History of health in the Chinese Bronze Age: Results from five seasons of the Mogou bioarchaeology project

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Project background

The Mogou cemetery, in Lintan County, Gansu Province, China, was excavated from 2008-2012 by the Gansu Provincial Institute of Cultural Relics and Archaeology and the School of Cultural Heritage of Northwest University. The cemetery dates to 1750-1100 BCE, the middle and late Bronze Age material culture horizons of Qijia and Siwa. It is located in the Tao River Valley, in the upper Yellow River drainage, in the western Loess Plateau. The site yielded 1688 graves and over 5000 skeletons. Bioarchaeologists from Cambridge University were initially invited to do an inventory and analysis of the human remains. The team began work in 2015, and grew to include scholars and students based in or originating from China, the UK, the US, Canada, and Singapore. The team has visited the collection five times, growing to 8+ participants in the last two seasons. The work has included some post-excavation organizing and curation, as well as basic inventory, and collecting data on paleopathology, metrics, and paleodemography. The hope is to eventually analyze the entire skeletal series, while training Chinese and foreign students in skeletal analysis. Other teams and graduate projects, primarily from within China, have conducted or are in the process of conducting analyses of dietary stable isotopes, human aDNA, and pathogen aDNA.

Findings to date

The bioarchaeology team has collected data on approximately 760 individuals so far. Preservation is generally very good at the site, and the collection includes individuals from neonatal to old adult ages at death, making it an ideal collection for assessing Bronze Age social, environmental, and health changes in Northwest China. An initial analysis found the prevalence of nonspecific indicators of physiological stress (41.6% of individuals with CO/PH, 43.1% of individuals with dental enamel hypoplasias, 47.1% of individuals with subperiosteal new bone formation on the appendicular skeleton) are higher than those at other published sites in the region. The population also experienced a notably high prevalence of interpersonal violence (11.4% of adults), largely perimortem cranial trauma. Eleven adult individuals have presented with healed circular trepanations on the parietal bones, which appear to be ritualistic rather than medical, given the consistency in location and size, as well as the lack of other cranial pathological lesions in these individuals. The cemetery has also yielded individuals with lesions suggestive of a range of specific infectious, metabolic, and congenital illnesses (including tuberculosis, scurvy, DISH, ankylosing spondylitis, and carcinomas), for which radiographic and DNA analyses are ongoing.

Analyses in progress

The Gansu Institute is still seriating the grave goods from the large number of excavated graves, so a detailed temporal analysis is pending, but it is known which areas of the cemetery come from the early Qijia occupation, the late Qijia occupation, and the smaller Siwa occupation. We plan to examine changes through time in measures of health and paleodemography. These can then be correlated with regional settlement data and climate change proxies to understand the interaction of cultural, technological, and biophysical factors in the human skeleton. Analyses are in progress to examine the relationship between fertility, morbidity, and mortality and environmental conditions; changes in fine-grained oral health data through time for dietary reconstruction; distribution of osteoarthritis within the skeleton and across the population, as well as metric analysis, to reconstruct changes in mechanical stressors and activity; and specific cases of presumed disability due to congenital conditions and injuries. Specific infectious diseases are also being examined through aDNA analysis by collaborators at Fudan University. We anticipate a continuing fruitful long-term international collaboration, and the chance to train many future cohorts of students.

References


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