

COVID-19 Pandemic and Oral and Maxillofacial Surgery

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Abstract

Objective: To present a brief overview of global adjustments to COVID-19 by oral and maxillofacial surgeons and to characterise the reactions and adaptations of the oral and maxillofacial surgery specialty in Nigeria.

Materials and Methods: A review of the global literature was done to highlight available guidelines for oral and maxillofacial surgery under COVID-19 pandemic. Questionnaires were electronically sent to maxillofacial surgeons in Nigeria and, a telephone survey of the Nigerian oral and maxillofacial surgery centres was done to characterise the reactions and adaptations of local practitioners to the pandemic situation.

Results: Out of the 822 questionnaires electronically delivered to maxillofacial surgeons across 156 centres worldwide, the response rate was only 20.2%. Twenty-eight (17.9%) centres were completely shut down while only 6 (3.8%) centres were functioning normally. Other centres scaled down services and/or number of personnel. Surgeons older than 60 years were made to stay away in some centres while some personnel were drafted to support the medical team at the frontline COVID-19 treatment centres.

Conclusion: It concluded that the variability of practices is remarkable and this is largely due to unequitable resources and lack of uniform policies even among federal tertiary health institutions and the authors therefore proposed an algorithm to guide oral and maxillofacial patients' classification and management in the face of COVID-19 pandemic.

Keywords: Infectious disease, Personal protective equipment, Risk stratification, Patient classification.

Introduction

When the news of a novel viral disease epidemic in Wuhan, China emerged in December 2019, the world did not foresee a pandemic that would in subsequent months cripple the entire world ecosystems. By February 11, 2020, the World Health Organisation (WHO) which is the global health authority, named the disease, Coronavirus disease 2019 (acronymed COVID-19)¹ and a month later, on March 11, 2020 declared COVID-19 a global pandemic and a public health emergency². Since then, the world has been battling perhaps the biggest health emergency of the current century.

While the effect of COVID-19 pandemic is being felt in all walks of life, its impact on the global health industry is gravely unprecedented. Its continuously evolving nature, rapid mutation of the aetiological agent, unusual immune characterisation, amorphous clinical presentations, high case fatality and lack of definite treatment protocol make clinical management a great ordeal. The high contagion rate and its propagation mechanism which involve close contact between people and transmission of body fluids such as aerosolized saliva and airway secretions^{3,4} pose a serious threat to both the health care workers and the patients. Furthermore, there have been prodigious demands for medical supplies with attendant depletion of reserves and consequent

supply deficit all over the world^{5,6}. This situation has forced a response from professionals in most medical and healthcare disciplines with each group articulating guidelines and recommendations for safe practices in the face of the pandemic.

The objective of this paper is to present a brief overview of global adjustments to COVID-19 by oral and maxillofacial surgeons and to characterise the reactions and adaptations of the oral and maxillofacial surgery specialty in Nigeria. Additionally, an algorithm is proposed to guide the selection and prioritization of oral and maxillofacial surgical care during the Covid-19 pandemic.

Transmission mechanism for COVID-19 and the implications for the Head and Neck surgeons

COVID-19 is caused by a new viral specie in the genus betacoronavirus^{7,8} recently named SARS-CoV-2^{8,9} because of its single, plus-stranded RNA genome, its binding affinity for Angiotensin 2 Converting Enzyme (ACE-2) receptor and clinical manifestation as acute respiratory illness which are similar to SARS-CoV⁹. SARS-CoV is another member of the coronavirus group responsible for the outbreak of Systemic Acute Respiratory Syndrome that affected 26 countries and resulted in more than 8000 cases in 2003¹¹. The viral particle of SARS-CoV-2 is of submicroscopic size graded in the range of 0.06 – 0.14 microns¹². The particle is transmitted through droplets and aerosols generated from secretions in the oral and pharyngeal spaces of infected or carrier human hosts and dispersed through sneezing, coughing, breathing or even talking and travel varying range of dispersion distances^{8,13} (Fig.1).

An individual is infected mostly when viral contaminants settle and percolate through the mucous membranes of the aerodigestive tracts and the eyes¹³. It undergoes an incubation period which ranges between 5 to 14 days before exhibiting clinical symptoms¹⁴. The evolution of the symptoms spectra varies widely and include headache, anosmia, dysgeusia and cough and flu-like symptoms when mild to moderate and acute dyspnea and respiratory failure in the very severe form which has been found to be rapidly fatal in the presence of co-morbidity¹⁵.

The surgical specialists that work primarily in the head and neck region include the oral and maxillofacial surgeons, otorhinolaryngologists, ophthalmologists and neurosurgeons. These specialists operate in close proximity to the patient's aerodigestive outlets from where the contaminated droplets are emitted¹⁶. They are therefore more vulnerable than most other medical and surgical

specialists who also interact with patients. In two separate publications, the relative proximity and disease exposure risk of different occupational categories was compared and the dentists were found at the top¹⁷ or among those with the highest risk¹⁸ and this includes the oral and maxillofacial surgeons (Fig. 2). The implication of this reality is that necessary adjustments must be made by the oral and maxillofacial surgeon to minimize risk exposure for themselves, co-workers, their patients and their respective family members. Such adjustments are best guided by professional and institutional policies and guidelines.

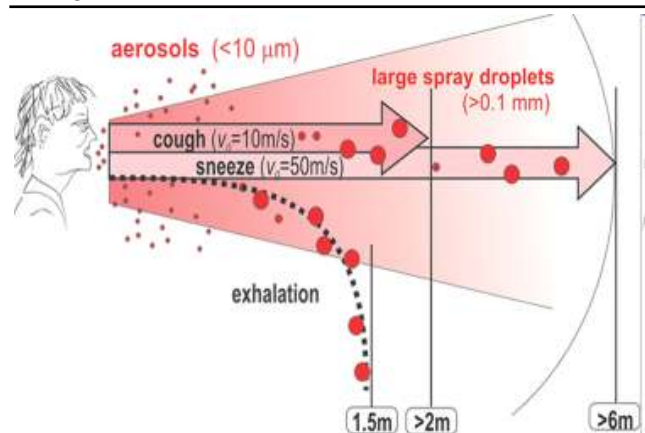


Fig. 1: Varying dispersion distances of projected aerodigestive droplets

Source: Dr Ziad H. Delemi's presentation at the 1st Virtual International Conference for Al-Quadisiyah University.

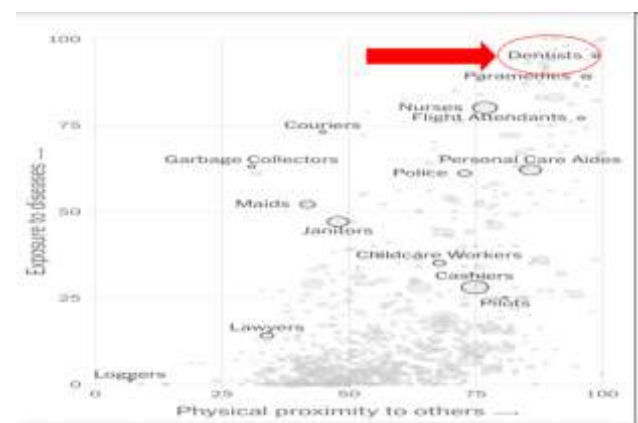


Fig. 2: Comparative exposure risk of different occupational group

Source: <https://www.nytimes.com/interactive/2020/03/15/business/economy/coronavirus-worker-risk.html>

A review of COVID-19 guidelines for maxillofacial surgeons in the global literature

The most robust guidelines currently existing in the world literature to guide surgical practice in the head

and neck region is articulated by the Association for Cranio-maxillofacial Osteosynthesis (AO-CMF). The guidelines encapsulate expert opinions in various specialities including otolaryngologists, ophthalmologists, neurosurgeons and maxillofacial surgeons, it includes anecdotes from medical and surgical specialists in Wuhan, China where the outbreak began as well as the most recent peer reviewed publications available on the subject^{19,20}. This is without prejudice to individual authors and health institutions that have also conducted surveys and low evidence clinical researches to assess and determine the common and best responses to the outbreak in these surgical specialities.

In a release titled: "AO-CMF International Task Force Recommendations on Best Practices for Maxillofacial Procedures during COVID-19 Pandemic"²⁰. The AO group highlighted six issues in their executive summary as follows:

1. Surgical procedures involving the nasal-oral mucosal regions are high risk for infection of medical personnel due to aerosolization of the COVID-19 virus.
2. Asymptomatic patients may be infected with COVID-19 virus.
3. Elective procedures and routine ambulatory visits should be cancelled.
4. Appropriate PPE should be worn during surgical procedures and urgent ambulatory visits, which includes N95/full face shield or PAPR (Powered Air purifying Respirators).
5. Intra-operative measures which limit the generation of aerosolized virus are recommended.
6. Oncologic cases in which a worse outcome is expected if surgery is delayed more than 6 weeks should be performed with appropriate PPE.

Although these recommendations were pronounced at the onset of the pandemic, most of the directives are still relevant even now that the health systems are stabilizing. Similar recommendations are more or less being reiterated by more recent publications with only slight modifications.

In an editorial by Luiza et al¹³ in the Open Journal of Dentistry, an attempt at classifying common oral and maxillofacial procedures into elective, urgent and emergency categories was made to guide prioritisation and preparation for surgical care. Also, alternative methods for executing normally aerosolising procedures were suggested and appropriate use of personal protective equipment based on type and location of procedures were advised. At the onset of the outbreak, Maffia et al⁵

also conducted a worldwide questionnaire-based survey to examine the impact of COVID-19 on the specialty of oral and maxillofacial surgery and the types of adjustments being made in maxillofacial surgical practices all over the world. Out of the 822 questionnaires electronically delivered to maxillofacial surgeons across 156 centres worldwide, the response rate was only 20.2%. It was noted that 28 (17.9%) centres completely shut down while only 6 (3.8%) centres were functioning normally. Other centres had scaled down services and/or number of personnel. Surgeons older than 60 years were made to stay away in some centres while some personnel were drafted to support the medical team at the frontline COVID-19 treatment centers. Unfortunately, of the 166 completed responses received from 54 countries, only 5 (3%) were returned from Africa for which the respondents' countries were not specified. Hence, the outcome of the survey may not properly reflect the local situation in Nigeria and Africa.

Furthermore, Bali and Chaudhry in their article titled: "Maxillofacial Surgery and COVID-19, the Pandemic!"²¹ emphasized the need to reiterate and reinforce best practices in Infection Prevention and Control (IPC), ranging from proper training for and judicious use of PPEs, workstation surfaces disinfection, general sanitation of the operatory especially in-between patients, deployment of telescreening for patient scheduling and discretionary selection of only patients that must be treated. They also offer advice in alternative techniques to minimise aerosolisation during oral and maxillofacial surgical procedures.

By far, the most comprehensive recommendations for oral and maxillofacial surgical practice in front of the COVID-19 pandemic is that presented by the AO-CMF²⁰ whose executive summary was highlighted earlier. The guidelines provide specific directives for various high risk procedures involving the oral and maxillofacial surgeon and other head and neck surgical specialists. Some of these will now be elucidated in some details.

At the onset, general comments which simply advised suspension of elective procedures altogether until safe and well thought out strategies are put in place which must include the training of all staff in donning and doffing of PPEs. The use of telemedicine and videoconferencing was advocated for triaging new patients and follow up of old patients. Use of protective face masks (N95/PAPR), face shield and full PPEs for urgent and emergency procedures, assumption of every patient as infected unless confirmed negative by testing and absence of

suggestive clinical signs and symptoms 24 hours prior. In addition to reduction in the number of clinical personnel, deliberate exclusion of surgeons who are over 60 years of age, immunocompromised, having chronic respiratory diseases or multiple co-morbidities is also advised.

Specific recommendation for airway management requires that full PPEs must be used for endotracheal intubation and tracheostomy. The best hand should make the first attempt to hasten the process and shorten exposure. Patients must be paralysed before any form of intubation and ventilation should be momentarily suspended during tracheal incision to avoid coughing and excessive emission of aerosol. Suctioning should be limited and only personnel directly involved in the intubation procedures must be within the operatory. Other members of the managing team must allow a minimum of 10-20 minutes for generated aerosol to disperse before entering the room²⁰.

For facial fractures, closed reduction is to be preferred where possible otherwise, self-drilling screws should be used for ORIF. As much as possible, bone drilling and sectioning with powered cutting instruments should be avoided instead, the use of osteotome should be encouraged. Percutaneous approach should be preferred to extensive intraoral incision and soft tissue cutting with monopolar diathermy should be minimized while bipolar should be preferred for cautery with both used at very low settings. If suctioning is required, low speed suction can be used. Similar protocol should be observed for emergent oncologic surgery and shorter procedures should be generally preferred.

Dental emergencies must be diligently screened to justify immediate intervention otherwise, such should be palliated with analgesics and antibiotics. Where the risk of infection or prophylactic extraction ahead of adjuvant therapies is indicated, routine dental extraction may be done with appropriate PPEs and if surgical extraction is required, it should be preferably performed in a negative pressure environment such as an Air Infection Isolation Room (AIIR).

Additional guideline for cancer management according to Ueda et al²², requires that patients should be specially reviewed towards a preference for neoadjuvant therapy or targeted therapy if the anticipated outcome is comparable to surgery. Consideration must be given to the patient's immune status, co-morbidities, age and overall prognosis in deciding between in-hospital and outpatient care in

the light of potential exposure to the COVID-19 disease.

Practices of oral and maxillofacial surgery centres in Nigeria in response to COVID-19 Pandemic

While the literature is replete with rapidly published articles on the impact of COVID-19 on the healthcare industry and clinical guidelines for dealing with the outbreak, there was not a single Nigerian literature on the responses of the oral and maxillofacial speciality in the local setting. Not even a communique from the national body (Nigerian Association of Oral and Maxillofacial Surgeons) was found to provide guidance and standard of practice in the face of the pandemic. This gap may probably have been filled by recommendations of some international bodies such as the AO-CMF. However, knowing that socio-political, economic and cultural differences have defined the responses to the outbreak from various continents and countries, it is appropriate to examine the adjustments being made in various oral and maxillofacial surgical departments in Nigerian hospitals.

To this end, we undertook a standardized direct telephone interview of the heads of departments of oral and maxillofacial surgery in the tertiary and secondary hospitals in Nigeria so as to characterise the response of the surgical specialty to the viral outbreak in the country. The intention was to contact all centres with a consultant oral and maxillofacial surgeon in place, however, we succeeded in reaching virtually, all the major teaching hospitals, the National Hospital, Abuja and Federal Medical Centres at Abeokuta and Gombe. In all, 12 departments of maxillofacial surgery were interrogated. The findings presented in Tables 1a and b, largely similar in some ways, also varied remarkably in terms of resources availability/sources of supply and operational policies.

The responses of 12 teaching hospitals are depicted in the tables 1a and 1b. These included University of Port Harcourt Teaching Hospital (UPTH), Port Harcourt and University of Benin Teaching Hospital (UBTH), Benin-City from the South-South geopolitical zone and Obafemi Awolowo University Teaching Hospital (OAUTH) Ile Ife, University College Hospital (UCH) Ibadan, Lagos University Teaching Hospital (LUTH), Lagos State University Teaching Hospital (LASUTH) and Federal Medical Centre, Abeokuta from the South West geopolitical zone. Others were Aminu Kano Teaching Hospital (AKTH) Kano, Usman Dan Fodio University Teaching Hospital (UDUTH), Sokoto, Ahmadu Bello University Teaching Hospital (ABUTH), Zaria, Federal Medical Centre, Gombe and the National Hospital, Abuja (NHA) from the Northern region.

At the peak of the COVID-19 outbreak, there was obvious scale down of elective cases relative to emergencies across all institutions. However, it is interesting to note that almost all the South-Western and Northern hospitals completely stopped elective cases apart from OAUTH, Ile-Ife in the South-West where 10 -15% of their workload was still constituted by elective procedures and AKTH, Kano and NHA, Abuja in the North with 10% and 20% elective workloads respectively. On the contrary, the South-Southern hospitals maintained considerably higher quantum of elective services, staying between 30 - 35% of sustained workload. It is noteworthy that the Federal Medical Centre, Gombe - a Northern hospital, completely shut down her maxillofacial care services during the period. Among the active centres whose services were predominantly emergencies, the two most frequent types of emergency cases reported were complicated infections (mostly orofacial abscesses) and trauma. Infection cases were most prevalent in six centres while trauma cases were prevalent in five centres. The National Hospital, Abuja claimed to have had equitable distribution of infection, trauma and oncologic emergencies. Considering the restriction of interstate movement and in some places, intra-state lockdown as well, one would have expected significant drop in trauma cases but despite this, five centres still saw predominantly trauma emergencies. The higher number of centres seeing mostly infection cases however, may be a reflection of the movement restriction.

In terms of aerosol generating procedures (AGPs) versus non aerosol generating procedures (NAGPs), virtually all the hospitals suspended AGPs apart from UDUTH, Sokoto in the North and FMC, Abeokuta in the South who retained 10-20% and 30% AGPs respectively. There does not appear to be a uniform governing policy or adopted guidelines among these hospitals as each one operated based on institutional or departmental discretion and the resources available to it.

Since the COVID-19 outbreak there has been conscious adjustments in terms of use of personal protective equipment (PPE) across the hospitals with increased utilisation of wider range of PPEs in the clinic settings. However, deployment is guided by available resources and the need to ration material and prioritize cases. Generally, there appears to be restricted access to high grade protective face masks such as N95 and KN95 respirators, FFP2, FFP3 and PAPR. Most centres still use the regular surgical masks for examinations and procedures. Also, most centres deploy N95 masks in high risk or AGP situations only. Where this is not available, centres like OAUTH, Ile-Ife routinely doubles the surgical

mask while in NHA, Abuja the surgeon often uses ordinary locally fabricated cloth mask supplied by the hospital. Whereas, LASUTH, Ikeja particularly claims to have access to different types of high grade face masks and indeed full complement PPEs at all times. Furthermore, while the use of other PPEs such as face shield, and preference for sterile surgical gloves instead of the usual non sterile latex gloves has become more rampant, a lot more is desired in the use of head covers, shoe covers, apron and gowns for surgical procedures in the clinic settings. Many centres do not use head cover routinely unless for major operation in the theatre. As for shoe covers only LASUTH, Ikeja uses this routinely while UDUTH, Sokoto improvises with the conventional nurses' cap. Even though the use of scrubs rather than outside wears is presently more widely embraced, majority still do not use non-absorbent aprons over their scrubs. In this survey, only UCH, Ibadan LASUTH, Ikeja and FMC Gombe adopt the use of apron routinely; especially when reusable fabric gowns are used. In her own case, LUTH, Lagos reserves the use of aprons for only high risk procedures.

There appears to be increasing use of disposable non-absorbent gowns among maxillofacial surgeons in the clinical settings, a number still used the reusable cloth gowns when available. However, some centres such as UPTH Port Harcourt, AKTH Kano, ABUTH Zaria and NH Abuja are yet to practice routine use of surgical gowns for minor surgical procedures in the clinic settings.

Another interesting finding of this survey was the report on providers of PPEs used by the surgeons in these facilities. While the hospital management have been responsible partly or wholly in many institutions, it is notable that patients and rarely the individual surgeons still share the responsibility of providing PPEs. Particular attention must be drawn to OAUTH, Ile-Ife where patient is said to provide up to 80% of PPEs and UCH Ibadan LUTH Lagos and NH Abuja where patients still make significant contribution to PPE provision. On the contrary, the situation in AKTH Kano, FMC Abeokuta and FMC Gombe are commendable as all PPEs in use are absolutely provided by hospital management and sometimes supported by donations from NGOs (as in the case of AKTH, Kano). Similarly in UPTH, initially, patients had to take significant share in providing PPEs, this has changed recently as management frowned at the practice and is gradually taking full responsibility. It is likely that the decision to have patients provide PPE are not supported by management in most institutions but was borne out of desire to get services going in the face of scarce hospital resources. Also, a result of pressure by

patients to take responsibility for own care rather than wait unpredictably. The ultimate desire in all centres is already obtainable in LASUTH, Ikeja where the management solely provide full complement PPE for all the procedures they do.

With the gradual easing of restrictions on movement and economic activities, and better understanding of the disease transmission, pathologic mechanism and treatment consensus, healthcare services is gradually returning to normal with new norms being adopted in terms of patient screening and triaging, innovative and less proximal consultation strategies, and greater consciousness to best practices in infection prevention and control. Most oral and maxillofacial surgical departments and centres across the country are also gradually taking on more elective cases, performing more AGPs and devising management strategies to minimise risk exposure of staff and

patients. FMC, Gombe which completely shut down at the beginning of the outbreak is now fully operational without any restriction while paying conscious attention to best practices to mitigate unnecessary exposure. UPTH, Port-Harcourt is gradually doing the same.

OAUTH, Ile-Ife has adopted a roster philosophy to minimise staff exposure; so only minimum number of staff are on duty or within an operatory per time. The routine oral rinse with 1% hydrogen peroxide before any oral surgical procedure has also been adopted by the hospital. UCH Ibadan has done infrastructural modification by installing an operatory cubicle with air extractor device to create a negative pressure environment which is now reserved for AGPs while UPTH has elected to exclude staff over the age of 60 years from active participation in clinical duties. (Tables 1a and b)

Table 1(a & b): COVID-19 Responses in major Nigerian centres for oral and maxillofacial surgery.

Table 1a Analysis of practice in six Nigerian hospitals

		UPTH	UBTH	OAUTH	UCH	LUTH	LASUTH
Relative proportion of Elective to Emergency cases at the peak of covid-19 scare		65% EM	70% EM	85 -90% EM	100% EM	100% EM	100% EM
		35%EL	30% EL	10 – 15 % EL	0% EL	0% EL	0% EL
Most frequent emergency cases at the peak of covid-19 scare		Infection>	Infection>	Infection>	Trauma>	Infection>	Trauma>
		Trauma	Trauma	Oncology	Infection	Trauma	Oncology
Relative proportions of AGPs vs Non AGPs at the peak of covid-19 scare		0% AGP	0% AGP	10% AGP	0% AGP	0% AGP	0% AGP
		100% NAGP	100% NAGP	90% NAGP	100% NAGP	100% NAGP	100% NAGP
Personal Protective Equipment (PPE) use since the COVID-19 outbreak	Face Mask	Surgical masks mostly N95 Occasionally	Surgical mask	Double Surgical mask	N95 & Surgical mask	N95 /KN95 for high risk procedures	N95, ASMAT with respirator
	Face shield (FS) /Goggle (G)	No	FS or G	No or rarely	Yes for high risk procedures	FS or G	FS or G
	Gloves	Regular Latex gloves	Surgical gloves	Surgical gloves (Elbow length)	Latex & Surgical gloves	Latex & Surgical gloves	Surgical gloves + elbow length
	Head cover	No	Yes always	No	Occasionally	No	Yes always
	Shoe cover	No	No	No		No	Yes always

	UPTH	UBTH	OAUTH	UCH	LUTH	LASUTH
Apron	No	No	No	Nylon Apron always	Yes only for high risk procedures	Yes
Gown	Only for GA procedures	Reusable Cloth gown	Disposable	Reusable cloth gown in Clinic Disposable non-absorbent gown in theatre	Disposable gowns always	Disposable gowns always
Who is responsible for providing PPE?	Patients (50%) Management (40%) Self (10%)	Management	Patients 80% Management 20%	Items like disposable gowns and N95 and FS mostly by patients. Surgical masks and other by management	Patients provide disposable gowns always Management provides N 95, Goggles and face shield	100% by Management
Current changes following the ease restrictions and better understanding of COVID-19 transmission and pathologic mechanisms	All cases are now being attended. Management has taken responsibility for providing all PPEs	GA cases were suspended but has now resumed, gradual return toward normal	Slight shift toward normal but personnel exposure are limited by rostering, and routine oral rinses with 80% hydrogen peroxide for all intraoral procedures	Gradual return toward normal. A special cubicle with installed air extractor now designated for AGPs	Gradual return towards normal as more AGPs are now being performed	Not much has changed but there is gradual increase in elective cases performance to about 30%

Table 1b Analysis of practice in another six Nigerian hospitals

	AKTH KANO	UDUTH SOKOTO	ABUTH ZARIA	FMC ABEOKUTA	FMC GOMBE	NHA ABUJA
Relative proportion of Elective to Emergency cases at the peak of covid-19 scare	90% EM 10% EL	100% EM 0% EL	100% EM 0% EL	100% EM 0% EL	Complete Shutdown	80% EM 20% EL
Most frequent emergency cases at the peak of covid-19 scare	Trauma> Infection	Trauma> Infection	Infection> Exodontia	Trauma> Infection	-	Infection=Trauma= Oncology
Relative proportions of AGPs vs Non AGPs at the peak of covid-19 scare	0% AGP 100% NAGP	10 - 20% AGP 80-90% NAGP	0% AGP 100% NAGP	30% AGP 70% NAGP	-	0% AGP 100% NAGP
Personal Protective Equipment (PPE)	Face Mask N95 SM	Surgical mask mostly, occasionally N95	Surgical mask mostly, occasionally N95	N95 for AGP, Surgical mask for others	N95 for procedures clinic Surgical mask in theatre	Surgical mask Cloth Mask provided Rarely N95

	AKTH KANO	UDUTH SOKOTO	ABUTH ZARIA	FMC ABEOKUTA	FMC GOMBE	NHA ABUJA
Face shield (FS) / Goggle (G)	FS OR G	FS most times	FS or G	FS or G	FS or personal glasses	FS or G
Gloves	Surgical gloves	Surgical gloves (Elbow length)	Regular latex and surgical gloves	Regular Surgical gloves (sometimes elbow length as one prefers)	Surgical gloves	
Head cover	No	Yes always	No	Yes	Yes always	No
Shoe cover	No	Improvised with nurses cap always	No	No	No	No
Apron	No	No	No	No	Yes	No
Gown	No	Disposable	No	Disposable	Disposable and reusable	No
Who is responsible for providing PPE?	NGOs/management	Management mostly, patients occasionally	Management Some individuals elect to procure some for self	100% management	100% by management but individuals elect to procure for self	Management 60% Individuals 40%
Current changes following the ease of restrictions and better understanding of COVID-19 transmission and pathologic mechanisms	Select short procedure for GA AGP has increased to 40%,	Elective cases and AGPs are steadily increasing	Not much changes yet	Elective has increased to 70%, AGP to 40%, Theatre is now opened but still some logistic restrictions	Fully reopened with 80-85% Elective to 10 -15% Emergencies 40-45% AGPs.	Not much, only patient turn out has increased
AGPs - Aerosol Generating Procedures NAGPs - Non Aerosol Generating Procedures PPEs - Personal Protective Equipment FS - Face Shield G - Goggle						

Proposed algorithm for oral and maxillofacial care in the face of COVID-19 Pandemic

Based on our observation of lack of uniform criteria across oral and maxillofacial practices in the world and more pertinently in Nigeria, we decided to propose an algorithm to guide surgeons providing oral and maxillofacial care. This algorithm is based on the WHO case definition for COVID-19 (see Appendix)²³, categorisation of oral and maxillofacial procedures¹³, and procedural risk assessment. It comprises two components, namely;

- 4-Dimensional Patient Profiling Template (4-DPPT)
- Oral and Maxillofacial Surgical Intervention Advisory (OMSIA)

The 4-DPPT is a scoring template for classifying the oral and maxillofacial patient. It consists of four criteria domains which are; COVID-19 Case definition, Procedure type classification, Procedure risk stratification, and Co-morbidity status which have maximum scores of 4, 3, 3, and 2 respectively (Table 2a). Based on the total score from the four domains, patients may be classified into specific risk level as Class 1, Class 2 or Class 3 (Table 2a). The OMSIA (Table 2b) is a listing of patient management advice fitted to specific situations presented by an individual patient. While it is the surgeon's responsibility to assemble treatment strategies on a case-by-case basis, the OMSIA provides a guide for managing patients in this era of COVID-19 pandemic, based on currently existing guidelines in the world literature.

Table 2(a & b): Proposed algorithm for decision making and prioritisation of oral and maxillofacial surgical care during COVID-19 Pandemic

a.	4-Dimensional Patient Profiling Template for Oral and Maxillofacial Surgery		
	Criteria	Score	Patient's score
	COVID-19 Case definition		
	o Asymptomatic	1	*
	o Suspected	2	
	o Probable	3	
	o Infected	4	
	Procedure type categorisation		
	o Elective	1	*
	o Urgency	2	
	o Emergency	3	
	Procedure risk stratification (potential for aerosol generation)		
	o Low risk	1	*
	o Medium risk	2	
	o High risk	3	
	Co-morbidity status		
	o Negative	1	*
	o Positive	2	
	Total Score	12 (maximum)	?

Patient Classification

Class 1 Risk level: Score 4 - 5 (minimum)

Class 2 Risk level: Score 6 – 8

Class 3 Risk level: Score 9 – 12

*Patient's domain score; Patient's total score

b. Oral and Maxillofacial Surgical Intervention Advisory (OMSIA)

Case definition	Recommendation
Asymptomatic	Treat as potential carrier, use basic PPE (Face mask, face or goggle shield and sterile surgical glove and wear scrubs)
Suspected	Refer to Infectious disease management team for further screening and possible PCR testing, then proceed with treatment once cleared but ensure basic PPE + at least reusable gown and apron.
Probable	Suspend definitive surgical intervention; palliate with medications if possible, Inform local/State Infectious disease management team or NCDC, ensure PCR testing is twice negative before definitive surgical intervention. Use full complement PPE (face mask, face shield, head cover, shoe cover, non -absorbent disposable gown $\pm$ apron)
Infected	Suspend procedure until full recovery unless in the presence of life threatening maxillofacial emergency in which case, use full PPE with PAPR, Hamza suite and use negative pressure theatre airborne infection isolation room (AIIR).
Procedure type	
Elective	Delay until after epidemics if condition is unlikely to worsen otherwise, ensure optimal condition and full IPC protocol for the safety of staff and patient. Ensure PPE according to the case definition.
Urgency	Consider the possibility of palliation if outcome is not threatened, otherwise perform the minimum intervention possible to salvage the situation. Observe the use of PPE according to the case definition.
Emergency	Perform procedure doing all that could be done to save life or to avoid irreversible complications but always assume patient is SARSCoV-2 infected and treat as such as there might not be time for screening and testing.
Procedure risk	
Low risk	Perform procedure in regular clinic or theatre setting ensuring basic PPE
Medium risk	Perform procedure with full complement PPE, regular non absorbent disposable gown is sufficient instead of Hamza suite. Washable reusable gown if used should be with underlay of nylon apron. Minimise staff number and exclude medically at risk personnel.
High risk	Perform procedure with full complement PPE, use non -absorbent disposable gown with underlay of nylon apron or preferably use Hamza suite if available. Consider less aerosolising alternative techniques e.g self -drilling screw instead of power drills, osteotome instead of power cutting saw. Performed procedure in a negative pressure operatory or AIIR
Co-morbidity	
Negative	Perform procedure readily but observe PPE based on case definition
Positive	Ensure control of background morbidity, perform the minimum procedure required, pay special attention to immune booster nutrition and minimize hospital stay.

Source: <https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200321-sitrep-61-covid-19.pdf>

Among the benefits of this algorithm is that it will enhance standardisation of practice across centres, facilitate clear documentation and professional communication in oral and maxillofacial surgical services, especially during this pandemic period. It will permit quick determination of the cumulative risk on a patient so as to decide appropriate treatment facility and expertise in case of need for referral. Using the OMSIA, a maxillofacial surgeon or facility can rapidly take clinical decision and articulate appropriate treatment strategy for an individual patient. Above all, the algorithm will facilitate appropriate prioritization of care among patients requiring surgical procedures by the maxillofacial surgery team during the COVID-19 pandemic.

Conclusion

Without a doubt, the emergence of COVID-19 has rapidly changed the face of healthcare practice worldwide. Despite its many adverse effects, it has also enforced the consciousness of the society, the government and especially the healthcare practitioners about essential health practices and the need for improved healthcare infrastructures and supplies which are often taken for granted. The new norms thereby engendered are sure to facilitate improvement in general public health. More pertinently, the practice of oral and maxillofacial

surgery under a condition of highly contagious infectious pandemic involving transmission via the aerodigestive route is being redefined. While many international professional bodies have risen promptly to articulate consensus to guide medical and surgical practices, the fact remains that variation in social, political, cultural and economic characteristics across the world will always necessitate personal adaptations. The Nigerian Association of Oral and Maxillofacial Surgeons and African Association of Oral and Maxillofacial Surgeons need to take proactive steps towards achieving consensus to guide local practitioners in the country and the African continent.

Even within Nigeria, the variability of practices is remarkable and this is largely due to unequitable resources and lack of uniform policies even among federal tertiary health institutions. This paper has highlighted the current international guidelines, reported the prevailing situation locally across the country and proposed an algorithm to guide oral and maxillofacial patients' classification and management in the face of COVID-19 pandemic. The algorithm so proposed, can be adapted to other specialities and epidemic or pandemic situations that might emerge in the future.

Appendix

WHO'S CASE DEFINITION FOR COVID-19

SUSPECTED CASE

Case A

A patient with acute respiratory illness (fever and at least one sign/symptom of respiratory disease, e.g., cough, shortness of breath), AND a history of travel to or residence in a location reporting community transmission of COVID-19 disease during the 14 days prior to symptom onset.

Case B

A patient with any acute respiratory illness AND having been in contact with a confirmed or probable COVID-19 case (see definition of contact) in the last 14 days prior to symptom onset.

Case C

A patient with severe acute respiratory illness (fever and at least one sign/symptom of respiratory disease, e.g., cough, shortness of breath; AND requiring hospitalization) AND in the absence of an alternative diagnosis that fully explains the clinical presentation.

PROBABLE CASE

Case A

A suspect case for whom testing for the COVID-19 virus is inconclusive (Inconclusive being the result of the test reported by the laboratory).

Case B

A suspect case for whom testing could not be performed for any reason.

Confirmed Case

A person with laboratory confirmation of COVID-19 infection, irrespective of clinical signs and symptoms.

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