Applications of Forensic Dentistry In Aviation Accidents

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IJASM 2016; 60(1):32 -33

Mass disasters resulting in mass human casualties may be caused by natural events, such as flooding, earthquake, or volcanic eruption and also during accidents involving mass transport by land, sea, or air. Although many accident victims are never found and identified, ethical, social and legal issues oblige us to make every effort and use all available methods to identify as many victims as possible.

Forensic dentistry is one of the fast emerging potential branches of dentistry primarily concerned with identification of individuals living or dead with the help of teeth and can be a valuable adjunct in aviation accident investigations. The special value of teeth for serving as one of the most reliable elements for identification lies in their relative indestructibility, unique features and for being one of the strongest components of the human body [1-5]. Forensic dentistry can usually be applied along with other methods of identification such as fingerprints, personal possessions and medical examination.

Dental identification is usually performed by comparison of post-mortem dentition with ante mortem records like dental charts, radiographs, study models, photographs and various military records. Identification of individuals is attempted based on individual characteristics of teeth – tooth morphology, regressive changes like attrition, hypercementosis, dental caries, restorations and impaction.

The development of aviation has been rapid and notably safe. However, the incidents involving loss of life have occurred many times. The increasing sizes of the aircraft, speed and the explosive nature of aircraft fuel have all contributed to the possibility of a disaster. The field of forensic dentistry has found one of the major areas of potential applications in the field of aircraft accident investigation.

The key to success in mass disaster identification is accurate planning, operational readiness, preparedness and team approach. A primary reason of having a team approach in the investigation team is to establish a pool of skilled labour which allows cross training among the various specialities and recognise the importance of the various observations made at the site of the accident. The investigation team may comprise of Aviation/Marine Medicine Specialist, Forensic Pathologist, Forensic Anthropologist, Radiologist Photographic expert, Finger/foot print expert and clerical assistants. Experienced dentists who have undergone a formal training or practical course in forensic dentistry are the desired staff required for being part of the investigation team.

A versatile dental kit, as described by Sir Ashley, Ford and Mason (1972) should be a mandatory requirement for dental investigation team at the accident site [6]. The universal tooth numbering system should be followed for correct interpretation of dental data.

The success of forensic dentistry in identifying a victim, living or dead lies in the accurate comparison of post-mortem data to that of ante-mortem dental records. Ante-mortem dental records can be procured from old victim photographs, dental prosthesis or orthodontic appliances, preserved dental records from military or civil institutional facilities. All post-mortem details like dental prosthesis, supernumerary teeth, congenitally missing teeth, carious lesions, regressive changes - attrition, erosion, abrasion or enamel hypoplasia, restorations, photographs and radiographs should be recorded, saved and entered in standard formats. Peri-apical X-rays & Ortho-pantomograms (OPG) are valuable aids in forensic investigations as they permit visualization of the structures of the jaws and associated areas [7].

Cases where the classical forensic identification methods fail to reach a reliable conclusion, the teeth can serve as excellent source of DNA isolation. The DNA can be used for sex determination and for establishing confirmed identity of an individual [8].

A dentist can be an active member of the DVI (Disaster victim identification) team along with specialists in respective forensic streams. A central data base record

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system with complete dentition details of each person including photographs, hard tissue and soft tissue details should be recorded and stored. The details can be digitalized and stored in a chip based storage cards with a provision of regular and periodical update. This central data base with the Digital Orthopantomogram (OPG) dental records of all serving soldiers will be a valuable asset to the Armed Forces.

Over the last decade, significant advancements have been made in the field of dentistry and forensic dentistry has been one such fast emerging potential branch. Both scientific and organisational preparation is required for the optimal utilisation of this branch.

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