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HOW LONG DID THEY LIVE? WHAT AILED THEM?

Analyzing early medieval cemeteries sheds light on the societal status, health, living conditions, and adaptive strategies of the inhabitants of the early Piast monarchy.



Fig. 1
One of the graves
uncovered at the Bodzia
burial site in Kuyavia

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Fig. 2
Graphic documentation
of a burial chamber at
the Pień burial site
(Chełmno Land), photo by
A. Janowski and A. Piasecki

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The early Piast monarchy was a period of intense change, not only in politics and culture. The baptism of Mieszko I in 966 marked the beginning of a process that extended far beyond the formal adoption of a new faith by the ruling elite. Christianity brought with it new ideological, social, and cultural norms that gradually reshaped all levels of society. Although the Christianization of Poland advanced slowly at first, affecting mainly the elite and inhabitants of major centers, it eventually spread to the lower classes – often partially assimilating earlier pagan traditions.

During this time, funerary practices also underwent a significant shift. Cremation – long associated with pagan religions – was gradually replaced by the burial of unburnt bodies (Figs. 1–2). Scholars continue to debate the reasons for the spread of inhumation across the Western Slavic lands: was it a direct consequence of Christianization, or did it result from an independent, less-understood shift within pagan burial customs? Whatever the cause, by the second half of the tenth century, inhumation had become the

predominant burial practice in the Polish lands. This change opened new opportunities for researchers to examine the biological condition of populations living in the early Piast state.

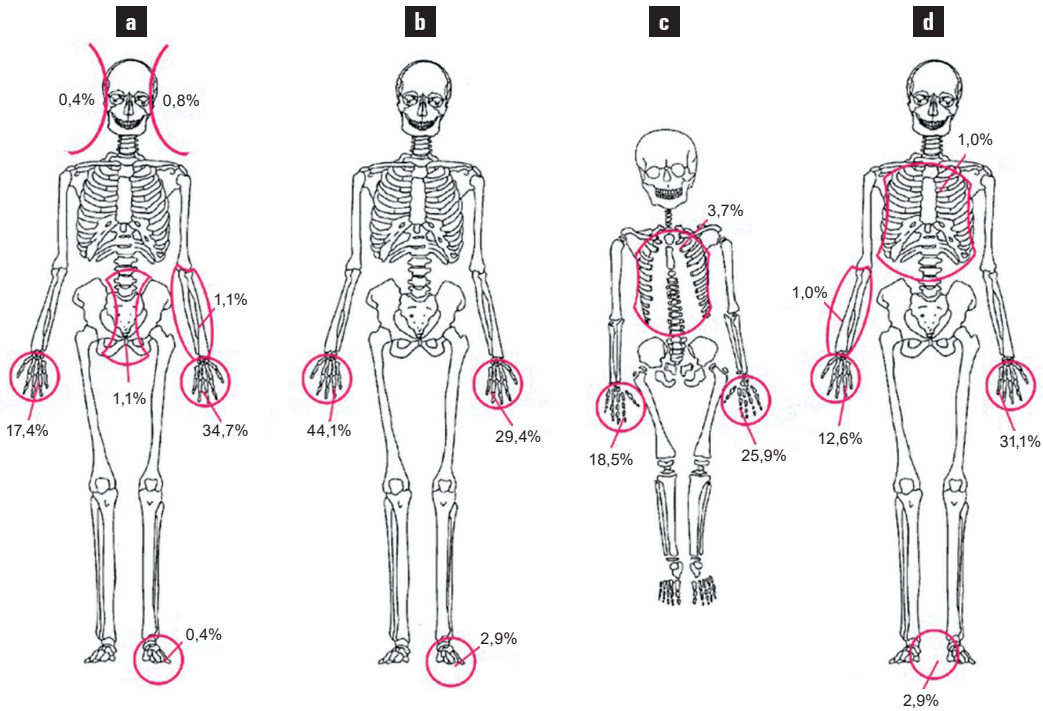
The earliest skeletal cemeteries, located in forested and rural areas, likely represented a continuation of older burial traditions. Over time, interment in woodland clearings or open fields was gradually abandoned, and burial *in agris sive in silvis* – in fields or forests – came to be formally prohibited. Still, this shift may have been only a superficial adaptation of Christian norms, as many core elements of the ritual remained rooted in pagan beliefs. The dead were often buried with objects that reflected their social status or were intended for use in the afterlife. The number and quality of such grave goods were likely influenced by the individual's wealth and societal rank, with some graves containing insignia of power. Certain categories of items – such as temple rings found near female skulls, or weapons and horse gear in male graves – clearly serve as archaeological markers of culturally defined gender roles.

Anthropological analysis of burials

A key component in the interpretation of any burial is a classical anthropological analysis. Uncremated remains are subjected to detailed assessment, particularly with regard to the development of so-called

Fig. 3
Distribution of rings in burials at selected early medieval cemeteries, by the sex of the deceased:

a) women,
b) men,
c) children,
d) individuals of undetermined sex



dimorphic traits. Sexual dimorphism is genetically determined and manifests in differences in the structure of various skeletal elements. For example, male skulls are typically larger, with more pronounced sculpting of the occipital area and brow ridges, and a more steeply sloped frontal bone. Distinct differences are also observed in the pelvis – its overall shape, the contour of the pelvic inlet, the shape of the greater sciatic notch and obturator foramen, the angle and

position of the iliac wings, the structure of the ischial ramus, and the form of the pubic symphysis. Additional factors include the robustness, size, and sculpting of the postcranial skeleton.

In children and adolescents, dimorphic traits are much less developed, making it difficult to determine their sex using standard anthropological criteria. This has kept alive a broader debate among scholars: in the early medieval period, were children already perceived

Ryc. 4
Grave goods distribution by sex of the deceased at the early medieval burial site in Pień (Chełmno Land)

- Legend:
- bucket
 - bronze dish
 - ceramic vessel
 - dipper
 - axe
 - semi-precious stone beads
 - glass beads
 - silver chain
 - silver bead
 - necklace clasp
 - bell
 - amulet-box pendant (kaptorga)
 - temple ring
 - earring
 - clay spindle whorl
 - iron knife
 - whetstone
 - conical mount
 - T fabric
 - T other

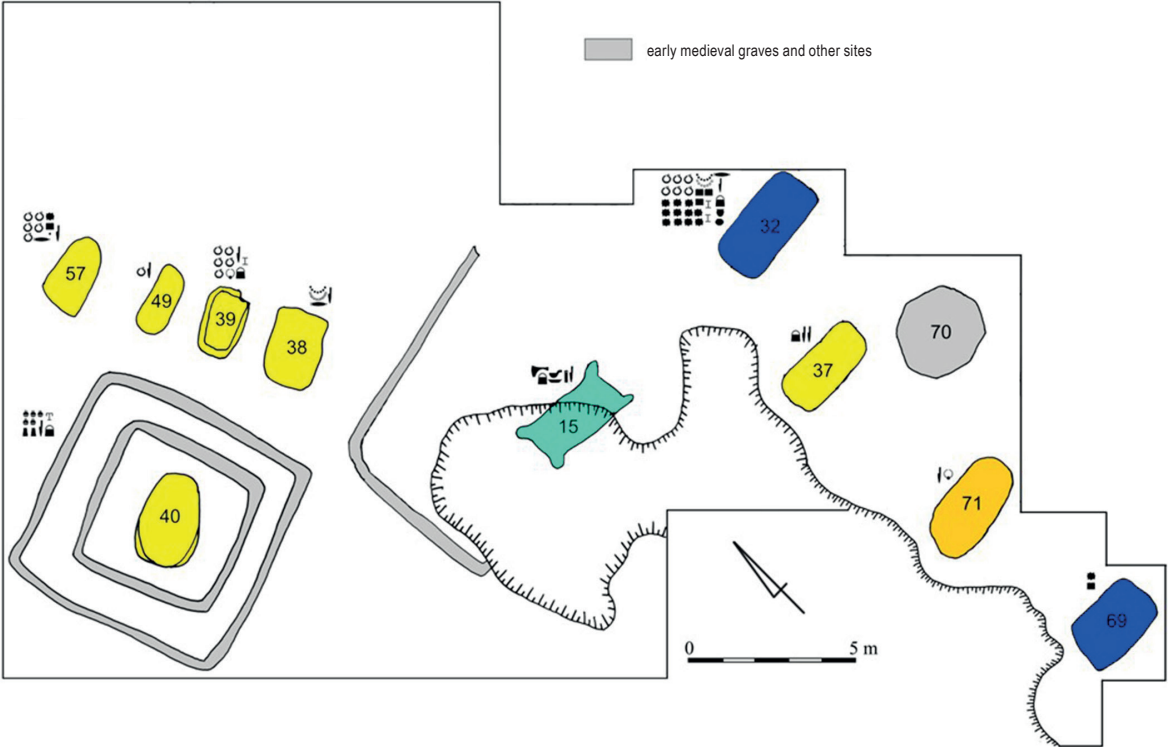


TABLE 1
Halley-type life table for individuals buried at the Bodzia cemetery in Kuyavia

Age class	dx	lx	qx	Lx	Tx	ex
0–10	22	100	0.2200	890	2760	27.6
10–20	8	78	0.1026	740	1870	24.0
20–30	30	70	0.4286	550	1130	16.1
30–40	10	40	0.2500	350	580	14.5
40–50	22	30	0.7333	190	230	7.6
50–60	8	8	1.0000	40	40	5.0

Legend:
dx – fraction of individuals dying at age x,
lx – percentage surviving to age x,
qx – probability of dying at age x,
Lx – total years lived by individuals aged xt,
Tx – total years of life remaining to individuals aged x,
ex – life expectancy at the start of the age class

as having a specific gender, or was gender something that was “acquired” or socially constructed at a certain stage of life? According to some researchers, children who died before undergoing the ritual of *postrzyżyny* (first haircut) might be buried with ornaments typically associated with women, symbolizing the fact that they remained under their mother’s care until death. However, children’s graves sometimes contain objects such as knives or large, heavy ornaments that the child likely never used in life but would have been intended for them to use as adults. For this reason, even when the child’s sex cannot be established based on archaeological criteria, the inclusion of grave goods or offerings (e.g. miniature weapons) is often interpreted as indicating the child’s “future” or “perceived” gender. Consequently, research reports may refer to the grave of a “girl” or a “boy.”

Age estimation

Another crucial aspect of anthropological analysis is determining the age at death. For adults, this is usually assessed based on the degree of cranial suture fusion, the extent of tooth wear, and morphological changes in the pubic symphysis and the auricular surface of the pelvic bone. In the case of children and adolescents, age is estimated based on the degree of ossification in various parts of the skeleton, the development or eruption of teeth, and changes in bone length associated with growth. Anthropological studies typically use a six-stage age classification system, which reflects the correlation between developmental changes and an individual’s biological age: *infans I* (early childhood, from birth to around 6–7 years), *infans II* (later childhood, from 6 to about 12–14 years), *juvenis* (adolescence, from 14 to around 20–22 years), *adultus* (young adulthood, from 22 to about 30–35 years), *maturus* (mature adulthood, from 35 to 50–55 years), and *senilis* (old age, over 55 years).

Age assessment enables researchers to track patterns in grave goods observed at early medieval

cemeteries (Figs. 3–5), such as the tendency to more richly furnish the graves of women who died in early adulthood and men who died in mature adulthood. On some burial sites, children’s graves – especially those of older children – appear to be equipped with less diverse items. The least varied grave goods are usually associated with the oldest individuals (*senilis*), regardless of gender.

As part of anthropological analysis, the empirically reconstructed age and sex structure of the deceased is then used as the basis for calculating Halley’s mortality tables (Table 1). These are constructed either from the distribution of age at death or using the probability of death in relation to the age structure of the living population. This allows researchers to assess the reproductive potential of a given community and estimate the extent to which natural selection may have operated on the population. At early medieval burial grounds, the majority of child burials are of individuals who died before the age of ten, while mortality rates among slightly older children show a marked decline. This is usually ascribed to the higher vulnerability of young children to infectious diseases,

Fig. 5
Sex distribution of individuals buried at the Bodzia burial site (in %):
w – women,
m – men,
c – children,
? – individuals of undetermined sex

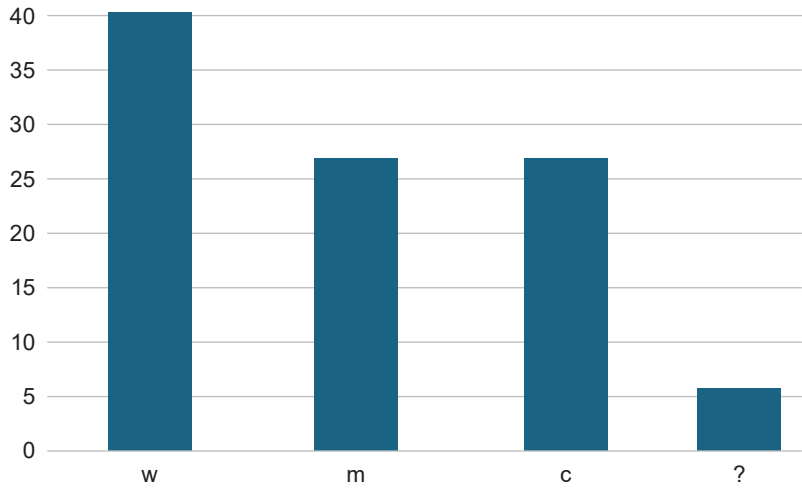
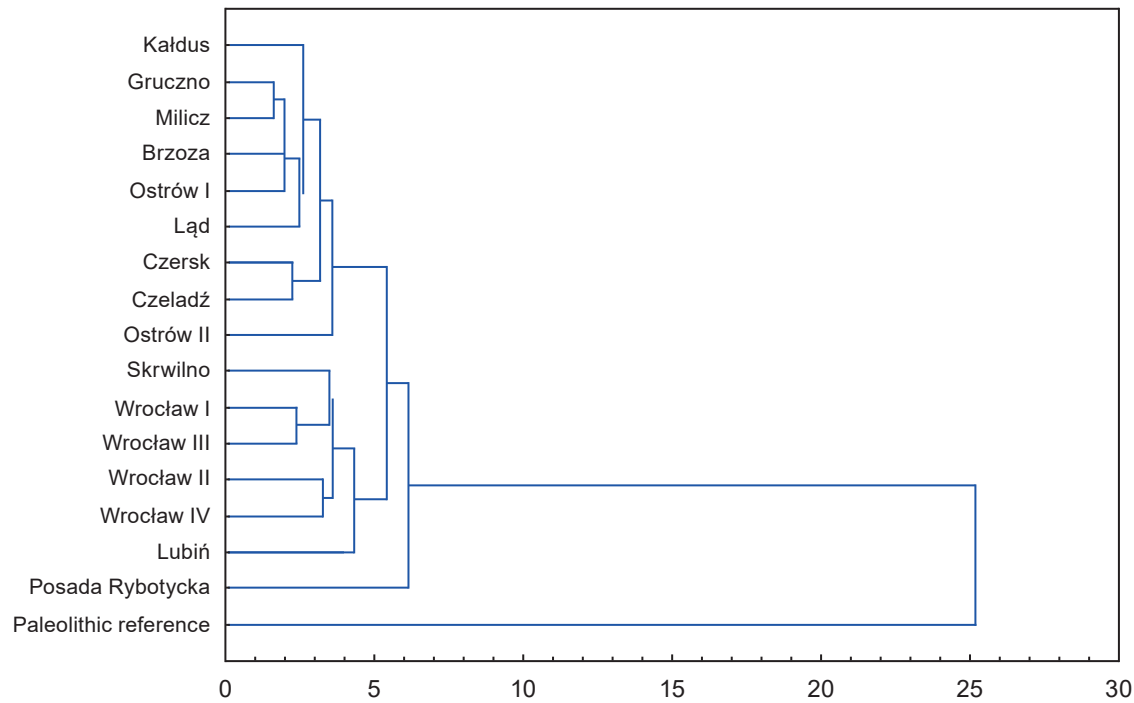


Fig. 6
Dendrogram showing
relationships between
selected prehistoric
and early historic
populations based
on cranial index values



nutritional deficiencies, or metabolic disorders. In many cases, the number of child burials discovered appears to be lower than expected based on demographic models, which suggest that in early medieval populations children’s graves could account for as much as 50% of all burials. This discrepancy is most often explained by positing burial practices that left little archaeological trace, or the possibility that children were buried in separate cemetery areas not yet identified in excavations. Among adults, the highest mortality rates tend to occur between the ages of 40 and 50. An analysis of death distribution by sex reveals an excess of female mortality between the ages of 20 and 30, most likely related to complications during childbirth. The highest number of male deaths, meanwhile, occurs in the 40–50 age group.

Metric analysis of bones

Individual bones recovered from burial sites are also subjected to detailed metric analysis. These measurements are used to estimate the average stature of the deceased during life, taking sex into account (Table 2), and to conduct comparisons between different populations (Fig. 6). For example, the estimated average height of men buried at the Bodzia cemetery in Kuyavia was 168 cm, classifying them as relatively tall compared to other early medieval populations in Poland. In contrast, the average height of women from the same site was 152 cm, consistent with the stature of women from other groups of the same period.

A key element of skeletal analysis involves identifying and describing the frequency and severity

TABLE 2
Estimated living stature of men and women based on Pearson’s method, for selected early medieval cemeteries in present-day Poland

Sites and dates	Men [cm]	Women [cm]	Sites and dates	Men [cm]	Women [cm]
Wolin. 9th–12th c.	166.2	151,9	Wiślica. 10th–13th c.	168.3	156.1
Niemcza. 10th c.	166.3	154,8	Końskie. 11th c.	164.3	152.2
Bodzia. 10th/11th c.	168.0	152,3	Kałdus (Site 4). 11th c.	166.0	155.3
Nowy Bazar. 10th–12th c.	166.3	154,7	Złota Pińczowska. 11th–12th c.	164.4	155.2
Ostrów Lednicki. 10th–12th c.	165.3	153,0	Milicz. 11th–13th c.	166.2	154.2
Gdańsk. 10th–13th c.	164.2	159,4			

of pathological and developmental changes. Many of these are closely linked to living conditions and reflect the presence of stressors that disrupted normal physical development. Among the most important are degenerative joint changes. These most commonly involve either the formation of new bone tissue (as in osteoarthritis) or the progressive loss of bone (as in other arthropathies). Primary, idiopathic osteoarthritis is likely caused by biomechanical stress or injury and reflects the ageing of the musculoskeletal system. Secondary osteoarthritis, on the other hand, often develops after fractures that have altered normal bone structure or joint mechanics. The location and intensity of these changes frequently offer clues about the physical demands placed on individuals, providing insights into the everyday activities and labour conditions of the population.

Metabolic diseases also leave identifiable traces on bones and offer further evidence of past living conditions. One such condition is *cribra orbitalia* – a porous lesion on the roof of the eye sockets – indicating that the body had activated immune responses to infection. This condition may be linked to chronic inflammation or genetic disorders, such as thalassaemia or sickle-cell anaemia. Since *cribra orbitalia* is more commonly observed in populations with low standards of living and hygiene, it is regarded as an important indicator of poor socioeconomic conditions in the communities being studied

Traces of disease and trauma

Skeletal remains from early medieval cemeteries frequently show evidence of dental and periodontal diseases, as well as changes to tooth crowns resulting from various nutritional deficiencies. Tooth decay was extremely common, and its prevalence in a given group is closely tied to dietary habits. Enamel hypoplasia – developmental defects in the enamel often triggered by environmental stress, such as the transition from breastfeeding to solid food (known as weaning stress) – appears as longitudinal, transverse, or circular grooves on the surface of the tooth crown. These hypoplastic lines allow researchers to estimate quite precisely the age at which stress factors began affecting the individual. Analysis of these pathophysiological changes provides insight not only into the prevalence and severity of dental disease in a population but also into the individual dietary patterns of its members.

Another category of conditions that leave visible traces on bones includes infectious diseases. These often were not the direct cause of death but did result in overlapping tissue reactions. Inflammation of bone tissue typically occurs in response to one or more harmful stimuli – ranging from pathogens to trauma or tumors. Anthropologists therefore often



distinguish between specific infections (caused by a known pathogen, such as *Mycobacterium leprae*, which causes leprosy) and non-specific infections (for example, viral infections). Bone inflammation is widely recognized as a valuable indicator of environmental stress and is considered one of the most important markers of the health status of prehistoric and early historic populations.

Trauma also offers compelling clues about life in the early Middle Ages. Injuries are relatively common in early medieval populations, particularly on skulls (for example, in material from Kałdus in the Chełmno region, cranial injuries were found in just over 7% of individuals), and less often on the postcranial skeleton (such as parry (“nightstick”) fractures of the ulnae). A particularly striking case was recorded at the cemetery in Pień, also in the Chełmno region. Several bones from the upper torso and right foot were found unnaturally displaced from the rest of the body. These changes may have resulted from blows inflicted with a sharp-edged weapon – possibly a sword – as suggested by fractures in the right parietal bone of the skull (Fig. 7). The blows had damaged the right side of the skull above the hatline, the shoulder area, and the neck, and had severed the left hand (only the right hand was found in the grave) and part of the right foot. Due to the poor preservation of soft tissues, it was not possible to conclusively determine the origin of the injuries or the cause of death. At the cemetery in Bodzia, a male skeleton was found with several cranial injuries that showed no signs of healing, suggesting he may have died in combat involving bladed weapons.

As all these examples serve to show, anthropological analysis of early medieval Polish cemeteries thus provides valuable information about the place of the individual within the social structure of past communities, while enriching our understanding of the health, living conditions, and adaptive strategies of those who lived in the Polish lands centuries ago. ■

Fig. 7
One of the skulls excavated at the Pień burial site (Chełmno Land) with suspected evidence of trauma

Further reading:

Bojarski J. (2024). Grave and cemetery as a manifestation of social behaviours: A few thoughts on the example of early medieval burials from the Chełmno-Dobrzyń zone, *Archaeologia Historica Polona*, 30, 7–36.

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Janowski A. (2013). Are the chamber graves from Pień really Scandinavian?, in: *Scandinavian Culture in Medieval Poland*, ed. B. Stanisławski, et al., Warsaw, 395–409.

Płoszaj T., et al. (2020). Analysis of maternal lineage structure of individuals from chamber graves placed in medieval cemetery in Kałdus, Central Poland, *Homo*, 71(1): 43–50.

Polinski D., ed. (2020). *Early Medieval and Early Modern Burial Site in Pień, Toruń, 2021*, <https://www.archeologia.umk.pl/panel/wp-content/uploads/Pien-Cmentarzysko-mini.pdf>