Introduction

Within the framework of the ERC-project “The value of mothers to society” (VAMOS), we are investigating midwifery in prehistory. The potential of this bio-archaeological study lies in the opportunity to evaluate, estimate and interpret infant and maternal health as recorded at the Nature History Museum in Vienna, spanning a long time period (c. 3000-15 BC, Late Neolithic to Late Iron Age), together with their archaeological background. Pregnancy and childbirth are formative events for women and may leave physical traces on the female skeleton. Kinship relations between individuals who were buried together in double, triple, and multiple burials will be clarified using mtDNA analyses. Furthermore, the social status (social index value = Si) of the buried individuals will be inferred through archaeological observations; grave depth and diameter, orientation and number and value of co-buried objects are taken into consideration.

Results

Concerning the results from the Bronze Age pilot study sample from Unterhautzenthal (N Adults = 39), sex determination from the skull and the pelvic bones was mostly consistent with archaeological findings. Five females were found to be buried with neonates and children. Unfortunately, two of them, juvenile mothers, had no pelvic remains preserved. However, mtDNA analyses for kinship relations is pending. On sample level, significant results according to sex and pelvic features were obtained for the preauricular sulcus (p = 0.01), Fisher’s exact test; Monte Carlo 99% CI (95%); Kendall’s τ = .000). Males and females show a distinct sexual dimorphism: from the largest femoral length measurements, there is a higher possible movement in this joint, and the capsule and the sacro-iliac ligaments are prone to the highest strain there; bony exostoses and arthritides at this site can be the result of overload damage of the joint capsule and cartilage (Dihlmann 1987). Moreover, due to the decreasing relaxation levels after childbirth, the locking mechanism of the sacro-iliac joint improves again; but this may occur in a pattern adopted during pregnancy; such a sacral “subluxation” occurs mostly in form of a back-ward rotation of the ilium relative to the sacrum, more frequently but not exclusively unilaterally (Williams et al. 1995).

The pictures above show pelvic changes in 3 females of different ages, from Unterhautzenthal. The females from burial 93B and 109A show especially peculiar changes at the anterior-superior margin of the auricular facies. This location is typical for reparative constrictions, as there is the highest possible movement in this joint, and the capsule and the sacro-iliac ligaments are prone to the highest strain there; bony exostoses and arthritides at this site can be the result of overload damage of the joint capsule and cartilage (Dihlmann 1987). Moreover, due to the decreasing relaxation levels after childbirth, the locking mechanism of the sacro-iliac joint improves again; but this may occur in a pattern adopted during pregnancy; such a sacral “subluxation” occurs mostly in form of a back-ward rotation of the ilium relative to the sacrum, more frequently but not exclusively unilaterally (Williams et al. 1995).

Discussion

Statistical results from the pilot study Unterhautzenthal show statistically significant associations between sex, body height, and the existence of preauricular sulci. Sex determination from the skulls, which frequently occur together (Fig. 9), indicating potential error in using only one feature (cf. Kelley 1979). In a CT study, złodziejek-Kuzmiczek et al. (2016) show that the sacral bone is more strongly involved in bearing weight than the hip, and the joint areas are recorded (present/not present). Features at the hip bone and the sacral bone are assessed, as these may influence the occurrence of bone growth constriction and number and value of co-buried objects are taken into consideration.

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References

Cape Town, South Africa: University of Cape Town.

Material and Methods

Systematic, bilateral examination of selected pelvic features is being carried out, including the preauricular sulcus (shape F/M after Brücke 2002) and sulci (stages 0–4 after Steckel et al., 2006), pinning at the pubic and sacral surface (stages 0–3, Swanson & Galloway 2010) and the external genitalia (stages 0–3, Snodgrass & Galloway 2003, Maass 2012). Exostoses at the margin of the sacro-iliac joint, and exostoses and lesions at the ventral pubic surface are being assessed (presentation not present). In addition, due to biomechanical reasons, selected muscle markings are recorded, and degenerative/congenital changes especially at the hip and the bone joint areas are recorded (present/not present). Features at the hip bone and the sacral bone are assessed, as these may influence the occurrence of bone growth constriction and number and value of co-buried objects are taken into consideration.

Systematic photographs are taken of each feature at the pelvic and the sacral bones for comparison.