

A69 Taphonomic Effects of Acidic Soil on Human Remains in Japan: A Preliminary Study

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Learning Overview: After attending this presentation, attendees will be more familiar with unique taphonomic features in human osseous remains that indicate prolonged exposure to acidic soil.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by introducing the effects of unusual decompositional processes that may be mistaken for non-taphonomic alterations to the analyst unfamiliar with the effects of acidic soil on human remains.

Criminal investigation methodology has a long history in Japan, though research in forensic anthropology has been somewhat limited, possibly due to historically low crime rates, a lack of forensic research facilities, and reluctance among people to donate their bodies to science, owing to various cultural concerns, though the latter issue is slowly changing.¹⁻⁴ Because of the current status of forensic anthropology in Japan, certain archaeological collections can provide valuable insight into the taphonomic effects that result from prolonged postmortem contact with the soil found there.

The islands of Japan are volcanically active, which has had an effect on soil composition. The soil of central and southern Japan are mainly Ultisols or Oxisols, with average pH levels of 6.5 to 4.5 and are relatively low in iron.⁵ The low pH levels, indicating high acidity, are due mainly to the sulfurous compounds found in volcanic emissions such as ash.⁶ Due to this high soil acidity, bones and other organic materials generally do not preserve well, unless they are deposited in such a way as to seal them off from the soil matrix and/or they are deposited in a very alkaline environment, such as shell middens.⁷

The archaeological collections used in this study to examine the effects of an acidic environment on human remains were all recovered from sites dated to the Yayoi period (~900 BCE to 250 CE) in either western Honshu or northern Kyushu. Yayoi burials of this region were either inhumations without a burial container, or the bodies were placed in wooden coffins, stone sarcophagi, or in large ceramic jars called *kamekan*.⁸⁻¹² These different styles of interment afforded varying levels of protection, which resulted in an observable gradient in preservation. There are fewer extant human remains from later periods due to a decline in the use of durable containers and a gradual tendency toward cremation as a means of disposal. Thus, Yayoi period burials of this region are optimal for study here.

Observations among recovered remains reveal that the acidic soil can have a detrimental effect on bones, but with some recognizable patterns of cortical attrition. Direct contact with the soil can result in a slow dissolution of the structure, while the portion of the structure not in contact with the soil may remain intact. If a burial container became compromised during interment, water dripping on the remains could result in highly conserved taphonomic defects. Recognition of the results of prolonged deposition in this environment is important to avoid conflating this particular postmortem alteration with a non-taphonomic etiology.

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Taphonomy, Decomposition, East Asia