

# Professional Guidelines & Prevention Protocol for Maxillofacial Procedures Amid Newly Emerged Corona Virus Disease (Covid-19)

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**Keywords:** Covid OMFS Trauma, Pandemic; Coronavirus; COVID-19; Maxillofacial surgery .

## Abstract:

Corona viruses are positive strand of RNA viruses that are found in certain wild animals, some house hold pets, and can also affect humans . on 31 December 2019, 27 cases of unexplained etiological pneumonia were diagnosed in Hubei Province of Republic of China, which later was identified as severe acute respiratory syndrome corona virus 2 (SARS-CoV-2), which began to spreads uncontrollably at an exponential rate.the virus was identified as (SARS-CoV-2) which later by Chinese Center for Disease Control and Prevention spread on January 7<sup>th</sup>, 2020 & spread of the virus was so rapid that World Health Organization (WHO) had to announce (SARS-CoV-2) as a pandemic by March 11<sup>th</sup> 2020.(2)

It has been reported that 2019-nCoV can be detected in human secretions such as sputum, faeces and urine.The death rate has been calculated between 0.39% and 4%, has a incubation period of 7-14 days (mean 6.4 days).(5) Inevitably, health-care workers are in close contact with infected patients. Physicians and other health care workers who perform and participate in examinations and procedures within the head and neck region and airway are at particularly high risk of exposure and infection from aerosol and droplet contamination. There is a high viral load in the nasal cavity of infected patients with SARS-CoV-2 & high risk specialties exposed to SARS-CoV-2 infection includes Ear, Nose, and Throat (ENT) Surgeons and Dentists, Oral and Maxillofacial surgeons, Ophthalmologist.

## INTRODUCTION:

Corona viruses are positive strand RNA viruses that cause human disease, and household and pet animals..Coronaviruses (CoVs) are the biggest cluster of Nidovirales-related viruses, including Coronaviridae, Arteriviridae, Mesoniviridae and Roniviridae families.Club-shaped spiked projections originates from the surface of the Corona virus, which resembles solar corona appearance leading to the term corona viruses.(1)

on 31 December 2019, 27 cases of unexplained etiological pneumonia were diagnosed in Hubei Province of Republic of China, which later was identified as severe acute respiratory syndrome corona virus 2 (SARS-CoV-2), which began to spreads uncontrollably at an exponential rate.the virus was identified as (SARS-CoV-2) which later by Chinese Center for Disease Control and Prevention spread on January 7<sup>th</sup>, 2020 & spread of the virus was so rapid that World Health Organization (WHO) had to announce (SARS-CoV-2) as a pandemic by March 11<sup>th</sup> 2020.(2)

It has been reported that 2019-nCoV can be detected in human secretions such as sputum, faeces and urine.The virus of the Acute Respiratory Syndrome SARS-CoV and SARS-CoV-2 (Novel corona virus)bind to targeting cells by the 2-converting angiotensin enzyme (ACE 2), generated by the lung, intestine, kidney and blood vessel & epithelial cells in the blood vessels. There is typically high expression of ACE2 receptor of 2019-nCoV on the epithelial cells of oral mucosa, which is particularly enriched in the epithelial cells of the tongue.(3) An in vivo study by Lili Chen, Jiajia Zhao collected Saliva and oropharyngeal swabs samples from 31 COVID-19 patients showed that, 13 cases were tested positive for oropharyngeal swab nucleic acid detection. Among these 13 patients, there were 4 cases with positive nucleic acid detection in saliva, of which 3 cases were critically-ill patients on ventilator support, and 1 case being ordinary without ventilator support, thus confirmed the possibility of 2019-nCoV being present in saliva.(4)

COVID-19 is a highly contagious zoonosis (with a reproductive number of 2.8, which means that under favourable conditions one case generates 2.8 new cases).Most infections (81%) are asymptomatic or produce only mild symptoms, whereas 15% occur in severe form that has required hospitalization. Some 3% to 4% benefit from respiratory support in an intensive care unit (ICU). The death rate has been calculated between 0.39% and 4% & covid-19 has a incubation period of 7-14 days (mean 6.4 days).(5) Health services staff are constantly in close proximity with contaminated patients. Clinicians and other health-care professionals who conduct and engage in head and neck and airway assessments and surgeries are at especially high risk of being exposed. Spread of infection from clinical procedures which generates from aerosol and droplet contamination are also considered cause of contamination. A substantial viral concentration has been noted in the nasal cavity of SARS-CoV-2 patients with high load of viral load. high risk clinical specialties exposed includes Ear, Nose, and Throat (ENT) Surgeons and Dentists, Oral and Maxillofacial surgeons.(6)(7)As various studies & research are providing information about COVID-19, Concepts & protocols must be formulated as per triage of patient & the degree of emergency care, in the field head & neck surgeries as well as of oral and maxillofacial surgery.

## MATERIALS AND METHODS:

The following online biographical repositories have been used to classify related published research: MEDLINE, EMBASE, Pro Quest, PUBMED, Research Gate, Science Guide, and the Google search engine database. Literature search was conducted for English-language article & free-text keywords like ‘corona virus disease 19, COVID-19, severe acute respiratory syndrome corona virus 2, SARS-CoV-2, transmission, pandemic, oral surgical procedures, oral and maxillofacial surgery, dental, personal protective equipment, infection prevention and control.After reading the article titles and abstracts, full text, 25 articles were included based on the quality of the studies.The last search was run on 27 April 2020.The goal of the search is to find out top level infection prevention & control protocol & cross checking with documented infection rates of viral diseases in exposed general population.

## RESULTS:

**Personal protective equipment:-** Stanford University School of Medicine guidelines suggest Personal protective equipment along with powered air purifying respiratory (PAPR).Patients with urgent operations will be screened 48 hours before surgery including two COVID-19 checks 24 hours apart.The Stanford University protocol recommends PAPR (powered air purifying respiratory) or a combination of an N95 mask with eye protection for all OR staff if a patient is found to be COVID-19 positive.(8) At a minimal level, AO-CMF suggests N95 (FFP2) mask with face shield (or mask / with shield connected above N95), gloves, non-porous robe, disposable cap. Scrubs worn (Figure 1.) during the procedure should be changed immediately afterwards.It is widely agreed that better shielding is offered by FFP3 or PAPR, and should be used instead of N95 mask if accessible. We realize that PAPR (powered air purifying respiratory) may not be widely available, and alternatively many devices or techniques such as the FFP3 mask with Stryker Flute system or FFP2 or FFP3 mask paired with goggles and hoods may be used.(9) protective masks, known as “surgical anti-projection masks”,should comply with European safety norm “NF EN 14683”. They limit the aerial diffusion of potentially infectious particles, but should imperatively be renewed every 4 hours, to guarantee their effectiveness. It should be noted that the presence of a beard reduces the effectiveness of any mask.

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FFP2 filter masks allow for a better protection of caregivers from contamination by airborne spread of very small infectious agents. In stage 3 epidemic phase, any practitioner specialized in oral health (naturally exposed to the risk contamination) must be equipped with a FFP2 filter mask.(10)

Protective glasses or large face shields protect against projections of the virus on the ocular conjunctiva. Their use is systematically recommended for any procedure at risk of ocular projection of biological liquid, regardless of the patient's status. considering the risks of coughing and nauseous reflex at the time of examination use of protective glasses or large face shields resolves concerns of practitioners working in the oral cavity, with procedures ranging from a simple examination of a tooth, to that of the oral cavity, the oropharynx, the larynx, the eye. (11)

The gloves protect the practitioner in case of contact with potentially contaminated organic secretions, even more so if his hands have skin lesions that could become over-infected. Finger pads are considered insufficient. Wearing gloves is recommended if there is a risk of contact with contaminated body fluids and in case of skin lesions on the hands.(12)



Figure. 1 Recommended personal protective equipment.

For trauma facilities, the American College of Surgeons (ACS) advocates proactive use of PPE for droplet prevention on all patients. Patients with upper respiratory complaints must wear a face mask. They understand the need for hospital policies for the control of airways in emergency settings and for clinical involvement in positive COVID-19 or indeterminate COVID-19 status patients and recommend that hospitals create such policies should none exist.(13) The American Society of Anesthesiologists (ASA) also acknowledges the increased risk of viral aerosolization and dissemination from airway treatment, including endotracheal intubation. N95 masks, protective eyewear, gowns and gloves are recommended. ASA went one move further and recommends the protection of PEP by prioritizing workers at the highest risk of COVID-19 exposure or practitioners in the highest risk groups.(8)

#### Physical Examination and Associated Procedures:-

General examination should ideally be conducted in a separate room, apart from other patients, and only the relevant personnel should be present. The examination should be carried out by the most experienced person present and could be a more targeted examination, depending on the judgment of the investigating physician. Proper doffing and disposal of PPE are of utmost importance.(Table.1) In the event of high risk clinical procedures required, Patients with active SARS-CoV-2 infection or Patients with influenza like symptoms or Patients under evaluation for SARS-CoV-2 infection, clinician should wear Single-use N95 mask, Goggles or face shield, Gown, Gloves where as patient should wear surgical mask. In moderate risk clinician procedures such as examination of ear, nose, mouth, or throat in asymptomatic patients, clinician should wear Surgical mask with face shield to allow for reuse of mask & Gloves while patient should not need to wear surgical mask. While all other examination in asymptomatic patients, clinician should wear Gloves use of mask is optional in such events.(14)

The 2019 Novel Corona virus Working Group, Peking Union Medical College Hospital requirements for the selection of first-line medical staff included passing physical exams and technical training for COVID-19. Contenders were eliminated when they were pregnant, over 55 years of

age, with a history of chronic illnesses such as chronic hepatitis, kidney disease, diabetes mellitus, autoimmune disease, and tumors. All individuals with acute fever were also exempted. For those operating with suspected or infected COVID-19 patients, isolation or observation was mandatory as Viral secretion was detected in hospitalized Chinese patients who recovered for a period of 8 to 37 days with a median of 20 days. All elective and non time sensitive, non urgent surgical procedures and admissions must be rescheduled as necessary(5)

**Formulation of triage of maxillofacial patients during COVID-19 pandemic:-** Patients should be categorized based upon hierarchy of care . depending upon care required for maxillofacial patients depending upon severity of conditions to be treated the surgeries are divided into elective, Intermediate, Urgent & Emergency surgeries. If conservative therapy is a viable option to surgery then it should be endorsed. at times of reduced capacity for surgery. It is necessary to note that the decision to perform or cancel surgery should be taken dynamically. They focus on both medical and logistical considerations. As there is ongoing depletion in medical resources worldwide due to COVID-19 pandemic, postponement of elective surgery is must.

Patients who require elective surgeries, like those of Primary and secondary cleft lip and palate malformations, Orthognathic surgery, craniofacial malformations without consequences such as sleep apnoea/elevated intracranial pressure, temporomandibular pathology with complaint of mild pain, Orbital decompression with visual acuity not affected, removal of disease-free teeth with no risk of impairment dental implant surgery, prophylactic removal of impacted teeth, facial esthetic correction, biopsy of clinically benign lesion etc. These surgeries are recommended for Deferral of surgery until COVID-19 pandemic situation has settled.

It is suggested that instances such as tooth extraction and complications such as hemorrhaging, procedure of localized abscesses in the oral cavity, repair of oro-antral fistulas, therapy of pulpitis, etc., be referred to general dentistry, to reduce work load while focusing on providing emergency care to maxillofacial cases.(7)

Intermediate surgeries includes, surgeries of benign, slowly growing tumors, Closed fractures with limited impairment of function such as displaced fracture, or an anterior wall frontal sinus, Larger cystic lesions, Surgery for temporomandibular pathologies that cause severe pain, Treatment of craniofacial malformations with sleep apnea/elevated intracranial pressure etc., are deferred until COVID-19 pandemic situation has settled as long as risks of deferral are under control, if it goes out of control emergency surgery under highest level of protection is recommended. Alternatively displaced fracture, or an anterior wall frontal sinus treated conservatively with reasonable likelihood of healing.

While all urgent surgeries (figure.2 ) should proceed after complete blood count, necessary biochemical test, plain chest x-ray, CT thorax, 3d ultrasound, COVID-19 test under PPE protection. While in life threatening cases, emergency cases should be done with the highest level of protection assuming patient is COVID-19 positive.(25)

**Aerosol-generating procedures:-** Endoscopic inspections of the nose, sinuses, oropharynx, hypopharynx, and larynx are among the most prevalent diagnostic tests for the head and neck, and are routinely conducted as procedures producing aerosols.

The nose and nasopharynx have also been demonstrated to be reservoirs for elevated SARS-CoV-2 virus loads, and after manipulation, viral particles have been shown to be airborne for 3 hours or more and, As the proportion of symptom-less SARS-CoV-2 Positive patients is high, all patients should be presumed to be contagious. Examinations should be restricted to those patients with a valid indication and need. The number of staff members in the operating room should be limited to a minimum. The operating room should be equipped with adequate ventilation with negative pressure. The examination should be carried out by the most experienced professionals available in an acceptable manner. Regular or low-priority evaluations should be postponed during the pandemic. Besides eye protection and

gloves, respirators of a high protection level (FFP3/N99/equivalent) and waterproof gowns must be utilized. Aerosol-generating treatments are indeed tracheotomy, tracheostomy, airway suction, abscess drainage, irrigation of wounds, use of ultrasonic / piezoelectric equipment, use of hand pieces with high speeds, etc. (14)(7)

**Outpatient care:-** Patients are encouraged to employ tele-medicine prior to presenting for evaluation. A center that is adequately equipped to treat infected patients is intended for patients that have reported symptoms that are compatible with COVID-19 infection, either recently been visited in regions that have a severe COVID-19 burden and therefore are at high risk of infection. While somewhat subjective, it is best for patients who report non-urgent problems not to attend a hospital. Patients with vague symptoms may require evaluation and remote E-prescription of non-scheduled drugs.. (15)

Outpatient visits must be restricted to a minimal level throughout the peak of the COVID-19 disease outbreak. Only urgent problems should prompt a patient to come to an outpatient unit or private practice.

Waiting areas should allow for adequate social distancing. Only a single parent or guardian be allowed to accompany pediatric patients for emergency clinics. Examination rooms and operating use is staggered to avoid repeat usage in rapid succession. Emergency assessments and diagnosis will therefore be carried out in a manner that minimizes the probable spread inside the operating environment. (16)

If an outpatient visit is deemed necessary waiting and contact times should be short. The intention is to provide optimal care for patients without increasing the likelihood of viral transmission. Medical masks should be provided to patients with respiratory symptoms. Such patients must be isolated if other patients are present and therefore should be put on hold if the rationale for the visit appears to be of minor concern. (7) Investigate epidemiological history, clinical features and temperature. The majority of patients have symptoms of fever. Patients with a recent outbreak history of fever, cough and other respiratory symptoms should be referred to the fever center for care. Such a patient has been re-examined by regular preoperative examinations, including blood screening, chest CT and respiratory function assessments. (18)

**Inpatient care:-** All patients who are admitted to an inpatient unit should undergo a test for SARS-CoV-2 on a routine basis, during the COVID-19 pandemic. Until a negative result is obtained. The new patient will be isolated from other patients and advised to wear a surgical mask and to perform proper hand hygiene. Ongoing temperature checking must be performed twice a day for all patients. Additionally, a no-visitor policy should be adopted. Patients should be allowed the use of online communications gadgets for contact with relatives and friends. (7) Assuming that all providers are eligible at all locations of patient care, attendance with the least amount of current obligation or advanced training can be preferred to take control of a particular case. In order to minimize the use of hospital resources, patients are discharged on the day of admission unless contraindicated. When possible, adjunct procedures requiring close follow-up are discouraged in favor of appropriate alternatives. The medical staff must use personal protective equipment based on the risk of infection and type of activity. (15)

**Operative Room Precautions:-** Intubation should be performed by the most experienced member of the team. Paralysis should be considered to limit coughing. Limit the amount of mask / bag ventilation before intubation and bypass jet ventilation, suction as much as is absolutely necessary to minimize aerosolisation. Intubation is preferred over placement of LMA (Laryngeal Mask Airway) . (9)

Intubations are a high risk process because of the interaction to secretions, blood, droplets and aerosols by the physician and should be indicated only for patients with severe respiratory distress or hypoxemia after standard oxygen therapy. (5)

When the patient has proceeded to the Operating Room, the authorized staff should preferably wait 20 to 30 minutes outside of the operating suite

after intubation with aerosol generation. This is the time required to remove airborne contaminants with 99% and 99.9% efficiency, respectively. Any quasi-essential workers walk out of the room and resume only when the airway has been secured. (8) "Bag valve-mask ventilation, non-invasive ventilation, and intubation (in spontaneously breathing patients). It may produce regional aerosol production which may enable airborne transmission to those closely associated in the process" (18)

An "aerosol box" comprising of a clear plastic container has been commonly implemented for use in myriad operating rooms across the globe, efficiently protecting the provider's face from the patient's airway thus enabling the physician to shift his / her arms easily to conduct all the required tasks during endotracheal intubation. This aerosol box was created by pro bono by Hsien Yung Lai, anaesthetist at Mennonite Christian Medical facility in Hua Lian, Taiwan, and licensed under a Creative Commons license. Lateral access points were introduced by Philippine ENT surgeons for tracheostomy and upper aerodigestive tract operation.

It was also shown that epidural mixed spinal-epidural anesthesia is relatively safe thus, this approach should certainly be used for incision and drainage of large abscesses. Insufficient sedation may lead to high risk during intubation in the event that the patient becomes agitated and/or has a coughing attack with increased risk of pathogen transmission. (19) According to Aminnejad et al and Yang et al, Intravenous lidocaine administration prior to tracheal extubation may reduce coughing without adverse effects and may also be suggested for intubation with the aim of lowering the risk to the physician who is performing the procedure.

The endotracheal tube must be secured and patient is then put in mechanical ventilation. All devices must be collected in double-sealed bags and proper disinfection implemented during disposal. All equipment and environment surfaces must be cleaned and disinfected. (20)(21) Any quasi-essential members during extubation will be out of the room. Anybody who is present should maintain appropriate PPE. After removing the tube, an oxygen mask must be placed over the face to attenuate aerosolisation with coughing. (9)

**Tracheostomy:-** American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS) stated that tracheostomies must be undertaken in patients with satisfactory ventilation level, ideally with confirmed negative status of COVID-19, and should not be performed until 2 to 3 weeks after intubation. Open tracheostomy can be recommended because of the proposed reductions in the risk of aerosolisation of secretion. However, these considerations may need to be adjusted according to need during surgery. (8)

In overall, most tracheostomy operations must be avoided or postponed (even after 14 days) attributable to the elevated infectious risks of the operation and successive care until the acute infection phase has reached when there is a high probability of recovery, and When tapering the ventilator became the key treatment priority. (6) The patient should be paralyzed, pre oxygenated, ventilation held before the trachea is incised to minimize aerosolization. Suctioning should be limited as much as possible, to avoid aerosolization. Bipolar cautery is preferred over monopolar. Progress the tube distally until the trachea is incised to prevent having a hole in the ETT balloon. Closed suctioning systems are preferred for tracheotomy care. (9)

American Academy of Otolaryngology recommendations include:

- 1) Avoid tracheotomy in COVID-19 positive or suspected patients during periods of respiratory instability or heightened ventilator dependence. Tracheotomy can be recommended in patients with healthy pulmonary status but should not occur earlier than 2-3 weeks after intubation, and preferably with negative COVID-19 testing.
- 2) Adhere to strict donning and doffing procedures based on institutional protocol. Limit the number of providers participating in tracheotomy procedure and post-procedure management. Perform entire tracheotomy procedure under complete paralysis.
- 3) Rely on cold instrumentation and avoid monopolar electrocautery.



Progress the tube distally until the trachea is incised to prevent having a hole in the ETT balloon.

4) Minimize tracheal suctioning during procedure to reduce aerosolization. Choose cuffed, non fenestration tracheotomy tube. Maintain cuff appropriately inflated post-operative and attempt to avoid cuff leaks.

5) Place a heat moister ex changer (HME) with viral filter or a ventilator filter once the tracheotomy tube is disconnected from mechanical ventilation.(22)

Specific recommendations additionally include the following:

1. In awake patients, adequate topical preparation to make the examination more comfortable is important. However, use of sprays should be avoided. Carefully placed pledgets should be used to provide decongestion and anesthesia.

2. Topical anesthesia for any office-based intervention of the larynx under the guidance of a laryngoscope or strobolarngoscope is performed through application of a spray. This is considered high risk; therefore, office-based biopsy, injection, laser, or other procedures should be delayed if possible.

3. When a video screen is accessible to project the examination, use those to keep the patient's and health care workers faces apart.

4. Disposable endoscopes may be considered.

5. After completion of the examination, The endoscope needs to be treated properly after the inspection has been done. The endoscopes Should not be removed from the examination room without a protective cover.(6)

The American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS) and the ENT UK emphasize the need for further care in post-tracheostomy treatment to minimize droplet transmission. This includes keeping the tracheostomy tube cuff appropriately inflated, favoring Inline suction, preservation of a closed circuit and post-tracheostomy deferral of routine reforms until COVID-19 is negative. (23)

**Patient Transfer:-** appropriate safety during relocation of SARS-CoV-2-positive patients or patients with ambiguous infection status following a high-risk procedure is crucial. If approved, non intubated patients may be relocated while wearing a surgical mask (not a N95 mask). If oxygen is necessary, it may be supplied by face mask over the surgical mask. The corridors and elevators should be kept free of people during the transfer. Intubated patients should be transported with an intensive care unit ventilator (dry circuit, filter in place).(10)(6)

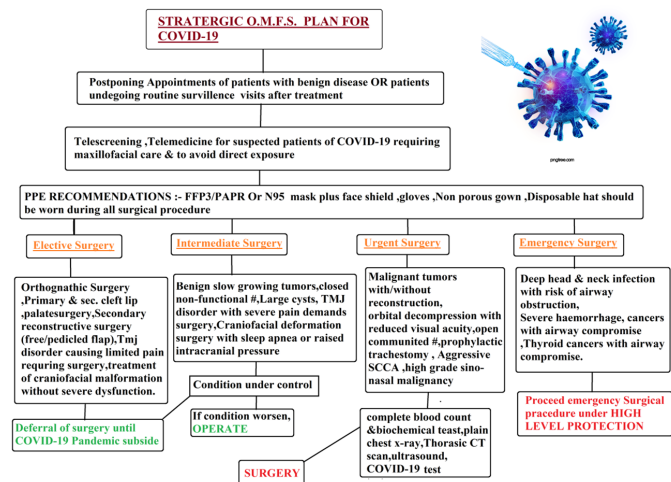


Fig.2 Strategic plan of oral & maxillofacial surgery during COVID-19 pandemic.

Event	Personal protection equipment							
	Surgical mask	N95 mask	goggle/ Face Shield	disposable gloves	disposable medical cap	Isolation gown	protective clothing	disposable shoe covers
Routine								
Check up	Yes		Yes	Yes	Yes			
Operating ordinary patients	Yes		Yes	Yes	Yes			Yes
confirmed/suspected patients	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Aerosol generating procedure		Yes	Yes	Yes	Yes	Yes		Yes

Table 1. Recommendations for protection levels of medical professionals on various events

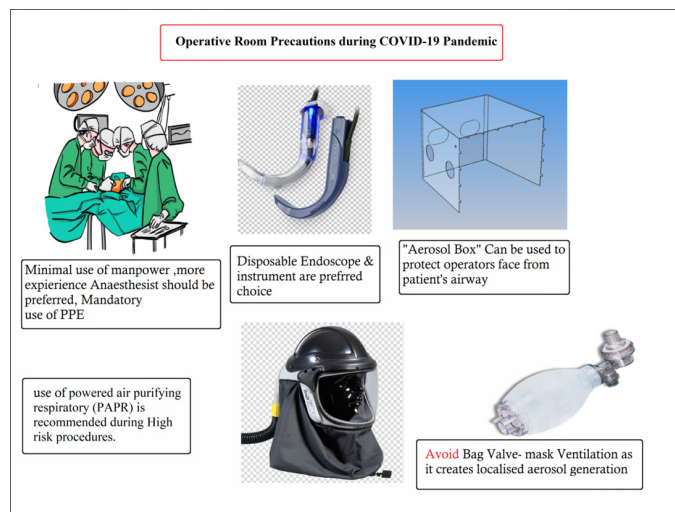


Fig. 3 Operative room precautions.

**Specific instructions while Maxillofacial operative procedure:-**

- 1) Whenever possible an experienced team should perform the surgery. If an extra-oral approach is a relevant alternative to an intraoral one, it should be preferred.
- 2) Excessive water cooling for hand pieces, saws, ultrasonic devices, and piezoelectric devices should be avoided. The self-drilling screws should be used instead of drilling screw holes.
- 3) The use of osteotomes should be considered wherever possible. Electrical cautery should be skipped or undertaken with the lowest possible intensity.
- 4) During the procedure, leaving or entering the operating room should be limited to a minimum. The 15-minute period must elapse after the patient has vacated the operating room prior to cleaning and disinfection can proceed (7)
- 5) Scalpel over monopolar cautery for mucosal incisions .
- 6) If a fracture requires ORIF in lower face fractures, Enable intra-oral installation of MMF screws, mount a bio-occlusive wrapping over the

mouth and use a trans-cutaneous approach instead of an extended intra-oral approach

7) In mandibular fractures, Consider closed reduction with self-drilling MMF screws.

8) In mid face fractures, Consider closed reduction alone if fracture is stable following reduction .

9) Consider using Carroll-Girard screw for reduction, and Limit intraoral incision when two-point fixation (rim and ZF) is adequate for stabilization in mid-face trauma.Consider delay of non-functional frontal bone/sinus fractures in case of frontal sinus fractures, Consider postponing non-functional frontal bone / sinus fractures in frontal sinus fractures, endonasal endoscopic procedure, and related instrumentation (power micro debridors) raise a very significant risk of aerosol development and should be excluded whenever deemed necessary .

10) Consider manually scraping the mucosa, while conducting a frontal sinus obliteration or cranialization, and don't use a burr or power equipment.(9)

11) The surgery can only be done in the negative pressure operating room for suspected or confirmed patients during procedure. The types of items in the operating room should be minimized to help reduce the risk of contamination, disposable items must be used as often as possible and medical staff should be streamlined.

12) Powerful suction should be enforced when using the electrosurgical equipment to reduce the dispersion of surgical smoke and aerosols.

13)It is suggested that ultrasonic scalpel be given preference in those procedures that may be performed with ultrasonic scalpel to reduce surgical smoke.The anesthetic machine and the operating room need to be thoroughly disinfected before the next operation can be carried out.(17)

14)If possible avoid long-term MMF as provider safety is limited for in-office adjustments and removal in the clinic.

15)Consider preoperative chlorhexidine gluconate or povidone-iodine swish and spit, for all crano maxillofacial trauma management.

16)oxidative agents containing mouth rinses with 1% hydrogen peroxide or 0.2% povidone-iodine are recommended over chlorhexidine .(8)

17)Anti-retraction hand pieces (Fig.4) configured with anti-retractive valves may perform an efficient role in preventing the spread and dispersion of droplets and aerosols during emergency treatment .(24)

18)In case of head & neck oncology, if non-surgical therapy is equivalent to surgery + radiation, non-surgical therapy is recommended .

While surgery is considered in following events, such as Cases in which a worse outcome is expected if surgery is delayed more than 6 weeks. i. SCCA of the oral cavity, oropharynx, larynx, hypopharynx, Cancers with impending airway compromise, High grade or progressive salivary cancer, High grade sino-nasal malignancy without equally efficacious non-surgical options etc.(9)

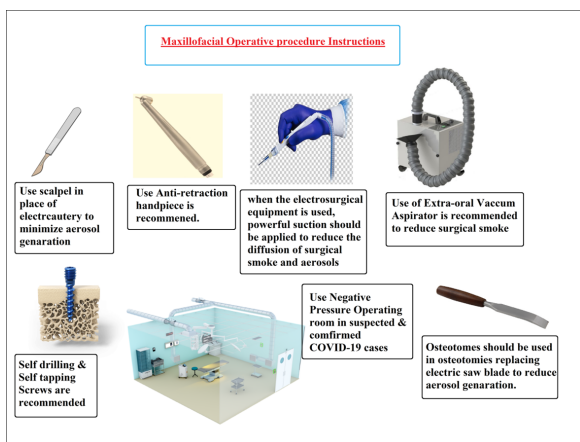


Fig.4 Instructions for Maxillofacial operative procedure

**Team-Based Isolation & Provisions for Infection among Team Members:-** University of Illinois, Chicago (UIC) Oral and Maxillofacial Surgery (OMS) department suggests, Team formation comprises of a surgeon attending, a chief resident, a senior resident and a first-year resident at a the emergency care at the institute stage. Teams are rotated every three to four days. Members of a single team are isolated from each other as much as possible. When one team rotates off call, an entirely new team is called in, preventing cross-contamination.(15)

To prevent spread of Covid-19 among team members Upon returning to duties rotation, any members of the team that have served directly with the injured team member will be given a 14 day period of self-isolation or other suitable treatment, Strict minimal interaction between teams should be maintained.(25)

New teams will be allocated to compensate the impacted facility after eliminating factors that may have led to the other team's initial exposure. In the event of a staffing shortage, entire teams may be asked to cross-cover between facilities. Attending surgeons represent the final line of defense for the OMS team and should be reserved, for only those clinical cases requiring direct attending involvement. If Attending surgeons get infected/ quarantined increases chances of complete shutdown of OMS facility.(15)

**Conclusion:**

The COVID-19 pandemic situation is a real life threat, to prevent the spread of the infection short term preventive measure are of little value focus should be on long time prevention measures. The aim of Professional guidelines & prevention protocol for Maxillofacial Procedures is to sustain functionality of Maxillofacial surgery for during this pandemic.

significant changes in the infrastructure of outpatient units, inpatient units, and operating rooms are needed to combat the COVID-19 pandemic at the same time there is scarcity of personal protective equipment & medical resources due to increased demand hence, it is recommended to focus on only urgent /emergency surgery while deferring all elective or non-emergency surgeries to save resources.

All surgical procedures must be conducted with personal protective equipment appropriate for the elevated risk. Telemedicine is a useful tool if resources allow it.

**REFERENCES:**

- 1) Anthony R. Fehr and Stanley Perlman, Corona viruses: An Overview of Their Replication and Pathogenesis, Helena Jane Maier, Erica Bickerton Paul Britton, Corona viruses, Methods and Protocols, DOI 10.1007/978-1-4939-2438-7.
- 2) Lu H, Stratton C, Tang Y: Outbreak of pneumonia of unknown etiology in Wuhan, China: the mystery and the miracle. J Med Virol. 2020, 92:401-402. 10.1002/jmv.25678.
- 3) Xu H, Zhong L, Deng J, et al. High expression of ACE2 receptor of 2019-nCoV on the epithelial cells of oral mucosa. International Journal of Oral Science 2020; 12: 8.
- 4) Lili Chen, Jiajia Zhao, Jinfeng Peng, Xiaoshuang Li et.al, Detection of 2019-nCoV in Saliva and Characterization of Oral Symptoms in COVID-19 Patients, The Lancet Infectious Diseases, 2020.
- 5) Kowalski LP, Sanabria A, Ridge JA, et al. COVID-19 pandemic: Effects and evidence-based recommendations for otolaryngology and head and neck surgery practice. Head & Neck. 2020;1-9. <https://doi.org/10.1002/hed.26164>.
- 6) Babak Givi ; Bradley A. Schiff ; Steven B. Chinn,, Daniel Clayburgh et.al., Safety Recommendations for Evaluation and Surgery of the Head and Neck During the COVID-19 Pandemic, JAMA Otolaryngol Head Neck Surg. Published online March 31, 2020  
doi:10.1001/jamaoto.2020.0780.
- 7) Matthias Zimmermann, Emeka Nkenke, Approaches to the management of patients in oral and maxillofacial surgery during COVID-19 pandemic, Journal of Cranio-Maxillofacial Surgery, <https://doi.org/10.1016/j.jcms.2020.03.011>.

- 8) Tsung-yen Hsieh, Raj D. Dedhia, Whitney Chiao et al., A Guide to Facial Trauma Triage and Precautions in the COVID-19 Pandemic, Facial Plastic Surgery & Aesthetic Medicine, Volume X, Number X, 2020.  
DOI: 10.1089/fpsam.2020.0185.
- 9) Grant M, Schramm A, Strong B, et al. AO CMF international task force recommendations on best practices for maxillofacial procedures during COVID-19 pandemic. 2020. Available at [https://aocmf3.aofoundation.org/-/media/project/aocmf/aocmf/files/covid-19/ao\\_cmf\\_covid-19\\_task\\_force\\_guidelines.pdf?la=en&hash=C2B89E1E6E9AB72EBF386C7](https://aocmf3.aofoundation.org/-/media/project/aocmf/aocmf/files/covid-19/ao_cmf_covid-19_task_force_guidelines.pdf?la=en&hash=C2B89E1E6E9AB72EBF386C7).
- 10) The French Society of Stomatology, Maxillo-Facial Surgery and Oral Surgery, Practitioners specialized in oral health and coronavirus disease 2019: Professional guidelines from the French society of stomatology, maxillofacial surgery and oral surgery, to form a common front against the infectious risk, J Stomatol Oral Maxillofac Surg 121 (2020) 155–158 .  
<https://doi.org/10.1016/j.jormas.2020.03.01>
- 11) Lai THT, Tang EWH, Chau SKY, Fung KSC, Li KKW. Stepping up infection control measures in ophthalmology during the novel coronavirus outbreak: an experience from Hong Kong. Graefes Arch Clin Exp Ophthalmol 2020. <http://dx.doi.org/10.1007/s00417-020-04641-8> .
- 12) Yan Y, Chen H, Chen L, Cheng B, Diao P, Dong L, et al. Consensus of Chinese experts on protection of skin and mucous membrane barrier for healthcare workers fighting against coronavirus disease 2019. Dermatol Ther 2020. <http://dx.doi.org/10.1111/dth.13310> . e13310 .
- 13) American College of Surgeons Committee on Trauma. Maintaining Trauma Center Access & Care during the COVID-19 Pandemic: Guidance Document for Trauma Medical Directors. American College of Surgeons. 2020. <https://www.facs.org/quality-programs/trauma/maintaining-access> Accessed March 30, 2020.
- 14) Babak Givi, Bradley A. Schiff, Steven B. Chinn et al., Safety Recommendations for Evaluation and Surgery of the Head and Neck During the COVID-19 Pandemic, JAMA Otolaryngology–Head & Neck Surgery, Published Online: March 31, 2020.  
doi:10.1001/jamaoto.2020.0780
- 15) Seth Ebben, Raza A. Hussain, Michael Miloro, Nicholas Callahan, THE UIC COVID COVERAGE PROTOCOL: A Technical Note for Pandemic Oral and Maxillofacial Surgery Call Coverage, Journal of Oral and Maxillofacial Surgery, <https://doi.org/10.1016/j.joms.2020.04.004>
- 16) Peng, X., Xu, X., Li, Y. et al. Transmission routes of 2019-nCoV and controls in dental practice. Int J Oral Sci 12, 9 (2020). <https://doi.org/10.1038/s41368-020-0075-9>.
- 17) Liujun Zeng, Tong Su, Long Huang, Strategic plan for management in Oral and Maxillofacial surgery during COVID-19 epidemic, Oral Oncology (2020), doi: <https://doi.org/10.1016/j.oraloncology.2020.104715>.
- 18) Brücher B.L.D.M, Nigri G, Tinelli A, Lapeña Jr J.F.F, Espin-Basany E, et al. 2020. COVID-19: Pandemic surgery guidance. 4open, 3, 1.EDP Sciences, 2020 [www.4open-sciences.org](http://www.4open-sciences.org) <https://doi.org/10.1051/fopen/2020002>
- 19) Aerosol Box Evaluation (2020), Watch the Latest Aerosol Box Evaluation, Dr. Hsien Yung Lai calls on plastic fabricators worldwide to supply health care professionals with this cost-effective shield, #COVID-19. March 22, 2020. Available
- 20) Aminnejad R, Salimi A, Saeidi M. Lidocaine during intubation and extubation in patients with coronavirus disease (COVID-19). Can J Anaesth. 2020. <https://doi.org/10.1007/s12630-020-01627-2>
- 21) Yang SS, Wang NN, Postonogova T, et al. Intravenous lidocaine to prevent postoperative airway complications in adults: a systematic review and meta-analysis. Br J Anaesth. 2020;124:314-323. <https://doi.org/10.1016/j.bja.2019.11.033>  
<https://www.entnet.org/content/tracheotomy-recommendations-during-covid-19-pandemic>
- 1) Airway and Swallowing Committee of the American Academy of Otolaryngology-Head and Neck Surgery. Tracheotomy recommendations during the COVID-19 pandemic. American Academy of Otolaryngology—Head and Neck Surgery. 2020.
- Fallahi et al., Being a front-line dentist during the Covid-19 pandemic: a literature review, Maxillofacial Plastic and Reconstructive Surgery (2020) 42:12 . <https://doi.org/10.1186/s40902-020-00256-5>.
- 25) Meng, L., Hua, F., & Bian, Z. (2020). Coronavirus Disease 2019 (COVID-19): Emerging and Future Challenges for Dental and Oral Medicine. Journal of Dental Research.  
<https://doi.org/10.1177/0022034520914246>.