



FULL MOUTH REHABILITATION ON PARTIALLY DENTATE NATURAL TEETH AND IMPLANTS: A CASE REPORT

Prosthodontics

Dr Shuja

Mohammed Khan*

BDS, Post Graduate Trainee, ITS-CDSR Muradnagar *Corresponding Author

Dr Kashinatha Shetty

Professor, ITS-CDSR Muradnagar

Dr Gaurav Issar

Reader, ITS-CDSR Muradnagar

Dr Shweta Tyagi

BDS, Post Graduate Trainee, ITS-CDSR Muradnagar

Dr Sushant Bajaj

BDS, MDS, Prosthodontics

ABSTRACT

Background- Diagnostic technology and restorative protocols have advanced to the point where implant therapy has the capacity to go far beyond the replacement of missing teeth. From straightforward single-tooth replacements to full-mouth reconstructions, clinicians can provide patients with restorations that significantly improve upon the function and esthetics with which the patient presents to the office. When treatment planning an implant case, rather than simply filling the edentulous space with an implant, it is imperative that clinicians evaluate and address the needs of the entire dental system.

Material and method- This case report considers a 53 year male with a chief complaint of difficulty in chewing because of his missing teeth in the upper and lower right and left-back tooth region for 2 years and wanted to undergo treatment for the same. After clinical and radiological examination, provisional diagnosis for Maxillary arch and Mandibular arch was Kennedy's Class 1 Modification 1. Seven Adin Touareg- S implants (Adin Implant System Ltd. Israel) were placed and intentional RCT were carried out. The rehabilitation was done with fixed tooth-supported zirconia bridge prosthesis restoring anterior teeth and fixed Implant-supported screw-retained prosthesis replacing posterior missing teeth.

Conclusion- Although the patient presented for the restoration of missing teeth, a comprehensive evaluation determined that full mouth rehabilitation was needed to correct an array of dental issues. The treatment plan dramatically improved overall esthetics, comfort and function.

KEYWORDS

INTRODUCTION:

Loss of teeth is accompanied by a lot of adverse aesthetic and biomechanical sequelae. In cases of multiple tooth loss, treatment options can be removable partial denture, complete denture, overdenture, or implant-supported prosthesis. Among them, implant-supported fixed prosthesis slows down resorption of alveolar ridges and rehabilitates approximately full function of the natural teeth,^{1,2} hence achieving relatively higher satisfaction on the patient's behalf, compared to the conventional removable dentures.³ By providing more stable occlusal conditions, an implant-supported fixed partial denture can be a good alternative, when the patient shows lack of neuromuscular control for removable denture.⁴

Arnd Käyser was the first to introduce the shortened dental arch (SDA) concept in 1981, and he defined it as a dentition that is missing the majority of the posterior teeth. Käyser drew attention to the lack of the necessity of a complete set of teeth, and the fact that despite missing teeth, patients could achieve satisfactory oral function without long-term complicating sequelae.⁵

The 1982 World Health Organization (WHO) oral health goal for developing countries was set as the retention of 20 healthy, functional, aesthetically natural teeth without resorting to a prosthesis, and the findings of SDA research indicate that SDAs conform to this goal.⁶ In modern prosthodontic decision-making, the old dogma that lost teeth must always be replaced has shifted to the notion of a minimal acceptable healthy, natural, functioning dentition.^{7,8}

The SDA concept has become a favored treatment option relative to other complex procedures. For example, the use of the SDA concept precludes the need to place implants in risky posterior bone sites adjacent to vital structures.^{9,10}

This case report aims to show the functionally and esthetically satisfying full mouth rehabilitation with implant-supported screw-retained prosthesis replacing posterior missing teeth and tooth-supported zirconia bridge prosthesis restoring anterior teeth.

CASE REPORT:

A 53-year male reported to the Department of Prosthodontics, ITS

DENTAL COLLEGE, MURADNAGAR with a chief complaint of difficulty in chewing because of his missing teeth in the upper and lower, right and left-back tooth region since 2 years.

After taking a thorough case history, Past medical and surgical history was noncontributory.

On intraoral examination, attrition and wear facets on the cervical region of the remaining dentition were seen. Also, supra eruption was observed in 21,34. (Fig. 1) Interarch space was measured to be 16mm in the right lateral and 14 mm left lateral region. A preoperative OPG was taken which shows endodontic treated teeth in 12 13 22 33. (Fig. 2) The diagnosis for the Maxillary arch was Kennedy's Class 1 Modification 1 with remaining anterior teeth and for the Mandibular arch was Kennedy's Class 1 Modification 1 with remaining canines and 1st premolar teeth present.

Diagnostic impressions were made to obtain diagnostic cast followed by a facebow record. A Tentative Jaw relation was obtained which was then mounted on Hanau wide view semi-adjustable articulator with the diagnostic casts. A diagnostic wax mockup was done to determine the length, width & angulation of the teeth. The inter arch distance was sufficient, an occlusion without increasing the vertical dimension was developed. (Fig. 3)

The patient was then recalled to educate and motivate the formulated treatment plan such as,

Option 1: Fixed: fixed tooth-supported zirconia bridge prosthesis restoring anterior teeth and fixed Implant-supported screw-retained prosthesis replacing posterior missing teeth.

Option 2: Semi fixed: Precision Attachment denture

Option 3: Removable: Tooth supported over-denture, Cast partial denture, Complete denture

The patient rejected the removable option and decided to receive the fixed option.

The proposed treatment plan was divided into pre-prosthetic phase,

prothetic phase, and maintenance phase. The pre-prosthetic phase included advising the patient to undergo intentional RCT irt 21,14,43,44,34.

After the completion of the endodontic phase, the patient was advised for a cbct evaluation to assess the bone quantity and quality so as to select the implant of a suitable dimension. After CBCT evaluation and bone mapping, 7 Adin Touareg- S implants(Adin Implant System Ltd. Israel) were placed irt 15, 23,24,35,36,45,46.(Fig. 4) The patient was also advised for Implant placement irt 16,26 with sinus lift but he was reluctant to undergo further advanced surgical procedure Figure 5 shows OPG with implant placement and endodontic treatment in all the teeth. After 2 weeks of post-implant placement, the tooth preparation was done and final impressions were made using putty wash impression technique and 2 pairs of die casts were prepared followed by the Face bow record for zirconia prosthesis (Fig. 6). Then Jaw relation recording was done at the predetermined vertical dimension followed by temporization. The master casts were sent to CAD-CAM lab for the fabrication of zirconia prosthesis.(Fig. 7) The prefinal Zirconia prosthesis was checked for fit, extension, occlusion, shade and smile line during the trial(Fig. 8). The final prosthesis was placed in the semi-adjustable articulator to check and eliminate centric and eccentric interferences and to develop uniform contact in occlusion. After the cementation of anterior zirconia prosthesis (Fig. 9), the patient was then recalled for the next phase of treatment i.e. the implant FPD prosthesis.

An implant level open tray impression was made followed by JIG verification (Fig.10). For confirmation of complete seating, IOPAR were taken. Implant supported screw-retained prosthesis was fabricated and was checked in the patient's mouth for complete passive seating (Fig.11). Figure 12 shows post-operative OPG and image of the patient.

DISCUSSION:

Proper diagnosis and treatment planning is key to any successful mouth rehabilitation. Implant Full-mouth rehabilitation is also designated as implant complete mouth rehabilitation.¹¹ Successful implant treatment involves osseointegration of implants that are placed in ideal positions for the fabrication of a dental prosthesis.¹²

In this case, as all has been acknowledged as a treatment of choice for function and esthetics, implant supported fixed partial denture achieved good satisfaction on patient's behalf, resulting in increased psychological confidence and social activity. With fixed reconstructions, it is particularly important that there is sufficient interocclusal space to ensure rigidity.¹³

Zirconium oxide, also known as zirconia, has gained increasing popularity in contemporary dentistry due to its biocompatibility, high flexural strength, toughness, and esthetic properties. As CAD/CAM technology gets ubiquitous, zirconia is currently being used for the fabrication of all ceramic copings and frameworks for both fixed prosthodontics and implant dentistry.^{14,15}

The shortened dental arch concept does not contradict current occlusion theories and appears to fit well with the problem-solving approach. In some situations, the restoration of the dental arches up to the second molars is limited by either the patient's financial situation or surgical complications, difficulties, and complexities encountered by the clinician.¹⁶

The SDA concept is advantageous for plans that do not involve compensating for the loss of the posterior teeth and thus reduces the cost of treatment and the possible hazards of inserting implants in the area of the maxillary sinus.¹⁷

Käyser et al. suggested the adaptive capacities of patients with shortened dental arches are sufficient when at least four, preferably symmetrically positioned, occlusal units are left. Thus, in the SDA concept, the treatment is directed at preserving the anterior and premolar teeth.¹⁸ Gotfredsen and Walls found that SDAs with a minimum of three occluding units exhibited no signs of occlusal instability, whereas such signs appeared with extremely shortened dental arches that involved fewer than two pairs of occluding premolars.^{19,20}

CONCLUSION:

Although the patient presented for the restoration of missing teeth,

comprehensive evaluation determined that full-mouth rehabilitation was needed to correct an array of dental issues. The treatment plan not only created the restorative space needed for the patient's implant restorations, but also dramatically improved overall esthetics, comfort and function. The importance of evaluating the dental system as a whole when a patient presents for implant treatment is paramount. Although a majority of implant cases involve straightforward single-unit restorations, thorough examination can reveal that a more comprehensive course of action is needed to maximize the long-term prognosis of the patient's oral health and minimize the odds that the patient will eventually require more extensive treatment.

- **Consent For Publication-** Not Applicable
- **Availability Of Data And Materials-** Not Applicable

Authors Contributions

- 1st author did the stage II implant surgery and prosthetic rehabilitation.
- 2nd author planned and guided in the prosthetic rehabilitation.
- 3rd author did the stage I implant surgery.
- 4th author analyzed and interpreted the patient data and contributed in writing manuscript.
- 5th author assisted in the stage I implant surgery

Acknowledgement-

Not Applicable



Figure 1: Intraoral frontal view

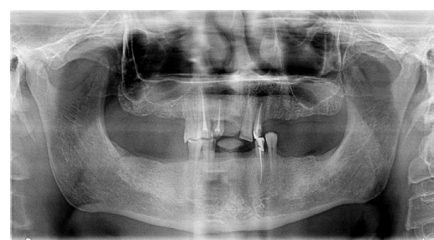


Figure 2: Preoperative OPG

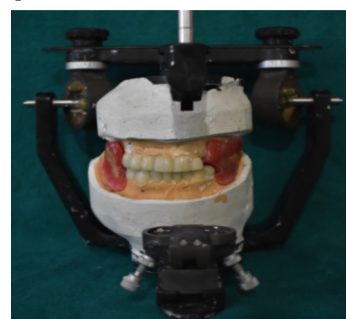


Figure 3: Diagnostic wax mockup

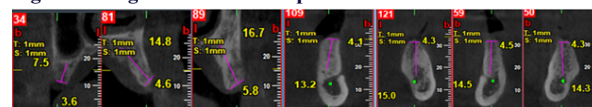


Figure 4: Cone beam computed tomography sections



Figure 5: Postoperative OPG



Figure 6: Facebow record

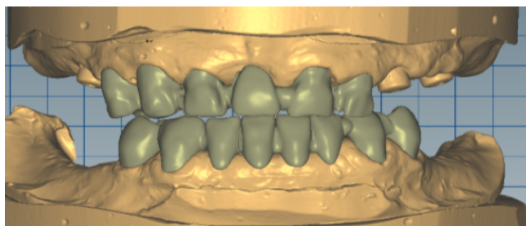


Figure 7: CAD file



Figure 8: Prefinal zirconia prosthesis trial



Figure 9: cementation of zirconia prosthesis



Figure 10: Jig verification



Figure 11: Screw retained implant prosthesis trial

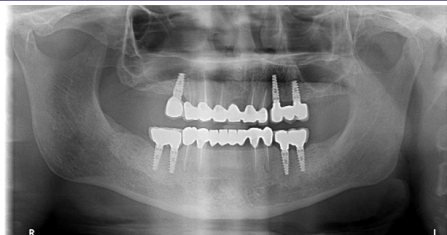


Figure 12 a : Post-operative OPG



Figure 12 b : Post-operative image

REFERENCES

1. Adell R, Lekholm U, Rockler BR, Brånemark PI. A 15-year study of osseointegrated implants in the treatment of the edentulous jaw. *International journal of oral surgery*. 1981 Jan 1;10(6):387-416.
2. van Steenberghe D, Lekholm U, Bolender C, Folmer T, Henry P, Hermann I, Higuchi K, Laney W, Linden U, Astrand P. Applicability of osseointegrated oral implants in the rehabilitation of partial edentulism: a prospective multicenter study on 558 fixtures. *Int J Oral Maxillofac Implants* 1990;5:272-81.
3. Pjetursson, B.E., Karoussis, I., Bürgin, W., Brägger, U. and Lang, N.P., 2005. Patients' satisfaction following implant therapy: a 10-year prospective cohort study. *Clinical oral implants research*, 16(2), pp.185-193.
4. Budtz-Jørgensen E. Restoration of the partially edentulous mouth-a comparison of overdentures, removable partial dentures, fixed partial dentures and implant treatment. *J Dent* 1996;24:237-44.
5. Käyser A. F. 1981. Shortened dental arches and oral function. *J. Oral Rehabil*.8:457-462.
6. World Health Organization/Fédération Dentaire Internationale . 1982. Global goals for oral health in the year 2000. *Int. Dent. J.* 32:74-77.
7. Fernandes V. A., and Chitre V.. 2008. The shortened dental arch concept: a treatment modality for the partially dentate patient. *J. Indian Prosthodont. Soc.* 8:134-139.
8. Armellini D., and Von Fraunhofer J. A.. 2004. The shortened dental arch: a review of the literature. *J. Prosthet. Dent.* 92:531-535.
9. Tidwell J. K., Blijdorp P. A., Stoelinga P. J., Brouns J. B., and Hinderks F.. 1992. Composite grafting of the maxillary sinus for placement of endosteal implants. A preliminary report of 48 patients. *Int. J. Oral Maxillofac. Surg.* 21:204-209.
10. Jacobs R, Adriansens A, Verstreken K, Suetens P, van Steenberghe D. Predictability of a three dimensional planning system for oral implant surgery. *Dentomaxillofac Radiol* 1999;28:105-11.
11. Ferro KJ, Driscoll CF, Freilich MA, Guckes AD, Knoernschild KL, McGarry TJ. The glossary of prosthodontic terms: Ninth edition. *J Prosthet Dent* 2017;117:e23-6.
12. Budtz-Jørgensen E. Restoration of the partially edentulous mouth-a comparison of overdentures, removable partial dentures, fixed partial dentures and implant treatment. *J Dent* 1996;24:237-44.
13. Raigrodski AJ. Contemporary materials and technologies for allceramic fixed partial dentures: a review of the literature. *J Prosthet Dent* 2004;92:557-62.
14. Conrad HJ, Seong WJ, Pesun IJ. Current ceramic materials and systems with clinical recommendations: a systematic review. *J Prosthet Dent* 2007;98:389-404.
15. Sheiham, A. 2002. Minimal intervention in dental care. *Med. Princ. Pract.* 11(Suppl. 1):2-6.
16. Armellini, D., and J. A. Von Fraunhofer. 2004. The shortened dental arch: a review of the literature. *J. Prosthet. Dent.* 92:531-535.
17. Kanno, T., and G. E. Carlsson. 2006. A review of the shortened dental arch concept focusing on the work by the Käyser/Nijmegen group. *J. Oral Rehabil.* 33:850-862.
18. Gotfredsen, K., and A. W. Walls. 2007. What dentition assures oral function? *Clin. Oral Implant Res.* 18(s3):34-45.
19. Witter, D. J., N. H. Creugers, C. M. Kreulen, and A. F. De Haan. 2001. Occlusal stability in shortened dental arches. *J. Dent. Res.* 80:432-436.