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VIEWPOINT

Reducing Aerosol Transmission of SARS-CoV-2 in Craniomaxillofacial Osteosynthesis

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INTRODUCTION

The current COVID-19 pandemic, accompanied by a wave of medical emergencies across the globe, has caused an unprecedented healthcare crisis, putting both health care providers and their patients at a high risk.[1] Aerosol-generating procedures, especially from the aerodigestive tract, carry a serious risk of infection and calls for a better understanding of these procedures to mitigate the associated risks.[2,3] Maxillofacial surgical procedures are known to generate significant amounts of aerosols and require specific measures beyond the conventional personal protective equipment to reduce exposure.[4]

The new norms, guidelines, and safety recommendations from governing/professional bodies of oral and maxillofacial surgery in India are comprehensive in their length and breadth, and they allow elective procedures. However, the concerns regarding the safety of many routine aerosol-generating procedures have not yet been addressed. Evidence suggests that inoculation with a high initial viral load may result in more severe patterns of infection,[3] calling for innovative aerosol reduction methods during these procedures.

In the maxillofacial practice, osteosynthesis is one of the most commonly undertaken procedures. Considering the high aerosol generation during osteosynthesis, it is recommended that an intermaxillary fixation be performed under local anesthesia. However, in most cases, intermaxillary fixation becomes infeasible due to poor patient compliance, thereby triggering unfavorable outcomes.[4]

An innovative method of drill activation has recently been proposed. The drill tip, if completely immersed in saline, is known to considerably reduce aerosol generation.[4] The method suggests operative fields be fully submerged in saline before drill activation, and the saline be suctioned away before screw placement. However, this method has certain limitations. Firstly, effective submersion of saline is possible only in lower and upper muco-buccal pouch, thereby limiting its utility or mandible fracture fixation and occasionally anterior maxilla. Secondly, the submersion technique risks endanger adjacent vital structures (mental nerve, facial artery, etc) due to poor control and visibility.

TECHNICAL NOTE

One of the challenges during maxillofacial osteosynthesis is the aerosolization through the use of drills that create aerosols; the splatters that are ejected from the operating site in a ballistic trajectory contaminate the

Fig. 1. Osteosynthesis on fibula flap without cannula showing aerosol production.

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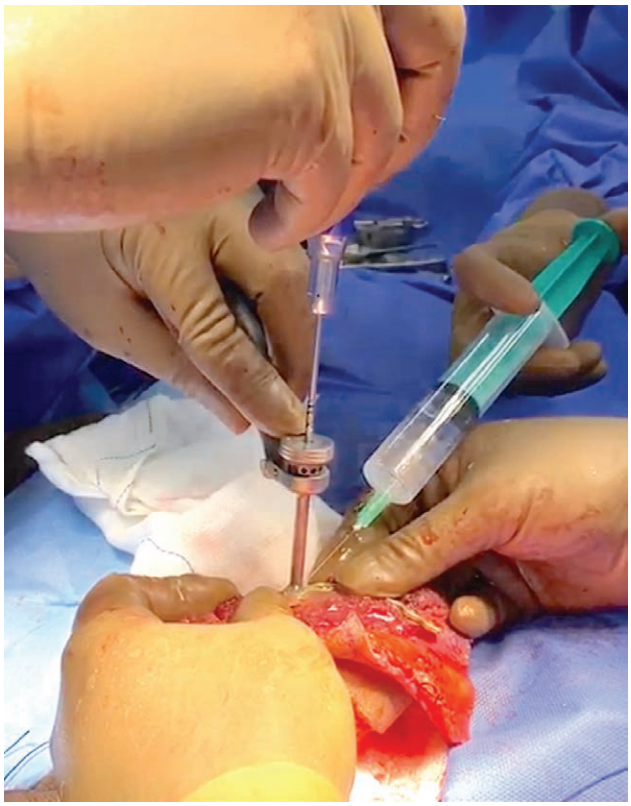

Fig. 2. Osteosynthesis on fibula flap with cannula showing less aerosol production.

operator and the operating cubicle, thereby increasing the risk of virus exposure.[5] Furthermore, in some patients, drilling alongside the nerve and posterior part of the oral cavity becomes a key challenge.

We suggest, as an alternative, using the cannula or the trocar sleeve of a transbuccal set as a "drill sleeve" to efficiently reduce the aerosol production and yet protect the vital structures and improve the control over drill (Figs. 1, 2). (**See Video [online],** which demonstrates aerosol production with and without drill sleeve.) The trocar sleeve is ergonomically designed to be used by the surgeon's non-operating hand and allows safe drilling even in the non-accessible bony surfaces in the oral cavity. If used, the drill sleeve with saline immersion technique can efficiently reduce aerosolization. Additionally, it can be easily used for fractures in the head and neck regions and also on the bony surfaces with vital structures in its close proximity. The guide helps in decreasing the use of other retractors, and thereby reducing traction on the adjacent soft tissue.[5] Further, when used with saline immersion method, safe drilling is ensured even with an obscure view.

CONCLUSIONS

We have found that the use of the drill sleeve (cannula) is a simple, cost-effective, and reliable method to minimize aerosol generation during surgical procedures. The drill sleeve method can be used in conjunction with the saline submerged drilling technique to further reduce the aerosol generation. Although the described method is not being prescribed as a surrogate to proper protective measures, nor does it condone the need for further studies to conclusively prove its efficacy, it can be considered as a potent alternative to reduce the aerosol production, especially given the severity of the Covid-19 crisis, which affects us on a day-to-day basis.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

REFERENCES

1. Patel NA, Ji YD, Odera SL. The role of oral and maxillofacial surgeons in COVID-19 response. *J Oral Maxillofac Surg.* 2020;78:1052–1053.
2. Howard BE. High-risk aerosol-generating procedures in COVID-19: Respiratory protective equipment considerations. *Otolaryngol Head Neck Surg.* 2020;163:98–103.
3. Grant J, Shafi A, Halsnad M. Aerosol prevention in osteosynthesis for maxillofacial trauma – a technical note. *Br J Oral Maxillofac Surg.* 2020;58:721–722.
4. Kerawala C, Riva F. Aerosol-generating procedures in head and neck surgery – can we improve practice after COVID-19? *Br J Oral Maxillofac Surg.* 2020;58:704–707.
5. Morawska L, Cao J. Airborne transmission of SARS-CoV-2: The world should face the reality. *Environ Int.* 2020;139:105730.