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Walking through tray containing sodium hypochlorite solution may sanitize the sole in COVID-Era

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Abstract

During the COVID-19 pandemic, for the sanitization of sole, a new device was developed as a COVID Era Sanitization Tray (CEST). This device was made of steel sheet of rectangle shape with dimensions of 10 cm length, 5 cm width, and 2 cm raised margin all around. A sponge of appropriate size was fitted in the tray to absorb the water and sodium hypochlorite in the ratio of 9:1. All patients and their attendant were instructed to enter the hospital through this tray only. This device was helpful in preventing the spread of infections from hospital to home and vice versa.

Keywords: CEST; Covid; sodium hypochlorite,;Sole;Tray.

Introduction

Apart from dust, there are many novel pathogens, bacteria, viruses and parasites which continuously spread from one person to other and from one place to another place. Recently in early 2020 after the emergence of the novel "severe acute respiratory syndrome coronavirus 2" or SARS-Co V-2, known for causing coronavirus disease 2019 or COVID-19, it has been declared a global pandemic situation. As neither vaccine nor herd immunity was achieved for this novel coronavirus, the only option was to prevent its spread by sanitizing the hand as well as other body parts. Frequent and effective hand washing is the most commonly used method to prevent the spread of this virus-like other previous viruses, bacteria and dust. The use of alcohol-based hand sanitizer also reduces the spread of transmission of these pathogens [1,2]. Although, sanitization of hands has been considered and proven its strong impact on the prevention of infection transmission but unfortunately no study to date considered the sanitization of sole. If hand washing with soap water can reduce the spread of this virus [3] then sanitization of the sole should be also considered to stop the transmission of infections and dust particles from one place to another and from one person to another person.

Methods and Material for new Device:

In the pandemic COVID era, every citizen of the world gives priority to sanitising every part of their body including the face, hands, and neck. We developed a new device with a steel sheet to sanitize the sole. This steel sheet was made as a rectangle-shaped tray in a dimension of 10 cm in length and 5 cm in breadth with a 2 cm raised margin all around [Figure.1]. Its margin was raised 2 cm in view to stop the spillage of water while walking through the tray and also kept the sodium hypochlorite solution in place. The plastic sheet was then spread over the surface of this rectangle-shaped tray. The purpose of spreading this plastic sheet was to completely seal

this tray and prevent the leakage of the tray as well as also stop the corrosive effect of sodium hypochlorite solution. After that, the appropriate size of the sponge was cut and fitted into this tray to absorb the water and sodium hypochlorite solution [Figure.2]. The water and sodium hypochlorite solution were mixed in a ratio of 9:1 to pour over the fitted sponge in the tray. The final design of this tray was much attractive and was kept at the entry gate of our hospital as well as at every entrance of the ward. As this tray was made in the era of COVID-19 to sanitize the sole, its name was given as Covid Era Sanitization Tray or CEST for sole [Figure.3].The approval for funding the cost for this device was taken from Director of our Institute.

Table .1 Duration of survival for COVID-19 virus.

Site of Stay	**Duration of survival**
Oral fluid droplet(Airborne)	8-14 Minutes
Surface aerosol	3 Hours
Copper surface	4 Hours
Cardboard	24 Hours
Plastic sheet	2 Days
Stainless steel	2-3 Days

Figure 1: Showing steel tray in a dimension of 10 cm (Length) x 5 cm (Width) x 2 cm (Height)

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Figure 2: Tray is covered with plastic sheet and solution of water and sodium hypochlorite is being pored over fitted sponge.

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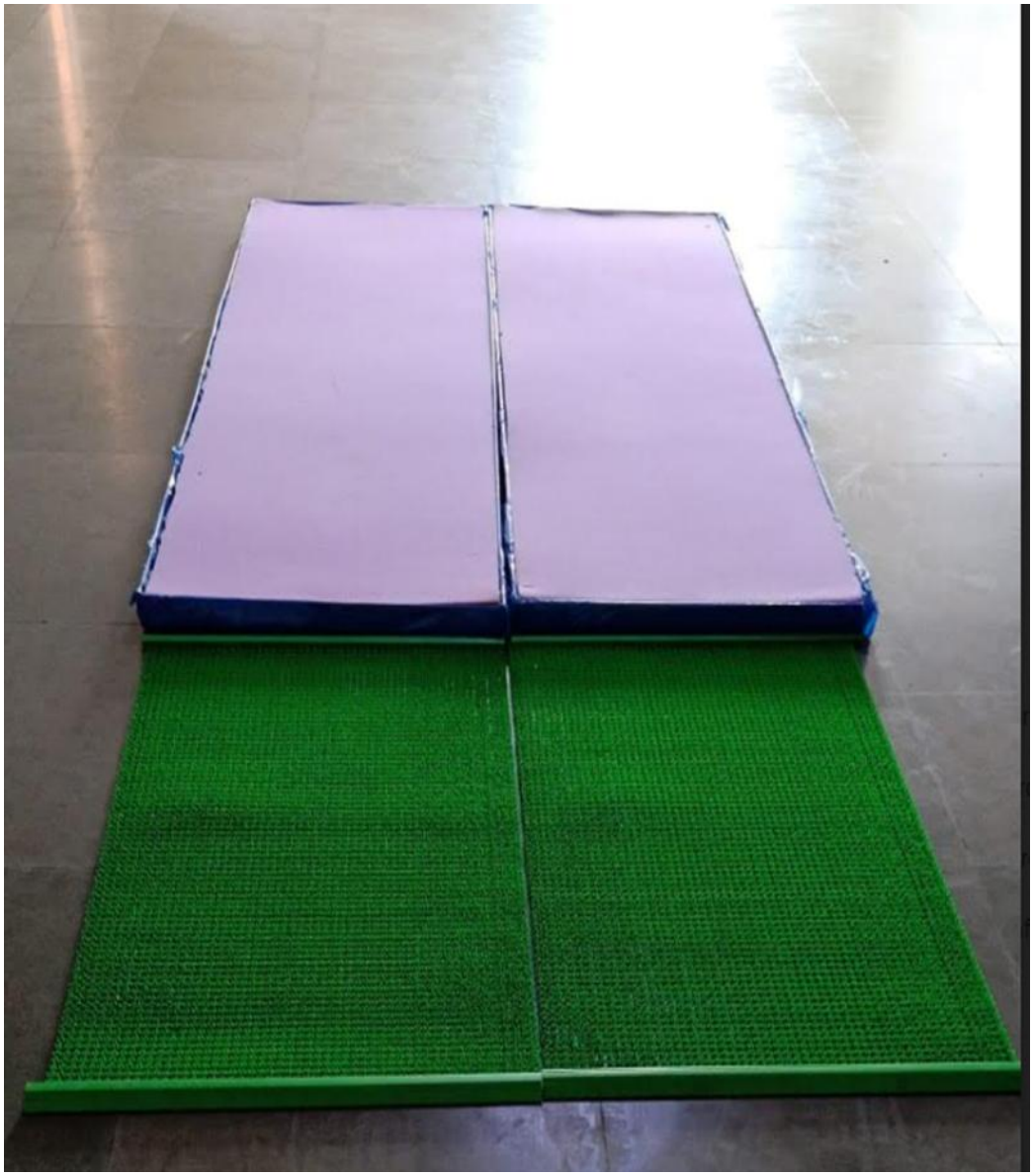
Figure 3: Showing CEST (Covid Era Sanitzation Tray) to sanitize the walking sole



Discussion:

In the pandemic COVID-19 era, it was difficult to confidently say that one measure like face mask application or sanitization of hands only is the sufficient to stop the transmission of coronavirus or other micro-organisms. In fact, all measures are required to reduce the magnitude and strength of such pandemic contagious diseases. COVID-19 is an enveloped, single-stranded RNA virus with a size of approximately 50 to 150 nm in diameter. Transmission mainly occurs through respiratory aerosol spreading from an infected person [4]. This novel coronavirus is also found and survives from hours to days depending upon the site of the stay [5-7]. Table.1 showed that coronavirus may remain to survive from hours to days except for its oral fluid droplet. This variation in the duration of survival for different inanimate surfaces also depends upon the nature of the surface, pH, temperature and relative humidity of the surrounding [8]. In view to consider its survival on the surface, it is mandatory to disinfect the surfaces of the hospital and obviously sole. Because of this reason, the infections may be spread from outside to the hospital and vice versa through the sole. Although, there are many disinfectants recommended but most commonly used, especially against the COVID-19 virus is sodium hypochlorite solution [9]. Hypochlorous acid like other disinfectant destroys the cell wall of microbes or viruses, and subsequently destroy them [10]. HOCl

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has been shown to destroy coronaviruses like other viruses in less than 1 minute [11]. The sodium hypochlorite solution may be diluted 10-fold to destroy the surface viruses and other microorganisms [12]. The sodium hypochlorite solution as a disinfectant is more effective against staphylococcus aureus and Pseudomonas aeruginosa biofilms than other disinfectants [13, 14]. This compound in fact fulfils all the criteria to consider as an ideal disinfectant with the features like easy to use, inexpensive, has a good safety profile, is easily available, has a broad range of bactericidal and virucidal properties and also can disinfect a large surface area quickly [15]. Surface disinfection with 0.1% sodium hypochlorite is considered effective against coronaviruses within 1 minute [8, 17]. There are many other potent surface disinfectants like ethanol, isopropanol, a combination of 45% iso-propanol with 30% n-propanol, glutardialdehyde, formaldehyde, and povidone-iodine [16]. Some studies suggested that in case of unavailability of sanitizer or disinfectant, even soap water is more than sufficient to sanitize our body parts [3]. Considering the occurrence of micro-organisms on the surface and the impact of using a disinfectant, the new device developed is really very helpful to sanitize the walking sole.

Conclusion:

Walking through CEST definitely reduce the spread of dust and infections including corona infection. Although further research is require to prove the fact confidently.

Acknowledgement:

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