

Northern Wall: Preliminary Report on Materials from Cluster 27

Bioarcheological Analysis of the Human Skeleton

Daniela Wolin and Uuriintuya Munkhtur

Preliminary analysis of the skeleton of the tomb occupant was conducted by Uuriintuya Munkhtur and Daniela Wolin. All methods employed were non-invasive and guided by current bioarchaeological standards. A detailed inventory was undertaken (Buikstra and Ubelaker 1994) and taphonomic conditions were recorded. Age was estimated using a variety of techniques, including epiphyseal fusion (Scheuer and Black 2004), pubic symphysis morphology (Brooks and Suchey 1990), auricular surface morphology (Buckberry and Chamberlain 2002; Lovejoy et al. 1985), and cranial suture closure (Meindl and Lovejoy 1985). Pathological conditions and traumatic lesions were recorded, described, and photographed when observed.

The skeleton is almost complete, with only a few hand and foot bones absent (Fig. A.1). The individual was estimated to have been a 40-60 year old adult at the time of death, based primarily on characteristics of the pubic symphysis and auricular surface of the pelvis. Fusion of the epiphyses and cranial sutures, extensive antemortem tooth loss, and the presence of osteoarthritic changes are also suggestive of an older individual. Based on the features of the skull and pelvis, the individual was assessed to have been female.

Several pathological conditions were noted in the skeleton. Almost all of the maxillary and mandibular dentition were lost antemortem, with the exception of a single tooth root in the left maxilla (Fig. A.2a and A.2b). An abscess is also present in the right maxilla. Small osteophytes were observed on the bodies of the thoracic and lumbar vertebrae. The superior bodies of a small number of thoracic vertebrae are compressed (Fig. A.2c) and ossification of the ligamentum flavum was also noted in the lower thoracic vertebrae. The 4th lumbar vertebra displays bilateral spondylolysis (Fig A.2d), a condition that could have caused pain in the lower back (Plomp 2017:149). Sacralization of L5 with a pseudarthrosis (false joint) between the left transverse process of L5 and the ala of S1 was also noted in this individual (Fig. A.2e and A.2f). Although sacralization has a congenital etiology, scholars have noted that it may cause complications (Lewis 2019:598). It is possible that this condition may have impacted the development or severity of other changes in the vertebral column. Mild osteoarthritic changes were observed in several joints, including the knees, ribs, hands and feet, and hips. Enthesophytes on the patella (Fig. A.2g) and the presence of marginal osteophytes on the distal

femora and proximal tibiae (Fig. A.2h) suggest that stress was placed on the knee joint. No traumatic lesions were observed, and the cause of death is unknown.

Figures



Fig. A.1: Skeletal inventory of the Khar Nuur burial.

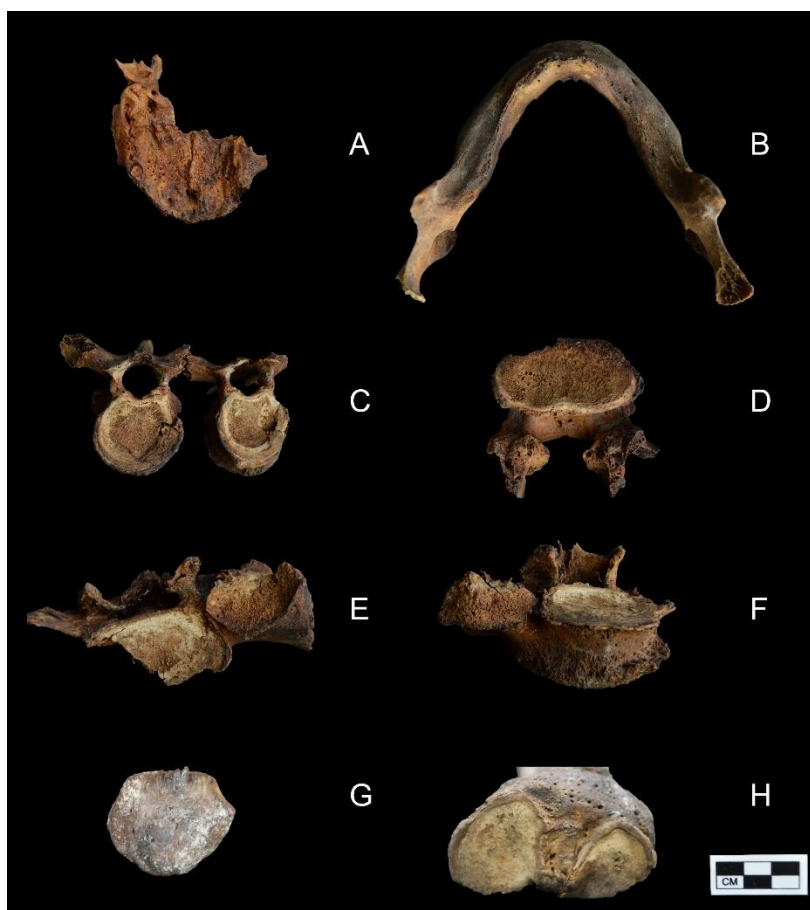


Fig. A.2: Paleopathology: A. Antemortem tooth loss in the maxillae (left) and mandible (right); B. Compression fractures in the thoracic vertebrae (left) and complete spondylolysis in L4 (right); C. Sacralization of L5; D. Ossification of the quadriceps tendon on the patella (left) and marginal osteophytes on the tibial plateau (right).

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Analysis of Wood Samples

Wang Shuzhi

Three wood samples uncovered during the 2018 season were sent for analysis by Wang Shuzhi at the Institute of Archaeology, Chinese Academy of Social Sciences, Beijing. The wood samples came from an artifact which was perhaps a saddle. The samples were carbonized for 20 minutes under 400° heating. Observation was carried out on fresh fractures using a reflected light microscope with dark and light fields, after the charcoal was hand broken on the three anatomical wood planes: transverse, radial and tangential sections. Identifications were carried out by comparisons with wood anatomy atlases (Cheng et al. 1992) and with photographs of extant woods in Mongolia and Inner Mongolia. A scanning electron microscope was used to distinguish small-scale anatomical details and to take micro-photos. Terminology of wood anatomical characters follows the recommendations of the IAWA list (IAWA Committee 1989, 2004; Schweingruber 1990).

Interestingly, the three samples provided for analysis came from three different types of wood, suggesting access to a diversity of resources as used in this grave. One of the samples was identified as that of a *Salix / Populus* (willow or poplar) (Fig. B.1) It is a tree or shrub that usually grows on riverbanks and in wetlands, and therefore often indicates proximity to a river or seasonal waterway. It is used for fuel and its branches can be used for woven basketry.

A second sample was identified as *Betula* (birch) (Fig. B.2). It is a lowland genus that grows mainly on low mountain slopes and along rivers. The density of this wood is high, so it is often used to build habitations and construct household furnishings and other implements.

The third sample was identified as *Morus* (mulberry) (Fig. B.3). The texture of *Morus* is moderate and slightly prone to splitting but it has robust dimensional stability and durability and is good for adhesion and nail-holding capacity.

2.1

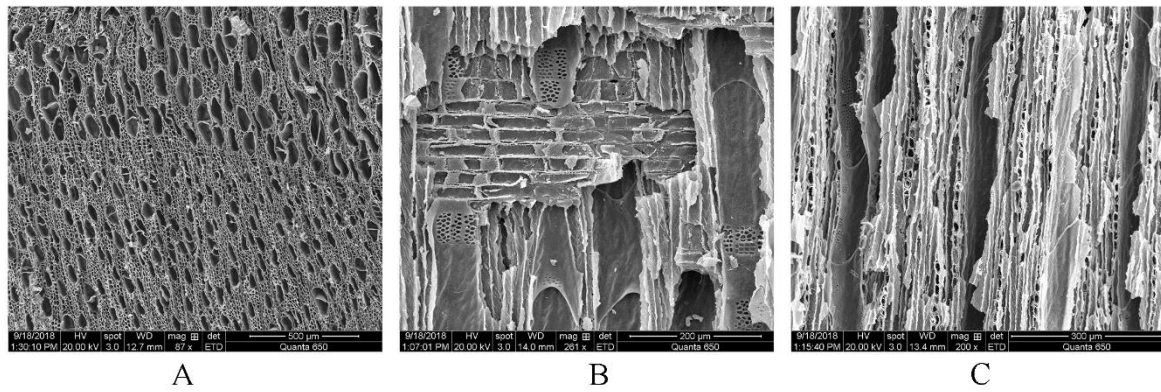


Fig. B.1: a. Anatomic microstructure of transverse section of *Salix* sp.; b. Anatomic microstructure of radial section of *Salix* sp.; c. Anatomic microstructure of tangential section of *Salix* sp.

2.2

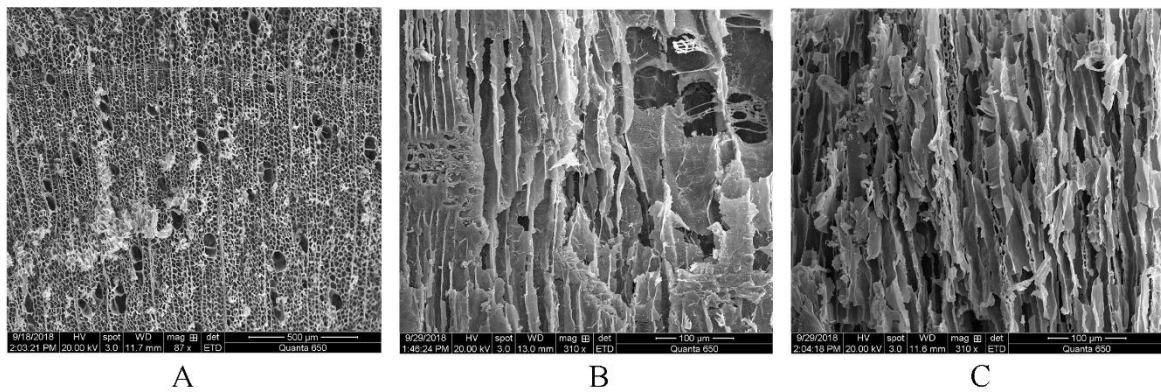


Fig. B.2: a. Anatomic microstructure of transverse section of *Betula* sp.; b. Anatomic microstructure of radial section of *Betula* sp.; c. Anatomic microstructure of tangential section of *Betula* sp.

2.3

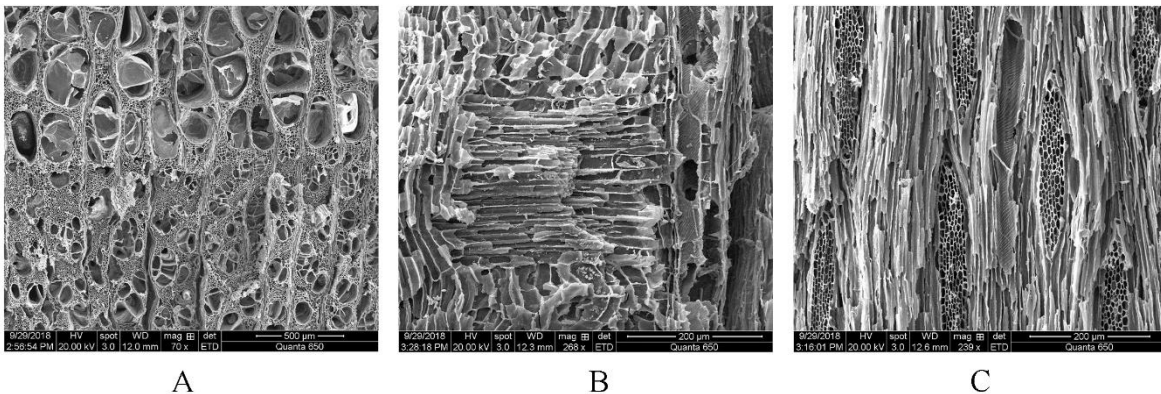


Fig. B.3: a. Anatomic microstructure of transverse section of *Morus*.; b. Anatomic microstructure of radial section of *Morus*.; c. Anatomic microstructure of tangential section of *Morus*.

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Analysis of Silk Textiles Samples

Orit Shamir and Nofar Shamir

From the different textiles found inside the grave, bundles of 9x7cm and 9.5x6 cm in size (Fig. C.1), were initially analyzed in Israel, followed by analysis of the entire textile collection in Mongolia by Drs. Orit Shamir and Nofar Shamir in 2023. Here we present a textile analysis based on observations with the naked eye, by magnifying glass, and using a Dino-Lite digital microscope. Technological data such as thread count per cm, spin direction and thread diameter, weaving technique, etc., were recorded for every piece of woven silk textile in the assemblage (e.g., Pearson et al. 2020). More extensive information will be presented in a manuscript, on which we are currently working, that will focus on these textiles and other textile unearthed in the different expeditions of the Mongol-Israeli-American archaeological project.

Each of the two bundles analyzed in Israel consists of five textiles in an excellent state of preservation. The fabrics do not have any signs of wear and repair and don't have evidence of having been sewn. All the textiles in this sample are made of silk. The threads are reeled (filament silk) rather than spun. Silk reeling is the process by which a number of cocoon fibers are reeled together to produce a single thread. This is achieved by unwinding filaments collectively from a group of cooked cocoons at one end in a warm water bath and winding the resultant thread onto a fast-moving reel. Reeled or filament silk is a high quality fiber, as is spun silk, and both types have been identified from high status archaeological contexts in Mongolia.

Most of the textiles examined are woven with a high-density plain-weave tabby technique, with more warp threads than weft threads (analytical methods will be described in a forthcoming study). The two exceptions are one textile from bundle 2 which was woven in a compound tabby in which the weft or the warp is divided into two or more series, one of which appears on the face while the other (or others) appears on the reverse (Fig. C.2, Burnham 1980:29). The other textile is a single textile sample from bundle 1 and has weft-wrapping on a plain weave ground (Fig. C.3, Emery 1966:220). The number of threads per cm is usually higher in one of these systems (probably the warp) – 24-66 threads per cm and the weft is 8-31 threads per cm (e.g., 26x8; 40x30; 24x31; 26x30; 66x14; 26x10). The threads have different thicknesses and usually the warp thread is thinner than the weft. The threads

are dyed blue, red, brown, and cream (Fig. 12 and Figs. C.2 and C.3). Unlike the patterns found on earlier textiles from the Xiongnu period of Mongolia (ca. 1st century CE) known from the burial site of a noble at the Noyon Uul cemetery (Karpova et al. 2016; Tamburini 2022:87), no patterns were observed on the silk samples although this may be due to sample size and condition. Two textiles bear gold stains, probably from attached beads or from remains of gold as strips or wrapped silk threads.

It is interesting that no items made of woven wool or felt were found in our sample. Those materials are typical for Mongolia and were found, for example, in a tenth-century rock burial at Üzüür Gyalan (Pearson et al. 2020). The samples we examined probably originated from China as indicated by the materials (silk) as well as the production techniques (reeled and not spun threads). Most of the samples examined are made using a simple tabby weaving technique with fewer exhibiting compound weaves. This contrasts with the Xiongnu burial textiles mentioned above which had fragments of couching (i.e., applied decorative cordage), garments, embroidered curtains and silk fabrics with woven patterns featuring compound weaves with stylized birds (Karpova et al. 2016; Langford 2009:115, 130; Tamburini 2022:87). Compound textiles, such as stylized patterns, are also known from the Mongol period (Allsen 2001; Shea 2018). However, our analysis also reveals that textiles from the Khar Nuur burial consist of many layers of silk textiles compounded together with modern roots penetrating the textiles make cataloging difficult. Notably, the silks appear to have been lengths of cloth rather than garments.

Figures



Fig. C.1: The two silk textiles bundles

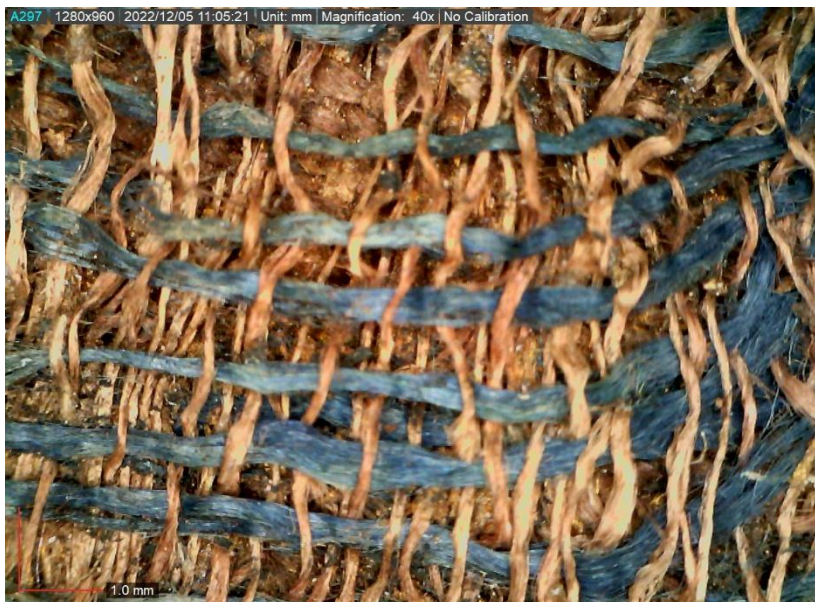


Fig. C.2: A microscopic photo of a silk textile in compound weave.



Fig C.3: A microscopic photo of a silk textile with weft-wrapping.

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