The role of dental implant in maxillofacial prosthetic rehabilitation in Rizgari teaching hospital

Othman A. Omar [(1)]

Backgrounds and objectives: Loss of any maxillofacial subunit will certainly pose a functional, esthetic, and psychological problems. In addition the mode of fixation of prosthesis is of major concern. This research aimed to study the role of dental implant in fixing maxillofacial prosthesis.

Method: A retrospective hospital based study was designed from June 2019 to January 2023. Maxillofacial prosthetic unit is the only center in the region treating patients with lost maxillofacial subunits. Inclusion criteria were, 18 years old or above, patients who lost facial structure unit/s (mandible, maxilla, orbit, nose, auricle, etc...). Cone beam CT was used for implant site planning. All the surgeries of implant placement were done under local anesthesia through full thickness skin flaps. Implants were placed 1cm away from each other for hygienic purposes and at least 7mm away from hairy skin.

Result: A total of 28 implants were used for prosthetic rehabilitation of 10 patients (7 males and 3 females) with age range of 27-70 years. All the implants passed the period of healing and the follow up period after prosthetic rehabilitation successfully with 0% failure. No unwanted sequel like skin infection or peri implantitis or pain is reported.

Conclusion: Dental implant considered the best mode of fixation in maxillofacial rehabilitation with best functional, esthetic and psychological outcomes.

Keywords: dental implant, rehabilitation, prosthesis, maxillofacial defects

[(1)] Department of Oral and Maxillofacial Surgery, College of Dentistry, Hawler Medical University, Erbil, Iraq.
Corresponding author: Othman A. Omar
email: dr_othmm978@yahoo.com

INTRODUCTION

The reconstruction of oral and maxillofacial (OMF) defects secondary to tumor, osteonecrosis, trauma, and congenital disease represent a daunting task in head and neck surgery and require a multidisciplinary treatment approach.

Maxillofacial defect is of great concern physically, emotionally, and psychologically for a patient. However, it is an even bigger challenge for a team attempting rehabilitation, as a crucial decision has to be made between surgical approach and/or prosthetic rehabilitation.[1]

Dental implants have become an integral part of orofacial rehabilitation. In addition to their use for tooth replacement, they have become important in maxillofacial prosthetic rehabilitation. Head and neck cancers often require ablative surgery that includes the maxilla and mandible. The use of dental implants to support prostheses replacing portions.

of the jaws and facial skeleton has given individuals with this disease functionality, aesthetics, and emotional support that have never before been possible.[2]

For defects affecting facial subunits such as the nose and orbit, a maxillofacial prosthetic can both obturate the defect and achieve aesthetically pleasing outcomes. Osseointegrated implants placed into sound bone at

the defect site allow the maxillofacial prosthodontist to optimize prosthesis retention without the need for adhesive or a mechanical device.[3]

Defects that affect the maxillofacial region as a result of trauma or tumor surgery can be difficult to reconstruct and frequently call for a multi-staged surgical procedure that involves the use of nearby and/or distant vascularized tissue to replace any missing facial subunits and restore their form, function, and appearance. This is particularly true when different tissue types, like skin, cartilage, and bone, are lost.[4]

Maxillofacial rehabilitation procedures are frequently lengthy and frequently necessitate several additional procedures spread out over a long period of time to produce results that are aesthetically pleasing.[5] On the other hand, prosthetic rehabilitation can offer a different, quicker, and easier course of treatment, as well as lower initial costs, the potential for immediate new teeth, and ease of oncologic surveillance.[6]

As a result Branemark's introduction of osseointegrated implants for dental rehabilitation in the late 1970s, their use was later extended to the craniomaxillofacial complex and outside the oral cavity.The stability and predictability of the osseointegrated implant, which has a success rate of 90–95% over a ten-year period, has emerged as a promising treatment option for dental rehabilitation and offers better retention for maxillofacial prostheses without the use of adhesive agents.[7,8]

In recent years the Department of Oral and Maxillofacial Surgery in Rizgari teaching Hospital is expanded to add maxillofacial prosthetic rehabilitation unit which is the only center in the region offering such services.

The aim of this study is to evaluate the role of osseointegrated implant in prosthetic rehabilitation of patients with maxillofacial defects whose treatment by surgery is challenging and often with poor outcome.

METHODS

A retrospective hospital based study was designed from June 2019 to January 2023. Maxillofacial prosthetic unit is the only center in the region treating patients with lost maxillofacial subunits. Inclusion criteria were, 18 years old or above, patients who lost facial structure unit/s (mandible, maxilla, orbit, nose, auricle, etc...) subsequent to trauma or tumor ablation, congenital malformations, and patients who refuse multiple reconstructive surgeries and failed surgical attempts. Exclusion criteria were Patients treated with high doses of radiotherapy, uncontrolled diabetes and hematologic diseases.

The study was approved by the Medical Ethics Committee of the College of Dentistry, Hawler Medical University.

The exact positioning of the placement of implants and the amount of available bone was determined using cone-beam CT (CBCT).

All the surgeries of implant placement were done under local anesthesia through full thickness skin flaps. Implants were placed 1cm away from each other for hygienic purposes and at least 7mm away from hairy skin. Furthermore the implants were not placed at the center of the defect to avoid the transfer of destructive forces to bones to which they are attached by being exposed to Class I level forces during rotational movements of the prosthesis.

Three implants were placed for cases of orbital loss (Superior lateral orbital rim) (Figure 1), auricular loss (mastoid bone) (Figure 2), and 2 implants for nasal prosthetic reconstruction and multiple implants for bone grafted maxillary or mandibular bones.

Osteotomy was done as conventional protocol for endosseous implants using (Nucleoss, Turkey, and Eurotec, France) implant system with dimension range 3.0-4.2 mm × 5-10 mm depending on the available bone in the boundary of the defects.

After 4 months postoperatively, 2nd stage surgery was done to expose the implants and long gingival former was used. In cases with thick soft tissue over the implant an impression post is used to emerge through the skin. Then the patients were referred to maxillofacial prosthodontist for prosthetic fabrication. The patients were followed up during the healing period and 1-3 years after prosthetic rehabilitation.

Figure 1: Orbital loss due to shell injury, 3 parallel implants in lateral part of superior orbital ridge.

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RESULTS

A total of 28 implants were used for prosthetic rehabilitation of 10 patients (7 males and 3 females) with age range of 27-70 years. All the implants passed the period of healing and the follow up period after prosthetic rehabilitation successfully with 0% failure. No unwanted sequel like skin infection or peri implantitis or pain is reported. The distribution of implants is shown in Table 1.

All the patients showed high satisfaction with results functionally, cosmetically and psychologically. (Figures 3,4,5)

Table 1: distribution of impants.

Anatomic region	No. of cases	No. of implants/ case	Total	Failure/ s
Maxilla	1	3	3	0
Mandible	1	3	3	0
Orbit	3	3	9	0
Auricle	3	3	9	0
Nose	2	2	4	0
			28	0%

Figure 2: Auricular malformation, 3 parallel im-

Figure 3: Orbital prosthesis fixed by 3 dental implants. Prosthesis by Dr. Zhalla Dara Miran (College of Dentistry/ Hawler Medical University)

Figure 4: nasal prosthesis fixed by 2 dental implants. Prosthesis by dr. Zhalla Dara Miran (College of Dentistry/ Hawler Medical University)

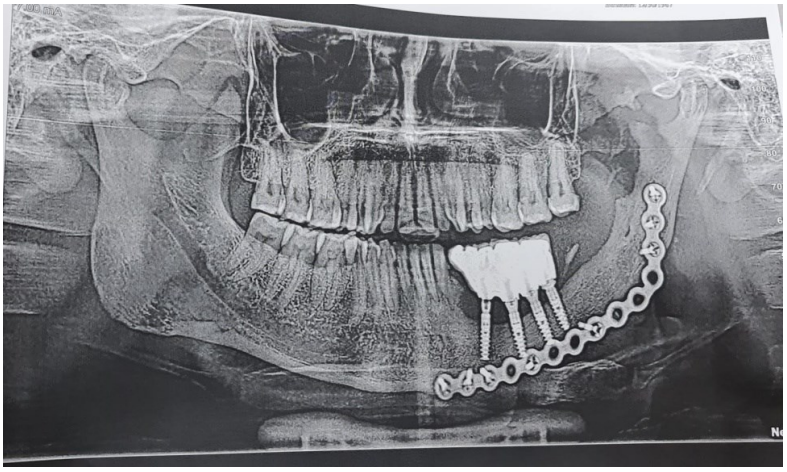

Figure 5: A case of previous ameloblastoma. The resected part of mandible is rehabilitated by iliac bone graft and dental implants.

DISCUSSION

The discovery of osseointegration has been arguably one of the most beneficial medical breakthroughs especially in the head and neck region. The number of successful implants being placed is increasing rapidly as better implants, more efficient investigative techniques and superior armamentarium is readily available. These implants have also revolutionized the scope and the efficacy of rehabilitation of the entire craniofacial region. Advances in the science of craniofacial implantology will ensure that the
patients receive the most comprehensive rehabilitation that can be offered and ensure that
their early return to form and function.[9,10]
Whenever surgical reconstruction of the lost natural tissue is not possible, a prosthetic replacement provides a good and reliable option for the patient. Dental implant provides the best and more superior method of fixation of maxillofacial prosthesis. No more use of adhesives, tissue and bone undercuts. Furthermore it is more effective functionally and psychologically. The high success rate and reliability of dental implant is proved by many researchers working in this field. [1-3,7-10]
There is no reported case of peri-implant infection. Implant infections have been documented in the research literature with a frequency ranging from 0.01% to 3.9% in various case presentations or patient groups.[11] The systemic or topical anti-biotic treatment with a wide spectrum creates good results in implant infections and implants rarely need to be

displaced. Furthermore using high standards of sterilization and disinfection during surgical procedure is another important factor in reducing infection.

CONCLUSION: Dental implant considered the best mode of fixation in maxillofacial rehabilitation with best functional, esthetic and psychological outcomes.

CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest relevant to this article.

REFERENCES

1. Chauhan, Dushyant; Roy, I. D. Viswamnara, M.; Thakur, Ashish; Athwale, Ravi. Rehabilitation of Auricular Defect with Implant-Retained Auricular Prosthesis - A Case Report. Annals of Maxillofacial Surgery 11(1):p 164-168, Jan–Jun 2021. | DOI: 10.4103/ams.ams_343_20
2. Bashiri, R., Khalili, M., Weiner, S. (2021). Rehabilitation of Oral Cancer Patients using Dental Implants and Maxillofacial Prosthetics. In: El Assal, R., Gaudilliere, D., Connelly, S.T. (eds) Early Detection and Treatment of Head & Neck Cancers. Springer, Cham. https://doi.org/10.1007/978-3-030-69859-1_10
3. Le, J., Ying, Y., Kase, M., & Morlandt, A.. Surgical Reconstruction and Rehabilitation of Midface Defects using Osseointegrated Implant-supported Maxillofacial Prosthetics. Journal of Diagnostics and Treatment of Oral and Maxillofacial Pathology. 2022, 6(1). https://doi.org/10.23999/j.dtomp.2022.1.4
4. Beumer J, Marunick MT, Esposito SJ. Maxillofacial rehabilitation: prosthodontic and surgical management of cancer-related, acquired, and congenital defects of the head and neck. 3rd edition. Quintessence Publishing Co. Inc; 2011.
5. Burget GC, Walton RL. Optimal use of microvascular free flaps, cartilage grafts, and a paramedian forehead flap for aesthetic reconstruction of the nose and adjacent facial units. Plast Reconstr Surg 2007;120(5):1171–207. https://doi.org/10.1097/01.prs.0000254362.53706.91
6. Moreno MA, Skoracki RJ, Hanna EY, Hanasono MM. Microvascular free flap reconstruction versus palatal obturation for maxillectomy defects. Head Neck 2010;32(7):860–8. https://doi.org/10.1002/hed.21264
7. Tolman DE, Desjardins RP. Extraoral application of osseointegrated implants. J Oral Maxillofac Surg 1991;49(1):33–45. https://doi.org/10.1016/0278-2391(91)90264-m
8. Ueda M, Hibino Y, Niimi A. Usefulness of dental implants in maxillofacial reconstruction. J Long Term Eff Med Implants 1999;9(4):349–66.
9. Roumanas ED, Freymiller EG, Chang TL, Aghaloo T, Buemer J III. Implant retained prosthesis for facial defects: An up to 14-year follow-up report on the survival rates of implants at UCLA. Int J Prosthodont 2002; 15: 325-32.
10. D'Souza, D. . Role of Implants in Maxillofacial Prosthodontic Rehabilitation. In: Turkyilmaz, I. , editor. Current Concepts in Dental Implantology [Internet]. London: IntechOpen; 2015 [cited 2023 Jan 16]. Available from: https://www.intechopen.com/chapters/48007 doi: 10.5772/59578
11. Kaltreider, S. A., & Newman, S. A. Prevention and management of complications associated with the hydroxyapatite implant. Ophthalmic plastic and reconstructive surgery,1996; 12(1): 18-31.