



## Odontology Section - 2015

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### G53 Application of Digital Laboratory and Clinical Dental Evidence

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After attending this presentation, attendees will be informed about a new and increasing source of dental evidence to assist in casework.

This presentation will impact the forensic science community by increasing awareness of antemortem digital data sources as well as by opening discourse on the associated concerns and potential issues.

Advances in technology have rapidly changed the way the dental profession diagnose and treat their patient population. Initially, advances in computer technology were directed toward practice management. In more recent times, these advances have been directed in the diagnostic and restorative disciplines of dental practice. Computer matching software as well as digital radiography have played a significant role in mass disasters and most medical examiners' offices. Now digital restorative dentistry, besides modifying how patients are treated and methods of practice, provides a new and unique application and valuable source of antemortem information.

In situations such as a mass disaster or the discovery of unknown remains, the location of quality antemortem dental records is a critical step in the identification process. Through the years, forensic dentists have been very innovative in their methods of locating useful dental records. When reaching roadblocks through the normal pathway of collecting evidence from dental care providers, other avenues have been followed. These have included non-traditional methods such as medical radiographs of the skull, photographs, insurance company data, and military records. Requirements or mandates for dentists to maintain records vary from state to state. In the United States, the time frame can range from no mandate to ten years. There are regions of Canada that mandate up to 30 years of retention. During the search for records, there are times that dead ends are met and records have been purged with no recovery possible. History has also shown that the disaster itself can destroy the antemortem evidence. This was true in the crash of Arrow Flight 1285 in Gander, Newfoundland, and during hurricane Katrina.

The advances in digital dentistry have added a whole new dimension and data source in antemortem record acquisition. Digital scans of the dentition for prosthetic fabrication, orthodontics, protective mouth guards, and other oral appliances have become commonplace in dental practices and will only increase in time. Digital scans have been used for study models, single crowns, bridges, complete full dentures, implant design and fabrication, and orthodontic applications. This digital data may be stored in the office of the provider or in the dental laboratory's database. Being able to follow leads to connect the dots and locate the data may be frustrating, but in the end may be very rewarding.

These records will provide restorative information along with anatomical variances. Through these records, dentist can acquire 3D dental casts or models as well as high-definition digital photos. 3D printers can fabricate dental casts from the stored data. These records can be useful to compare restorative patterns, tooth position shape and size, and other possible identifiers such as rugae patterns. Besides the anticipated problems associated with locating these records, concerns associated with data storage need to be considered. The potential for data to be purged based on limits of storage capacity is a real issue. These issues will need to be addressed and possibly require legislative action and mandates. Custodial issues as well as ability to access, manage, and utilize the data are other concerns.

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#### **Digital Dental Evidence, Technology, Antemortem Records**