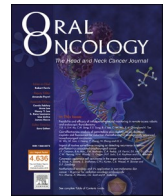




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## Letter to the editor

**Maxillo-facial reconstruction following cancer ablation during COVID-19 pandemic in southern Italy**

## ARTICLE INFO

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## ABSTRACT

In COVID-19 pandemic era, one major concern is related to ensure optimal management to oncologic patients, even though a context of radical uncertainty. The aim of our effort is to guarantee high-quality and timely care, minimizing COVID-19 infection risk, according to our head and neck (HN) reconstructive mission, still more challenging because of the criticality of the period. Thus, our reconstructive decision algorithm is changed. Microvascular free flaps, reported to be the gold standard for surgical reconstruction, represent extremely specialized procedures necessitating an extended resource allocation not affordable in the adversities of the period. Therefore, we are obliged to define a paradigm shift in our approach, based on free-style reconstructive surgery principles of propeller flap concept. According to our experience, we believe that this viable and feasible surgical technique could represent a reconstructive landmark in this pandemic era, since any guideline is missing, besides HN reconstructive surgery is most likely heading towards a new reconstructive approach.

*To the Editor,*

In COVID-19 pandemic era, one major concern is related to ensure optimal management to oncologic patients, even though a context of radical uncertainty. According to our reconstructive mission, still more challenging because of the criticality of the period, the aim of our effort is to guarantee high-quality and timely care, minimizing COVID-19 infection risk.

As governments respond to this crisis with drastic behaviour modifications such as social distancing and quarantines, head and neck (HN) surgeons are at the front line to modify the established treatment protocol for providing an efficient HN reconstruction in a scenario of an unprecedented health emergency where guidelines for maxillofacial surgeons are still not available and other societies' recommendations are not founded on evidence-based medicine [1-3].

**In this current global lockdown scenario, cancer screening opportunities are significantly disrupted, a matter that inevitably could lead to missed or later diagnosis.**

Thus, an increased number of patients are admitted to our department at an advanced stage of disease and remarkable determination is directed at improving oncological management in the field of reconstructive surgery allowing extensive tumour resection in noteworthy difficulties on resource allocation.

In fact, during this pandemic several criticalities have to be faced in cranio-maxillofacial surgery, including reduction of anaesthesiologists, re-allocated for shifts in COVID hubs, reduction of medical workforce because of contagion, considering that maxillo-facial surgeons are at high risk of infection since upper respiratory tract is the main viral reservoir. Nevertheless, surgical staff is limited to essential personnel to avoid flux of multiple professionals into operative room (OR). OR to intensive care unit (ICU) hand-off should be minimized due to the need

for many ICU spots for COVID-19 patients. Moreover, OR list capacity is reduced due both to decreased workforce and to increased time required to intubate and extubate the patient.

Continuing our commitment to surgical patients is our obligation, thus we have to maintain the same standards and to overcome those unexpected adversities. Consequently, our approach is dictated by best-practice accounting for reduced operative times and hospital stay, minimized necessity of ICU and tracheostomy, decreased necessity of revision surgery achieving optimal surgical outcomes according to the principle of one-shot surgery. Thus, our reconstructive decision algorithm is changed. Microvascular free flaps, reported to be the gold standard for surgical reconstruction due to their widespread acceptance, popularity, versatility and reliability [4], represent extremely specialized procedures necessitating long surgical time, increased utilization of ICU, considerable donor site morbidity, amplified rates of revision surgery, prolonged hospitalization and high costs [5,6], thus an extended resource allocation not affordable in the adversities of the period. Therefore, we are obliged to define a paradigm shift in our approach, based on free-style reconstructive surgery principles of propeller flap concept. This protocol is developed through consensus among our multidisciplinary team division, based on our experience and on review of the existing but limited literature [6-10].

During the lockdown, from the 9th of March to the 3th of May 2020, 12 patients underwent major reconstructive surgery at cranio-maxillofacial unit, University of Campania "Luigi Vanvitelli", Naples. Tumour sites were mobile tongue, retroauricular area, retromolar trigone, lip, nasal septum, soft and hard palate. All the patients underwent to cancer removal, neck dissection and simultaneous surgical reconstruction through pedicled flap: superficial temporal artery perforator (STAP) flaps, submental island flap (SMIF), nasolabial flap, Karapandzic flap, tunnelized-Facial Artery Myo Mucosal Island Flap (t-FAMMIF) and mucoperichondrial advancement flap (Table 1).

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**Table 1**  
Patient and surgical procedure data.

Patient	Gender	Age	Tumor site	Pathology	TNM stage	Surgery performed
1	M	63	Left mobile tongue	SCC	T1N0 M0	Tumour resection Ipsilateral selective neck dissection levels I-III SMIF
2	F	68	Right retromolar trigone	SCC	T3N1 M0	Tumour resection Ipsilateral selective neck dissection levels I-IV STAP flap
3	M	49	Right mobile tongue	SCC	T2N0 M0	Tumour resection Ipsilateral selective neck dissection levels I-IV Nasolabial flap
4	M	60	Inferior lip	SCC	T2N1M0	Tumour resection Bilateral selective neck dissection levels I-III Bilateral Karapandzic flap
5	F	72	Right malar area	SCC	T1N1 M0	Tumour resection Ipsilateral selective neck dissection levels I-III STAP flap
6	M	60	Right retroauricular area	SCC	T2N1 M0	Tumour resection Ipsilateral selective neck dissection levels I-V STAP flap
7	M	56	Left mobile tongue	SCC	T1N2 M0	Tumour resection Ipsilateral selective neck dissection levels I-V t-FAMMIF
8	M	63	Left mobile tongue	SCC	T2N0 M0	Tumour resection Ipsilateral selective neck dissection levels I-IV t-FAMMIF
9	M	63	Nasal septum	SCC	T3N2 M0	Tumour resection Bilateral selective neck dissection levels I-III Bilateral mucoperichondrial advancement flap
10	F	84	Left mobile Tongue	SCC	T1N0 M0	Tumour resection Ipsilateral selective neck dissection levels I-IV t-FAMMIF
11	F	55	Left soft and hard palate	SCC	T2N0 M0	Tumour resection Ipsilateral selective neck dissection levels I-IV t-FAMMIF
12*	M	68	Right mobile tongue	SCC	–	–

Note: TNM staging according to the 8th edition of staging of head and neck cancer by the American Joint Committee. Neck dissection classification according to the Consensus Statement of The American Head And Neck Society (AHNS) and the Committee for Head and Neck Surgery and Oncology of the American Academy of Otolaryngology-Head and Neck Surgery.

Abbreviations: SCC, Squamocellular carcinoma; SMIF, Submental island flap ; STAP flap, superficial temporal artery perforator flap ; t-FAMMIF, tunnelized-Facial Artery Myo Mucosal Island Flap.

\* Anaphylactic shock during induction of general anesthesia.

**Table 2**  
Operative and Management data.

	Operating time (min)	Need for Tracheostomy	Re-exploration	ICU stay (days)	Hospital stay (days)
1	350 min	–	–	3	6
2	100 min	–	–	3	6
3	400 min	–	–	4	10
4	225 min	–	–	–	4
5	400 min	–	–	–	5
6	465 min	–	–	–	6
7	675 min	√	–	3	12
8	490 min	–	–	2	5
9	530 min	–	–	–	4
10	50 min	–	–	–	1
11	445 min	–	–	–	6
12*	–	–	–	–	–
Statistical analysis**	400 min (IQR:287.5–477.5)	8.3%	0%	3 days (SD: 1.62)	6 days (IQR:4.5–6)

Abbreviations: ICU, intensive care unit; min, minutes.

Note:  
\* Anaphylactic shock during induction of general anesthesia  
\*\* Categorical data were expressed as number and percentage, while continuous variables either as median and interquartile range (IQR) or mean and standard deviation (SD), based on their distribution assessed by the Shapiro-Wilk test. A P-value of less than 0.05 was taken as statistically significant. Analyses were performed using SPSS Software version 24.0 (IBM Corp., Armonk, NY, USA).

Median surgery time was 400 min [interquartile range (IQR):287.5–477.5], mean ICU stay was 3 days [standard deviation (SD):1.62], median hospital stay was 6 days [IQR:4.5–6], re-exploration rate was 0% and tracheostomy rate was 8.3% (Table2).

Governance measures have assessed that the best standards of

patient care were maintained at those expected in pre-COVID-19era, avoiding a dramatic increase in patient morbidity and mortality.

According to our one-stage reconstructive approach, we have achieved excellent morpho-aesthetic and functional outcomes, comparable with microsurgical reconstructive techniques in agreement with the

most recent literature [6,9]. Moreover, we have drastically reduced the necessity of tracheostomy, decreased anaesthesia and operative time, diminished hospital and ICU stay with an increased safety because of the emerging evidence of a higher mortality with a 23.8% rate in case of perioperative COVID-19 contagion [11]. Furthermore, if compared to our experience in HN microsurgical reconstruction, our management allowed a faster patient turn over, with the possibility of treating an increased number of oncological patient despite the limitations of the period. We reported no total or partial flap losses, minimizing both readmission rate and necessity of revision surgery, reaching the mandatory target of one-shot surgery. Additionally, internal financial audit assessed that those improvements have endorsed a cost-saving benefit of our pathways in HN surgery with a higher hospital revenue margin, allowing the allocation of resources to those most in need.

In a scenario of unprecedented restraints where surgeons are asked to serve and lead during this pandemic, our reconstructive protocol could provide practical suggestions on how to define an emerging approach mitigating COVID-19 impact on health-system and HN patients. In fact, the advantages of pedicled flaps to achieve complex HN reconstructions acquire even more importance if we consider the context of emergency. Comparing the results of our experience during COVID-19 pandemic with the most recent literature, we noticed that it was already elicited a return to alternative reconstructive options instead of microsurgical free flaps, such as regional and pedicled flap, in a period before COVID-19 outbreak, in order to achieve the advantages of contain costs and accommodate patient comorbidities, with at least equivalent surgical outcomes [12,13].

In conclusion, the current global health crisis has presented new challenges for providing high-quality HN patient care but at the same time has allowed us to appreciate and learn from the significant benefits of pedicled flaps, even if microsurgical surgery still represent the gold standard in reconstructive technique. According to our experience, we believe that this viable and feasible surgical technique could represent a reconstructive landmark in this pandemic era, since any guideline is missing, besides HNSurgery is most likely heading towards a new reconstructive approach.

#### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

#### References

- [1] Allevi F, Dionisio A, Baciliero U, et al. Impact of COVID-19 epidemic on maxillofacial surgery in Italy. *Br J Oral Maxillofac Surg.* 2020;58(6):692–7.

- [2] <https://societabasicranio.it/blog/chirurgia-del-basicranio-durante-lemergenza-covid-19.html>.
- [3] <https://aocmf3.aofoundation.org/-/media/project/aocmf/aocmf/files/covid-19/aocmf-covid-19taskforceguidelines.pdf?la=en&hash=C2B89E1E6E9AB72EBF386C747D3BC74CF1009C1E>.
- [4] Kovatch KJ, Hanks JE, Stevens JR, Stucken CL. Current practices in microvascular reconstruction in otolaryngology-head and neck surgery. *Laryngoscope.* 2019;129(1):138–45.
- [5] Gao LL, Basta M, Kanchwala SK, Serletti JM, Low DW, Wu LC. Cost-effectiveness of microsurgical reconstruction for head and neck defects after oncologic resection. *Head Neck.* 2017;39(3):541–7.
- [6] Gabrysz-Forget F, Tabet P, Rahal A, Bissada E, Christopoulos A, Ayad T. Free versus pedicled flaps for reconstruction of head and neck cancer defects: a systematic review. *J Otolaryngol Head Neck Surg.* 2019;48(1):13.
- [7] Aslam-Pervez N, Caldroni SJ, Isaiah A, Lubeck JE. A Retrospective Volume Matched Analysis of the Submental Artery Island Pedicled Flap as Compared to the Forearm Free Flap: Is It a Good Alternative Choice for the Reconstruction of Defects of the Oral Cavity and Oropharynx? *J Oral Maxillofac Surg.* 2018;76(3):656–63.
- [8] Kramer FJ, Böhrnsen F, Moser N, Schliephake H. The submental island flap for the treatment of intraoral tumor-related defects: No effect on recurrence rates. *Oral Oncol.* 2015;51(7):668–73.
- [9] Morse E, Henderson C, Carafeno T, et al. A Clinical Care Pathway to Reduce ICU Usage in Head and Neck Microvascular Reconstruction. *Otolaryngol Head Neck Surg.* 2019;160(5):783–90.
- [10] Howard BE, Nagel TH, Donald CB, Hinni ML, Hayden RE. Oncologic safety of the submental flap for reconstruction in oral cavity malignancies. *Otolaryngol Head Neck Surg.* 2014;150(4):558–62.
- [11] Shah ASV, Wood R, Gribben C, et al. Risk of hospital admission with coronavirus disease 2019 in healthcare workers and their households: nationwide linkage cohort study. *BMJ* 2020;371:m3582.
- [12] Joseph BSNST, Mohan MT, Tharayil J. Comparison of islanded facial artery myomucosal flap with fasciocutaneous free flaps in the reconstruction of lateral oral tongue defects. *Int J Oral Maxillofac Surg.* 2020;49(8):1000–6.
- [13] Ferri A, Perlangeli G, Montalto N, et al. Transoral resection with buccinator flap reconstruction vs. pull-through resection and free flap reconstruction for the management of T1/T2 cancer of the tongue and floor of the mouth. *J Craniomaxillofac Surg.* 2020;48(5):514–20.

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