

# Extended Orbital Exenteration: Proposal for Modification of Meyer and Zaoli's Classification

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## ABSTRACT

**Background:** The orbital exenteration classification by Meyer and Zaoli has become popular in the literature as a means whereby clinicians present exenteration procedures. Although Meyer and Zaoli's classification is adopted in our practice

**Objective:** To propose a modification of Mayer and Zaoli's classification to accommodate cases of orbital exenteration where one or both eyelids will be spared.

**Methods:** A retrospective study of cases of maxillary tumours treated with maxillectomy and orbital exenteration over a 13 years period (January 2005-December 2017) in a Nigerian tertiary health facility.

**Results:** They were 14 maxillectomies with orbital exenteration out of 91 maxillectomies carried out within the study period. There were more males (71.4%) than females (28.6%) and the age range was between 5 to 72 years (mean of 42.57 years, the median age was 45 years). Based on Meyer and Zaoli's classification of orbital exenteration, 5 cases were classed as type IV, nine cases, however, could not be classified as they met all other requirements for classification as type IV except for the eyelid preservation which cannot be accounted for in Meyer and Zaoli's classification

**Conclusion:** Modification of Mayer and Zaoli's classification to accommodate orbital exenteration cases where one or both eyelids were spared will make it more complete and exhaustive

**Keywords:** Orbital exenteration; Classification of orbital exenteration; Lid-sparing orbital exenteration

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Received: 14-April, 2022

Revision: 2 May, 2022

Accepted: 3 June, 2022

Citation: Fomete B, Omeje KU, Agbara R, Adebayo E, Ikhekuamen E, Amole O. Extended orbital exenteration: proposal for modification of Meyer and Zaoli's classification. *Nig J Dent Res* 2022; 7(2):97-102  
<https://dx.doi.org/10.4314/njdr.v7i2.4>

## INTRODUCTION

Surgical resection of the entire maxilla is known as total maxillectomy and it includes the floor, medial wall of the orbit and the ethmoid sinuses. The surgical procedure may be extended to include orbital exenteration (OE) when the maxillary lesion has infiltrated the orbit to involve either fat, muscle, globe, eyelids, or lacrimal apparatus. Orbital exenteration was defined by Aryasit et al.,<sup>1</sup> as disfiguring and mutilating surgery aimed at removing all the orbital contents together with the periosteum, and eyelids with or without the orbital bone. Kesting et al.,<sup>2</sup> in 2017 noted that OE is extended when there is the removal of neighbouring anatomic structures such as periorbital bone and soft tissues.

Orbital exenteration in patients undergoing maxillectomy can be of curative or palliative benefit for extensive tumours persistently invading the orbit from the maxilla, skin or some infections such as necrotizing fasciitis and fungal infection.<sup>2, 3, 4, 5</sup> Reconstruction of OE defects can be very challenging, especially when associated with maxillectomy defects. The options for reconstruction may include the advancement of local or regional flaps to obliterate defects or the utilization of prosthetics. Both options are not without merits and demerits.

Fomete et al.,<sup>4</sup> in 2017 classified maxillectomy into limited, subtotal, total and extended. In limited maxillectomy, only one of the maxillary walls is removed, while the subtotal maxillectomy involves the removal of at least two walls, including the palate; total maxillectomy is a term reserved for procedures resecting the entire maxilla. In extended maxillectomy removal of the entire maxilla with other adjacent structures which may include the orbit is the norm.

Classifications in surgery help surgeons to standardize their practice and allow communication with greater ease of understanding as well as reduces ambiguity, especially for the purpose of reconstruction.<sup>4</sup> Yeatts<sup>5</sup> classified orbital exenteration into total and subtotal orbital exenteration, he further subclassified total OE into those with or without removal of the eyelid whereas, in subtotal OE, there is the partial removal of the orbital tissues with a sacrifice of the eye. This is sometimes referred to as extended enucleation.

Meyer and Zaoli classified Orbital exenteration for tumours in relation to the extent of destruction involved in the surgery:<sup>6</sup> They identified four classifications in patients who required maxillectomy with orbital exenteration as follows:

Type I: palpebral skin and conjunctiva are spared

Type II: only the palpebral skin is spared while the eyeball and its appendages are removed with the conjunctiva

Type III: both eyelids are removed with orbital contents

Type IV: the eyeball, eyelids and appendages of the eye are removed with the involved bone structures.

The orbital exenteration classification in 1971 by Meyer and Zaoli<sup>6</sup> has become popular in the literature since it allows clinicians to easily characterize exenteration procedures.

The wide acceptance of this classification may not be unrelated to its simplicity to use and adaptability for most maxillectomy cases where orbital exenteration is incorporated.

The aim of the present study is to describe the pattern of presentation of maxillectomies, classify those that had orbital exenteration and recommend a modification for Mayer and Zaoli's classification based on our findings.

## PATIENTS AND METHODS

A retrospective study of cases of maxillary tumours that had maxillectomy with orbital exenteration over a 13-years period (January 2005- December 2017) in a Nigerian tertiary health facility was undertaken.

Ethical approval (NHREC/10/12/2015 and ABUTH/HRE/CL/05) to conduct the study was obtained from Ahmadu Bello University Zaria health research and ethics committee. Data retrieved from patients' folders and operation record books included demographics, indications for surgery, the histological status of tumor as well as the location of tumour. Orbital exenteration carried out in this study was classified according to Meyer and Zaoli<sup>6</sup> (1971).

## RESULTS

Fourteen maxillectomies with orbital exenterations were conducted out of the 96 patients who underwent maxillectomies in the period under review. There were more males 71.4% than females 28.6% and the age range of the patients was

between 5 to 72 years (mean of 42.57 years, the median age was 45 years). Indications for maxillectomy were malignant lesions 92.9 % ( 13 cases) and benign lesions 7.1%. While 64.3% presented on the left side, 35.7% were on the right side.

Squamous cell carcinoma as a histologic diagnosis was seen in 5 patients. This accounted for the highest frequency in those with malignant disease while the only patient with benign histology was a case of recurrent maxillary ameloblastoma.

Details of the histologic diagnosis of the patients are presented in Appendix I.

All were cases of extended maxillectomy with various degrees of exenteration.

**Figure 1** showed the clinical photographs of a 45-years old woman with a histologically diagnosed right-sided maxillary antral carcinoma (squamous cell carcinoma of maxillary antrum) who was intubated to undergo maxillectomy with orbital exenteration.

**Figures 2 and 3** are the clinical photographs of the patient in Figure 1, three days and 1-month post-operative periods respectively



**Figure 1:** Photograph of a 45 year old woman with a right sided histologically diagnosed maxillary antra carcinoma intubated to for maxillectomy with orbital exenteration.



**Figure 2:** Photograph of the patient on figure 1 at 3 days post-operative



**Figure 3:** Photograph of the patient on figure 1 at 30 days post-operative

Based on Meyer and Zaoli's classification of orbital exenteration, 5 cases were classified as type IV, nine cases could not be classified as they met all the other requirements to have been classified as type IV except for the eyelid preservation which cannot be accounted for in Meyer and Zaoli's classification.

We, therefore, propose a modification of Meyer and Zaoli's classification of type IV into type IVA for those with eyelid preservation and IVB for those without eyelid preservation.

#### DISCUSSION

The aim of the present study is to describe the pattern of presentation of maxillectomies, classify those that had orbital exenteration and recommend

a modification for Meyer and Zaoli's classification based on our findings.

The first recorded exenteration was carried out by Bartische<sup>10</sup> in 1583. Rajak et al.,<sup>3</sup> reported 12 cases of maxillectomy with exenteration while the present study recorded 14 cases. Yeatts'<sup>5</sup> classification of orbital exenteration into total and subtotal though popular has a demerit of creating a problem in distinguishing between his subtotal OE from simple enucleation where solely the eyeball is resected. The absence of this limitation in the classification of Zaoli and Mayer makes it more acceptable for communication among surgeons.

The finding of the present study which noted a gender prevalence of more males than females is similar to that of Reza et al.<sup>7</sup> However Reza et al recorded a mean age of 86 years which was higher than that of the present study. Their higher mean age may be a reflection of the higher life expectancy in the population they studied.

The commonest indication for maxillectomy with OE was malignancy (92.6%) which is in agreement with the findings of previous researchers<sup>2, 3, 8, 9</sup>

This study recorded 64.3% (9 cases) on the left and 35.7% on the right. This agreed with Nassab et al<sup>7</sup>, who had 20 out of 32 cases on the left. There was however no case of bilateral exenteration in this study.

Five out of the 14 cases in this study were type IV based on Meyer and Zaoli's classification. And the remaining 9 could not be classified because one or both eyelids were spared. Rajak et al<sup>3</sup>, reported 2 out of 12 cases in which eyelids were spared. This was higher than the 17/45 type IV cases reported by Kesting et al<sup>2</sup>. This could be so because all the cases reported here were done by maxillofacial surgeons while in the report by Kesting et al<sup>2</sup>, 30 cases out of the 45 were carried out by maxillofacial surgeons. The absence of further sub-classification of type IV Meyers and Zaoli's classification may create some vacuum and possible confusion in the description of cases where the eyelids were spared. This is because the impact on the quality of life from the sparing or non-sparing of the eyelid may be immense for the patients.

## CONCLUSION

Lesions that infiltrate the orbit necessitate exenterative procedures which have been classified

by Meyer and Zaoli. Some of our cases had orbital exenteration with preservation of the eyelids which is not included in their current classification, hence the proposal to modify Meyer and Zaoli's classification type IV into two subtypes, with cases of preserved eyelids being subtype IVA).

## Source of Support

Nil.

## Conflict of interest

None declared

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**APPENDIX I**

Details of the histologic diagnosis of the patients

**Age, gender, histologic diagnosis and type of orbital exenteration in the studied patients**

S/N	Age/Sex	Clinical presentations	Diagnosis	Type of maxillectomy	Type of exenteration	Follow up/ complication
1	40/M	Fungating right orbitomaxillary lesion, involvement of both eyelids mobile teeth, presence of lymph nodes	SCCa mod diff	Extended maxillectomy	Type III, type IV(since there is communication with the oral cavity). Immediate recons of the eyelids using the forehead (Type iv)	Flap was never divided due to financial difficulty the patient requested to go home get money for next stage but never returned.
2.	72/M	Extensive swelling over the Lt maxillary, temporal and orbital region with areas of ulceration. Upper eyelid involved.	Ameloblastic carcinoma meanwhile the working diagnosis was recurrent ameloblastoma	Radical resection. Patient underwent chemoradiation.	Type III, Type IV (Type iv)	Died after 6 months of chemotherapy
3	50/M	Lt antro-orbital swelling with loss of vision, proptosis, eyelids not involved. Nasal bleeding and obstruction. cranial involvement.	Well dif SCCa	Extended maxillectomy.	Type III, Type IV, preservation of both eye lids. (Type iv with preservation of eyelids)	
4	62/F	Lt antro-orbital lesion, loss of vision, scar over the skin, intraorally mobile teeth, lesion extending to the opposite side.	Chondroblastic sarcoma	Extended maxillectomy, ethmoidectomy. Chemotherapy	Type II, Type IV, preservation of both eyelids. (Type iv with eyelid preservation)	Wound breakdown, depressed, initially refused feeding.
5	22/M	Rt antro-orbital swelling, infected with skin involvement, loss of vision with marked proptosis, lesion present intraorally with lesion crossing midline	Chondroblastic sarcoma	Extended maxillectomy with soft tissue excision	Type II, Type IV with preservation of both eyelids. (Type iv with eyelids preservation)	

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6	5/M	Fungating orbital lesion extending to the maxilla and intraorally	Retinoblastoma	Extended maxillectomy	Type II, Type IV(type iv)	Died in the course of therapy
7	45/F	Orbitomaxillary lesion.	SCCa	Extended maxillectomy	Type IV (type iv)	Loss to follow up after 6weeks
8	40/M	Lt maxillary swelling involving the orbit	Adenocarcinoma of minor salivary gland	Extended maxillectomy, chemoradiation.	Type II, Type IV.(Type iv with preservation of eyelids)	
9	52/F	Rt maxillary swelling involving the orbit.	Recurrent ameloblastoma	Rt Maxillectomy	Type IIb, Type IV(type iii)	
10	32/M	Lt maxillary lesion extending to the orbit.	SCCa	Lt maxillectomy	Type IIa, Type IV(type iv with preservation of eyelids)	
11	23/F	Recurrent Lt maxillary lesion, involving the orbit, limited mouth opening, had surgery and chemotherapy, with tracheostomy	Chondrosarcoma	Lt extended maxillectomy	Type IV defect with preservation of both eyelids(type iv with eyelid preservation)	
12	M/60		Adenoid cystic Ca		Exenteration(type iv with preservation of eyelids)	
13	M/55		Mucoepidermoid Ca		Exenteration(type iv with preservation of eyelids)	
14	M/70		SCCa	extended maxillectomy	Exenteration(type iv with preservation of eyelids)	

**Key:**

SSCa: Squamous cell carcinoma

Ca: Carcinoma