



A38 Age-at-Death Estimation From the Auricular Surface of the Ilium: A Comparison of Two Methods

Andrea Ost, MS*, Erie, PA 16507; Luis L. Cabo, MS, Mercyhurst University, Erie, PA 16546

Learning Overview: After attending this presentation, attendees will better understand two different methods for age-at-death estimation from the auricular surface and how their scoring criteria can influence the obtained age estimates.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by further demonstrating the utility of the auricular surface as a skeletal age marker, particular in aging older individuals.

Accurate age-at-death estimation (*aging*, hereafter) is important for both paleodemographic studies and forensic casework. The most popular aging methods use the cranial sutures, sternal rib ends, pubic symphysis, and auricular surface of the ilium. Although these conventional methods are well-validated, all of them share a common problem in the lack of precision of their age estimates for older individuals (generally over 60 years).

Two auricular surface component methods have shown promising results in improving the estimates for older individuals. The first method, developed in 2005 by Igarashi and colleagues on a Japanese sample ($N=700$), scores the auricular surface on a binary scale for the presence/absence of 13 traits.¹ Igarashi et al. includes separate equations for males and females, which is discordant with methods popularly employed in the United States. The present study compares Igarashi et al. to Transition Analysis, developed in 2002 by Boldsen et al.² Transition Analysis uses Bayesian conditional probabilities to combine multiple skeletal age indicators, including the auricular surface, into an age estimate that can be performed with fragmentary remains. This study tested the utility of these two methods on a sample of 400 individuals, aged 16–93 years, from the Hamann-Todd Collection.

Accuracies were compared between groups through goodness-of-fit tests, and Spearman's rank-order correlation was utilized to assess the correlation with age of both overall method and individual trait scores. Igarashi et al. tended to underage both males and females, with the latter significantly more underaged.² The development of sex-specific equations with this method did not markedly increase accuracy. Although Igarashi et al. does not appear to accurately estimate age at death, some of its unique traits do show a high correlation with age, indicating that these traits ought to be reexamined. Transition Analysis, despite exhibiting disparate distributions in the middle age ranges, displayed unprecedentedly high accuracy rates in the young and, particularly, the old age classes. Furthermore, although the auricular surface is not meant to be used in isolation with Transition Analysis, the documented ages of the individuals fell into the range provided by the method 87.5% of the time. When combined with other skeletal indicators that could have more utility in the middle age ranges (e.g., pubic symphysis and cranial sutures), this method may provide both precise and accurate results for all age classes. In conclusion, this research demonstrates that, when analyzed according to scorable changes, the auricular surface shows high potential for aging older individuals.

Reference(s):

1. Boldsen, Jesper L., George R. Milner, Lyle W. Konigsberg, and James W. Wood. Transition Analysis: A New Method for Estimating Age from Skeletons. In: *Paleodemography: Age Distributions from Skeletal Samples*, edited by Robert D. Hoppa and James W. Vaupel, 73-106. Cambridge: Cambridge University Press, 2002.
2. Igarashi, Yuriko, Kagumi Uesu, Tetsuaki Wakebe, and Eisaku Kanazawa. New Method for Estimation of Adult Skeletal Age at Death from the Morphology of the Auricular Surface of the Ilium. *American Journal of Physical Anthropology*. 128 (2005): 324-339.

Age Estimation, Auricular Surface, Transition Analysis