

## Forensic Odontostomatology an Overview

Sunit Kumar Jurel\*

Faculty of Dental Sciences, Upgraded KGMC Lucknow, India

Forensic odontology is the study of dental applications in legal proceedings. The subject covers a wide variety of topics including individual identification, mass identification, and bite mark analysis. The study of odontology in a legal case can be a piece of incriminating evidence or an aspect of wide controversy. There have been many cases throughout history which have made use of bite marks as evidence. Bite marks are usually seen in cases involving sexual assault, murder, and child abuse and can be a major factor in leading to a conviction. Biting is often a sign of the perpetrator seeking to degrade the victim while also achieving complete domination. Bite marks can be found anywhere on a body, particularly on soft, fleshy tissue such as the stomach or buttocks. In addition, bite marks can be found on objects present at the scene of a crime. Bite marks are commonly found on a suspect when a victim attempts to defend him/herself.

One of the first published accounts involving a conviction based on bite marks as evidence was the “**Gorringe case**”, in 1948, in which pathologist Keith Simpson used bite marks on the breast of the victim to seal a murder conviction against Robert Gorringe for the murder of his wife Phyllis. Another early case was *Doyle v. State*, which occurred in Texas in 1954. The bite mark in this case was on a piece of cheese found at the crime scene of a burglary. The defendant was later asked to bite another piece of cheese for comparison. A firearms examiner and a dentist evaluated the bite marks independently and both concluded that the marks were made by the same set of teeth. The conviction in this case set the stage for bite marks found on objects and skin to be used as evidence in future cases.

The role of dentistry in forensic dentistry includes:

### Bite Mark Analysis

Upon collection of dental evidence, the forensic odontologists analyzes and compares the bite marks. Studies have been performed in an attempt to find the simplest, most efficient, and most reliable way of analyzing bite marks. Factors that may affect the accuracy of bite mark identification include time-dependent changes of the bite mark on living bodies, effects of where the bite mark was found, damage on soft tissue, and similarities in dentition among individuals.

Most bite mark analysis studies use porcine skin (pig skin), because it is comparable to the skin of a human, and it is considered unethical to bite a human for study in the United States. Limitations to the bite mark studies include differences in properties of pigskin compared to human skin and the technique of using simulated pressures to create bite marks. Although similar histologically, pigskin and human skin behave in dynamically different ways due to differences in elasticity. Furthermore, postmortem bites on nonhuman skin, such as those used in the experiments of Martin-de-las Heras et al., display different patterns to those seen in antemortem bite injuries. In recognition of the limitations of their study, Kouble and Craig suggest using a G-clamp on an articulator in future studies to standardize the amount of pressure used to produce experimental bite marks instead of applying manual pressure to models on pig skin.

### Age Estimation

Not only can the age of a human specimen be narrowed by evaluating the patterns of tooth eruption and tooth wear, recent studies provide evidence that cementum, the mineralized tissue that lines the surface of tooth roots, exhibits annual patterns of deposition.

### Comparison with Previous Records

At the scene of the crime, odontologists collect the skull or remaining teeth, which are taken back to the forensic laboratory for the postmortem dental investigation. X-rays are taken and if the jaw is completely intact and the dental records used to compare are recent, the job of proving a match is a relatively simple one. Dentists mark on a chart the position of missing teeth, crowns, bridges, fillings, caps, root canals and various other treatments during a patient’s routine check-up. The task of identifying a victim is made more difficult when the dentist records and x-rays are out of date or when the skull is severely damaged and has parts missing.

### Use of DNA Extirpated from Dental Pulp as a Diagnostic Tool

In the late 1980’s, with development of technology that is faster, more sensitive and more specific, the analysis of DNA caused a revolution in the field of forensic science, including forensic dentistry, anthropology and archaeology, making identification easier and more accurate. Until then only dental identification had been used, in forensic dentistry.

DNA is a molecule that builds genes, so the gene carries all genomic information that determines inherited characteristics. In the nucleus of all somatic cells in the body we find a double stranded structure of genomic DNA. Most of the cells inside the body contain organelles located in cytoplasm called mitochondria, and each mitochondria contains several mitochondrial DNA, mt DNA, molecules. A large number of mitochondria inside the cell increases the chance that the mt DNA will stay preserved for a longer period. It is the only means of identification if there are a few generations in-between people whose DNA are being compared.

### Use of Cheiloscopy in Forensic Dentistry

Cheiloscopy is a forensic investigation technique that deals with identification of humans based on lips traces. This is unique for

\*Corresponding author: Sunit Kumar Jurel, Faculty of Dental Sciences, Upgraded KGMC Lucknow, India, Tel: 09453604322; E-mail: [dentistmj1110@yahoo.co.in](mailto:dentistmj1110@yahoo.co.in)

Received March 26, 2012; Accepted March 26, 2012; Published March 28, 2012

Citation: Sunit Kumar J (2012) Forensic Odontostomatology an Overview. J Forensic Res 3:e105. doi:10.4172/2157-7145.1000e105

Copyright: © 2012 Sunit Kumar J. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

individuals like the finger prints. Lip prints are hereditary yet considered to be individualistic, each possessing their own unique characteristics. For this reason it is safe to suggest that lip prints can be included in the forensic sciences arena as a legitimate means of identifying persons of interest connected with criminal activity. Lip prints thus hold potential promise as an instrumental tool in forensic odontology.

### **Time Elapsed Since Death**

Dentistry, distinct form of forensic pathology, has little to offer, but if death has occurred, the teeth of a corpse may take on a distinctive purplish pink colour that is due to accumulation of blood breakdown products in the dentinal tubules. It appears to take from 7 to 14 days

before discoloration becomes apparent so this may give some gross indication of time of death.

Finally to conclude with, Dental practitioners should be aware of the forensic application of dentistry. Dental records that are used to provide patients with optimal dental service could also be very beneficial to legal authorities during an identification process. Therefore, all forms of dental treatments should be recorded and kept properly. Dental clinicians, other healthcare workers, are at the forefront in detecting signs of violence appearing on their patients. They should be aware of the criteria of abusive injuries, and the reporting mechanisms to ensure a correct response by the concerned authorities.