



## Physical Anthropology Section – 2005

### H14 Unusual Cranial Base Trauma in Victims of the Khmer Rouge

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After attending this presentation, attendees will be familiarized with an unusual pattern of cranial trauma observed in skeletal remains of Khmer Rouge victims.

This presentation will impact the forensic community and/or humanity by disseminating information to the forensic community regarding a pattern of trauma stemming from extreme interpersonal violence. Hypothetical scenarios will be proposed concerning the specific origin of this trauma.

The skeletal remains described in this study represent victims of the Khmer Rouge; the remains are currently housed in a memorial stupa at Choeung Ek, near Phnom Penh, Cambodia. Between 1975 and 1979, approximately 15,000 men, women, and children were executed and buried in mass graves at Choeung Ek. It is likely that most of these individuals were originally detainees in Phnom Penh's Tuol Sleng prison. In the early 1980s, Vietnamese officials excavated roughly half of the mass graves at Choeung Ek. When the remains were disinterred, they were disarticulated, sorted by bone type, and later stored in a stupa built on the site. The Cambodian government now administers the site as a museum and it is popularly referred to as "the Killing Fields," although numerous such sites are scattered throughout Cambodia.

Witness accounts suggest that members of the Khmer Rouge generally avoided using up scarce ammunition on executions – gunshot was not necessarily the standard method of execution. Alternate means such as stabbing, strangulation, suffocation, and bludgeoning were often employed instead.

A random sample of 85 crania housed in the stupa was examined for morphological variation and trauma. Subadult crania were excluded and a sex estimate was recorded for each individual. Sex estimates were based solely on cranial morphology, as all crania were disassociated from their respective post-cranial portions. Since sex and age estimates were fairly generalized, patterns of differential execution treatment were difficult to assess.

Out of the 85 crania examined at Choeung Ek, ten individuals (12%) display blunt force trauma to the occipital. The trauma typically presents as a sizeable loss of the occipital bone from the middle of the foramen magnum to the external occipital protuberance (roughly between opisthion and opisthocranium). Half of the fractures are focused centrally on the squamous portion of the occipital, the other are oriented to the left or right. In several cases, the foramen magnum is fractured posterior to the occipital condyles; in many cases the entire occipital base is absent. The breakage pattern includes fractures that migrate across the sphenoccipital sutures and into the lesser wings of the sphenoid. Often, fractures run from the margins of the missing bone toward lambda and the mastoid processes. Some of these fractures even split large external occipital protuberances. Multiple blows are apparent on several crania. Radiating fractures are visible on nearly all crania; concentric fractures are associated with some as well. Beveling is present on the margins of the affected bones, typically on the inner table, though a few instances of external beveling occur, suggesting that differential forces were applied to the cranial base.

The cranial trauma appears to represent a unique and deliberate pattern of execution. While most interpersonal violence is directed at the face, forehead, and sides of the head, here it is directed at the cranial base. Two possible methods of producing the observed trauma are proposed. One hypothesis is that the individuals were struck while in a crouched "execution-style" position, much the same as would be appropriate for a beheading. A second possibility is that the executed individuals were struck with an upswing directed at the skull base, while standing. In either case, this trauma demonstrates an effort to maximize the effectiveness of the blow - this area of the skull is strongly supported, but potentially sensitive because of its connection with the spinal column.

**Forensic Anthropology, Cranial Trauma, Execution**