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Digital Prosthodontic Echoes: Forensic Dental Techniques Revealing Lost Identities

Dr. Jincy G, Dr. Athira K S, Dr. T C Giri, Dr. Allen Jim Hines, Dr. Junu Henry, Dr. Celin Joel

Corresponding Author: Dr. Jincy G, Senior Lecturer, Department of Prosthodontics, Sree Mookambika Institute of Dental Sciences Kulasekharam, Tamil Nadu

Email Id: serviceheb@gmail.com

ABSTRACT

Forensic dentistry is a vital component of human identification in criminal investigations, mass disasters, and cases involving mutilated or decomposed remains. Among dental specialties, prosthodontics plays a significant role due to its involvement in dental restorations, prostheses, maxillofacial rehabilitation, and implant therapy, all of which may serve as reliable forensic evidence. Prosthodontists possess specialized expertise in dental materials, prosthetic design, occlusion, craniofacial anatomy, and implant systems, enabling accurate interpretation and comparison of antemortem and postmortem dental records.

The advent of digital technologies has transformed forensic prosthodontics by improving accuracy, reproducibility, and efficiency. Digital tools such as intraoral scanning, cone-beam computed tomography (CBCT), digital radiography, computer-aided design/computer-aided manufacturing (CAD/CAM), three-dimensional (3D) printing, and virtual facial reconstruction facilitate precise documentation, long-term data storage, and reliable comparison of forensic records. Digitally fabricated prostheses incorporating laser markings, barcodes, or radio-frequency identification (RFID) tags enhance traceability and durability under extreme conditions. Furthermore, digital analysis of palatal rugae, dental implants, bite marks, and maxillofacial prostheses minimizes observer bias and strengthens forensic outcomes.

With the increasing prevalence of digitally driven prosthodontic practice, prosthodontists are emerging as key contributors to multidisciplinary forensic teams, highlighting the importance of systematic digital record maintenance in routine clinical practice.

Keywords: Forensic dentistry; Prosthodontics; Digital dentistry; Human identification; Dental implants; CAD/CAM; Forensic odontologist

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