

Triage and Prioritize Procedures in Oral and Maxillofacial Surgery during COVID-19 Pandemic: A Review of Literature

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Introduction: The novel coronavirus disease (COVID-19) pandemic, caused by severe acute respiratory syndrome coronavirus, is rapidly expanding. Due to the rapid spread of this disease through respiratory droplets, oral and maxillofacial surgery can be correlated with a high risk of Covid 19 transmission. **Materials and Methods:** A comprehensive review of the literature has been done for this purpose. Interventions were prioritized based on their necessity and urgency for the well-being of the patients. **Results:** Although Elective surgery must be delayed until COVID-19 pandemic situation has been insolvent, urgent surgery can be done in negative pressure operative room on the patients with Covid 19 and with the adequate personal equipment protection in healthy patients. **Conclusion:** Triage and prioritize of procedures in oral and maxillofacial surgery during Covid 19 pandemic is of great importance.

Keywords: COVID-19; Oral Surgery; Maxillofacial Surgery; Pandemic; Urgent

Introduction

Coronavirus disease 2019 (COVID-19) pandemic has put several unprecedented challenges on the medical community, physicians, dentists, and other health care workers who perform and participate in examinations and procedures within the oral and maxillofacial region who particularly are at a high risk of exposure and infection from aerosol and droplet contamination. In this regard, the origin of droplets can be nasopharyngeal or oropharyngeal, normally associated with saliva. Accordingly, larger droplets could contribute to viral transmission to the subjects nearby, and on the other side, the long-distance transmission is also possible with smaller droplets infected by the air-suspended viral particles (1). Specific data on the risk of infection in oral maxillofacial surgeons are not available, since 2019-nCoV can be directly passed from a person to another person by respiratory droplets, so emerging evidence suggested that, it may also be transmitted through contact and fomites (2, 3). The severe respiratory illness caused by the COVID-19 was firstly detected in Wuhan, Hubei province, China, and infections have spread to all other regions of world (4) There is a high viral load in the nasal and oral cavity of the infected patients by this disease, which especially puts the surgeons at risk for a SARS-CoV-2 infection, especially those who are located

around this region as dentists and oral and maxillofacial surgeons (5, 6). Moreover, because of inhalation of airborne particles and aerosols produced during the oral maxillofacial surgery procedures on the patients with COVID-19, it can be considered as a high-risk procedure in which surgeons are exposed to this virus directly and closely, and have to be aware of the new challenges brought by the risk of virus transmission between the patients and medical staff. Herein, we highlighted the common procedures and triaging patients according to the degree of urgency of treatment in the field of oral and maxillofacial surgery, due to there is a limited clinical evidence about this stage, so we recommend Triage and prioritize of procedures in oral and maxillofacial surgery.

Materials and Methods

An electronic search was performed in PubMed, Embase, and Cochrane databases, which were used by the search term in this review with keywords including COVID-19, oral surgery, maxillofacial surgery, guidelines, and protective equipment. After screening, seven relevant articles were chosen and then categorized as shown in Table 1. The objective was to triage and prioritize the procedures in oral and maxillofacial surgery during the COVID-19 pandemic.

Table 1. Recommendations and guidelines for oral and maxillofacial surgery procedure during COVID-19 pandemic in 2020

Author	Year	Guidelines
M. Zimmermann <i>et al.</i>	2020	Management of surgical procedures based on the priority in the healthy subjects and COVID-19 patients and urgent and emergency procedure must be done using personal protective equipment
T. Hsieh <i>et al.</i>	2020	Facial trauma triage and precautions were prioritized.
A. Alharabi <i>et al.</i>	2020	Developing the guidelines for dental patients' management.
L.A. Boccalatte <i>et al.</i>	2020	Surgeries should be performed using personal protective equipment suitable for the high risk of aerosolization.
L. zeng <i>et al.</i>	2020	Recommendation on protection in maxillofacial surgery before, during, and after the operation.
S. P. Edwards <i>et al.</i>	2020	Recommendations in soft tissue and hard tissue's injury treatment.
M. Grant <i>et al.</i>	2020	Recommendations on the Best Practices for Maxillofacial Procedures.

Results

Although it might be easy to distinguish between elective and emergency procedures, the boundaries between the interventions of elective intermediate and urgent surgery priority can be occasionally blurred. Also, based on our experience and review of the literature, we classified the procedures in oral and maxillofacial surgery according to their priority. Commonly performed oral maxillofacial elective procedures in operative room are illustrated In chart 1 (7-17) and recommendation for the management of surgical procedures in healthy and covid 19 patient are illustrated in table 2 and 3 (7-17).

Discussion

According to the literature, the peak of the pandemic is still coming and no effective medication or vaccination is available (8-10). In some studies, it was recommended that, we must delayed low priority elective surgery until the medication or vaccination has been available (9-11). Also, in other studies, it was suggested that, elective surgery can be done when the number of infections reduces (12-14). However, our opinion because of a high risk of viral transmission in oral maxillofacial surgery procedure and low priority elective surgery must be delayed until the COVID-19 pandemic situation in the country has been insolvent and intermediate priority elective surgery can be done until pandemic situation in the country has been under control. Moreover, urgent surgery must be done under the specific condition during Covid 19 pandemic, so for this reason, prioritizing the oral maxillofacial surgery procedure and

guideline is of great importance. A number of oral surgery, maxillofacial surgery procedures are high risk owing to exposure of airway and mucosal surfaces and the possibility of generating aerosols, and there is also a risk for the transmission of this virus in oral maxillofacial surgery. So, all the elective procedures should be postponed until COVID-19 pandemic situation has been under control or insolvent based on their priority. In addition, urgent and emergency procedures in oral maxillofacial surgery must be done under the protection such as using personal protective equipment and should be performed in a designated operating room with negative pressures in COVID-19 patients (7, 8). Also, in another study, there was a guideline and strategy on triaging the procedure and emergency procedure must be done using the protective equipment (9-15). We recommended a triage and prioritizing of procedures in oral and maxillofacial surgery and certainly there are few studies on the impaction of COVID-19 in oral maxillofacial surgery procedure, so further studies are needed.

Conclusion

Maintaining the health and strength of our clinical workforce is critical to avoid the collapse of our health care system. Due to this reason, elective surgery must be Deferral of surgery until COVID-19 pandemic situation has been insolvent, and urgent and emergency surgery can be done in the patients with COVID-19 with personal equipment protection and in negative pressure operative room and also in healthy subjects with personal equipment protection.

Conflict of Interest: 'None declared'.





Table 2. Recommendations for the management of surgical procedures in oral and maxillofacial surgery in healthy subjects during the COVID-19 pandemic

Elective procedures	Recommendations
<p>Low preference: (if the patient demand to do surgery)</p> <ul style="list-style-type: none"> -Cosmetic surgery -reconstructive surgery (free graft, pedicled graft) -Temporomandibular joint surgery with the limited pain and with no limitation in mouth -Cranio maxillofacial malformations surgery -Implant surgery in native bone -Maxilomandibular advancement surgery with no severe sleep apnea <p>alveolar bone graft in the cleft patients</p>	<p>Deferral of surgery until the end of COVID-19 pandemic situation in the country</p>
<p>Low preference: (if the patient need to do surgery)</p> <ul style="list-style-type: none"> -Cosmetic surgery: if patient have a functional problem -Reconstructive surgery (free graft, pedicled graft) if patient have a functional and aesthetic problem -Temporomandibular joint surgery with the limited pain and with no limitation in mouth if there is a higher risk of disease worsen. -Cranio maxillofacial malformations surgery if patient have a functional and aesthetic problem. -Implant surgery in native bone if there is a high risk of bone resorption in future and functional problem for patient is so important. -Maxilomandibular advancement surgery with no severe sleep apnea if patient have a functional and aesthetic problem alveolar bone graft in the cleft patients if patient have a functional and aesthetic problem 	<p>Like intermediated preference we can deferral of surgery until COVID-19 pandemic situation in the country has been under control and surgery must be done in a hospital where patients with COVID-19 are not hospitalized and Surgery must be done using personal protective equipment, including: FFP2 respirator/N95 respirator, disposable sterile gown, sterile gloves, eye protection (googles / face shield), Disposable medical cap , Disposable shoe covers</p>
<p>Intermediated preference</p> <ul style="list-style-type: none"> -Closed mandibular and maxillary fracture with no functional problem -Zygomatic maxillary complex fracture with no functional problem - Zygomatic arc fracture without any functional problem <p>arch bar removal</p> <ul style="list-style-type: none"> -Benign slow growing cyct and tumor surgery -Maxilomandibular advancement surgery with no severe sleep apnea, --Temporomandibular joint surgery with severe pain and limitation in mouth opening -Cleft lip and palate surgery in golden time (after 10 weeks for lip repair, between 9-18 months for palate repair and between 3-5 years for pharyngeal flap surgery) - Implant surgery in bone graft patients (iliac and intra oral bone graft) 9-12 months after bone graft -Orthognathic and genioplasty surgery due to functional and the psychological problem 	<p>Deferral of surgery until COVID-19 pandemic situation in the country has been under control and surgery must be done in In a hospital where patients with COVID-19 are not hospitalized and Surgery must be done using personal protective equipment, including: FFP2 respirator/N95 respirator, disposable sterile gown , sterile gloves, eye protection (googles / face shield), Disposable medical cap, Disposable shoe covers</p>
Urgent procedures	Recommendations
<ul style="list-style-type: none"> Open comminuted mandibular and maxillary fractures Malignant tumors surgery Deep head and neck infections without the risk of airway obstruction closed mandibular and maxillary fracture with functional problem zygomatic maxillary complex fracture with functional problem zygomatic arc fracture with functional problem Benign fast growing cyct and tumor surgery Implant surgery in bone graft patients (iliac and intra oral bone graft) more than 12 months after bone graft. 	<p>Surgery must be done using personal protective equipment, including: FFP2 respirator/N95 respirator, disposable sterile gown, sterile gloves, eye protection (googles / face shield) , Disposable medical cap, Disposable shoe covers</p>
Emergency procedures	Recommendations
<ul style="list-style-type: none"> Deep head and neck infections with the risk of airway obstruction Ludwig angina Severe hemorrhage risk of airway Obstruction due to trauma and abscess airway management surgery (Tracheotomy cricothyrotomy) 	<p>Surgery must be done using personal protective equipment, including: FFP2 respirator/N95 respirator, disposable sterile gown, Disposable medical cap, Disposable shoe covers , eye protection (googles / face shield)</p>



Table 3. Recommendations for the management of surgical procedures in oral and maxillofacial surgery in Covid 19 patients during the COVID-19 pandemic

Elective procedures	Recommendations
Low preference : (if the patient demand to doing surgery) Cosmetic surgery -Reconstructive surgery (free graft, pedicled graft) -Temporomandibular joint surgery with the limited pain and with no limitation in mouth -Cranio maxillofacial malformations surgery -Implant surgery in native bone -Maxilomandibular advancement surgery with no severe sleep apnea alveolar bone graft in the cleft patients	Deferral of surgery until the end of COVID-19 pandemic situation in the country and recovery from COVID-19 should be confirmed.
Low preference: (if the patient need to doing surgery) -Cosmetic surgery: if patient have a functional problem -Reconstructive surgery (free graft, pedicled graft) if patient have a functional and aesthetic problem -Temporomandibular joint surgery with the limited pain and with no limitation in mouth if there is a higher risk of disease worsen. -Cranio maxillofacial malformations surgery if patient have a functional and aesthetic problem. -Implant surgery in native bone if there is a high risk of bone resorption in future and functional problem for patient is so important. -Maxilomandibular advancement surgery with no severe sleep apnea if patient have a functional and aesthetic problem -Alveolar bone graft in the cleft patients if patient have a functional and aesthetic problem	Like Intermediated preference we can Deferral of surgery until COVID-19 pandemic situation in the country and has been under control and recovery from COVID-19 should be confirmed and surgery must be done in In a hospital where patients with COVID-19 are not hospitalized and Surgery must be done using personal protective equipment, including: FFP2 respirator/N95 respirator, disposable sterile gown, sterile gloves, eye protection (goggles / face shield), Disposable medical cap, Disposable shoe covers
Intermediated preference: -Closed mandibular and maxillary fracture with no functional problem -Zygomatic maxillary complex fracture with no functional problem -Zygomatic arc fracture without any functional problem arch bar removal -Benign slow growing cyct and tumor surgery -Maxilomandibular advancement surgery with no severe sleep apnea, Temporomandibular joint surgery with severe pain and limitation in mouth opening -Cleft lip and palate surgery in golden time (after 10 weeks for lip repair, between 9-18 months for palate repair, and between 3-5 years for pharyngeal flap surgery) - Implant surgery in the bone graft patients (iliac and intra oral bone graft) 9-12 months after bone graft -Orthognathic and genioplasty surgery due to the functional and psychological problem	Deferral of surgery until COVID-19 pandemic situation has been under control in the country and recovery from COVID-19 should be confirmed and surgery must be done in In a hospital where patients with COVID-19 are not hospitalized and Surgery must be done using personal protective equipment, including:FFP2 respirator/N95 respirator, disposable sterile gown, sterile gloves, eye protection (goggles / face shield), Disposable medical cap, Disposable shoe covers
Urgent procedures	Recommendations
-Open comminuted mandibular and maxillary fractures -Malignant tumors surgery -Deep head and neck infections without the risk of airway obstruction -Closed mandibular and maxillary fracture with functional problem zygomatic maxillary complex fracture with functional problem zygomatic arc fracture with functional problem -Benign fast growing cyct and tumor surgery implant surgery in the bone graft patients (iliac and intra oral bone graft) more than 12 months after bone graft	Surgery must be done in negative pressure operative room using personal protective equipment, including: FFP3 respirator/N99 respirator, disposable sterile gown, Disposable medical cap ,sterile gloves, eye protection (goggles / face shield), Disposable shoe covers
Emergency procedures	Recommendations
-Deep head and neck infections with the risk of airway obstruction -Ludwig angina - Severe hemorrhage - Risk of airway Obstruction due to trauma and abscess -Airway management surgery (Tracheotomy cricothyrotomy)	Surgery must be done in negative pressure operative room using personal protective equipment, including: FFP3 respirator/N99 respirator, disposable sterile gown, sterile gloves, Disposable medical cap, eye protection (goggles / face shield), Disposable shoe covers



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