



## Challenges in embalming in Covid-19 pandemic

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### ABSTRACT

Cadaveric dissection is the most important and significantly contribute to learning anatomy by understanding the 3D relationships of all body structures and their variations so also to a future professional career. Nowadays even though some institutions stopped the dissection of cadavers and started the use of virtual dissection table for the study of human anatomy but still, the knowledge gained in didactic lecture is believed to be reinforced and elaborated by the dissection of cadavers. So undoubtedly the cadaveric dissection facilitates learning of the 3D structure of the human body through observation, but at the same time, it is expensive, time-consuming and potentially hazardous. The current outbreak is unpredictable. Even though the scientists around the world learnt much about coronavirus and Covid-19 in a short span but still there are many grey areas, and guidelines are evolving based on new information and different issues regarding embalming dead bodies of Covid-19. India is in the phase of cluster spread but not having a community-transmission. But this will also have an impact on body donation. To deal with the continually changing epidemiology and new information related to body donation and embalming issues, guidelines should be regularly updated. This review cites the safety precautions for embalming the dead bodies of Covid-19 victims and the challenges in procurement of the cadavers for medical education in times of highly hazardous Covid-19 pandemic.

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### INTRODUCTION

Covid-19 is also known as SARS-CoV-2 ( Severe Acute respiratory syndrome Coronavirus-2). It is

caused by the Corona Virus infection that emanated in December 2019 in China (Hubei Province) and in five months affected the globe. The cases outside China are linked mainly to travellers from China and other countries with a significantly higher number of victims of Covid-19. Still, some cases have been identified with no history of travel in affected countries. Humans are likely to have contracted Covid-19 from an intermediate host, but now it is transmitted human-to-human (AST, 2020). Covid-19 being a new disease with limited knowledge and evolving guidelines regarding the management of dead bodies, procurement of the corpses seem to be a great challenge for medical, educational institutes worldwide.

### Review

A milestone in medical education is when medical

students start doing cadaveric dissection. For centuries, the Cadaveric dissection has been used for teaching anatomy in almost all the medical institutions all over the world (Williams *et al.*, 2014). Cadaveric dissection is the most important and significantly contributes to learning gross anatomy by understanding the 3D relationship of every anatomical structure with their variations for a future professional career, as best medical, or surgical practice is based on sufficient anatomical knowledge of human anatomy which can only be learnt from dissection of cadavers. (Mwachaka *et al.*, 2016).

Defining the anatomical site of a lesion is a significant step for a physician to resolve a problem efficiently. So adequate anatomical knowledge is a must for surgeons and for anyone who performs an invasive procedure on a patient. Knowledge of anatomy is also important to complete a medical checkup, to make a diagnosis and also to communicate with colleagues (Papa and Vaccarezza, 2013). Undergraduate medical education has experienced a significant rejuvenation since last century due to the advent of the technology as a significant teaching-learning tool. Advanced 3DVT (Three-dimensional visualization technology) has come up as the most promising to enhance the understanding and knowledge of anatomy (Yamine and Violato, 2015). Nowadays, some institutions have stopped dissection of cadavers and have started the use of virtual dissection table for the study of human anatomy (Aziz *et al.*, 2002). Still, many researchers believed that the cadaveric dissection reinforces the knowledge gained in theory class (McLachlan *et al.*, 2004). So undoubtedly, the cadaveric dissection facilitates the learning of 3D structure of the human body through observation, but at the same time, it is expensive, time-consuming and potentially hazardous (Rani *et al.*, 2016).

The Bombay Act was enacted in 1949 in Maharashtra state and underwent several Amendments, the latest being in 2014. Now it is called as the Maharashtra Anatomy Act (Bombay Anatomy Act, 2018; The Maharashtra Anatomy Act, 1949). The Bombay Act allows the use of unclaimed bodies or the donated bodies for anatomical examination (for medical education or research purposes) and therapeutic purposes (Bharambe *et al.*, 2019). During this Covid-19 pandemic, medical institutes have queries regarding the effect of this disastrous situation on body donation. With all the safety precaution, the body donation unit of all the medical institutions augments all donation feasibilities.

According to Lai *et al.*, the probability of acquiring a Covid-19 infection from the infected donated body

is not known. But the major factors that a significant impact on transmission include epidemiological factors, incubation period, degree of viremia and viability of the virus within the blood and specific compartments of the body (Lai *et al.*, 2020). During this outbreak, in India government and many health organizations issued various guidelines. Amongst these, according to the guidelines issued by the Ministry of Health and Family Welfare, the primary mode of transmission of Covid-19 is through the droplet. And it is very unlikely for the Covid infection to spread from the dead body to health care workers or members of the family who follow adequate standard precautions while handling the dead body. There are some standard preventive measures to be taken by health care workers while handling dead bodies of Covid-19 victims, during body removal from isolation room or area, for environmental cleaning and disinfection, for dead body handling in the mortuary, for embalming, for an autopsy which should be avoided but if done the infection control practices should be followed, for transportation and at crematorium or burial ground (Das, 2020).

The standards and practices of embalming around the world may or may not be similar to the utmost safety standards to which funeral professionals in the United States stick to. According to WHO Interim Guidance (24th March 2020), to prevent restrained handling of the dead body embalming was not recommended (WHO Interim Guidance, 2020). According to the guidelines, friends and family members of a dead Covid-19 infected person can visit and view the dead body, but not touch, hug or kiss the deceased. The health ministry's guidelines for dead body management of Covid-19 said that the families would have to be on guard during cremation. Embalming of the dead body won't be allowed, and as far as possible autopsies should be avoided. However, strict infection prevention control practices should be adopted if an autopsy is unavoidable. In the absence of data on infection from dead bodies, it is unclear that how long the virus stays in the dead body and so WHO is recommending proper disposal of bodies to prevent possible spread from secretions. The guidelines allow some of the religious rituals, but the family members will be prohibited from bathing, kissing and hugging of the dead body. Government has worked on framing the guidelines for handling dead bodies as the disposal of dead bodies has to be proper for preventing the spread of infection. The guidelines have been framed in collaboration with the World Health Organization (WHO) guidelines on Infection prevention and control of epidemic and pandemic prone acute respira-

tory infections in health care (Sharma, 2019).

Recently, the National Funeral Directors Association (NFDA) learnt that the Centre for Disease Control and Prevention (CDC) adheres to its recommendation that those who had died of Covid-19 can be embalmed without undue risk if professionals for funeral follow standard safety protocols.

NFDA clarified the guidance to be followed by funeral professionals in the United States. However, CDC Noted that WHO which is a world health organization, furnished broad guidelines for all the countries irrespective whether underdeveloped or developed. So even though the safety standards, protocols and training in these countries may not as scrupulous as in the USA, the WHO guidance can be prudent to aid protection of their citizens. Implementing these standard operating procedures and standards of safety care should minimize risk existing in dead body embalming. The CDC advised abstaining from touching the body of the victim who has died of Covid-19 and to wear proper protective equipment including gloves, disposable gown as well as a face shield or goggles and a facemask while embalming dead bodies of confirmed or suspected Covid-19 cases. In asserting the safety while embalming these victims, CDC advised using proper personal protective equipment (PPE) Kit which include a disposable gown, face shield or goggles, and face mask and respiratory protection (e.g., NIOSH-approved N-95 respirator or higher level of protection) if aerosols are likely to be generated. The CDC also advised selecting appropriate PPE and should be aware of PPE for aerosol-generating procedures and advised to be well versed with safety protocols including, the ways to reduce the production of aerosols one suggested option is to embalm without aspiration. CDC issued guidance stating that embalming of victims of Covid-19 is safe if embalmer takes proper safety precautions by selecting appropriate PPE and preventing or minimizing the splashing and aerosolization of body fluids.

Recently WHO issued guidelines to NFDA on embalming of Victims of Covid-19. WHO's guidelines align with CDC in important issues, i.e. bodies of covid-19 can be buried or cremated, there is no evidence of transmission of infection from the dead body of Covid-19 and avoid contact of family members with the dead body (hugging, kissing etc.) (NFDA, 2020). To ensure the safety of the embalmer, infection prevention guidelines should be followed, which include the screening and testing of body donors or potential donors that could have contracted Covid-19. Donors should be screened for potential Covid-19 infec-

tion (AST, 2020). Screening for Covid-19 includes three different methods such as (1) Epidemiologic screening for travel and potential exposures, (2) History for symptoms suggestive of Covid-19, and (3) Laboratory screening like nasopharyngeal and oropharyngeal or bronchoalveolar lavage sample for testing Covid-19. A recent study specifies that negative laboratory results may not rule out Covid-19 infection (Winichakoon *et al.*, 2020).

## CONCLUSION

The current outbreak of Covid-19 is unpredictable. While scientists have learned a lot about this highly infectious dreaded disease in a relatively short time, there are still many grey areas, and guidance is evolving based on new data about embalming of dead bodies of Covid-19. So, the guidelines should be regularly updated to account for the changing epidemiology and new information regarding body donation and embalming issues. The study of literature available till date suggest that no definitive guidelines are available regarding safety and practice of embalming dead bodies of suspected or confirmed cases of Covid-19 so embalmers should use their best professional judgment whether they are comfortable in embalming after exercising the recommendations for safety.

## Limitations

Because Covid-19 is a new disease, public health experts are still learning. Hence, knowledge about this novel virus remains limited, and so do the strategies and guidelines for embalming. Hence, it's a great challenge in procuring cadavers for medical education during this pandemic of Covid-19.

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## Conflict of Interest

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## REFERENCES

AST 2020. COVID-19 American Society of Transplantation. *FAQs for Organ Donation and Transplantation*. Updated on: 01 January 2020.

- Aziz, M. A., McKenzie, J. C., Wilson, J. S., Cowie, R. J., Ayeni, S. A., Dunn, B. K. 2002. The human cadaver in the age of biomedical informatics. *The Anatomical Record*, 269(1):20–32.
- Bharambe, V., Puranam, V., Manvikar, P. R., Bajpayee, P. 2019. Anatomy acts in India: a review. *Eur. J. Anat*, 23(6):469–477.
- Das, S. 2020. Coronavirus death in India: Covid-19 dead body management guidelines released by Ministry of Health & Family Welfare in India. *India Today Coronavirus death in India: How to handle Covid-19 dead bodies*, pages 1–7. Updated on: 15.03.2020.
- Lai, C.-C., Shih, T.-P., Ko, W.-C., Tang, H.-J., Hsueh, P.-R. 2020. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease-2019 (COVID-19): The epidemic and the challenges. *International Journal of Antimicrobial Agents*, 55(3):105924–105924.
- McLachlan, J. C., Bligh, J., Bradley, P., Searle, J. 2004. Teaching anatomy without cadavers. *Medical Education*, 38(4):418–424.
- Mwachaka, P. M., Mandela, P., Saidi, H. 2016. Repeated Exposure to Dissection Does Not Influence Students' Attitudes towards Human Body Donation for Anatomy Teaching. *Anatomy Research International*, 2016:1–5.
- NFDA 2020. Situation Update: Novel Coronavirus (COVID-19). Updated on: 7 April 2020 .
- Papa, V., Vaccarezza, M. 2013. Teaching Anatomy in the XXI Century: New Aspects and Pitfalls. *The Scientific World Journal*, 2013:1–5.
- Rani, A., Chopra, J., Verma, R. A., Pankaj, R. K. 2016. Reflections of medical students' on cadaveric dissection in present scenario. *Int J Cur Res Rev*, 8(24):1–5.
- Sharma, N. C. 2019. Coronavirus: Govt shares dead body management guidelines. *Journal of Psychiatrists' Association of Nepal*, 8:17–21.
- WHO Interim Guidance 2020. Safe Management of a Dead Body in the Context of COVID-19. pages 13–13.
- Williams, A. D., Greenwald, E. E., Soricelli, R. L., DePace, D. M. 2014. Medical students' reactions to anatomic dissection and the phenomenon of cadaver naming. *Anatomical Sciences Education*, 7(3):169–180.
- Winichakoon, P., Chaiwarith, R., Liwsrisakun, C., Salee, P., Goonna, A., Limsukon, A., Kaewpoowat, Q. 2020. Negative Nasopharyngeal and Oropharyngeal Swabs Do Not Rule Out COVID-19. *Journal of Clinical Microbiology*, 58(5):297–317.
- Yamine, K., Violato, C. 2015. A meta-analysis of the educational effectiveness of three-dimensional visualization technologies in teaching anatomy. *Anatomical Sciences Education*, 8(6):525–538.