Osteoarchaeological assessment of generalized stress indicators in skeletons from the Tápió-Szántógláegét cemetery, Hungary

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Introduction / Research questions

Skeletal stress markers are non-specific skeletal and dental anomalies which usually are adaptive responses to stressors working on the body during one’s life and can be related for example to diet, diseases or trauma. Differences in stress marker patterns are said to be representative of different processes. e.g. infection, famine, and these processes may develop with different prevalence amongst different social status people (Roberts and Manchester: 2005). As the Bronze Age is the period with increasing differences in social stratification, this seemed like a perfect period to examine the above-mentioned phenomena. Supplementary archaeological data with stress marker analysis may provide us a more comprehensive perspective on quality of life of past populations or possible social status of individuals.

The main aim of our study is to compare the degree of development of stress markers in selected individuals from the Tápió-Szántógláegét cemetery in relation to archaeological data about burial equipment of individuals examined to see if there is some kind of characteristic pattern. It is possible to confirm that people buried with richier equipment are characterized with better biological condition (Roberts, Manchester: 2005).

Archaeological background

The multi-component site of Tápió-Szántógláegét is located in the Great Hungarian Plain at the confluence of Marosi and Tisza rivers, on the eight side of Tiszalök in the area of present Szeged (Fig.13).

Graves dug back to the Bronze Age, Gallo-As, Avars, and Hunnic, Sarmatian and Árpád Age settlements had been excavated in this site. The Late Bronze Age part of the cemetery which we are focusing on is related to the Tumuli Culture (5th; 995, 1800, 1610, 983, 1964). In the Late Bronze Age (1400-900 BCE, Tumuli Culture) Tápió-Szántógláegét cemetery almost 700 graves were excavated, but the estimated total number of burials in Tápió is 1800-2500, including both inhumations and cremations with distinct domination of inhumations indicating the influence of Middle Bronze Age Perjénos Culture (Czirják: 2003).

Materials and methods

Our sample originates from the Late Bronze Age part of cemetery, where both rites of burial coexisted together. For the purpose of our studies we chose 16 individuals, all of osteoarchaeolgical specimens are from inhumations. All of them were chosen by number of bronze items in the graves, and we created two sub-groups of individuals (Fig.12).

The skeletal material is stored at the Department of Biological Anthropology, University of Szeged. The sample contains individuals belonging to Adults (20-39 ys) and Mature (60-95ys) age categorics, all of them were found in the southern part of cemetery. Concerning sex determination and age estimation we relied on the analyses carried out by Faris and Upfolt (1975) (Fig.12 and 13). We recorded macroscopic osteological lesions related to different stress markers, our recording and later analyses were based on paleopathological (e.g. Aufderheide, Rodriguez-Navarro, 1997; Vörös Árpad, 2003; Tiszalök, Manchester 2005; Waldron 2006) and modern medical (e.g. Resnick and Newman; 1995) publications. Moreover, other macroscopically visible bone pathologies were also recorded (Fig.4-8), these lesions might give us a more comprehensive perspective on our topic, but that complete paleopathological analysis is not demonstrated here.

Stress Indicators

The main stress markers we chose are: cribra cranii (Fig.1.1), cribra orbitalis (Fig.1.1), linear enamel hypoplasia (Fig.1.2), endocranial lesions (Fig.1.1), periostitis (Fig.1.3), endocardial lesions (Fig.1.7) and hypervascularisation (Fig.2.2) Many factors may be involved in development of such skeletal and dental anomalies, as they are an adaptive response to stressors working on the body during the years of development (Roberts, Manchester: 2005). The response might be determined by several factors like genetic predispositions, and further factors might be related to the subject’s external influence, and impacts of socio-cultural systems. However, it should be remembered that lack of stress indicators in the skeleton may refer to not only a healthy person but also person who never got a chance to recover (Sick, Wood et al:1992).

Results

To understand social role and status of particular individual, more complex approach is required. That’s why we decided to check if there is any relation between number of bronze items in burials to sex, grave orientation or side of the body on which the dead were buried. We observed differences between male and female burials, but in most cases they were not visible at first glance (Fig.20). We can also see a difference in orientation of the graves in relation to number of bronze objects. There is a clearly breaking point between two group (Fig.21) where the majority of owners of bronze objects were buried on or close to the east-west axis, while most of the individuals without any bronze object on the south-north axis. This might suggest that number of bronze items might be appropriate differentiating criterion for our sample.

The first we recorded was that there is a visible degree in occurrence of cribra orbitalis with increase of number of bronze items in burial (Fig.16). Figure 17 is showing us the relationship between the amount of preserved teeth in both groups and diagnosed cribra orbitalis. We can observe much more individuals from the group with higher disease in group without bronze items, which might confirm the theory about the correlation between the development of cribra orbitalis and probable lower social status.

Unfortunately, some individuals in our sample had no teeth preserved. Despite this we can observe few tendencies (Fig.18.). Linear enamel hypoplasia does not seem to be connected with only one group. But we definitely can see clearly visible tendency in occurrence of calcius and caries. The prevalence of these alterations is higher in the group with richer burial equipment, it might be related to different type of food they consumed.

During the anthropological analyses we also recorded non specific stress indicators. We found few cases of hypervascularisation in the thoracic spine (sub-sample graves with bronze items). Rib periodontitis was common in both groups, indicating some long infection, in all probability in the majority of cases irregularities (maligne spondylolysis) on the visceral surfaces can be seen, only in one single case proliferative bone lesions refer to active periodical processes were recorded (Fig.3.). As several paleopathological publications (e.g. Pálfi et al. 2012, Spekler et al. 2012) suggest that co-existence of different non-specific stress markers may be related to early-stage tuberculosis, we examined the co-existence of these lesions (Fig. 29). Interestingly people from much more groups with higher number of bronze items in burials are showing the presence of bigger agglomerates of the markers. However, we can’t say anything about the underlying disease in these cases, prevalence of tuberculosis (or infectious processes, at least) might seem to be higher in the latest group.

Conclusion / Future studies

However, the sample is too small to draw conclusion on the whole population buried in the Late Bronze Age Tápiós-Szántógláegét cemetery, our project has demonstrated that the previously assumed general association between stress markers and number of bronze artifacts found in graves is not present. Except for cribra orbitalis, we didn’t find less stress markers in skeleton remains with more bronze artifacts, nonetheless, these results can echo things, with higher number of examined individuals. Our project shows, how important it is the multidisciplinary approach in archaeological-biocultural research. For further studies it would be very useful to analyze the rest of inhumations from this site in case to see if the observed tendencies can persist through the bigger sample. Our project is a promising start for further steps of the subject.

References

Hard copy available upon request.

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