



Physical Anthropology Section - 2012

H44 The Contribution of the Artificial Radiocarbon Dating Method in Determining the Medicolegal Relevance in Skeletonized Human Remains Cases: Experiences in Chile

Macarena Arias, BS, and Ximena Leiva, BS, Servicio Médico Legal de Chile, Avenida La Paz 1012, Santiago, CHILE*

After attending this presentation, attendees will appreciate the significant value of radiocarbon analysis in forensic cases.

This presentation will impact the forensic science community by showing how time-since-death of skeletonized remains obtained using radiocarbon analysis, can help establish their medicolegal relevance.

The estimation of time-since-death (TSD) of skeletal remains is one of the most important tasks in the forensic field; by defining the age of a skeleton, forensic anthropologists can determine the medicolegal relevance of the finding. Moreover, regarding the particular history of Chile, this determination provides evidence for the probable link between some remains and some of the victims of the military dictatorship (1973-1990) who are still missing.

This presentation discusses the experience of the Unidad Especial de Identificación Forense, of the Servicio Médico Legal de Chile, in relation to the estimation of this parameter using the Modern Radiocarbon Method (post-bomb). This method is based on the dramatic increase in the concentration of atmospheric carbon-14 between 1950 and 1963 as a result of nuclear tests. Although these levels have declined steadily in recent decades, they have never been as low as those known before 1950.

Since humans incorporated the atmospheric carbon-14 during this period, the concentration of this element in the different tissues can be measured. Depending on their particular rate of cell renewal, some tissues will express atmospheric carbon-14 concentrations in close to the birth date of the individual, while others will show the concentration of this element near the time of death. Next, the radiocarbon values reflected in the different tissues are compared with the annual averages of the atmospheric carbon-14 concentration curve defining the time during which that person lived.

In 1990, 20 bags containing mummified human remains were recovered from a mass grave within the Pisagua cemetery, in the north of Chile. They were identified as 19 victims executed during Pinochet's dictatorship. However, there was one bag with different characteristics, called "Bolsa N° 20", which could not be associated to the same inhumation context. The uncertainty surrounding this case lingered for over 15 years until 2008 when a radiocarbon analysis showed that these corresponded to a prehistoric inhumation.

Since this case, the Unidad Especial de Identificación Forense has sent several samples such as hair, teeth, and bone for radiocarbon analysis; these samples were related to more than thirty cases without a clear temporal context. Through this method, it has been possible to define time-of-death with a high level of accuracy, including cases within the temporal framework of forensic relevance, or excluding cases that belong to periods of prehistoric or historic colonial interest.

Artificial Radiocarbon, Time of Death, Skeletonized Human Remains