Innovations

Full Mouth Rehabilitation and Management of Complications: A Case Report

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Abstract: *Rehabilitating partially edentulous patients, especially in distal extension cases where traditional fixed prostheses without implants are impractical, presents significant challenges. This report emphasizes modern dentistry's goals of restoring oral health, function, and comfort by discussing the use of a removable prosthesis connected to an implant as a viable treatment option. This method offers cross-arch stability during mastication and improves esthetics by reducing metallic display through a stress director system. The case also highlights the effectiveness of implant-supported hybrid prostheses in addressing aesthetic, functional, and speech concerns in extreme cases. The abstract underscores the importance of tailoring prosthetic solutions to meet both patient-specific needs and comprehensive dental considerations, including biological and mechanical factors, while advocating for precision attachments to enhance esthetics and biomechanics in oral rehabilitation.*

Keywords: *Full mouth rehabilitation, Cobalt chrome, palatal frame work, Hybrid prosthesis, Implant-supported prosthesis, and precision attachments*

Introduction:

Dental implants have gained widespread popularity for rehabilitating edentulous patients, offering significant improvements in oral health, function, and comfort compared to conventional removable prostheses. [12] Esthetics and function are critical considerations when planning prostheses for partially edentulous patients, as they play a significant role in enhancing patient self-confidence. [13]

The selection of an appropriate prosthesis depends on several factors, including the extent and position of the edentulous area, the ability of the abutment teeth to bear occlusal load, and the condition of the mucosa and underlying bone. Implant-retained prostheses are highly effective but may not always be feasible due to insufficient bone or economic constraints. [3, 14]

An alternative approach is a combination of fixed and removable partial dentures with precision attachments. This method offers both esthetic and functional benefits, like retention, reduced compression of the ridge, The increase in partially edentulous patients can be attributed to global aging and enhanced oral health prevention. As a result, a variety of prosthetic options have emerged, including removable partial dentures (RPDs) and partial dentures that are either tooth-supported or implant-supported. [15]

The effectiveness of a prosthesis in restoring and maintaining functions similar to those of natural dentition is influenced by the number and location of missing teeth. The framework provides superior retention, stability, comfort, masticatory efficiency, and periodontal health for abutment teeth compared to conventional complete dentures, which can sometimes lead to poor retention, fracture of the dentures, and patient satisfaction. [10, 12]

This article details the process of full mouth rehabilitation using a combination of an implant assisted removable denture with a palatal strap and a mandibular implant-supported fixed prosthesis. This approach combines the advantages of both prosthetic types to achieve optimal aesthetic and functional outcomes, ensuring long-term durability and patient satisfaction.

Case Presentation:
A 55-year-old female presented to the Department of Prosthodontics with a chief complaint of missing teeth in both the upper and lower arches. She had undergone zygoma implant placement in the upper arch one month prior and sought additional implants and fixed teeth for the lower arch.

After a CBCT evaluation, a treatment plan was developed to place four implants in the lower arch. [Figure 1] Three months post-placement, multiunit and healing abutments were installed. During a follow-up visit for impression-making, it was discovered that the implant in the first quadrant was mobile. Radiographic examination, including an orthopantomogram, showed a dislodged zygomatic implant in the upper right side and rigid implants in the right and left canine regions, as well as the left backside region. The patient was informed and referred back to the clinic, where the failed implant was removed.

The patient was unwilling to undergo any further invasive procedures due to the time and complexity involved. Consequently, the decision was made to use attachments on the remaining implants at positions 13, 23, and 25, and to connect the prosthesis with a framework.

Treatment plan:
In the treatment plan, the failed implant in the maxillary arch was removed, and reimplantation was advised. The patient preferred an immediate treatment option, so an attachment supported denture with a palatal strap or cobalt chrome frame was proposed and accepted. The zygoma implant on the left was in good condition. For the lower arch, the plan was to place four implants using the All-on-4 protocol with dentium implants.

Maxillary Rehabilitation Steps:
After removing the failed implant, a 15-day healing period was observed. The rehabilitation process began with making an alginate impression of the edentulous arch to create custom trays with a 2mm spacer. Open tray transfer copings were placed, and the implant positions were marked and recorded in the custom tray. The tray position was verified for accuracy before the implant in the second quadrant was splinted with pattern resin. A final impression was then made using putty.

In the laboratory at Banyan Laboratory, the cast was poured, and jig verification was performed using RVGs (radiovisiography) to ensure accuracy. Face bow transfer and jaw relations were recorded. A wax try-in was conducted with attachments placed in the maxillary arch, and impressions were taken. [Figure 2] For the lower arch, a screw-retained hybrid denture was fabricated. In the maxillary denture, retention inserts with color codes indicating their retention strength were placed. [Figures 3 & 4]

Post-operatively, the patient was instructed to maintain excellent oral hygiene, avoid hard or sticky foods, attend follow-up visits, and handle the prosthesis with care. They were advised to contact the clinic if they experienced any discomfort, prosthetic mobility, or signs of infection. A panoramic radiograph was taken, and the patient was educated on oral hygiene maintenance and regular recall visits. Evaluations at six months, 12 months, and 18 months post-loading showed no complaints, screw loosening, or significant bone loss.

Mandibular Rehabilitation Steps
For the mandibular rehabilitation, a healing abutment was initially placed for one week. Following this, open tray transfer copings were installed, and appropriately sized impression copings were placed on the implants. Implant-level impressions were taken using the open tray technique with individual trays, and implant analogs were attached to the impression copings. The impressions were then poured using soft tissue moulage material to accurately reproduce the soft tissue, and mandibular definitive working casts were poured in type III dental stone.

To establish the occlusal vertical dimension and centric relation, record bases, occlusal rims, and inter-occlusal bite registration material were used. The positions of the anterior teeth were determined based on esthetics and phonetics, and face-bow transfers were performed to ensure proper alignment and fit of the prosthesis.

Verification indexes were fabricated with pattern resin, connecting the impression copings, and checked intraorally to ensure the accuracy of the master cast. Metal frameworks were fabricated and checked intraorally for passive seating over the implants, and tooth setting was done using prefabricated resin teeth. [Figure 5]

Clinical evaluation of the midline, vertical dimension of occlusion, and centric relation was performed, with esthetics and phonetics assessed and patient acceptance obtained during trial insertions. The prostheses were adjusted to ensure proper occlusal contacts, anterior guidance in protrusion, and canine guidance in lateral excursions, while allowing for proper hygiene. At delivery, abutments were screwed in and torqued as per manufacturer recommendations, and screw access holes in mandibular prostheses were sealed with polytetrafluoroethylene strips and filled with shade A2 composite resin. Occlusion was verified using articulating paper. [Figures 6 & 7]

Post-delivery care included instructions for using and maintaining the prostheses, with follow-up assessments at 24 hours, 1, 2, 6, and 12 months, and annually thereafter. Success criteria such as implant stability, absence of pain or subjective symptoms, lack of peri-implant infection, and no continuous radiolucency around implants were evaluated through visual and radiographic examinations. Minimal bone loss was observed radiographically, with no implant failures during the 2-year follow-up period, and all patients reported satisfaction with the prostheses, citing improved appearance, speech, hygiene, and chewing function. [Figures 8 & 9]

Discussion:

The choice of a maxillary palatal frame work and a mandibular screw-retained hybrid fixed prosthesis for this patient was driven by the need for excellent retention, stability, stress distribution, and good proprioception from the remaining natural teeth. [1-4]

These factors are crucial in ensuring a functional and comfortable prosthetic outcome. According to Bansod et al. (2022), alternative treatment options included the extraction of the remaining teeth, followed by traditional complete denture therapy. However, this was not chosen as it would have reduced

proprioception and the support provided by the natural teeth and periodontium. Additionally, an implant-supported prosthesis was not considered due to the patient's unwillingness to undergo further surgical procedures. [1-4]

For partially edentulous patients, various treatment options must be considered based on diagnostic factors and patient conditions. Advances in techniques such as CAD-CAM, precision-milled and semi-precision attachments, improved impression materials, and modern techniques and designs have significantly enhanced treatment outcomes. [5, 6]

Stability is a major concern in removable partial dentures, as a lack of stability can lead to poor chewing ability, a common issue faced by many patients. Cast partial dentures (CPD) are preferred due to their strength, rigidity, and good stability, making them a reliable choice for many patients. [7, 8]

In dental implantology, accurate and precise planning is essential to detect clinical difficulties before treatment and to foresee final outcomes. A potentially edentulous patient usually prefers a fixed prosthesis over a removable one to restore function and aesthetics. Screw-retained fixed complete dentures (FCD) are a good treatment choice in such situations due to their lower incidence of biological and mechanical complications. A completely edentulous state can be successfully rehabilitated with 4–6 implants supporting fixed complete dentures. [9, 10]

In the current case, the maxilla was restored with 3 implants supporting fixed complete dentures, and the mandible was rehabilitated with a screw-retained hybrid fixed prosthesis. The follow-up evaluation showed the prosthesis to be cost-effective and durable.

Bibliography:

1. *Shah R, Aras M. Esthetics in Removable Partial Denture: A Review. Kathmandu Univ Med J 2013;44(4):344-348.*
2. *Balwani TR, Dubey SG, Sathe S, Chandak A: Demystifying role of phonetics in complete denture. Int J Res Pharm Sci. 2020, 11:2037-43.*
3. *Watson CL, Reeve PE, Barnes E, Lane AE, Bates JF: The role of personality in the management of partial dentures. J Oral Rehabil. 1986, 13:83-91.*
4. *Runov J, Kroone H, Stoltze K, Maeda T, El Ghamrawy E, Brill N: Host response to two different designs of minor connector. J Oral Rehabil. 1980, 7:147-53.*
5. *Al-Jammali ZM, Saad Z, Saad M: Prosthodontics clinical cases (patients with decreased inter-arch distancecase report). IJMRA. 2020, 3:1-9*
6. *Raigrodski AJ. Contemporary materials and technologies for allceramic fixed partial dentures: a review of the literature. J Prosthet Dent 2004;92:557-62.*

7. *Conrad HJ, Seong WJ, Pesun IJ. Current ceramic materials and systems with clinical recommendations: a systematic review. J Prosthet Dent 2007;98:389-404.*
8. *McCracken WL. Contemporary partial denture designs. J Prosthet Dent 2004; 92:409-417.*
9. *Chrystie JA. Principles of clasp retention: A review. Aus Dent J 1988; 33:96-100.*
10. *Bakersandr JLJ, Goodkind RJ. Precision attachment removable partial dentures. Calif, USA: Mosby, San Mateo 1981.*
11. *Anthony DH, Peyton FA. Dimensional accuracy of various denture-base materials. J Prosthetic Dent 1962; 12:67-81.*
12. *Awad MA, Locker D, Korner-Bitensky N, Feine JS: Measuring the effect of intra-oral implant rehabilitation on health-related quality of life in a randomized controlled clinical trial. J Dent Res. 2000, 79:1659-63.*
13. *Zarone F, Apicella A, Nicolais L, Aversa R, Sorrentino R: Mandibular flexure and stress build-up in mandibular full-arch fixed prostheses supported by osseointegrated implants. Clin Oral Implants Res. 2003, 14:103-14.*
14. *Jain, gupta A, ChhabraS,SangwanA. Prosthodontic Rehabilitation using Attachment Retained Overdenture- Case ReportsIOSRJDMS2015:14 (8) Ver. II):17-23*
15. *. Thakare KS, Bhongade ML, Charde P, Kale S, Jaiswal P, Somnath BK, Pendor S: Genetic mapping in Papillon-Lefèvre syndrome: a report of two cases. Case Rep Dent. 2013,*

Figure 1: OPG shows the placement of four implants in the maxillary arch.

Figure 2: Wax try-in was done with attachments placed in the maxillary arch.

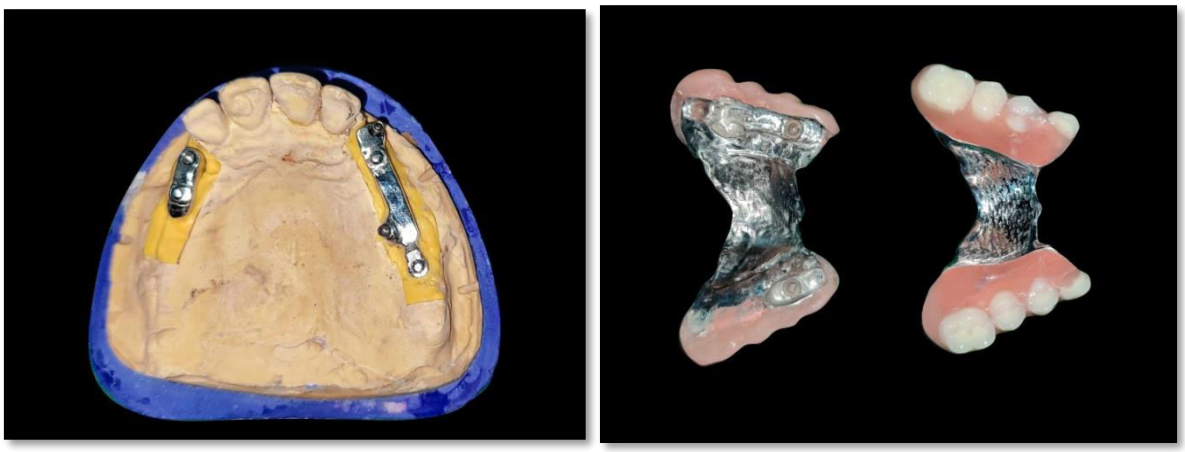

Figure 3: In the maxillary denture, retention inserts with color codes

Figure 4: Maxillary occlusal view

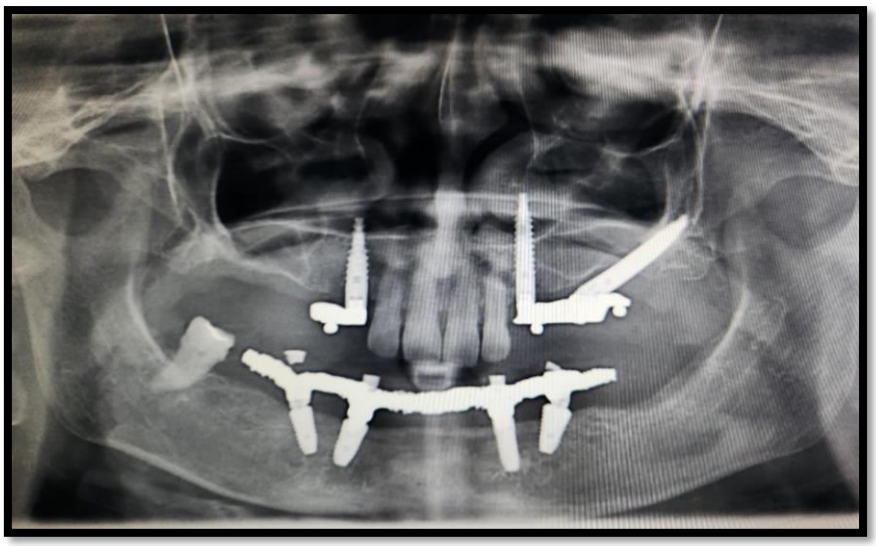

Figure 5: OPG shows a failed implant in the maxillary arch was removed and 4 implants were placed in the mandibular arch.

Figure 6: Wax try-in was done with attachments placed in the mandibular arch.

Figure 7: Occlusal view of maxilla and mandibular dentures

Figure 8: Frontal and lateral view of definitive occlusion

Figure 9; post-treatment extraoral picture