IMPACT OF INTRAOPERATIVE NAVIGATION IN SURGICAL MARGINS IN MIDFACE MALIGNANCIES

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INTRODUCTION

- The surgical treatment of midface malignant tumours is often highly complex, being a surgical challenge for Oral and Maxillofacial surgeons.
- The three-dimensional anatomy of midface makes anatomical orientation difficult with an increased risk of affected surgical margins.



From Cordeiro PG, Santamaria E. A classification system and algorithm for reconstruction of maxillectomy and midfacial defects. *Plast Reconstr Surg*. 2000;105:2331–2346.

Recently, computer-assisted techniques and intraoperative (IO) navigation have been applied in complex head and neck resections with promising results.

(Brown and Stage Disease Type of reconstruction Shaw) (AJCC 8th ed)

IV

IV

Free Rectus Abdominis

Free Rectus Abdominis Flap

Temporalis Flap

Free Rectus Abdominis Flap

Free Anterolateral Thigh Flap

Free Iliac Crest Bone

Free Rectus Abdominis Flap

Free Rectus Abdominis Flap

Temporalis Flap

Miocutaneous lateral Vast Free Flap

Fibula OMC free flap

Free Iliac Crest Bone Flap

Free Anterolateral Thigh Flap

Free Iliac Crest OMC Flap

Miccutaneous lateral Vast Free Flap

oralis Flap

apula OMC Flap

apula OMC Flap

MATERIAL AND METHODS

- Thirty-six patients with malignant and locally advanced midface tumours (T4a 8^a AJCC edition) were selected between September 2016 and December 2020.
- Ambispective study:
 - **GROUP 1**: 18 patients prospective selected. Surgery + Intraoperative navigation
 - **GROUP 2**: 18 patients retrospective selective. Conventional Surgery

OBJECTIVE

- Main Objective: To demonstrate that IO Navigation reduces surgical affected margins in midface malignant tumours resections.
- Secondary Objectives: IO navigation improves prognosis, surveillence and decrases risk of surgical complications.



Preoperative planning. Tumour volume (orange) and safety surgical margins (green).

SC

sc

domyosa

Amelanotic Melanoma

Ductal ADC

sc

SC

SC

sc

SC (inverted papiloma)

aceous ADC

SC

tenoid Cystic Carcinoma

SNUC

sc

Leiomyosarcoma

SC

SC

VI IV

VI IV

IIB IV

VI

IIID IV

IIID

V IV

IVD

VI IV

IIID IV

IIID IV

IVD

IVD IV

IIID IV

v

IVB IV

IID

IVD

#1

#2

#3

#4

#5

#6

#7

#8

#9

10

11

#12

13

14

15

16

17

18

WORK-FLOW AND RESULTS



Intraoperative Navigation System.

Any surgice margin

NO

NO

NO

YES

NO

NO

NO

YES

NO

YES

NO

YES

NO

YES

YES

YES

YES

YES



Intraoperative Navigation checking the planned safety surgical margins

Patient	Histology	Maxilectomy (Brown and Shaw)	Stage Disease (AJCC 8th ed)	Type of reconstruction	Any surgical margin affected
# 1	SC	IID	IV	Temporalis Flap	NO
#2	SC	IID	IV	Temporalis Flap	NO
# 3	SC	IVD	IV	Free Iliac Crest Bone Flap	YES
#4	Quistic Adenoid Carcinoma	IID	IV	Fibula OMC Flap	YES
#5	SC	IIB	IV	Temporalis Flap	NO
#6	SC	IVD	IV	Free Rectus Abdominis Flap	YES
#7	SC	IID	IV	Temporalis Flap	NO
#8	SC	IIID	IV	Free Iliac Crest Bone Flap	YES
#9	Clear Cell adenoarcinoma	IIID	IV	Free Iliac Crest Bone Flap	YES
# 10	SC	IID	IV	Free Anterolateral Thigh Flap	YES
# 11	SC	IIID	IV	Temporalis Flap	YES
# 12	SC	IID	IV	Temporalis Flap	NO
# 13	SC	IID	IV	Temporalis Flap	YES
# 14	SC	IID	IV	Temporalis Flap	NO
# 15	Oral Cavity Melanoma	IID	IV	Temporalis Flap	YES
# 16	Oral Cavity Melanoma	IID	IV	Fibula OMC Flap	NO
# 17	Pleomorph Sarcoma	IIID	IV	Free Iliac Crest OMC Flap	YES
# 18	SC	IID	IV	Temporalis Flap	YES
Control Group: 11 of 18 patients with any surgical margin					

Intraoperative Navigation Group: 9 of 18 patients with any surgical margin affected

affected.

CONCLUSIONS

- 1. Intraoperative Navigation improves anatomical 3D orientation in complex resections of malignant midface tumours.
- It could help to achieve a higher rate of free surgical margins (X² Pearson, p 0.28) and a lower rate of intraoperative complications.
- 3. However, It is mandatory to perform randomized studies to confirm these preliminary results.
- Navigation-guided resection of maxillary tumours: The accuracy of computer-assisted surgery in terms of control of resection margins- A feasibility study.
 Tarsitano et al. (2017), Journal of Cranio-Maxillofacial Surgery, 46 (12), 2240-2247