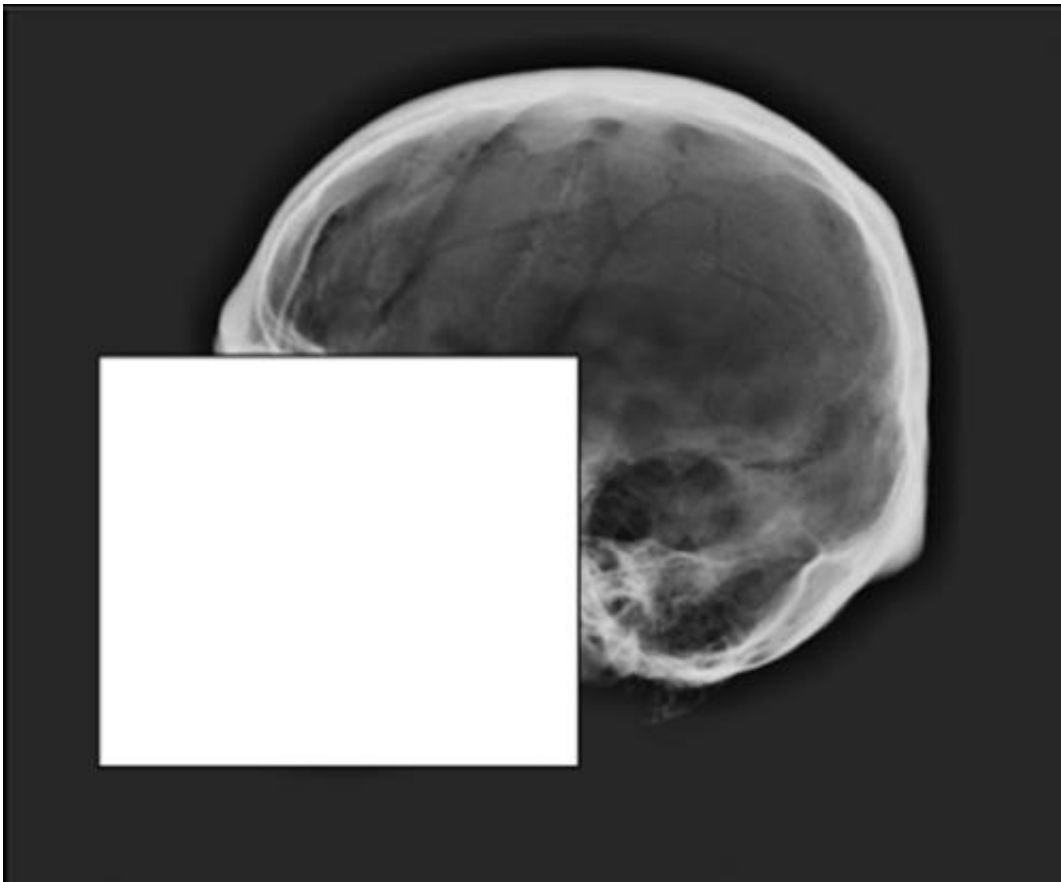


Study raises questions about longstanding forensic identification technique

December 11 2013, by Matt Shipman



This X-ray image shows the cranial vault outline of a skull. [Click to enlarge.](#)
Credit: Ashley Maxwell.

Forensic experts have long used the shape of a person's skull to make positive identifications of human remains. But those findings may now

be called into question, since a new study from North Carolina State University shows that there is not enough variation in skull shapes to make a positive ID.

"In a lot of cases, murder victims or the victims of disasters are from lower socioeconomic backgrounds and don't have extensive dental records we can use to make a match," says Dr. Ann Ross, a forensic expert and professor of anthropology at NC State who is senior author of a paper on the new study. "But those people may have been in car accidents or other incidents that led them to have their skulls X-rayed in emergency rooms or elsewhere. And those [skull](#) X-rays have often been used to make IDs. I've done it myself.

"But now we've tried to validate this technique, and our research shows that the shape of the skull isn't enough to make a positive ID," Ross says.

At issue is the "cranial vault outline," not the "face" of the skull. The cranial vault outline is the profile of the skull when viewed from the side, running from just above the bridge of the nose to the point where the skull and neck meet.

For the study, the researchers surveyed 106 members of the American Academy of Forensic Sciences. Survey [participants](#) were asked to evaluate 14 antemortem X-rays and five postmortem X-rays. Participants were then asked to match the 5 postmortem X-rays with the appropriate antemortem X-ray, effectively establishing a positive ID.

But the researchers found that only 47 percent of the participants made accurate identifications on all five skulls. Participants who have Ph.D.s did slightly better, with 56 percent of them getting all five correct. (The test has been made available here so that anyone can take it.)

"This doesn't mean that cranial vault outlines aren't useful," says Ashley

Maxwell, lead author of the paper and a former graduate student at NC State. "For example, outlines can be valuable if teeth or other features are missing or have been destroyed. But it does mean that cranial vault outlines shouldn't be given too much weight.

"The more characteristics we can take into account, such as facial features and cranial vault outlines, the more accurate we can be," Maxwell says.

More information: "A Radiographic Study on the Utility of Cranial Vault Outlines for Positive Identifications." Ashley B. Maxwell and Ann H. Ross. *Journal of Forensic Sciences* Nov. 25, 2013. [DOI: 10.1111/1556-4029.12346](https://doi.org/10.1111/1556-4029.12346)

Abstract

A standard method for positive identification is the use of antemortem and postmortem radiographic comparisons. The purpose of this research is to test the visual accuracy of antemortem and postmortem radiographic comparisons of cranial vault outlines and to evaluate their uniqueness using geometric morphometric methods. A sample of 106 individuals with varying levels of education and forensic case experience participated in a visual accuracy test. Of the 106 individuals, only 42% correctly assigned all of the radiographs, with accuracy rates ranging from 70 to 93% for each radiographic comparison. Vault shape was further examined using elliptic Fourier analysis, and paired t-tests were computed on the first 10 principal components accounting for 100% of the variance, which found no significant differences. The visual accuracy test and elliptic Fourier analysis shows that vault outlines may not be unique enough for positive identifications when used as a sole indicator.

Provided by North Carolina State University

Citation: Study raises questions about longstanding forensic identification technique (2013, December 11) retrieved 18 April 2024 from <https://phys.org/news/2013-12-longstanding-forensic-identification-technique.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.