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ABSTRACTS

Tooth Avulsion, Identity and Funerary Archaeology at Al Khiday 2, Central Sudan

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Deliberate removal of healthy teeth during life (also termed tooth avulsion, evulsion or ablation) has been reported in numerous archaeological populations irrespective of cultural background, time period and geographical location. In our contribution we are presenting data on tooth avulsion from the multi-phase cemetery of Al Khiday 2, located on the western bank of the White Nile, approximately 20km south of Omdurman (Khartoum). The three phases of use of the cemetery date to the Classic/Late Meroitic (end of the 1st millennium BCE/beginning of the 1st millennium CE), the early Neolithic (mid-5th millennium BCE) and pre-Mesolithic (12.700/11.100-6750 BCE) periods.

Tooth avulsion was observed in the majority of the 94 pre-Mesolithic individuals, involving the maxillary central incisors. However, only three of the 32 Neolithic individuals had avulsed teeth, targeting the mandibular central incisors, while none of the 43 Meroitic individuals showed evidence of avulsion practices. We investigated whether there was a correlation between biological sex and tooth avulsion in combination with funerary settings (grave orientation and placement of the body within the grave) to identify potential patterns of cultural identity in these diachronic groups, but found no specific pattern probably due to an almost uniform burial rite for the pre-Mesolithic population, with prone burial being the preferred body position, but no discernible preferential orientation. Further comparisons were made with published examples of tooth avulsion from along the Nile Valley (e.g., Ginefab School, Sudan) and late Pleistocene and early Holocene populations (e.g., Afalou-bou-Rhumel, Algeria and Gobero, Niger) in Northern Africa.

The confusing case of Grave 42: a bioarchaeological analysis

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Grave 42 is an atypical burial uncovered within the Varosfalva cemetery during fieldwork in 2016

in Transylvania, Romania. The skeleton of Grave 42 was found in a semi-prone, extended position. Grave 42 is extremely well preserved, which is consistent with the Varosfalva site; however both the positioning of the skeleton and the quantity of grave goods and hardware is unique. Excellent preservation has conserved many of these associated goods, including coins, buttons, leather, coffin wood, coffin nails, and other coffin hardware which date this burial to the 19th Century. The skeleton is mostly complete, estimated to be a male between twenty-seven and thirty-four years old. Evidence of healed blunt forced trauma is present on the right parietal, along with a healed fracture on the right nasal bone. Grave 42 represents a potentially atypical burial within this cemetery, due to its semi-prone positioning. While many burials in this cemetery included grave goods, this individual appears to be more wealthy than others there and is buried in an unusual way: face down. In this paper we will explore what this atypical burial represents in regards to wealth and status within the local community and determine the reasoning for the atypical positioning of the remains.

Does menstrual phase affect the relationships between catecholamines and perceived environmental stress?

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The results of studies examining the relationship between catecholamine (epinephrine (Epi) and norepinephrine (NE)) excretion and perceived stress during the day in women are contradictory. One reason for the inconsistency may be that the relationships are affected by the phase of the menstrual cycle when measurements are made. The purpose of this study was to compare the relationships between changes in perceived daily environmental stress and Epi and NE excretion between the follicular and luteal phases of the menstrual cycle (MC) in 71 women (mean age=34.9±7.7 yrs.) who all worked in clerical, technical, or professional positions at a major medical center in NYC. Each woman was studied on a mid-follicular (day 8±2) and mid-luteal (day 22±2) day of their MC. Perceived stress at work and home was measured on a 0-10 scale; women were classified as work stressed (WS) or home stressed (HS) on each day based on the difference in work-home stress designation. The rates of Epi and NE excretion were compared across work (11AM-3PM), home (approx. 6PM-10PM) and sleep (approx. 10PM- 6AM) environments, MC phase and WS/HS designation using repeated measures ANOVA models. The results show that in both phases of the cycle, Epi and NE excretion is highest at work and lowest during sleep ($p < .001$) in both WS and HS women; however, in the follicular phase, Epi at home among HS women is elevated relative to

WS women ($p < .084$). These findings suggest that the Epi-perceived stress relationships may vary over the MC.

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A phylogeny of the CHIA gene in the context of insectivory

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Insects are an important food resource for many primates. However, the chitinous exoskeletons of insects may reduce the value of this food source because chitin, a structural polysaccharide similar in structure to cellulose, is indigestible in the absence of a specialized enzyme. Insectivorous bats produce the chitinolytic digestive enzyme acidic mammalian chitinase (AMCase) in the stomach in order to digest insect exoskeletons. Thus, expressing a functional AMCase in the gut may also be an important adaptation for insectivorous primates. The gene *CHIA* encodes AMCase, offering a minimally invasive method for studying this gut enzyme in primates. We mined published genomes of *Macaca*, *Gorilla*, *Papio*, *Pongo*, and two insectivorous bats for *CHIA* and sequenced the gene in a number of additional primate species with varying levels of annual insect consumption: From high (*Tarsius*, *Saimiri*, *Cebus*) and medium (*Callithrix*, *Aotus*, *Saguinus*, *Erythrocebus*, *Allochocebus*, *Miopithecus*, *Allenopithecus*) levels to no insect intake (*Colobus*, *Alouatta*). A sanguivorous bat (*Desmodus rotundus*) was also sequenced to provide a non-insectivorous bat comparison. Preliminary analyses suggest that the *CHIA* amino acid sequences, but not the nucleotide sequences, of insectivorous primate species are more similar to those of insectivorous bats than those of other primates. This indicates that there may have been convergence in digestive enzyme function between two groups of mammals in response to similar diets.

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Human remains and artefacts from Romualdo's cave, Istria, Croatia

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Romualdo's cave is located on the southern slopes of the Lim channel in Istria, Croatia. It was recognized as potentially interesting

ABSTRACTS

archaeological site in the late 19th century when several researchers led small-scale excavations in the cave. In the mid 20th century M. Malez conducted more extensive excavations of the site and unearthed various archaeological and paleontological material dating from the Late Pleistocene to the Bronze and Iron Ages. The Late Pleistocene finds included Upper Paleolithic types of tools, faunal remains and two juvenile human teeth. In 2007 and 2008 D. Komšo led small scale excavations during which several Mousterian-like artefacts were found. In 2014 new excavations of the site started as a part of the ARCHAEOLOGIM (Archaeological Investigations into Late Pleistocene and Early Holocene of the Lim Channel, Istria) financed by the Croatian Science Foundation. During the three years of work at the site, human skeletal material and artefacts from Bronze Age, as well as artefacts from Iron age were found. The lower sequence yielded Musterian artefacts and Pleistocene faunal remains dated to over 48 kya. Here we report the basic findings of these excavations, as well as analysis of the skeletal remains. The Upper Paleolithic associated deciduous teeth are fully modern and add to our knowledge of Upper Paleolithic humans in East Central Europe.

The ARCHAEOLOGIM project (Archaeological Investigations into Late Pleistocene and Early Holocene of the Lim Channel, Istria) is financed by the Croatian Science Foundation.

New Small Catarrhine Fossils from Songhor and Lower Kapurtay and their Implications for Interpreting Early Miocene Primate Communities

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The early Miocene localities Songhor and Lower Kapurtay (~19.5 Ma) have yielded new small-bodied catarrhine fossils that play a critical role in assessing taxonomic diversity and regional endemism among penecontemporaneous primate communities. The new material consists of 38 dentognathic specimens, including a partial maxilla, several mandibles, and numerous isolated adult and deciduous teeth. Previous workers have recognized three small catarrhine taxa at Songhor: *Limnopithecus evansi*, *Kalepithecus songhorensis*, and *Dendropithecus macinnesi*. Based upon a comprehensive examination of our new specimens and all historic collections from Songhor and Lower Kapurtay, we draw several conclusions. First, qualitative and quantitative analyses support the validity of both *K. songhorensis* and *L. evansi*, but the

hypodigm of each samples more than one taxon, including one previously unrecognized in the collections. This new taxon differs from the similar-sized *L. evansi* in having non-externally angulated canines and upper molars with more peripheralized cusps. Second, *Dendropithecus* at Songhor is both more common than previously thought and differs from the Kisingiri population in having molars with more isolated cusps and lacking a distolingually projecting distal fovea on the m2. Using this new taxonomic framework, we reexamined small catarrhine fossils at other Tinderet localities and conclude that their diversity has been underestimated both within the same time period, as well as between successive time periods. Consequently, our results provide additional support for the distinctiveness of penecontemporaneous early Miocene catarrhine communities. Overall, these new discoveries reinforce the importance of the Tinderet localities for understanding catarrhine biogeography and diversification.

Cortical Bone Structural Variation in Modern Human Metatarsals

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Long bone cross-sectional geometry is widely used to compare bone structural changes in response to subsistence strategies and activity patterns. Recent studies of metatarsal midshaft cross-sectional properties found few differences between presumed unshod and shod groups. Here we investigate entire metatarsal diaphyses in order to test the hypothesis that presumed footwear use does not differentiate metatarsal internal structure. Metatarsal sets from 45 individuals representing Later Stone Age (LSA) foragers (15 Fynbos biome, 15 Forest biome) and 15 black South Africans from the RA Dart Collection were analyzed for cortical bone thicknesses (CBT) and second moments of area (SMA) using high resolution images. A color map approach and penalised discriminant analysis were performed in order to visualize and quantitatively assess group-specific patterns.

The complete shafts of 1st and 5th metatarsals exhibit major differences proximally or distally, which are probably linked to kinematic differences responsible for loading differences during gait. In assessing structural variation within all

five metatarsals, there appear to be differing influences of terrain as well as foot wear patterns. Greater CBTs are observed for the LSA groups compared to the Dart samples, and mediolateral reinforcement is also pronounced in the former. SMA results display similar patterns amongst the groups except that LSA foragers demonstrate elevated values overall. Increased resistance to repetitive loading reflects elevated mobility in the LSA groups. These findings could have useful implications for evaluating sets of hominin metatarsals.

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Paternal grandmothers increase and maternal grandmothers decrease fertility of couples they reside with

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Humans are cooperative breeders, where family members ensure their fitness benefits by influencing reproduction of relatives. Paternal grandmothers (PGM), who have lower certainty of genetic relatedness with their son's children, should promote production of higher number of grandchildren even at the cost of their lower quality. In contrast, such quantity-quality tradeoff may not apply for maternal grandmothers (MGM).

We compared reproductive patterns among three groups of married women (aged 45 and older) from rural Poland: those who lived with their own mother (MGM, N=193 families), with mother-in-law (PGM, N=283), or without either mother (N=150). Groups did not differ in waiting time to first pregnancy or age at first reproduction, which indicates that their biological potential to have children was the same. PGMs and MGMs lived, on average, for the same length of time (about 16 years) with families. However, couples who lived with PGM had 19% higher average number of children compared to couples living by themselves (5.1 v. 4.3), while the presence of MGM was associated with 14% reduction in family size (3.7). Higher parity of the PGM-families was achieved through longer reproductive span (by 2.4 years), later age at last birth (35.0 v. 32.6 years old), and marginally shorter average inter-birth intervals (28.6 v. 32.1 months). At the same time, children born to couples who lived with PGM had significantly lower Apgar scores (9.1 v. 9.4) than those living with MGM.