

# Giving a Voice to the Little Ones: The Bioarchaeology of Children in the Baltics

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**Abstract.** The skeletal remains of non-adults provide endless insights into numerous aspects of their personal, family and social lives. Although they were considered to be marginal members of society, children can potentially shed light on factors influencing the overall health and survival of their communities, sensitively conveying the ability of a population to adapt to its environment and cope with moments of crisis. In the last decade, worldwide interest in the archaeology of children has grown, and has driven the bioarchaeological investigation of their skeletal remains. However, the bioarchaeological study of non-adults has received surprisingly little interest in the Baltic states. This review presents the past and current state of the art with specific focus on the Baltic area from prehistory to historic times, outlining new research fields and the benefits of studying non-adult skeletal remains, and proposing specific possible directions for future work on this topic. The paper is aimed at giving a louder voice to the youngest actors of ancient communities, and perhaps offers a starting point for developing a definitive bioarchaeology of children in the Baltics.

**Keywords:** Bioarchaeology of children, Baltic bioarchaeology, Estonia, Latvia, Lithuania, Livonia

## Balso suteikimas mažiesiems: Baltijos šalių vaikų bioarheologija

**Anotacija.** Vaikų skeletai teikia be galo daug informacijos apie jų asmeninį ar socialinį gyvenimą. Traktuoti kaip marginali visuomenės grupė, vaikai potencialiai gali padėti atskleisti pagrindinius veiksnius, paveikusius sveikatos būklę, bendrąjį visos visuomenės išgyvenamumą, jos gebėjimą prisitaikyti prie aplinkos ir krizinių situacijų. Pastarąjį dešimtmetį visame pasaulyje didėjo susidomėjimas vaikų archeologija, ne išimtis ir jų palaikų tyrimai. Tačiau Baltijos šalyse vaikų bioarheologija beveik nesusilaukė daugiau dėmesio. Ši apžvalga pristato praeityje ir šiuo metu Baltijos regione vykdomų tyrimų padėtį, ypatingą dėmesį skiriant vaikų palaikų tyrimams nuo priešistorinių iki istorinių laikų, nurodant galimą vaikų skeletų tyrimo naudą ir siūlant galimas tolesnio darbo kryptis. Straipsnio tikslas yra suteikti garsesnę balsą jauniausiems senovės bendruomenių veikėjams ir pasiūlyti atskaitos tašką Baltijos šalių vaikų bioarheologijos plėtrai.

**Reikšminiai žodžiai:** vaikų bioarheologija, Baltijos šalių bioarheologija, Estija, Latvija, Lietuva, Livonija.

## 1. Introduction

*“After the feast was over (...), the godmother laid the baby in the cradle, and said to the Queen, ‘Whenever the baby goes to sleep, be sure you lay the basket beside her, and leave the eggshells in it. As long as you do that, no evil can come to her; so guard this treasure as the apple of your eye, and teach your daughter to do so likewise.’ Then, kissing the baby three times, she mounted her coach and drove away”.*

- *The child who came from an egg* (Estonian fairytale).  
Andrew Lang, *The violet fairy book* (1901)

The skeletal remains of children provide endless insights into the complexity of their personal and social lives, starting with their birth and continuing through the important steps of their growth and development. Although for much of history they were considered to be simply passive and marginal members of the society, children have the potential to shed light on factors influencing their survival and health, and are able to accurately convey the ability of a population to adapt to its environment and cope with periods of crisis and upheaval. Non-adults are in fact rather sensitive barometers of fertility, mortality, stress, and pathology affecting ancient communities (Larsen, 1997, p. 337).

In the last decade, there has been a growing interest in the archaeology of children, including the bioarchaeological investigation of their skeletal remains and the analysis of their position within past societies. A large number of studies have provided important insights into several aspects of the bioarchaeology of perinates, infants, children, and adolescents, such as their mortality, growth patterns, and paleopathology (Lewis, 2007, 2017; Halcrow & Tayles, 2008; Wheeler, 2012; Bourbou, 2018; Inglis & Halcrow, 2018; Gowland & Halcrow, 2020; Halcrow & Ward, 2020; Halcrow et al., 2020).

However, the bioarchaeological study of non-adults specific to the Baltic countries is currently underdeveloped, and lacks a coherent line of research. Treated as marginal elements of past societies, children have been neglected in both archaeological and bioarchaeological research, enduring as silent traces of the ancient communities they once actively constituted. In the light of recent developments in the field, this short review presents the past and current state of the art on this topic, focusing specifically on the Baltic area from prehistory to historic times, and outlining the potential benefits and contributions of the scientific study of child remains in the future.

First, a brief outline of the general development of child bioarchaeology and its current study trends is presented, followed by an overview of bioarchaeological research on children in Lithuania, Latvia and Estonia in the last thirty years. The paper will then outline the current state of the art, some future prospects for the study of this material, and potential contributions to the wider field of bioarchaeology. This review is therefore aimed at giving a louder voice to the youngest actors of ancient populations, and perhaps serves as a starting point for the development of expanded bioarchaeology of children in the Baltics.

## 2. Brief history of the archaeological and bioanthropological study of children

*Bioarchaeology* is defined as the study of human skeletal remains from archaeological contexts, with the aim of reconstructing several aspects of the lives of ancient populations, such as diet, pathology, migrations, interpersonal relationships, and culture (Larsen, 1997, p. 337). Consequentially, *child bioarchaeology* is defined as the study of child remains from archaeological contexts (Lewis, 2007, p. 1; Halcrow & Ward, 2020, p. 2203). The first bioarchaeological investigations of children mainly followed the same trends in research methods being applied to adults, and were crafted to describe and classify physical features of the human skeleton. Among these, the macroscopic and metric characteristics of the skull received most of the attention (Halcrow & Ward, 2020, p. 2204; Halcrow et al., 2020, p. 1). Until the 1990s, non-adults were systematically marginalized from bioarchaeological research, although some papers took into account issues related to the scarce representation of children in ancient cemetery contexts, and to their high mortality rates in the past (Mays et al., 2017).

From this starting point, two main lines of thought guided the anthropological research focused on the non-adult members of ancient communities. The first began with the fundamental analysis by Philippe Ariès on the conception and treatment of children in medieval contexts (*Centuries of childhood: a social history of family life*, 1962). Here, infants and children were labeled as passive subjects of society, almost invisible in the archaeological record and mostly part of a domestic and feminine dimension, which was strictly intertwined within female gender roles (Baxter, 2008, p. 159). According to Ariès, the concept of infancy as understood in the present day was nonexistent until the Early Modern Age; prior to then, the parents showed a complete lack of empathy and affection towards their offspring, dressing them and treating them like miniaturized adults. This detached approach would have represented a defense mechanism against the overwhelming and persistent high infantile mortality (Ariès, 1962). Successive publications expanded on the topic (De Mause, 1974; Stone, 1977; Pollock, 1983), while others began to criticize this traditional point of view (Attreed, 1983; Hanawalt, 1986, 1993; Swanson, 1990; Shahar, 1992). The second line of research was inspired by the 1970s feminist movements, evolving with 1990s theories of gender relationships to societal roles and visibility. A major interest was directed towards those population groups usually defined as “invisible”, moving the child from a strictly feminine dimension to a more active position in the society; the little ones started to be considered parts of the social life, actively contributing to the modification of their environment (Lillehammer, 1989; Derevenski, 1994; Baker, 1997; Lander, 1998; Kamp, 2001). In particular, Lillehammer (1989) was one of the first authors focusing on the role of children in archaeology, suggesting a multidisciplinary use of funerary archaeology, ethnography and osteology as means for understanding the complex connections between children, adults and the physical environment (Lillehammer, 1989, p. 89). Her pivotal work was expanded by several researchers (Coulon, 1994; Scott, 1999; Beausang, 2000). In particular, the studies on infantile individuals in Anglo-Saxon England by Sally Crawford have widely discussed this topic (Crawford, 1991, 1993, 1999, 2000, 2007). It was therefore only after the mid-20<sup>th</sup> century that non-adults effectively entered the anthropological record.

The most direct means to reach these social and cultural inferences are via an osteological approach. With this purpose, important milestones specifically based on the anatomy and physiology of the immature skeleton were developed from the 2000s onwards. The globally-used reference volume by Scheuer & Black (2000), *Developmental juvenile osteology* (and later editions – Schaefer et al., 2004; Scheuer & Black, 2004; Cunningham et al., 2016), the guide for the identification and recovery of infantile human remains in archaeological contexts (Baker et al., 2005), and the recent volume by Han et al. (2018) on the anthropology of the fetus are among these. Two recent publications by Mary Lewis, *The bioarchaeology of children* (2007) and *The paleopathology of children* (2017), were specifically dedicated to children in archaeological and forensic contexts. From here, the bioarchaeology of non-adults stably continued to progress, becoming a well-recognized and appreciated line of research. A growing number of studies allowed exploration of the everyday lives of non-adults in different times and places. In fact, a recent review by Mays et al. (2017) reported that one out of five articles, published in the 2005–2015 decade in the main anthropological journals, was specifically focused on non-adult human remains – a trend increasing especially in Western Europe. A rise in the number of biocultural studies was also observed, with a tendency towards the evaluation of socio-cultural aspects of anthropological analyses (*social bioarchaeology*). At the moment, the two principal lines of research in the field are biomolecular studies (aDNA and especially stable isotope analysis for dietary and migration reconstructions) and paleopathological analyses (Mays et al., 2017, p. 41). Future research on children will most likely follow paramount aspects such as sex determination (still quite unreliable for young individuals, unless it is performed via aDNA or peptide analysis), the development of new, more accurate methodologies for age estimation that would enable narrower age uncertainties, more precise paleodemographic analyses, and improved techniques for paleopathological investigation, including advances in the aforementioned biomolecular studies of ancient diseases (Lewis, 2007, p. 184).

### 3. Lithuania

Lithuania has seen a consistent long-term development of bioarchaeological and paleopathological studies. From the 1990s onwards, the Lithuanian research on human skeletal remains, under the pioneering work of Rimantas Jankauskas, followed two main trends: a) the release of specific case studies of particular interest, and b) paleoepidemiological studies of disease, with an osteobiographical approach focused on the reconstruction of past living conditions of ancient populations (Jankauskas & Gerhards, 2012, p. 471). Bone disease patterns related to specific and nonspecific infections such as tuberculosis (Jankauskas, 1998, 1999; Faerman & Jankauskas, 2000; Faerman et al., 1997, 1999), treponematosi (Jankauskas, 1989, 1991, 1994; Giffin et al., 2020), metabolic disease and endocrine disorders (Jankauskas, 2003; Jatautis et al., 2011), skeletal dysplasias and malformations (Jankauskas, 2001), tumors and joint lesions (Jankauskas, 1992), oral pathology (Palubeckaitė et al., 2006; Miliauskienė & Jankauskas, 2015), ear diseases (Sakalinskas & Jankauskas, 1991, 1993), trauma (Jankauskas & Zakaras, 1993; Teegen et al., 1997), and stress markers (Palubeckaitė & Jankauskas, 2000, 2001; Palubeckaitė et al., 2002) were reported. The bioarchaeological approach applied in these studies produced interesting results regarding the lifestyles of Mesolithic and Neolithic populations (Butrimas & Jankauskas, 1998; Palubeckaitė & Jankauskas, 2006; Jankauskas et al., 2006), and medieval/postmedieval communities (Jankauskas, 2002; Jankauskas & Urbanavičius, 1998). This approach was also applied to the forensic examination of Soviet-regime victims from 1944–1947, who were executed by the KGB in prisons and buried in clandestine mass graves (Jankauskas, 2009; Jankauskas et al., 2005).

The Lithuanian research group in Vilnius University is currently rather active, and in recent years has employed biomolecular techniques for the detection of human pathogens such as typhus and trench fever (Raoult et al., 2006), has covered trauma analysis (Jatautis et al., 2010; Kozakaitė, 2011, 2018; Kozakaitė & Jankauskas, 2013; Kozakaitė et al., 2018a, 2018b) and has performed several mummy studies, with the establishment of the *Lithuanian Mummy Project* (Morrow et al., 2014; Piombino-Mascali et al., 2014a, 2014b, 2014c, 2014d; Panzer et al., 2015; Piombino-Mascali et al., 2015, 2016, 2017a, 2017b).

Although no systematic studies were specifically dedicated to the bioarchaeology of children in Lithuania, numerous publications indirectly contributed to this line of research, providing precious information about the youngest sections of Lithuanian medieval and early modern populations. In addition to the analysis of skeletal human remains, the demographics and lifestyle of non-adult individuals were explored through the analysis of toys, footwear and manufactured items, presenting interesting integrative data for osteological analyses (Sarcevičius et al., 1999; Blaževičius, 2019; Blaževičius & Jatautis, 2016). Other paleodemographic studies reported a marked underrepresentation of children in Lithuanian burial sites; this problem was attributed to aspects connected to taphonomy, cultural traditions, low-quality or incomplete archaeological examinations, as well as birth rates and migration (Jatautis & Mitokaitė, 2013; Blaževičius & Jatautis, 2016).

Among the bioarchaeological reports, several also took into account the non-adult sections of the population (Jankauskas, 2002; Jankauskas et al., 2006; Kozakaitė et al., 2019), and isotopic analyses provided information about the non-adult diet at the individual and population levels (Antanaitis-Jacobs et al., 2009; Piličiauskas et al., 2017a, 2017b; Whitmore et al., 2019; Bliujienė et al., 2020). Furthermore, numerous studies dedicated to nonspecific stress indicators shed light on the health and dietary status of Lithuanian children. Among these, several capillary analyses of linear enamel hypoplasia and cribra orbitalia in medieval and early modern populations allowed exploration of the relations between stress markers and child survival (Barakauskas, 1997; Palubeckaitė & Jankauskas, 2000, 2001; Palubeckaitė et al., 2002, 2006; Jatautis et al., 2011). Non-adult health was also investigated through the analysis of infantile skeletal growth patterns and stature variations in children from medieval populations, comparing them to modern local populations and to other Baltic sites (Šereikiene & Jankauskas, 2002, 2004).

Within the context of specific case studies, paleopathological investigations on children were focused on endocranial meningeal reactions (Jankauskas & Schultz, 1995) and metabolic disorders (Jankauskas & Schultz, 1999). Of particular interest for the understanding of the treatment of children in early modern Lithuania is the case study reporting striking evidence of child abuse in Alytus (Kozakaitė et al., 2018b). In the context of the *Lithuanian Mummy Project*, the radiological study of one infantile case highlighted the presence of rickets (Panzer et al., 2013). In addition, the genome of an ancient strain of variola virus was sequenced and reconstructed from samples gathered from a Lithuanian child mummy, allowing reconstruction of the recent history of smallpox (Duggan et al., 2016).

It is therefore evident that the recent Lithuanian bioarchaeological research did consider and include child remains, and as the Vilnius research group grows larger, further work specifically focused on non-adult skeletal material will be conducted in the next years.

#### 4. Latvia

In the last 20 years, systematic bioarchaeological and paleopathological studies on Latvian materials were carried out by the research group guided by Guntis Gerhards, Gunita Zariņa and colleagues from the University of Latvia. Bioarchaeological research was dedicated to trauma analysis (Gerhards, 2007, 2008), secular stature variations (Gerhards, 2005, 2006), infectious diseases (Gerhards et al., 2017; Pētersone-Gordina et al., 2018), malnutrition and metabolic diseases (Pētersone-Gordina, 2018; Pētersone-Gordina et al., 2013), dental diseases (Pētersone-Gordina & Gerhards, 2011; Pētersone-Gordina et al., 2018) and biomolecular studies (Legzdiņa et al., 2015; Ščesnaitė-Jerdiakova et al., 2015; Kazarina et al., 2019; Susat et al., 2020). International collaborations were undertaken by Lithuanian and Latvian research groups, and skeletal data from these countries were also included in the database of the Global History of Health Project (Steckel et al., 2006).

Although in the recent years Latvian archaeology has shown increased interest in topics inherent to social archaeology, the specific focus on childhood archaeology is still quite underdeveloped (Vilka, 2014). However, some recent research papers did focus on prehistoric children, either exclusively (Vilka, 2012, 2013, 2015; Zariņa & Zariņa, 2012) or as part of other social aspects (Radiņš, 1999; Bandare, 2002; Šnē, 2002). In particular, the paper by Vilka (2014) analyzed child burials from the Middle and Late Iron Age (5<sup>th</sup>–12<sup>th</sup> century AD), investigating their positions as members of the society playing an active role in the collective, ideological, and mythological life of their communities, and therefore challenged the traditional view developed by Ariès (1962). Vilka also reported a general underrepresentation of children in numerous coeval cemeteries, a topic that appears to be recurrent in Latvian archaeological sites. This issue was also reported by Gerhards (2002) and Zariņa (2009), and recently investigated more thoroughly by Vilka (Ērkške, 2020). This interesting insight into Latvian archaeology also demands further investigations of the youngest members of prehistoric societies, since most of this information has remained confined to field archaeological reports. The author therefore suggests an interdisciplinary approach combining archaeological, osteological, biomolecular and ethnographic material to answer important questions about children in prehistoric and historic societies (Vilka, 2014).

As in Lithuania, no systematic studies were specifically dedicated to the bioarchaeology of children in Latvia either. However, numerous publications contributed to this line of research in an indirect manner, providing valuable insights into the living conditions of non-adult individuals. Variations in the body stature of different segments of the Latvian population were addressed, also contributing to the knowledge of growth variations in children (Gerhards, 2005, 2006). In addition, numerous aspects of child demography may be indirectly inferred from the results of the bioarchaeological investigation of specific burial areas (Gerhards, 2000; Zariņa, 2006; Rudoviča et al., 2011; Gerhards et al., 2017), and from the isotopic analyses of several populations, which also included non-adult remains and studies of child weaning patterns (Eriksson, 2003, 2004; Eriksson et al., 2003). Recent international journal publications have specifically addressed the health status of medieval and early

modern Latvian populations and discussed the effects of particularly difficult historical periods on Livonian children. Among these, Zariņa et al. (2016) combined the paleopathological investigation of cribra orbitalia with stable isotope analysis and trace element concentrations in children from an early modern cemetery in Jekabpils, to explore physiological and nutritional stresses occurred during childhood. The work of Pētersone-Gordina and colleagues was dedicated to the integration of paleopathological data regarding stress indicators in teeth and bones with isotopic data for dietary reconstruction (Pētersone-Gordina, 2018; Pētersone-Gordina & Gerhards, 2011; Pētersone-Gordina et al., 2013, 2018). Her work also included carbon and nitrogen isotopic analysis of incremental dentine to identify the periods of physiological and nutritional stresses in children and adults (that is, children who survived childhood) (Pētersone-Gordina, 2018). Finally, the recently published paper by Ērkške (2020) was dedicated to the problem of child underrepresentation in Latvian cemeteries, proposing an exhaustive discussion upon the intrinsic, extrinsic and cultural factors leading to similar cemetery patterns and providing striking examples from Latvian Iron Age cemeteries. These works have the potential to lead the way for the development of a systematic and well-grounded bioarchaeology of children in Latvia.

## 5. Estonia

The development of systematic bioarchaeological studies in Estonia started slightly later compared to the neighboring Baltic countries, with the work of eminent researchers such as Karin Mark and Leiu Heapost from the 1950s onwards (Kriiska & Lõugas, 2006, p. 275; Allmäe et al., 2019, p. 9). In the last thirty years, the research groups from both Tallinn University and the University of Tartu have studied human skeletal samples not only from the Stone Age to the Modern period, but also from contemporary populations (Allmäe et al., 2019, p. 9). The main research areas were population studies of Estonian communities and neighboring countries (Allmäe, 1998, 2003; Heapost, 1998, 2000, 2002, 2006, 2007, 2016; Kalling & Heapost, 2013; Mark & Heapost, 2014), cremation analyses (Allmäe, 2004, 2014a), forensic anthropological cases from the 20<sup>th</sup> century (Allmäe & Limbo-Simovart, 2015; Allmäe et al., 2017), as well as paleodemographic topics (Allmäe, 1998, 2014b).

The bioarchaeological case studies reported were numerous (Allmäe, 2006, 2008a, 2010; Peets et al., 2010, 2012), as were the insights into stature and sexual dimorphism issues (Allmäe, 1995, 1997, 2000, 2008b; Heapost, 2003). Additionally, several biomolecular studies focused on diet and nutrition in ancient Estonian populations (Lõugas et al., 1996; Allmäe et al., 2012; Tõrv & Meadows, 2015; Lightfoot et al., 2016; Oras et al., 2018; Agurauja-Lätti & Lõugas, 2019; Tõrv, 2019). Specific paleopathological investigations were dedicated to cases of traumatic injuries (Kalman, 2000a, 2000b, 2000c; Malve, 2019a, 2019b, 2020a), inflammatory lesions (Kalman, 1999), syphilis (Kalman, 2000d; Malve, 2011; and the biomolecular study by Majander et al., 2020), infectious disease (Malve, 2020b) oral pathologies (Allmäe, 1999a, 1999b; Limbo, 2004, 2011, 2013), and stress markers (Limbo, 2006, 2008a, 2008b, 2009; Allmäe & Limbo, 2010).

As observed for the other two Baltic states, Estonian bioarchaeology also lacks a specific research focus on children; they are often examined only marginally within standard archaeological and bioarchaeological investigations. Although their presence in medieval and early modern communities was thoroughly investigated from a historical point of view, when issues related to birth, family ties, scholarship and disease (Veispak, 1986; Põltsam-Jürjo, 2003, 2017, p. 115, 2018; Mänd et al., 2012, p. 355; Kröönström & Põltsam-Jürjo, 2019, p. 288) were explored, very little research was performed on child remains from an archaeological point of view. A recent example is a BSc thesis by Randoja (2012), focused on the identification of social age groups with the integration of grave goods and biological age estimations. From a bioarchaeological perspective, information about non-adults can be mainly extrapolated from contemporary excavation reports in the context of specific archaeological sites (Kalling, 1995, 1997; Allmäe, 1998, 2003, 2010; Kalman, 1999; Heapost, 2007). In particular, the fieldwork reports by Malve and colleagues from the University of Tartu always provide a paleodemographic and paleopathological analysis of the whole population, including the youngest members of the society (Lõhmus

et al., 2011; Valk et al., 2011, 2019; Roog & Malve, 2012; Laneman et al., 2015; Lissitsina et al., 2015; Malve, 2015, 2016; Malve & Valk, 2008; Malve et al., 2011, 2012, 2019; Mägi et al., 2019). Another example is the paper dedicated to stone-cyst graves in Kaseküla (Western Estonia), in which the Accelerator Mass Spectrometry (AMS) dating of human remains revealed the use of these burials for infant remains in the Late Iron Age (Laneman, 2012). Information about the health and lifestyle of Estonian children may also be gained from the numerous capillary analyses of stress markers (mainly enamel hypoplasia) performed on Estonian populations in the early 2000s (Limbo, 2006, 2008a, 2008b, 2009; Allmäe & Limbo, 2010). Very few papers were specifically dedicated to children; most of them covered basic anthropological matters such as craniometric characteristics of children and juveniles (Allmäe, 1995), stature estimation (Allmäe, 1997), and anthropological features of modern children (Heapost, 2017; Õun et al., 2019). Of particular interest is the case study reported by Allmäe (2006) regarding a 10<sup>th</sup>–13<sup>th</sup> century single-family burial site from Maidla, which thoroughly discusses the reasons for the underrepresentation of children in this and in other coeval cemeteries; the paper also provides a thorough discussion of the factors affecting fertility in ancient populations (Allmäe, 2006, p. 9). Furthermore, a striking paleopathological case study focusing on two children from the Tartu dome church was reported by Malve (2011), confirming the presence of congenital syphilis in medieval Tartu. Finally, a recent paper by Oras and colleagues from different research groups was dedicated to the multidisciplinary analysis of two Egyptian child mummies displayed at the University of Tartu art museum (Oras et al., 2020).

The interest in osteoarchaeology is currently growing in the University of Tartu research group, as new students and researchers are entering the field and showing interest in specific bioarchaeological topics. The study of non-adult remains forms a large section of the doctoral research of the author of this review, and several osteological and biomolecular analyses of child remains in Estonian medieval and early modern populations have already been performed and will be performed in the near future, possibly attracting new students interested in this complex yet fascinating line of research.

## 6. Future prospects and conclusions

This paper presents an overview of the available child skeletal remains in the Baltic countries over prehistoric and historic periods, clearly proving that these remains have significant potential for enabling wider, multifaceted and multidisciplinary bioarchaeological analysis of non-adult remains in the region.

Firstly, there exists a large number of child burials available for further analysis. Although some studies effectively report a problem of child underrepresentation in prehistoric and historic cemeteries (Gerhards, 2002; Zariņa, 2009; Malve, 2012; Roog & Malve, 2012; Ērkške, 2020), in numerous other contexts non-adults are fairly represented, constituting a large and nearly unstudied part of prehistoric and historic cemeteries in the Baltic countries. Several examples can be listed for medieval and early modern Estonian contexts. For instance, the percentage of non-adult burials calculated for the urban cemetery of St Jakob in Tartu represented about 50% of the whole cemetery population, which is in line with several other coeval Estonian churchyards. Similar (and often larger) percentages were calculated for the urban cemetery of St John in Tartu (Kalling, 1995), the village cemetery of Tääksi in Viljandimaa (Allmäe, 1998), the Valjala cemetery in Saaremaa (Mägi et al., 2019), the rural cemetery of Makita in Tartumaa (with an impressive percentage of 60.8% (Heapost, 1993)), and the village cemetery of Mustla (Kaldre et al., 2011). These are just a few examples of the large number of non-adult skeletal remains available for study. In fact, the amount of well-preserved skeletal material recovered over the years from archaeological excavations in Estonia, as well as in the whole Baltic area, is truly remarkable; this material provides the quantity, quality and potential to support wide and innovative research projects. Non-adult burials represent an essential and conspicuous part of archaeological reports, but they have been frequently ignored from a bioarchaeological point of view, and often considered to be less important relative to the remains of adult individuals.

Secondly, there are several advantages in the bioarchaeological study of children. The skeletal remains of non-adults are not only different in size and number with respect to adult remains; in fact, they allow us to explore entirely different aspects of growth and disease that cannot be fully inferred from adult samples. For example, age estimation is more accurate when performed on children's remains compared to adults, since the skeletal changes occurring in a rapidly growing body are easily detectable, numerous, and can be associated with narrower age ranges. Age estimation also depends on specific dental and skeletal markers (tooth formation and eruption, bone fusion and growth). Although the influence of genetic and environmental factors clearly affects the growth and ageing process of each age category, these markers are easier to detect and measure compared to the more variable degenerative changes used to estimate the age of adults (Lewis, 2007, p. 184). The refinement of globally-used methodologies and the development of more accurate techniques for age estimation in children is an enduring research topic in bioarchaeology; the creation of narrower age ranges allows for more detailed paleodemographic reconstructions that are beneficial for the interpretation of the life and health conditions of a whole population (Halcrow & Tayles, 2008, p. 208). The biological age estimated from the skeleton must not be confused with the social age of the individuals, which was societally imposed in different periods and communities, and often strikingly different from the concept of childhood we have today (Kamp, 2001; Baxter, 2005; Halcrow & Tayles, 2008). However, the ability to place individuals within more accurate age categories also allows a deeper understanding of their position in the community. This is particularly true for historical societies where available written sources provide information regarding aspects such as birth, childcare, labor, legal issues and age of marriage (examples for medieval Livonia can be found in Põltsam-Jürjo, 2003, 2017, 2018). This evidence, together with the interpretation of the funerary customs recorded on-site and the integration of bioarchaeological data from several Baltic sites, may lead to more nuanced interpretations of the archaeological context. The large amount of skeletal remains available for study constitutes precious material for the investigation of social age and paleodemographic issues in this area of Europe and enables wider cross-regional comparisons for future scholars.

The study of child remains is also highly informative from a paleopathological point of view. In particular, the study of stress indicators (*i.e.* cribra orbitalia, growth disruptions, Harris lines and enamel developmental defects) is still a matter of current research, offering interesting opportunities to investigate the stress experience of children by assessing their physiological disruptions in growth (Halcrow & Ward, 2020, p. 2205). These indicators generally develop during childhood, and bone lesions tend to remodel and disappear with age. Hence, the true prevalence of lesions such as cribra orbitalia and Harris lines can be more accurately assessed in non-adults (Lewis, 2007, p. 184). The same can be stated for the signs of metabolic disorders such as scurvy or rickets, since the physiology of the immature bone causes a more severe reaction in response to nutrient deficiencies (Lewis, 2017, p. 193). The development of enamel hypoplastic defects occurs during infancy, and the study of similar stress markers in the adult population also provides evidence regarding the health status of children, since adults are nothing but children who survived childhood (Lewis, 2007, p. 185; Halcrow & Tayles, 2011, p. 341). The comparison of pathological data gathered from adults and children may therefore clearly highlight the presence of differential treatments, diets or health conditions in different age groups in the same cemetery sample and between different populations. Thus, the performance of similar specific studies throughout the Baltic countries with standardized techniques and similar research questions may be truly informative regarding the life and death of different Baltic communities from the same time periods.

Moreover, there are particular stress markers that have received less attention in the field. This is the case of the endocranial lesions, which are bone productive or destructive lesions detected on the inner surface of the cranial bones. These pathological changes have been associated with specific and nonspecific meningitis, birth traumas, infectious diseases such as tuberculosis, or metabolic disorders such as scurvy (Lewis, 2004, 2017, p. 141). Since their etiology is still of difficult interpretation, they are commonly listed as nonspecific indicators of stress (Lewis, 2004). The large number of non-adult remains from archaeological excavations in the Baltic



area may provide ideal samples for the examination of similar unexplored pathological changes. The recording of these features has already started in Estonia, with the study of large samples of fetuses and perinates by the author (see the photographic repository by Morrone et al., 2019), but would greatly benefit from a direct comparison with other Baltic sites.

The study of stress markers and metabolic diseases in children has been explored also from a biomolecular point of view, integrating the pathological examinations with stable isotope analysis of collagen carbon and nitrogen. Isotopic values not only provide means for the dietary reconstruction of children and mothers (in the case of fetuses and perinates), but numerous studies have demonstrated that episodes of physiological and metabolic stress experienced by mothers and children may also be recorded in their isotopic signals, especially nitrogen values (see Katzenberg & Lovell, 1999; Reitsema, 2013; Olsen et al., 2014). Therefore, stable isotope analyses are not only useful for understanding the effects of everyday diet on stress marker occurrence, but may also be used as biological indicators of physiological stress caused by episodes of famines or epidemics (Beaumont & Montgomery, 2016; Beaumont et al., 2013; Olsen et al., 2018). Anomalous  $\delta^{13}\text{C}$  or  $\delta^{15}\text{N}$  values in archaeological populations provide alternative explanations beyond diet or environment (e.g. episodes of other stresses such as disease) and become a powerful tool of investigation when historical periods of crisis are incorporated. A similar approach was applied in Latvia on material from medieval Livonia (Pētersone-Gordina, 2018; Pētersone-Gordina et al., 2018), and is currently ongoing in Estonia as well. This work integrates the data from famine and epidemic episodes recorded in historical sources with the isotopic sampling of rural and urban populations from medieval and early modern cemeteries.

Stable isotope analysis has been frequently used to identify breastfeeding and weaning patterns in infants and children, as these essential moments are important indicators of the health status of children and mothers, the role of adults in childcare, the subsistence and availability of supplementary foods, and population fertility (Halcrow & Tayles, 2011, p. 342). Several studies have explored the biomolecular aspects of breastfeeding and weaning, often identifying the age ranges in which they occurred in the past, what type of diet children were weaned to, and their connection with the mortality and morbidity of ancient populations (Katzenberg & Pfeiffer, 1995; Katzenberg et al., 1996; Herring et al., 1998; Richards et al., 2002; Beaumont et al., 2013, 2015; Reitsema, 2013). This is another potential avenue of investigation for the Baltic bioarchaeology of children; the work by Pētersone-Gordina (2018) in Latvia, which also included stable isotope analysis of incremental dentine, represents a remarkable starting point.

Finally, recent lines of investigation on child remains have tackled the age category of adolescents (Lewis, 2019) and trauma analysis. The latter, performed within a life-course theory framework, has the potential to reveal information on child abuse, caregiving, child labor and personhood in childhood (Lewis, 2007, p. 169). This was explored only in a single paper from the Lithuanian research group (Kozakaitė et al., 2018b), and therefore a well-established line of research on childcare and trauma is still lacking in the Baltic area.

These are only a few of the possible suggestions for future studies on children in the Baltic countries, and they already reveal countless opportunities for crafting new and unexplored research topics. In the future, the development of new paleopathological and bioarchaeological studies on children in this part of Europe may lead to the creation of a specific database of Baltic collections, including individuals of all ages and from different sites and periods. This would allow future researchers to add more data and information about the life and death of children in the Baltics, and to compare the various childhood analyses on a wider temporal and spatial scale.

Children were not a mute and silent marginal part of ancient societies. The little ones walked, played, sometimes worked, and occupied most of the time available from their mothers and caregivers, playing an active role in the everyday life of past human groups. We could never imagine a modern community without the frolicking, laughing and crying of children, so why shouldn't we imagine them in the past as well? Hopefully, this review will trigger a new interest in the study of the youngest sectors of ancient Baltic communities, providing a starting point for collaboration between research groups and encouraging other researchers to approach this complex

yet fascinating aspect of bioarchaeology. Although children were marginalized and somehow abandoned from Baltic bioarchaeology in the past, the present offers countless opportunities to study them from different and exciting points of view, placing them back into the picture of the everyday life of past communities.

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## Balso suteikimas mažiesiems: Baltijos šalių vaikų bioarcheologija

Alessandra Morrone

Santrauka

Pirmieji bioarcheologiniai vaikų tyrimai daugiausia buvo atliekami tokiais pat metodais kaip ir suaugusiųjų tyrimai. Tačiau pastarąjį dešimtmetį vis daugiau dėmesio kreipta į biologinius skirtumus tarp suaugusiųjų ir nesuaugusiųjų bei pastarųjų išskirtinę padėtį praeities visuomenėse. Daugybė darbų pateikė svarbių išvalgų apie naujagimių, kūdikių, vaikų ir paauglių mirtingumo bei sergamumo tendencijas ar augimo modelius. Vis dėlto Baltijos šalių vaikų bioarcheologiniai tyrimai iki šiol yra nepakankamai išplėtoti ir neturi nuoseklios tyrimų linijos.

Nors Lietuvoje nebuvo atliekami sistemingi vaikų bioarcheologiniai tyrimai, žinių apie nesuaugusius ir jų padėtį viduramžių ir ankstyvųjų naujųjų laikų populiacijose netiesiogiai pateikia bendros publikacijos apie bendruomenių demografinius ar traumų rodiklius; o koreliuojant su osteologiniais duomenimis analizuojama žaislų istorija ar net vaikų avalynė. Panaši situacija yra ir kaimynėje Latvijoje, nors pastaraisiais metais Latvijos mokslininkai pradėjo labiau domėtis socialinės archeologijos temomis. Pavyzdžiui, naujausi moksliniai straipsniai sutelkė dėmesį į vidurinio ir vėlyvojo geležies amžiaus vaikų palaidojimus ir jų, kaip nedalomos visuomenės narių, aktyviai dalyvaujančių kolektyviniame, ideologiniame, net mitologiniame gyvenime, padėtį. Estijoje vaikų padėtis viduramžių ir naujųjų laikų bendruomenėse buvo kruopščiai ištirta istoriniu požiūriu, tačiau, žvelgiant iš bioarcheologinės perspektyvos, informaciją apie nesuaugusius daugiausia galima ekstrapoliuoti tik iš archeologinių kasinėjimų ataskaitų. Vis dėlto ir Tartu universitete didėja susidomėjimas konkrečiomis vaikų bioarcheologijos temomis. Pavyzdžiui, Estijos viduramžių ir ankstyvųjų naujųjų laikų populiacijose jau atlikti biomolekuliniai vaikų skeletų tyrimai.

Baltijos šalys iki šiol nėra skyrusios daugiau dėmesio vaikų bioarcheologijai, todėl šiame straipsnyje atskleidžiamas daugialypis vaikų palaikų ir jų tyrimų vaidmuo, unikalūs rezultatai ir tarpdisciplininis potencialas.