

# Implications of Dentition in Forensic Odontological Investigations

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## DESCRIPTION

Forensic science encompasses anthropology, biology, chemistry, physics, medicine, pathology, phonetics, psychiatry, fingerprinting, and other specialized knowledge. Modern humans have made great strides in science and technology, but they have also confronted a slew of new issues, such as major disasters, terrorism, and rising crime rates. Despite the advancements in technology and medical science that have occurred over the previous few decades, human cultures have seen a significant increase in criminal activity. It is necessary to prosecute the offender(s) in order to safeguard the law and uphold the rule of law. To convict the perpetrator or solve a crime, law enforcement and forensic science specialists use specialized expertise and procedures to obtain, inspect, evaluate, and demonstrate evidence. Since many years, forensic science has aided in the unraveling of the riddles surrounding countless cold cases that have been lingering, and it has transcended traditional methods of investigation.

Teeth serve as an effective biological reservoir for a variety of biological data, including growth patterns, food, sickness, geographic origin, migration patterns, environmental stress, and, finally, an individual's identity. They are the human body's toughest structures, able to withstand all types of traumatic and taphonomic destructions, making them ideal for determining the biological identity of highly disfigured individuals or severely damaged skeletal remains. Enamel develops during adolescence and does not change structurally later, providing long-term evidence of major life events such as protracted illness or exposure to environmental stress. They are more durable than bones and are frequently the only human remains found in forensic or bio archaeological investigations. They are the most precious and abundant source of DNA. The victim's oral hygiene and dental restorations may represent his or her living circumstances and socioeconomic class. Tailors, shoemakers, musicians, and carpenters, for example, may have distinct professional dental abnormalities that can aid in the identification of the deceased. The sockets of missing teeth can reveal whether teeth were extracted naturally or by force, aiding

in the reconstruction of events surrounding death.

The victim's teeth are crowded and pinkish in colour, indicating a violent death. Furthermore, the palatal rugae are unique to each individual and are referred to as the "fingerprints of the oral cavity." The state of a person's teeth, whether healthy or damaged, can reveal information about his or her eating habits or habitual behavioral pattern. The geological features of soil intervening among the teeth, and saprophyte invasion on the tooth dentine or cementum can operate as 'locality prints' indicating where the person was killed or died. The presence of diatoms in the oral cavity or, in some cases, in the tooth pulp, can provide information concerning drowning deaths. A person's regional association and migration history can be revealed by the elemental and isotopic makeup of their teeth. Aside from its use in determining an individual's age, the structure and condition of a person's teeth can provide hidden information about a person's health, food, and tool use. Other forensic dentistry procedures include bite mark analysis, cheiloscopy, rugoscopy, teeth prints, dental DNA analysis, elemental and isotopic compositions, radiographic analysis, and so forth.

In collapsed buildings, bones and teeth are the only forensic evidence available to help identify the victims, and teeth are critical in the identification process. There are two types of dental identification procedures: comparative and reconstructive identification. The primary and most widely utilised test is to compare the ante-mortem dental record with post-mortem data to determine if they belong to the same person or not. The fundamental concern in this method is that post-mortem dental data will be compared to ante-mortem dental records such as dental casts, written data, and dental X-rays in order to establish identity. People with numerous and intricate dental restorations or procedures are frequently easier to spot than those who have had little or no dental work done. Due to the lack of ante-mortem dental records repositories in India, identification errors are common. Reconstructive identification is the second approach, which is used when there is no ante-mortem dental record to compare. In these cases, the forensic odontologist

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reconstructs the person profile solely based on the characteristics of the dental data available. Digital odontometrics and radiological metrics of teeth, made possible by technological improvements in computer programmes, aid in comparing postmortem data with antemortem data for personal

identification, particularly in circumstances when fingerprint or facial traits are unavailable. Post-mortem data is frequently generated by forensic odontologists based on detailed mapping of dental anatomy and radiography.