



## Physical Anthropology Section – 2004

### H37 The Zygomaticomaxillary Suture: A Study of Variability Within *Homo Sapiens*

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After attending this presentation, attendees will understand how one can use zygomaticomaxillary suture patterning to aid in the identification of an individual's ancestry.

This research will have an immediate impact throughout the field of forensic anthropology because it illuminates previous studies and gives more detailed insight into population biology.

This research examines the frequency of occurrence of different zygomaticomaxillary suture shapes/forms among major populations of *Homo sapiens*. This study tests the hypothesis that zygomaticomaxillary suture shapes do not differ in frequencies within various major populations of *Homo sapiens*. This research expanded on a previous study (n=133) by examining a sample size of 769 individuals from eleven major worldwide populations. Frequencies of these two suture shapes were determined for each of the populations and this evidence was used to determine the forensic utility of this trait. Populations examined for this study include U.S. Whites, American Indians from the Southwest, American Indians from the Great Plains of North America, U.S. Blacks, Japanese, Northern Chinese, Southeastern Chinese, Mongolians, Australian Aborigines, Peruvians, and East Polynesians from Easter Island.

The primary goal of this research is to assess the frequencies of suture shapes within a sample that represents many of the world's major populations. A second objective of this study is to determine whether or not other suture shapes exist besides the curved and angled forms described in previous studies. The third goal has been to determine the forensic utility of using suture patterning to aid in the identification of an individual's ancestry.

Two methods, a visual assessment and a metric assessment, are used to classify the angled and the curved suture patterns. For many years, the visual method was accepted as the standard way to assess the zygomaticomaxillary suture pattern. While testing the visual method, the author found that many individuals are hard to assess visually, meaning it is difficult to tell whether they have angled or curved patterns. These borderline patterns appear to look 'straight' until the use of metrics allows one to determine reliably whether the pattern is angled or curved. Through testing, the author established a more accurate method using calipers to take three measurements along the suture. The three measurements taken along the suture are: M1= zygoorbital breadth; M2 = bimaxillary breadth; and M3 = widest breadth along the sutures at any point above the bimaxillary points. These measurements allow for the assessment of the overall suture pattern for an individual in a manner that is more objective, replicable, and testable.

After collecting data from 11 different populations (n=769) the null hypothesis was rejected. As a result of this study it was discovered that many populations do pattern well and have significantly higher frequencies of angled or curved forms. The author established that the previously documented curved and angled forms are the only two shapes that consistently pattern well within populations. Furthermore, the author determined that this trait is forensically useful in assessment of ancestry, however, it is not as definitive as suspected in previous studies. This research also revealed the weakness in using one trait solely for race attribution. The zygomaticomaxillary suture is a useful forensic trait *only* when combined with the many others used to assess ancestry. With documented suture pattern frequencies for many populations, forensic anthropologists will now know what the probability of assessing ancestry is using zygomaticomaxillary suture patterns. This research will have an immediate impact throughout the field of forensic anthropology because it illuminates previous studies and gives more detailed insight into population biology.

**Forensic Anthropology, Zygomaticomaxillary Suture, Ancestry**