



JOURNAL of FORENSIC ODONTO-STOMATOLOGY

VOLUME 31 Supplement 1 October 2013
Abstract book IOFOS Conference 2013 Firenze

THE ROLE OF FORENSIC DENTISTRY IN FIRE SCENE INVESTIGATION: DETERMINE THE DIRECTION AND THE TEMPERATURE OF FIRE BY DENTAL BIOMATERIALS EVIDENCE IN A BODY BY NOT-SO-SPONTANEOUS HUMAN COMBUSTION

Cristiana Palmela Pereira*, Joao Franco Costa, Jorge Costa Santos, Maria Cristina de Mendonça

* Ph.D., Legal Medicine and Forensic Sciences, Faculty of Medicine, University of Lisbon, Portugal - Assistant Professor, Departments of Pharmacology and Therapeutic and Dental Morphology, Faculty of Dental Medicine, University of Lisbon - Integrate Researcher from the Research Centre of Statistics and Applications of the University of Lisbon - Forensic Odontologist, Portuguese National Institute of Legal Medicine and Forensic Sciences, South Branch, Lisbon, Portugal.

The author declares to have no conflict of interest.

Fire investigation involves the examination of all fire-related incidents once firefighters have extinguished the fire. The practice is similar to the examination of crime scenes in that the scene must be preserved and evidence collected and analyzed, but with numerous additional difficulties and dangers. The primary purposes of a fire investigation is to establish the origin (seat) of the fire, the temperature of the fire, determine the likely cause, and thus conclude whether the incident was accidental, natural or deliberate.

In December 2012, the body of 89-year-old woman was discovered in her Portugal home by a member of her family. Actually, only part of the body woman's, the legs were found. The rest of her body had been burned to ashes without scientific criteria to identify her. A hole in the kitchen floor and roof was the only evidence of the fire that had killed her; the rest of the house remained perfectly intact. The first hypothesis when the crime scene investigators found the cadaver inside the home was spontaneous combustion because of the external examination of the cadaver refers to the sudden ignition of a material without an external ignition source such as aflame or spark. The phenomenon occurs as a result of exothermic chemical reactions occurring within the material, releasing heat. In cases where the material is piled together, the heat cannot dissipate effectively and so the temperature within the material rises. The rise in temperature causes chemical reactions to accelerate, producing even more heat. Spontaneous combustion tends to be characterized by the apparent source of the fire being the center of the material, as heat is dissipated more readily from the surface, thus resulting in the center reaching the highest temperature. What makes the charred bodies in this forensic case of spontaneous human combustion so peculiar is that the extremities often remain intact. Although the torso and head are charred beyond recognition, the feet, and/or part of the legs may be unburned. Also, the room around the person shows little or no signs of a fire, aside from a greasy residue that is

sometimes left on furniture and walls. However, this is scientific questionable because, first the ignition was present and second the center of the material is not the source, the fire went from the external to internal surface from the cadaver. What happened was, like in some circumstances the fat rendered from a burning body can act in the same manner as the fuel in an oil lamp or candle. If the body is positioned so that oils rendered from it can drip or drain onto an ignition source, it will continue to fuel the flames. This effect is enhanced if there are combustible fuels-carpet padding, bedding, upholstery stuffing-that can absorb the oils and act as a wick. The investigation should ideally begin with an external examination of the scene by the crime police investigators and then the interior examination of the scene is then conducted, usually with the production of the layout of the scene detailing the location of items and any bodies. Fire effects on certain dental materials can indicate the direction and the temperature of fire. As fire burns upwards and outwards, V-shaped smoke/burn patterns may be found on surfaces adjacent to the fire, with the end of the V pointing towards the point of ignition. However ventilation can affect the path or shape of V-shaped patterns. Smoke deposits of biomaterials surface scan suggest the direction, from which the fire originated, and alloys and plastics tend to melt in the direction of fire, thus distortion of such dental material scan act as directional indicators and indicators of the temperature. The Forensic Dentistry had two main issues to resolve in this particular forensic pathology case, and they were: (1) the scientific identification of the cadaver; (2) the temperature and the direction of the fire in the cadaver.

KEYWORDS: Forensic Odontology, Identification, Fire.

JFOS. October 2013, Vol.31, Sup.No.1 Pag 42-43
ISSN :2219-6749