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REHABILITATION OF DEEP BITE WITH DENTAL IMPLANTS AND FIXED DENTAL PROSTHESES: A CASE REPORT

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Abstract:

Rehabilitation of patients with a deep bite is restored either with a tooth-supported fixed prosthesis, implant prosthesis, or by a combination of both. Implant-retained fixed bridges range from limited span to complete arch for dentulous and edentulous jaws. The desire to achieve expected results has in the long-run involved several issues concerning the materials, techniques, and anchorages used. Concerning the types of connection between the implant and restoration, these can be screwed, cemented, or a technique combining both can be implemented. The purpose of this article is to describe an impression technique and its various procedures for the rehabilitation of a patient with a deep bite using a tooth and implant-supported prosthesis.

Key words: *deep bite, full arch rehabilitation with implant and tooth-supported prosthesis, esthetic smile, castable abutments, and screw-retained implant prosthesis.*

Introduction

The occlusal vertical dimension (OVD) is defined as the distance between two selected anatomic points in a maximal intercuspal position[1]. Collapsed bite occurs in one of the two situations. Firstly, the patient grinds their teeth aggressively and reduces the biting surface. Secondly, when enough teeth are lost and remaining natural teeth and supporting alveolar bone are unable to withstand normal biting forces and begin to tip sideways, resulting in over-closure of the jaws. For evaluation of the adequacy of this, it is compared with the physiologic rest position of the mandible[2]. When permanent teeth are missing, a removal partial denture can never be the solution[3]. Rehabilitation of these cases is done either with a tooth-supported fixed prosthesis, implant prosthesis, or by a combination of both. Successful placement of implant retained prosthesis depends greatly on the technique and materials used[4]. It also involves the osseointegration of implants that are

placed in an ideal position for the fabrication of prostheses[5]. Nowadays the most pleasing smiles which have vanished due to the loss of teeth, supporting alveolar bone, and muscle are created by prosthetic materials[6,7]. The use of implant-retained fixed bridges ranging from limited span to complete arch restoration has become a popular mode of treatment in recent years[8,9].

Figure 1: Pre-operative OPG

Diagnosis and Treatment Planning

A 30-year-old female reported to the Department of Prosthodontics and Crown & Bridge willing to restore her lost smile and teeth. On examination, it was found that her maxillary canines were impacted as well as she had faulty fixed bridges in regions 14 to 17 and 24 to 26 with missing 15 16, and 25 respectively. The patient also had missing mandibular posteriors in both quadrants and root canal treated mandibular anterior. The patient had a deep bite in the anterior region and collapsed bite in the posterior region and she wanted to rehabilitate them. The patient was not willing to her maxillary central incisors rather she wants to leave them as it is. A proper case history was recorded for the patient including noncontributory medical history, routine blood investigations, and dental and oral examinations. After clinical and radiological assessments (Figure1), considering

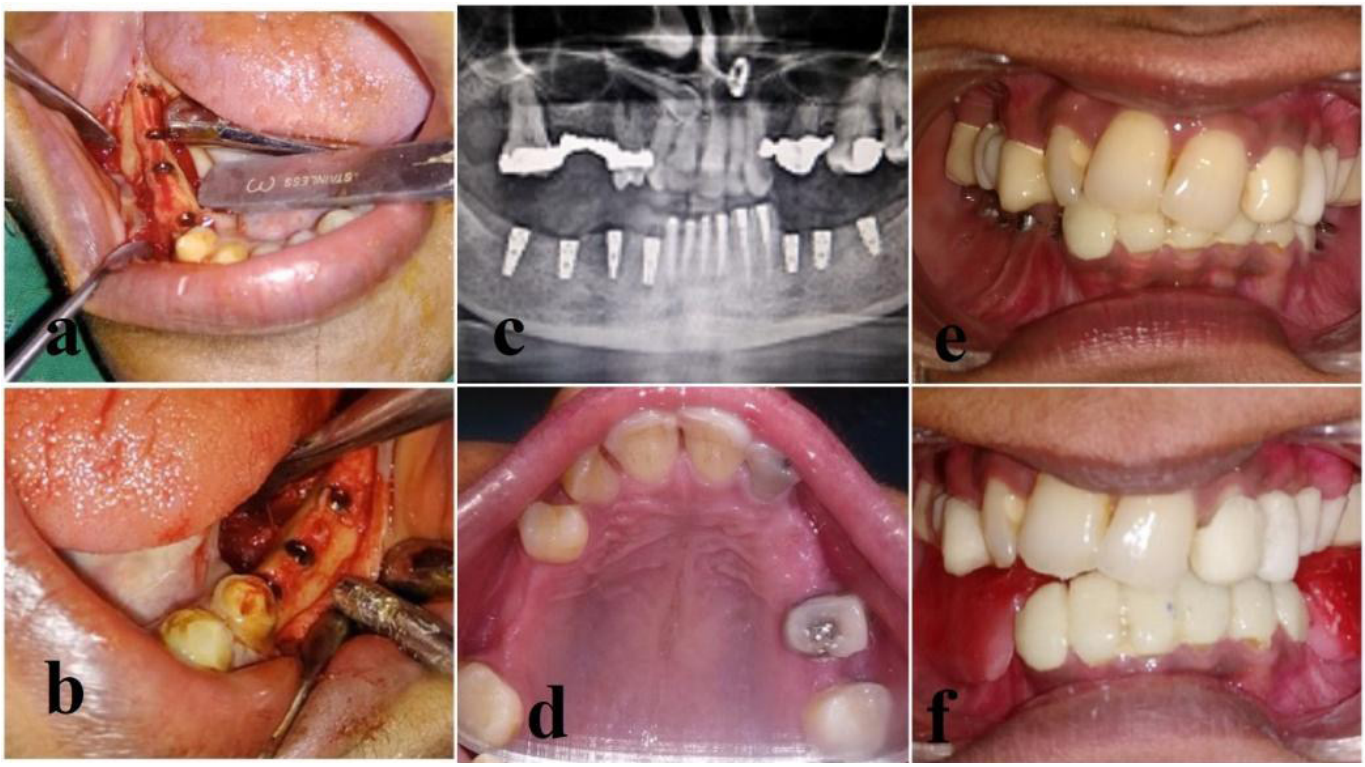

Figure 2: a & b. Implants placement (right & left region), c. Panoramic radiograph following implant placement, d. Occlusal view after removal of faulty prosthesis, e. Temporization over prepared crowns, f. Bite registration over the temporized teeth

the loss of bone, labial support, and financial status, it was decided to remove the faulty bridge and restore the lower posteriors with an implant-supported fixed prosthesis and fixed crowns for the remaining teeth.

Surgical Stage

After clinical and radiological assessments including cone beam computerized tomography, titanium implants (Adin-dis, Israel) were placed in locations 34(3.75W/8L), 35(4.2W/6.2L), 36(4.2W/6.2L) in first appointment and locations 44(3.5W/10L), 45(3.5W/10L), 46(4.2W/6.2L), 47(3.5W/10L) at second appointment (Figures 2a, 2b, 2c). The two-staged approach was employed and implants were left to submerge healing. After four months of an osseointegration period, healing abutments were placed.

Prosthetic Stage

After implant placement, at the first prosthodontic visit faulty fixed prostheses from 14 to 17 and 24 to 26 were removed. Because of extensive decay extraction of 24 and endodontic therapy in 14, 22 and 26 were advised (Figure 2d). Tooth preparation in locations 31, 32, 33, 34, 41 and 42 were done and temporary crowns were given at raised bite within the physiological limits. After healing of extracted sites as well as completion of root canal treatment of desired teeth, fiber post was placed in 14 and tooth preparations of 12, 14, 17, 22, 26 and 27 were done. Temporary crowns for these teeth were also given at raised bite within the physiological limits (Figure 2e). Prior to impression making of both the arches, the occlusal rim was made on mandibular posteriors and inserted in the patient's mouth to check for the raised vertical dimension (Figure 2f).

Figure 3: Final prosthesis

After evaluation of the vertical dimension, the impression for the maxillary arch was made with a single-step putty wash technique using a custom tray. For the impression of the mandibular arch open tray impression copings were screwed in the patient's mouth, and a putty impression was made with an open stock tray for diagnostic purposes. After retrieval of the impression implant analog was placed and cast was poured with type III dental store and a jig was made with dental floss and pattern resin over it by screwing the impression copings with implant analogs. The jig was examined intra-orally to check for implant parallelism and transferred to the diagnostic cast. A new custom tray was fabricated over it for making final impression. The open tray impression posts were again tightened in the patient's mouth and the final impression was made with a custom tray using single-step putty wash technique. The impression was disinfected with 2% gluteraldehyde solution and sent to the lab along with the castable abutments for the fabrication of porcelain fused to metal prosthesis. The prosthesis fit was verified in the patient's mouth. Desired occlusal corrections were made according to centric, lateral, and protrusive movements. Group function occlusion was achieved; the prosthesis was glazed and luted with Glass Ionomer Cement (Figure 3). The patient was highly satisfied with her enhanced smile. Post-operative instructions were given and regular follow-up appointments were maintained

after every 3 months.

Discussion

Rehabilitation of completely edentulous patients offers a great challenge to dentists when a lack of restorative space or other problems exists[10,11]. In patients who are periodontically healthy, full mouth rehabilitation using implant-supported prosthesis has become a widely accepted treatment option[12]. However, various treatment strategies have been developed for oral rehabilitation[13]. Implant-supported prostheses are the best treatment option for restoring difficult situations, which is sometimes impossible via conventional prosthesis as it fulfills both functional and esthetic requirements of the patient[14]. In 1984, Turner classified the treatment of a collapsed bite by the amount of loss of VDO (Vertical Dimension at Occlusion) and available space to restore it[15]. In these kinds of cases where interocclusal space or esthetics is of prime concern, increasing the OVD becomes inevitable[16]. His classification as well as conventional treatment includes raising the VDO with multiple crown-lengthening procedures has been widely used to date. However, the etiology for such situations is multifactorial, clinically controlled trials of restorative and Prosthodontic approaches are limited in quality and quantity. Moreover, there is lack of evidence regarding the long-term outcomes of the treatment methods as well as materials which may cause difficulty in clinical decision-making[17].

Conclusion

According to this clinical report, full mouth rehabilitation for high aesthetic demands was carried out effectively by increasing the vertical dimension of the occlusion as well as correcting the deep bite utilising temporary crowns following fixed implant and tooth-supported prosthesis on the basis of accurate diagnosis.

References

1. The glossary of Prosthodontics terms. 9th Edition. J Prosthet Dent 2017;117(5S):1-105.
2. Jahangiri L, Jang S. Onlay partial denture technique for assessment of adequate occlusal vertical dimension: a clinical report. J Prosthet Dent 2002;87:1-4.
3. Hariharan A, Dhanaraj SP. Implant-supported prosthesis on edentulous mandible with multiple impacted teeth- a case report with 5 year follow up. J Indian Prosthodont Soc 2019;19369-373.
4. Williamson R. Placing the single-tooth, Screw-retained implant Prosthesis. JADA, June 2000;131:810-811.
5. Singhal MK, Pandey B, Agarwal A, Yadav S, Ojah P, Pal A, Parai P. Customized implant full-mouth rehabilitation: A biomedical depiction. Contemp Clin Dent. 2018;9(3):488-493
6. Steigmann M. Aesthetic flap design for correction of buccal fenestration defects. Pract Proced Aesthet Dent 2008;20(8):487-494
7. Montero J, Paula CM, Albaladejo A. The 'Toronto prosthesis', an appealing method for restoring patients candidates for hybrid overdentures: a case report. J Clin Exp Dent. 2012;4(5):309-312
8. Bencharit S, Sacco DS, Border MB, Barbaro CP. Full Mouth Rehabilitation with Implant-Supported Prostheses for Severe Periodontitis: A Case Report. Open Dent J 2010;4: 165-171.
9. Floyd P, Palmer R, Barrett V. Treatment planning for implant restorations. British Dental Journal 1999;187(6):297-305
10. Rajgiri S, Dayalan M. Full mouth rehabilitation with Implant supported fixed prosthesis. Int J Oral Implant Clin Res. 2016;7(3):73-80.
11. Prasad S, Kuracina J, Monaco EA Jr. Altering occlusal vertical dimension provisionally with base metal Onlays: a clinical report. J Prosthet Dent 2008;100:338-42.
12. Ghalaut P, Shekhawat H, Meena B. Full-mouth rehabilitation with immediate loading basal implants: A case report. Natl J Maxillofac Surg. 2019;10(1):91-94.
13. Ahmad AG, Osman M, Awadalkreem F. Full-mouth rehabilitation of a patient with cleidocranial dysplasia using immediately loaded basal implant-supported fixed prosthesis: A case report. Int J Surg Case Rep 2019;65:344-348.
14. Siadat H, Rokn A, Beyabanaki E. Full arch all-on-4 fixed implant-supported prosthesis with 8.5 years of follow up: A case report. J Dent (Tehran) 2018;15(4):259-265.
15. Turner KA, Missirlian DM. Restoration of the extremely worn dentition. J Prosthet Dent 1984;52:467-74.
16. Bachhav VC, and Aras MA. Altering occlusal vertical dimension in functional and esthetic rehabilitation of severely worn dentition. J Oral Health Res 2010;1(1):1-8.
17. Johansson A, Johansson AK, Omar R, Carlsson GE. Rehabilitation of the worn dentition. J Oral Rehabil 2008;35:548-66.