



## Endoscopy during the COVID-19 pandemic: simple construction of a single-use, disposable face shield using inexpensive and readily available materials

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To date, the COVID-19 pandemic has infected over 1.5 million people globally, despite all efforts to control its transmission, and has had wide-reaching negative consequences. Personal protective equipment, so vital to the protection of medical staff on the frontline, is universally in short supply, regardless of a production step-up in an attempt to meet the ever-increasing international demand.

A critical component of personal protective equipment, especially required for endoscopy, is the face shield (visor), which is designed to reduce the risk of exposure to potentially infective droplets through splashing.<sup>1-8</sup> Unfortunately, during the COVID-19 pandemic, face shields are particularly in very short supply. Although most commercially available face shields are designed for single use, the global shortage has driven frontline healthcare professionals to resort to reuse after attempted “cleansing” with disinfecting wipes.

Given the international shortage/unavailability of face shields, in an attempt to mitigate the risks associated with the reuse of face shields designed for single use, we have developed a very easy and quick method of constructing disposable, single-use face shields with simple, inexpensive, and readily available materials.

### SIMPLE FACE SHIELD MATERIALS

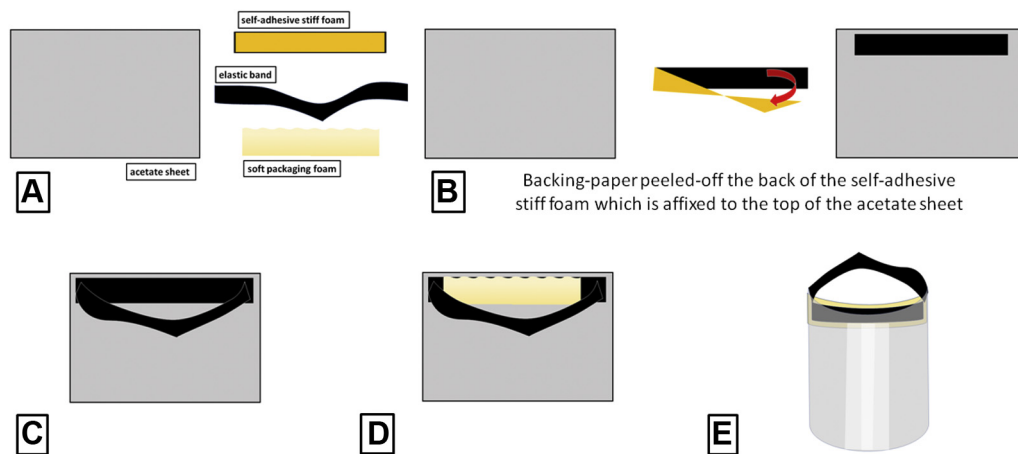
For the construction of an effective, single-use, disposable face shield, we sourced inexpensive, simple, and readily available materials online. These consisted of (1) an A4 generic acetate sheet (produced for overhead projectors; eg, Hartwii Inkjet OHP Film, Hartwii Imaging Materials, China), (2) a strip of self-adhesive stiff foam (eg, Kompriband Foam Sealing Tape, Ramsauer GmbH & Co KG, Germany), (3) a 2.0-cm wide

**TABLE 1. Materials required with examples of their manufacturers, all sourced online**

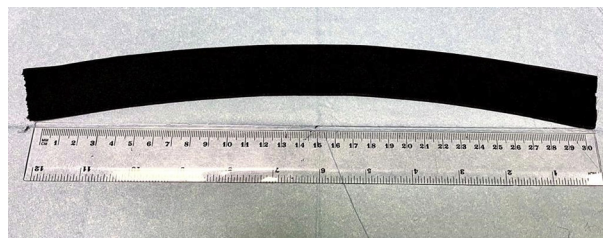
Material	Example of manufacturer
A4 generic acetate sheet (produced for overhead projectors)	Hartwii Inkjet OHP Film
Strip of self-adhesive stiff foam	Kompriband Foam Sealing Tape
32- × 2.0-cm elastic band	Generic Tailoring Elastic Band roll (2.0 cm × 40 m)
A piece of generic soft packaging foam, 30 × 30 × 20 mm	HMF 1458-30 Cubed Foam, 30 mm
1 small bottle of 20-g cyanoacrylate glue (superglue)	Everbuild HV20 Superglue, 20 g



**Figure 1.** **A.** Affixing a self-adhesive stiff foam strip to the A4 acetate sheet. **B.** Affixing the ends of the 32- × 2-cm elastic band to the stiff foam strip and A4 acetate sheet with cyanoacrylate glue. **C.** Affixing the piece of packaging foam to the stiff foam strip and acetate sheet with cyanoacrylate glue.



**Figure 2.** **A**, Schematic stepwise construction of the face-shield: materials needed. **B**, Affixing a self-adhesive stiff foam strip to the A4 acetate sheet. **C**, Affixing the ends of the elastic band to the stiff foam strip and A4 acetate sheet with cyanoacrylate glue. **D**, Affixing the piece of packaging foam to the stiff foam strip and A4 acetate sheet with cyanoacrylate glue. **E**, Fully constructed, simple, inexpensive face shield.



**Figure 3.** Elastic band (2 cm wide and approximately 32 cm long, one size fits all).

elastic band (eg, Elastic Band, 2.0-cm × 40-m roll), (4) a piece of generic, soft packaging foam (eg, HMF 1458-30 Cubed Foam, 30 mm), and (5) cyanoacrylate glue (superglue; eg, Everbuild HV20 Superglue, Everbuild, Leeds, UK, 20 g) (Table 1). By using these items as described in the following 3-step sequence and as demonstrated in our short video (Video 1, available online at [www.VideoGIE.org](http://www.VideoGIE.org)), each individual disposable face shield would cost around £1.57 (\$1.95 USD) or even less (Figs. 1 and 2).

### SIMPLE FACE SHIELD STEPWISE CONSTRUCTION

**Step 1**—Affixing the strip of self-adhesive stiff foam to the A4 acetate sheet: The backing paper is peeled off the back of the self-adhesive stiff foam, which is affixed to the top of the lengthwise side of the A4 acetate sheet (Figs. 1A and 2B).

**Step 2**—Affixing the elastic band to the A4 acetate sheet (~32-cm long, one size fits all) (Fig. 3): Using a couple of drops of cyanoacrylate glue (superglue), affix the ends of the elastic band to the A4 acetate sheet,

beneath the ends of the self-adhesive strip of stiff foam (Figs. 1B and 2C).

**Step 3**—Affixing the piece of packaging foam to the stiff foam strip and A4 acetate sheet: Using a line of cyanoacrylate glue (superglue), affix the piece of packaging foam to the strip of stiff foam (Figs. 1C and 2D).

After waiting briefly for the glue to rapidly dry, the simple face shield is ready to be worn (Figs. 2E and 4). This stepwise construction of the face shield is clearly demonstrated in Video 1. This short instructive video demonstrates the construction of a single-use, disposable face shield using simple, inexpensive, and readily available materials when purpose-built, commercially prepared face shields are unavailable or in short supply.

### DISCLOSURE

*Drs Despott and Murino receive research support from Aquilant Medical and Fujifilm and educational support from Olympus and Pentax Medical. All other authors disclosed no financial relationships.*



**Figure 4.** Simply constructed, inexpensive face shield, ready for use.

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