



## Physical Anthropology Section – 2008

### H58 Studies in Isotopic Variability: Investigating Human Tooth Enamel

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After attending this presentation, attendees will learn about the various types and opportunities for isotopic variability within human tooth enamel studies. In particular issues of inter-tooth and intra-tooth variability, and sampling techniques will be discussed.

This presentation will impact the forensic community by investigating and highlighting the sources of isotopic variability in tooth enamel studies that are of most concern to forensic anthropologist performing isotopic analysis.

Stable isotope analysis has provided the forensic community with a powerful tool for determining region of origin and migrational patterns in modern populations. However, for forensic scientists isotopically analyzing region of origin in living populations sample consistency can be difficult to maintain. There are a number of scenarios that can affect the isotopic outcome ranging from dissimilar comparative samples to differing sample techniques. Creating baseline comparatives and even comparing samples between populations works best when samples are chemically similar (same tooth or bone type). Unfortunately, similar samples from a given population maybe difficult to obtain, and there are few studies on modern populations documenting the isotopic variability present within different teeth of a given individual or within the enamel of a given tooth. After attending this presentation, attendees will learn about the various types and opportunities for isotopic variability within human tooth enamel studies. In particular issues of inter-tooth and intra-tooth variability, and sampling techniques will be discussed. This presentation will impact the forensic community by pinpointing the sources of isotopic variability in tooth enamel studies that are of most concern to forensic anthropologist performing isotopic analysis.

Anthropologists have been using stable isotope technologies to investigate the dietary habits and migrational patterns of archaeological populations for decades. However, stable isotope analysis of modern humans within a forensic context is relatively recent. Since 2000, forensic anthropologists have begun to explore the application of stable isotopes to studies on migration and region of origin determination of modern populations. The isotopic analysis of modern forensic material presents unique obstacles previously non-existent within archaeological populations. For forensic anthropologist, investigating region of origin the major obstacles of concern are the isotopic effects of the modern diet, and sample population similarity. Each of these areas represents major points of potential variability within modern samples. In addition to the inherent isotopic variability of modern samples, sample collection methodologies and mass spectrometry choices can contribute variation to value outcomes. Unfortunately, the literature contains few references investigating the effects of these obstacles for modern population studies. For researchers, understanding and investigating these obstacles is critical to the maintenance and reporting of quality science

#### References:

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#### Stable Isotope Analysis, Variability, Tooth Enamel