Full mouth rehabilitation with maxillary equator® attachment over denture and mandibular hybrid denture - a case report

Marian Anand Bennis, Deepak Nallaswamy V
Department of Prosthodontics, Saveetha Dental College, Chennai, Tamil Nadu, India

ABSTRACT

Implant-supported prosthodontic rehabilitation of total edentulism remains the most complex restorative challenges. The main reason being the number of variables that affect both the aesthetic and functional aspects of the prosthesis. A hybrid denture or the ‘Toronto prosthesis’ is one that is fabricated over a metal framework and retained by screws threaded into implants. This article presents the fabrication of implant-retained maxillary Equator® attachment overdenture opposing mandibular implant-retained hybrid prosthesis. A total of four implants (Equinox® Myriad plus) were placed the maxillary arch and six implants (Equinox® Myriad plus) in the mandibular arch. The patient’s occlusal vertical dimension, centric relation, aesthetics and phonetics were determined and maintained throughout the restorative process. This case report describes the management of a completely edentulous patient with a mandibular implant-supported fixed prosthesis and maxillary implant-retained overdenture with Equator® attachment.

INTRODUCTION

For many patients, being edentulous is regarded as a handicap with respect to oral function (Bottlang et al., 2010). This has an impact on their overall well being and quality of life (Alzarea, 2017). With the advent of implants, this is no longer the case. The main objective of implant placement in completely edentulous individuals is to provide fixed support and improved stability for the prosthesis (Hara et al., 2016). Common treatment options for completely edentulous patients include implant-retained prosthesis, and conventional removable prosthesis (Sargolzaie et al., 2017). Many innovations in attachments have increased the number of options for restorative dentists (Mijiritsky et al., 2014; Mendes et al., 2016). This case report describes the management of a completely edentulous patient with a mandibular implant-supported fixed prosthesis and maxillary implant-retained overdenture with Equator® attachment.

CASE REPORT

A 60-year-old male patient presented to the Department of Prosthodontics at Saveetha Dental College, with a chief complaint of loose dentures. The patient was edentulous for 4 years and had lost most of his teeth to caries. He was wearing a set of complete dentures for the past 4 years, which was ill-fitting and uncomfortable. The patient desired improvement in prosthesis and was advised to go for an implant-retained prosthesis. No relevant medical history was observed. After an initial consultation, a complete extraoral and intraoral examination of
the patient was carried out. A diagnostic impression was recorded, and cone-beam computed tomography (CBCT) was advised. The CBCT revealed a close proximity of the right and left sinus floor to the maxillary posterior alveolar ridge. A complete medical and hematological examination revealed no absolute contraindication to any therapeutic or surgical modality.

As the patient was not willing for sinus lift due to increase in treatment time, the treatment planning was limited to 4 implants in the maxilla and 6 implants in the mandible with the present dentures being used as a radiographic stent (Greenberg, 2015). The previous dentures were also used to assess the vertical dimension and the interarch space prior to treatment planning.

Finally, implant-retained maxillary Equator® overdenture with a bar-retained hybrid prosthesis in

Figure 1: Radiograph of implant placement after Stage 1 Surgery.

Figure 2: Full-thickness mucoperiosteal flap elevation (Maxilla) and placement of healing abutments.

Figure 3: Verifications jigs made with Pattern Resin® (GC Corp, USA)

Figure 4: Upper and lower Master open tray impression made with Monophase® material

Figure 5: CAD-CAM milled PolyMethyl Methacrylate verification jigs

Figure 6: Upper and lower occlusal rims are customised to record the centric relation

Figure 7: Pre operative (Left) and post operative (Right) photograph of the patient
mandibular was the treatment plan formulated. The treatment plan was divided into two phases, Surgical phase and Prosthetic phase.

Surgical phase involved the placement of endosseous implants (Equinox Myriad Plus®) after administration of local anesthesia. A crestal incision was placed with a number 15 bard parker blade. A full-thickness mucoperiosteal flap was elevated, following which Endosteal implants were placed in in11,21,13,23 regions in the maxilla and 33,35,37,43,45,47 regions in the mandible (Figure 1) (Nejad et al., 2016). The flap was then sutured, and post-operative instructions were given. The delayed loading protocol was followed. Therefore the patient was called back after the 6 month healing period for the prosthetic phase.

In the prosthetic phase, an Orthopantomogram was first obtained (Figure 1) to evaluate and assess the bone to implant contact. The radiograph showed good bone to implant contact, and the patient was scheduled for stage 2 surgery. Stage 2 surgery was performed under local anesthesia, after the elevation of the flap to expose the cover screws. A full-thickness mucoperiosteal flap elevation (Figure 2) was performed to clinically assess the health of the implants. No fenestration or bone loss was observed clinically. The cover screws were then removed and replaced with healing abutments and the flap sutured was sutured back again.

After 2 weeks, the patient was recalled, and the healing was assessed (Mijiritsky et al., 2014). Upon satisfactory healing, a diagnostic impression was recorded with alginate (Tulip®) and standard stock trays. Custom Light polymerised special trays (Polytray® Delta Dental) were adapted over the casts after blocking out undercuts with wax. Direct impression copings were then placed on the implants and were splinted together (Figure 3) with pattern resin(GC®, USA). Pattern resin was used because of its low polymerisation shrinkage value and ease of application. The master impression was then recorded with a medium-bodied impress (Abduo and Lyons, 2013) ion material (Figure 4) (Monophase® Dentsply, USA).

Once the master casts were obtained, they were optically scanned using a model scanner (Zirkon Zahn® USA). The implant positions were then verified with a PMMA (Poly methyl methacrylate) jig, which was designed (Afshari et al., 2017) and milled via CAD-CAM (Figure 5). The jig was then verified both clinically as well as radiographically (Buser et al., 2008) for any misfit. Once the fit was verified (D’haese et al., 2000), occlusal rims were fabricated to determine the interocclusal space. The occlusal rims were then placed into the patient’s mouth, and the jaw relations (Centric and Vertical) were recorded (Figure 6). Maxillary and mandibular metal frameworks were fabricated and were verified for an accurate fit, clinically and radiographically in the patient’s mouth. After evaluation, the frameworks were sent back to the lab for teeth setting. The patient’s son was also called for the trial appointment to assess aesthetics (Laederach et al., 2017). After the trial, the prosthesis was inserted after tightening the abutments to 25Ncm. Occlusal adjustments were made, and bilateral balance was verified. The patient was satisfied with his aesthetic appearance and restored chewing function (Figure 7). Peri implant-bone levels were assessed after two years of follow up and were found to be within a normal range (Jawad et al., 2017)

CONCLUSIONS

This case report presents a treatment option and procedure of full mouth rehabilitation involving mandibular implant-supported fixed prosthesis and maxillary implant-retained overdenture with Equator® attachment.

Conflict of Interest

The authors declare that they have no conflict of interest for this study.

Funding Support

The authors declare that they have no funding support for this study.

REFERENCES

Abduo, J., Lyons, K. 2013. Rationale for the use of CAD/CAM technology in implant prosthodontics. International Journal of Dentistry, pages 768121–768121.

Afshari, F., Sukotjo, C., Alfaro, M., Mccombs, J., Campbell, S., Knoernschild, K., Yuan, J. C.-C. 2017. Integration of Digital Dentistry into a Predoctoral Implant Program: Program Description, Rationale, and Utilization Trends. Journal of Dental Education, 81(08):986–994.

Alzarea, B. 2017. Oral health related quality-of-life outcomes of partially edentulous patients treated with implant-supported single crowns or fixed partial dentures. Journal of Clinical and Experimental Dentistry, 9(5):0–0.

Bottlang, M., Walleser, S., Noll, M., Honold, S., Madey, S. M., Fitzpatrick, D., Long, W. B. 2010. Biomechanical rationale and evaluation of an implant system for rib fracture fixation. European Journal of Trauma and Emergency Surgery, 36(5).
Buser, D., Chen, S., Weber, H., Belser, U. C. 2008. Early implant placement following single-tooth extraction in the esthetic zone: biologic rationale and surgical procedures. The International Journal of Periodontics & Restorative Dentistry, 28(5):441–451.

D'haese, J., Ackhurst, J., Wismeijer, D., Bruyn, H. D., Tahmaseb, A. 2000. Current state of the art of computer-guided implant surgery. Periodontology, 73(1):121–133.

Greenberg, A. M. 2015.

Hara, M., Matsumoto, T., Yokoyama, S., Higuchi, D., Baba, K. 2017. Location of implant-retained fixed dentures affects oral health-related quality of life. Clinical Implant Dentistry and Related Research, 19(4):710–716.

Jawad, S., Barclay, C., Whittaker, W., Tickle, M., Walsh, T. 2017. A pilot randomised controlled trial evaluating mini and conventional implant retained dentures on the function and quality of life of patients with an edentulous mandible. BMC Oral Health, 17(1).

Laederach, V., Mukaddam, K., Payer, M., Filippi, A., Kühl, S. 2017. Deviations of different systems for guided implant surgery. Clinical Oral Implants Research, 28(9):1147–1151.

Mendes, F. A., Borges, T., De, F., Gonçalves, L. C., Oliveira, T. R. D., Prado, C. J., Neves, F. D. D. 2016. Effects of new implant-retained overdentures on masticatory function, satisfaction and quality of life. Acta Odontologica Latinoamericana : AOL, 29(2):123–129.

Mijiritsky, E., Mazor, Z., Lorean, A., Mortellaro, C., Mardinger, O., Levin, L. 2014. Transition From Hopeless Dentition to Full-Arch Fixed-Implant-Supported Rehabilitation by a Staged Extraction Approach. Journal of Craniofacial Surgery, 25(3):847–850.

Nejad, M. F., Proussaefs, P., Lozada, J. 2016. Combining guided alveolar ridge reduction and guided implant placement for all-on-4 surgery: A clinical report. The Journal of Prosthetic Dentistry, 115(6):662–667.

Sargolzaie, N., Moeintaghavi, A., Shojaiie, H. 2017. Comparing the Quality of Life of Patients Requesting Dental Implants Before and After Implant. The Open Dentistry Journal, 11:485–491.

Yoshida, T., Masaki, C., Komai, H., Misumi, S., Mukaibo, T., Kondo, Y., Hosokawa, R. 2016. Changes in oral health-related quality of life during implant treatment in partially edentulous patients: A prospective study. Journal of Prosthodontic Research, 60(4):258–264.