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# ASTRONOMICAL ORIENTATION OF SKELETONS IN THE EARLY ENEOLITHIC NECROPOLIS AT PODLOKANJ

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**Abstract.** In this paper analysis of orientation distribution will be presented concerning ten skeletons in the Podlokanj-Južne bašte necropolis. Data acquired this way support the theory that members of the Early Eneolithic Tiszabolgár-Bodrogkeresztúr culture orientated their dead toward the point of actual sunrise.

## 1. INTRODUCTION

The presence of the skeleton/grave orientation toward the azimuth of sunrise or sunset has been confirmed in case of several prehistoric necropoles. Orientation measurements have been conducted on Neolithic, Early Eneolithic and Bronze Age necropoles and it has been determined that skeletons are frequently being orientated toward the cardinal points of azimuth or the sunrise/sunset azimuth on the day of the burial (e.g., Schlosser and Čierny, 1982; Barlai, 1992; Barlai and Bognár-Kutzián, 1995; Vince *et al.* 1996).

Points of sunrise and sunset are on the exact east and west only on two days in a year, at summer and winter equinoxes. In the summer, sunrise azimuth moves toward the north, and in the winter toward the south. Degree of these deviations depends on latitude of the necropolis and the time of the year when the burial took place.

Having taken these facts into the consideration and assuming that there was a ritual of sunrise/sunset determined burials, then the exact position of the sun - the actual point of sunrise on the day of death or burial, would have to be established for the purpose of orientating the skeleton axis. If we analyse the angular distribution of skeleton orientation and then compare these results with the sunrise/sunset azimuth on the given latitude, we can establish a relation between burial customs and the azimuth of the actual sunrise (Vince *et al.* 1996).

## 2. THE NEKROPOLIS AT PODLOKANJ

The Podlokanj-Južne bašte excavation site is located in the northern region of Banat, at the junction of Yugoslav, Romanian and Hungarian border, at About 20 degrees east longitude and 46 degrees north latitude (Fig. 1). The necropolis belongs to the Early Eneolithic Tiszabolgár-Bodrogkeresztúr culture. During the excavations carried out in 1996. twelve graves were discovered containing skeletons in contracted position. Male skeletons were placed on the right, and female on the left-hand side.

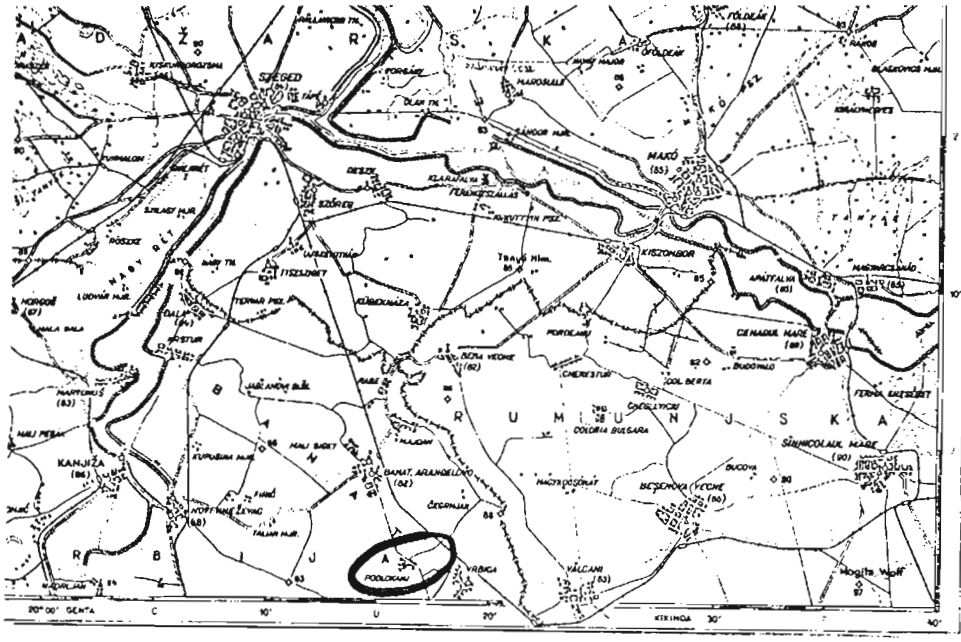


Fig. 1. Geographical position of Early Eneolithic Age nekropolis at Podlokanj.

The angle of skeleton orientation was determined on the basis of drawings of graves acquired from Grčki-Stanimirov (1997). The angle between the skeleton axes, determined by spinal column, and geographical north was measured clockwise (from north toward the east). Out of twelve excavated skeletons, the orientation was determined for ten (5 male and 5 female). In remaining two graves (graves No. 6 and 10) the bones were dislocated wich made determining orientation imposible.

Distribution of orientation angles and the number of skeletons are presented on histogram, while the difference of sunrise azimuths at summer and winter solsticies is presented by a horizontal bar (Fig. 2). The width of orientation distribution is almost identical to the difference of sunrise azimuths at summer and winter solsticies. The only two exceptions are graves No. 4 and 2, with deviations of few degrees. These deviations can be atributed to an error prehistoric gravediggers or/and archaeologists could have made when measuring the orientation of a grave. The results acquired indicate that bodies were orientated toward the azimuth of the sunrise on the day of their death or burial. Other researchers have came to similar results (Barlai, 1992; Barlai and Bognár-Kutzián, 1995).

Former studies indicate that mortality rate in spring and autumn is higher then in other seasons of the year. This has been a rule from prehistory untill this day, though that rate must have been higher in prehistory due to the unsanitary conditions (Barlai, 1992). As seen on the histogram, the skeleton angular distribution is orientated in the east-west direction, with three peaks: spring/summer, spring/autumn and autumn/winter peak. Mortality rate was the highest (60%) during the spring/autumn

months (March/September and mid June), and the lowest (10%) during autumn/winter months when only one person was buried (in December). The other histogram peak shows increased mortality (30%) during spring/summer months (April/Septembar, May/August, May/July).

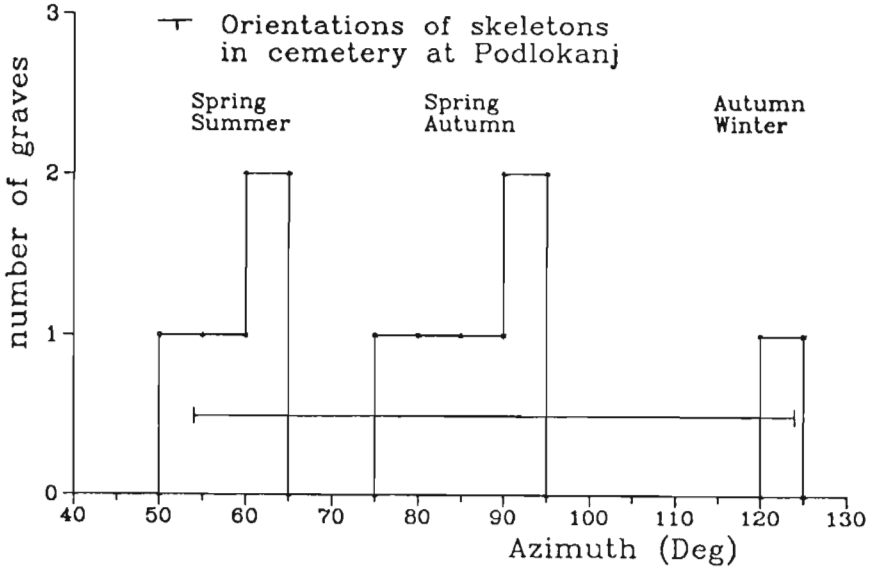


Fig. 2. Orientations of skeletons in necropolis at Podlokanj.

We could either assume that mortality during cold periods of the year was minimal or that due to the hardness of frozen soil graves were being dug only on special occasions (similar conclusion was drawn in case of the Gomolava necropolis as well (Vince *et al.* 1996)). If we take the second assumption as correct then questions like where were the bodies of those who died in winter baried or where were they kept untill the weather was more favorable, remain to be answered.

Differences in grave dimensions can be established on account of drawings of graves (Grčki-Stanimirov, 1997). At this stage it is important to mention that none of the graves is a child grave (assertion based on femur measurements) so that can not effect our further analysis. Assumption that smaller graves were dug during the colder period of the year, when ground was hard and frozen, has been examined and partly confirmed. For that purpose time of the burial was estimated and than compared with dimensions of the grave. This comparison showed that, within one sex group, larger graves were indeed dug during warmer periods of the year (Tab. 1). However, another interesting relation is this way revealed - as a rule female graves are larger than male ones (for 41 cm on average). Naturally, this could be attributed to the fact that female skeletons were accompanied with a greater number of ceramic vessels, but that did not seem to be crucial (e.g., Tab. 1., graves No. 11 and 9 with the same number of ceramic vessels). If they had another, maybe less practical reason, for making female graves larger, ramains to bee seen.

**Table 1.** The angle of skeletons, periods of the burial and grave dimensions data.

F E M A L E

| Grave | Angle of skel. | Burial date | Lenght (cm) | Width (cm) |
|---|---|---|---|---|
| 4 | 53° | June 15 | 200 | 95 |
| 1 | 82° | April 2-3/September 10 | 160 | 140 |
| 9 | 87° | March 24-25/September 19-20 | 160 | 100 |
| 12 | 90° | March 19-20/September 24-25 | 145 | 95 |
| 2 | 122° | December 4-6 | 140 | 110 |

M A L E

| Grave | Angle of skel. | Burial date | Lenght (cm) | Width (cm) |
|---|---|---|---|---|
| 7 | 55° | June 6-11 | 155 | 115 |
| 13 | 62° | May 13-15/July 30 | 125 | 80 |
| 5 | 78° | April 9-10/September 3 | 110 | 75 |
| 8 | 92° | March 15/September 28-29 | 105 | 55 |
| 11 | 63° | May 9-12/August 1-3 | 105 | 55 |

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