

An Overview of Forensic Dentistry

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Editorial

In criminal justice cases, forensic dentistry, also known as forensic odontology, comprises the handling, analysis, and appraisal of dental evidence. In addition to assisting investigating agencies in identifying recovered human remains, forensic dentists are involved in the identification of entire or fragmented bodies. Forensic dentists have also been found to use earlier dental data to identify fire victims. Unidentified people's age, race, occupation, past dental history, and socioeconomic status may be determined with the help of forensic dentists [1].

The age (in children) and identification of the individual to whom the teeth belong are two types of evidence that can be inferred from teeth. Dental data, including radiographs, ante-mortem (before to death) and post-mortem (after death) pictures, and DNA are used to accomplish this. Bite marks left on the victim (by the attacker), the perpetrator (from the victim of an attack), or an object located at the crime scene are another sort of evidence.

Several scientific organisations, including the National Academy of Sciences (NAS), the President's Council of Advisors on Science and Technology (PCAST), and the Texas Forensic Science Commission, have denounced bite mark analyses. There are no scientific studies or proof that bite marks can provide enough detail for positive identification. There are countless occasions where specialists' assessments of the identical bite mark evidence differ significantly. The study of dental applications in legal procedures is known as forensic odontology. Individual identification, mass identification, and bite mark analysis are just a few of the subjects covered in this course. In a legal case, odontology research might be used as incriminating evidence or as a point of contention [2].

Bite marks have been used as evidence in a number of cases throughout history. Bite marks are commonly encountered in cases of sexual assault, homicide, and child abuse, and they can play a significant role in a conviction. Biting is frequently a sign that the perpetrator is attempting to humiliate the victim while simultaneously gaining complete dominance. Bite marks can appear anywhere on the body, although they are most common on soft, fleshy tissue like the stomach and buttocks. Bite marks have also been seen on artefacts found at a crime scene. When a victim tries to defend himself, bite marks are frequently detected on the culprit [3,4].

High-profile Criminal Cases

Rev. George Burroughs was accused of witchcraft and working with the Devil in 1692 during the Salem Witch Trials, with biting his victims allegedly serving as evidence of his crimes. His bite markings, as well as other people's bite marks, were matched to the victim's bite marks. The bite marks were readily accepted as evidence by the judges, and it was the first time bite marks

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were used as evidence to solve a crime in what would become the United States. He was later found guilty and sentenced to death by hanging. He was exonerated by the state around two decades later, and his children were compensated for the unjust execution.

The "Gorringe case" in 1948 was one of the first public cases of a conviction based on bite marks as evidence, in which pathologist Keith Simpson utilised bite marks on the victim's breast to cement a murder conviction against Robert Gorringe for the murder of his wife Phyllis. *Doyle v. State*, which occurred in Texas in 1954, was another early case. In this case, the bite mark was discovered on a piece of cheese at the burglary site. After that, the defendant was invited to bite into another slice of cheese as a comparison. Both a weapons examiner and a dentist separately analysed the bite marks and decided that they were created by the same set of teeth. In this case, the conviction paved the way for bite marks discovered on objects and skin to be used as evidence in future prosecutions.

Organization

The field of forensic odontology is supported by a number of organisations. The Bureau of Legal Dentistry (BOLD), the American Board of Forensic Odontology (ABFO), the American Society of Forensic Odontology (ASFO), the International Organization for Forensic Odonto-Stomatology (IOFOS), and the Association Forensic Odontology For Human Rights are just a few of the organisations involved (AFOHR). The British Association for Forensic Odontology (BAFO) and the Australian Society of Forensic Odontology are two examples of forensic Odontological societies (AuSFO). BOLD was founded in 1996 at the University of British Columbia with the goal of developing innovative forensic odontology technology and methodologies. The forensic odontology programme at the University of British Columbia is the only one of its kind in North America.

The Royal College of Dentists of Canada does not recognise forensic dentistry, hence there is no such organisation in Canada. However, there are three well-developed and skilled forensic dental groups. British Columbia, Ontario, and Quebec are among these groups. The BC Forensic Odontology Response Team (BC FORT) in British Columbia is led by six dentists. They are mostly concerned with catastrophe victim identification.

Identification Methods

Radiograph comparison

To achieve a positive identification of an individual, antemortem and postmortem radiography records can be compared. Teeth are utilised because they are extremely resilient and resistant to harsh environments. Dental restorations as well as unique morphology for each individual can be seen on radiographs. Due to the variability of treatments and growth for each individual, dental patterns are unique, which makes them useful for human identification. The antemortem records are acquired from the dentist's existing files and compared to the radiographs taken from the deceased unknown individual.

DNA extraction

Because teeth are chemically and physically resistant to harsh environments, they are a valuable source of DNA. This approach is particularly beneficial when other DNA sources are unavailable, such as in burn victims. Teeth can be used to build a DNA profile that can be used to identify unknown

deceased people. The dental pulp, which is located under the enamel and dentin layers in the core of the tooth and includes the nerves and blood flow, is housed by dentin and enamel, which create a resistant and protective covering. Genomic and mitochondrial DNA are recovered from the pulp. Before harming the teeth, it is recommended that DNA analysis be compared to other approaches [5].

Conflict of Interest

None.

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