




# Novel and economical apparatus to decrease direct droplet exposure during endoscopy in the ongoing COVID-19 pandemic: A hypothesis-generating innovation

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The Corona Virus Disease (COVID)-19 pandemic has brought unprecedented challenges upon the health care system. Up to 20% of health care workers involved in the direct care of COVID-19 patients have been infected [1]. Of all the challenges faced by a gastroenterologist, endoscopy poses the maximum risk. Endoscopy is an aerosol-generating procedure with a significant, apparently unrecognized, droplet exposure [2]. Most guidelines [3–5] recommend deferring elective procedures, whereas pre-procedural screening, adequate usage of personal protective equipment, and strict infection control protocols are essential before emergency procedures. All protocols are dedicated to reducing exposure to droplet [6]; however, there is an unmet need in the ways to decrease the droplet expulsion at the patient level.

We have designed a novel apparatus made out of commonly available items to reduce direct droplet exposure to the endoscopist during various endoscopic pro-

cedures. Our apparatus consists of a transparent plastic sheet sandwiched between two surgical masks, with a hole in the center to accommodate the mouth guard, and a long camera cover sleeve attached to the front (Fig. 1). The mouth guard is then positioned in the mouth of the patient, and the apparatus completely covers the patient's face, including the mouth and the nose (Fig. 2). The ties of the masks are tied behind the patient to secure it in position. Endoscopy can then be carried out by inserting the endoscope through the distal end of the camera cover sleeve (Supplementary Video). The endoscopy assistant holds the distal end of the camera cover during the entire procedure and at the time of withdrawal of the endoscope, thus preventing any escape of droplets generated during the procedure. After removal of the endoscope, the mouth guard is removed and sterilized with glutaraldehyde for reuse, according to standard protocols. The remaining apparatus is discarded. The entire apparatus (excluding the mouth guard) costs approximately rupees (0.5 \$).

This apparatus is economical and can be easily assembled using readily available items in the endoscopy suite. This is a hypothesis-generating innovation, and its efficacy to prevent the transmission of infection needs to be proven by appropriately designed studies before it can be used in practice. The clinical utility of the apparatus can be further explored in the current scenario, especially in the resource constrained settings.

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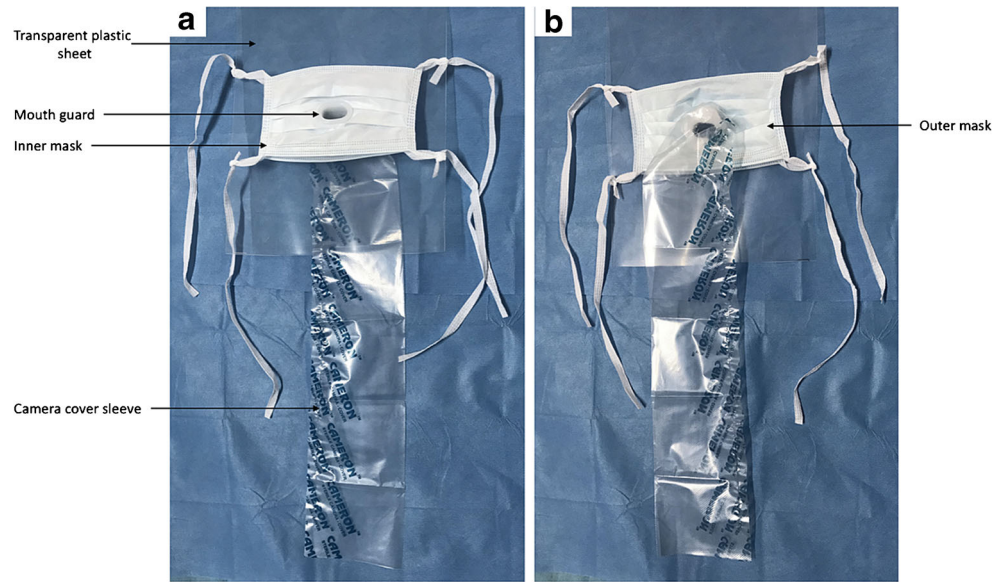
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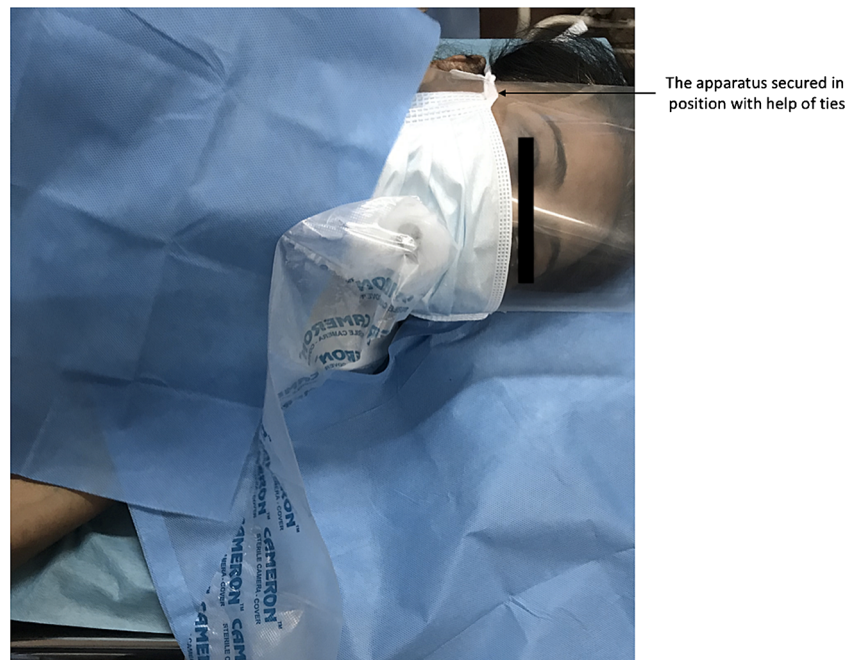
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**Fig. 1** The apparatus consisting of a mouth gag, surgical masks, a transparent sheet, and a camera cover as seen from the inner side (a) and the outer side (b) of the mouth guard



**Fig. 2** The apparatus as applied on the patient



## Compliance with ethical standards

**Conflict of interest** AA, AA, DG, and AS declare that they have no conflicts of interest.

**Informed consent** Obtained

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