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Short fieldwork report

Human remains from Ajnala, India, 2014

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Except for Roopkund Lake (Uttaranchal, India) and a Harrapan civilization site at Rakhigarhi (Haryana), from where ancient human skeletal remains were recovered recently (Rai et al. 2015), no other mass burial has been reported from any other part of India. In April 2014 a large number of human skeletal and dental remains were excavated from an abandoned well present underneath a religious structure in the heart of the North Indian suburb of Ajnala (31.84°N 74.76°E), situated north-east of the district of Amritsar (Punjab), India (**Figure 1**). There are several possible origins of these skeletons. First of all, these remains may have belonged to the soldiers (from the Indian states of Bengal, Bihar and Uttar Pradesh) killed in a mass execution committed by British rulers in India in July 1857 (Cooper 1858). The rebellious soldiers allegedly murdered some British officers and fled away from the cantonment area in July 1857. However, they were captured, imprisoned and killed near the site by British forces and their dead bodies (mentioned as 282 in number) were buried in a nearby abandoned well. A religious structure was built over the sand-filled well with human bodies of slain soldiers to make this mass burial site not easy accessible.

Figure 1. Well in Ajnala before and after excavations.

Socio-political sensitivity of the incident and the consequent sanitary concerns were cited as the emergent reasons for the immediate disposal in the well (Cooper 1858).

However, some amateur local historians are of the opinion that the recovered human remains supposedly belonged to the victims killed during Hindu-Muslim partition conflicts in August 1947, when India gained independence from British rule, during which time India was divided into Hindustan (India) and Pakistan. Other local inhabitants have argued that the bodies might have been dropped into the well before or after 1857 but much before the partition violence of 1947.

The widespread media coverage of the 1857 incident gained much public support in early 2014, motivating patriotic conscience local people to excavate the well without systematic documentation. The well was explored after relocating the religious structure built over its periphery to an adjoining locale. As the entire excavation process was performed by amateur excavators unaware of the appropriate methodologies and strategies commonly used by bioarchaeologists in dealing with such mass burial sites, it resulted in recovery of heaps of badly damaged and commingled human remains belonging to multiple individuals (**Figure 2**). It was only after the actual recovery of remains from the well that the state government (Department of Archaeology

Figure 2. Assorted human remains from Ajnala.

and Museums, Government of Punjab) came into action and felt a need for authentication of written historical records and establishment of biological profiles and/or identity of recovered human remains from the well. The first two authors of this report were entrusted by the authorities to study these remains. Standard forensic archaeological techniques were used here to reconstruct the events that led to formation of this assemblage.

During excavation, the skeletal elements of multiple individuals were found buried in the well sediments in a haphazard, overlapping and disorganised manner, with diverse positioning of individual skeletons (as revealed by the excavators' versions and corroborated by the photographs provided, **Figure 3**). On their first visit to the site, the authors found the badly damaged and commingled human remains packed in wooden boxes with sliding glass covers. Prolonged exposure to extremely hot and humid weather of the site had made the bones seriously brittle, weathered, and fragile. The teeth, jaw fragments, and intact skeletal elements, including few skulls, were segregated out, properly packed in airtight containers (cushioned with cotton and thermacol sheets) and were, later on, cautiously transported to the laboratory for their further forensic osteological analyses. Personal items like coins, medals, bracelets, beaded arm-bands, stone bullets/bolas etc., (**Figure 4**) were packed separately in airtight steel boxes to be examined by archaeologists. No pelvis, sacrum, sternum or other most fragile bones were retrieved from the excavated remains or the debris scattered at the site. Most of the skeletal elements (available to the authors) are very fragile and get damaged easily during their handling and further analysis.

Figure 3. Human remains from Ajnala during excavation.

Figure 4. Assorted artefacts found in Ajnala well.

Besides teeth, jaw fragments, and few intact skulls, some postcranial skeletal elements like femoral heads, clavicles, vertebrae, long bones, phalanges, calcanei and tali, external auditory meatus portions of temporal bones etc., were also found preserved in fairly good condition to be used for identification purposes. The authors had also segregated out thousands of damaged long bones from the commingled human remains at the site, however, they were thrown into river waters by caretakers as a part of the funerary rites.

Table 1 shows the total number of different types of teeth recovered from the well. The soil removed from inside the well was carefully screened by the authors at site to recover even a single tooth present. The minimum number of individuals (MNI) present in the well was approximated to be 246 as calculated from the mandibular molars. This number is only slightly lower than the reported number of 282 executed individuals.

Table 1. Total number of teeth recovered from Ajnala well. I – incisors, C – canines, P – premolars, LM – mandibular molars, UM – maxillary molars.

	I	**C**	**P**	**LM**	**UM**	**Total**
Displaced teeth	1365	724	1276	1186	871	5422
Teeth in incomplete alveoli	73	85	275	266	182	881
Teeth in intact skulls	24	12	24	18	18	96
Teeth in skull casts	8	4	6	6	3	27
Total	1470	825	1581	1476	1074	6426
MNI	184	206	198	**246**	179	

Numerous personal items like copper- and iron-made wrist bracelets, gold necklace pieces, coins and medals (indented with Queen Victoria's photograph and year of make), gold rings, beaded arm-bands etc., were also recovered with the human remains (**Figure 4**). Some of these personal artefacts were dated to 1856 and earlier strongly indicating that the the mass burial was associated with the executions carried out in 1857. A few artefacts, like beaded arm bands and wrist bracelets, indicated the affiliation of the individuals to Bengal, Bihar and Uttar Pradesh because the majority of such articles are commonly used even today by people from these states. Some hand and foot phalanges still had corroded copper and iron rings preserved in place.

Teeth were preserved in a better condition than bones, having all of their diagnostic features and anatomical structures intact. No animal or human subadult bone/dental remains were identified. As the remains were found at a depth of 5 meters or more in a bricked well, the remains were not affected by scavenging.

The shovel-shape of most examined incisors (N=742) is consistent with possible Asian origins of the individuals recovered. Suture closure patterns of the intact skulls (N=13) and presence of the third molar in the initially examined 246 jaw fragments supported the opinion that the remains belonged to adult individuals, though suture closure is a comparatively less reliable method for age-at-death estimation (Khandare et al. 2014) and the 3rd molar may also erupt before adulthood (Tuteja et al. 2012; Manjunatha & Soni 2014). The preliminary radiographic analysis of tooth-pulp area ratio of canines (N=645) found that the average age of these individuals was more than 30 years and only 14 teeth (2.2%) were found to be sub-adults below 14 years of age when compared with previous studies (Jeevan et al. 2011; Babshet et al. 2011). The epiphyses of the fragmented long bones showed no signs of osteoarthritis, implying that victims were relatively young on average.

Figure 5 shows a lesion in the frontal region (almost at the same anatomical position) that was observed in few intact skulls recovered from the site. Preliminary analysis indicated it is the result of taphonomic damage, probably inflicted during exhumations by the untrained excavators. It cannot, however, be ruled out that some blunt weapon might have been used to inflict the same type of perimortem injury to the heads of the victims during their execution. Some temporal skull fragments were found to have embedded in them some bullet-like stone pellets. The detailed microscopic examination and interpretation of all such cranial injuries is underway and is expected to clarify their perimortem or postmortem nature.

The gross anatomical features of the intact skulls are apparently distinct, implying that they may perhaps have belonged to young and mature males from different ethnic groups. The majority of the skulls had characteristic male anatomical features like flared zygomatic bones, squarish orbits, blunt orbital margins, high rugosity, broad pyriform nasal apertures etc. Merely on the basis of the morphological cranial or

Figure 5. Skulls from Ajnala with lesions in the frontal bone.

skeletal features, no definite opinion can be given about the sex assessment. However, ancient DNA and stable isotope analyses, radiographic tooth-pulp area ratio estimations, odontometric sex determination, elemental analysis of bones and teeth etc., are under way to solve this forensic anthropological puzzle to be communicated in future publications in some bioarchaeological or forensic journals.

A very few teeth had postmortem discolouration effects or taphonomic damages. Some mandibular and maxillary fragments still had 3 to 14 teeth intact in their sockets. The morphological characteristics of all the teeth like crown morphology, occlusal wear patterns, restorations, metallic crowns, fillings and any evidence of tobacco smoking, nut chewing etc., were preliminarily examined for almost all the teeth. Molar and premolar crowns were usually found intact, though a few of them had attrition and occlusion wear facets (both pits and fissures) on their occlusal surface. The majority of teeth were found free from dental caries (crown as well as cervical root), again implying that victims had good dental hygiene. The initial analysis of non-cariogenic wear of anterior dentition (incisor and canine) indicated the use of some raw fibrous foods by the victims in their diet. No signs of any dental treatment works (like fillings or restorations) were noticed in any of the tooth or jaw fragments. Very few teeth showed signs of enamel hypoplasias, an indicator of stressful childhood (cf. King et al. 2015). Blackish-brown and reddish-brown stains were present extraneously on some teeth, indicating probable use of tobacco or betel-nut chewing habit in some

of the victims (**Figure 6**). The habit of chewing 'gutaka' is common among individuals residing in present day Bengal, Bihar and Uttar Pradesh. Few molars (free from dental caries or attrition) were randomly selected for DNA analysis that is ongoing in the ancient DNA facility at the Centre for Cellular and Molecular Biology (CCMB) laboratory, Hyderabad, India.

Figure 6. Details of dental calculus on one mandible from Ajnala.

From the dental sample, 2166 displaced molar teeth (1278 mandibular and 888 maxillary) were preliminarily examined for the prevalence of dental caries and wear. The upper teeth were more carious (1.58%) than the lower ones (0.38%); molars being more affected than the premolars or canines of both jaws. Among the carious teeth more than 84% had caries on smooth surfaces, followed by 10.5% on occlusal surfaces, while 5.5% of lesions were present on root surfaces (no sign of cervical caries). Canines and premolars had a comparatively higher degree of wear than the molar teeth of both jaws. It can be concluded that victims had good dental health compared with modern populations.

Although the unscientific exhumation of the human remains compromised available forensic evidence, some remarks on identification can be provided. The artifacts (e.g. coins and medals) found with the remains strongly support the date of 1857. No evidence supports the opinion that these human remains belonged to the victims of partition conflicts during or around 1947. The authors do not aim to perform individual identification of the victims. Keeping in mind the commingled nature of remains, lack of demographic information of missing persons, and absence of known direct descendants of the reported deceased persons, the positive identification of the victims seems to be unlikely even with DNA analyses.

Future research analyses of the recovered human remains will be designed to address questions about the manner and cause of death, living conditions, and geographic affinities of the victims, and more specifically:

- final confirmation of the dating of the remains,
- the most likely number of individuals buried in the well,
- whether the remains belong to Northern Indians (local area of site) or individuals from Bengal, Bihar and Uttar Pradesh as reported by written records,
- the demographic profile and other characteristics of the individuals,
- whether any trauma to the remains is related to violent behaviour.

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