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Covid 19 – A Forensic Odontologist Perspective

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Abstract

Investigations related to forensic odontology involves handling of antemortem as well as postmortem dental records. In case of any identification process, forensic odontologists may end up in exposing these dental related records. Exposure to any biological remains, and its related surfaces or objects at the scene, during this pandemic situation, puts any forensic professional at risk towards COVID-19. A detailed description on the risk involved during dental identification and autopsy procedures, and the knowledge about the precautionary measures which have to be exercised, makes the forensic team to carry forth the work cautiously without any perplexity or doubt.

Keywords: Coronavirus, Dental Autopsy, Forensic Odontology, Precautionary Measures, COVID-19

Introduction

Coronavirus disease (COVID-19), caused by SARS CoV 2, is the lethal pandemic disease that is grievously affecting the entire world. Over 2,29,92,517 cases have been reported in India, with the death rate reaching 2,49,992.[1] This devastating count has caused mental and emotional pain leading to fear of death among general public. Government of India has initiated lock down and several other restrictions to curb this pandemic. Irrespective of all these measures, the rate of transmission of this disease is becoming higher on daily basis. India, being in its second wave of infectivity, has experienced a severe impact in all the sectors including industrial, commercial and small scale. Majority of the health care practitioners face limitations in their work field. Of no doubt, a dental professional is one of the highly affected fraternities, as it involves close contact with the person who is treated, particularly the oral and pharyngeal secretions.[2]

The current COVID-19 pandemic raises a new challenge for forensic odontologists, in performing their duties in the areas like disaster victim identification, age estimation, DNA profiling, and facial reconstruction, to name a few.[3] Investigation of oral and para-oral structures requires biological sample collection, which is a difficult task in this present situation as it involves contact with saliva, blood and respiratory fluids. Radiographs may have to be taken at times. Precautionary measures need to be taken while addressing these cases, as they may serve as a possible source of infection, if handled improperly.[2]

Forensic Odontologist and COVID-19

Forensic odontology has been defined by the Fédération Dentaire Internationale (FDI) as 'that branch of dentistry, which in the interest of justice, deals with the proper handling and examination of dental evidence, and with the proper evaluation and presentation of dental findings'.[4] Out of the different roles played by the forensic odontologist, victim identification is the commonly encountered and pivotal task, which helps in identifying the unidentified deaths. Forensic pathologist and odontologist, work hand in hand, in the identification process of the deceased. Performing a dental autopsy procedure in the present situation is a cumbersome task for the forensic odontologist on site. Handling the autopsy specimen, without the knowledge of underlying medical problem of the deceased, increases the risk of infection for the forensic professionals. Any unidentified corpse can be positive or negative for COVID 19. One cannot take a chance to deal with the case, without proper medical investigations and precautionary measures.[5] There is no clear scientific evidence substantiating the duration or

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period, SARS-CoV-2 will remain in dead bodies. A study done on a human, who died of COVID-19, one month earlier, reported the possibility of persistence of viral genome for more than 30 days. However, the fact that how long SARS-CoV-2 can remain alive in a human corpse is still unclear.[6] Another research group also stated that the swab test taken from one of the dead bodies kept in mortuary tested positive for SARS-Cov-2.[7] The survival of SARS-CoV-2 in a deceased depends on the organ and tissue involved, temperature and humidity related to the body, and the nature of burial.[6]

People who are working in the autopsy field are at higher risk in contracting the infection. A thorough check on the infectious nature of the deceased should be performed before any procedure. There is various opinion on the retention of viral load in different body structures. Any specimen from the corpses has to be handled with extra-precautionary measures, as this can serve as a possible source for infection spread. Dermal inoculation, respiratory droplets, biological fluids, inhalation and contamination through mucous membranes are the potential ways by which the infection can spread. Moreover, handling of the equipment during the procedure can also be a source for viral lodgment. Therefore, proper handling of the tissues and equipment is required during transportation and storage.[2,7]

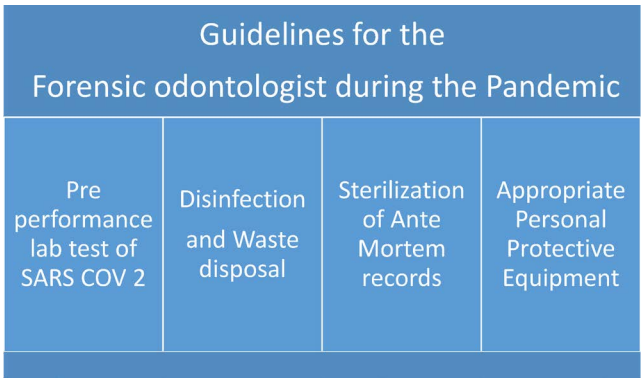
Guidelines/Recommendations during Identification Process

Every procedure carried forth by the forensic dental expert, be it from collection of antemortem record to dental autopsy procedure, needs precautionary guidelines, to restrict the spread. The forensic board of different countries has put various guidelines and recommendations to perform autopsy procedures.[8] A combined summary of these protective measures are highlighted in this platform for knowledge and application. A complete history of the case should be obtained from the medical team or coroner to determine the infectious nature. Laboratory testing for SARS-CoV-2 should be performed before initiating the procedure, through oropharyngeal and nasopahayngeal swab method, depending on the condition of the deceased.[5] Every corpse should be treated as potentially positive while performing the procedure. Antemortem dental records are to be collected and handled with basic protective measures. Dental photographs, radiographs and dental casts are to be disinfected before any examination.[3] Even though the chance of transmission through these records is minimal, the act of negligence may end up in potential spread. It is recommended to perform dental radiography in essential cases alone. Covering or wrapping the radiographic and photographic equipment with plastic or disposable sheets will prevent cross contamination.[9] Minimally invasive procedures like bitemark analysis and age estimation methods also require personal protective measures and disinfection protocol.

Postmortem or dental autopsy procedures need to be carried out with fully covered Personal Protective Equipment (PPE). All the forensic professionals including the support team members should be trained to arm themselves with PPE. Adequate knowledge and training regarding 'Donning and Doffing' may reduce the source of contamination.[2] Personal protective equipment includes a disposable head wear, long-sleeved water resistant gown, double pair of disposable gloves, N95 respirator or FFP2/FFP3 face mask, disposable face shield, goggles and shoe cover.[7] Changing of apron, gown or PPE between contacts is essential and proper hand washing measures to be taken after removing the PPE to prevent any surface contamination.[9] Sawing of jawbones generates bone aerosol and these procedures can be avoided if it is of less significance for the case in consideration. Adequate ventilation and space are required surrounding the autopsy table during aerosol generating procedures. The team should contain a minimum number of working members, which include forensic pathologist, odontologist and technical staff; with all the members equipped with proper respiratory protective measures.[9]

Sterilization of the instruments and equipment is a mandate soon after the procedure. One of the experimental studies analyzed the persistence of viral viability in environment and surfaces, by estimating the viral concentration in aerosols and other surfaces made of stainless steel, plastic, copper and cardboard. The study resulted that SARS-CoV-2 remained viable in aerosols, with its half-life estimating 1.1 to 1.2 hours. The viability was found to be longest in stainless steel and plastics, being 5.6 and 6.8 hours respectively; followed by copper and cardboard.[10] Having said so, regular cleaning and disinfection of the frequently touched objects surrounding the autopsy table with 0.05% – 0.1% sodium hypochlorite solution is a requisite. Surfaces that are intolerable to sodium hypochlorite can be disinfected with neutral detergent followed by 70% ethanol.[10]

Material waste generated during the procedures need to be treated and disposed as infectious clinical waste Category B. Staff involved in waste management should be trained to handle biomedical waste disposal and should also be provided with personal protective equipment.[11]



Summary

The duty of forensic professional should not get restricted due to the challenges brought forth by the pandemic situation. A Standard Operating Protocol (SOP) will pave way for the forensic experts to do the fieldwork. Preparation and training subduing to these SOPs will prevent the team member from becoming a possible source of infection spread. All the forensic professionals including forensic pathologists, odontologists and supporting staff should be aware of the risks involved while performing a forensic task during current situation. An ongoing update in the norms and regulations is essential to keep the spirit of work active and 'on'.

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