

MANAGEMENT OF HEAD AND NECK SURGERIES DURING COVID 19 PANDEMIC: PRACTICAL STRATEGY.

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Received: 14 March 2020 Revised and Accepted: 8 July 2020

ABSTRACT: The pandemic 2019 novel coronavirus (2019-nCoV) infection has presented dire situation to oral surgeons. All-encompassing precaution has to be taken to lessen person-to-person transmission of COVID-19 and it supports to control this massive outbreak. Oral and maxillofacial surgical intervention carries high risk due to concomitant use of powered instruments and subsequently it produces aerosol which is considered to be highly infectious agent. Due to unprecedented nature of diseases, this current article reviews only recent publications and qualities of evidence were limited. This data were explored using electronic databases such as PubMed and Google Scholar and up-to-date reports from major health bodies are Centres for Disease Control and Prevention (CDC), World Health Organization (WHO), and major national oral surgery associations. The aim of this review article is to provide a comprehensive review regarding severe acute respiratory syndrome coronavirus 2 infectious diseases and COVID-19 impact on head and neck surgeries. It describes about contingency management, provision of emergency life threatening situation and protective measures for oral surgeons through currently available data and literature

KEYWORDS COVID-19, head and neck surgeries, PPE, aerosol management

I. INTRODUCTION

On December 2019, study was published on Pro med-mail international society for infectious diseases regarding collection of pneumonia cases with undefined aetiology in the place of Wuhan, China. An emergency symposium was held in the hospitals and they obtained help from federal agencies to trace out the causative agents for infectious diseases.¹ Dr. Jianguo Xu is an academician who directed the scientific team and announced about new type coronavirus in the national press conference.² Furthermore, News outlets and Pro med-mail confirmed coronavirus as the potential organism from the evidence of genetic sequencing.³ The samples were taken from these patients and the published genome sequence showed a great similarity to the coronavirus species which were usually detected in the pangolins and bats.^{4,5} The Corona Virus Study Group of the International Committee on Taxonomy of Viruses mentioned that, it belong to the family of single stranded RNA virus known as Coronaviridae and later it is named again as Severe Acute Respiratory Syndrome coronavirus -2(SARS-cov-2).⁶

The emergency committee formulated by World health organization(WHO) reported that COVID 19 spread can be diminished by initial diagnosis, appropriate isolation, timely patient care and implementation of a consistent communicating monitoring system.⁷ The symptoms of COVID 19 mild symptoms like dry cough, sore throat and fever whereas some others showed major symptoms which led to deadly complications like multiple organ failure, pulmonary oedema, septic shock, severe pneumonia and acute respiratory distress syndrome.⁸ It is well thought-out as a life threatening infection because there is no standard evidence for effective vaccine and drugs till now.^{9,10}

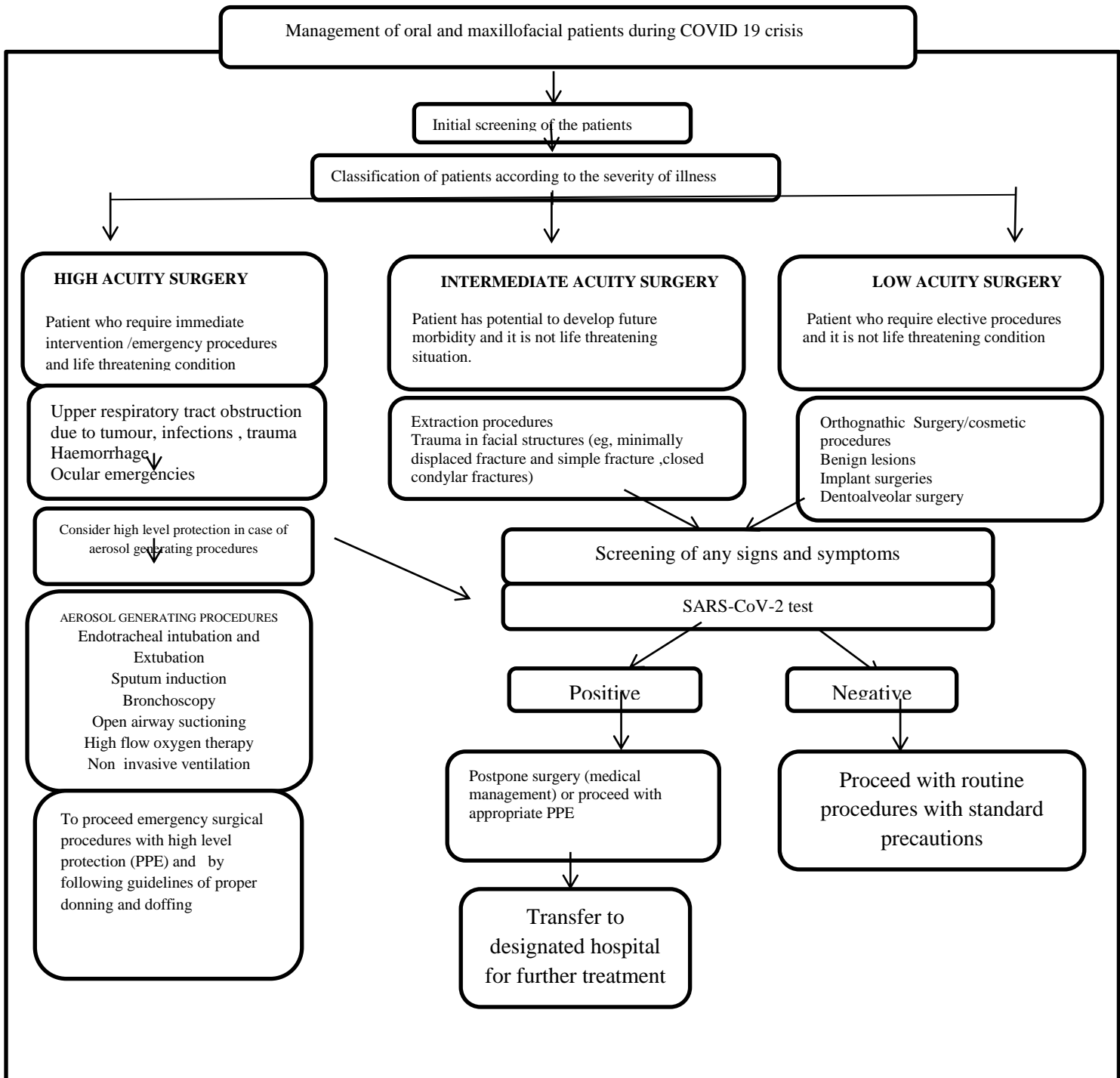
The route of spread of infection from one individual to others are through droplets, aerosol, contaminated surfaces and faeco-oral route.¹¹⁻¹³ It may be spread due to the direct contact or indirectly from the surfaces in contact with the infected person or from the things used by the infected person.¹⁴ The virus from the respiratory droplet may persist in the air for wide period of time and spread to others.¹⁵ The droplets origin may be oropharyngeal or nasopharyngeal which is closely associated to saliva. Due to the presence of large amount of SARS-CoV RNA present in saliva, there is increased chance to spread through health care professionals especially dentist are at high risk.¹⁶ The incubation period of coronavirus in humans is said to be about 2-14 days and possible up to 0- 27days.¹⁷ The unprecedented nature of the disease hold threatening situation to the

oral and maxillofacial surgeons because of higher possibility of inhaling aerosol particles during oral procedures and close contact with contaminated droplets. It is apparently important for oral surgeon to stay attentive to avoid cross contamination between surgeons and patients. The purpose of this article is to collect consolidated guidelines and information was formulated by health regulatory authorities and to explore research articles which enable oral surgeons to avert the spread of infections, particularly handling urgent and emergency procedures.

II. MANAGEMENT OF HEAD AND NECK SURGERIES DURING COVID 19 CRISIS

As oral and maxillofacial surgeons, not only have the concern to battle against the spread of the infection, but they have definite responsibility to face the challenges of the acute and serious maxillofacial diseases. Amidst the COVID 19 crisis, surgeon has to be aware of the life threatening situation and there is absolute need for categorizing the patient according to the severity of the illness. From this context, it is essential to develop revised protocol for clinical situation .On March 17, American college of surgeon established guidelines for prioritize the illness and stratified into three categories (low, intermediate and high) (Figure 1).

- High acuity surgeries- The patient possess higher potential for mortality rate and it need immediate intervention to alleviate lethal circumstances like upper airway obstructions due to tumour ,trauma and infection, haemorrhage ,ocular emergencies. Consequently, oral surgeons are directed to follow strict prevention control measures in addition to the routine precautions.
- Intermediate acuity surgeries- The patient have potential to develop future morbidity and it is not life threatening situation. The clinical conditions like benign pathology, facial reconstruction, odontogenic infection, extraction procedures, orofacial trauma like simple mandible fracture, closed condylar fracture and involvement of zygomatic arch. In context to COVID 19, surgeries can be suspended with medical management and surgical procedures can be done with suitable infection control measures.
- Low acuity surgeries-The patient who requires elective surgeries like orthognathic surgeries, implant procedures, benign pathologies, TMJ pathologies, surgeries for cleft lip and palate. Based on CDC interim guidance, surgeons are advised to defer the surgical procedures until the pandemic situation are under control.



On march 26 2020, AO CMF (Arbeitsgemeinschaft für Osteosynthesefragen Craniomaxillofacial International) recommendations for aerosol generating maxillofacial procedures like airway management procedures are intubation, extubation and tracheostomy and management of facial trauma ,surgical oncology cases.¹⁸

1. INTUBATION

- In order to prevent number of attempts during procedures, it is highly important to perform intubation by well experienced member in the team.
- Intubation is preferred over laryngeal mask Airway (LMA) during surgical procedures.
- To the maximum extent, stop the aerosol spread through reducing usage of mask/bag ventilation earlier to intubation, whereas suctioning is absolutely essential.

- Jet ventilation is hazardous procedures and it should be carried out under negative pressure room with appropriate PPE .
- In operating field, there is increased risk for health care personnel due to presence of virus particles through aerosol procedures, therefore it is recommended to wait 20 minutes outside the operating room for air exchange.

2. EXTUBATION

- To alleviate aerosolization, it is suggested to wear oxygen mask over the face after tube removal.
- All unnecessary personnel educated to stay outside the room during extubation to avoid unnecessary exposure.

3. TRACHEOSTOMY

- Tracheostomy procedure on patient with suspected or confirmed COVID 19 carry high risk and hold great challenge to oral surgeons.
- Consider percutaneous or open approach may lead to less aerosol production
- Patient should be paralysed to avoid coughing, preoxygenated and hold ventilation before incising the trachea.
- To avoid aerosolization, limit the suction as soon as possible.
- Prefer bipolar cautery rather than monopolar.
- For tracheostomy care, closed suctioning procedures are chosen.
- The confirmed or suspected COVID 19 patients ,avoid tracheostomy in case of respiratory instability or heightened ventilator dependence.
- Prefer non fenestrated and cuffed tracheostomy tube.
- After detaching the tracheostomy tube, use ventilator filter or heat moister exchanger with viral filter (HME).

4. MAXILLOFACIAL TRAUMA MANAGEMENT

When patient visits to the clinic/hospital with fracture are truly require immediate attention to treat patient according to intensity and site of the fracture in the maxillofacial region. Pre-operatively screening and COVID 19 test is mandatory if patient is undergoing surgery. If it is confirmed or suspected case, patient can be managed non operatively or delaying the surgical procedure. Therefore, surgeon should be aware of the current recommendation in this COVID 19 circumstance and planned to provide optimize care for the individual. Hereby, specific recommendations are given below depending on the anatomical site. (Table -1)

Table 1 - Specific recommendation for management of maxillofacial trauma depending on the anatomical area.

UPPER FACE FRACTURES/FRONTAL SINUS PROCEDURES.	MIDFACE FRACTURE	LOWER THIRD /MANDIBULAR FRACTURE
Delaying the procedures for non functional part /fracture in the sinus region	If fracture segments are stable, prefer closed reduction	Prefer closed reduction with self-drilling MMF screws
Avoid endoscopic endonasal procedure if possible	Use Carroll-Girard screw for reduction	Consider managing the fracture with MMF screws intraorally rather than ORIF
Perform stripping of mucosal surface manually during frontal sinus obliteration or cranialization ,instead of using power equipment	In order to provide mucosal incisions, use scalpel instead of monopolar cautery	During, mucosal incisions, use scalpel instead of monopolar cautery
Minimize the use of suctioning and irrigation	Minimize the use of suctioning and irrigation	Minimize the use of suctioning and irrigation
In lowest power setting ,use bipolar cautery to achieve homeostasis	In lowest power setting ,use bipolar cautery to achieve homeostasis	In lowest power setting ,use bipolar cautery to achieve homeostasis
Use self-drilling screws	Use self-drilling screws	Use self-drilling screws for monocortical screw fixation

Consider osteotome instead of power instrument during osteotomy	Consider osteotome instead of power instrument during osteotomy.	Consider osteotome instead of power instrument during osteotomy.
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5. MANAGEMENT OF ORAL CANCER

On April 2020, Professor Hanna, He is a president of the American Head and Neck Society suggested to suspend the major surgery of head and neck cancer in case of COVID 19 positive unless it is lethal condition whereas for non COVID 19 individuals recommended to use non-surgical therapy because deferment of the treatment may negatively impact the prognosis of the individuals.¹⁹ Chaves et al suggested not to postpone cancer treatment in negative SARS-CoV-2 patients and established emergency international guidelines for treatment of head and neck cancer patients.²⁰ Deo et al proposed alternative guidelines to defer oral surgery and advised to follow neoadjuvant chemotherapy/oral metronomic therapy for locally advanced oral cancers.²¹

AO CMF (Arbeitsgemeinschaft für Osteosynthesefragen Craniomaxillofacial International) on march 26,2020 listed several oral oncology cases not to deferred.

They are as follow

- Squamous cell carcinoma involves oral cavity, oropharynx, larynx, hypopharynx hold high risk to surgeon if it is delayed for more than 6 weeks.
- Cancers in head and neck region which is imminent in obstructing airway passage
- Papillary thyroid cancer is rapidly growing, bulky disease more prone to obstruct airway
- High grade or progressive salivary carcinoma
- T3/T4 melanoma
- Rapidly progressing cutaneous SCCA with regional disease
- Salvage surgery for recurrent/persistent disease
- High grade sino-nasal malignancy without chance of non-surgical therapy.

III. DIAGNOSIS OF CORONAVIRUS DISEASES

- Methods of laboratory diagnosis test –Real time RT-PCR

Universally, real time RT-PCR protocols have been anticipated for the diagnosis of coronavirus. The sample used in this method is respiratory secretions which can be obtained from bronchoalveolar lavage, endotracheal intubations and oropharyngeal or nasopharyngeal swab. Molecular tests are used for prompt detection of virus when there is urgent need in diagnosing the infected individuals. Daniel K W Chu et al established two one step quantitative real-time RT-PCR assays to detect two different regions like ORF1b and N gene regions of the viral genome. They were designed this purely depend on the first openly available sequence in Genbank . The primer and probe sets are made to react with this coronavirus; later assays were evaluated using the panel of positive and negative controls .²²⁻²⁴

- Other common supplementary laboratory finding are
 - Lymphopenia
 - Raised lactate dehydrogenase
 - Increased prothrombin time
 - Elevated inflammatory markers are CRP and ESR.
- Radiological examination

The conventional chest X-ray as well as chest CT scan can be used to identify the pattern of coronavirus diseases. Grading severity of the coronavirus disease is totally relying on the involvement of the lungs. Ground glass opacities and lung consolidation are the two main signs well appreciated in the affected COVID 19 individuals. An additional finding of CT images includes inexact ground glass opacity, interlobular septal thickening, air bronchogram sign, air trapping and consolidation with vascular involvement. Yan Li and Liming Xia conducted study to evaluate the radiological findings of coronavirus diseases and results showed that sign of “Reversed halo” and pulmonary nodules are the unusual finding for misdiagnosing coronadiseases.²⁵

IV. GENERAL RECOMMENDATION FOR ORAL SURGEONS

- **Infection Prevention and Control guiding principle for routine healthcare practices during COVID 19**

1. Implement telemedicine strategies so as to reduce the risk of SARS-CoV-2 transmission among the health care workers.

2. Follow triage protocols to decide if there is absolute need for an appointment or advice can be given to patient for managing at home.
3. Screening everyone for sign and symptoms before entering health care setting remains an imperative approach which could help to implement accurate precaution.
4. Although screening carried out before entry to the hospitals, it should also be obligatory to assess admitted patient every day for any presence of symptoms pertaining to COVID 19.
5. Avoid close by physical contact to the patient and maintain no less than 6 feet distance to inhibit SARS-CoV-2 transmission
6. Health care professionals should remain follow the standard infection control measures and universal precaution because there is high chance to come across asymptomatic or pre-symptomatic patients with SARS-CoV-2 infection.
7. CDC recommends postponing elective surgeries or non-emergency procedures in this current predicament circumstance.²⁶

- **Infection Prevention and Control guiding principle for suspected or confirmed SARS-CoV-2 infection during COVID 19**

PATIENT PREPARATION

1. For patient with suspected or confirmed SARS-CoV-2 infected individuals, advise them to stay in a single-person room with closed door, whereas patients undergoing aerosol generating procedures instruct them to stay in Airborne Infection Isolation Rooms (AIIRs)
2. Individuals entering the room should adhere to the usage of PPE.
3. Instruct patient to wear facemask.
4. Suspected or confirmed SARS-CoV-2 infected people are educated to stay in the same room
5. To the maximum extent, limit the movement of patient to outside from the designated room .
6. After discharge or transfer of the patient, avoid the entry to the vacated room due to existence of infectious materials and allow adequate period for air changes. Future followed by suitable cleaning and disinfecting the surface before it is resumed to routine usage.²⁶

V. SAFETY RECOMMENDATIONS FOR ORAL SURGEONS

Novel coronavirus disease is life threatening circumstances and it disseminates through droplet and contact transmission. Considering the current serious situation, oral surgeons should stick to the universal precautions, including hand hygiene protocol, personal protective equipment (PPE), cleaning and disinfection, environmental management, hospital waste management, so as to lessen the spread of the infectious disease.

- **PERSONAL PROTECTIVE EQUIPMENT (PPE)**

WHO described PPE as an effective method for infection control and averts the spread during this massive pandemic. PPE usage is mainly based on the hospital settings, target persons, type of activity and transmission dynamics of the infectious agents like contact transmission, droplet spread and through aerosols. Oral surgeons involved in direct contact to the individuals should use gloves, gown, mask and wear eye protection (goggles or face shield), whereas for aerosol generating procedures, usage of respirators, follow eye protection, gowns or fluid resistant aprons and gloves are extremely required.

Respirators (e.g. N95, FFP2 or equivalent standard) have been used for an extended time during previous public health emergencies involving acute respiratory illness when PPE was in short supply. This refers to wearing the same respirator while caring for multiple patients who have the same diagnosis without removing it and evidence indicates that respirators maintain their protection when used for extended periods. However, using one respirator for longer than 4 hours can lead to discomfort and should be avoided. Although the surgeon adhere to interim guidance of PPE, practicing donning and doffing step is more important in infection control.²⁷ (**Table 2**)

Table 2-Sequence of Donning and Doffing^{28,29}

DONNING	DOFFING
Identify proper size of PPE to don	Remove gloves
Follow proper hand hygiene protocol using hand sanitizer	Remove gown
Isolation gown	Exit patient room
Put NIOSH-approved N95 filtering face piece respirator or facemask	Perform hand hygiene measures using hand sanitizer
Face shield and goggles	Remove face shield and goggles
Gloves	Discard respirator
	Follow hand hygiene protocol after removing the respirator/facemask

• **HAND HYGIENE MEASURES**

Hand hygiene is considered to be simple and active method to prevent the spread of infection .CDC suggests using alcohol-based hand rub (ABHR) containing 60-95% of alcohol rather than soap and water. So far, laboratory data reveals that ABHR formulations helps to inactivate SARS-CoV-2 but influence of hand hygiene measures reducing the pathogen is still unclear.³⁰⁻³²

VI. ENVIRONMENTAL CLEANING AND DISINFECTION

WHO recommend using hypochlorite-based products either in liquid or powdered formulations because of broad spectrum of antimicrobial activity and it has potential to eradicate microbes at various concentration. The dissolved preparations create a dilute aqueous chlorine solution in which contain undissociated hypochlorous acid component and it is considered to be potent antimicrobial agent. In the coronavirus crisis, U.S. Environmental Protection Agency (EPA) currently updating list of disinfectants which is effective against infectious pathogens at various concentration. They recommended using 0.1% (1000 ppm) in the COVID-19 crisis, whereas presence of large spills blood and body fluids need increased concentration of 0.5% (5000 ppm).Despite the fact that hypochlorite is an antimicrobial agent, but it is promptly inactivate in presence of organic matters. Therefore, it is imperative to clean the surface with soap and water prior to the disinfection.³³

VII. CONCLUSION

In the context of COVID 19 circumstance, we as oral surgeons have to stay updated regarding the guidelines and recommendations and nature of SARS-CoV-2 transmission. In spite of following standard precautions, it is mandatory to implement aforementioned guideline to prevent the transmission of COVID-19.

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