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## *Preliminary osteological investigation of early medieval site Gz 10 in Giecz, Poland*

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**Abstract:** Early medieval site Gz 10 yields a new human skeletal collection from Giecz, Poland. So far 55 individuals have been recovered, just over half of whom are subadults. It is estimated that the majority of adults were 35–50 years old and the majority of subadults were younger than six years old at the time of death. Ongoing analysis includes indicators of stress (healed *cribra orbitalia* and *porotic hyperostosis* and linear enamel hypoplasia), infection, periodontal disease, degenerative joint disease, trauma, stature, and population structure.

**Keywords:** Medieval Poland, Giecz, osteology, trauma, paleopathology

**Abstrakt:** Badania wczesnośredniowiecznego stanowiska Giecz 10 dostarczyły nową kolekcję kości ludzkich z Giecza (woj. wielkopolskie). Do tej pory odkryto 55 grobów, z których nieco ponad połowę stanowiły pochówki dzieci i młodzieży. Wiek w momencie śmierci większości z osobników dorosłych oszacowano na 35–50 lat, a większości niedorośli na mniej niż sześć lat. W trakcie analiz są ponadto wskaźniki stresu (*cribra orbitalia*, *porotic hyperostosis* i liniowa hipoplazja szkliwa), infekcje, choroby przyzębia, choroby zwyrodnieniowe stawów, urazy, ogólna budowa ciała i struktura populacji.

**Słowa kluczowe:** wczesnośredniowieczna Polska, Giecz, osteologia, urazy, paleopatologia

A new collection of early medieval skeletal remains is under investigation in Giecz, Poland. Site Gz 10 was discovered in autumn 2013, during a routine pedestrian survey of an agricultural field 500 m NW of the previously recorded early medieval site Gz 4. The following year, the Archaeological Reserve in Giecz, Branch of the Museum of the First Piasts at Lednica, conducted preliminary archaeological testing under the direction of Magda Miciak. The authors assisted in a larger-scale excavation carried out in the fall of 2015. In 2016 excavations continued, in conjunction with the Slavia Foundation, as part of the 2016 Giecz Mortuary Archaeology Field School. During the 2015 and 2016 field seasons, the authors began curating the Gz 10 skeletal remains, recording an inventory of elements and conducting basic osteological analysis. Investigations include estimating age-at-death and adult sex determination, while evidence of stress, disease, and trauma are currently also being compiled.

According to site archaeologists (M. Miciak, T. Krysztofiak, pers. comm.), some Gz 10 grave goods are similar to those recovered from Gz 4, which are predominately dated to the second half of the 11<sup>th</sup> century through the 13<sup>th</sup> century. However, comparable to Gz 4, some Gz 10 grave goods are cruder forms, which suggest even earlier medieval times. If confirmed, then at least a portion of the individuals might have been interred prior to the attack of Bohemia, which occurred in 1038 AD [DAVIES 1982]. Another explanation is that the artifacts are remnants of the pre-war settlement and were simply buried with a more recent population. At this point it is uncertain if individuals from Gz 10 were biologically related to the individuals buried at Gz 4. We hope to shed light on this topic through biological distance research, which is currently underway to compare Gz 4 to Gz 10, as well as other contemporaneous European populations. Following are the initial observations of this new skeletal collection.

### *Population demography*

Standard methods were utilized to estimate the age-at-death of each set of remains, as well as determine the sex of adult individuals. After taking into consideration the necessary lines of evidence, individuals were placed into standard age cohorts. Subadults were assigned to the following groups: *infans I* (infants/toddlers): 0–5 years, *infans II* (children): 6–11 years, *juvenis I* (juveniles): 12–15 years, and *juvenis II* (adolescents): 16–20 years. Adults were assigned to the following age cohorts: *adultus* (younger adults): 20–34 years, *maturus* (mature adults): 35–50 years, and *senilis* (older adults): >50 years.

### *Subadult methodology*

Age-at-death in subadult remains was primarily based on the eruption of teeth and the development of tooth roots and crowns, since teeth are less affected by stress [SMITH 1991]. In cases where tooth roots and crowns were sufficiently visible, the preferred method was a combination of Moorrees *et al.* [1963] and Smith [1991].

When this was not possible, Ubelaker [1989], a revision of the 22 stages depicted by Schour and Massler [1941], was utilized.

In addition to dental analysis, bone elements were also tested for age estimation. Measurements were obtained using digital sliding calipers and the data were compared to reported maximum lengths of long bones [MARESH 1970] and clavicles [BLACK, SCHEUER 1996]. In suspected fetal remains, the length and width of the basilar portion of the unfused occipital [SCHEUER, MACLAUGHLIN-BLACK 1994] were analyzed, in addition to long bone and clavicle lengths [FAZEKAS, KÓSA 1978]. The extent of epiphyseal fusion was also observed and compared to summaries reported throughout Scheuer and Black [2000].

#### *Adult methodology*

For adult individuals, age was estimated based on age-related morphological changes of the *os pubis* [BROOKS, SUCHEY 1990], auricular surface [LOVEJOY ET AL. 1985], and fourth sternal rib ends [IŞÇAN ET AL. 1984]. In addition, epiphyseal fusion of the medial clavicles, sacral bodies, and vertebrae were considered as described in Scheuer and Black [2000].

Adult sex determination was based on sexual dimorphism of the cranium [BUKSTRA, UBELAKER 1994] and *os coxae* [PHENICE 1969; BUKSTRA, UBELAKER 1994]. In addition, sex was based on the maximum measurements of the humeral and femoral heads [STEWART 1979], obtained with digital sliding calipers.

#### *Results*

Currently 55 sets of remains have been unearthed at site Gz 10. Results show that, thus far, just over half (51%) of the recovered skeletal remains were subadults (Figure 1) at the time of death. The vast majority of subadults (79%, or ~40% of the total site population) were less than six years old. The authors note that the long bones typically underestimate age when compared to dental age, as well as the age obtained from the clavicles and the *pars basilaris*, just as they experienced with the Gz 4 remains. It should also be noted that quite a few adults overlap age cohorts, as shown in Figure 2.

Of the recovered adult individuals, there are almost an even number of males (n=12) and females (n=13) currently in the collection. Sex was not determined for two adults, due to the paucity of remains of one case and ambiguity in the other.

#### *Initial observations*

The Gz 10 skeletal remains range from highly fragmentary to excellent condition. However, bone preservation is generally not as good as in the case of Gz 4, despite such close proximity. This is probably related to the differences in soil chemistry. The Gz 10 subadults are especially fragmentary, which is not uncommon for archaeological remains. There is evidence that some infant and child remains were disturbed by adult burials. Similar to Gz 4, some of the remains have sustained taphonomic damage related to agricultural activities, particularly plow action [JUSTUS 2005].

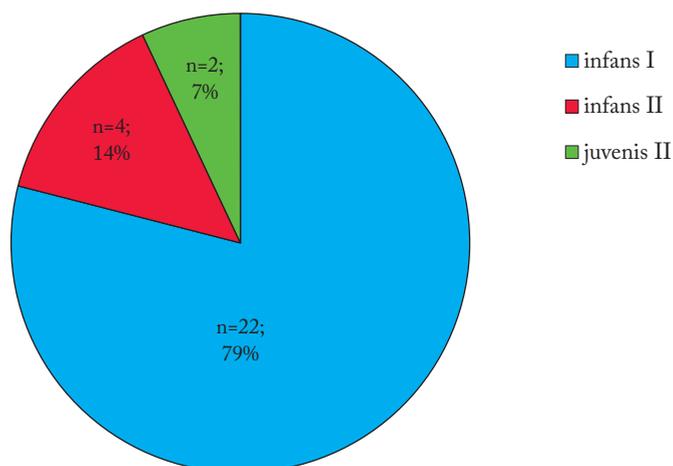


Fig. 1. Distribution of preliminary age cohorts of subadult remains excavated at Gz 10 between 2014 and 2016

Ryc. 1. Giecz, stan. 10, wstępny rozkład grup wiekowych szkieletów dzieci i osobników młodocianych badanych w latach 2014–2016

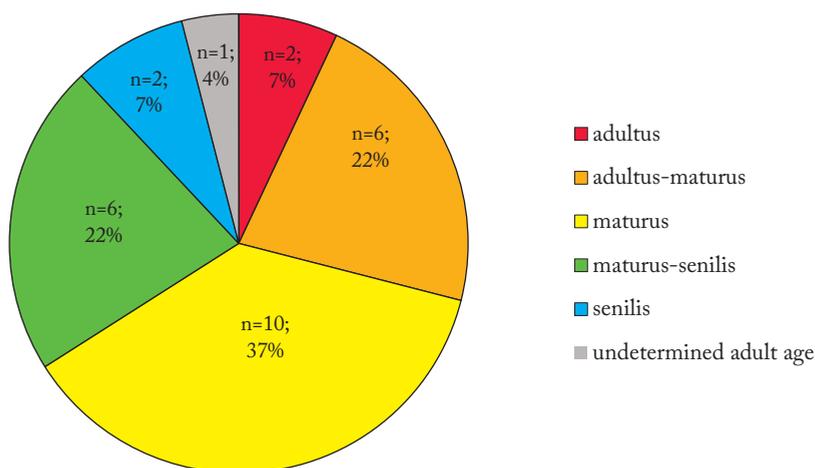


Fig. 2. Distribution of preliminary age cohorts of adult remains excavated at Gz 10 between 2014 and 2016

Ryc. 2. Giecz, stan. 10, wstępny rozkład grup wiekowych szkieletów osobników dorosłych badanych w latach 2014–2016

Investigation of stress and deprivation is in the early stages. Common stress indicators described in Ortner [2003] and Roberts and Manchester [2005] are observed in Gz 10, for example linear enamel hypoplasia in adult teeth and healed *porotic hyperostosis* and *cribra orbitalia* in the cranium. Other observations include rib lesions, periodontal disease, and antemortem trauma.

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### *Future research plans*

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Further excavation of Gz 10 is planned for the 2017 field season, again as part of the Giecz Archaeology Field School. In addition to ongoing analysis of pathological conditions, stress indicators, degenerative joint disease, and stature, biological distance analysis is currently being conducted using craniometric and cranial nonmetric traits. A comparative dental biodistance study of Gz 10 and Gz 4 will commence in the 2017 season. When a more complete sample is recovered, these data will be subjected to statistical tests and a more thorough report of investigations will be provided.

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### *Conclusion*

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The new Gz 10 collection is already proving to be a valuable resource for gaining a better understanding of population health, lifestyle, and population structure in early medieval Poland. So far, a sample of 55 individuals have been unearthed at site Gz 10, which includes everything from possible fetuses and newborns to older adults. Establishing a substantial skeletal collection looks promising as the future seasons progress.

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Wstępne rozpoznanie antropologiczne pochówków  
z wczesnośredniowiecznego cmentarzyska w Gieczu, stan. 10.

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### Streszczenie

Badania wykopaliskowe na nowo odkrytym wczesnośredniowiecznym cmentarzysku w Gieczu (woj. wielkopolskie) dostarczyły interesującej kolekcji kości ludzkich. Stanowisko 10., zlokalizowane zaledwie 500 m w kierunku NW od stanowiska 4., zostało odkryte w 2013 roku podczas rutynowej prospekcji terenowej prowadzonej przez pracowników Rezerwatu Archeologicznego Gród Wczesnopiastowski w Gieczu, oddziału Muzeum Pierwszych Piastów na Lednicy. W latach 2015 i 2016 autorki artykułu uczestniczyły w badaniach wykopaliskowych na stanowisku, obejmując opiekę na materiałem kostnym i rozpoczynając jego analizę antropologiczną, której wstępne wyniki przedstawia niniejszy artykuł. Do tej pory odkryto groby 55 osobników. Większość (51%; n=28) stanowiły szkielety dzieci i młodzieży, spośród których prawie 80% w momencie śmierci miało mniej niż sześć lat. Spośród osobników zmarłych w dorosłym wieku (trzydzieści kobiet, dwunastu mężczyzn, dwie osoby o nieokreślonej płci) większość (37%; n=10) zmarła pomiędzy 35 a 50 rokiem życia. Na kościach i zębach zaobserwowano typowe wskaźniki stresu biologicznego, takie jak liniowa hipoplazja szkliwa czy zagojone *cribra orbitalia* i *porotic hyperostosis*, jak również ślady infekcji, chorób przyzębia czy urazy przedśmiertne. Dodatkowo rozpoczęto analizy pod kątem chorób zwyrodnieniowych stawów, ogólnej budowy ciała czy odległości biologicznej. Badania te będą kontynuowane podczas najbliższych sezonów wykopaliskowych prowadzonych równoległe ze Szkołą Letnią Archeologii w Gieczu organizowaną przez Rezerwat Archeologiczny w Gieczu we współpracy z Fundacją Slavia.