

Cover Page

Dual Purpose Easily Assembled Aerosol Chamber Designed for Safe Endoscopy and Intubation during COVID Pandemic

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Gastrointestinal endoscopy, particularly those performed through the oral route, is considered aerosol-generating procedures. These can potentially risk endoscopists, anesthetists, and other healthcare personnel [1,2]. The transmission can be interrupted by the proper use of personal protective equipment and by performing the endoscopy in a negative pressure room [3]. However, these may not always be readily available. Aerosol chambers have been used recently to reduce the spread of the virus during endotracheal (ET) intubation [4] and used as endoscopic shield while performing endoscopy [5].

A prototype aerosol chamber has been designed by Mahindra and Mahindra, Mumbai, with a provision for both safe endoscopy as well as intubation. Essentially, the chamber consists of four medical grade 4 mm thick Polycarbonate sheets, which can be assembled easily into an airtight box with four sides closed [Fig. 1]. It has four holes, two on the head side of the chamber, and one each of the side walls. These holes are covered with replaceable stickers made of thin plastic film, which are easily pierceable [Fig. 2]. The holes at the head-end are used for endotracheal intubation [Fig. 3] and one on the left, for endoscope introduction [Fig. 4]. The height of the chamber allows the manipulation of the laryngoscope to facilitate endoscopic intubation. During endoscopy, holes on the head end can also be used for stabilizing the patient [Fig. 5]. After the endoscopy, the chamber can be dismantled, and sheets can be sanitized before reuse. New plastic stickers are then used to cover the holes in the chamber. Our technique [video 1] is simple, safe, and quick. In patients not requiring ET intubation, we additionally use a modified face mask on the patient, after creating a small opening in its center, allowing for

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4 placement of the mouthguard through it [Fig. 6]. The approval from institutional
5 IRB was taken on 09.05.2020
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9 This aerosol chamber has the advantage of low cost (50 USD), easy
10 transportability, rapid reassembly, reusability after sanitization, and ease for
11 endotracheal intubation as well as endoscopy.
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4 **Footnotes**

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6 **Author contributions:**

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8 **M K Goenka** - served as project principal investigator, and supervised the overall
9 conduct of the study; developed the study concept and design, drafting of the
10 manuscript and critical revision of the manuscript. **Shivaraj Afzalpurkar** -
11 assisted with material support, acquisition of data, and drafting of the manuscript.
12 **Surabhi Jajodia** - assisted with the study concept and design, acquisition of data,
13 editing the video and drafting of the manuscript. **Bhavik Bharat Shah** - assisted
14 with writing-review and editing of the manuscript. **Indrajeet Tiwary and Saikat**
15 **Sengupta**- assisted with admistering the anesthesia during the procedure and
16 editing the manuscript. All authors provided final approval of the article prior to
17 submission.
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4 **LEGENDS**
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6 Fig. 1 – Designs and dimension of the Dual-purpose Aerosol Chamber.
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8 Fig. 2 – Aerosol Chamber demonstrating the different holes.
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10 Fig. 3 – Endotracheal intubation done through the 2 holes at the head end
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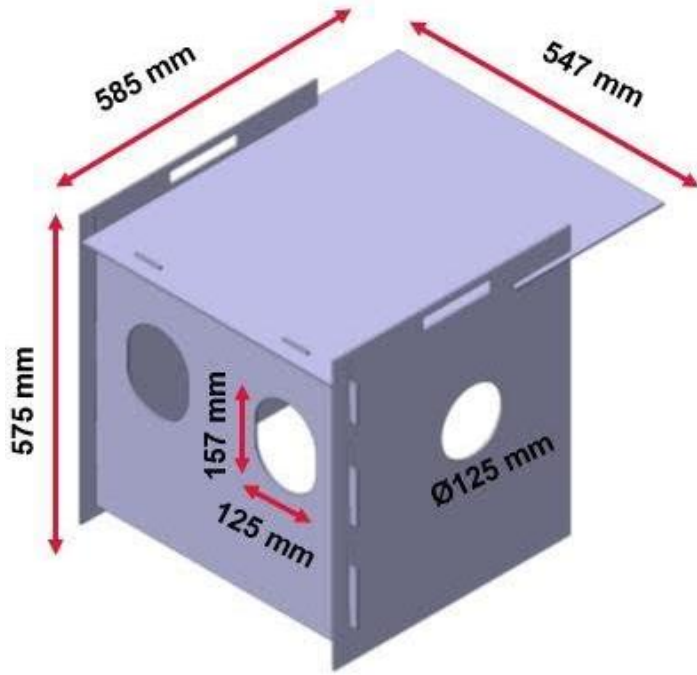
12 Fig. 4 – Endoscope piercing the hole at the left side wall
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14 Fig. 5- Endoscopist performing the procedure through the hole at the left side wall
15 and the assistant stabilizing the patient by his hands through two holes from the
16 head end
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20 Fig. 6 - Modified mask to allow positioning of mouth guard
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27 Video 1 – Design, dimensions and technique of use of the Dual-purpose Aerosol
28 Chamber.
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Fig 1



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Fig 2



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Fig 4



Fig. 5



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Fig. 6

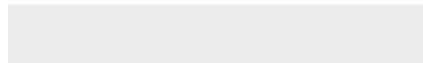


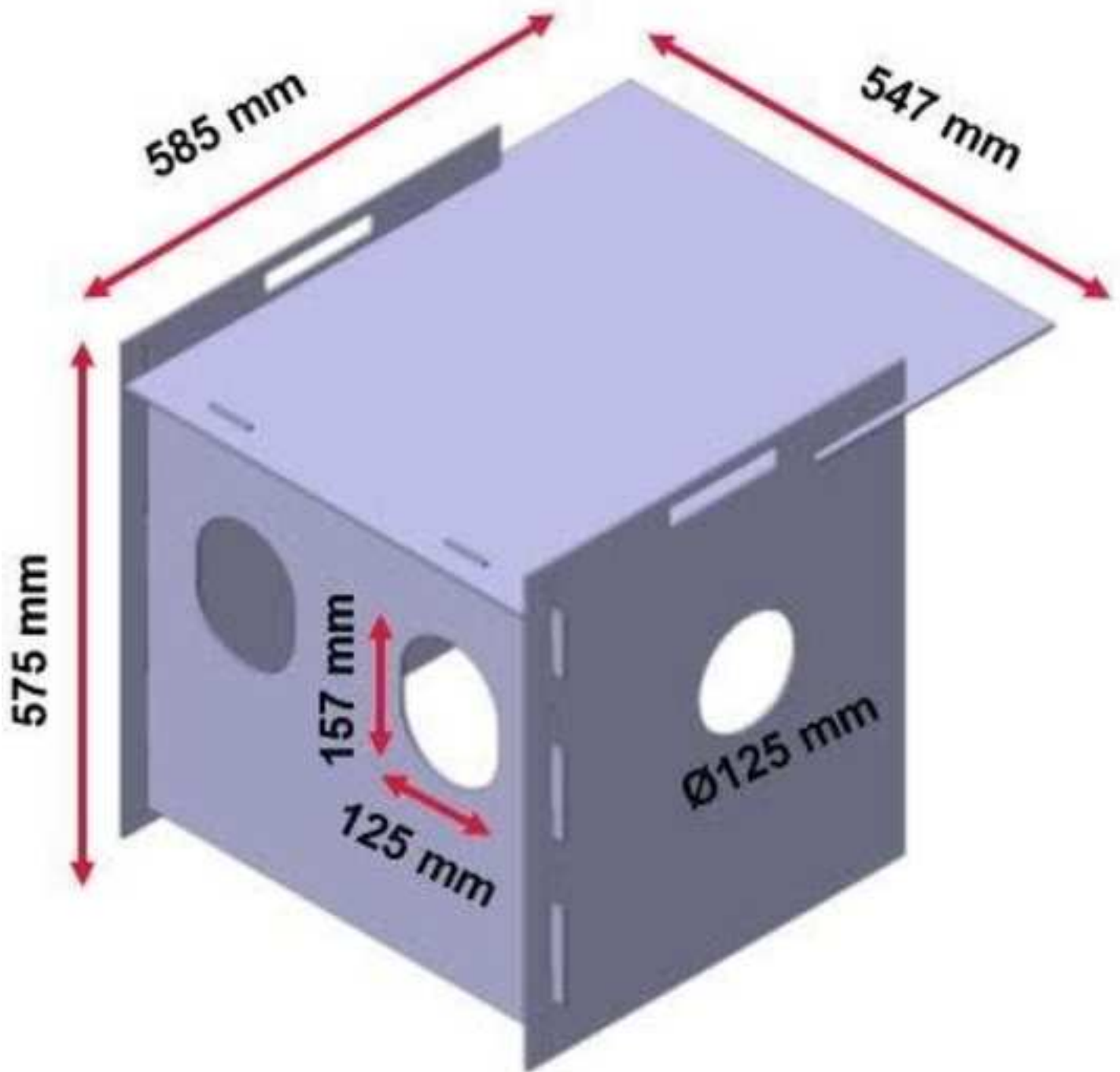
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Acronyms and Abbreviations

1. COVID- Coronavirus Disease
2. ET- Endotracheal
3. HCP- Health care personnel
4. PPE- Personal protective equipment