

## **Citrate Content of Bone: A Potential Measure of Postmortem Interval**

The reliable and accurate determination of the postmortem interval (PMI) of human skeletal remains continues to be a major problem in forensic science. The PMI is a crucial piece of information for forensic scientists and medicolegal investigators, since knowledge of the PMI can lead to identification of victim(s) and/or suspects in criminal cases by establishing the time dimension in investigations. Current chemical methods (e.g., luminol or radiodecay) lack the accuracy and/or precision necessary to provide reliable PMI values. Schwarcz et al. (2010) have suggested that citrate, which is bound to the calcium on the surface of bioapatite crystal comprising cortical bone, decreases in concentration with an increase in PMI and that the rate does not depend significantly on storage conditions. This method may provide a promising approach to PMI determination of skeletal remains; therefore it warrants further investigation. The main objectives of this research are to validate, further optimize, and develop the method, applying it to the analysis of fresh and known aged human bone samples. A UV-Vis based biochemical assay and a high-performance liquid chromatography method were used to determine citrate content in bone samples. Preliminary studies involved the analysis of fresh and aged pig bone samples to obtain a baseline citrate value and to evaluate the relationship between citrate content and time as a model for human bone. Human bone samples of known age were also analyzed to test the applicability and robustness of the method. Results from these studies along with those from optimization studies and calibration will be presented.

*Keywords: Forensic Science, Postmortem Interval, Citrate*