Rehabilitation with Implant Supported Fixed Prosthesis- A Case Report

Dr. Neeraj kumar¹, Dr. Anamika Ahlawat², Dr. Divya Dahiya³, Dr. Reena Ravi⁴

¹²⁴Professor, Dept. of Prosthodontics, PGIDS, Rohtak
¹²⁴Post-graduate student, Dept. of Prosthodontics, PGIDS, Rohtak

ABSTRACT

Today dental implant becomes the mainstay in treatment of edentulism and prosthodontic reconstruction. Dental implants supported fixed prosthesis has many benefits compared to a conventional removable denture, including increased patient satisfaction, improved speech, esthetic, function and self esteem. The aim of the present case report is to describe the oral rehabilitation of a patient with a fixed implant supported prosthesis. The fixed implant retained fixed prosthesis offers good patient acceptance along with aesthetics, comfort and function in cases of edentulism.

Key Words: Screw retained implant prosthesis, Full arch prosthesis

INTRODUCTION

The use of dental implants to replace missing teeth has become a popular mode of treatment in recent years. The social embarrassment caused by moving dentures and the constant effort to stabilize them have led many patients to seek for implant supported fixed prosthesis. Fixed implant prosthesis are totally implant supported, with no transfer of load to denture bearing areas, thus avoiding the possibility of further resorption associated with tissue born prostheses. Several studies indicated that implant supported restorations performed using meticulous surgical and restorative skills can provide long lasting benefits to edentulous patients [1]. However, the clinician may have to face numerous challenges in accomplishing this task [2,3]. Failure to understand stress factors and stress distribution can lead to bone loss and restoration failure [4]. Thorough pre operative treatment planning, prosthetic driven surgery and splinting the framework can control the distribution of forces [4-7]. This article explains in detail the treatment planning and surgical and prosthetic steps taken to rehabilitate a patient with completely edentulous lower jaw and partially edentulous in upper jaw with implant restorations.

CASE REPORT

A 48-year-old male patient reported to the department of prosthodontics with edentulous mandibular arch and several attrited and missing teeth in maxillary arch. The patient had not significant medical history. The patient was reluctant to wear removable dentures and wanted fixed teeth. He was educated about implant supported fixed prosthesis treatment option. The surgical and the prosthetic procedures were discussed in detail and he gave his consent for a implant-supported fix prosthesis.

Pre surgical evaluation included a thorough clinical and radiographic examination (Figure1-3) to analyze the implant sites. Cone beam computerized tomography (CBCT) scan showed adequate bone height, width and density at all implant sites. Conventional procedures were followed to fabricate interim removable dentures to establish vertical dimension of occlusion and for patient adaptation to it. 6 dental implants supported fixed prosthesis in mandibular arch was planned and two implants supported three unit bridge was planned at site of missing 1st and 2nd premolar and 1st molar region in first quadrant. Conventional Porcelain fused to metal crowns were planned on rest of the attrited maxillary teeth.
Fig. 1: Preoperative mandibular occlusal view

Fig. 2: Preoperative maxillary occlusal view

Fig. 3: Cone Beam Computed Tomography report
The cbct finding and selected implant size are:

**Mandible**

| CBCT scan finding(mm) | Implant size(mm) |
|-----------------------|------------------|
|                       | Length | width | Length | width |
| Left central incisor  | 17.2mm | 6.0 mm | 11.5mm | 3.75mm |
| Left canine           | 20.5mm | 5.2mm | 11.5mm | 3.75mm |
| Left 1st molar        | 10.6mm | 5.0mm | 8.0mm  | 3.5mm  |
| Right lateral incisor | 17.2mm | 4.5mm | 11.5mm | 3.5mm  |
| Right 1st premolar    | 20.2mm | 4.1mm | 11.5mm | 3.5mm  |
| Right 1st molar       | 10.9mm | 4.5mm | 8.0mm  | 3.5mm  |

**Maxil**

| CBCT scan finding(mm) | Implant size(mm) |
|-----------------------|------------------|
|                       | Length | width | Length | width |
| Right 1st premolar    | 15.8mm | 6.4mm | 11.5mm | 4.2mm |
| Right 1st molar       | 9.2mm  | 6.3mm | 8.0mm  | 4.2mm |

The patient was pre-medicated with appropriate oral antibiotics and analgesics. Local anaesthesia was administered, mid crestal incision was given and mucoperiosteal flap was raised. Six implants were placed in mandibular arch at strategic position and two implants in maxillary arch at site of 1st premolar and 1st molar in first quadrant (Fig 4-6). The implant placement was strategically decided to avoid cantilever in final prosthesis therefore 1st molar to 1st molar occlusion was planned in this case.

![Surgical drilling for implant placement](image1.png)

**Fig. 4: Surgical drilling for implant placement**

![Paralleling guide placement](image2.png)

**Fig. 5: Paralleling guide placement**
The implants were submerged below the crestal bone level. A two-stage surgical technique was planned and cover screws were placed. Suturing was carried out in interrupted horizontal mattress pattern. The sutures were removed after seven days and the removable dentures was given with soft denture liner to avoid excessive pressure on the implants or the mucosa. Soft diet was recommended to avoid excessive loading of implants during the first three months of healing period.

**Prosthetic Phase:** Six months later, patient was called for the second stage surgery and prosthetic phase. The implant sites were completely healed and free of any signs of inflammation. Incisions were given and cover screws were removed. Transmucosal healing abutments were placed in all the implants. The healing abutments were removed after 2 weeks when the gingival collars were formed around the implants and the sites were prepared for impression. A Closed tray impression technique was followed. Closed tray impression copings were tightened over the implants and impression was made with addition silicone impression material (Fig 7)

The impression was removed and implant analogs were attached to the impression copings and casts were poured. The closed tray copings were attached to each other with help of pattern resin on the cast and jig was fabricated for trial to ascertain the accuracy of the impression (Fig 8). Jig for mandibular arch was tightened in the patient’s mouth and a radiograph was obtained to ensure a complete and passive seating.
Customized trial denture bases were fabricated on the casts to record the maxillomandibular relations. Tooth preparations were done on remaining maxillary teeth (Fig. 9) and impression was made with addition silicone impression material. The maxillary cast was mounted on a semi-adjustable articulator using a face-bow. Vertical jaw relations were recorded to allow sufficient space for the final prostheses. The mandibular cast was then mounted using a centric relation record on wax occlusal rims (Fig 10).

Wax pattern for the metal frameworks were fabricated. Three unit implant supported bridge was given between 1\textsuperscript{st} premolar and 1\textsuperscript{st} molar in maxillary arch. For the mandibular arch, screw retained implant prostheses design was selected to allow easy retrievability, cleansability and maintenance. The implant orientation was such that the retaining screws would pass
through the occlusal aspect of the dental prosthesis (Fig 11). The framework or substructure was casted and then evaluated clinically (Fig 12).

![Fig 11: Metal framework on articulation with occlusal view](image)

The screws were tightened sequentially ensuring a passive fit. A radiograph was taken to confirm the complete seating of the framework. The metal frameworks were returned to the laboratory for porcelain veneering (Fig 13-14).

![Fig 12: Metal trial in patient mouth](image)

![Fig 13: Articulation with permanent prosthesis Left side view](image)
A canine guided occlusion with posterior disocclusion during excursions was provided. After glazing final tightening was done with the recommended torque. The screw access holes were sealed with gutta percha and resin composite (Fig 15-16).

The patient was comfortable and aesthetically satisfied after prosthesis insertion (Fig 17-19). After insertion post operative OPG was taken to check final fit (Fig 20). Oral hygiene instructions were given and patient was put on regular call after 24 hours, 1 week, and after 3 months and then yearly.
Fig 17: Frontal view

Fig 18: After insertion left lateral view

Fig 19: Smile of satisfaction after prosthesis delivery
DISCUSSION

The literature recommends a minimum of four implants for a fixed restoration but increasing the number of implants provides biomechanical advantages to the prosthesis and avoids cantilevers. An increase in the antero-posterior spread and more number of supporting implants increases the predictability of a successful outcome. The critical performance of the screw joint is affected by the handling of the screw seat. Discrepancy between the screw seat and the retentive screw may lead to early screw loosening.

Although immediate loading is preferred by the patient and restorative dentist alike, but literature cautions at several places that the chances of failure are heightened in cases of immediate replacements. Therefore, a two stage surgical technique was followed in this case.

Cement retained implant restorations are gaining popularity as they are simple, esthetic and economical. But such restorations are difficult to retrieve and any residual cement in the soft tissue surrounding the implant may lead to periimplant disease [18]. A screw retained prostheses design was selected to allow easy retrievability and maintenance.

CONCLUSION

Implant supported fix restoration can serve as an excellent treatment modality for edentulous patients. A long term prosthesis success requires a detailed pre-surgical clinical and radiographic analysis based on prosthetically driven implant position, judicious selection of prosthetic materials, prosthesis design and proper maintenance with a rational understanding of patient expectations and limitations.

REFERENCES

[1] Ganeles J, Rosenberg MM, Holt RL, Reichman LH (2001) Immediate loading of implants with fixed restorations in the completely edentulous mandible: report of 27 patients from a private practice. Int J Oral Maxillofac Implants 16: 418-426.
[2] Göthberg C, Bergendal T, Magnusson T (2003) Complications After Treatment with Implant-Supported Fixed Prostheses: A Retrospective Study. Int J Prosthodont 16: 201-207.
[3] Bragger U, Aeschlimann S, Burgin W, Hammerle CHF, Lang NP (2001) Biological and technical complications and failures with fixed partial dentures (FPD) on implants and teeth after four to five years of function. Clin Oral Implant Res 12: 26-34.
[4] Marin DOM, Dias KC, Paleari AG, Pero AC, Filho JNA, et al. (2015) Split-Framework in Mandibular Implant-Supported Prosthesis. A Case Reports in Dentistry 2015: 502394.
[5] Misch CE (2008) Contemporary Implant Dentistry. Missouri: 3rd ed. Elsevier Mosby Publication; 2008.
[6] Galluccio GO, Avrampou M, Taylor JC, Elpers J, Thalji G, et al. (2016) Maxillary Implant-Supported Fixed Prosthesis: A Survey of Reviews and Key Variables for Treatment Planning. Int J Oral Maxillofac Implants 31(suppl): s192-s197.
[7] Al-Taweel SM (2015) Controversy about implant number and distribution in full mouth implant-supported fixed prosthesis: A case report. J Int Oral Health 7: 126-129.
[8] Breeding LC, Dixon DL, Sadler JP, McKay ML (1995) Mechanical considerations for the implant tooth-supported fixed partial denture. J Prosthet Dent 74: 487-492.
[9] Becker CM, Kaiser DA, Jones JD (2000) Guidelines for splinting implants. J Prosthet Dent 84: 210-214.

[10] Cakan U, Anil N, Aslan Y (2006) Prosthetic Rehabilitation of a mandibular gunshot defect with an implant supported fixed partial denture: a clinical report. J Prosthet Dent 95: 274-279.

[11] Ogino Y, Kihara M, Yamada J, Toriya K, Koyano K (2015) Implant treatments for edentulous maxilla with anterior hyperfunction. Journal of Oral Implantology 41: 731-735.

[12] Mertens C, Steveling HG (2011) Implant-supported fixed prostheses in the edentulous maxilla: 8-year prospective results. Clin Oral Impl Res 22: 464-472.

[13] Sunil M, Reddy BM, Reddy TS, Reddy NR (2013) Full mouth rehabilitation with fixed implant-supported prosthesis: A case report. J NTR Univ Health Sci 2: 292-295.

[14] Rajgiri SU, Dayalan M (2016) Full mouth rehabilitation with implant supported fixed prosthesis. Int J Oral Implantol Clin Res 7: 73-80.

[15] Çötert HS, Zeytinoglu B, Zeytinoglu M (2014) Mock-Up Driven Designing of Full-Mouth Implant-Supported Metal-ceramic Fixed Prostheses. Dentistry 4: 204.

[16] Mathew M, John B, George A (2013) An early loaded implant supported mandibular complete arch fixed prosthesis in a young completely edentulous patient: A case report. Journal of Oral Implantology 39:487-495.

[17] Bencharit S, Sacco DS, Border MB, Barbaro CP (2010) Full mouth rehabilitation with implant-supported prostheses for severe periodontitis: A Case Report. Open Dent J 4: 165-171.

[18] Wilson TG (2009) The positive relationship between excess cement and peri-implant disease: A prospective clinical endoscopic study. J Periodontol 80: 1388-1392.