BIOLOGICAL RECONSTRUCTION OF THE LATE NEOLITHIC LENGYEL CULTURE

Ph.D. Thesis

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Introduction

The physical anthropological characteristics of the Transdanubian Late Neolithic-Early Copper Age Lengyel culture are well known due to its numerous excavated cemeteries, which are investigated by physical anthropologists and the majority of them was published by Zoffmann (1968, 1969-1970, 2004, 2012). According to current archaeological consensus the chronologically earlier Central European Linearbandkeramik culture (LBK) played a crucial role in the formation of the culture, which is supported by the same geographical distribution of them. However, archaeologically detected southern and southeastern influences in the material culture suggest an infiltration of new populations during this time period (Kalicz 2001). Considering the origin of Lengyel people the physical anthropological literature identifies multiple scenarios that differ in the assumed ratios of indigenous and infiltrated populations (Szathmáry 1980, 1981, Zoffmann 2004, Kővári és Szathmáry 2001, Kővári 2008). The present dissertation has been designed to investigate this fundamental question, based on the morphometric, taxonomic and craniometric comparative analyses of the human remains unearthed at the site of Alsónyék-Bátaszék. In addition, the pathology and the dental alterations were also observed and frequency data published, which will contribute to further comparative investigations (Pap 2012).

Material

Between 2006 and 2009 salvage excavations preceding the construction of M6 Motorway, a Lengyel settlement and related cemetery of nearly 2400 graves have been excavated at the site of Alsónyék-Bátaszék, in southeastern Transdanubia (Zalai-Gaál and Osztás 2009, Gallina et al. 2010). Since the total size of the site and the correlation of different parts of the cemetery and adjacent settlement at the time of my doctoral application was not yet known and became clear only later, the physical anthropological analysis and evaluation of the whole community was not feasible within the frames of this dissertation. Therefore, the present study considers the northern, the so-called 010/B part of the cemetery, comprising 862 graves. The results of this analysis, despite the fact that it wasn’t based on the whole series, significantly may modify our recent knowledge of the population of the Lengyel culture.

Methods

For the biological age estimation of the subadults I used methodologies outlined by Schour and Masser (1941), Stloukal and Hanáková (1978), Ferembach et al. (1979), Schinz et al. (1952), Ubelaker (1989) and Bernert et al. (2007). The age estimation of adults was carried out on the basis of Todd (1920), Nemeskéri et al. (1960), Miles (1963), Szilvássy (1978), Işcan et al. (1985) and Meindl and Lovejoy (1985). The morphological sex was described by the method of Éry et al. (1963). The demographic analysis was carried out on the basis of
Acsádi and Nemeskéri (1970). The anatomical variation was examined according to Finnegan (1972), Hauser and De Stefano (1989) and Saunders (1978). The metric and the morphological evaluation was based on Martin and Saller (1957), Alekseiev and Debets (1964) method. Stature was estimated using the work of Pearson-Rösing (1988), Sjøvold (1990) and Bernert (2005). Taxonomical analysis was carried out mainly by the method of Lipták (1962, 1965). The craniometric comparative examinations of the male and female series was based on the mean of 10 measurements of the skulls, which were standardized with the average standard deviations of Alekseiev and Debetz (1964). I applied the direct distance values between the examined series in the course of the comparison and used the Euclidean, Chebyshev, Penrose distance and the Pearson’s correlation coefficient (Penrose 1954, Rahmann 1962). I analyzed the limit of the significant similarity at 0.1, 0.5 and 1% significance level in every distance calculating method. The pathological investigation was based on the systematization according to Steinbock (1976). During the analysis of oral pathologies I recorded the number of premortem tooth loss, cavities, alveolar abscesses and dental hypoplasia.

**Objectives**

In the dissertation I seek to answer the following questions.

- How did the demographic composition of the community of Alsónyék look like? Do the demographic characteristics of the analyzed sample resemble those observed in other series of the Lengyel culture?
- As a characteristic of the Lengyel mortuary practices, graves are usually found in smaller or larger grave groups occupying unused territories of the settlement. The research assume that such spatial distributional patterns may correlate with affinal relations between the deceased. Based on the demographic characteristics and on the heritable anatomical variations of the skeletal remains, is it possible to verify the family relationships of the deceased in these groups?
- What was the anthropological image characterizes the populations of the Lengyel culture? How does the physical anthropological analysis of this large sample affect or alters our recent knowledge of the Lengyel populations?
- Is it possible to demonstrate an anthropological continuity between the population of the Lengyel culture and the earlier inhabitants that occupied the same territory? Can we verify the assumed continuity between populations of earlier Neolithic periods, or do we need to calculate with a population infiltration or migration during the Late Neolithic in Transdanubia?
- What are the differences or similarities between the anthropological physiognomy of population occupying Eastern and Western Carpathian Basin and lived in the same Late Neolithic period?
- What was the general state of health of the community of Alsónyék? What diseases occurred most frequently within the population? How does it inform us about their lifestyle?
- What was the oral pathological status of the community of Alsónyék? How does it inform us about their diet and way of life?
- Do the anthropological characteristics of individuals buried in graves resting on four wooden pillars and contain a large amount of high quality grave-goods show any difference from the average individuals buried in simple graves? Can we see any anthropological physiognomy or pathological difference suggesting alternative lifestyle, diet, or different origin marking their distinctive position within the community?

**Results and conclusions**

Following the questions and goals of the present dissertation the results of the physical anthropological analysis of the skeletal material from Alsónyék can be summarized as follows.

According to the demographic analysis, the population of the Alsónyék community was blessed with an unrealistic mortality parameters. Despite to the previously expectations, the ratio of neonates (±0) is merely 1%, consequently the life expectancy at birth (eₓ) is rather high (32.61 years). The proportion of infans I. and II. is also low (9.1% and 8.0%). In the meantime, contrary to the expected value, the ratio of adult and mature aged individuals is almost equal (36.7% and 36.8% respectively), while senile aged individuals are practically missing from the cemetery (0.2%).

The very low ratio of the neonates in the cemeteries of the Lengyel (and other prehistoric) communities is usual, and the data from Alsónyék suggest no difference. However, in the case of other Lengyel samples, the infant mortality is generally notable. The observed moderate number of children at the site of Alsónyék is a general phenomena in the prehistoric series, which can be explained by the poorer preservation of their smaller bones. Furthermore, child burials were perhaps placed in a shallow graves, which were destroyed by erosion, agricultural work, etc.

Based on demographic observations of historical populations, a general trend can be assumed, showing a higher mortality rates among adult aged individuals, and relatively lower mortality among the mature aged individuals. In contrast, series of the Lengyel culture display higher mortality rate among mature aged individuals. The explanation of this phenomenon is still unclear.

The ratio of male and female is not even in any known Lengyel cemetery. Almost all characterized by female dominance. The higher proportion of females may be attributed to flaws in the traditional sexing method, mortuary practices, polygamy, the death of the males far from the community, etc.
The demographic structure observed in the archaeologically outlined grave groups do not correlate with the assumed family relationship. Based on the low ratio of children, the unequal proportion of male and female burials and the spatial distribution of child and adult burials next to each other, these groups seem to be no the representations of a kinship based organization during funerary practices.

The analysis of anatomical variations on skeletal remains somewhat may modify the above described picture. In some cases, based on the manifestation of certain hereditary traits on the skulls of the individuals buried next to each other suggest affinity, however, the disproportionate demographic characteristics makes it rather unlikely. Further verification of the kinship ties may become possible by the determination of the relative and absolute chronology of the burials, and by biomolecular analyses of the human remains.

The morphometric analysis of the Alsónyék population presents a significant heterogeneity with the dominance of dolicho-, and hyperdolichocran headed and leptoprosop faced individuals. Due to the mosaic-like distribution of individual sizes and indices, the classification of them into concrete variants was not possible.

The results of the taxonomic analysis of the series from Alsónyék compared to earlier analyzed series from other Lengyel cemeteries produced some novel information of the anthropological composition of the culture (Nemeskéri 1961, Szathmáry 1981, Zoffmann 1968, 1969-1970, 2001). It can be established that previous assumption of dominance of the atlanto-mediterranean and nordoid types cannot be maintained any longer. The present analysis of the Alsónyék population suggests the dominance of the gracile mediterranean variant within the Lengyel population. These results have fundamental effects on our understanding of the anthropological composition of the Lengyel population.

In order to answer the question considering the origin of the human populations of the Lengyel culture, I conducted a comparative craniometric analysis incorporating Penrose, Euclidean and Chebyshev distance measurements and Pearson’s correlation matrix. Based on the 38 males and 26 females series sampled from the Carpathian Basin, North-, East-, Central-, South-, and Southeast-European and from the Near Eastern Neolithic and Copper Age populations, the serie of Alsónyék represent significant relations with only a few. In case of females, within a low significance level (0.1% and 0.5%) all calculating method show significant connection with the Lengyel series from the cemetery of Mórágy, the LBK series from the Bruchstedt cemetery in Germany, and the pooled LBK series from Bohemia. In case of males, using the Penrose and Euclidean distance, there are no significant similarity with any series, not even at a generous, 1% significance rate. On the other hand, employing Chebyshev distance and Pearson’s correlation matrix, the male sample present so much connections, that based on the archaeological and anthropological literature can not be explained. In total, the comparative craniometric analysis of the Alsónyék series reinforces Zoffmann’s earlier Penrose
results, which suggested an indigenous (LBK) biological origin for the population of the culture (Zoffmann 1984, 1992, 2004).

Anthropological differences and similarities between populations of eastern and western Carpathian Basin during this time period have been long debated. While Szathmáry (1981) originate the Late Neolithic population of the Tisza culture partially from the south, Zoffmann (1992, 2004) dismisses this possibility. According to her opinion, the populations of the Tisza and Lengyel cultures were in close genetic relations with each other. This may suggest small-scale or more significant population shifts within the Carpathian Basin during the Late Neolithic. The female series from Alsónyék, using the Penrose and Euclidean distance calculations, does not present significant similarity with the population of the Tisza culture. However, significant connection occurred between these populations at the significance level of 0.5%, using the Chebyshev distance and Pearson correlation matrix. Meanwhile, there is absolutely no observable correlation between the male series from Alsónyék and the population of the Tisza culture irrespective of distance measuring methodology. We have to admit, however, that beyond a narrow significance level (!), the population of the Tisza culture provides the closest relation to the population of the Alsónyék cemetery.

The detailed paleopathological analysis of the skeletal population of the cemetery show a relatively low ratio of traumatic deformations, non specific inflammations, and degenerative articular diseases. As for the haematological disorders, cribra orbitale occurred with a high incidence among children, which likely reflects iron deficient diet. At the same time, among the adult the most frequent alterations were the enthesopathic deformities, primarily on the calcaneum and on the patella, which are generally considered to be markers of more active lifestyle.

Besides these above mentioned alterations some rare or significant diseases occurred, too. These include cases of benign tumor and of so-called pathological birth. Two cases of deformities affecting the frontal ligaments of the spinal column suggesting DISH-syndrome. The most important pathological alteration occurred in the case of an individual buried in a post-framed grave construction. On the vertebral column of this person very typical morphological lesions caused by tuberculosis could be observed. The significance of this find is that this is the second earliest representation of the disease from the Carpathian Basin. It dates after the instances observed in the Tisza culture cemetery of Hódmezővásárhely-Gorzsa (Masson 2011).

The oral pathological examinations revealed a general low frequency of carious lesions, alveolar abscesses and cysts, that suggests an adequate dental hygiene. However, the frequent appearance of dental hypoplasia suggests unpredictable food supply in the early childhood.

I had the opportunity to analyze 68 individuals, who were buried in post-framed grave constructions. The demographic and morphometric characteristics of them show overall similarities to the rest of the population of the Alsónyék community. The frequency of different
pathological alterations and dental diseases is also similar to that of the rest of the population buried in simple graves. Based on these, the archaeologically manifested socio-economic differentiation cannot be supported by the physical anthropological characteristics and by the lifestyle among the members of the Alsónyék community.

The above outlined results and interpretations, the clarification of unanswered questions will be possible only through the physical anthropological analysis of the full population of the Alsónyék cemetery. Proceedings in the physical anthropological investigations considering the Lengyel culture requires further burial excavations for better understanding of the Early- and Middle Neolithic of the region and of the other contemporary, Late Neolithic populations from Western Transdanubia.

References


The author's published papers on the topic of the Ph.D. dissertation

Papers published in journals accepted by the Doctoral School of Biology:


Papers published in journals and edited volumes not accepted by the Doctoral School of Biology:


Papers published in conference brochures: