

A BIOARCHAEOLOGICAL INVESTIGATION INTO THE HUMAN REMAINS DISCOVERED IN THE CHLOOKOP AREA

A Meyer, WC Nienaber, N Keough

Department of Anatomy, School of Medicine, Faculty of Health Sciences, University of Pretoria

Introduction

Forensic anthropologists are consistently required to analyze human skeletal remains from both forensic and archaeological contexts. Standard physical anthropological methods are applied to both of these cases in the hope of obtaining an osteobiological profile (age, sex and ancestry). For death investigators in a forensic context these profiles may aid in the identification of individuals which are most often victims of crime. Osteobiological profiles of archaeological remains are important for other reasons. These profiles provide information pertaining to the environment and health status of these individuals when they were alive which may help us understand the lifestyles of past peoples.

In November 2008 human skeletal remains were discovered during construction works undertaken by Carlop Properties in the Chlookop industrial area, Kempton Park, Gauteng. The Forensic Anthropology Research Centre (FARC) of the University of Pretoria was notified and rescue excavations of both the exposed and undisturbed remains were undertaken. Excavations revealed a formal burial pattern which suggests a formal cemetery, probably associated with a historic institution. Two large factories were constructed in the Chlookop area, the Modderfontein Dynamite Factory (circa 1895-1950s) and the Klipfontein Organic Products Factory (circa 1941-1970s). These factories employed large numbers of laborers and provided most of them with living quarters on the factory premises. Medical care was also provided to Modderfontein Dynamite Factory employees by means of an on site hospital. Through physical anthropological analysis a preliminary profile of the Chlookop remains can be reconstructed and utilized to help understand the possible context of these remains.



Figure 3: Illustration of autopsy cut marks in the skull of Individual CHL 9

Aim

The aim of this project was to analyze the Chlookop remains by means of physical anthropological methods to determine their demographic features, as well as any associated pathology or trauma. This data was used in combination with archaeological and archival data to establish a possible time frame and historical context for the Chlookop cemetery and its remains.

Materials and Methods



Figure 1: Illustration of remains recovered in situ

The MNI (minimum number of individuals) was determined by visual pair matching of skeletal elements based on similarities observed in bone morphology, age and sex, trauma and pathology, and taphonomic alterations (L'Abbé, 2005). By process of elimination the skeletal remains of at least five individuals were reconstructed. Standardized osteometric measurements and calculations, coupled with morphological characteristics were used to determine the demographics of each individual (Buikstra and Ubelaker, 1994; Krogman and İşcan, 1986). Any traumatic and or pathological markers were also noted and their possible aetiologies discussed.

The skeletonized remains of at least 18 individuals were recovered and transported to the Department of Anatomy at the University of Pretoria (Table 1). Sixteen of these individuals were recovered *in situ* from a primary context (Fig.1), although six of these graves were disturbed (Fig.2) and presented incomplete skeletal elements. Some of the skeletal remains (representing at least 5 individuals) were found in a commingled state due to the disturbance of the graves during construction work.



Figure 2: Illustration of remains that had been disturbed due to construction works

Results

Table 1: Inventory of all remains as assigned into individuals

Individual	Context	Age	Sex	Pathology	Trauma
CHL 1*	Commingled	Adult	Female	None	None
CHL 2*	Primary	25 - 45	Male	None	None
CHL 3	Primary	25 - 35	Male	None	None
CHL 4*	Primary	Adult	N/A	None	-Autopsy
CHL 5*	Primary	Adult	Male	None	None
CHL 6*	Primary	25 - 35	Male	-Generalized bone disease -Osteophytic lipping of calcaneus and talus	None
CHL 7	Primary	3 years ± 12 months	N/A	None	None
CHL 8	Primary	20 - 30	Male	None	None
CHL 9	Primary	30 - 45	Male	-Generalized bone disease -Osteophytic lipping of calcaneus and talus	-Healed fracture of right clavicle and nose -Autopsy
CHL 10	Primary	30 - 45	Male	-Osteophytic reaction to right tibia and talus	-Healed fracture of the right fibula -Autopsy
CHL 11	Primary	30 - 50	Male	None	-Healed fracture of right first and second metacarpals -Healed sharp force trauma to frontal bone
CHL 12	Primary	25 - 40	Male	-Porotic hyperostosis -Cribra orbitalia	-Healed sharp force trauma to frontal bone
CHL 13	Primary	30 - 40	Male	-Osteophytic lipping of L5 and sacral base	-Unhealed fracture of right femur -Autopsy
CHL 14	Primary	27 - 40	Male	-Osteophytes on cervical vertebrae	None
CHL 15	Primary	17 - 19	Male	-Generalized bone disease	None
CHL 16	Primary	27 - 40	Male	None	None
CHL 17	Primary	6 - 9 months	N/A	None	None
CHL 18*	Commingled	Adult	Female	None	-Autopsy

* Disturbed graves

N/A: Determination hampered by fragmented state of remains or young age

Table 1 represents all the remains after primary analysis. Individuals CHL 6, CHL 9, and CHL 15 showed signs of generalized bone disease in the form of subperiosteal bone growth on the anterior surfaces of the tibiae and fibulae. Other pathological markers observed were cribra orbitalia and porotic hyperostosis in one of the male individuals (CHL 12). Furthermore, several fractures were observed in four of the males (CHL 9, CHL 10, CHL 11, and CHL 13). At least five of the adult males presented with cut marks associated with standard autopsy procedures (CHL 4, CHL 9, CHL 10, CHL 13, and CHL 18) (Fig. 3). One individual also presented with a healed sharp force trauma wound to the right frontal bone (CHL 12) (Fig. 4).

Discussion

The pathological state of the remains provides some insight into the living conditions of these people. Generalized bone disease observed can either be attributed to an injury to the area, chronic infection or malnutrition (Ortner, 2003). Cribra orbitalia and porotic hyperostosis are usually associated with anemia (Stuart-Macadam, 2005) although new research suggests that the causes might rather be due to a deficiency in vitamins B12 (cobalamin) and B9 (folic acid), poor sanitation, and infectious disease (Walker *et al.*, 2009).



Figure 4: Healed sharp force trauma

All healed fractures showed little indication of medical treatment by means of casts whereas the broken femur received prosthetic treatment by the attachment of a metal plate to fuse the fractured shaft (Fig. 5). The injury shows almost no signs of healing, which suggest this individual died shortly after being treated. Healed sharp force trauma observed in one of the males could possibly be suggestive of interpersonal violence.



Figure 5: Prosthetic treatment of right femur

No reference to the individuals' identity or to the context of the cemetery within the historical span of the Chlookop area has been located. However, the burial pattern observed, as well as the demographic profile and pathology observed on the skeletal remains suggests that these individuals could possibly be linked to one of two large industrial companies in the area. The Modderfontein Dynamite Factory (circa 1895-1950s) (Cartwright, 1964) and the Klipfontein Organic Products Factory (circa 1941-1970s) both employed large numbers of male and female labourers, the majority of which lived in compounds on the factory premises (Cartwright, 1964; NTS 6593, 397/3137(1)). The Modderfontein factory was also equipped with its own hospital (Cartwright, 1964) which might explain some of the medical treatment and autopsy procedures observed on the remains. The remains might therefore represent some of the labourers and their family members who lived and died in the factory compounds.

Conclusion

The preliminary results obtained from the bioarchaeological study of the Chlookop skeletal remains suggested that the majority of the individuals were adult males in their mid 20s to 30s, some suffering from health-related diseases and/or malnutrition. The high prevalence of fractures as well as the presence of one case of healed sharp force trauma might be suggestive of a hazardous lifestyle, either in terms of occupation or living conditions. The prosthetic treatment and autopsy procedures suggest the availability of medical treatment to some extent and possibly also liability of an institution towards injured employees. The demographic profile, pathology and archaeological evidence suggest that these individuals were most probably associated with a large institution, possibly employed as menial labourers and housed on the premises.

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