

Deoxyribonucleic acid profiling in forensic dental identification

Sir,

Forensic odontology is that specialty of dentistry, which deals with the proper handling and examination of dental evidence and the proper evaluation and presentation of dental findings in legal interest.^[1] When conventional dental identification methods fail, deoxyribonucleic acid (DNA) material from teeth can provide the necessary link to prove identity.^[2] Teeth represent an excellent source of DNA material because of the resistant nature of dental tissues to environmental assaults such as incineration, immersion, trauma, mutilation and decomposition. The neurovascular tissue that is confined within the pulp cavity is thought to be the best source of DNA. The coronal pulp chamber, odontoblastic processes, cellular cementum and radicular canals are the target areas of the teeth from which DNA can be extracted.^[1] The relative size of the dental pulp will vary in individual classes of teeth and molars are the better sources of pulpal DNA than incisors. The root body is the region with the greatest yield of DNA followed by crown body, root tip and the crown tip. DNA recovered from the teeth of an unidentified individual can be compared with a known ante mortem sample or to a parent or sibling.^[3] The ante mortem sample may be stored blood, hair brush, clothing, cervical smear and biopsy.

The principal laboratory methods used to compare and to evaluate fragments of DNA material from a suspect or victim are restriction fragment length polymorphism and polymerase chain reaction analyses.^[1] The method currently preferred to extract as much high quality DNA as possible is a method called cryogenic grinding.^[4] This technique involves cooling the whole tooth to extremely low temperatures using liquid nitrogen and then mechanically grinding to a fine powder. The major disadvantage of this method is that the tooth needs to be completely crushed.

Other common techniques, which have been executed to isolate and recover DNA from human teeth include

horizontal section, vertical split and conventional endodontic access.^[4] Horizontal sections through the interface between the crown and root will allow the investigator to study both the radicular and coronal pulp morphology. Vertical split technique allows convenient access to the entire length of the pulp chamber. The main drawback of the conventional endodontic access is the disruption of the occlusal surface of the tooth and the inability to predict the thoroughness of pulp debridement. In the present scenario, DNA evidence can be used in hand with dental evidence. When the dental pattern of an unidentified individual and the suspected victim are the same, forensic DNA testing should be attempted.

Thorakkal Shamim

Department of Dentistry, Government Taluk Head Quarters Hospital, Malappuram, Kerala, India

Address for correspondence: Dr. Thorakkal Shamim, Shangrila, Parappanangadi - 676 303, Kerala, India.
E-mail: shamu3duad@gmail.com

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