Original Article

Prosthetic Rehabilitation of Patients with Maxillary Defects in a Nigerian Tertiary Hospital

Omo JO, Sede MA, Enabulele JE

Department of Restorative Dentistry, University of Benin Teaching Hospital, Benin City, Edo State, Nigeria

Address for correspondence:
Dr. Julie O Omo,
Department of Restorative Dentistry,
University of Benin Teaching
Hospital, P.M.B. 111, Benin City,
Edo State, Nigeria.
E-mail: omole70@yahoo.com

Abstract

Background: Maxillary defects are managed by prosthodontic rehabilitation using obturators. This rehabilitation goes through various stages, which invariably affects the quality-of-life of the patients. **Aim:** This study aims to analyze the types and design of obturators used in the rehabilitation of maxillary defects at a tertiary health institution in Nigeria. **Materials and Methods:** This is a retrospective study of all patients with maxillary defects treated at a tertiary institution between the period of October 2010 and May 2013. The data of interest collected from the patient's register and case notes include age, gender, type of defects, design of obturators and conditions for which treatment was offered. The collected data were analyzed using Statistical Package for Social Sciences version 16.0 (Chicago, Illinois, 2010) and result presented in frequencies and tables. **Results:** A total of 19 case notes were retrieved. The age range was 5-73 years with the mean age of 46.37 ± 19.02 and peak age incidence at 41-60 years. The male: female ratio was 1:1.4. Surgical defects were the most common type of maxillary defects seen; accounting for 89.5% (17/19) of the cases, which were mostly associated with malignant tumors. Immediate surgical obturators were provided for 63.2% (12/19) of the subjects. Majority 70.6% (12/17) of those with surgical defects received immediate surgical obturators while all those with congenital defect were given feeding plate. There was a statistically significant association between the type of maxillary defect and type of obturator provided ($P < 0.01$). **Conclusion:** The results of this study suggest that majority of the obturators fabricated for patients with maxillary defect at the Tertiary health institution in Nigeria were immediate surgical obturators. Pre-surgical patient education and follow-up care is advocated.

Keywords: Maxillary defects, Maxillectomy, Obturators

Introduction

Maxillary defects are created by surgical treatment of benign or malignant neoplasms, congenital malformation and trauma.[1] Their occurrence is also associated with the enucleation of maxillary cysts.[2] Patients with acquired maxillary defects differ from those with congenital defects due to the abrupt alteration in physiologic processes associated with surgical resection of the maxillae.[3] The ensuing defect creates oronasal and oroantral communication leading to difficulties in mastication, hypernasal speech, fluid leakage and various degrees of cosmetic concerns.[4] These post-surgical effects usually have serious consequences as they affect the form and function of normal stomatognathic system leading to a reduction in quality-of-life of the patient.[5] Early management is therefore important in retaining function and enhancing the patient's self-esteem.[2]

Maxillectomy defects are managed by prosthodontic rehabilitation or surgical correction of defect. The decision to use either of the options is influenced by the site, size, etiology, severity, age and the patient's wishes.[6] However, the success of the prosthodontic option depends upon the collaboration and planning of the surgeon, prosthodontists and the patient. Prosthodontic rehabilitation of total or partial maxillectomy in patients includes the separation of oral and nasal cavities to allow adequate deglutition and articulation, support for the orbital contents to prevent enophthalmos and diplopia, support of the soft-tissue to restore the midfacial contour and an acceptable aesthetic result.[7-9]

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Central to achieving the desired results in the rehabilitation of maxillectomy patients is the use of an intraoral prosthesis known as a maxillary obturator. It is positioned in the closure of a congenital or acquired tissue opening, primarily located in the hard palate and/or contiguous alveolar or soft-tissue structures.[10]

Obturators can be classified as immediate surgical obturator (feeding plates), temporary or interim obturator and definitive obturator depending upon the time period elapsed from surgical resection of maxilla.[11] An immediate surgical obturator is the first prostheses placed and is used to minimize post-operative complications.[12] It supports soft-tissue, minimizes scar contracture and disfigurement, reproduces the anatomic integrity of the palate, improves post-operative oral hygiene and protects the surgical packing from food debris contamination.[13] It also allows the patient to resume normal diet, protect the wound from trauma and maintain pressure either directly or indirectly on split thickness skin graft.[14] Furthermore, it restores speech to a reasonable level and obviates the use of nasal gastric tubes. They can also be used to correct lip and cheek contour and reduces the flow of exudates into the mouth.[15]

The temporary or interim obturator is constructed from a post-surgical impression cast, which has a false palate and ridge without teeth. The closed bulb extending into the defect area is hollow.[1]

The definitive obturator is fabricated about 6 months after surgery from post-surgical maxillary cast, when the surgical site has completely healed and minimal dimensional changes are unlikely.[1] This obturator has a metal frame work, which acts as the palate and supports the teeth and a closed hollow bulb.[16]

Crucial to achieving adequate rehabilitation for patients with maxillary defects, it is important that there is a high level of cooperation between the prosthodontist and the surgeon prior to surgery.[9] This will ensure that the patient benefits maximally from the rehabilitation. However, it is important to note that the rehabilitation goes through various stages, which invariably affects the quality-of-life of the patients. Therefore, the aim of the present study is to analyze the rehabilitation of maxillary defects, the types, design of obturators and conditions for which they were indicated at the Tertiary Health Institution in Nigeria.

Materials and Methods

This was a retrospective study of all maxillectomy patients treated at the Prosthodontic unit, Department of Restorative Dentistry in a Tertiary Health Institution in Nigeria between the period of October 2010 and May, 2013. The data of interest collected from the patient's register and case notes include demographic characteristics (age and gender), type of defect, design of obturators, conditions for which they were indicated, pre-surgical education and post-rehabilitation follow-up. Ethical approval was sought from the ethical committee of the University of Benin Teaching Hospital.

Statistical analysis

The collected data were analyzed using Statistical Package for Social Sciences version 16.0 (Chicago, Illinois, USA, 2010) and result presented in frequencies and tables. Chi-square was used to compare relevant variables. Confidence interval of 95% was used and $P < 0.05$ was considered to be statistically significant.

Results

A total of 19 case notes were collected during the study period. The age range was 5-73 years with the mean age of 46.37 ± 19.02 and peak age incidence at 41-60 years. The male: female ratio was 1:1.4 [Table 1].

Surgical defects were the most frequent type of maxillary defect seen accounting for 89.5% (17/19) of the cases while congenital and traumatic defects accounted for 5.3% (1/19) each. Malignant tumors were the main indication for surgery 76.5% (13/17) [Table 2]; of which squamous cell carcinoma constituted 84.6% (11/13) and adenocystic carcinoma 15.4% (2/13). Immediate surgical obturators were provided for 63.2% (12/19) of the subjects while 26.3% (5/19) subjects received the definitive obturator [Table 3]. Majority 70.6% (12/17) of those with surgical defects received immediate surgical obturators

Table 1: Demographic characteristics of subjects

Characteristics	Frequency *n*	Percentage
Age group (years)		
<20	3	15.8
21-40	4	21.1
41-60	8	42.1
61-80	4	21.1
Gender		
Female	11	57.9
Male	8	42.1

Table 2: Indications for surgery in subjects with surgical maxillary defect

Type of lesion	Frequency *n*	Percentage
Malignant lesions		
Squamous cell carcinoma	11	64.6
Adenocystic carcinoma	2	11.8
Benign lesions		
Ameloblastoma	1	5.9
Juvenile ossifying fibroma	1	5.9
Fibrous dysplasia	1	5.9
Osteoblastoma	1	5.9
Total	17	100.0

while the subject with congenital defect received a feeding plate. There was a statistically significant association between the type of maxillary defect and type of obturator provided ($P < 0.01$) [Table 4]. The case record of the subjects lacked information on pre-surgical education, counseling and post-rehabilitation support.

Discussion

After maxillectomy, prosthetic restoration of the resulting defect is an essential step because it signals the beginning of patient's rehabilitation.[17] In this study, a total of 19 subjects were seen during the period under review. Although it appears small, the number is similar to those reported in previous studies.[18-20] This may be attributed to the fact that approximately 5% of all malignant diseases are located within the oral and maxillofacial area[21] and are associated with increased mortality; thereby making maxillectomy a rare surgical procedure.

Majority of the subjects in this study were over 40 years of age; and therefore falls within the age range commonly affected by maxillary carcinomas.[22,23] A male/female ratio of 1:1.4 was observed in this study; a value that is lower than those reported in other studies.[19,24] It however compares with the result of a 10 years retrospective study[25] that examined the pattern of maxillectomy defects in Ibadan, Nigeria.

Congenital maxillary defect was found in only 5.3% of the subjects. This may be due to the use of the surgical option in the closure of congenital defects or as a result of the challenges of retention, compliance and changes in the maxillary growth in growing children.[26] Prosthodontic rehabilitation of missing oral and facial structure is indicated when surgical procedures cannot produce satisfactory functional or cosmetic outcomes.[27] The large number of subjects with surgical defects in this study can be explained by the fact that the study center is a tertiary health facility with full complement of specialties that adequately meets the needs of maxillectomy patients; providing services to her immediate environs and neighboring states.

Table 3: Obturator types provided for subjects

Obturator type	Frequency *n*	Percentage
Feeding plate	1	5.3
Immediate surgical obturator	12	63.2
Temporary obturator	1	5.3
Definitive obturator	5	26.3
Total	19	100.0

Table 4: Association between maxillary defect and type of obturator provided

Maxillary defect	Type of obturator provided *n* (%)				
	Feeding plate	Immediate surgical	Temporary	Definitive	Total
Congenital	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)
Traumatic	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	1 (100.0)
Surgical	0 (0.0)	12 (70.6)	1 (5.9)	4 (23.5)	7 (100.0)
Total	1 (5.3)	12 (63.2)	1 (5.3)	5 (26.3)	19 (100.0)

P=0.001

The major indication for surgery in these subjects was malignant tumors; accounting for 82.4%. This is in agreement with the observation that malignant tumors of the maxilla are more common than the benign tumors.[24,27] In this study, squamous cell carcinoma was the commonest indication for surgery (64.6%); a finding that is similar to a report from a previous studies.[9,28] The immediate surgical obturator (feeding plate) was the obturator prosthesis mostly constructed for the patients with maxillary defect in this study. It was provided for 68.5% of the subjects while the definitive obturator was received by 26.3% of the study population. This implies that a majority of the subjects did not receive the definitive obturator; hence the desired functions of mastication, speech and esthetics may not have been optimally restored; with the consequence of a deteriorating quality-of-life in the subjects. According to Irish *et al*.,[29] patients with increasing difficulties with obturator function reported increased disease impact, depression, loss of behavior or emotional control and decreased positive effect. These may have been the complaints of the subjects in this study, but due to inadequate follow-up or perhaps as a result of recurrence of the malignant condition, deteriorating health and death; they never returned.

The case records of the subjects reviewed in this study lacked information on pre-surgical education, counseling and post-rehabilitation support. This may be attributed to the absence of adequate discussion and communication of the treatment plan between the surgeons, prosthodontists and the patients. Patient's motivation and education about the type of prosthesis along with its limitations are the first steps toward a successful treatment.[2] In a relatively illiterate society like ours,[30] the patients must be informed of what is required of them at every stage of treatment; else they will be lost to follow up at the earliest difficulty. This may have been the situation with those that terminated their treatment at the immediate surgical obturator (feeding plate) stage.

The results of this study suggest that majority of the obturators fabricated for patients with maxillary defect at the Tertiary Health Institution in Nigeria were immediate surgical obturators. Pre-surgical patient education is a necessity and follow-up care is advocated.

Further research on the impact of adequate patient counseling prior to rehabilitation is advocated.

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References

1. Keyf F. Obturator prostheses for hemimaxillectomy patients. J Oral Rehabil 2001;28:821-9.
2. Popli S, Parkash H, Bhargava A, Gupta S, Bablani D, Kar AK. A two-piece sectional interim obturator. A clinical report. J Prosthodont 2012;21:487-90.
3. Singh A, Kumar N, Singh V, Singh SK. Transitional prosthesis for a dentulous hemimaxillectomy patient. Natl J Maxillofac Surg 2010;1:173-5.
4. Ahila SC, Anitha KV, Thulasingam C. Comparison of obturator design for acquired maxillary defect in completely edentulous patients. Indian J Dent Res 2011;22:161-3.
5. Garhnayak M, Garhnayak L, Kar AK, Chittaranjan B. Prosthetic rehabilitation of a unilateral maxillary defect with an intermediate obturator. Indian J Dent Res 2010;2:378-82.
6. Shabir AS, Talib AN, Sabzar A, Nazia MZ, Sunil J. Prosthetic rehabilitation of a patient with limited mouth opening consequent to partial maxillectomy: A clinical report. Int J Health Sci Res 2013;3:82-7.
7. Wang RR. Sectional prosthesis for total maxillectomy patients: A clinical report. J Prosthet Dent 1997;78:241-4.
8. Byju PK, Ranjith KP, Shajahan PA. Maxillectomy defect rehabilitation with obturator prosthesis-A case report. Int J Contemp Dent 2011;2:118-21.
9. Tirelli G, Rizzo R, Biasotto M, Di Lenarda R, Argenti B, Gatto A, *et al*. Obturator prostheses following palatal resection: Clinical cases. Acta Otorhinolaryngol Ital 2010;30:33-9.
10. The glossary of prosthodontic terms. J Prosthet Dent 2005;94:10-92.
11. Wiens JP. Acquired maxillofacial defects from motor vehicle accidents: Statistics and prosthodontic considerations. J Prosthet Dent 1990;63:172-81.
12. Türkaslan S, Baykul T, Aydın MA, Ozarslan MM. Influence of immediate and permanent obturators on facial contours: A case series. Cases J 2009;2:6.
13. Shambharkar VI, Puri SB, Patil PG. A simple technique to fabricate a surgical obturator restoring the defect in original anatomical form. J Adv Prosthodont 2011;3:106-9.
14. Juntavee N. Prosthetic rehabilitation of maxillectomy patient. Kaen Dent J 1998;1:93-9.
15. Meenakshi A, Shah D. The obturator prostheses for maxillectomy. SRM J Res Dent Sci 2012;3:193-7.
16. Singh M, Bhushan A, Kumar N, Chand S. Obturator prosthesis for hemi maxillectomy patients. Natl J Maxfac Surg 2013;4:117-20.
17. El Fattah H, Zaghloul A, Pedemonte E, Escuin T. Pre-prosthetic surgical alterations in maxillectomy to enhance the prosthetic prognoses as part of rehabilitation of oral cancer patient. Med Oral Patol Oral Cir Bucal 2012;17:e262-70.
18. Rogers WA, Salinas TJ, Novoselsky A. Maxillary definitive obturators: Rationale of design. J Dent Technol 1996;13:19-26.
19. Riaz N, Warriach RA. Quality of life in patients with obturator prostheses. J Ayub Med Coll Abbottabad 2010;22:121-5.
20. Hertrampf K, Wenz HJ, Lehmann KM, Lorenz W, Koller M. Quality of life of patients with maxillofacial defects after treatment for malignancy. Int J Prosthodont 2004;17:657-65.
21. Rieger J, Wolfaardt J, Seikaly H, Jha N. Speech outcomes in patients rehabilitated with maxillary obturator prostheses after maxillectomy: A prospective study. Int J Prosthodont 2002;15:139-44.
22. Rogers SN, Lowe D, McNally D, Brown JS, Vaughan ED. Health-related quality of life after maxillectomy: A comparison between prosthetic obturation and free flap. J Oral Maxillofac Surg 2003;61:174-81.
23. Chidzonga MM, Mahomva L. Squamous cell carcinoma of the oral cavity, maxillary antrum and lip in a Zimbabwean population: A descriptive epidemiological study. Oral Oncol 2006;42:184-9.
24. Berk B, Heller A, Heller D, Schwartz S, Wein EA. Ewing sarcoma of the mandible: A case report. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1995;79:156-66.
25. Dosumu OO, Abiodun OA. The pattern of maxillectomy defects seen at the prosthetic clinic of University of Ibadan Dental School. Ghana Dent J 2012;9:20-2.
26. Berkowitz S. Facial and palatal growth. In: Berkowitz S, editor. Cleft Lip and Palate, Diagnosis and Management. 2nd ed. Berlin: Springer; 2006. p. 23-34.
27. Murad N, Zakirullah, Ghani F. Types of maxillary tumour and the resulting post surgical defects in patients in a teaching hospital. J Postgrad Med Inst 2012;26:106-10.
28. Guttal KS, Naikmasur VG, Rao CB, Nadiger RK, Guttal SS. Orofacial rehabilitation of patients with post-cancer treatment – An overview and report of three cases. Indian J Cancer 2010;47:59-64.
29. Irish J, Sandhu N, Simpson C, Wood R, Gilbert R, Gullane P, *et al*. Quality of life in patients with maxillectomy prostheses. Head Neck 2009;31:813-21.
30. Federal Republic of Nigeria. The National Literacy Survey. Abuja: Nigeria National Bureau of Statistics (Nigeria); 2010.

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