

# An innovative 'Prop technique' of mouth opening in post-COVID-19 mucormycosis maxillectomy: Finding a new way with minimal efforts

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## ABSTRACT

General anaesthesia is associated with damage to teeth, particularly during laryngoscopy. Dental injury is more probable when pre-existing dental pathology or risk factors are present. Post-coronavirus disease -2019 mucormycosis is a rare, fulminant, lethal, angio-invasive, opportunistic fungal disease and is increasingly recognised in diabetic and immunocompromised patients. Since the flange of the laryngoscope blade appears to be the source of tooth injury, alternate methods of wide mouth opening during laryngoscopy should be examined, especially when mouth opening is limited. In this case series, we have studied 12 cases of maxillectomies with an aim to improve restricted mouth opening by using the 'Prop technique' resulting in a minimum hinging force of the flange of the blade on teeth. Preoperatively, patients were warned about the possibility of dental injuries during anaesthesia or surgery.

**Key words:** Coronavirus, general anaesthesia, laryngoscopy, mouth opening, mucormycosis, prop, risk factors

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## INTRODUCTION

Dental trauma in anaesthesia is a relevant issue concerning morbidity and litigations.<sup>[1]</sup> Diseased bone is prone to dental trauma during anaesthesia procedures like laryngoscopy, throat packing and nasogastric tube insertion. post-coronavirus disease (COVID)-19 mucormycosis is a lethal disease that invades the maxilla and palate leading to dental injuries.<sup>[2]</sup> Considering these problems and limited data on techniques for mouth opening, it is necessary to establish standardised strategies. In this prospective series, we describe the 'Prop technique' of bite block with the scissoring method to reduce harm, adding to the overall limited experience with bite block.

## CASE DESCRIPTION

Twelve cases of mucormycosis maxillectomy were performed in our tertiary medical college hospital through May–June 2021. All patients with American

Society of Anesthesiologists (ASA) IIE to IVE physical status were included in this prospective case-series after obtaining informed consent and approval from the institutional review board.

Patients with submucosal fibrosis, tympano-mandibular joint ankylosis, left molar injuries, and those who did not give their consent were excluded. Following standard preoperative examination, the post-COVID-19 sequelae and multiorgan problems were given specific focus.<sup>[3,4]</sup> Cone-beam computed

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tomography (CBCT) images were taken for maxillary involvement.<sup>[5]</sup>

Of the 12 cases, two male patients aged 42 and 53 years with ASA physical status III were referred for post-COVID-19 mucormycosis partial maxillectomy immediately after endoscopic sinus surgery. Both recovered from coronavirus infection and diabetes mellitus was diagnosed in both of them. They manifested with maxillary swelling, palatal lesion, restricted and painful mouth opening along with loose upper incisors, and thus, a difficult airway was anticipated [Figure 1a]. CBCT images revealed severe maxillary osteolytic lesions [Figure 1b]. Perioperative preparation included optimisation of deranged blood sugars, hypotension and hypokalaemia due to ongoing antifungal therapy.

All the cases were performed using standardised institutional protocol and safety precautions. Standard ASA monitors were attached. The airway was compromised in all these patients, and hence, the difficult intubation cart was kept ready. Premedication was done with intravenous (i.v.) glycopyrrolate 4 µg/kg, i.v. midazolam 0.03 mg/kg and i.v. fentanyl 2 µg/kg. After preoxygenation, induction was done with i.v. propofol 2 mg/kg.

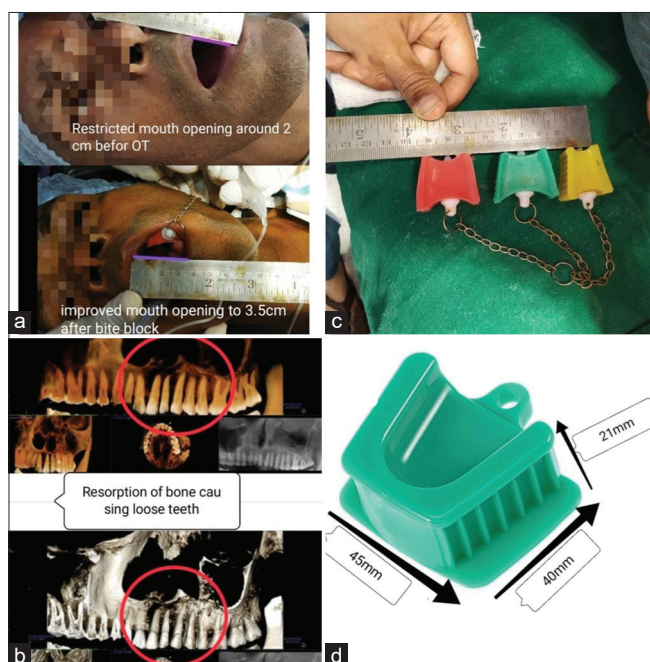
Injection succinylcholine 1.5–2 mg/kg was used as a relaxant.

In all the 12 cases, following routine induction, the mouth was opened using the scissoring method with the left hand. A green-coloured dental bite block with serrations on the molar side was inserted using the right hand between the left upper and lower molars [Figures 1c and 1d]. This bite block kept the mouth opening patent, leaving the left hand free to insert the laryngoscope and the right hand free to hold the endotracheal tube. After using green-coloured bite block, the mouth opening improved by an average of 0.5–1.5 cm [Figure 1a]. Gentle laryngoscopy was performed with the conventional blade from the right side of the mouth and the patient was intubated with a flexometallic tube and throat packed uneventfully. Patients were maintained on inhalational isoflurane, 50% air:oxygen and iv vecuronium 0.08–0.1 mg/kg. On completion of the surgery, haemostasis was confirmed and the throat pack was removed. A nasogastric tube was inserted, the neuromuscular blockade was reversed and after ascertaining adequate muscle power, patients were extubated and shifted to recovery room with oxygen. The postoperative period was monitored either in the ward or in the intensive care unit depending upon the clinical condition of the patients.

It took just few seconds for insertion of the bite block after which the mouth opening improved [Table 1]; intubation was uneventful in all the cases and was performed successfully and atraumatically by experienced anaesthesiologists.

## DISCUSSION

Dental damage is a stereotypical adverse effect of general anaesthesia, especially when anaesthesiologists and surgeons collaborate. All patients should be acquainted with dental injury during the preanaesthetic evaluation, particularly when difficult intubation is anticipated or preexisting dentition such as loose teeth, unstable crowns or intraoral prosthesis exist.<sup>[6]</sup> Apart from laryngoscopy-induced dental damage, other contributing factors include aggressive suctioning in posterior mouth, oropharyngeal airway and biting of endotracheal tube during emergence from anaesthesia.<sup>[7]</sup> There is preponderance of the maxillary left central incisor to damage, according to the majority of anaesthesiologists.<sup>[5]</sup> The early incidences of mucormycosis maxillectomies activated a search with



**Figure 1:** (a) Preoperatively, the patient had a restricted mouth opening of 2 cm, which improved to 3.5 cm after the red coloured bite block was inserted during induction (b) Cone-beam computed tomography reveals maxillary resorption at the root of the teeth, resulting in loose teeth (c) Three different colours and sizes of bite blocks (d) Size of the green bite block

**Table 1: Patient demographics, ASA status, type of surgery, dental and mouth opening status**

Age/Sex	Diagnosis and surgery	ASA status	Preoperative mouth opening and dental status	Mouth opening after bite block
42 years/ Male	Post COVID mucor-mycosis partial maxillectomy	III (E)	Restricted painful mouth opening of 2.5 cm and painful loose teeth (upper incisors)	3.5 cm (green bite block)
53 years/ Male	Post COVID mucormycosis partial maxillectomy	III (E)	Restricted painful mouth opening of 3 cm and painful loose teeth (upper jaw)	4.2 cm (green bite block)
65 years/ Male	Post COVID mucormycosis complete maxillectomy	III (E)	Restricted painful mouth opening of 3 cm and painful loose teeth (upper incisors)	4.2 cm (green bite block)
59 years/ Male	Post COVID mucormycosis partial maxillectomy	IV (E)	Restricted painful mouth opening of 2.8 cm and teeth pain (upper jaw)	4 cm (green bite block)
52 years/ Male	Post COVID mucormycosis partial maxillectomy with debridement	III (E)	Restricted painful mouth opening of 2.5 cm and loose painful teeth (upper right jaw)	3.8 cm (green bite block)
60 years/ Male	Post COVID mucormycosis partial maxillectomy	III (E)	Restricted painful mouth opening of 3.5 cm and teeth pain (left upper canines)	4 cm (green bite block)
78 years/ Male	Post COVID mucormycosis partial maxillectomy	III (E)	Restricted painful mouth opening of 3 cm and loose teeth (upper right jaw)	4 cm (green bite block)
74 years/ Female	Post COVID mucormycosis partial maxillectomy	III (E)	Restricted painful mouth opening of 2.5 cm and loose teeth (upper right incisors and canine)	3.5 cm (red bite block)
52 years/ Male	Post COVID mucormycosis partial maxillectomy with debridement	III (E)	Restricted painful mouth opening of 3.2 cm and painful and loose teeth (upper left canine)	4 cm (green bite block)
57 years/ Female	Post COVID mucormycosis partial maxillectomy with debridement	III (E)	Restricted painful mouth opening of 3 cm and painful loose teeth (upper right incisors and premolar)	3.6 cm (red bite block)
35 years/ Male	Post COVID mucormycosis partial maxillectomy with debridement	II (E)	Restricted painful mouth opening of 2.5 cm and painful loose teeth (upper right jaw)	3.2 cm (green bite block)
50 years/ Female	Post COVID mucormycosis partial maxillectomy with debridement	III (E)	Restricted painful mouth opening of 3.2 cm and painful loose teeth (upper left incisors)	4 cm (red bite block)

ASA: American Society of Anesthesiologists; COVID: Coronavirus disease

a course of action to lessen the traumatic consequences.

Mucormycosis is an opportunistic fungus that has a mortality rate of 35–96% after COVID-19.<sup>[8]</sup> The presence of fungus in the bone marrow causes vascular insufficiency, leading to bone deterioration and fungal osteomyelitis.<sup>[5]</sup> Facial swelling, decreased mouth opening, facial palsy, palatal involvement, epiglottitis, supraglottic oedema and fungal debris in the oropharyngeal region in these patients contribute to a difficult airway.<sup>[5]</sup> Many of these were present in the cases in this case series and CBCT assisted in determining the extent of maxillary resorption [Figure 1b] in them and their dental status.

Nasal intubation is usually preferred for dental surgeries, but it is avoided in postcoronavirus mucormycosis maxillectomy cases, as when these patients undergo maxillectomy following endoscopic

sinus surgeries, the exposed vasculature can cause bleeding.<sup>[7]</sup> Though awake fiberoptic intubation is still the gold standard, it is usually avoided due to the fear of aerosolisation to healthcare personnel. A video laryngoscope is an alternative technique, but we developed 'prop technique' due to cost concerns in infective surgeries. Even with standard laryngoscopy, we believe that a dental bite block will be more beneficial. It will keep the mouth open and patent, requiring only a small amount of force to lift the epiglottis with minimum hinging on upper incisors.

Dental bite blocks are available as big green: 45 × 40 × 21 mm, medium red: 40 × 35 × 17 mm and smallest yellow: 35 × 34 × 16 mm [Figure 1c and d]. A metallic chain connects all three blocks for visibility and to prevent dislodgement in the oral cavity.<sup>[9]</sup> It is simple to insert between the left upper and lower molars with one hand due to flexibility. The serrations

on the block guide to stabilise and promote mouth opening [Figure 1d]. It is easy to disinfect these bite blocks. We preferred green and red-coloured bite blocks; however, if both are not fitting, the yellow block can be used.

Numerous modified laryngoscope blades, such as the Bizzari-Guffrida, the Bucx modification of the Macintosh, the Bellscope and the Callender blades,<sup>[6]</sup> are available to prevent tooth damage.<sup>[9,10]</sup> Mouthguards were previously used to protect teeth from injury, but they restrict direct visibility of the glottis, making it more difficult to guide the endotracheal tube into the larynx. This possible 'prop technique' will eliminate the drawbacks for above-mentioned gear.

The triple manoeuvre and the scissoring approach are additional ways to open the mouth for laryngoscopy, but a dental bite block keeps the mouth open and patent. In low-resource settings, a dental bite block is readily available, inexpensive, stays between the molars due to its smaller size, not obstructing the laryngoscopic view and also not coming in the way of the endotracheal tube. We propose that the prop technique developed for mucormycosis maxillectomy can effectively overcome anticipated dental trauma.

The dental bite block has various limitations. If not used carefully and correctly, it can cause tooth loosening or gum injury and get dislodged during incorrect laryngoscopy. It is not effective in preventing lip injuries and inserting it may be time consuming in inexperienced hands.

It is likely that this 'prop technique' could become a novel way of performing laryngoscopy in routine oropharyngeal surgeries.

## CONCLUSION

The 'prop technique' of conventional laryngoscopy can comfortably and effortlessly conquer predicted dental issues in mucormycosis maxillectomy procedures.

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## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity but anonymity cannot be guaranteed.

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## Conflicts of interest

There are no conflicts of interest.

## REFERENCES

1. Vaibhav Sahni. Dental considerations in anaesthesia. *JRSM Opne* 2016;7:1-5. doi: 10.1177/2054270416675082.
2. Saldanha M, Reddy R, Vincent MJ. Paranasal mucormycosis in COVID-19 patient. *Indian J Otolaryngol Head Neck Surg* 2021;1-4. doi: 10.1007/s12070-021-02574-0.
3. Ali S, Athar M, Ahmed SM. Basics of CPB. *Indian J Anaesth* 2019;49:257-62.
4. Gupta KK, Singh A, Kalia A, Kandhola R. Anaesthetic considerations for post-COVID-19 mucormycosis surgery- A case report and review of literature. *Indian J Anaesth* 2021;65:545-7.
5. Sai Krishna D, Raj H, Kurup P, Juneja M. Maxillofacial infections in Covid-19 era—actuality or the unforeseen: 2 case reports. *Indian J Otolaryngol Head Neck Surg* 2021;2:2-5.
6. Owen HI, Smith W. Review dental trauma associated with anaesthesia. *Anaesth Intensive Care* 2000;28:133-45.
7. Hooli SA, Gadre VN, Bage S, Gilvarkar MD. The aftermath of COVID-19 pandemic: Rhino-orbital mucormycosis. *Indian J Anaesth* 2021;65:548-53.
8. Kulkarni PK, Reddy NB, Shrinivas B, Takkalki VV. Anesthetic considerations in the management of mucormycosis. *Int J Med Public Health* 2015;5:387-90.
9. Jawa A, Srinivasan I. Comparison of optragate and conventional bite block as mouth opening aids in children. *J Dent Med Sci* 2016;15:44-9.
10. Singh M. A Simple though tricky way of managing dislodged tooth under general anaesthesia. *J Anesth Intensive Care Med* 2018;5:3-5.