# Daily Activity Patterns among People Interred in Umm an-Nar Communal Tombs from Southeastern Arabia

Jaime M. Ullinger[1], Lesley A. Gregoricka[2], Laura Allen[3], Janeth Cabañas[4], Sarah Caminito[5], Maddy Hull[6], Angelique Lindberg[7], Caden Rijal[8], Abby Sargent[2], Sarajane Smith-Escudero[9]

[1]Quinnipiac University, [2]University of South Alabama [3]University of New Hampshire, [4]University of California, Berkeley, [5]University of Pennsylvania, [6]Dickinson College, [7]Boston University, [8]Wellesley College, [9]University of Notre Dame

## Introduction & Background

A collaborative project that trains undergraduates in anthropological research (*REU Site: Bioarchaeology of Bronze Age Social Systems*) sought to examine skeletal evidence of daily activity patterns from those buried in two Umm an-Nar (2700-2000 BCE) tombs in the United Arab Emirates to explore questions related to daily life in the Early Bronze Age, as well as possible differences in workload associated with age or sex. Disparities reflective of heterarchical, hierarchical, and/or gendered divisions of labor may speak to the growth of social complexity in the region.

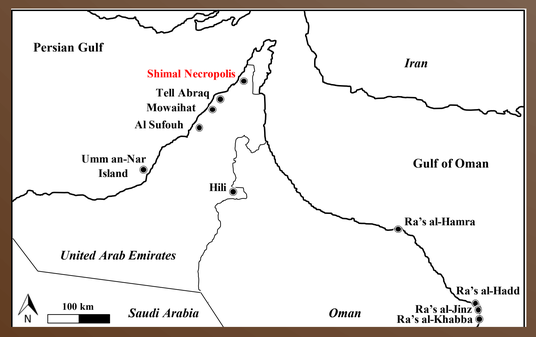



Figure 1. Map of southeastern Arabia showing the location of the Shimal Necropolis.

Semi-sedentary agro-pastoralists during the Umm an-Nar engaged in oasis agriculture and managed herds of sheep, goat, and cattle (Potts 2012). Tombs were constructed close to settlements and contained the fragmentary and commingled skeletons of hundreds of individuals interred across multiple generations. Intentional commingling may symbolize a transition of the individual dead into an ancestor collective, possibly to resist growing social hierarchies among the living (Gregoricka 2020).

Located at the Shimal Necropolis (Figure 1) in the Emirate of Ras al-Khaimah are tombs Unar 1 (U1; 2400-2200 BCE) and Unar 2 (U2; 2300-2100 BCE) (Figure 2). Recent analyses demonstrated a MNI of 194 (U1) and 410 (U2) (Ullinger et al. 2020), with all age groups interred within both tombs (Gregoricka et al. 2022).

Figure 2. Tombs Unar 1 (left) and Unar 2 (right), following excavation.

## Methods

### *Squatting Indicators*

Medial and lateral squatting facets (MSF, LSF) were scored on tibiae from U1 (n=107) and U2 (n=278) and on tali from U1 (n=283) and U2 (n=674), following Barnett (1954), Singh (1959), and Smith & Woollen (2020).

Figure 3: Authors LA (left) and SC (right) measuring tali.

### *Entheseal Changes of the Humerus*

Fibrocartilagenous entheses were evaluated on U1 proximal (n=41) and distal (n=53) humeri and U2 proximal (n=38) and distal (n=120) humeri using the Coimbra Method (Henderson et al. 2015). Entheseal changes were examined at subscapularis, supraspinatus, infraspinatus, and common extensor entheses.

### *Entheseal Changes & Degenerative Joint Disease of the Patella*

The superior quadriceps femoris tendon (QFTE; U1 n=94; U2 n=153) and the inferior patellar ligament (PLE; U1 n=38; U2 n=100) entheses were examined for entheseal changes (Mariotti et al. 2004); the presence of the vastus notch was also noted. Patellae were scored for degenerative joint disease (DJD) following Buikstra and Ubelaker (1994).

### *External Auditory Exostoses and Otitis Media*

External auditory exostoses (EAE) were examined in both U1 (n=46) and U2 (n=145) (Standen et al. 1998), and sex estimated following Buikstra and Ubelaker (1994). The cochlear promontory was examined with a stereomicroscope to observe remodeling and resorption indicative of otitis media (OM) (Floreanova et al. 2020).

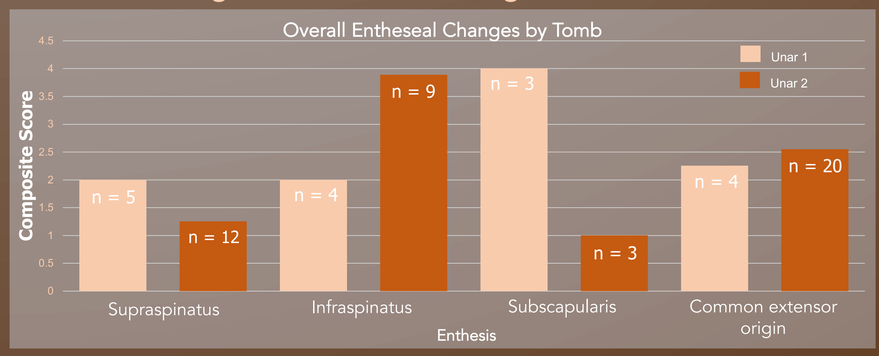
## Results

### *Squatting Indicators (Figure 4)*

There was no significant difference between sides for tibial squatting facets [Fisher's Exact (FE): p=1]. For the talus, LSF were more common on the R side (FE: p=0.0057), although no side difference was found for other talar changes. No sex differences were found (FE: p>0.05) for any squatting indicators on the talus. No differences were found between tombs (FE: p>0.05) for either the tibia or talus.

Figure 4: U1.40.177 L tibia with LSF (left); U2.42.473 R talus with LSF (right).

### *Entheseal Changes of the Humerus (Figure 5)*




There was no significant difference in entheseal changes between sides for any of the entheses, nor between the two tombs (Mann-Whitney U: p>0.05).

Figure 5: Entheseal changes across four humeral entheses from U1 and U2.

### *Entheseal Changes & DJD of the Patella (Figure 6)*

There was significantly more DJD in U2 than in U1 ($\chi^2$=8.63 df=1, p=0.003), although no difference was found for entheseal change ($\chi^2$=0.48, df=1, p=0.48) or vastus notch presence ($\chi^2$=0.4 df=1, p=0.53). Within each tomb, no difference was seen between the right and left sides for any of the conditions (p>0.05).

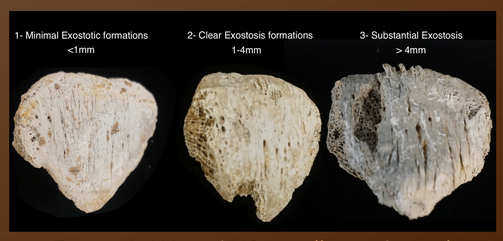



Figure 6: U1 and U2 patellar entheseal change gradations (Mariotti et al. 2004)

### *EAE and Otitis Media (Figure 7)*


Figure 7: Promontory surfaces showing (a) no remodeling (U2.4.638), (b) remodeling (U2.4.186), (c) resorption (U2.4.285).

Four individuals from U1 (n=46, 9%) and three from U2 (n=145, 2%) had evidence of EAE (FE: p=0.059). For temporals where sex could be estimated, a significant difference was found for EAE in males (n=4) and females (n=1) (FE: p=0.016). 74% (n=94) of temporals from both tombs had evidence of OM; no difference was found between tombs (FE: p=0.080).

## Discussion & Conclusions

There are few differences in activity markers among those interred in tombs U1 & U2. People interred in both tombs likely engaged in strenuous activities possibly related to oasis agriculture. Significantly more DJD in patellae from U2 may indicate that some individuals in that tomb engaged in more repetitive activities at the same joint, or that they lived to older ages than those interred in U1. In addition, presence of both EAE and OM in at least a few individuals suggests that they may have been involved in pearl-diving.

## Acknowledgements

This research was funded by a NSF-REU Award (#1852426). Special thanks are extended to Summer 2022 REU project mentors Carlina de la Cova and Jesse Goliath, as well as to Leslie Williams and Jessica Cerezo-Román for their assistance and expertise. Thanks are also given to Christian Velde, Imke Moellering, and the National Museum of Ras al-Khaimah for permission to conduct this research.