F23 Analysis of Dental Evidence From the Crime Scene

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After attending this presentation, attendees will be familiarized with the use of Scanning Electron Microscopy/Energy Dispersive X-ray Spectroscopy (SEM/EDS), Fourier Transform Infrared Spectroscopy (FTIR), and Polarizing Light Microscopy in identifying trace dental evidence.

This presentation will impact the forensic science community by documenting the use of these technologies, Scanning Electron Microscopy, FTIR, and Polarizing Light Microscopy in analyzing a solid fragment, and possibly connecting it to the crime committed.

The presentation will emphasize the usefulness of SEM/EDS, FTIR, and Polarizing Light Microscopy, and their respective databases in the dental and general forensic communities.

During the commission of a crime, many types of trace evidence may be left behind. The challenge for the forensic team, besides collecting this evidence, is to analyze the specimen, and either confirm or deny its connection to the perpetrator or victim. Through SEM/EDS, a suspected tooth fragment can be assessed, and its chemical elemental composition determined. Though this will not positively identify the origin of the fragment, an elemental spectral comparison to a known sample can show whether it is consistent with tooth structure. Polarizing Light Microscopy and FTIR are two more methods which can be used. These analyses can determine the molecular and chemical structure of the fragment, for example, the carbon chain orientation. Once again, the results from Polarizing Light Microscopy and FTIR need to be compared to a known subject. A database of these “knowns” can be accumulated by the investigating institution, or as in the case of SEM/EDS, access to the FBI’s (SLICE) database can be obtained. The author will document the use of these technologies, Scanning Electron Microscopy, FTIR, and Polarizing Light Microscopy in analyzing a solid fragment, and possibly connecting it to the crime committed.

SEM/EDS Analysis, Trace Dental Evidence, FTIR

 ** Presenting Author*