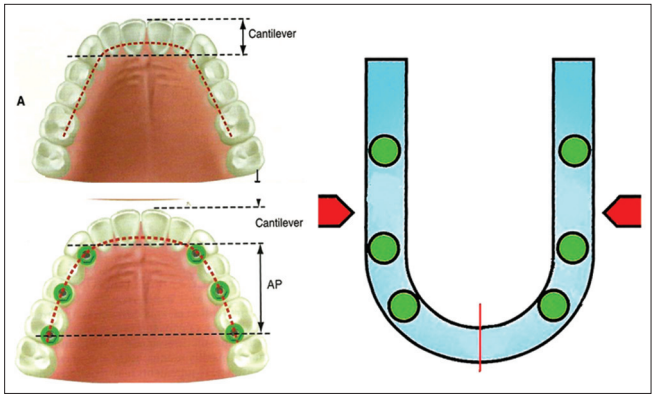

Figure 3: Proposed implant sites

Treatment protocol

To minimize the cardiovascular stress on the patient, two separate stage one surgeries were done for the maxillary and mandibular arches. The surgeries for both the arches followed an identical sequence with respect to pharmacological and surgical protocol. The patient was anesthetized with lignocaine without adrenaline to reduce cardiac effects. Using the surgical stent, initial osteotomy sites were started with two-millimeter drills [Figure 5].

These initial osteotomy preparations created the correct angulation and depth as determined by the BLUE SKY software. Tissue punches were used in both the arches to minimize trauma to the patient.

Following removal of surgical stent, internal hexed dental implants were placed following the manufacturer's osteotomy protocol. Cover screws were placed over the implants [Figure 6] and a healing period of four months was given after which stagetwo

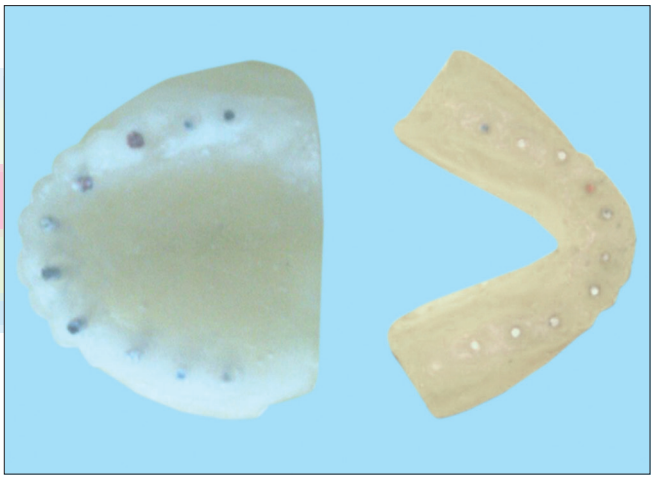

Figure 2: Radiographic stent to used during CBCT scan

Figure 4: Radiographic stent converted as surgical stent during first stage surgery

surgery was performed. Transmucosal healing caps were placed in the second stage surgery after locating the implant sites [Figure 7].

Transfer copings were attached [Figure 8] and then an open tray impression was made on each arch [Figure 9]. A jaw relations record was made to confirm the patient's existing jaw relationship. Abutments were selected [Figure 10] and then the metal try-in was done [Figure 11]. Following this, a bisque try-in was performed [Figure 12]. Final cementation of maxillary and mandibular fixed prosthesis was done using zinc phosphate cement [Figure 13]. Post-treatment panarogram showed the maxillary and mandibular implant supported prosthesis [Figure 14].

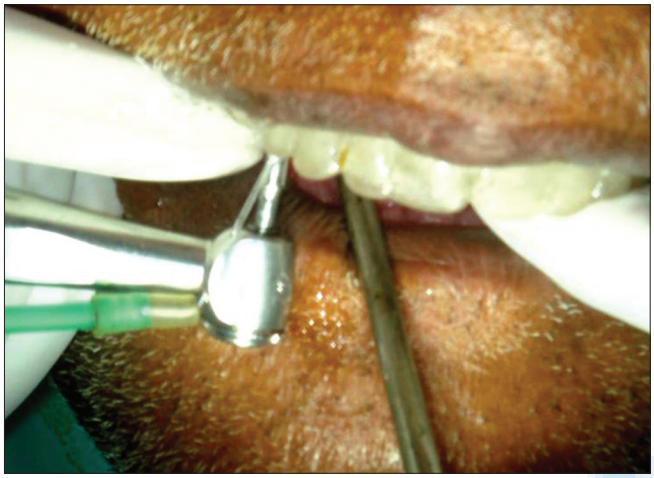

Figure 5: Initial pilot drill being done through the surgical stent

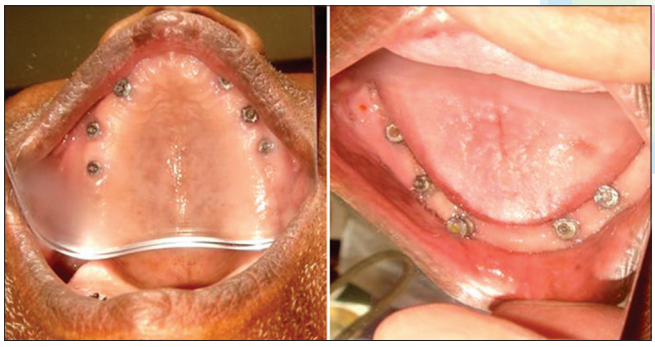

Figure 7: Maxillary and mandibular healing abutments

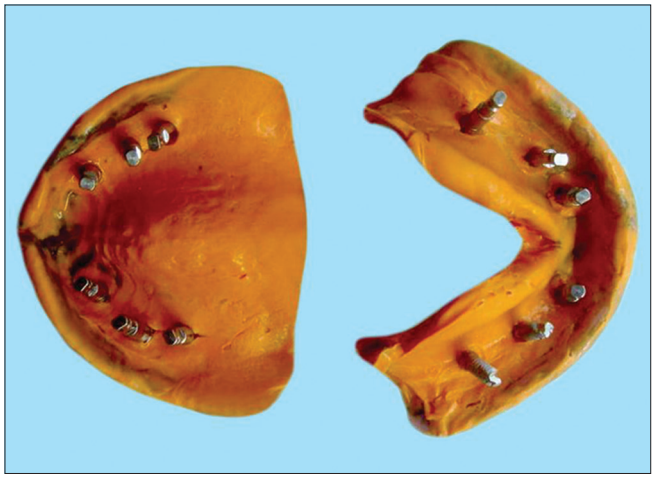

Figure 9: Maxillary and mandibular open tray impression

DISCUSSION

Treatment of partial and total edentulism with dental implants has evolved into a predictable procedure for majority of patients and is expected to play a significant

Figure 6: Completion of placement of maxillary implants and cover screw

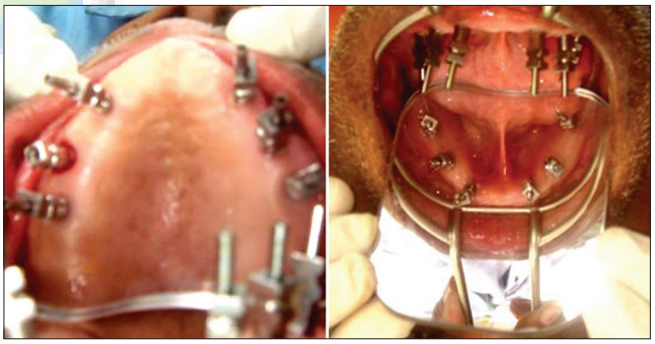

Figure 8: Maxillary and mandibular arch with transfer copings attached for open tray impression technique

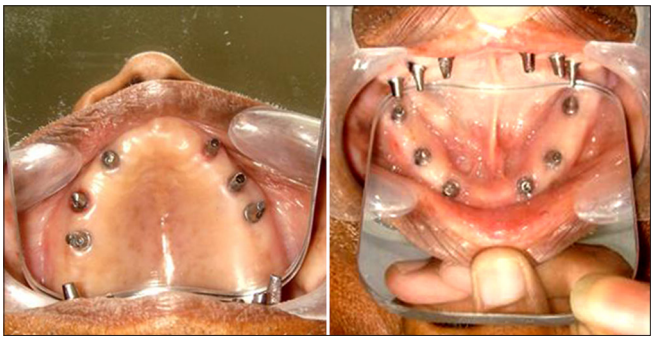

Figure 10: Abutments attached to implants

Figure 11: Metal try-in

Figure 12: Bisque try-in was done

Figure 13: Final cementation done

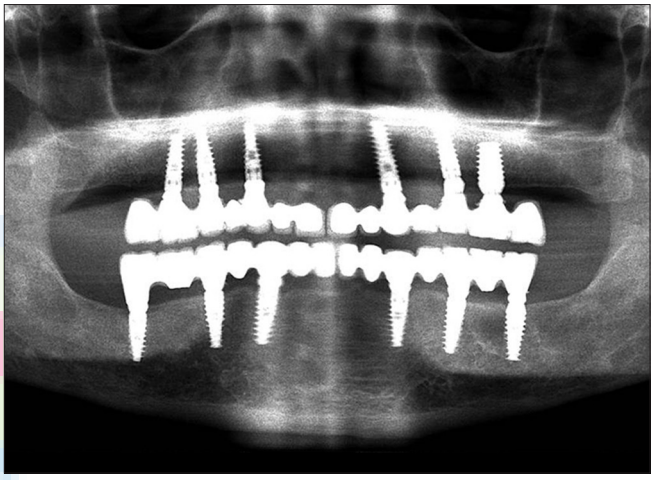

Figure 14: Post treatment panorogram

Figure 15: Post operative frontal view

role in oral rehabilitation. Clinicians must temper their enthusiasm for implant dentistry with thorough knowledge and understanding of the physiologic implications of existing systemic diseases for proper treatment outcome and patient well being.

Smith *et al*.,[7] studied the risk factors associated with dental implants in healthy and medically compromised patients. They found that implant surgery and required anaesthesia were safe procedures and that bone quality, quantity and trajectory as well as surgical and prosthetic techniques was probably more critical for favourable outcome. A systematic review by Beikler *et al*.,[8] revealed that more detailed guidelines must be developed to aid in the improved predictability of dental implants in a special-patient category.

In this case report, minimally invasive treatment protocol was performed in two separate stage one surgeries. Tissue punch was used instead of the flap technique which further reduced the invasiveness of the procedure. Minimum number of implants required for proper function with good biomechanics were used to reduce the surgical time, trauma and cost. The entire surgical procedure was performed after an expert medical opinion with the surgery done under medical supervision.

CONCLUSION

Through meticulous diagnosis and planning, full mouth reconstruction utilizing dental implants with CBCT scan and minimally invasive surgery was performed on a medically compromised patient. The guidance of the case based on prosthetic end result was the key. Using the patient's duplicated 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 [Figure 15].

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