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New prospects for investigating early life-course experiences and health in archaeological fetal, perinatal and infant individuals.

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Abstract:

Children have become firmly embedded within multi-disciplinary investigations of young lives, yet within these studies the youngest members of past populations persist in lingering on the margins of discussion. Fetal, perinatal and infant lives are tangential; unable to articulate their thoughts and feelings, with their position and role in society typically a product of parental or wider social vectors, these individuals, their experiences, and their roles are complex to decipher. Yet as keepers of both biological and social data - regarding themselves, their mothers and wider community dynamics - these individuals are central in developing comprehensive narratives of infanthood in the past. However, a lack of methodologies for investigating these young lives has been a constant limitation. With recent advancements able to further our understanding of these early life-courses, it is now pertinent to focus on fetal, perinatal and infant lives further.

Keywords: Non-adult; Birth; Age Estimation; Pathology; Growth; Wellbeing

Introduction: The Bioarchaeology of Childhood

In 2017 the Society for the Study of Childhood in the Past (SSCIP) celebrated its 10th birthday, which saw several articles discussing the origins, development, and future avenues for the studies of childhood, both within and beyond archaeology (See Childhood in the Past Vol. 10.1). Having been invited the following year to deliver the biennial lecture for SSCIP, I found it timely to reflect on these discussions and consider the trajectory of future investigations within my own work. Here I present my thoughts on investigations into fetal, perinatal and infant individuals, the remarkable innovations that are furthering these, and the hurdles we are yet to overcome.

Mays and colleagues (2017) note how the prosperity of SSCIP, as a multidisciplinary forum dedicated to the consideration and discussion of children and non-adults, signifies the shift in attitudes held towards these once marginalised individuals, and the increasing importance and agency afforded to

them. Furthermore, extensive dialogue around the development and origins of these enquiries has been undertaken, particularly within archaeology, where there has been a marked effort over the last two decades to afford and include the voices of those that were once relegated to a brief paragraph of a site report, if indeed included at all (e.g. Baxter 2005; Finlay 2013; Kamp 2015; Lillehammer 1989; 2015). This is no more apparent than for fetal, perinatal and infant individuals who were often listed only by skeleton number, with no analysis seemingly conducted. Shifts in praxis have resulted in increasingly inclusive and nuanced interpretations of childhood and infanthood in the past. However, despite the changing landscape of this discipline it is still widely regarded that non-adults receive limited attention in archaeological discourse. Though this may still be true when compared broadly against the number of bioarchaeological studies of adult individuals, there are now thousands of studies focussing on non-adults, with novel research and new developments bringing ever increasing awareness, recognition, and understanding of these young lives. As such, I question whether it is time for us to move away from this general reflection, instead re-focussing our efforts to ensure that all non-adults – whether fetus, infant, child, or adolescent – receive similar attention and consideration.

The Earliest Life-Courses

Fetal, perinatal and infant individuals have been identified and recovered from archaeological sites across the world, yet their presence, though often accepted (and expected) has historically not been widely understood. The role and agency of the fetus and infant is now being investigated and questioned more thoroughly from both an anthropological and archaeological perspective (See the edited volume by Han, Betsinger & Scott (2018) for further discussion) with studies examining the material culture of infancy, epigraphic and literary references, and interpretations of the funerary treatment afford in death to these individuals, all aiding our ability to comprehend these past lives (e.g. Carroll 2011; Cootes et al. 2020; Dunne et al. 2019; Harper 2018; Maltin et al. 2021). However, though we know that older children maintain their own agency, the agency and physical impact that fetal and infant individuals exerted on past populations is substantially more limited. This makes their lives and experiences ever more ephemeral and complex to decipher. Consequently, an advantage of archaeological investigations is our ability to analyse the skeletal remains of the individuals themselves, looking beyond material culture and funerary treatment, which often reflects adult perceptions, tributes, and demands of the infant, to investigate the physiological impacts of their brief but important experiences. The bioarchaeology of infanthood has thus seen exponential growth over the last decade (e.g. Lewis 2007; 2017; Halcrow et al. 2018; Halcrow &

Ward 2017), with greater understanding of these early beginnings a result of fetal-infant individuals being increasingly recognised and valued as members of past communities.

As such, within bioarchaeology, investigations into the fetal-infant individual, and the nexus between mother and child, are increasing as our interest in the complex relationship between biological and sociocultural variables rises (Adair 2004; Barker 2012; Gowland 2015; 2017; Gowland & Halcrow 2020). Bioarchaeological investigations are paramount as the skeleton provides the most direct insight into life course experiences. With it established that both pre- and postnatal life is highly influential in determining later childhood and adult health (Barker 2012; Gluckman & Hanson 2006), there is an increasing need for the study of fetal-infant individuals to investigate the dynamics influencing their life courses, and the development of appropriate methodologies to investigate these. However, despite skeletal remains providing the greatest evidence of these social, cultural, and physical experiences, fetal-infant individuals are still commonly overlooked in our investigations and narratives of 'childhood' the past. Much has been written about these limitations (see Lewis 2007 for discussion) but those typically identified include:

1. Issues with historic archaeological practice and the misidentification (or lack of identification) of these young individuals which rendered them 'absent' from the archaeological record. Where they were identified, they were typically considered to be of limited value.

2. Lack of experience and understanding of fetal and infant anatomy, and few specialists investigating this age-group specifically.

3. Methodological limitations which persist, relating to establishing accurate age-at-death estimations, biological sex estimation, and the identification and interpretation of pathological lesions.

It is these issues which have undoubtedly resulted in the relative lack of studies of fetal-infant individuals when compared to those regarding older children. Indeed, it is disingenuous to assume that all 'children' have received equal attention to date, and just a brief search of the literature will support this. Even within this journal, 'Childhood in the Past', a search of articles that include 'fetal' in the title will return only one result (though of course other articles will include fetal individuals within their discussions). Thus, there undoubtedly continues to be deficiencies in our knowledge and

methodologies to examine, analyse and interpret these younger life courses. Of course, that is not to say that valuable studies into infanthood do not exist - they do - and there have been immeasurable advancements in our understandings, not least the fundamental principle of comprehending their distinct, and ever-changing anatomy (e.g. Baker et al. 2005; Satterlee Blake 2018; Scheuer & Black 2000). However, it is still true that there are simply fewer fetal-infant studies in comparison to those focussing on older age groupings, and major issues regarding the construction of biological profiles, and understanding aspects of these brief lives, prevail. Despite this, it is encouraging to see that both the number of investigations, and investigators, focussing on fetal-infant individuals is ever-increasing.

(Insert Figure 1)

Fig. 1: Photograph of an in-situ burial of an Iron Age fetal-infant individual at the site of Piddington, Northamptonshire. The individual was excavated and recovered as part of the ongoing rescue excavations in 2019. Photograph taken by the author.

New Developments and Continuing Challenges

Fundamental limitations of physiological analysis of fetal-infant individuals continue to endure, resulting frequently in vague understandings of these early points of life; where we aim to generate results with higher resolution, interpretations are inevitably littered with caveats of potential population variation and methodological inaccuracies, limitations, and errors. Yet, despite these lingering challenges there have been several exceptional developments within the broader discipline of bioarchaeology within the last few years, that will undoubtedly lead to changes in the way we approach and conduct fetal-infant studies. These investigations have furthered our understanding of, and helped address issues related to: biological sex estimation (e.g. Gowland et al. 2021); age estimation and growth (e.g. Cardoso 2007; Carneiro et al. 2016; Ives & Humphrey 2006; Nagaoka et al. 2012; Nelson et al. 2021; Thornton et al. 2020); bioerosion and the identification of still birth (e.g. Booth 2016; Booth et al. 2016); analyses observing physiological stress (e.g. Beaumont et al. 2013; 2015; Beaumont & Montgomery 2016; Quade et al. 2020); weaning and dietary studies (e.g. Fuller et al. 2006; Nitsch et al. 2011; Kendall et al. 2021); pathological lesions (e.g. Lewis 2017; 2018; Morrone et al. 2021; Palamenghi et al. 2021; Wheeler et al. 2013); and contextual investigations of non-adult individuals (e.g. Cannon & Cook 2015; Ellis 2019; Helfrecht et al. 2020; Murphy & Le Roy 2017). Such methods are improving and increasing our ability to distinguish between and specify exact moments of the early life course, and the events experienced, both pre- and postnatally.

Indeed, it is well established that prenatal life is as critical as any early postnatal experience to offspring cognitive, physical, and health success. Consequently, the fetal and early infantile period is the most sensitive to a range of biological, social, and environmental factors. This means that these young individuals act as both barometers for overall population health, as well as providing unrivalled insights into individual experiences of health, birth, and death in archaeological and historical societies. Yet, there continue to be challenges in fetal-infant investigations attempting to explore these aspects of early life. As such, I propose that there are at four key limitations and research areas where we should focus our attentions to enable further insights into the pre- and postnatal life course. These are: age estimation methodologies, the identification of growth disruption, continued exploration of birth experiences, and the identification of pathological from physiological new bone formation.

Age Estimation Methodologies:

Concerns around the applicability and comparability of ageing methodologies, the use of dental and skeletal techniques to assess/measure development, and the correlation of these developmental stages with age prevail. Given intrinsic and extrinsic variables, the applicability of methods to geographically, temporally, and culturally diverse populations is questioned. Furthermore, some existing methods traditionally applied to age fetal-infant individuals have intersecting age categories, limited sample sizes, and include individuals within their data of unknown age, leading to fundamental questions around the accuracy and suitability of these methods. New aging techniques are continuing to be developed, but more investigations interrogating the estimation of age, using a range of skeletal elements and individuals are required.

The Identification of Growth Disruption:

The identification of growth disruption is problematic, relying on the accurate metric assessment of fetal-infant skeletal remains, and comparison of results against an established age-estimates, the limitations of which I discuss previously. Where large differences between skeletal growth and age can be identified, growth disruption can be insinuated, but we are potentially missing those who have experienced acute or limited growth disruption. These investigations are important as growth, and the disruption of normal growth, are indicative of both pre- and postnatal experiences, and can contribute to discussions of physiological stress, poor health, maternal well-being, and birth experiences and outcomes (such as prematurity and small for gestational age). Consequently,

evidence of growth disruption, even in these very young individuals, is essential to identify if we are to truly develop comprehensive interpretations of fetal-infant lives.

Exploration of Birth Experiences:

Subsequently, questions surrounding birth experiences and outcomes, and the identification of these (e.g. small for gestational age (SGA), intrauterine growth restriction (IUGR), still birth or prematurity) deserve increasing recognition and attention. Stillbirth, prematurity, SGA and IUGR are central concerns surrounding pregnancy today, but these vital early life experiences are seldom considered in an historical context. These birth outcomes are associated with a multitude of health conditions and are important aspects to consider in relation to both fetal-infant and maternal health. Despite infant mortality rates known to be much higher in the past than those today, the cause of these inflated levels, and the relationship between birth experiences and mortality rates, remains unknown. Methodological developments (e.g. histological analysis of bioerosion (Booth et al. 2016)) are aiding these discussions, but further investigation is required.

Identification of Pathological New Bone Formation:

Finally, the identification of pathological new bone formation, and distinguishing this from physiological new bone formation as a result of rapid growth, continues to be a major limitation. Bioarchaeological studies infer poor health from the presence of pathological lesions on skeletal remains. Subsequently, pathological changes are considered to represent physiological responses to detrimental onslaughts. Despite this established association, little attention has been afforded to the identification and interpretation of pathological lesions in fetal-infant individuals. This is a result of methodological challenges with the distinction between pathological and normal changes in those younger than 4 years old, highly problematic (Lewis 2007). Currently macroscopic methodologies for assessing and identifying pathological lesions are inadequate. Identifying and interpreting evidence of pathological changes in fetal-infant individuals is thus, both subjective and variable, with little standardisation or comparability between investigations. Comprehension of pathological changes is important to aid discussion of intra- and extrauterine health disruption, as well as providing proxies for maternal and community health.

Bringing Up Baby

These current discussions and developments within fetal-infant bioarchaeology are, of course, particularly pertinent to me personally. As a bioarchaeologist, dedicated to understanding the lives and experiences of the very young in the past, I am acutely aware of the limitations continuing to

impede and cast doubt of fetal-infant studies. My previous research has highlighted the need for a holistic approach to the investigation of fetal-infant individuals, exploring evidence of growth disruption and pathological changes in a sample of over four hundred individuals. Yet, as the concerns mentioned above indicate, our interpretations and knowledge of these past individuals and communities can be significantly improved. Given the increasing number of fetal-infant individuals identified, excavated, and assessed it is essential that we begin to address these questions.

Consequently, it is my aim to do this through my new research project: '*Bringing up Baby: Investigating early life course experiences and health in fetal and infant individuals from archaeological and historical populations in Britain*'. The project builds on important research questions that have arisen from my continued exploration of the fetal-infant life course in the past. The project will simultaneously consider skeletal and contextual data to explore relationships between detrimental early life experiences and the sociocultural worlds in which the individuals developed and/or lived. This research is multidisciplinary in its approach, utilising some of the new scientific methods detailed previously, to investigate socially and culturally driven enquiries and explore the lived experiences of fetal-infant individuals in past societies. In particular, my project seeks to consider evidence of detrimental birth outcomes and skeletal pathology, establishing methods by which to investigate these factors, and documenting changes in fetal-infant health over time, to explore socially and culturally regulated variables impacting the fetal-infant life course.

Fetal-Infant Research: Privileges, Problems and Ethics

Though it is anthropologically, archaeologically, and clinically important to investigate the early life course, as researchers in this field we must never forget the importance of ensuring this work is conducted in an ethical, appropriate, and sensitive way. The discourse of infant morbidity and mortality is particularly emotive and regardless of whether we are working with archaeological, historical, or medical collections, the privilege of being able to investigate these individuals should always be acknowledged. Within bioarchaeology, discussions around the ethical excavation, curation, and analyses of human remains are ongoing and multifaceted, often context and resource dependant (see Squires et al. 2020 for extensive discussion). Furthermore, the nature of analyses (whether they are destructive or passive), and the ownership of data and human remains, are leading to ongoing discussions over the power dynamics of who constructs narratives of the past (e.g. Fuentes 2020; Tsosie et al. 2021). Thus, investigations of fetal-infant individuals are not only particularly emotive, given contemporary perspectives regarding the vulnerability of these individuals, but must ensure that they are cognizant of the archaeological/historical context of these

collections. This is particularly pertinent for those of us who have, and continue to, work with medical collections, where in many instances targeted collection, structural violence, and racism have all been central in their formation (Gindhart 1989; Nystrom 2014; Vanderbyl et al. 2020). This is something that is being more universally discussed within bioarchaeological dialogue, yet the acknowledgement that this has occurred for some of our collections of infants and children too is perhaps particularly distressing. This is something with which I must personally reckon with also, having previously analysed medical collections of vague and likely violent provenance. Therefore, as we continue our investigations, and further our knowledge and understanding of these early life courses, it is essential that we acknowledge, address, and consider the implications of these practices where applicable. Subsequently, all investigations of fetal-infant individuals should be conscientious of individual experiences, emotions, and agency, critical of both the methods and contexts of future investigations. Furthermore, it is imperative that as researchers, scientists, and humans we never forget our own privilege in having the opportunity to conduct such investigations into these brief but important lives.

Conclusion

The first 1000 days of life – from conception through to infancy – have been recognized as the most fundamental and influential in shaping future growth and health. Hence, the skeletal analysis of fetal-infant individuals can now provide unparalleled insights into pre- and postnatal experiences within different sociocultural, temporal, and economic milieus. Furthermore, the development of life course models (e.g. Developmental Origins of Health and Disease hypothesis) has recognised that both short- and long-term health outcomes are not a product of genetic endowment alone, but are also regulated by environmental, social, cultural and psychological factors experienced in early life. As such, assessment of the skeletal remains of these young individuals is paramount to understand temporal changes in fetal-infant health over time, as well as being critical for understanding health implications for infants today. Establishing clearer methodologies for the accurate estimation of age, growth disruption, birth outcomes and pathological identification is vital for comprehensive insight into fetal-infant lives in the past. With an enduring legacy of underrepresentation, and a paucity of knowledge still existing in regards to aspects of assessment of fetal-infant individuals, this is a critical and emerging area of research that requires further ethical and sensitive investigation and engagement from the bioarchaeological community.

Disclosure Statement:

No potential conflict of interest was reported by the author.

Notes on Contributor:

Claire Hodson was awarded a British Academy Postdoctoral Research Fellowship in 2020 for her project 'Bringing up Baby', to be held at the Department of Archaeology, University of Reading (Grant Award: PF20\100096). Claire's research has long been focussed on the fetal, perinatal and infant life course, investigating ways in which growth and health of these individuals was disrupted in past archaeological societies. Claire is currently the membership secretary for the Society for the Study of Childhood in the Past.

References

Adair L. 2004; Fetal adaptations to maternal nutritional status during pregnancy. *American Journal of Physical Anthropology*, Vol. 123, Suppl. 38: 50.

Baker, B., Dupras, T. and Tocheris, M. 2005; *The Osteology of Infants and Children*. College Station, TX: Texas A&M University Press.

Barker, D. J. P. 2012; Developmental origins of chronic disease. *Public Health*, Vol. 126: 185-189.

Baxter, J. E. 2005; *The Archaeology of Childhood: Children, Gender, and Material Culture*. California: AltaMira Press.

Beaumont, J., Geber, J., Powers, N., Wilson, A., Lee-Thorp, J. and Montgomery, J. 2013; Victims and survivors: Stable isotopes used to identify migrants from the Great Irish Famine to 19th century London. *American Journal of Physical Anthropology*, Vol. 150: 87-98.

Beaumont, J., Montgomery, J, Buckberry, J and Jay, M. 2015; Infant Mortality and Isotopic Complexity: New Approaches to Stress, Maternal Health and Wellbeing. *American Journal of Physical Anthropology*, Vol. 157: 441-457.

Beaumont, J. and Montgomery, J. 2016; The Great Irish Famine: Identifying Starvation in the Tissues of Victims Using Stable Isotope Analysis of Bone and Incremental Dentine Collagen. *PLoS ONE*, Vol. 11 (8).

Booth, T. J. 2016; An investigation into the relationship between bacterial bioerosion and funerary treatment in European archaeological human bone. *Archaeometry*, Vol. 58 (3): 484- 499.

Booth, T. J., Redfern, R. C., Gowland, R. L. 2016; Immaculate conceptions: Micro-CT analysis of diagenesis in Romano-British infant skeletons. *Journal of Archaeological Science*, Vol. 74: 124-134.

Cannon, A. and Cook, K. 2015; Infant Death and the Archaeology of Grief. *Cambridge Archaeological Journal,* Vol. 25 (2): 399-416.

Cardoso, H. F. V. 2007; Environmental Effects on Skeletal Versus Dental Development: Using a Documented Subadult Skeletal Sample to Test a Basic Assumption in Human Osteological Research. *American Journal of Physical Anthropology*, Vol. 132: 223-233.

Carneiro, C., Curate, F. and Cunha, E. 2016; A method for estimating gestational age of fetal remains based on long bone lengths. *International Journal of Legal Medicine*, Vol. 130 (5): 1333-41.

Carroll, M. 2011; Infant death and burial in Roman Italy. *Journal of Roman Archaeology*, Vol. 24: 99-120.

Cootes, K. V. E., Thomas, M., Jordan, D., Axworthy, J. and Carlin, R. 2021; Blood is thicker than baptismal water: A late medieval perinatal burial in a small household chest. *International Journal of Osteoarchaeology*, (Early View): 1-8.

Dunne, J., Rebay-Salisbury, K., Salisbury, R. B., Frisch, A., Walton-Doyle, C., and Evershed, R. P. 2019; Milk of ruminants in ceramic baby bottles from prehistoric child graves. *Nature*, Vol. 574: 246-248.

Ellis, M. 2019; *The Children of Spring Street: The Bioarchaeology of Childhood in a 19th Century Abolitionist Congregation.* Cham, Switzerland: Springer.

Finlay, N. 2013; Archaeologies of the beginnings of life. World Archaeology, Vol. 45 (2): 207-214.

Fuentes, A. 2020; Biological anthropology's critical engagement with genomics, evolution, race/racism, and ourselves: Opportunities and challenges to making a difference in the academy and the world. *American Journal of Physical Anthropolog*y, Early View: 1-13.

Fuller, B. T., Fuller, J. L., Harris, D. A. and Hedges, R. E. M. 2006; Detection of Breastfeeding and Weaning in Modern Human Infants with Carbon and Nitrogen Stable Isotope Ratios. *American Journal of Physical Anthropolog*y, Vol. 129 (2): 279-293.

Gindhart, P. S. 1989; An Early Twentieth-Century Skeleton Collection. *Journal of Forensic Sciences*, Vol. 34 (4): 887-893

Gluckman, P. D. and Hanson, M. A. 2006; *The Developmental Origins of Health and Disease*. Cambridge: Cambridge University Press.

Gowland, R. L. 2015; Entangled Lives: Implications of the Developmental Origins of Health and Disease Hypothesis for Bioarchaeology and the Life Course. *American Journal of Physical Anthropology*, Vol. 158, No. 4: 530-540.

Gowland, R. L. 2017; Infants and mothers: linked lives and embodied life courses. In S. Crawford, D. Hadley and G. Shepherd (Eds.) *The Oxford Handbook of the Archaeology of Childhood*. Oxford: Oxford University Press: Chapter 6.

Gowland, R. and Halcrow, S. (Eds.) 2020; *The Mother-Infant Nexus in Anthropology: Small Beginnings, Significant Outcomes*. Switzerland: Springer Nature.

Gowland, R., Stewart, N. A., Crowder, K. D., Hodson, C. M., Shaw, H., Gron, K. J. and Montgomery J. 2021; Sex estimation of teeth at different developmental stages using dimorphic enamel peptide analysis. *American Journal of Physical Anthropology*, Early View: 1-11.

Halcrow, S. E., Tayles, N. and Elliot, G. E. 2018; The Bioarchaeology of Fetuses. In S. Han, T. K. Betsinger, and A. B. Scott (Eds.) *The Fetus: Biology, Culture, and Society*. New York: Berghahn Books: 83-111.

Halcrow, S. E. and Ward, S. M. 2017; Bioarchaeology of Childhood. In H. Montgomery (Ed.) *Oxford Bibliographies in Childhood Studies*. New York: Oxford University Press.

Han, S., Betsinger, T. K. and Scott, A.B. (Eds.) 2018; *The Fetus: Biology, Culture, and Society*. New York: Berghahn Books.

Harper, E. 2018; Toys and the Portable Antiquities Scheme: A Source for Exploring Later Medieval Childhood in England and Wales. *Childhood in the Past,* Vol. 11.2: 85-99.

Helfrecht, C., Roulette, J. W., Lane, A., Sintayehu, B. and Meehan, C. L. 2020; Life history and socioecology of infancy. *American Journal of Physical Anthropology*, Vol. 173 (4): 619-629.

Ives, R. and Humphrey, L. 2017; Patterns of long bone growth in a mid-19th century documented sample of the urban poor from Bethnal Green, London, UK. *American Journal of Physical Anthropology,* Vol. 163 (1): 173-186.

Kamp, K. A. 2015; Children and their Childhoods: Retrospectives and Prospectives. *Childhood in the Past*, Vol. 8 (2): 161-169.

Kendall, E., Millard, A. and Beaumont, J. 2021; The "weanling's dilemma" revisited: Evolving bodies of evidence and the problem of infant paleodietary interpretation. *Yearbook of Physical Anthropology*, Early View: 1-22.

Lewis, M. E. 2007; *The Bioarchaeology of Children: Perspectives from Biological and Forensic Anthropology*. Cambridge: Cambridge University Press.

Lewis, M. E. 2017; *Paleopathology of Children: Identification of Pathological Conditions in the Human Skeletal Remains of Non-Adults*. London: Academic Press.

Lewis, M. E. 2018; Fetal Paleopathology: An Impossible Discipline? In S. Han, T. K. Betsinger, and A. B. Scott (Eds.) *The Fetus: Biology, Culture, and Society*. New York: Berghahn Books: 112-131.

Lillehammer, G. 1989; A child is born: the child's world in an archaeological perspective. Norwegian Archaeological Review, Vol. 22: 89-105.

Lillehammer, G. 2015; 25 Years with the 'Child' and the Archaeology of Childhood. Childhood in the Past, Vol.8 (2): 78-86.

Maltin, E., Turner-Walker, G., Tegnhed, S. and Peacock, E. E. 2021; The concealed interment of a first-trimester foetus in Gällared Parish Church (1831), Sweden: Age-estimation and reconstructed taphonomy. *International Journal of Osteoarchaeology,* (Early View): 1-12.

Mays, S., Gowland, R., Halcrow, S. and Murphy, E. 2017; Child Bioarchaeology: Perspectives on the Past 10 Years. *Childhood in the Past*, Vol. 10 (1): 38-56.

Morrone, A., Tõrv, M., Piombino-Mascali, D., Malve, M., Valk, H. and Oras, E. 2021; Hunger, disease, and subtle lesions: Insights into systemic metabolic disease in fetal and perinatal remains from 13th- to 15th-century Tartu, Estonia. *International Journal of Osteoarchaeology*, Early View: 1-22.

Murphy, E. and Le Roy, M. 2017; *Children, Death and Burial: Archaeological Discourses.* Childhood in the Past Monograph. Oxford: Oxbow Books.

Nagaoka, T., Kawakubo, Y. and Hirata, K. 2012; Estimation of fetal age at death from the basilar part of the occipital bone. *International Journal of Legal Medicine*, Vol. 126 (5): 703-11.

Nelson, J. S., Harrington, L., Holland, E. and Cardoso, H. F. V. 2021; Does age estimated from teeth forming in different early life periods show differential discrepancy with known age? *American Journal of Human Biology*, Early View: e23577.

Nitsch, E.K., Humphrey, L.T. and Hedges, R. E. M. 2011: Using stable isotope analysis to examine the effect of economic change on breastfeeding practices in Spitalfields, London, UK. *American Journal Physical Anthropology*, Vol. 146: 619-628

Nystrom, K. C. 2014; The Bioarchaeology of Structural Violence and Dissection in the 19th - Century United States. *American Anthropologist*, Vol 116: 765-779.

Quade, L., Chazot, P. L. and Gowland, R. 2021; Desperately seeking stress: A pilot study of cortisol in archaeological tooth structures. *American Journal of Physical Anthropology*, Vol. 174: 532-541.

Palamenghi, A., Biehler-Gomez, L., Mattia, M., Breda, L. and Cattaneo, C. 2021; The challenging diagnosis of cranial congenital anomalies in a newborn from an Italian 20th century documented skeletal collection. *International Journal of Osteoarchaeology*, Early View: 1-7.

Satterlee Blake, K. A. 2018; The Biology of the Fetal Period: Interpreting Life from Fetal Skeletal Remains. In S. Han, T. K. Betsinger, and A. B. Scott (Eds.) *The Fetus: Biology, Culture, and Society*. New York: Berghahn Books: 34-58.

Scheuer, L. and Black, S. 2000; *Developmental Juvenile Osteology*. London: Academic Press.

Squires, K., Errickson, D. and Márquez-Grant, N. (Eds.) 2020; *Ethical Approaches to Human Remains: A Global Challenge in Bioarchaeology and Forensic Anthropology*. Swtizerland: Springer Nature.

Thornton, R., Edkins, A. L. and Hutchinson, E. F. 2020; Contributions of the pars lateralis, pars basilaris and femur to age estimations of the immature skeleton within a South African forensic setting. *International Journal of Legal Medicine*, Vol. 134 (3): 1185-1193.

Tsosie, K. S., Yracheta, J. M., Kolopenuk, J. and Smith, R. W. A. 2021; Indigenous data sovereignties and data sharing in biological anthropology. *American Journal Physical Anthropology*, Vol. 174: 183-186.

Vanderbyl, G., Albanese, J., & Cardoso, H. V. 2020; Structural violence and the nature of cemetery-based skeletal reference collections. *Human Remains and Violence*, Vol. 6 (2): 81-103.

Wheeler S. M., Williams, L., Beauchesne, P. and Dupras, T. L. 2013; Shattered lives and broken childhoods: Evidence of physical child abuse in ancient Egypt. *International Journal of Palaeopathology*, Vol. 3 (2): 71-82.