

LETTER



WILEY

Thinking outside the box in COVID-19 era—Application of modified aerosol box in dermatology

Dear Editor,

The novel coronavirus disease (COVID-19) since its origin in Wuhan, China in late December 2019 has rapidly spread to infect a large proportion of the world population, over a span of few months. The World Health Organization (WHO) declared COVID-19 as a pandemic on 12 March 2020.¹ The primary mode of spread of infection is through aerosols, where the virus is dispersed in respiratory droplets while the patient coughs or sneezes. This can infect another person directly, through inhalation of infected droplets, or indirectly, on coming in contact with infected fomites.² Therefore, to break the chain of transmission, social distancing, regular hand washing, and avoidance of touching the face are advocated on a general basis. In addition, health care workers, who have a high chance of acquiring the infection from infected patients, are advised to follow extra precautions like donning personal protective equipment (PPE).³ However, with the rapid spread of infection, there is a gross shortage of PPE throughout the world. Also, in a nonemergency setting like a Dermatology out-patient department, the use of PPE at all times may not always be feasible. This necessitates the need for innovating new techniques to minimize spread of the infection from patients to doctors and vice versa.

In March 2020, Dr Lai Hsien-yung, a Taiwanese doctor, devised an aerosol box to minimize risk of infection to health care personnel during high aerosol generating procedures like intubation. It consists of a transparent plastic box, with an opening on one side to fit over the patient's chest and two holes on the opposite side through which physicians can fit their hands.⁴

The efficacy of this aerosol box was later tested on mannequins with simulated cough reflex.⁵

Currently, many modifications of the original aerosol box have been proposed for application in other fields like dentistry and otorhinolaryngology.⁶ Dermatology is another speciality where the physicians have a high risk of exposure to the virus while examining and operating on lesions on the face.

Hence, the authors propose a modified design of this aerosol box to assist in performing dermatological procedures on the face like electrocautery, microneedling with a dermapen/dermaroller, chemical peels, and lobuloplasty, among others. This modified aerosol box (Figure 1) consists of:

- A narrower base on the head end, so as to be accommodated on a procedure chair, which gradually widens by 10 cm toward the foot end, to accommodate the shoulders of patients.

- In addition to the two circular working ports on the back surface at the doctor's end, this modified aerosol box also has two more working ports on each of the other two surfaces. This facilitates access of the patient's face from all directions during a procedure.
- Height of the box is 50 cm, with extra 5 cm length of the frame projecting downward from the base U-plate. This provides stability to the box and prevents it from sliding down from an inclined chair.

The box can be easily disinfected using 0.5% hypochlorite solution or 70% alcohol and reused for multiple patients on the same day. The authors acknowledge that this aerosol box, just like any other device, is not 100% protective or fail proof. It has been proposed to aid in providing protection to the dermatologist, in case the patient inadvertently sneezes/coughs suddenly during a procedure.

Currently, dermatologists are faced with a moral dilemma of whether to continue their practice or not. Most clinics are offering consultations only for emergency cases, while the routine cases are advised to follow up through tele-consultations.⁷ While this can be followed for a short time, until we tide over the acute crisis of COVID-19, it is not practical in the long run. Dermatological procedures cannot be postponed indefinitely. At the same time, we cannot restart our practice the same way as before the COVID era. We need to restructure our work environment to adapt to the current scenario.^{8,9} At present, there is no specific treatment or vaccine for COVID-19 which can help to eradicate the infection in the near future. We need to prepare to resume our daily lives, despite the prevalence of the infection. WHO recommends using COVID-19 rapid tests only in research setting and not in clinics, as they were found to lack both sensitivity as well as specificity.¹⁰ Hence, we propose the use of this aerosol box, as a precautionary measure, to minimize spread of infection to the maximum possible extent.

ACKNOWLEDGMENT

We would like to thank Ann's group for making the prototype of the aerosol box.

CONFLICT OF INTEREST

The authors declare no potential conflict of interest.

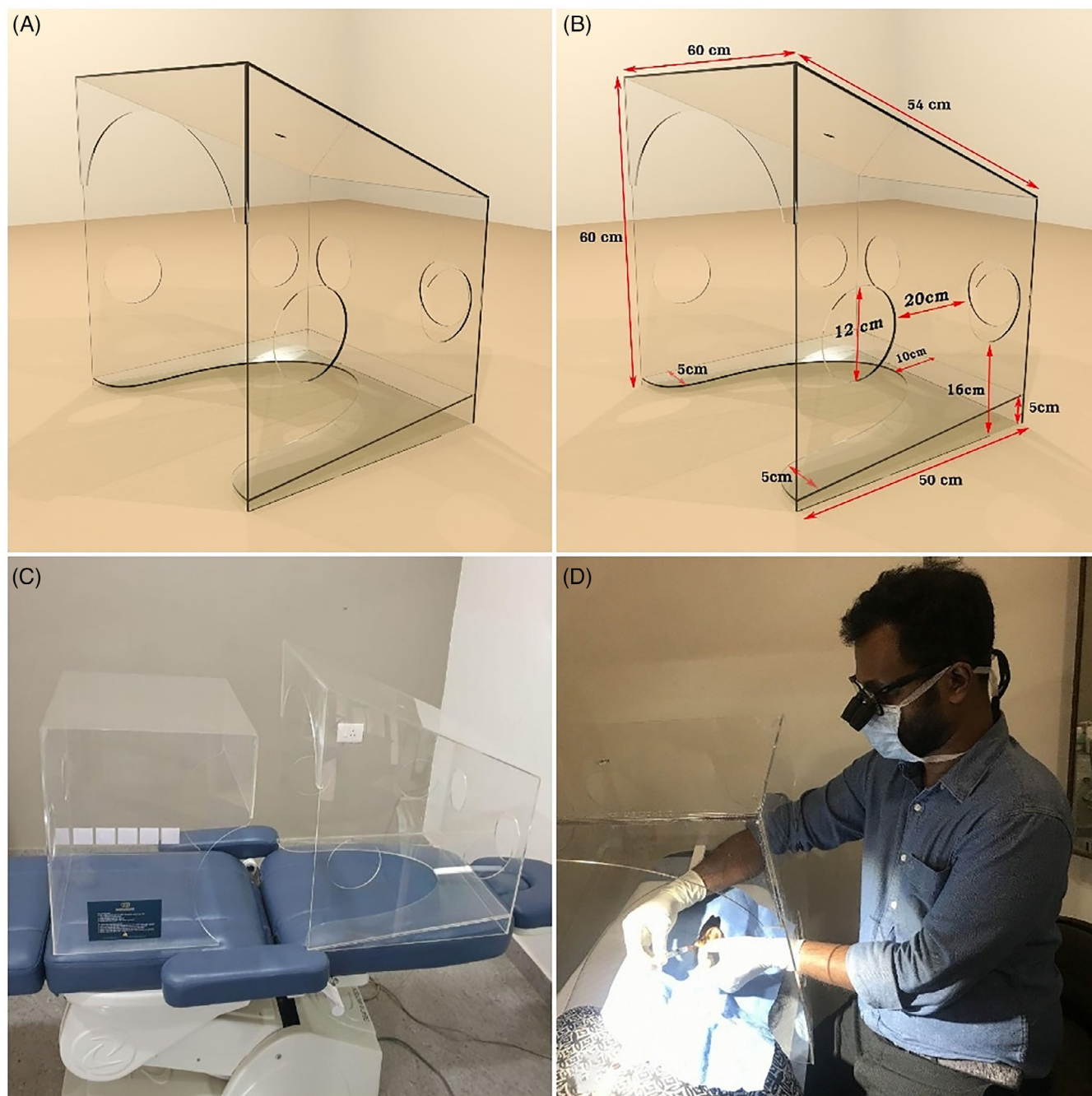


FIGURE 1 A, Three-dimensional (3D) image of the dermatology aerosol box from the left oblique view. B, 3D image of the dermatology aerosol box from the left oblique view showing the standard measurements. C, Conventional aerosol box on the left compared to the dermatology aerosol box on the right. D, Dermatology aerosol box in use for performing lobuloplasty

DISCLAIMER

We confirm that the manuscript has been read and approved by all the authors, that the requirements for authorship as stated earlier in this document have been met and that each author believes that the manuscript represents honest work.

Bibilash Babu¹
Swathi Shivakumar² 
Karthika Asokan³

¹Department of Aesthetic Surgery, Cosmetiq Clinic, Trivandrum, Kerala, India

²Department of Dermatology, Cosmetiq Clinic, Trivandrum, Kerala, India

³Department of Intensive Care, Regional Cancer Centre, Trivandrum, Kerala, India

Correspondence

Swathi Shivakumar, Department of Dermatology, Cosmetiq Clinic,
Pulli Lane, Chackai, Trivandrum, Kerala 695024, India.
Email: drswathishivakumar@gmail.com

ORCID

Swathi Shivakumar  <https://orcid.org/0000-0002-4497-7687>

REFERENCES

1. WHO Announces COVID-19 Outbreak a Pandemic [Internet]. 2020. <http://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/news/news/2020/3/who-announces-covid-19-outbreak-a-pandemic>. Accessed March 19, 2020.
2. Rothan HA, Byrareddy SN. The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. *J Autoimmun*. 2020;109:102433.
3. Rational Use of Personal Protective Equipment for Coronavirus Disease 2019 (COVID-19) [Internet]. https://apps.who.int/iris/bitstream/handle/10665/331215/WHO-2019-nCov-IPCPPE_use-2020.1-eng.pdf. Accessed April 2, 2020.
4. News T. Taiwanese doctor invents device to protect US. [Internet]. *Taiwan News*. <https://www.taiwannews.com.tw/en/news/3902435>. Accessed April 21, 2020.
5. Canelli R, Connor CW, Gonzalez M, Nozari A, Ortega R. Barrier enclosure during endotracheal intubation. *N Engl J Med*. 2020;382:1957-1958.
6. Babu B, Gupta S, Sahni V. Aerosol box for dentistry. *Br Dent J*. 2020;228(9):660-660.
7. Kwatra SG, Sweren RJ, Grossberg AL. Dermatology practices as vectors for COVID-19 transmission: a call for immediate cessation of non-emergent dermatology visits. *J Am Acad Dermatol*. 2020;82:e179-e180.
8. Patri A, Gallo L, Annunziata MC, Megna M, Fabbrocini G. COVID-19 pandemic: University of Naples Federico II Dermatology's model of dermatology reorganization. *Int J Dermatol*. 2020. <https://onlinelibrary.wiley.com/doi/abs/10.1111/ijd.14915>. Accessed May 29, 2020.
9. Marasca C, Ruggiero A, Annunziata MC, Fabbrocini G, Megna M. Face the COVID-19 emergency: measures applied in an Italian Dermatologic Clinic. *J Eur Acad Dermatol Venereol*. 2020;34(6):e249. <https://onlinelibrary.wiley.com/doi/abs/10.1111/jdv.16476>. Accessed May 29, 2020.
10. Advice on the Use of Point-of-Care Immunodiagnostic Tests for COVID-19 [Internet]. <https://www.who.int/news-room/commentaries/detail/advice-on-the-use-of-point-of-care-immunodiagnostic-tests-for-covid-19>. Accessed April 24, 2020.