

Oral autopsy: A simple, faster procedure for total visualization of oral cavity

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Abstract

Identification of humans, especially in mass disaster is a challenging aspect for team members of the disaster victim identification (DVI) unit. Identification is necessary for humanitarian and emotional reasons and for many legal issues, particularly for family members. In the modern day, all possible methods have been applied for establishing the identification of deceased individuals. The DVI team comprises specialists from different disciplines. The forensic dentist plays a major role in the identification of victims in disaster. To establish a simple, faster and time saving procedure for Postmortem dental identification in mass disaster. In this article, we present a simpler and faster method, which helps in gaining access into the oral cavity that helps in the recording of postmortem oral findings where required.

Key words: Disaster victim identification, mass disaster, oral autopsy, postmortem dental record


Introduction

Identification of individuals in mass disaster and also tracing unidentified human remains are challenges to the investigating team. The forensic dentist plays an important role in identification, especially in mass disasters.^[1-3] Identification based on dental information is a highly efficient, reliable, and rapid procedure.^[4,5] Currently, forensic dentistry plays a major role in forensic research and identification of humans worldwide. Be it a manmade disaster or natural disaster, the important information obtained contributes to the identification of mass disaster and homicide victims. It can be achieved by the tooth shape and position, restorations, malocclusion, anomalies in teeth and so on that make each dentition unique. It can also

guide investigative officer in homicide cases by establishing identity of criminals.^[6,7]

Usually, the forensic dentist participates in establishing the age,^[7-9] determination of sex,^[7,10,11] and race of corpses or skeletal remains,^[12] manufacture of models for rugoscopy,^[13,14] examination of bite marks,^[15] and assessment of facial trauma, especially in cases of child abuse.^[16,17] The forensic dentist is also responsible for making radiological examinations^[18,19] and postmortem dental records.^[20]

The common problems that a forensic team faces during identification are poor state of conservation of unidentified bodies and incomplete presence of remains, which may retard the identification process. In such situations,

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oral autopsy may help; in difficult cases where oral examination cannot be completed due to accessibility, for proper visualization of teeth and its structure oral autopsy is necessary. Oral autopsy helps to make a proper postmortem dental record. It primarily helps to register the teeth present in the oral cavity, the ante mortem dental treatments received, the study of dental malpositioning, and the type of occlusion. Within the field of forensics, dental evidence is considered to be the most trustworthy method of identification.^[4] In this article, we have attempted to explain a simple method to obtain access to the oral cavity for recording postmortem dental findings in suitable cases where accessibility is a challenge and there is a presence of complex findings.

Description of procedure

Consent is to be obtained from the medical officer and also the investigative officer for performing an oral autopsy after explaining the complete procedure. This oral autopsy procedure is simpler, faster, and preserves facial configuration, which may help in the visual recognition of the remains by family members and other interested

persons. The procedure includes:

- Photographic records are needed before the procedure [Figures 1a and 2]
- Incision needs to be done from the angle of the mouth to the tragus of the ear on either side [Figures 1b and 3]
- A careful folding of lip and cheek tissues [Figures 1c and 4]
- Sectioning of the muscles and the capsular ligament of the temporomandibular joint
- Opening of the oral cavity by traction allowing visualization of the lower and upper dental arcades [Figure 5]
- Obtaining the photographic records of the case [Figure 6]
- Removal of prostheses, orthodontic, and orthopedic appliances, and any foreign object if present in the mouth
- Charting of the mouth in the postmortem dental record [Figure 7]
- Description of the anomalies of shape, position, and size of the teeth
- Taking of adequate photographs to compare with ante mortem records. [Figures 1d and 8]

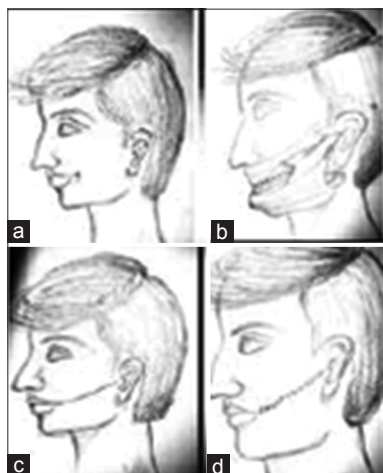


Figure 1: Sketch of procedure (a) Before autopsy (b) Incision from angle of mouth to tragus of ear (c) Reflect of flap (d) After suturing



Figure 2: Before oral autopsy



Figure 3: After oral autopsy



Figure 4: During procedure access to the oral cavity



Figure 5: Examination of the oral cavity



Figure 6: Occlusion in a closed position

Postmortem dental record																																																																															
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Figure 7: Postmortem dental record chart

- The information obtained can be compared with the data offered by the family, dentists of the victims, and contributing private or public institutions (ante mortem data), and finally establishment of the identity.

Miscellaneous data

(Some of the manifestations an examiner has to look for include bluish color of the lips and fingernails due to hydrochloric acid, corrosion of oral mucosa due to consumption of kerosene, petrol, etc., blue line along the gum, with bluish black edging to the teeth in chronic lead poisoning, garlic smell from the oral cavity due to consumption of organophosphorus poison,



Figure 8: Suturing

garlicky pungent odor due to consumption of aluminum phosphide, etc.)

Discussion

Disaster is said to be an event, which affects multiple individuals' lives as well as properties at a given time and place. Disaster can be natural such as hurricane, tornado, flood, and earthquake or manmade such as a terrorist attack. It may affect a large number of people. If individuals remain to be unidentified, it is a source of psychological trauma to the surviving family members and friends and slows down the legal procedure. The mass disaster management team is a group of specialists which comprise the police, army, home guards, civil guards, and medical examiners such as forensic pathologists and forensic odontologists. The role of dentists is essential, especially in the DVI team.^[1,2,5,7,21] This has been noted in the case of the tsunami in 2004, the World Trade Center attack in 2001, and many more such incidents. It is necessary for the forensic identification team to have a good relation with the local or state dental association so that the identification of victims in mass disaster is speedy.

Scientifically supported positive identification, especially in mass disaster and also unidentified human remains/body require a well-organized, preplanned management.

Usually, the process of identification of unknown cadaver relies on the antemortem and postmortem data. It is very much necessary to have good access to the oral cavity to record complex finding by oral autopsy as a part of identification without disfiguring facial configuration. As a standard protocol, the photographs of unknown cadavers are obtained by DVI team members. The person performing oral autopsy has to consider taking photographs before and after oral autopsy. The photographs of both arches occlusion, restoration, and dental appliances (each appliances and restorations has to be photographed and explained) have to be taken. A detailed examination of the oral cavity helps to understand the socioeconomic status and personal habits of the victim as well as the treatment received by him/her.

Radiographs surely have a very important role in the process of identification; they provide details, which may not be registered by clinical examination, for example, the shapes of restorations, bases under restorations, dental and radicular shapes, endodontic treatments, and anatomy of the maxillary sinuses. Virtopsy or imaging methods such as orthopantomogram (OPG), computed tomography (CT), and magnetic resonance imaging (MRI) can be used; if antemortem radiographic record is available, it has to be compared with the postmortem record and this would thus, contribute as an additional element in process of identification.

An attempt can be made to help the investigating team by performing oral autopsy of an unknown deceased individual and providing the complete dental picture to the team, requesting them to contact the dentist in and around the location in which the deceased person was found.

Although many researchers such as Fereira *et al.*,^[22] Luntz (cited by Vale and Noguchi),^[22] and Jakobsen *et al.*^[22] have suggested their own methods for obtaining access to the oral cavity, each method has its own advantages and disadvantages. Primarily, the main aim of the investigative team is identification of the individual, which may solve many legal and administrative issues. Any procedure can be followed with the prime consideration of preparing a proper postmortem dental record, which may facilitate identification of the individual.

Further oral autopsy may help in thorough examination of the oral cavity in cases where death has occurred due to the consumption of poison.^[23-26] It also helps to collect the oral mucosal tissue for establishing postmortem interval.

Conclusion

Recording of postmortem oral findings are useful for future comparison with antemortem records. Accessibility to the

oral cavity is essential for recording the postmortem data. We have attempted a procedure, which is easy to perform to obtain total accessibility to the oral cavity where accessibility is a difficult by bilateral incising from the angle of the mouth to the tragus of ears and reflection of tissue. We have found the above procedure not only simpler but also faster.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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