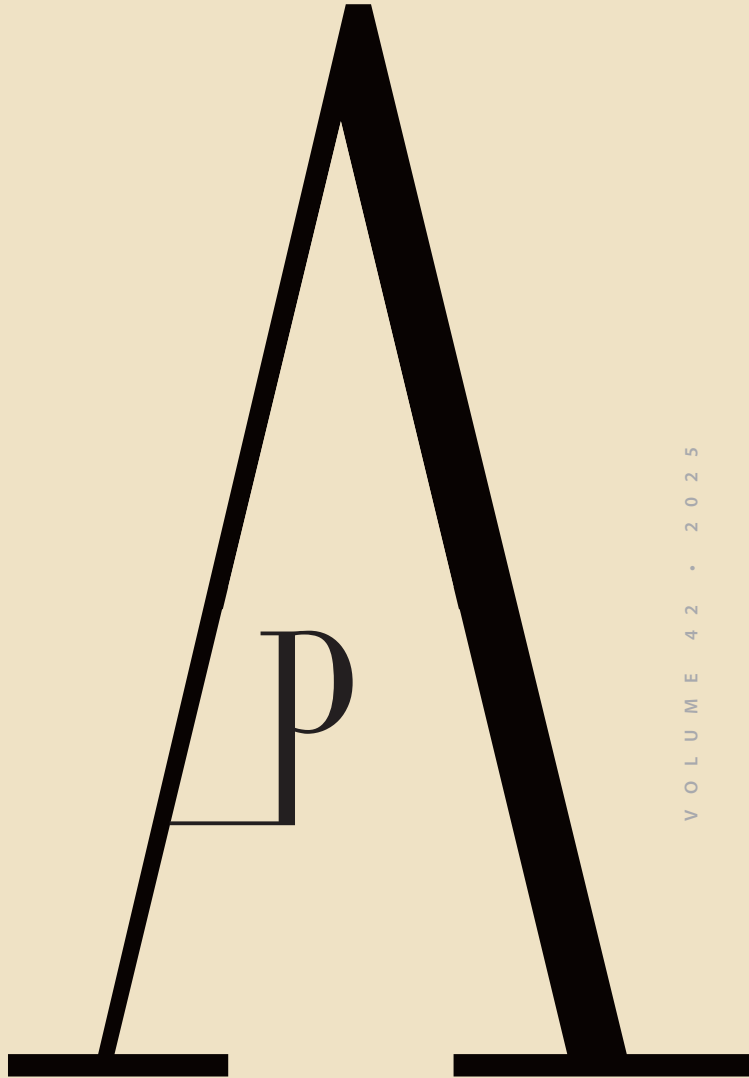


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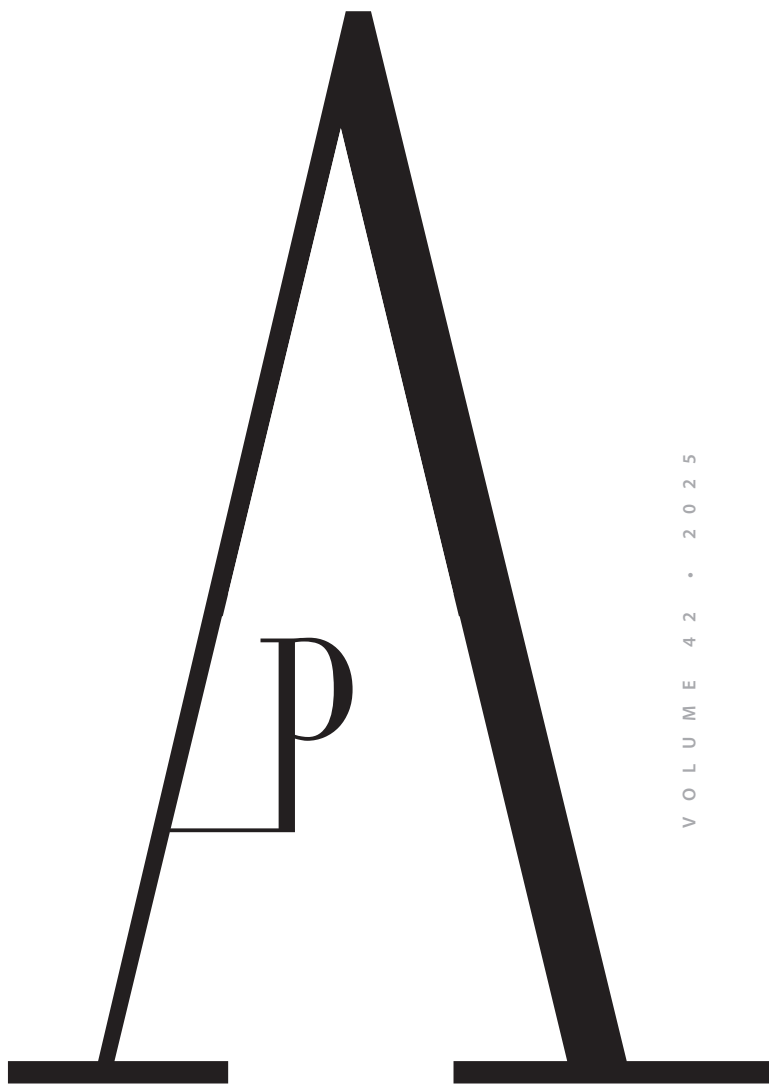
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The social landscape of death: a theoretical perspective on funerary practices in Post-Medieval Portugal

A dimensão social da morte: reflexão teórica sobre práticas funerárias no Portugal Pós-Medieval



Nathalie Antunes-Ferreira^{1a*}

Abstract Funerary practices and burial sites offer valuable insights into how societies conceptualise death and an enhanced perspective on communities' social, economic, and cultural contexts. The integration of archaeological data, historical records, iconographic and documentary sources, and socio-cultural anthropology strengthens the understanding of death-related discourses, symbolic representations, and changing attitudes over time. Key funerary indicators, such as graves and spatial distribution in the necropolis, inhumation type, body positioning and orientation, and grave goods, reveal the deceased's integration in their communities and socio-economic status. This paper explores these indicators to promote a broader understanding of communities' cultural, social, and economic contexts, focusing on the Portuguese Post-Medieval period (1450–1835) while

Resumo As práticas funerárias e as necrópoles fornecem informes sobre como as sociedades conceptualizam a morte, proporcionando, igualmente, uma perspetiva acerca dos contextos sociais, económicos e culturais das comunidades. A intersecção de dados arqueológicos, da história das mentalidades, de fontes iconográficas e documentais e da antropologia sociocultural, enriquece a compreensão dos discursos sobre a morte, das suas representações simbólicas e das atitudes ante a morte. Os indicadores funerários, como as sepulturas e a sua distribuição espacial, o tipo de inumação, a posição e orientação do corpo e o espólio votivo, revelam a integração do defunto na comunidade e o seu estatuto socioeconómico. O presente artigo aborda os indicadores supramencionados com o intuito de promover uma compreensão mais aprofundada dos contextos culturais, sociais e económicos das comuni-

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summarising key concepts. Furthermore, it highlights the importance of a multidisciplinary approach for a comprehensive interpretation of funerary practices. A detailed contextual analysis of skeletal remains, burial features, and associated material culture is essential to ensure reliable interpretations of funerary practices and social dynamics. Nevertheless, this approach requires the expertise of professionals with extensive fieldwork experience and specialised knowledge in archaeology, biological anthropology, and bioarchaeology.

Keywords: Funerary practices; bioarchaeology; social inequalities; post-medieval; Portugal.

dades, centrado-se no período Pós-Medieval Português, entre 1450 e 1835. Destaca ainda a importância da multidisciplinaridade para uma interpretação holística das práticas funerárias. O estudo dos remanescentes esqueléticos, das características das inumações e da cultura material é essencial para garantir interpretações mais abrangentes das práticas funerárias e das dinâmicas sociais da comunidade. Todavia, esta investigação exige profissionais com vasta experiência de campo e conhecimento especializado em arqueologia, antropologia biológica e bioarqueologia.

Palavras-chave: Práticas funerárias; bioarqueologia; desigualdades sociais; pós-medieval; Portugal.

Introduction

The analysis of funerary practices and burial contexts in necropolis excavations offers significant insights into how societies perceive death (Duday, 2009; Thevenet et al., 2014; Tillier et al., 2014; Bizot and Richier, 2023). Such analyses deepen our understanding of the discourses, representations, and shifts in attitudes toward death (Ariès, 1977; Vovelle, 1983; Stutz and Tarlow, 2013; Thevenet et al., 2014). They also provide a broader perspective on social, economic, and cultural contexts (Duday, 2009; Campos, 2019; Oliveira and Silva, 2021). The integration of archaeological data (e.g., Pearson, 2003; Cruz, 2011; Stutz and Tarlow, 2013), the history of mentalities (e.g., Ariès, 1977; Vovelle, 1983; Alexandre-

Bidon, 1993; 1998; Queiroz and Rugg, 2003), and socio-cultural anthropology (e.g., Van Gennep, 1981; Pina-Cabral, 1985; Huntington and Metcalf, 1991), along with written and iconographic sources, supports a holistic interpretation of funerary practices.

While death is universal, it is marked by diverse cultural and social processes that extend beyond biological death, leading to distinct responses across societies (Huntington and Metcalf, 1991; Rebay-Salisbury, 2012; Stutz and Tarlow, 2013; Thevenet et al., 2014; Campos, 2019; Oliveira and Silva, 2021) and historical periods (Pearson, 2003; Howarth and Leaman, 2013; Lopes, 2019). The reality of death shapes social practices and relationships, influences cultural structures,

and permeates all aspects of human existence (Huntington and Metcalf, 1991; Rebay-Salisbury, 2012; Stutz and Tarlow, 2013; Oliveira and Silva, 2021).

Necropolises and graves constitute material evidence of the deceased's integration in their communities, yielding an understanding of social, economic, and cultural contexts (Séguy and Signoli, 2008; Duday, 2009; Howarth and Leaman, 2013; Tillier et al., 2014; Campos, 2019; Bizot and Richier, 2023). The grave architecture, spatial distribution, type of inhumation, body positioning and orientation, and accompanying grave goods provide insights into symbolic meanings of death, funerary ideologies, collective representations of death, social dynamics, and the socioeconomic status of the deceased (Huntington and Metcalf, 1991; Duday, 2009; Araújo, 2010; Howarth and Leaman, 2013; Stutz and Tarlow, 2013; Antunes-Ferreira, 2015; Oliveira and Silva, 2021). In the absence of written records, graves provide essential evidence for interpreting the life and death of past populations (Duday, 2009).

This paper focuses on funerary indicators that reflect communities' cultural, social, and economic contexts, particularly during the Portuguese Post-Medieval period (1450–1835). It aims to summarise key concepts in funerary anthropology and emphasises the importance of a multidisciplinary approach to interpreting these practices. Furthermore, we highlighted that the paper is framed within a Christian context (Roman Catholic

Church), as it concerns Portuguese Post-Medieval Christian communities whose funerary practices reflect this religion's values, beliefs, and theological influences.

The following subsections explore key funerary indicators — such as spatial distribution, burial in coffins, the use of shrouds and lime, grave goods, body orientation and positioning, and primary and secondary inhumations and skeletal reductions — selected for their relevance in understanding Post-Medieval Portuguese funerary practices. These indicators have been systematically documented in Portuguese archaeological fieldwork, particularly since 1999, in accordance with Article 8 of Decree-Law No. 270/99, which requires teams to include specialists in biological anthropology and/or bioarchaeology. Additional aspects, such as the death of unbaptized children, body preparation, and funerary ceremonies for both the deceased and their community, are also addressed, based on historical and iconographic sources rather than archaeological excavations.

Spatial distribution

Burials in consecrated ground were required to guarantee the soul's salvation (Howarth and Leaman, 2013; Campos, 2019; Ginja, 2019). The choice of burial site reflected socioeconomic inequalities, with greater demand driving up costs. Wealthier individuals secured graves inside prestigious churches, often establishing family tombs. In contrast, lower-class individuals were typically

buried in churchyards, which are less prestigious locations because of their distance from the altar (Queiroz and Rugg, 2003; Antunes-Ferreira, 2015; Ginja, 2019; Lopes, 2019; Oliveira, 2019).

Churchyard burials often consigned individuals to anonymity, as these graves frequently lacked tombstones, resulting in a *damnatio memoriae* — the erasure of an individual's memory from collective consciousness (Vovelle, 1983; Ginja, 2019). However, even in churches, many graves bore no epitaphs, emphasising the priority of the soul's salvation over individual recognition (Rosa, 2010). In brief, despite the perception of death as a universal equaliser, funerary practices underscored ongoing social disparities, reflecting existing hierarchies even in death.

The preference for specific burial areas and differential funerary treatment based on age, especially for infants under one year old, has been documented across historical periods, including Post-Medieval Western Europe (e.g., Tillier and Duda, 1990; Alexandre-Bidon, 1998; Séguy and Signoli, 2008; Tzortzis and Séguy, 2008; Duda, 2009; Baills-Talbi, 2012) and Portugal (e.g., Cruz, 2011; Antunes-Ferreira, 2015; Curate et al., 2015). Infants were generally underrepresented in burials (Cardoso, 2003/2004; Séguy and Signoli, 2008; Duda, 2009; Baills-Talbi, 2012; Antunes-Ferreira, 2015). This underrepresentation may reflect inadequate fieldwork techniques and recovery procedures in the past (Cardoso, 2003/2004; Paredes, 2013), as well as a lack of interest

in children as subjects of study (Baxter, 2022). In such excavations, the limited attention given to infants often led to their exclusion from archaeological research. In recent years, however, theoretical and methodological advances have positioned infants as a significant focus within bioarchaeological research, demonstrating that they are far from archaeologically invisible (Paredes, 2013; Zuzarte, 2020; Baxter, 2022; Lourenço et al., 2025).

Accordingly, contemporary Portuguese excavations have shown a greater representation of infants in burial contexts. For instance, in the children's necropolis of São Domingos in Lisbon, 2798 individuals were recovered, ranging in age from 20 gestational weeks to 16 years (Lourenço et al., 2025). In Faro, an area adjacent to the Church of the Misericórdia was excavated, revealing infant — two months to three years old — burials that, when interpreted alongside historical documentation, were identified as newborns from the *Roda dos Expostos* (foundling wheel), a system for infants abandoned by their mothers and anonymously entrusted to the Misericórdia (Paredes, 2013). Many infant burials, particularly those under two years of age, were exhumed in the graveyard of the Church of Espírito Santo in Bucelas (Estêvão et al., 2020) and in the cemetery of the Church of Nossa Senhora da Salvação in Arruda-dos-Vinhos (Antunes-Ferreira et al., 2013).

Furthermore, some infant burials show evidence of careless deposition

(Cardoso, 2003/2004; Paredes, 2013; Curate et al., 2015), notably in the Ermida of Espírito Santo in Almada (Curate et al., 2015) and the Ermida of Nossa Senhora da Conceição in Seixal (Antunes-Ferreira and Ferreira, 2001). Similar examples were observed in extra-cemetery contexts in Lisbon: at Rua do Vale, five fetuses were hastily interred in a backyard, while at Rua Marquês de Angeja, a fetus was buried inside a pot (Antunes-Ferreira and Curate, 2024). While these practices may appear disconcerting from a contemporary perspective, they may have reflected the accepted norms of the period, particularly among lower socioeconomic groups. High infant mortality rates and pervasive poverty often contributed to emotional detachment among parents (Ariès, 1988; Séguy and Signoli, 2008).

Burials in coffins

The widespread use of coffins in Portugal began in the 16th and 17th centuries (Marques, 2010; Campos, 2019), but they were expensive and generally affordable only to wealthier individuals (Alexandre-Bidon, 1998; Howarth and Leaman, 2013; Campos, 2019; Lopes, 2019).

In the Portuguese archaeological record, coffin burials have been widely documented across the country, including in the crypts of the Chapel of Espírito Santo in Loures (Antunes-Ferreira, 2015), the Ermida of Santo António in Monchique (Pires and Antunes-Ferreira, 2003), the Convent of Santana in Lisbon (Antunes-Ferreira, 2022), the crypt at the Palácio

dos Condes de Murça in Lisbon (Filipe et al., 2012), and the Convent of Santa Maria da Consolação in Oporto (Seabra, 2011), all associated with individuals of high socioeconomic status. Particularly noteworthy — given the rarity of coffin burials among non-adult individuals — are the necropolises of the Church of Santa Maria de Alcáçova in the Castle of Montemor-o-Velho (Silva and Imperial, 2019), Souto da Carpalhosa (Ginja, 2019), the Church of São Mamede in Travanca (Zuzarte, 2020), and the crypts of the Chapel of Espírito Santo in Loures (Antunes-Ferreira, 2015).

We highlight that taphonomic factors may have led to the destruction of coffins, leaving no visible traces at many archaeological sites. Only an archaeological analysis of the human remains can confirm whether a coffin was used. Nonetheless, postmortem movements of body parts — typically associated with the voids created by coffins — are rarely documented (Duday, 2009; Tillier et al., 2014; Antunes-Ferreira, 2015).

The poorest individuals often relied on communitarian coffins provided by churches and confraternities. These coffins were used to transport the deceased to the necropolis. Upon arrival, the body was removed from the coffin and buried directly in the ground, after which the same coffin could be reused for subsequent burials (Pina-Cabral, 1985; Araújo, 2010; Howarth and Leaman, 2013).

More commonly, a bier carried the body from the home to the cemetery, exposing the deceased to public view

and allowing the community to witness their passing (Queiroz and Rugg, 2003; Campos, 2019; Oliveira, 2019). This practice is not documented archaeologically, but it is depicted in the panels of Setúbal's Church of São Julião and the Talhão of the Cemetery of Santa Casa da Misericórdia, illustrating 18th-century funeral processions in which the deceased were transported in an open coffin. Additionally, an article published in 1855 in the *O Setubalense* newspaper reported a procession in which a bier was used to carry the deceased to the cemetery.

Shroud

Shrouding the body was a common practice across Europe (Alexandre-Bidon, 1993; Howarth and Leaman, 2013), including Portugal (Araújo, 2010; Marques, 2010; Cruz, 2011; Antunes-Ferreira, 2015), and was observed among all social classes since the Middle Ages. The shroud, typically a white linen cloth — reminiscent of the fabric associated with Christ's shroud — was closely fitted around the deceased (Howarth and Leaman, 2013). After washing the body, the family or caregivers dressed the deceased in ordinary clothing or, in some instances, in the religious habit of their congregation (Marques, 2010; Oliveira, 2019). Garcia de Resende's description (1596) of King João II of Portugal's burial exemplifies these practices:

"He remained lying dead with his face uncovered for more than an hour until he was completely cold, while they prepared and shrouded him very neatly" (...). "At mid-

night, the king's body was carried in a tomb covered with black velvet, with a white damask cross on top, placed on a litter draped with a large black velvet curtain (...)" (Resende, 1596: 78–79).

Children and unmarried women often wore white garments symbolising innocence and purity, sometimes adorned. In contrast, impoverished individuals and children were frequently shrouded without clothing (Alexandre-Bidon, 1993). Ribbons tied the hands and feet, keeping the body in position, while pins fastened the shroud (Alexandre-Bidon, 1993; Antunes-Ferreira, 2015).

In the Portuguese archaeological record, evidence attests to this practice, particularly through the presence of shroud pins around skeletonized remains and, more rarely, remnants of the shrouds themselves (Antunes-Ferreira, 2015). Such evidence were observed in the crypts of the Chapel of Espírito Santo in Loures (Antunes-Ferreira, 2015), the Convent of Santana in Lisbon (Antunes-Ferreira, 2022), the Convent of Jesus in Setúbal (Antunes-Ferreira and Cândido, 2017), the Recolhimento of Nossa Senhora da Soledade in Setúbal (Neto and Antunes-Ferreira, 2012), the Convent of Santa Maria da Consolação in Oporto (Seabra, 2011), the graveyard of the Church of Santa Maria de Alcáçova in the Castle of Montemor-o-Velho (Silva and Imperial, 2019), and the Convent of Nossa Senhora do Carmo in Lisbon (Benisse, 2005). Interestingly, at the cemetery of the Military Hospital at São Jorge Castle

in Lisbon, the bedsheets of infected patients were reportedly used as shrouds to avoid waste (Henriques et al., 2020), highlighting the value of documentary sources in complementing archaeological interpretations of funerary practices.

Lime

The use of lime became widespread from the Middle Ages onward. Its purposes were to mask the odour of decomposition, accelerate bodily decay, and mitigate health risks associated with miasmas (Weiss-Krejci, 2011; Bianucci et al., 2013). Garcia de Resende (1596: 80) described this practice regarding King João II of Portugal's body: "(...) *they placed three baskets of lime inside the coffin so that it would be consumed more quickly (...)*".

The miasma theory, rooted in Hippocratic principles, dominated explanations of disease transmission from the Middle Ages through the 19th-century. It posited that diseases spread through contaminated air — miasmas — arising from decaying organic matter, polluted water, and waste. These miasmas were identified by their invisible, odorous pestilential vapours (Ariès, 1977; Queiroz and Rugg, 2003; Weiss-Krejci, 2011).

In the Portuguese archaeological record, lime use is extensively documented in Post-Medieval necropolises. Examples include the crypts of the Chapel of Espírito Santo in Loures (Antunes-Ferreira, 2015), the Convent of Santana in Lisbon (Antunes-Ferreira, 2022), the Convent of Santa Maria da Consolação in Oporto

(Seabra, 2011), and the crypt at the Palácio dos Condes de Murça in Lisbon (Filipe et al., 2012). Interestingly, Seabra (2011) and Antunes-Ferreira (2015) noted differences in the treatment of the deceased between crypts and cloisters: all crypt burials contained lime, whereas only a few cloister burials did. The explanation for these differences may lie in the fact that accelerating the decomposition of corpses in confined spaces was necessary, as such areas were thought to concentrate pestilential odours (miasmas) believed to transmit disease. Indeed, Ariès (1977) reports multiple fatalities among gravediggers exposed to the intense stench of corpses in such conditions. Unexpectedly, in the cemetery of the Military Hospital at São Jorge Castle in Lisbon, no evidence of lime use has been recorded, despite the burial of infectious patients (Henriques et al., 2020).

Grave goods

Grave goods provide significant insights into societal attitudes toward death (Pearson, 2003; Weiss-Krejci, 2011; Howarth and Leaman, 2013) and may reveal the cultural, social, and economic frameworks of past communities (Pearson, 2003; Rebay-Salisbury, 2012; Antunes-Ferreira, 2015). The family offered these objects to assist the deceased's transition into the afterlife and to prevent their return to the world of the living, emphasizing the ritual significance of burial (Van Gennep, 1981; Pearson, 2003; Thevenet et al., 2014).

In Post-Medieval Portugal, votive objects encompassed religious items such as medals (associated with saintly protection), crucifixes, rosaries, reliquary boxes, scapulars, and even amulets, and their presence is frequently identified in the archaeological record (Cruz, 2011; Antunes-Ferreira, 2015; Costa, 2022).

Medieval burials commonly contained coins, but these became rare during the Post-Medieval period (Barroca, 1987; Antunes-Ferreira and Curate, 2024). Nonetheless, Barroca (1987) highlights that the tradition of Charon's obol persisted in certain contemporary practices in northern Portugal. For instance, coins were recovered in association with non-adult and adult individual burials in the necropolis of Souto de Carpalhosa in Leiria (Ginja, 2019), in an adolescent from the graveyard of the Church of Espírito Santo in Bucelas (Estêvão et al., 2020), in adults from the crypts of the Chapel of Espírito Santo in Loures (Antunes-Ferreira, 2015), and non-adults and adults in the cemetery of the Church of Nossa Senhora da Salvação in Arruda-dos-Vinhos (Antunes-Ferreira et al., 2013).

Christian beliefs in humility and the renunciation of material possessions as virtues for gaining entry to Paradise influenced the inclusion of grave goods. Even wealthier individuals often embraced simplicity, with some requesting burial in a religious habit or opting for churchyard interment as a gesture of modesty (Vovelle, 1983; Araújo, 2010; Howarth and Leaman, 2013; Antunes-Ferreira, 2015).

An example of this practice is the burial of the nobleman D. Luís Castro do Rio in the central crypt of the Chapel of Espírito Santo in Loures (Antunes-Ferreira, 2015), who requested to be dressed in the habit of Franciscan friars (Piedade, 1728).

Body position in Christian burials

The placement of the deceased in Christian burials is typically supine, with origins in Roman traditions (Ariès, 1977; Tardieu, 1993). In this position, the face looking toward Heaven symbolises spiritual elevation (Alexandre-Bidon, 1993; Tardieu, 1993). In contrast, fetal and prone placements were rare and often associated with marginalised groups, such as individuals with physical deformities, mental illnesses, or infectious diseases (e.g., leprosy, tuberculosis). Hunchbacks, for instance, were sometimes buried in lateral or prone positions (Tsaliki, 2008). Burials of condemned criminals, suicides, prisoners, enslaved people, or those accused of witchcraft may also display these positions (Gonçalves and Santos, 2005; Tsaliki, 2008). An example is provided by the enslaved Africans from Valle da Gafaria in Lagos, who were deposited in prone and fetal burial positions and discarded in an urban waste dump (Ferreira et al., 2019), reflecting their marginalisation and dehumanisation even in death. Similarly, the deceased in Évora Prison during the Inquisition were displayed in prone, supine, and lateral positions and discarded like waste into a dump (Magalhães et al., 2015).

The positioning of the arms showed significant variability. Pearson (2003) proposes that these differences may reflect distinctions between groups in the cemetery. However, no archaeological or iconographic evidence indicates chronological changes in arm placement, suggesting that these variations may have symbolic or moral interpretations instead (Alexandre-Bidon, 1993; Tardieu, 1993; Xavier, 2001). In Post-Medieval Portuguese burials, the arms typically rested alongside the body or were placed on the lower abdomen area (Antunes-Ferreira, 2015), possibly symbolising modesty or humility before the Creator (Alexandre-Bidon, 1993), as also depicted in funerary statuary (Xavier, 2001). Less frequently, the arms were crossed over the chest or arranged in a prayer position, as observed, for instance, in some burials in the crypts of the Chapel of Espírito Santo in Loures (Antunes-Ferreira, 2015), the Convent of Jesus in Setúbal (Antunes-Ferreira and Cândido, 2017), and the crypts of the Palácio dos Condes de Murça (Filipe et al., 2012). Remarkably, in two women's burials from the crypts of the Chapel of Espírito Santo in Loures (Antunes-Ferreira, 2015), rope remnants were identified around the wrists, likely used to maintain the hands in that position. The difficulty of maintaining a prayer posture may have contributed to variations, while the symbolism could reflect fear or resignation (Alexandre-Bidon, 1993). A right hand near the chest might represent a gesture of blessing, suggesting that the de-

ceased could cross themselves on Judgment Day (Cruz, 2011). In children's burials, arms were often placed on the lower abdomen or extended, hands joined (Alexandre-Bidon, 1993; Tardieu, 1993), as was also observed in the infant burials from the crypts of the Chapel of Espírito Santo in Loures (Antunes-Ferreira, 2015), in the graveyard of the Church of Espírito Santo in Bucelas (Estêvão et al., 2020), and those from the cemetery of the Church of Nossa Senhora da Salvação in Arruda-dos-Vinhos (Antunes-Ferreira et al., 2013).

In Sobral de Monte Agraço and Arruda-dos-Vinhos, the deceased's marital status has influenced burial arm positioning since the late 19th-century, with possible earlier roots (Antunes-Ferreira, 2015). Ethnographic interviews conducted by the author with the long-term inhabitants of Arruda dos Vinhos documented these customs. However, these traditions are gradually fading as the influence of funeral agencies grows, which often overlook such customs. Guilherme Cardoso, an archaeologist with extensive experience in the region, supported these observations, noting similar practices in the neighbouring locality of Sobral de Monte Agraço. Unmarried individuals were buried with their hands together on their chests, resembling a prayer posture. Widowed individuals had their hands crossed over their chests, symbolizing unity and companionship in death. Finally, married individuals were buried with the right hand on the chest and the left arm extended alongside

the body, awaiting their companion. In summary, these local funerary practices reflect a nuanced cultural expression of identity and social status in death.

The lower limbs were generally extended, with rare deviations (Alexandre-Bidon, 1993; 1998; Tardieu, 1993), a pattern widely observed across all age groups in Post-Medieval Portuguese burials (Cruz, 2011).

Body orientation

In churches, burials followed a structured arrangement, with most individuals oriented toward the main altar. This orientation aligns with traditional architecture, in which the altar typically faces east (toward the sunrise) and the main entrance faces west (toward the sunset) (Alexandre-Bidon, 1993; Mattoso, 1997). However, in practice, many religious buildings deviate from this canonical alignment.

The standard burial orientation in churchyards was also East-West, with the deceased's head facing east, symbolising the journey toward Heavenly Jerusalem, a practice established by the 5th-century (Mattoso, 1997). Deviations from this standard orientation were uncommon. Painted crosses were placed on the coffin or shroud to mark the head's position, ensuring proper alignment during burial (Alexandre-Bidon, 1993). However, in Post-Medieval Portugal, burials exhibited various orientations, although an east-west alignment predominated. Burial in a consecrated place appears to have been valued more highly than strict

adherence to orientation, as observed in the crypts of the Chapel of Espírito Santo in Loures (Antunes-Ferreira, 2015) and in the Convent of Jesus (Antunes-Ferreira and Cândido, 2017). Conversely, in the Church of Santa Maria de Alcáçova in Castelo de Montemor-o-Velho (Silva and Imperial, 2019) and the Church of Nossa Senhora da Anunciada in Setúbal (Antunes-Ferreira, 2015), burials display varying orientations, likely reflecting the need to optimise available space.

Primary and secondary burials and reductions

Post-Medieval Portuguese burial practices included primary inhumations, secondary inhumations, and skeletal reductions, regardless of social hierarchy (Antunes-Ferreira, 2015). Primary inhumations involve the direct placement of the body in a permanent grave, whereas secondary inhumations involve an initial temporary grave followed by the transfer of skeletal remains to a final burial site (Tillier et al., 2014; Neves, 2019). Reductions refer to rearranging disarticulated bones within the original grave (Duday, 2009; Neves, 2019).

Archaeological and archaeothanatological interpretations propose that secondary inhumations and reductions were practical strategies for managing limited burial space in the necropolis (Cruz, 2011; Seabra, 2011; Antunes-Ferreira, 2015). Consequently, earlier interred individuals were removed or relocated in the grave to make room for a new burial. These fu-

nerary treatments are widely documented in Portugal, with frequent skeletal reductions in reused individual graves and secondary inhumations (ossuaries). In the crypts of the Chapel of Espírito Santo in Loures (Antunes-Ferreira, 2015) and the crypt of the Palácio dos Condes de Murça in Lisbon (Filipe et al., 2012), bones from earlier inhumations were moved to a corner to make space for new burials. At the necropolis of the Church of Espírito Santo in Bucelas (Estêvão et al., 2020), skeletal reductions occurred in almost all individual graves, and two partially excavated ossuaries contained at least 352 individuals. At the Convent of Santa Maria da Consolação in Oporto, 16 ossuaries were recovered alongside primary inhumations (Seabra, 2011), while in the Church of São Mamede of Travanca, 47 ossuaries were recorded in addition to primary inhumations (Zuzarte, 2020).

An alternative interpretation, based on Pina-Cabral (1985), suggests that skeletal disarticulation and the relocation of bones within graves or ossuaries may have served as final separation rites, permanently detaching the deceased from the living. He documented post-burial practices in which bones were cleaned and placed in ossuaries to create space for other family members. Interestingly, these practices sometimes occurred even when no new deaths were expected, proposing that the procedure signified the complete separation of the deceased from the living. This process marked the end of the liminal phase, during which the family

would verify whether the body had decomposed. In this context, burial represents a transitional phase in handling human remains. Families' focus on the grave diminishes after this phase, although rituals performed on All Saints' Day (*Todos-os-Santos*) and All Souls' Day (*Finados*) continue until the memory of the deceased fades. Notably, these rituals primarily target the most recently deceased but often extend to include older burials in the same grave (Pina-Cabral, 1985).

Such practices also raise questions about their theological implications. They contrast with the Christian ideal of bodily preservation until resurrection, inviting reflection on the relationship between doctrine and practice. The resurrection of the body is a central tenet of Christian doctrine, prescribing that it remains intact until the Final Judgment Day.

Nevertheless, archaeological evidence from Post-Medieval Christian necropolises indicates that skeletal reduction and secondary inhumation were typical, apparently contradicting this principle. Although no studies have yet addressed this contradiction, it suggests a degree of flexibility between doctrine and funerary practice. Indeed, a similar tension persists today, as cremation becomes increasingly widespread among Christians. Thus, the *Dicastero per la Dottrina della Fede* (2016) acknowledges that such flexibility has long existed within theological interpretation, affirming that God can recreate or transform the body at resurrection. It further reaffirms that,

while the human body possesses intrinsic dignity and should be interred in a sacred place, material integrity is not strictly required for resurrection.

Beyond the grave and funerary practices Unbaptized children's death

In the Post-Medieval period, the treatment of unbaptized children's deaths, including the preparation of their bodies and the associated ritual ceremonies, was deeply influenced by cultural and religious beliefs (Ariès, 1988; Pearson, 2003; Campos, 2019). Identifying these practices in the archaeological data poses challenges, but historical records, iconographic sources, and contemporary studies on death provide a better understanding.

Baptism was a pivotal rite that granted societal status to a newborn (Howarth and Leaman, 2013; Almeida, 2015; Campos, 2019). Before baptism, children existed in a liminal state, devoid of a name and social identity, which rendered their existence fragile and precarious (Van Gennep, 1981; Séguy and Signoli, 2008; Howarth and Leaman, 2013). If a child died unbaptized, their absence of social identity prevented their inclusion in both the worlds of the living and the dead. As a result, they were often denied burial in consecrated ground and excluded from Paradise (Alexandre-Bidon, 1998; Séguy and Signoli, 2008; Almeida, 2015; Campos, 2019).

Therefore, unbaptized infants were often buried discreetly, either in family homes or churchyards, reflecting parental anxiety regarding their children's spiri-

tual fate (Pearson, 2003; Baills-Talbi, 2012; Almeida, 2015). Parents feared that these infants, having been excluded from both living and dead worlds, might return as vengeful spirits (Almeida, 2015). This fear emphasized the urgency of baptizing newborns immediately after birth to ensure their spiritual salvation and integration into the Christian community (Tzortzis and Séguy, 2008; Almeida, 2015; Campos, 2019).

For unbaptized children, the theological concept of Limbo emerged — a neutral, eternal state separating them from Heaven, Hell, or Purgatory (Alexandre-Bidon, 1998; Almeida, 2015). Although Limbo was never formally codified in Catholic doctrine, it provided a framework for explaining the fate of these souls. The concept persisted until the International Theological Commission abolished it in 2007 (International Theological Commission, 2007).

Preparation and rituals for the deceased

The preparation of the deceased's body involved a symbolic process that included washing, anointing, and dressing. This ritual served as a purification rite, representing readiness for the afterlife (Van Gennep, 1981; Pina-Cabral, 1985; Araújo, 2010; Rebay-Salisbury, 2012). Wrapping the deceased in a shroud was an essential separation ritual, marking their transition and preparing them for the journey (Howarth and Leaman, 2013). Neglecting these rites was believed to risk leaving the soul trapped

between worlds, unable to find peace (Thevenet et al., 2014).

After preparing the body, the wake was held at home or at the church. During the wake, the coffin and the deceased were sprinkled with holy water to ward off malevolent spirits (Pina-Cabral, 1985). A lit candle, symbolising *lux perpetua* (eternal light), was placed nearby as a spiritual beacon (Vovelle, 1983).

The funeral procession, with the deceased carried in a coffin or bier, marked the public acknowledgement of the loss and allowed the community to mourn together. This spiritual and social ritual emphasised the collective farewell (Ariès, 1977; Queiroz and Rugg, 2003; Araújo, 2010).

Symbolism in funerary practices

Tile panels in Setúbal's Church of São Julião and the Talhão of the Cemetery of Santa Casa da Misericórdia illustrate 18th-century burial practices: the funeral procession transported the deceased in an open coffin to the church, displayed the body in a chapel, wrapped it in a shroud, and then carried it to the cemetery. Burials often involved the reuse of graves, as evidenced by the visible bones alongside fresh soil in the tile panel from the *Talhão* of the Cemetery of Santa Casa da Misericórdia.

The act of placing the deceased in a coffin represented their separation from home and marked the beginning of their journey to the afterlife. Funerary rites, such as sprinkling soil onto graves, symbolise the transition from the world

of the living to the world of the dead, signalling the end of the separation process (Pina-Cabral, 1985; Rebay-Salisbury, 2012). Consequently, the grave became a place of incorporation, integrating the deceased into the world of the dead (Van Gennep, 1981). In short, these rituals served to navigate the liminal phase of death, providing comfort to the community while ensuring a proper transition for the deceased to the afterlife.

In contemporary Western society, a waiting period of at least 24 hours must pass before burial, as stipulated, for instance, by Portugal's Decree-Law 411/98, which specifies a minimum of 24 hours before either burial or cremation. In contrast, during the Post-Medieval period, it could occur as little as a few hours after death (Vovelle, 1983; Lopes, 2019). Thus, the time allocated for funerary rites, marked by the presence of the deceased or the coffin in the home or church (Van Gennep, 1981), was extremely brief. However, in some parts of Europe during the 17th and 18th centuries, widespread superstitions led to burials often being delayed until the first signs of decomposition appeared, driven by the fear of premature burial (Vovelle, 1983).

Dying "well" is not solely an individual action; it requires collaboration from family and community (Pina-Cabral, 1985). The journey and integration of the deceased into the world of the dead involve a set of rites of passage (Van Gennep, 1981), and it is the responsibility of the living to assist the deceased during this journey (Pina-

Cabral, 1985; Lopes, 2019). For instance, the *Defuntos e Sufrágios Ordem 3ª do Carmo* manuscript from 1771, discovered in the archives of the Convent of Carmo of Setúbal, along with the *Espelho de Penitentes e Chronica da Provincia de Santa Maria da Arrábida* (Piedade, 1728), describe the required number and frequency of masses for deceased members. If the ceremonial and ritual requirements were fulfilled appropriately — rites of separation from the world of the living and incorporation into the world of the dead — death was not problematic (Pina-Cabral, 1985; Thevenet et al., 2014). However, neglecting these ceremonies and rituals could prevent the deceased's soul from separating from the world of the living (Pina-Cabral, 1985; Mattoso, 1997; Pearson, 2003; Campos, 2019). This situation became problematic, as such souls would be condemned to wander between both worlds — unable to find peace in the afterlife while still being tied to the living (Van Gennep, 1981; Pina-Cabral, 1985; Mattoso, 1997). Such restless spirits or ghosts might seek vengeance and torment the living (Pina-Cabral, 1985; Mattoso, 1997). Hence, these rites facilitated the soul's journey toward salvation and served a protective and practical function for the living (Van Gennep, 1981; Pina-Cabral, 1985).

Ariès (1977) and Vovelle (1983) noted a profound shift in attitudes toward death from the 19th-century onward. Death became less familiar and closer and more threatening. Ariès (1977) described it as “wild,” with the death and the deceased

viewed as objects of fear and repulsion. Although the “domesticated” death of the Medieval period through the 19th-century was also fraught with fear, it was simultaneously accepted and ritualised, fostering a degree of familiarity and public acknowledgement of death. Enlightenment-era hygienist theories, emerging around 1740, catalysed this change in mentalities. These theories criticised the traditional proximity between the living and the dead, especially targeting the practice of burying the dead in churches and churchyards (Ariès, 1977; Vovelle, 1983; Queiroz and Rugg, 2003; Campos, 2019).

The 19th-century Liberal reforms in Portugal marked a pivotal turning point for public health and hygiene, leading to measures such as the establishment of cemeteries and the banning of church burials (Queiroz and Rugg, 2003). Despite facing significant popular resistance, the government enforced these changes through key decrees issued in 1835 by Rodrigo da Fonseca Magalhães and later in 1844 and 1845 by António Bernardo Costa Cabral (Mattoso, 1997; Queiroz and Rugg, 2003). An article published in the *O Setubalense* local newspaper in 1855 clearly illustrates this transformation in attitude, criticizing the funeral customs of confraternities and brotherhoods. The report described a “barbaric” practice in which the deceased was publicly displayed during transportation to the cemetery:

“Mais Falta de Policia: Há nesta villa e entre algumas Irmandades o costume

barbaro de, quando conduzem á sepultura os seus confrades, levarem sobre o esquife como em charola o cadaver descoberto e exposto ao publico, atravessando assim a Povoação, e apresentando-lhe este espectáculo hediondo pela repugnancia que nos causa a sua vista, lugubre pelo horror de que nos sentimos possuidos ao contemplar o nosso semelhante já tornado cadaver, e irreligioso pelo pouco respeito e menos resguardo aos mortos (...)" (O Setubalense, 1855: 3).

The newspaper described the practice of parading the deceased through town as ghastly, gloomy, and irreverent. This portrayal highlights a growing societal disdain for public displays of the deceased, which evokes feelings of disgust and horror among onlookers. In summary, the changes in mentalities about death mark the advent of contemporary funerary practices prioritizing hygiene and showing profound respect for the deceased. It reflects a broader movement in Portuguese society to separate death from public life, encapsulating the new cultural paradigms toward mortality that defined the era.

Final remarks

A comprehensive understanding of funerary practices requires careful contextualization of skeletal remains, burial features, and associated material culture, which must be meticulously documented during excavations. This approach is essential to ensure reliable interpretations of funerary practices. Therefore, it is

paramount that fieldwork must be methodically planned and conducted by professionals with extensive knowledge and expertise in archaeology, biological anthropology, and bioarchaeology.

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References

- Alexandre-Bidon, D. 1998. *La mort au Moyen Age (XIIIe-XVle siècle)*. Paris, Hachette Littératures.
- Alexandre-Bidon, D. 1993. Le corps et son linceul. In: Alexandre-Bidon, D.; Treffort C. (eds.). *A réveiller les morts: le mort au quotidien dans l'occident Médiéval*. Lyon, Press Universitaires de Lyon: 183–206.
- Almeida, F. 2015. Felizes os que morrem «aninhos»: batismo e morte infantil em Portugal (séculos XVI-XVIII). *Revista de Historia Bajomedieval y Moderna*, 2: 43–53.
- Antunes-Ferreira, N. 2022. Vida e morte das freiras do Convento de Santana. *Arqueologia & História*, 71-72: 57–71.
- Antunes-Ferreira, N. 2015. *Antropologia funerária e paleobiologia das populações pós-medievais portuguesas: os casos de Nossa Senhora da Anunciada e Espírito Santo*. Dissertação de Doutoramento em Antropologia, FCSH, Universidade NOVA de Lisboa.
- Antunes-Ferreira, N.; Curate, F. 2024. Necrópoles medievais e modernas de Lisboa. In: Casimiro, T.; Boavida, C.; Carvalho, A. (eds.). *Lisboa subterrânea – 25 Anos depois*.

- Lisboa, Museu Nacional de Arqueologia/Imprensa Nacional: 183–203.
- Antunes-Ferreira, N.; Cândido, M. 2017. A al nascente do claustro do Convento de Jesus: resultados da intervenção arqueológica de 2015/16. In: Arnaud, J.; Martins, A. (coord.). *Arqueologia em Portugal: 2017-Estado da Questão*. Lisboa, Associação de Arqueólogos Portugueses: 1667–1674.
- Antunes-Ferreira, N.; Ferreira, M. 2001. As práticas de inumação na antiga Ermida de N. Sra. da Conceição (Seixal). *Era – Arqueologia*, 3: 59–73.
- Antunes-Ferreira, N.; Cardoso, G.; Santos, F. 2013. A necrópole medieval/moderno de Arruda dos Vinhos. In: Arnaud, J.; Martins, A. (coord.). *Arqueologia em Portugal: 150 anos*. Lisboa, Associação de Arqueólogos Portugueses: 1111–1117.
- Araújo, M. 2010. O mundo dos mortos no quotidiano dos vivos: celebrar a morte nas misericórdias portuguesas da época moderna. *Comunicação e Cultura*, 10: 101–114.
- Ariès, P. 1988. *A criança e a vida familiar no antigo regime*. Lisboa, Relógio de Água.
- Ariès, P. 1977. *L'homme devant la mort*. Paris, Éditions du Seuil.
- Baills-Talbi, N. 2012. *Sentiment de l'enfance et reconnaissance sociale: la place des enfants en bas âge (0-4 ans) dans les Trois Gaules (Ier s. av. J.-C. - Ve s. ap. J.-C.): étude des comportements au travers des sources littéraires, iconographiques, anthropologiques, archéologiques e ethnologiques*. Thèse de doctorat, Université Paris 1 Panthéon Sorbonne.
- Barroca, M. 1987. *Necrópoles e sepulturas medievais de Entre-Douro-e-Minho (séculos V a XV)*. Dissertação de Doutoramento em Arqueologia, Universidade do Porto.
- Baxter, J. 2022. *The Archaeology of childhood*. London, Rowman & Littlefield.
- Benisse, V. 2005. *Retrato de Lisboa moderna: estudo paleobiológico de uma amostra da população exumada no Convento do Carmo (séc. XVI-XVIII)*. Dissertação de Mestrado, Departamento de Ciências da Vida, Faculdade de Ciências e Tecnologia, Universidade de Coimbra.
- Bianucci, R.; Benedictow, O.; Fornaciari, G.; Giofre, V. 2013. Quinto Tiberio Angelerio and new measures for controlling plague in 16th century Alghero, Sardinia. *Emerging Infectious Diseases*, 19 (9): 1478–1483.
- Bizot, B.; Richier, A. 2023. L'archéothanatologie en contexte préventif: évolution des protocoles et des enjeux. *Archéopages*, Hors-série 6: 311–317. DOI: 10.4000/archeopages.13832.
- Campos, F. 2019. Morte em Coimbra. Mortalidade e atitudes perante a morte: 1750-1777. *Revista Portuguesa de História*: 169–194.
- Cardoso, H. 2003/2004. Onde estão as crianças? Representatividade de esqueletos infantis em populações arqueológicas e implicações para a paleodemografia. *Antropologia Portuguesa*, 20/21: 237–266.
- Costa, I. 2022. *Religião, superstição, materialidade e cultura: estudo do espólio funerário de enterramentos de necrópoles de Almada e Seixal (Séculos XV-XIX)*. Dissertação de Mestrado em Arqueologia, FCSH, Universidade NOVA de Lisboa.
- Cruz, C. 2011. *Viver a morte em Portugal: o potencial informativo dos relatórios antropológicos de campo (1994-2007)*. Dissertação de Doutoramento em Antropologia, De-

- partamento de Ciências da Vida, Faculdade de Ciências e Tecnologia, Universidade de Coimbra.
- Curate, F.; Henriques, F. R.; Rosa, S.; Matos, V. M. J.; Tavares, A.; António, T. 2015. Mortalidade infantil na Ermida do Espírito Santo (Almada): entre o afecto e a marginalização. *Almadan*, 19: 68–74.
- Dicastero per la Dottrina della Fede. 2016. *Ad resurgendum cum Christo*. Rome, Holy See Press Office (retrieved 23 October 2025).
- Duday, H. 2009. *The archaeology of the dead: lectures in archaeothanatology*. Oxford, Oxbow Books.
- Estêvão, F.; Antunes-Ferreira, N.; Neves, D.; Lisboa, I. 2020. Intervenção arqueológica na Rua Marquês de Pombal/Largo do Espírito Santo (Bucelas, Loures). In: Arnaud, J.; Martins, A. (coord.). *Arqueologia em Portugal: 2020 - Estado da Questão*. Lisboa, Associação de Arqueólogos Portugueses: 1677–1690.
- Ferreira, M. T.; Coelho, C.; Wasterlain, S. 2019. Discarded in the trash: burials of African enslaved individuals in Valle da Gafaria, Lagos, Portugal (15th–17th centuries). *International Journal of Osteoarchaeology*, 29(4): 670–680. DOI: 10.1002/oa.2747.
- Filipe, I.; Silva, I.; Figueiredo, A. 2012. *Relatório final dos trabalhos arqueológicos na cripta do Palácio dos Condes de Murça (Lisboa)*. Cruz Quebrada, Era Arqueologia, S. A.
- Ginja, A. 2019. Arquitetura e práticas funerárias: a necrópole de Souto da Carpalhosa na arqueologia da sua torre sineira. In: *Actas do colóquio práticas funerárias e atitudes perante a morte na região centro: da pré-história ao presente*. *Arqueologia, História, Arte e Antropologia*. Câmara Municipal de Alvaiázere: 99–115.
- Gonçalves, M.; Santos, A. L. 2005. Novos testemunhos do sistema defensivo islâmico junto à muralha de um arrabalde – notícia preliminar. *Xelb*, 5: 177–200.
- Henriques S.; Carvalho, L.; Amarante, A.; Wasterlain, S. 2020. A necrópole do hospital militar do Castelo de São Jorge e as práticas funerárias na Lisboa de época moderna. In: Arnaud, J.; Martins, A. (coord.). *Arqueologia em Portugal: 2020 - Estado da Questão*. Lisboa: Associação de Arqueólogos Portugueses: 1949–1961.
- Howarth, G.; Leaman, O. 2013. *Encyclopedia of death and dying*. London, Routledge.
- Huntington, R.; Metcalf, P. 1991. *Celebrations of death: the anthropology of mortuary ritual*. Cambridge, Cambridge University Press.
- International Theological Commission. 2007. *The hope of salvation for infants who die without being baptized*. Vatican City (retrieved 1 November 2015).
- Lopes, M. 2019. Agonia, morte, funeral e luto em Portugal do século XIX. In: Dillmann, M.; Ripe, F. (org.). *Cuidados com o corpo e a alma: na luso-américa dos séculos XVII a XIX*. Rio de Janeiro, Passagens Híbridas: 256–283.
- Lourenço, M.; Cunha, E.; Curate, F. 2025. Insights into the anatomical expressions of anencephaly in three infants from 17th to 19th-century Lisbon, Portugal. *International Journal of Paleopathology*, 49: 119–127. DOI: 10.1016/j.ijpp.2025.04.001.
- Magalhães, B.; Fernandes, T.; Santos, A. L. 2015. The unburied prisoners from the jail of the Inquisition of Évora, Portugal. *Journal of Anthropological Archaeology*, 39: 36–41.
- Marques, A. 2010. *A sociedade medieval portuguesa: aspectos da vida quotidiana*. Lisboa, Esfera dos livros.

- Mattoso, J. 1997. Pressupostos mentais do culto dos mortos. *Arqueologia Medieval*, 5: 5–11.
- Neto, J.; Antunes-Ferreira, N. 2012. Para as mulheres pobres, mas honradas: os recolhimentos em Setúbal. In: Teixeira, A.; Bettencourt, A. (eds.). *Actas do Congresso Velhos e Novos Mundos: estudos de Arqueologia moderna*. Lisboa, Faculdade de Ciências Sociais e Humanas, Universidade Nova de Lisboa: 561–568.
- Neves, M. J. 2019. *O contributo da arqueotanatologia para a compreensão das práticas funerárias nos 4º e 3º milénios a.C. no sul de Portugal: os hipogeus de Monte Canelas I (Portimão, Faro) e Monte do Carrascal 2 (Ferreira do Alentejo, Beja)*. Dissertação de Doutoramento em Antropologia, Departamento de Ciências da Vida, Faculdade de Ciências e Tecnologia, Universidade de Coimbra.
- Oliveira, M.; Silva, S. 2021. Funerary practices in archaeology: pluralities and heritage. *International Journal of Archaeology*, 9(2): 62–73. DOI: 10.11648/j.ija.20210902.15.
- Oliveira, R. 2019. Enterrar e rezar: a misericórdia de Pombal e a assistência aos mortos (séculos XVII-XIX). In: *Actas do colóquio práticas funerárias e atitudes perante a morte na região centro: da pré-história ao presente*. Arqueologia, História, Arte e Antropologia. Câmara Municipal de Alvaiázere: 117–128.
- O Setubalense. 1855. *Mais falta de Polícia*. Setúbal, 9: 3 (edição de 26 de Agosto).
- Paredes, J. 2013. *A infância moderna exposta nos ossos: caracterização biológica e paleopatológica duma amostra não adulta da roda da Santa Casa da Misericórdia de Faro*. Dissertação de Mestrado em Evolução e Biologia Humanas, Departamento de Ciências da Vida, Faculdade de Ciências e Tecnologia, Universidade de Coimbra.
- Pearson, M. 2003. *The archaeology of death and burial*. Gloucestershire, Sutton Publishing.
- Piedade, A. 1728. *Espelho de penitentes e chronica da provincia de Santa Maria da Arrábida*. Lisboa, Oficina de Joseph António da Sylva.
- Pina-Cabral, J. 1985. Os cultos da morte no noroeste de Portugal. In: Feijó, R.; Martins, H.; Pina-Cabral, J. (eds.). *A morte no Portugal contemporâneo: aproximações sociológicas, literárias e históricas*. Lisboa, Editorial Quercus: 65–87.
- Pires, A.; Antunes-Ferreira, N. 2003. A Ermida de Santo António (Monchique). *Era – Arqueologia*, 5: 37–53.
- Queiroz, F.; Rugg, J. 2003. The development of cemeteries in Portugal c. 1755-c. 1870. *Mortality*, 8(2): 113–128.
- Rebay-Salisbury, K. 2012. Inhumation and cremation: how burial practices are linked to beliefs. In: Sørensen, M.; Rebay-Salisbury, K. (eds.). *Embodied knowledge: historical perspectives on technology and belief*. Oxford, Oxbow Books: 15–26.
- Resende, G. 1596. *Chronica del rey dom loao, o 2º*. Lisboa, Iorge Rodrigues imprimidor de Liuros (com licença da Sancta Inquisição).
- Rosa, M. L. 2010. A morte e o além. In: Mattoso, J.; Sousa, B. (eds.). *História da vida privada em Portugal*. Mem Martins, Círculo de Leitores: 402–417.
- Seabra, A. 2011. Paleobiological study of the Convento of Santa Maria da Consolação. *Estrat Crític – Revista d'Arqueologia*: 490–494.
- Séguy, I.; Signoli, M. 2008. Quand la naissance côtoie la mort: pratiques funéraires et re-

- ligion populaire en France au Moyen Âge et à l'Époque Moderne. In: Gusi, F.; Muriel, S.; Olaria, C. (eds.). *Nasciturus, infans, puerulus vobis mater terra*. Castelló de la Plana, Servicio de Investigaciones Arqueológicas y Prehistóricas, Colección de Prehistoria y Arqueologia: 497–512.
- Silva, A. M.; Imperial, F. 2019. A necrópole da Igreja de Santa Maria de Alcáçova do Castelo de Montemor-o-Velho. Os enterramentos de não adultos. In: *Actas do colóquio práticas funerárias e atitudes perante a morte na região centro: da pré-história ao presente*. Arqueologia, História, Arte e Antropologia. Câmara Municipal de Alvaiázere: 59–66.
- Stutz, L.; Tarlow, S. 2013. Beautiful things and bones of desire: emerging issues in the archaeology of death and burial. In: Tarlow, S.; Stutz, L. (eds.). *The Oxford handbook of the archaeology of death and burial*. Oxford, Oxford University Press: 1–14.
- Tardieu, J. 1993. La dernière demeure: archéologie du cimetière et des modes de inhumation. In: Alexandre-Bidon, D.; Treffort, C. (eds.). *A réveiller les morts: le mort au quotidien dans l'occident Médiéval*. Lyon, Press Universitaires de Lyon: 223–244.
- Thevenet, C.; Rivoal, I.; Sellier, P.; Valentin, F. 2014. Introduction. In: Valentin, F.; Rivoal, I.; Thevenet, C.; Sellier, P. (eds.). *La chaîne opératoire funéraire: ethnologie et archéologie de la mort*. Paris, De Boccard: 1–11.
- Tillier, A.; Duday, H. 1990. Les enfants morts en période périnatale. *Bulletins et Mémoires de La Société d'Anthropologie de Paris*, 2(3): 89–98.
- Tillier, A.; Le Mort, F.; Duday, H. 2014. Archaeo-
thanatology and funeral archaeology, application to the study of primary single burials. *Anthropologie*, 52(3): 235–246.
- Tsaliki, A. 2008. Unusual burials and necrophobia: an insight into the burial archaeology of fear. In: Murphy, E. (ed.). *Deviant burial in the archaeological record*. Oxford, Oxbow Books: 1–16.
- Tzortzis, S.; Séguy, I. 2008. Pratiques funéraires en lien avec les décès des nouveaux nés. *Socio-Anthropologie*, 22: 75–92.
- Van Gennep, A. 1981. *Les rites de passage: études systématique des rites*. Paris, Éditions A. et J. Picard.
- Vovelle, M. 1983. *La mort et l'occident: de 1300 à nos jours*. Paris, Gallimard.
- Weiss-Krejci, E. 2011. The formation of mortuary deposits: implications for understanding mortuary behaviour of past populations. In: Agarwal, S.; Glencross, B. (eds.). *Social bioarchaeology*. Chichester, Wiley-Blackwell: 68–106.
- Xavier, P. 2001. *A morte: símbolos e alegorias*. Lisboa, Livros Horizonte.
- Zuzarte, J. 2020. *As crianças do centro-norte de Portugal nos finais do século XVIII: estudo paleobiológico e tafonómico dos indivíduos não adultos provenientes da escavação da Igreja de Travanca (Aveiro)*. Dissertação de Mestrado em Evolução e Biologia Humanas, Departamento de Ciências da Vida, Faculdade de Ciências e Tecnologia, Universidade de Coimbra.

A (not so) brief historical overview of porous skeletal lesions (PSLs)

Uma (não tão) breve contextualização histórica das lesões esqueléticas porosas (LEPs)



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Abstract Porous skeletal lesions (PSLs) — cribra cranii, cribra orbitalia, cribra humeralis, and cribra femoralis — are well-known skeletal alterations that have been described in paleopathology and bioarchaeology for more than two centuries. This paper offers a comprehensive historical synthesis of how their study — initially centered on cranial forms — expanded conceptually, methodologically, and anatomically. From early racial classifications of cranial cribra in the 19th century to the consolidation of the anemic models (genetic and iron-deficiency anemia) in the mid-20th century, and their subsequent re-evaluation under broader biosocial and stress frameworks, PSLs research has mirrored the wider evolution of paleopathology. The early 21st century brought the recognition of postcranial cribra, diversifying etiological interpretations and promoting a more integrated understanding of physiological,

Resumo As lesões esqueléticas porosas (LEPs) — cribra cranii, cribra orbitalia, cribra humeralis e cribra femoralis — são alterações ósseas amplamente conhecidas em paleopatologia e bioarqueologia, descritas há mais de dois séculos. Este artigo apresenta uma síntese histórica sobre como o seu estudo — inicialmente centrado nas manifestações cranianas — se expandiu conceptual, metodológica e anatomicamente. Desde as primeiras classificações raciais da cribra craniana no século XIX até à consolidação dos modelos anémicos (genéticos e de deficiência de ferro) em meados do século XX, passando pela sua posterior reavaliação sob perspetivas biosociais e de stresse, a investigação sobre LEPs reflete a evolução da própria paleopatologia. O século XXI trouxe o reconhecimento das cribra pós-cranianas, diversificando as interpretações e promovendo uma integra-

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environmental, and biocultural factors. Moreover, the recent application of imaging and elemental analyses has reshaped interpretations, emphasizing multifactorial and context-dependent mechanisms that include infection and inflammation. By tracing these transformations, this overview highlights how shifting scientific paradigms, technological innovation, and biocultural thinking continue to redefine the interpretation of PSLs. Rather than fixed diagnostic entities, they emerge as contextual expressions of physiology, environment, and adaptation, illustrating how paleopathology contributes to a deeper understanding of disease and human variability in the past.

Keywords: *Cribra cranii*; *cribra orbitalia*; *cribra humeralis*; *cribra femoralis*; paleopathology.

ção entre fatores fisiológicos, ambientais e bioculturais. Além disso, a aplicação recente de técnicas imagiológicas e de análises elementares reformulou as interpretações, destacando mecanismos multifatoriais, com novas associações a infeções e inflamação. Ao acompanhar estas transformações, esta revisão evidencia como os paradigmas científicos, a inovação tecnológica e o pensamento biocultural continuam a redefinir a interpretação das LEPs, ilustrando como a paleopatologia contribui para uma melhor compreensão da doença e da variabilidade humana no passado.

Palavras-chave: *Cribra cranii*; *cribra orbitalia*; *cribra humeralis*; *cribra femoralis*; paleopatologia.

1. Introduction

Porous skeletal lesions (PSLs) are well-known skeletal alterations, frequently recorded in bioarcheological studies. Commonly, they are also referred to as *cribra* and their designation varies according to the affected skeletal region: *cribra cranii* (Figure 1, example A; cranial vault, including the frontal, parietal, and occipital bones), *cribra orbitalia* (Figure 1, example B; orbital roof), *cribra humeralis* (Figure 1, example C; anatomical neck of the humerus, above the physeal line), and *cribra femoralis* (Figure 1, example D; femoral neck). In this study, the term PSLs — adapted from the concept of porous cranial lesions (PCLs) proposed by O'Donnell et al. (2020) — is used to en-

compass these four lesions as a descriptive category, rather than as evidence of a single cause or biological process. Although the expression PSLs had already appeared in Stark (2014) and Smith-Guzmán (2015), it was not employed specifically to designate *cribra*. Furthermore, in some cases, the word *cribra* will also be used to refer collectively to all four types.

The nomenclature of these lesions has remained almost unchanged since their first descriptions. A few variations exist, particularly for the postcranial lesion — *cribra humeri(s)*, *cribra femora*, and *cribra femori(s)* being among the most common. It should be mentioned that a few texts also refer to a *cribra fibularis* (e.g., Erkelens, 2017; Jasch-Boley and

Wahl, 2022); however, it will not be considered here. Perhaps the main exception is *cribra cranii*. A significant number of studies refer to porous lesions in the cranial vault as porotic hyperostosis. Yet the term *cribra cranii* was preferred in this work for two main reasons: 1) to ensure terminological consistency; and 2) because porotic hyperostosis may imply marrow expansion as the mechanism of lesion formation, which is unlikely to account for all the porosity observed in this region (Brickley et al., 2020).

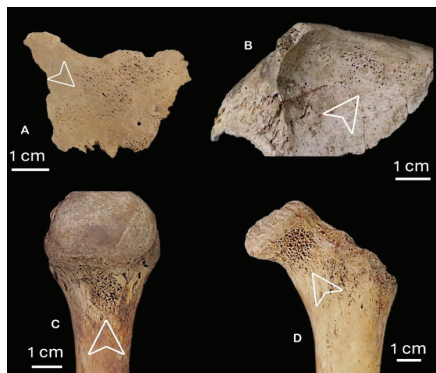


Figure 1. Examples of A - cribra cranii in a 2-year-old individual; B - cribra orbitalia in a 2 to 4-year-old individual; C - cribra humeralis in an 18-year-old female; D - cribra femoralis in an 11-year-old female.

The mechanisms underlying the formation and expression of PSLs remain debated, and nearly 200 years after their first descriptions, no consensus has been reached, as evidenced by recent analyses of current methodological and theoretical trends (Brickley, 2024). This paper therefore aims to contextualize the historical development of PSLs research,

elucidating how shifts in scientific and methodological paradigms have shaped its interpretation. By tracing the historical roots of PSLs research, it highlights conceptual and interpretative transitions that have influenced current understanding and continue to inform future directions in PSLs studies.

2. Early research on cranial cribra (mid-19th century to 1960s)

During the 19th century biological (formerly physical) anthropologists were particularly focused on the study of the human skull, predominantly from adult males (Little and Buikstra, 2023), so it is not strange that porosities draw the attention of scholars. For example, Hodgson and Owen (1859: 100) based on the observation of human skulls from Nepal noted that “[...] one shows the hypertrophy of the cranial vault to a great degree, with much density of the thickened bone.” A few years later, Rudolf Virchow (1874: 61–62) established a thorough description of porous lesions in two skulls from the Chilean Patagonia and Argentinian Pampa, acknowledging “a peculiar, flat, porous osteophyte formation on the surface of both orbital roofs, as well as several semicircular protrusions, one of which is located on the left parietal.”

It was not until 1885 that Hermann Welcker (1885) coined the term *cribra orbitalia* during the observation of skulls from the Socotra Island (Yemen). The author stated that: “the orbital process of the frontal bone facing the eye socket has

fine fissures and depressions forming an elliptical area up to 3 cm in length. Since these depressions communicate with the diploë, the surface of the bone often presents a very delicate network, from whose meshes small bone spicules and ridges frequently protrude. This formation, which I refer to as *cribra orbitalia*, occurs in different races." (Welcker, 1885: 93).

In this initial work, little attention was given to the possible etiologies of the lesion, and *cribra orbitalia* was interpreted as a distinguishing trait of South American populations. Later, Welcker (1887) introduced the first classification of *cribra orbitalia* into three severity degrees. He noted its characteristic thickening, similar to changes observed in the parietal bones, and its usual symmetry between the orbits. While initially describing *cribra orbitalia* as a non-pathological phenomenon, possibly linked to vascularization, Welcker later proposed that it might represent a pathological condition, most likely associated with osteoporosis.

Toldt (1886) was probably the first to portray an association between *cribra orbitalia* and age at death, suggesting higher frequencies in children. This author considers other potential etiologies, such as syphilis, lacrimal gland disease, local new bone formation in juveniles, or predisposition to present higher vascularization. Moreover, based on the observations of Peruvian skulls, he proposed that alterations with symmetrical osteophyte formations could be attributed to artificial modification of the skull.

The subsequent investigation of Adachi (1904a, b) consolidates the similarity between the orbital lesions and those found in the parietals, leading him to propose the term "*cribra parietallia*." Also, the author rejected the idea that cranial modification was responsible for these alterations, since he noted their presence also in non-modified skulls.

Subsequent studies focused primarily on describing the lesions (Le Double, 1906) and assessing their frequency in skulls from different regions (Oettking, 1909), reflecting the prevailing view that *cribra* "might potentially serve as an ethnological diagnostic feature" (Ahrens, 1904 in Bartels, 1905).

The publication of Koganei (1913) must be emphasized since he was the first to use the term *cribra cranii* to describe a "roughness not only on the frontal bone but also on the inner surfaces of other bones [...] which had a strong similarity to the *cribra orbitalia* first described by Welcker, and that these two conditions might be classified under the same category." (Koganei, 1913: 113).

Aleš Hrdlička published in 1914 a study of human skeletal remains from ancient Peru, describing symmetric cranial changes confined to the outer surface. Often beginning on the orbital roofs, these alterations involved increased vascularization and porous tissue deposition, which he termed "symmetric osteoporosis." Although differently named, his descriptions and photographs align with what had been identified as *cribra*

orbitalia and cribra cranii. Without citing earlier works, he observed that the condition was most frequent in infancy and early childhood, distinguished between active and healed lesions and suggesting a systemic disorder — likely toxic rather than nutritional or degenerative — as a possible cause.

A few years later, the works of Moore (1929) and Williams (1929) were pivotal in shaping cribra etiological interpretations, many of which continue to influence current research. Williams (1929) prefers the term “symmetric osteoporosis” but clearly equates it with cribra cranii and cribra orbitalia. He observed that, although anthropologists were familiar with the condition, it remained little known among pathologists. Noting its higher prevalence in infants and children, and its presence also in non-human primates, he proposed several possible etiologies, including endocrine disorders, disturbances in calcium metabolism, vitamin deficiencies (C and D), and other dietary factors. Additionally, Williams (1929) stated morphological similarities between cribra and those alterations described by Cooley et al. (1927) in their roentgenologic studies of anemic children’s skulls. Moore (1929) extended this argument by reporting similarities between bone changes in radiographs of individuals with sickle cell anemia and those in ancient Mayan skulls with cribra. The author suggested that sickle cell anemia, or a related condition, might account for the lesions, further speculating that the downfall of the

Maya was tied to widespread malarial infection. This was the first explicit connection between cribra, anemia, and malaria, setting an important precedent for subsequent research.

In his doctoral thesis, Pales (1929) reviewed thoroughly the literature on cranial cribra, detailing macroscopic, radiologic, and histologic evidence. Referring to it as cranial osteoporosis, he suggested vascular-mechanical disturbances — possibly linked to cranial modification or localized pressure — as its underlying cause.

After a period of continuous growth in cribra research, the number of publications declined markedly. Yet, in 1955, Hamperl and Weiss revisited the state of the knowledge, still drawing heavily from the works of Hrdlička (1914) and Williams (1929). Their publication focused on detailed lesion descriptions and a systematic review, ultimately proposing “hyperostosis spongiosa cranii” as the most appropriate designation for these porous alterations. The work of Møller-Christensen (1953), even if previous to Hamperl and Weiss (1955), marked a new precedent by associating cribra orbitalia — referred to here as “usura orbitae” — with leprosy. It is also worth noting that in a subsequent investigation, Møller-Christensen and Sandison (1963: 181) were perhaps the first to dismiss the potential of cribra as an “ethnic index” and unequivocally recognized its pathological nature, even though their etiology “is at present obscure.”

The 1960s ushered in a renewed perspective on cribra, gradually abandoning

its interpretation as specific racial traits and consolidating its recognition as a pathological condition. For example, Henschen (1961), after examining skulls from two medieval cemeteries from Denmark, observed that despite similarities between the individuals, the rates of cribra were markedly different. He posited that the lesions were more accurately understood as a pathological response, likely associated with nutritional deficiencies and chronic infections, reflecting a generalized poor state of health. Around the same time, the presence of cribra orbitalia was also documented in apes and monkeys (Nathan and Haas, 1966), reinforcing its recognition as a pathological phenomenon and opening possibilities for experimental approaches to its etiology.

3. Exploring the links between cranial cribra, anemia, and nutritional deficiencies (1960s to 1990s)

Angel (1964a; 1966) research was pioneering by offering a robust physiological and population-based argument linking cribra to genetic anemia, particularly thalassemia. While Moore (1929) and Williams (1929) had previously suggested this connection, they did not delve into the underlying mechanisms behind the lesion formation. Angel (1964a; 1966), on the other hand, identified high frequencies of cranial cribra in Mediterranean populations (Cyprus, Greece, Macedonia, Morocco, Turkey), many of whom inhabited swampy environments where *Anopheles* mosquitoes carrying the *Plasmodium*

were common. He noted that the distribution of cribra overlapped with malaria-endemic regions and with the occurrence of thalassemia in related modern populations, proposing these conditions as the most plausible causes. This hypothesis was further associated with physiological evidence. The diploë thickening, observed in individuals with porosity in the skull, likely reflected increased red cell production and hypertrophy of the red marrow — processes that hindered normal bone remodeling, leading to porous lesion formation (Angel, 1966). On this basis, the term “porotic hyperostosis” was proposed to describe porous lesions in both the cranial vault and orbits.

It should be mentioned that Angel (1966; 1967) recognized that cribra had a much broader distribution than thalassemia and sickle-cell anemia, suggesting also that lesions in skeletons from America were an effect of iron deficiency with prolonged lactation, severely restricted childhood diets, severe dysentery, or even production of abnormal hemoglobin in response to parasites, other than the plasmodium.

Hengen (1971), noting high frequencies of cribra in non-adults from equatorial regions, argued that poor iron intake combined with heavy parasitic load could synergistically contribute to iron deficiency anemia (IDA) and marrow expansion. He emphasized diploë hyperactivity as the key mechanism, thereby excluding vitamin deficiencies, scurvy, and systemic toxic disorders as primary causes. This ar-

gument was further supported in a study of Nubian skulls, where the presence of cribra orbitalia was interpreted as a result of IDA, potentially arising from high rates of parasitic infection, poor iron intake, frequent weanling diarrhea, and multiparity (Carlson et al., 1974). The focus seems to have shifted to IDA as a possible cause of cribra and the factors behind its development, in this case a synergistic interaction between diet and infectious diseases (e.g., Köhegyi and Marcsik, 1976; Cybulski, 1977; Mensforth et al., 1978).

Lallo et al. (1977) examining non-adult skeletons from Illinois and Ohio, proposed that cribra orbitalia was the initial osseous expression of porotic hyperostosis. This author argued that iron deficiency arose not only from infections but also from growth demands and a maize-based diet. Maize is not only low in iron, but it also prevents its absorption (Keigler et al., 2023). Consequently, it is not surprising that higher frequencies of cribra were found among canyon-bottom inhabitants in Arizona, whose diet relied heavily on maize, compared to the sage plain people in New Mexico, who consumed more iron-rich animal products (El-Najjar et al., 1975; 1976). This model gained popularity mainly due to its interpretative simplicity. In the book *Paleopathology at the origins of agriculture* (Cohen and Armelagos, 1984), several chapters mentioned this association. For example, Goodman et al. (1984: 297) state that cribra is the result of “increased adoption of a maize diet, especially among weanlings, as a

cause of poor nutrition and an increase in nutrition-related stress indicators.” However, the maize-dependent diet hypothesis was contested by Walker (1986). The author found that cribra in crania from a fish-dependent population of the Channel Islands (California), despite a protein- and iron-rich diet, was as frequent as among maize-dependent agriculturalists. This led him to suggest that high nutrient losses associated with diarrheal disease linked to parasite infections were more significant in the etiology of cribra than a low dietary intake of essential nutrients.

The notion that cribra was an indicator of nutritional impairment was even more widely disseminated than the maize hypothesis. One possible explanation is that although the maize-based hypothesis could easily explain the anemic origin, as Walker (1986) rightly points out, it would not fit in all contexts. Buikstra and Cook (1980: 449) noted that “samples with high frequencies of these defects [dental] also show other stress indicators, such as Harris Lines, meningeal reaction, cribra orbitalia, periostitis and early mortality.” This idea was also reiterated in several other works (e.g., Huss-Ashmore et al., 1982; Hummert and van Gerven, 1983; Moore et al., 1986; Hodges, 1987; Jerszynska, 1988), emphasizing its widespread recognition within the field.

The connection between IDA and cribra persisted, partially due to the seminal works of Stuart-Macadam. Revisiting various publications, this author provides compelling evidence that IDA causes cri-

bra. In her analysis of juvenile skulls from the Romano-British site at Poundbury Camp, she noted that in children, where red marrow is prevalent, increased production of RBCs (erythroid marrow hyperplasia) puts pressure on the skeletal system (Stuart-Macadam, 1985). Children's bones, more susceptible to changes, react with marrow expansion and bone erosion. Conversely, in adults, marrow expansion can occur without using all marrow space, suggesting that lesions likely reflect anemia experienced in childhood.

Stuart-Macadam (1987a) research integrates evidence from multiple disciplines to strengthen the IDA theory. From an anthropological angle, lesions on skulls resemble clinical symptoms of anemia, marked by thick, porous appearances, particularly in the frontal and parietal bones. These observations are corroborated by histological analyses revealing enlarged marrow spaces and thinned outer bone tables, indicative of marrow hyperplasia. Moreover, Stuart-Macadam (1987b) confirmed earlier radiological observations of the "hair-on-end" pattern, a feature common in genetic hemolytic anemias but also seen in other conditions. She also described subtler features such as changes in bone texture, diploic and orbital thickening, and sinus alterations, which resemble those observed in anemic patients and individuals with cribra (Sebes and Diggs, 1979; Poncet and Resnick, 1984). The study also incorporates demographic data, highlighting the wide variability in anemia prevalence,

with IDA notably affecting a large portion of the global population.

While the term porotic hyperostosis was widely used to describe orbital and cranial vault porosity, later studies questioned whether both reflect the same physiological process. Still, Stuart-Macadam (1989), drawing on earlier evidence and their similarities, argued for a common etiology.

The foundations were then consolidated, and from that point onward, several studies considered IDA as the most plausible cause of cribra (e.g., Guidotti, 1984; Goodman et al., 1988). Nevertheless, the work of Stuart-Macadam did not cease here, and she proposed a new perspective for the interpretation of cribra (Stuart-Macadam, 1991; 1992; Kent et al., 1994). She brought back the association between IDA and infections by highlighting the adaptability of iron metabolism when compared to the role of diet in developing IDA. Based on recent clinical data, at that time (Kent, 1986), she argues that hypoferremia is an adaptive response to disease and microbial invasion. In environments with high pathogen loads, individuals become hypoferremic to defend against pathogens, increasing the risk of IDA. Thus, "porotic hyperostosis" is no longer viewed merely as a nutritional stress indicator but as a sign of a population's adaptation to its pathogen load. To some extent, Mensforth (1991) reflects part of this perspective. Based on the observation of crania from Ottawa County, Ohio (850 to 1250

CE), the author suggests that dietary inadequacy and parasitism played a minor role in the etiology of cribra. Alternatively, local environmental circumstances associated with housing and resource exploitation may have played a fundamental role in elevating infectious disease loads, resulting in a greater prevalence of IDA.

Interestingly enough, this proposal did not gain as much attention as the previous argument, probably not only because it would imply a more complex scenario but also because it was rather deterministic. Goodman (1994) mentions that focusing only on one factor, either diet or parasitism, is simplistic and may imply a narrow view of adaptation. The author suggests that porous lesions are a sign of nutritional deficiency, from a variety of systemic consequences. Holland and O'Brien (1997: 191) echo this argument, mentioning that probably, there is not a major factor behind cribra expression; instead, there is "a multitude of more-or-less equally important, and interdependent, factors. It is this interdependency that all too often falls victim to the seductive lure of a simple just-so model." Approximately at the same time, Wapler and Schultz (1996) published an important study where they analyzed histologically ten samples of cranial cribra. The results of the microscopic analysis showed trabecular enlargement that was not only compatible with anemia but also with inflammation and postmortem erosion, emphasizing flaws in the IDA model.

4. Shifting perspectives: IDA challenged and the consolidation of the stress models (2000s to mid-2010s)

In the new millennium, the discussion on cribra's etiology was defined by a back and forth regarding the IDA hypothesis, yet some other possible etiological models have also been proposed. The works of Polo-Cerdá et al. (1999; 2000b) brought an interesting insight, since this is the only experimental study done so far. The authors induced IDA in Wistar rats ($n = 29$) through bloodletting and nutritional impairment (early weaning and magnesium deficiency). Both the autopsy and the CT scans results show porous lesions on the orbital roof, consistent with those described in humans.

Despite the significance of these results, this study did not particularly resonate within the scientific community, and more arguments that challenged the IDA hypothesis emerged. For example, Rothschild (2000) finds the association between iron deficiency and hyperplastic marrow problematic, as inadequate iron for blood cell production would result in hypo-regenerative marrow. The author proposes to explore the presence of genetic hemolytic anemias, hemoglobinopathies, parasitic infestations, and nutritional data. Additionally, histological analysis of cribra orbitalia in adult individuals from Sudan (2nd – 6th centuries CE) shows that, even if frequent (43.5%, 20/333), anemia was not the only cause of these lesions (Wapler et al., 2004). This author identified other conditions, such

as inflammation (29.4%, 25/85) and hypervascularization (5.9%, 5/85), together with postmortem alterations (20%, 17/85), even in well-preserved bones.

Already critical of some views regarding the etiology of cranial cribra (Walker, 1986), it was not until 2009 that Walker and co-authors published a vital work that refuted, theoretically and empirically, the IDA hypothesis. The authors critically assessed the potential of IDA to induce marrow hyperplasia and propose a biosocial mechanism that considers environmental instability as a result of: 1) populational growth with higher food demands filled by a plant-based diet (lack of vitamin B12 and folate); 2) cultural changes that affect the health condition of mothers whose milk does not suffice nutritional requirements of their children; and 3) climatic changes that conduct to less salubrious living conditions (e.g., poor sanitation and water contamination) resulting in infections and nutrient losses. These authors propose different mechanisms for cribra expression, marrow hypertrophy due to megaloblastic anemia (MA) would lead to cribra cranii, and orbital roof hematomas from vitamin C deficiency producing cribra orbitalia. Despite different processes, both were seen as outcomes of systemic homeostasis disruption. This synergy points to a more realistic scenario, considering the complexity of the human body (Walker et al. 2009).

Shortly after, this argument was contested, particularly regarding the in-

ability of IDA to cause marrow hyperplasia (Oxenham and Cavill, 2010). To these authors, IDA with heightened erythropoietic activity should be included in the differential diagnosis. Conversely, Rothschild (2012) commends the work of Walker et al. (2009) for recognizing and correcting the misconceptions about the nutritional implications traditionally linked to PCLs. This author calls for a disciplinary shift from disproven dietary explanations toward more plausible causes — genetic hemolytic anemias, hemoglobinopathies, and parasitic infections — that may offer deeper insights into the health of past populations.

In a more empirical study, the bone microarchitecture of seven non-adult individuals with cribra orbitalia was evaluated by peripheral quantitative computed tomography (HR-pQCT; Saint-Martin et al., 2015). The authors found that porosity in the orbital roof could be associated with inflammation or even taphonomy, moving away from an anemic origin. The debate is, however, far from being over. McIlvaine (2015) argues that, although the IDA hypothesis may not fully explain cribra, dismissing it risks underestimating the complexity of past health. The author notes that severe nutritional stress, such as iron deficiency, may not always produce cribra, making affected individuals appear healthy. This could bias assessments of past health, mask multiple deficiencies, and require reinterpreting earlier studies. These ongoing discussions over the IDA model continue to shape cribra's research, leading to no definitive consensus.

In parallel with IDA discussions several researchers have interpreted cribra as a “nonspecific indicator of stress”, largely due to insufficient evidence linking it to a specific etiology. The concept of stress emerged from Hans Selye’s works on the body’s responses to endogenous and exogenous factors. He first described a syndrome caused by harmful agents (Selye, 1936), which he later named stress (Selye, 1950). In osteology, Armelagos (1969) operationalized stress as an “index of biological response” influenced by cultural variations. Goodman et al. (1988) further explored how stress could be inferred from skeletal remains, demographic data, and contemporary health indicators, emphasizing the role of sociopolitical and environmental factors. Through studies of Nubian and Dickson Mounds (USA) populations, they distinguished between specific skeletal indicators of stress — such as the ones found for tuberculosis or syphilis — from nonspecific ones like Harris lines, enamel hypoplasia, periosteal reactions, and PCLs. This work set a precedent for using nonspecific indicators as proxies to estimate past health. Consequently, paleopathological interpretations often rely on these markers to provide insights into episodes of disease, infections, nutritional deficiencies, and other health challenges (Kyle et al., 2018; Buikstra, 2019).

It should be recognized that the conceptualization of stress in bioarcheology is dynamic. Hillson (2014) noted the often-ambiguous use of the concept, highlighting the need for consensus. Recently,

Edinburgh and Rando (2020) emphasized the importance of transparency in understanding the relationship between “nonspecific stress indicators”, environmental factors, and human behavior, advocating for precise language. In a study of more than 3,000 skeletons from pre- and post-contact central California (3050 BCE–1899 CE), traditional stress markers such as periosteal reactions and cribra were re-evaluated (Pilloud and Schwitalla, 2020). The authors highlighted methodological and theoretical challenges, arguing that lesions cannot be directly linked to external stressors. Instead, they advocated for interpretations grounded in clinical literature, regionally appropriate contexts, and the integration of archeological and climatic data. Due to the uncertainty around PSLs etiology, broader bioarcheological investigations often drew a straightforward association between PSLs and stress. This line of thought was followed through the years and is still present in some studies (e.g., Kyle et al., 2020; Laffranchi et al., 2021; Wiesinger and Kirchengast, 2021).

5. The postcranial cribra and emerging directions in PSLs research

So far, the studies presented considered solely PCLs. The historical context for porosity on the necks of humeri and femora is harder to trace. Although the postcranial skeleton’s involvement in anemia has long been known (Almklov et al., 1950), to the author’s knowledge, the association of postcranial porosity

with *cribra cranii* and *orbitalia* is more recent. Interestingly, Angel (1964b) describes bone reactions in the femoral neck and recognized this region as a “sensitive reaction area.” He highlighted changes like Poirier’s facet — extra joint surface near the femoral head rim — and Allen’s fossa — removed cortical bone revealing thickened trabeculae with a raised border. Finnegan and Faust (1974) later described these as normal variations. Although Angel (1964b) acknowledged the “cribriform” appearance of this area, characterized by atrophy and inflammation, he never directly connected it with porotic hyperostosis.

One of the first uses of the term *cribra femoris* was found in the research of Saunders et al. (1980). The authors briefly mention the appearance of this lesion in skeletons from St. Helen’s Church (England) and state that “*cribra femoris* may indicate calcium deficiency or iron-deficiency anaemia.” (Saunders et al., 1980: 109). This small reference seems to indicate that the term was used before, yet even after extensive bibliographic research, it was not possible to identify the source. A similar case was found in the work of Conheeney (1990), but the preferred terminology was *cribra femoralis*. It was just mentioned as being present together with *cribra orbitalia* in individuals from Southern Etruria (Italy), and no further inferences were made.

The literature seems to be even scarcer when it comes to the first description of *cribra humeralis*. The excep-

tion appears to be that, when studying the frequencies of *cribra orbitalia* in indigenous people from Hawaii and Australia, Zaino and Zaino (1975: 92) report “in one [individual] sieving was also present in the proximal portion of the humerus.” Nevertheless, the lesion did not receive any specific designation.

One of the key contributions to recognizing porosity of the humeral and femoral neck as *cribra* came from the work of Miquel-Feucht et al. (1999). Steaming from the analysis of 170 non-adult individuals from Spain, the authors define the existence of *cribra femoral* “as a bone alteration on the anterior and internal surface of the femoral neck, characterized by the presence of numerous small holes, identical to those of *cribra orbitalia*” (Miquel-Feucht et al., 1999: 5). They recognize likewise an associated “similar cribrous lesion at the humeral level, symmetrically shaped, and located on the anterior and internal surface immediately below the humeral head (anatomically the same area as the femoral neck)” to which they called *cribra humeral* (Miquel-Feucht et al., 1999: 9). Additionally, alongside macroscopic study, the lesions were examined through radiology, CT, and histology. Their similarities to *cribra orbitalia* led the authors to propose a “cribrous syndrome” defined by “the presence in subadult subjects of *cribra orbitalia*, symmetrical *cribra femoralis* in hyperplatymeric or platymeric femurs, and (variable) *cribra humeralis*,” with a shared etiology related to magnesium deficiency (Miquel-Feucht et al., 1999: 13).

Despite the conclusions presented in this study, few subsequent analyses addressed postcranial cribra (e.g., Polo-Cerdá et al., 2000a; Capasso, 2001; García et al., 2002; Zaragoza et al., 2005). As a matter of fact, these lesions were largely overlooked in paleopathological literature for quite some time, likely due to the language barrier, as most of these works were written in Spanish, and possibly also due to the similarity with normal porosity in early developmental stages. One exception is the study of Djurić et al. (2008) that evaluated the presence of the four cribra in 327 medieval non-adult skeletons (under 14 years old) from Serbia, finding that 33.3% (5/15) of individuals with all three bones preserved exhibited the four types of cribra. A similar pattern was observed among older individuals (11-15 years) in a subsequent study (Djurić et al., 2010). The authors suggested that both cranial and postcranial cribra in these populations may be linked to parasitic infections, leading to anemia and nutrient malabsorption.

One of the main contributions of the inclusion of the postcranial cribra in the etiological studies of PSLs came from the research of Smith-Guzmán (2015). The author revisited the Angel's (1964a; 1966) hypothesis — genetic hemolytic anemias may lead to cribra formation in association with malaria infection. By analyzing documented individuals from Uganda ($n = 98$), where malaria is endemic, and comparing them with those from the USA ($n = 106$), the author found higher frequencies of cribra orbitalia,

cribra humeralis, cribra femoralis, new bone growth, and spinal porosity in the Ugandan sample, particularly among individuals with an anemic/malaria cause of death. Cribra humeralis and femoralis correlated strongly with anemia and appeared mainly in younger individuals, whereas cribra orbitalia showed no such correlation, suggesting a possible distinct etiology. The discussion also highlighted the challenges of differential diagnosis, emphasizing the importance of carefully considering co-infections.

Studies on postcranial cribra have been increasing in recent years. In Medieval Spain ($n = 129$), Mangas-Carrasco and López-Costas (2021) found high frequencies of cribra orbitalia (78%) and cribra femoralis (70%), with more active lesions in non-adults. Importantly, 65% of cases showed co-occurrence, suggesting a shared etiology. Schats (2021), analyzing 232 individuals from the Netherlands, also reported high rates of femoralis (38.8%) and orbitalia (26.7%), especially in non-adults, but simultaneous lesions were rare, challenging the “cribrous syndrome” hypothesis. Data from Portugal, both in identified collections ($n = 56$; Gomes et al., 2022) and archeological samples ($n = 96$; Gomes et al., 2025), likewise neither confirm nor exclude the existence of the so-called “cribrous syndrome.” Nevertheless, it is possible to state that cribra humeralis seem differentiate from the other porosities and if there is a “cribrous syndrome” it involves only cribra orbitalia and femoralis, since this is the most frequent combination found.

Despite the growing body of evidence on cribra humeralis and femoralis, research remains disproportionately focused on PCLs. Furthermore, the inclusion of postcranial cribra, rather than settling the etiological debate, has opened the way for new and broader interpretations.

As summarized in Figure 2, this historical overview shows that, despite the renewed attention PSLs have received from the mid-2010s onwards (e.g., Brickley, 2018; 2024; Papathanasiou et al., 2018; McFadden and Oxenham, 2020; Morgan et al., 2025; Wyatt and O'Donnell, 2025), contemporary debates still revisit long-stand-

ing associations with geographic distribution, anemia, parasitism, and diet (e.g., Steyn et al., 2016; Cole and Waldron, 2019). Moreover, even the pathological nature of the lesions remains under discussion, as some researchers argue that they may result from vascular phenomena (Rothschild et al., 2021; 2023; Zdilla et al., 2022).

However, recent analytical advances such as CT scan (Rivera and Lahr, 2017; Anderson et al., 2021; O'Donnell et al., 2023), micro-CT scanning (Morgan et al., 2024), and elemental bone analysis (Gomes et al., 2021; 2025; Kilburn et al., 2021) have refined diagnostic approach-

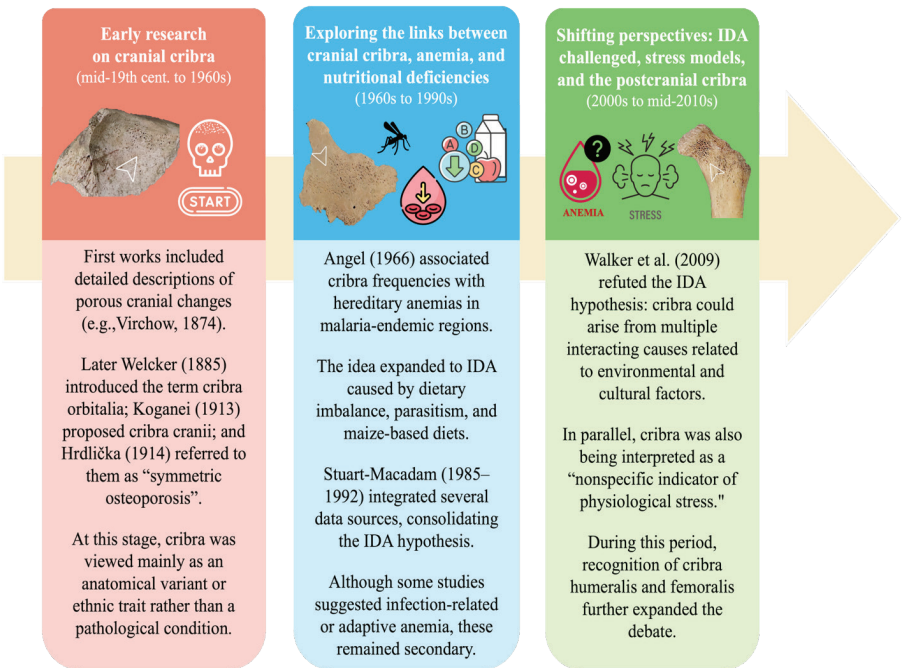


Figure 2. Historical synthesis of research on porous skeletal lesions (PSLs), highlighting the evolution of etiological interpretations of cranial cribra from the 19th century to the early 21st century. The three main phases illustrate the shift from anatomical descriptions to pathological and multifactorial frameworks, culminating in the recognition of postcranial cribra.

es and opened new interpretive possibilities. One good example is the evidence linking *cribra cranii* and *orbitalia* with respiratory infections in forensic (O'Donnell et al., 2020), clinical (Anderson et al., 2025), and identified skeletal collections (Gomes et al., 2022; 2024). These findings expand the discussion beyond nutritional and anemic frameworks, suggesting that inflammatory and infectious processes may also play a significant role in PSLs formation. Taken together, these developments illustrate how PSLs research has moved toward increasingly multifactorial and context-dependent interpretations. Despite this progress, several questions remain open in PSLs research. For instance, although some efforts have been made (e.g., O'Donnell et al., 2023), the minimum age at which PSLs first appear is still largely unexplored. Closer integration with clinical research could provide valuable insights into this issue and further advance the understanding of PSLs.

6. Final comments

Over nearly two centuries, interpretations of PSLs have mirrored the broader evolution of paleopathology itself — from typological and racial readings of cranial morphology to increasingly contextual, biocultural, and multifactorial perspectives. Each phase of this history reflects not only shifts in available evidence and analytical methods but also deeper transformations in how disease, adaptation, and variability are understood within human populations.

The trajectory traced here demonstrates that no single etiological model can account for the diversity of PSLs expression. From the mid-20th century onward, successive frameworks, such as genetic and nutritional anemias, infection and inflammation, and more recently biosocial approaches have captured part of a complex picture. While the IDA model dominated for decades due to its explanatory simplicity, subsequent research revealed a much broader range of contributing factors, from physiological and developmental processes to ecological and social determinants. The recognition of postcranial *cribra* further diversified this discussion, challenging long-standing assumptions that these lesions shared a single origin.

Equally significant is the way PSLs research has been shaped by methodological innovation. Advances in imaging and non-destructive chemical analyses seem to be the key to refine lesions descriptions and to test long-held hypotheses. These techniques allow direct observation of trabecular architecture, marrow space morphology, and elemental composition, bringing new rigor but also revealing the limitations of purely mechanistic explanations. At the same time, comparative and epidemiological studies should also be pursued to integrate environmental, demographic, and socioeconomic dimensions, pointing toward a more holistic understanding of skeletal health.

In this perspective, PSLs emerge not as diagnostic entities but as contextual

indicators — markers through which past health, living conditions, and biological adaptation can be approached. The interpretation of these lesions is a good example of the need to consider the intersections of biology and culture, individual physiology and collective environment, structure and history. Moving forward, PSLs research will benefit from approaches that embrace this complexity, combining standardized recording and imaging with contextual, cross-disciplinary analyses that bridge clinical, archeological, and social data.

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References

- Adachi, B. 1904a. Die Orbita und die hauptmasse des schädels der Japaner und die methode der orbitalmessung. *Zeitschrift für Morphologie und Anthropologie*, 7(3): 379–480.
- Adachi, B. 1904b. Die porosität des schädeldaches. *Zeitschrift für Morphologie und Anthropologie*, 7(2): 373–378.
- Almklov, J. R.; Hansen, A. E.; Schneider, M. 1950. Long bone involvement in sickle cell anemia. *Pediatrics*, 5(2): 204–209. DOI: 10.1542/peds.5.2.204.
- Anderson, A. S.; Blackwell, A.; Sutherland, M. L.; Kraft, T.; Sutherland, J.; Beheim, B.; Cummings, D.; Ghafoor, S.; Hooper, P. L.; Rodriguez, D. E.; Irimia, A.; Gatz, M.; Mack, W.; Rowan, C.; Miyamoto, M.; Buetow, K.; Finch, C.; Wann, L. S.; Allam, A.; Thompson, R. C.; Thomas, G.; Kaplan, H.; Stieglitz, J.; Trumble, B.; Gurven, M. D. 2025. Childhood skeletal lesions common in prehistory are present in living forager-farmers and predict adult markers of immune function. *Science Advances*, 11: eadw369. DOI: 10.1126/sciadv.adw3697.
- Anderson, A. S.; Sutherland, M. L.; O'Donnell, L.; Hill, E. C.; Hunt, D. R.; Blackwell, A. D.; Gurven, M. D. 2021. Do computed tomography findings agree with traditional osteological examination? The case of porous cranial lesions. *International Journal of Paleopathology*, 33: 209–219. DOI: 10.1016/j.ijpp.2021.04.008.

- Angel, J. L. 1967. Porotic hyperostosis or osteoporosis symmetrica. In: Brothwell, D.; Sandison, A.T. (eds.). *Diseases in antiquity*. Springfield, Charles C. Thomas: 378–389.
- Angel, J. L. 1966. Porotic hyperostosis, anemias, malaras, and marshes in the prehistoric eastern mediterranean. *Science*, 153(3737): 760–763. DOI: 10.1126/science.153.3737.760.
- Angel, J. L. 1964a. Osteoporosis: Thalassemia? *American Journal of Physical Anthropology*, 22(3): 369–373. DOI: 10.1002/ajpa.1330220342.
- Angel, J. L. 1964b. The reaction area of the femoral neck. *Clinical Orthopaedics and Related Research*, 32: 130–142. DOI: 10.1097/00003086-196400320-00022.
- Armelagos, G. J. 1969. Disease in ancient Nubia. *Science*, 163(3864): 255–259. DOI: 10.1126/science.163.3864.255.
- Bartels, P. 1905. Eduard Ahrens: Die cribra orbitalia und die spina trochlearis der Göttinger anatomischen Schädelammlung. *Zentralblatt für Anthropologie*, 10(2): 2.
- Brickley, M. B. 2024. Perspectives on anemia: factors confounding understanding of past occurrence. *International Journal of Paleopathology*, 44: 90–104. DOI: 10.1016/j.ijpp.2023.12.001.
- Brickley, M. B. 2018. Cribra orbitalia and porotic hyperostosis: a biological approach to diagnosis. *American Journal of Physical Anthropology*, 167(4): 896–902. DOI: 10.1002/ajpa.23701.
- Brickley, M. B.; Ives, R.; Mays, S. 2020. *The bioarchaeology of metabolic bone disease*. London, Elsevier Ltd.
- Buikstra, J. E. 2019. A brief history and 21st century challenges. In: Buikstra, J. E. (ed.). *Ortner's identification of pathological conditions in human skeletal remains*. London, Elsevier: 11–19.
- Buikstra, J. E.; Cook, D. C. 1980. Paleopathology: an american account. *Annual Review of Anthropology*, 9: 433–470. DOI: 10.1146/annurev.an.09.100180.002245.
- Capasso, L. 2001. *Fuggiaschi di Ercolano: paleobiologia delle vittime dell'eruzione vesuviana del 79 d.C.* Roma, L'Erma di Bretschneider.
- Carlson, D. S.; Armelagos, G. J.; van Gerven, D. P. 1974. Factors influencing the etiology of cribra orbitalia in prehistoric Nubia. *Journal of Human Evolution*, 3(5): 405–410. DOI: 10.1016/0047-2484(74)90203-6.
- Cohen, M. N.; Armelagos, G. J. 1984. *Paleopathology at the origins of agriculture*. Orlando, Academic Press, Inc.
- Cole, G.; Waldron, T. 2019. Cribra orbitalia: dissecting an ill-defined phenomenon. *International Journal of Osteoarchaeology*, 29(4): 613–621. DOI: 10.1002/oa.2757.
- Conheaney, J. 1990. The human bone from the excavation at the Mola di Monte Gelato, southern Etruria: a preliminary report. *Archeologia medievale: Cultura materiale, insediamenti, territorio*, 27: 477–481.
- Cooley, T. B.; Witwer, E. R.; Lee, P. 1927. Anemia in children. *American Journal of Diseases of Children*, 34(3): 347. DOI: 10.1001/archpedi.1927.04130210022002.
- Cybulski, J. S. 1977. Cribra orbitalia, a possible sign of anemia in early historic native populations of the British Columbia coast. *American Journal of Physical Anthropology*, 47(1): 31–39. DOI: 10.1002/ajpa.1330470108.
- Djurić, M.; Janović, A.; Milovanović, P.; Djukić, K.; Milenković, P.; Drašković, M.; Roksandic, M.

2010. Adolescent health in medieval Serbia: signs of infectious diseases and risk of trauma. *HOMO*, 61(2): 130–149. DOI: 10.1016/j.jchb.2010.02.003.
- Djurić, M.; Milovanović, A.; Janović, A.; Drašković, M.; Djukić, K.; Milenković, P. 2008. Porotic lesions in immature skeletons from Stara Torina, late medieval Serbia. *International Journal of Osteoarchaeology*, 18(1): 458–475. DOI: 10.1002/oa.955.
- Edinborough, M.; Rando, C. 2020. Stressed out: reconsidering stress in the study of archaeological human remains. *Journal of Archaeological Science*, 121: 105197. DOI: 10.1016/j.jas.2020.105197.
- El-Najjar, M. Y.; Ryan, D. J.; Turner, C. G.; Lozoff, B. 1976. The etiology of porotic hyperostosis among the prehistoric and historic Anasazi Indians of Southwestern United States. *American Journal of Physical Anthropology*, 44(3): 477–487. DOI: 10.1002/ajpa.1330440311.
- El-Najjar, M. Y.; Lozoff, B.; Ryan, D. 1975. The paleoepidemiology of porotic hyperostosis in the American Southwest: radiological and ecological considerations. *The American Journal of Roentgenology Radiology Therapy and Nuclear Medicine*, 125(4): 918–924. DOI: 10.2214/ajr.125.4.918.
- Erkelens, C. J. 2017. *The question of cribra femora. Examining the cause of cribra femora in a Dutch archaeological and medical skeletal collection*. Master dissertation, Leiden University.
- Finnegan, M.; Faust, M. A. 1974. *Bibliography of human and non-human non-metric variation*. Manhattan, University of Massachusetts.
- García, E.; Berrocal, M. I.; Baxarias, J.; Campillo, D.; Subira, M. E. 2002. Cribra and trace elements in the Prat de la Riba Necropolis (Tarragona, Spain, 3rd–5th centuries AD). *Antropologia Portuguesa*, 19(1): 71–83. DOI: 10.14195/2182-7982_19_7.
- Gomes, R. A. M. P.; Catarino, L.; Santos, A. L. 2025. The role of Fe, S, P, Ca, and Sr in porous skeletal lesions: a study on non-adult individuals using pXRF. *Biological Trace Element Research*, 203(2): 591–607. DOI: 10.1007/s12011-024-04187-4.
- Gomes, R. A. M. P.; Santos, A. L.; Catarino, L. 2024. Using pXRF elemental analysis to explore porous skeletal lesions: interplay of sex, age at death, and cause of death. *American Journal of Biological Anthropology*, 184(4): e24954. DOI: 10.1002/ajpa.24954.
- Gomes, R. A. M. P.; Petit, J.; Dutour, O.; Santos, A. L. 2022. Frequency and co-occurrence of porous skeletal lesions in identified non-adults from Portugal (19th to 20th centuries) and its association with respiratory infections as cause of death. *International Journal of Osteoarchaeology*, 32(5): 1061–1072. DOI: 10.1002/oa.3132.
- Gomes, R. A. M. P.; Catarino, L.; Santos, A. L. 2021. Anemia, cribra cranii and elemental composition using portable X-ray fluorescence: a study in individuals from the Coimbra identified osteological collections. *Journal of Archaeological Science*, 136: 105514. DOI: 10.1016/j.jas.2021.105514.
- Goodman, A. 1994. Cartesian reductionism and vulgar adaptationism: issues in the interpretation of nutritional status in prehistory. In: Sobolik, K. D. (ed.). *Paleonutrition: the diet and health of prehistoric Americans*.

- Carbondale, Center for Archaeological Investigations Occasional Papers: 163–177.
- Goodman, A. H.; Brooke Thomas, R.; Swedlund, A. C.; Armelagos, G. J. 1988. Biocultural perspectives on stress in prehistoric, historical, and contemporary population research. *American Journal of Physical Anthropology*, 31(S9): 169–202. DOI: 10.1002/ajpa.1330310509.
- Goodman, A. H.; Lallo, J.; Armelagos, G. J.; Rose, J. C. 1984. Health changes at Dickson Mounds, Illinois (A.D.950-1300). In: Cohen, M. N.; Armelagos, G. J. (eds.). *Paleopathology at the origins of agriculture*. Orlando, Academic Press, Inc: 271–306.
- Guidotti, A. 1984. Frequencies of cribra orbitalia in central Italy (19th century) under special consideration of their degrees of expression. *Anthropologischer Anzeiger*, 42(1): 11–16.
- Hamperl, V. H.; Weiss, P. 1955. Über die spongiöse hyperostose an schädeln aus Alt-Peru. *Virchows Archiv für pathologische Anatomie und Physiologie und für klinische Medizin*, 327: 629–642.
- Hengen, O. P. 1971. Cribra orbitalia: pathogenesis and probable etiology. *Homo*, 22: 57–76.
- Henschen, F. 1961. Cribra cranii, a skull condition said to be of racial or geographical nature. *Pathobiology*, 24(4): 724–729. DOI: 10.1159/000161189.
- Hillson, S. 2014. *Tooth development in human evolution and bioarchaeology*. Cambridge, Cambridge University Press.
- Hodges, D. C. 1987. Health and agricultural intensification in the prehistoric valley of Oaxaca, Mexico. *American Journal of Physical Anthropology*, 73(3): 323–332. DOI: 10.1002/ajpa.1330730305.
- Hodgson, B. H.; Owen, R. F. S. 1859. *Report on a series of skulls of various tribes of mankind inhabiting Nepal, collected, and presented to the British Museum*. London, British Museum.
- Holland, T. D.; O'Brien, M. J. 1997. Parasites, porotic hyperostosis, and the implications of changing perspectives. *American Antiquity*, 62(2): 183–193. DOI: 10.2307/282505.
- Hrdlička, A. 1914. Anthropological work in Peru in 1913, with notes on the pathology of the ancient Peruvians. *Smithsonian Miscellaneous Collections*, 61(8): 1–69.
- Hummert, J. R.; van Gerven, D. P. 1983. Skeletal growth in a medieval population from Sudanese Nubia. *American Journal of Physical Anthropology*, 60(4): 471–478. DOI: 10.1002/ajpa.1330600409.
- Huss-Ashmore, R.; Goodman, A. H.; Armelagos, G. J. 1982. Nutritional inference from paleopathology. *Advances in Archaeological Method and Theory*, 5: 395–474. DOI: 10.1016/B978-0-12-003105-4.50014-5.
- Jasch-Boley, I. I. F.; Wahl, J. 2022. The physical constitution of Lauchheim “Mittelhofen”'s subadults in the Merovingian period. *Anthropologischer Anzeiger*, 80(4): 481–499. DOI: 10.1127/anthranz/2022/1608.
- Jerszynska, B. 1988. Harris's lines and cribra orbitalia as indicators of stress in prehistoric human populations. *Anthropologie (Brno)*, 26(2): 103–104.
- Keigler, J. I.; Wiesinger, J. A.; Flint-Garcia, S. A.; Glahn, R. P. 2023. Iron bioavailability of maize (*Zea mays* L.) after removing the germ fraction. *Frontiers in Plant Science*, 14: 1114760. DOI: 10.3389/fpls.2023.1114760.
- Kent, S. 1986. The influence of sedentism and aggregation on porotic hyperostosis and

- anaemia: a case study. *Man*, 21(4): 605–636. DOI: 10.2307/2802900.
- Kent, S.; Weinberg, E. D.; Stuart-Macadam, P. 1994. The etiology of the anemia of chronic disease and infection. *Journal of Clinical Epidemiology*, 47(1): 23–33. DOI: 10.1016/0895-4356(94)90030-2.
- Kilburn, N. N.; Gowland, R. L.; Halldórsdóttir, H. H.; Williams, R.; Thompson, T. J. U. 2021. Assessing pathological conditions in archaeological bone using portable X-ray fluorescence (pXRF). *Journal of Archaeological Science: Reports*, 37: 102980. DOI: 10.1016/j.jasrep.2021.102980.
- Koganei, Y. 1913. Cribra cranii und cribra orbitalia. *Mitteilungen aus der Medizinischen Fakultät der Kaiserlichen Universität zu Tokyo*, 10: 113–154.
- Köhegyi, M.; Marcsik, A. 1976. Anatómiai variációk, fejlődési rendellenességek és szelektált patológiás leletek egy avar kori sorozatból. *Orvostörténeti közlemények*, 77(1): 9–25.
- Kyle, B.; Shehi, E.; Koçi, M.; Reitsema, L. J. 2020. Bioarchaeological reconstruction of physiological stress during social transition in Albania. *International Journal of Paleopathology*, 30: 118–129. DOI: 10.1016/j.ijpp.2020.06.003.
- Kyle, B.; Reitsema, L. J.; Tyler, J.; Fabbri, P. F.; Vassallo, S. 2018. Examining the osteological paradox: skeletal stress in mass graves versus civilians at the Greek colony of Himera (Sicily). *American Journal of Physical Anthropology*, 167(1): 161–172. DOI: 10.1002/ajpa.23624.
- Laffranchi, Z.; Beck De Lotto, M. A.; Delpino, C.; Lösch, S.; Milella, M. 2021. Social differentiation and well-being in the Italian Iron Age: exploring the relationship between sex, age, biological stress, and burial complexity among the Picenes of Novilara (8th–7th c. BC). *Archaeological and Anthropological Sciences*, 13(11): 182. DOI: 10.1007/s12520-021-01449-3.
- Lallo, J. W.; Armelagos, G. J.; Mensforth, R. P. 1977. The role of diet, disease, and physiology in the origin of porotic hyperostosis. *Human Biology*, 49(3): 471–83.
- Le Double. 1906. *Traité des variations des os de la face de l'Homme*. Paris, Vigot Frères.
- Little, M. A.; Buikstra, J. E. 2023. Foundation and history of biological anthropology. In: Larsen, C. S. (ed.). *A companion to biological anthropology*. Hoboken, John Wiley & Sons: 14–38.
- Mangas-Carrasco, E.; López-Costas, O. 2021. Porotic hyperostosis, cribra orbitalia, femoralis and humeralis in medieval NW Spain. *Archaeological and Anthropological Sciences*, 13(10): 1–17. DOI: 10.1007/s12520-021-01432-y.
- McFadden, C.; Oxenham, M. F. 2020. A paleoepidemiological approach to the osteological paradox: investigating stress, frailty and resilience through cribra orbitalia. *American Journal of Physical Anthropology*, 173(2): 205–217. DOI: 10.1002/ajpa.24091.
- McIlvaine, B. K. 2015. Implications of reappraising the iron-deficiency anemia hypothesis. *International Journal of Osteoarchaeology*, 25(6): 997–1000. DOI: 10.1002/oa.2383.
- Mensforth, R. P. 1991. Paleoepidemiology of porotic hyperostosis in the Libben and Bt-5 skeletal populations. *Kirtlandia. The Cleveland Museum of Natural History*, 46(1): 1–46. DOI: 10.5281/zenodo.16116762.
- Mensforth, R. P.; Lovejoy, C. O.; Lallo, J. W.; Armelagos, G. J. 1978. Part two: the role

- of constitutional factors, diet, and infectious disease in the etiology of porotic hyperostosis and periosteal reactions in prehistoric infants and children. *Medical Anthropology*, 2(1): 1–59. DOI: 10.1080/01459740.1978.9986939.
- Miquel-Feucht, M. J.; Polo-Cerdá, M.; Villalaín-Blanco, J. D. 1999. Síndrome criboso: cribra femoral vs. cribra orbitalia. In: Sánchez, J. A. (ed.). *Actas del V Congreso Nacional de Paleopatología*. Alcalá la Real, Asociación Española de Paleopatología – Ayuntamiento de Alcalá la Real: 221–237.
- Møller-Christensen, V. 1953. *Ten lepers from Naestved in Denmark: a study of skeletons from a medieval Danish leper hospital*. Copenhagen, Danish Science Press.
- Møller-Christensen, V.; Sandison, A. T. 1963. Usura orbitae (cribra orbitalia) in the collection of crania in the anatomy department of the university of Glasgow. *Pathobiology*, 26(2): 175–183. DOI: 10.1159/000161365.
- Moore, S. 1929. The bone changes in sickle cell anemia with note on similar changes observed in skulls of ancient Mayan Indians. *The Journal of the Missouri State Medical Association*, 26(1): 561–564.
- Moore, P.; Thorp, S.; Gerven, V. 1986. Pattern of dental eruption, skeletal maturation and stress in a medieval population from Sudanese Nubia. *Human Evolution*, 1(4): 325–330. DOI: 10.1007/BF02436706.
- Morgan, B.; Langlois, M.; Schats, R.; van der Merwe, A. E.; Ribot, I.; Waters-Rist, A.; Brickley, M. B. 2025. A framework for anemia differential diagnosis in paleopathology incorporating metric methods. *American Journal of Biological Anthropology*, 188: e70125. DOI: 10.1002/ajpa.70125.
- Morgan, B.; Zeller, M.; Ribot, I.; Brickley, M. B. 2024. Skeletal manifestations of anemia in the sternum in a modern clinical sample: an initial investigation. *Journal of Archaeological Science*, 164: 105942. DOI: 10.1016/j.jas.2024.105942.
- Nathan, H.; Haas, N. 1966. On the presence of cribra orbitalia in apes and monkeys. *American Journal of Physical Anthropology*, 24(3): 351–359. DOI: 10.1002/ajpa.1330240307.
- O'Donnell, L.; Buikstra, J. E.; Hill, E. C.; Anderson, A. S.; O'Donnell, M. J. 2023. Skeletal manifestations of disease experience: length of illness and porous cranial lesion formation in a contemporary juvenile mortality sample. *American Journal of Human Biology*, 35(8): e23896. DOI: 10.1002/AJHB.23896.
- O'Donnell, L.; Hill, E. C.; Anderson, A. S.; Edgar, H. J. H. 2020. Cribra orbitalia and porotic hyperostosis are associated with respiratory infections in a contemporary mortality sample from New Mexico. *American Journal of Physical Anthropology*, 173(4): 721–733. DOI: 10.1002/ajpa.24131.
- Oetteking, B. 1909. Kraniologische studien an Alt Ägyptern. *Archiv für Anthropologie*, 8: 1–90.
- Oxenham, M. F.; Cavill, I. 2010. Porotic hyperostosis and cribra orbitalia: the erythropoietic response to iron-deficiency anaemia. *Anthropological Science*, 118(3): 199–200. DOI: 10.1537/ase.100302.
- Pales, L. 1929. *État actuel de la paléopathologie. Contributions à l'étude de la pathologie comparative*. PhD Thesis, University of Bordeaux.
- Papathanasiou, A.; Meinzer, N. J.; Williams, K. D.; Larsen, C. S. 2018. History of anemia and

- related nutritional deficiencies: evidence from cranial porosities. In: Steckel, R.; Larsen, C. S.; Roberts, C.; Baten, J. (eds.). *The backbone of Europe: health, diet, work and violence over two millennia*. Cambridge, Cambridge University Press: 198–230.
- Pilloud, M. A.; Schwitalla, A. W. 2020. Re-evaluating traditional markers of stress in an archaeological sample from central California. *Journal of Archaeological Science*, 116: 105102. DOI: 10.1016/j.jas.2020.105102.
- Polo-Cerdá, M.; Miquel-Feucht, M.; Villalaín-Blanco, J. D. 2000a. Experimental cribra orbitalia in Wistar rats: an etiopathogenic model of porotic hyperostosis and other porotic phenomena. In: Verghetta, M.; Capasso, L. (eds.) *Proceedings of XIIIth European Meeting of the Paleopathology Association*. Teramo, Edigrafital: 253–259.
- Polo-Cerdá, M.; Miquel-Feucht, M.; Villalaín-Blanco, J. D. 2000b. Dental pathology and diet during the IV millenium BC in Ciudad Real (Spain). *International Journal of Dental Anthropology*, 1: 5–15.
- Polo-Cerdá, M.; Miquel-Feucht, M.; Villalaín-Blanco, J. D. 1999. Un modelo experimental de cribra orbitalia: estudio preliminar. In: Sánchez, J. (ed.). *Actas del V Congreso Nacional de Paleopatología*. Alcalá la Real, Asociación Española de Paleopatología – Ayuntamiento de Alcalá la Real: 1–12.
- Ponec, D. J.; Resnick, D. 1984. On the etiology and pathogenesis of porotic hyperostosis of the skull. *Investigative Radiology*, 19(4): 313–317. DOI: 10.1097/00004424-198407000-00014.
- Rivera, F.; Lahr, M. M. 2017. New evidence suggesting a dissociated etiology for cribra orbitalia and porotic hyperostosis. *American Journal of Physical Anthropology*, 164(1): 76–96. DOI: 10.1002/ajpa.23258.
- Rothschild, B. M. 2012. Extirpation of the mythology that porotic hyperostosis is caused by iron deficiency secondary to dietary shift to maize. *Advances in Anthropology*, 2(3): 157–160. DOI: 10.4236/aa.2012.23018.
- Rothschild, B. M. 2000. Porotic hyperostosis as a manifestation of iron deficiency? *Chungará (Arica)*, 32(1): 85–87. DOI: 10.4067/S0717-73562000000100014.
- Rothschild, B. M.; Surmik, D.; Bertozzo, F. 2023. *Modern paleopathology, the study of diagnostic approach to ancient diseases, their pathology and epidemiology*. Cham, Springer International Publishing.
- Rothschild, B. M.; Zdilla, M. J.; Jellema, L. M.; Lambert, H. W. 2021. Cribra orbitalia is a vascular phenomenon unrelated to marrow hyperplasia or anemia: paradigm shift for cribra orbitalia. *Anatomical Record*, 304(8): 1709–1716. DOI: 10.1002/AR.24561.
- Saint-Martin, P.; Dedouit, F.; Rérolle, C.; Guilbeau-Frugier, C.; Dabernat, H.; Rougé, D.; Telmon, N.; Crubézy, E. 2015. Diagnostic value of high-resolution peripheral quantitative computed tomography (HR-pQCT) in the qualitative assessment of cribra orbitalia: a preliminary study. *Homo*, 66(1): 38–43. DOI: 10.1016/j.jchb.2014.09.005.
- Saunders, C.; Havercroft, A. B.; Powers, R. 1980. Excavations at St Helen's church, Wheathampstead. *Herts Archaeology*, 8: 102–111.
- Schats, R. 2021. Cribrotic lesions in archaeological human skeletal remains. Prevalence, co-occurrence, and association in medieval and early modern Netherlands. *International Journal of Paleopathology*, 35: 81–89. DOI: 10.1016/j.ijpp.2021.10.003.

- Sebes, J. I.; Diggs, L. W. 1979. Radiographic changes of the skull in sickle cell anemia. *American Journal of Roentgenology*, 132(3): 373–377. DOI: 10.2214/ajr.132.3.373.
- Selye, H. 1950. Stress and the general adaptation syndrome. *British medical journal*, 1(4667): 1383–1392. DOI: 10.1136/bmj.1.4667.1383.
- Selye, H. 1936. A syndrome produced by diverse noxious agents. *Nature*, 138(3479): 32. DOI: 10.1038/138032a0.
- Smith-Guzmán, N. E. 2015. The skeletal manifestation of malaria: an epidemiological approach using documented skeletal collections. *American Journal of Physical Anthropology*, 158(4): 624–635. DOI: 10.1002/ajpa.22819.
- Stark, R. J. 2014. A proposed framework for the study of paleopathological cases of subadult scurvy. *International Journal of Paleopathology*, 5: 18–26. DOI: 10.1016/j.ijpp.2014.01.005.
- Steyn, M.; Voeller, S.; Botha, D.; Ross, A. H. 2016. Cribra orbitalia: prevalence in contemporary populations. *Clinical Anatomy*, 29(7): 823–830. DOI: 10.1002/ca.22734.
- Stuart-Macadam, P. 1992. Porotic hyperostosis: a new perspective. *American Journal of Physical Anthropology*, 87(1): 39–47. DOI: 10.1002/ajpa.1330870105.
- Stuart-Macadam, P. 1991. Anemia in roman Britain: Poundbury camp. In: Bush, H.; Zvelebil, M. (eds.). *Health in past societies: biocultural interpretations of human skeletal remains in archaeological contexts*. Oxford, BAR International Series 567: 101–113.
- Stuart-Macadam, P. 1989. Porotic hyperostosis: relationship between orbital and vault lesions. *American Journal of Physical Anthropology*, 80(2): 187–193. DOI: 10.1002/ajpa.1330800206.
- Stuart-Macadam, P. 1987a. Porotic hyperostosis: new evidence to support the anemia theory. *American Journal of Physical Anthropology*, 74(4): 521–526. DOI: 10.1002/ajpa.1330740410.
- Stuart-Macadam, P. 1987b. A radiographic study of porotic hyperostosis. *American Journal of Physical Anthropology*, 74(4): 511–520. DOI: 10.1002/ajpa.1330740409.
- Stuart-Macadam, P. 1985. Porotic hyperostosis: representative of a childhood condition. *American Journal of Physical Anthropology*, 66(4): 391–398. DOI: 10.1002/ajpa.1330660407.
- Toldt, C. 1886. Ueber Welcker's cribra orbitalia. *Mitteilungen der Anthropologischen Gesellschaft in Wien*, 15: 20–24.
- Virchow, R. 1874. Altpatagonische, altchilenische und moderne pampas schädel. *Verhandlungen der Berliner Gesellschaft für Anthropologie, Ethnologie und Urgeschichte*, 6: 51–64.
- Walker, P. L. 1986. Porotic hyperostosis in a marine-dependent California Indian population. *American Journal of Physical Anthropology*, 69(3): 345–354. DOI: 10.1002/ajpa.1330690307.
- Walker, P. L.; Bathurst, R. R.; Richman, R.; Gjerdrum, T.; Andrushko, V. A. 2009. The causes of porotic hyperostosis and cribra orbitalia: a reappraisal of the iron-deficiency-anemia hypothesis. *American Journal of Physical Anthropology*, 139(2): 109–125. DOI: 10.1002/ajpa.21031.
- Wapler, U.; Schultz, M. 1996. Une méthode de recherche histologique appliquée au matériel osseux archéologique: l'exemple

- des cribra orbitalia. *Bulletins et Mémoires de la Société d'Anthropologie de Paris*, 8(3): 421–431. DOI: 10.3406/bmsap.1996.2459.
- Wapler, U.; Crubézy, E.; Schultz, M. 2004. Is cribra orbitalia synonymous with anemia? Analysis and interpretation of cranial pathology in Sudan. *American Journal of Physical Anthropology*, 123(4): 333–339. DOI: 10.1002/ajpa.10321.
- Welcker, H. 1887. Cribra orbitalia, ein ethnologisch-diagnostisches merkmal am schädel mehrerer menschenrassen. *Archiv für Anthropologie Deutsche*, 17: 1–18.
- Welcker, H. 1885. Die abstammung der bevölkerung von Socotra. In: *Verhandlungen des fünften deutschen Geographentages*. Berlin, Dietrich Reimer: 92–94.
- Wiesinger, A.-S.; Kirchengast, S. 2021. Stress during subadult phase did not affect final body height among medieval Avar people. *Folia Anthropologica*, 17: 15–25.
- Williams, H. U. 1929. Human paleopathology, with some original observations on symmetrical osteoporosis of the skull. *Archives of Pathology*, 7(5): 839–902.
- Wyatt, B.; O'Donnell, L. 2025. How does social inequality alter relationships between porous cranial lesions and mortality? Examining the relationship between skeletal indicators of stress, socioeconomic status, and survivorship in a pediatric autopsy sample. *American Journal of Human Biology*, 37(1): e24164. DOI: 10.1002/ajhb.24164.
- Zaino, D. E.; Zaino, E. C. 1975. Cribra orbitalia in the aborigines of Hawaii and Australia. *American Journal of Physical Anthropology*, 42(1): 91–93. DOI: 10.1002/ajpa.1330420112.
- Zaragoza, M. B.; García, G.; Baxarias, J.; Campillo, D.; Subirá, M. E. 2005. Asociación de las líneas de Harris, con algunas patologías en la necrópolis tardorromana de Prat de la Riba, Tarragona (España). In: Cañellas Trobat, A. (ed.). *Actas del VII Congreso Nacional de Paleopatología*. Mahón-Menorca, Universitat de les Illes Balears: 274–282.
- Zdilla, M. J.; Nestor, N. S.; Rothschild, B. M.; Lambert, H. W. 2022. Cribra orbitalia is correlated with the meningo-orbital foramen and is vascular and developmental in nature. *Anatomical Record*, 305(7): 1629–1671. DOI: 10.1002/AR.24825.

Skeletal lesions consistent with tuberculosis in an adolescent from Qubbet el-Hawa, Aswan, Egypt (Late Period, 664–525 BCE)

Lesões esqueléticas compatíveis com tuberculose num adolescente de Qubbet el-Hawa, Aswan, Egito (Período Tardio, 664–525 AEC)



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Abstract Tuberculosis has been well established in Ancient Egypt and is defined as an endemic disease during dynastic times. In several tombs of the necropolis of Qubbet el-Hawa (QH) in Aswan, Egypt, unequivocal cases of tuberculosis (Pott's disease) have been identified in adults. The present study examines a well-preserved skeleton of an adolescent (approximately 14 years old) from the Late Period (664–525 BCE), buried in tomb QH33 of the necropolis and likely belonging to a middle-class individual. The individual exhibited a pattern of multifocal le-

Resumo A tuberculose encontrava-se amplamente difundida no Antigo Egito, sendo considerada uma doença endémica durante o período dinástico. Em vários túmulos da necrópole de Qubbet el-Hawa (QH) em Assuão, Egito, foram identificados casos inequívocos de tuberculose (mal de Pott) em adultos. O presente estudo examina um esqueleto bem preservado de um adolescente (aproximadamente 14 anos) do Período Tardio (664-525 AEC), enterrado na tumba QH33 da necrópole e provavelmente pertencente a um indivíduo de classe média. O indivíduo apresentava um

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sions consistent with the hematogenous dissemination of infection. The objective of this study was to provide new information on this type of lesion pattern attributed to tuberculosis, which may assist in future diagnoses in dry bone, and to offer data on affected locations commonly reported in clinical sources but rarely discussed in paleopathological literature. Likewise, microscopic analysis of the dentition has provided insights into the dietary pattern, offering a broader perspective on the possible presence of the disease in an individual associated with the elite of the Late Period in the region.

Keywords: Infectious disease; zoonotic disease; dynastic period; ancient Egypt.

1. Introduction

Diagnosing infectious diseases in human skeletal remains is particularly challenging, especially in non-adults, due to multiple factors. Disease progression depends on pathogen load, virulence, and the host's immune response. Because infections primarily affect soft tissues, fatal cases may leave no skeletal evidence (Ortner, 2008). In active tuberculosis cases, skeletal lesions represent only about 1–5% of all infections (Morris et al., 2002; Resnick and Kransdorf, 2005; Holloway et al., 2011). Moreover, such lesions are not always pathognomonic (Holloway et al., 2013), and the absence of clear bone changes complicates palaeopathological diagnosis (Roberts and Buikstra, 2003; Buikstra, 2019; Dangvard et al., 2019). In

padrão de lesões multifocais consistente com a disseminação hematogénica da infecção. O objetivo deste estudo foi fornecer novas informações sobre esse tipo de padrão de lesão atribuído à tuberculose, o que pode auxiliar em diagnósticos futuros em ossos secos, e oferecer dados sobre locais afetados comumente relatados em fontes clínicas, mas raramente discutidos na literatura paleopatológica. Da mesma forma, a análise microscópica da dentição permitiu identificar o padrão alimentar, oferecendo uma perspectiva mais alargada sobre a possível presença da doença num indivíduo associado à elite do Período Tardio da região.

Palavras-chave: Doença infecciosa; doença zoonótica; período dinástico; Egito antigo.

addition, the fragility of non-adult bones — due to their morphology, small size, and low density — often results in poor preservation and an underrepresentation of these conditions in the archaeological record (Baker et al., 2005; Lewis, 2007).

Paleopathological investigations have extensively utilized modern osteological series to characterize dry bone lesions associated with tuberculosis in adults, thereby enhancing our understanding of the disease (Kelley and El-Najjar, 1980; Matos and Santos, 2006; Santos and Roberts, 2006; Mariotti et al., 2015; Dangvard et al., 2019). However, comparatively less attention has been directed towards non-adults (Pálfi, 2012; Gooderham et al., 2020; Masiu et al., 2023), with only sporadic summaries available, often

of poorly preserved cases from diverse temporal and geographical contexts (Mays et al., 2002; Dabernat and Crubézy, 2011; Lewis, 2011; Dawson and Robson, 2012; Rubio et al., 2017; Sparacello et al., 2017; Abegg et al., 2020; Spekker et al., 2024, among others). This situation further complicates the identification of new cases in dry bone, due to the limited number of published examples in the palaeopathological record.

Diseases such as tuberculosis, caused by the *Mycobacterium tuberculosis* complex, significantly impacted past populations, particularly in the Fertile Crescent, where early agriculture emerged around 13,000 years ago (Wirth et al., 2008; HersHKovitz et al., 2015; Bendrey and Martin, 2022). This shift led to population growth, reduced mobility, and close human–animal coexistence, facilitating the spread of zoonotic and parasitic diseases (Mitchel, 2003; Stone et al., 2009; HersHKovitz et al., 2015).

In ancient Egypt, tuberculosis has been documented from Predynastic times (5500–3100 BCE) through to the Late Period (664–332 BCE; Zink et al., 2001; 2007; Donoghue et al., 2010; Dabernat and Crubézy, 2011). Ancient DNA analyses of individuals from Abydos (Predynastic/Early Dynastic period, 3650–3500 BCE) and from sites dating to the Middle Kingdom (2100–1550 BCE) and the New Kingdom to Late Period (1450–500 BCE) in Thebes have also been undertaken (Zink et al., 2003). These analyses extracted DNA from individuals with osseous tuberculosis,

revealing 66.7% positive results among those with lesions suggestive of tuberculosis, 20.8% among those with non-specific lesions, and 14% among cases without any observable bone lesions (Zink et al., 2003). These findings indicate that, despite the absence of skeletal lesions in many cases, tuberculosis was present in ancient Egypt, supporting the interpretation that the disease was endemic throughout the dynastic period (Zink et al., 2004; 2007; Crubézy et al., 2006).

Regarding palaeopathological findings in ancient Egypt, as in the general pattern, most identified cases involve adults, primarily cases of Pott's disease — the pathognomonic spinal lesion caused by tuberculosis — documented throughout the dynastic period (Elliot-Smith and Ruffer, 1910; Ruffer, 1921; Morse et al., 1964; Strouhal, 1991; 1999). Such cases have also been recorded in tombs from the New Kingdom (1550–1069 BCE) at Qubbet el-Hawa (Botella et al., 2021), the necropolis from which the individual examined in this study was recovered. Specifically, three cases of Pott's disease have so far been identified in tombs QH32 (Figure 1c — left), QH34bb (Figure 1c — right), and QH33 (Figure 1d — centre), confirming the presence of tuberculosis at this site during the dynastic period. Nevertheless, there remains a general underrepresentation of tuberculosis cases in the Egyptian palaeopathological record compared with molecular evidence, and only anecdotal evidence of non-adult individuals documented to date (Dabernat and Crubézy, 2011).

Clinical data may also provide insight into the absence of osteoarticular tuberculosis cases in children observed in archaeological contexts from similar historical periods. It is worth noting that skeletal involvement occurs in approximately 4% of children with active tuberculosis infection (Kritsaneeapaiboon et al., 2017). This complexity is further increased by the variation in osseous lesions according to age among non-adults (Rasool, 2001). In general, children in their first decade of life most frequently develop spinal tuberculosis and dactylitis, whereas involvement of the long bones and joints tends to occur during the second decade of life (Cruz and Starke, 2010), although this distinction is not entirely strict (Drobish et al., 2022; Ortiz et al., 2025). Moreover, although multifocal involvement due to tuberculous osteomyelitis is more common in children than in adults, only 5–15% of paediatric tuberculosis cases show multifocal lesions (Muradali et al., 1993; Morris et al., 2002), which partly limits the availability of comparable palaeopathological evidence showing similar lesion patterns.

Despite this, the higher prevalence of osseous lesions among subadults, together with the fact that in developing countries the incidence of osteoarticular tuberculosis can reach up to 20% of all tuberculosis cases (Muradali et al., 1993; Lin et al., 2005; Hong et al., 2010), has resulted in a greater number of reported cases. Consequently, numerous paediatric clinical reports have addressed osteoarticu-

lar tuberculosis (Alfer, 1892; Rasool, 2001; Kumar et al., 2003; Teo and Peh, 2004; Hosalkar et al., 2009; Ortiz et al., 2025, among others), thereby expanding current knowledge from the most frequent osseous locations to the more atypical ones (Agarwal, 2020). However, the use of such sources is complicated by the application of diagnostic techniques that differ substantially from those employed in dry bone analysis. Nevertheless, they can provide valuable comparative data for the interpretation of archaeological cases such as the present study, where the lesion pattern observed in the individual requires stronger diagnostic support than that available from the limited palaeopathological literature. The present study highlights the importance of diagnostic synergy between palaeopathology and clinical research, aiming to support future diagnoses in dry bone remains. This analysis focuses on the diagnosis of an unusual lesion pattern in an adolescent individual from ancient Egypt, as well as the application of new analytical approaches — such as dental microwear analysis — which contribute complementary information to the diagnosis and offer new perspectives for palaeopathological research.

2. Material and methods

The individual (QH33-UE35-n°4) was discovered within his coffin inside the main antechamber of tomb QH33 (Figure 1e and f), located at the bottom of a 13-m-deep shaft. Originally, the tomb belonged to the 12th Dynasty (1939–1760 BCE; Jiménez-Ser-

rano and Sánchez-León, 2015); however, the antechamber was reused until the Late Period (664–332 BCE), to which this burial corresponds (Jiménez-Serrano et al., 2016). The skeletal remains were found in a badly deteriorated coffin, together with nine better-preserved coffins that contained mummified adult individuals (Figure 1f and g). The richness of the funerary assemblage, including coffin iconography (Taylor, 2001), Ptah-Sokar-Osiris statues (De la Torre, 2019), bead nets (Silvano, 1980), and pottery (Jiménez-Serrano et al., 2016), allowed for precise dating of the burial to the 26th Dynasty (664–525 BCE).

The individual's age at death was estimated based on the developmental stage and size of the long bones (Cunningham et al., 2016) and by evaluating the dental development and eruption (AlQahtani et al., 2010). A macroscopic analysis of all bone structures was conducted for identification and differential diagnosis (Aufderheide and Rodríguez-Martin, 1998; Roberts and Buikstra, 2003; Lewis, 2018; Buikstra, 2019) and clinical studies (Rasool, 2001; Morris et al., 2002; Teo and Peh, 2004; Agarwal, 2020). Specific references were consulted for the analysis of lesions, such as *cribra orbitalia* (Rinaldo et al., 2019). Enamel hypoplasia was recorded following Goodman and Rose (1990), with age estimations calibrated according to Reid and Dean (2006). Enamel hypoplasia was documented using a 3D digital microscope HIROX KH-8700 using a low-range objective, providing magnifications of 35 $\times$ and 50 $\times$ (Lozano et al., 2022).

After cleaning the dentition with ethanol, dental moulds were created on-site using a silicone-based material (Coltene Affinis Precious, light body). High-quality replicas were produced by filling the moulds with epoxy resin (EPORAI 1060) and curing them for 24 hours. Upper and lower molars were analysed with a ZEISS Axioscope A1 optical microscope, capturing 100 $\times$ magnification micrographs of the buccal surfaces (Hernando et al., 2024). Additional analysis of lower molars and anterior teeth was conducted with a HIROX KH-8700 3D digital microscope at varying magnifications (35 $\times$ –140 $\times$) under ring light conditions to assess dental wear related to diet. Micrographs for microwear analysis were cropped to 0.56 mm² (Galbany et al., 2004), and striation parameters (total number, length, width, and orientation) were measured using ImageJ[®] (Hernando et al., 2024). Striation orientation followed established classification methods (Pérez-Pérez et al., 1994), and dietary proxies (NV/TN, NH/TN, NT/NV) were calculated to infer carnivorous or vegetarian diets (Lalueza et al., 1996).

3. Results

The skeleton was well preserved despite some missing bones (Figure 2.1). It displays notable fragility and lightness, leading to partial breakage in certain areas of the cortical bone. Based on dental eruption and of state of root formation in the upper right M3 (Figure 4a), the individual was estimated at approximately 14 years (range 13–15 years). Long bone diaphy-

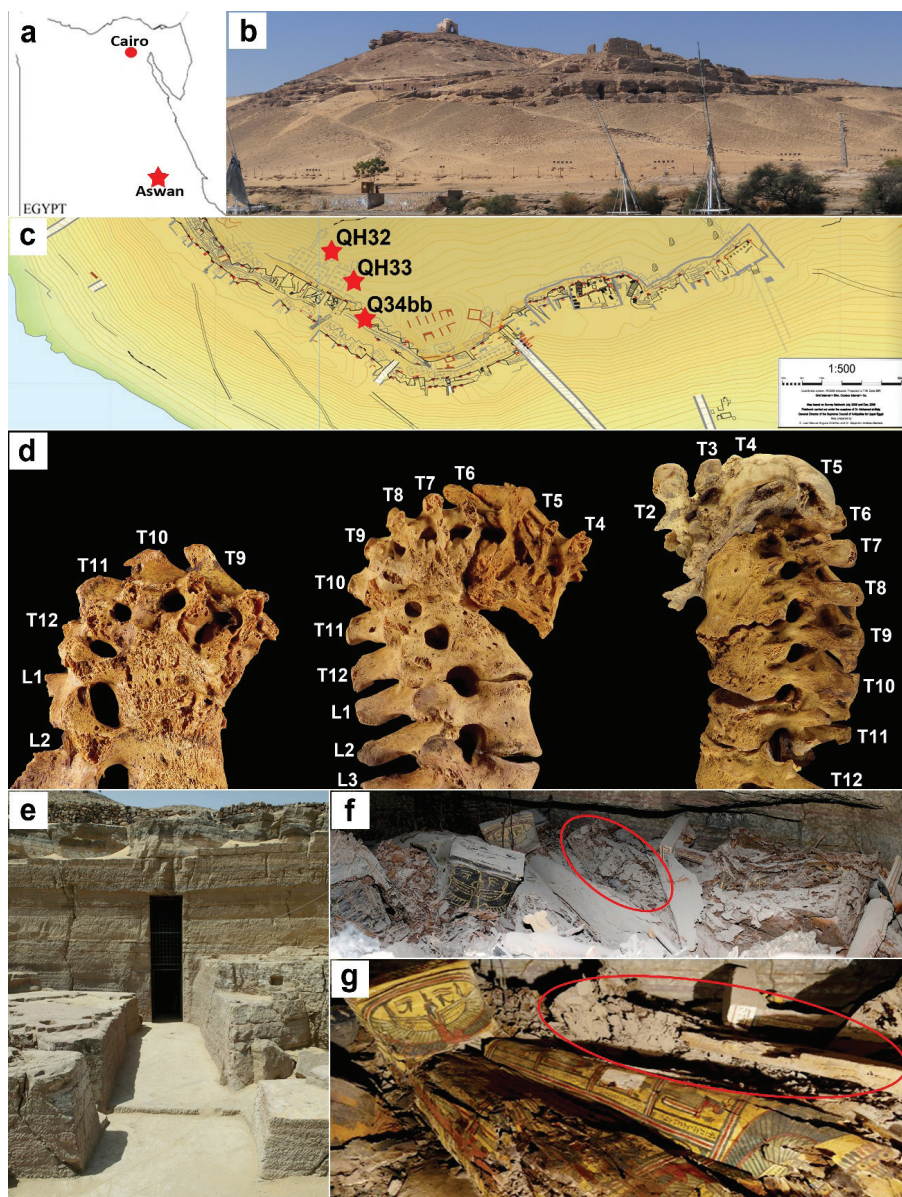


Figure 1. a. Map of Egypt. b. Panoramic view of the necropolis of Qubbet el-Hawa. c. Map of the tombs within the necropolis. d. Cases of Pott's disease in adults from left to right: QH32, QH33, and QH34bb. e. Façade and entrance door of the hypogeum/tomb QH33. f. Antechamber of the shaft at the time of its discovery, showing the level of funerary reuse during the Late Period. g. Detailed image of the deteriorated coffin of the adolescent (red circle).

seal metrics (Right humerus: 224 mm; right femur: 325 mm, and right tibia: 277 mm) suggest an age between 10.5 and 12.0 years, indicating a delay in skeletal growth.

Generalized bone loss was observed in the axial skeleton, with the most significant loss observed in the sternum (Figure 2b), sacrum (Figure 2g), and spinal vertebrae, along with a slight reduction in the height of T10 and T11 vertebral bodies (Figure 3a). Vertebral bodies of T7 to L2 exhibited alternating porosities and macroporosities (Figure 3a — detailed images), also affecting parts of the appendicular skeleton, specifically the region surrounding the radial and coronoid fossae of both humeri (Figure 2c), within the tuberoacetabular sulcus, and extending along the anterior surface of both ischia (Figure 2f).

Furthermore, the presence of lytic lesions has been observed in various regions of the skeleton. Firstly, the right parietal, located 34 mm from the squamosal suture and 8.7 mm from the coronal suture, exhibited a circular erosion (6.7 mm in diameter and 2.1 mm in depth) affecting the external table and diploë without perforating the internal table of the cranium. The lesion exhibited a smooth internal surface with macroporosity and a labiated margin along the entire circumference (Figure 2a). A further lytic lesion was identified in the sternal aspect of the sixth rib, perforating the rib body (Figure 3b). On the visceral surface, two communicating perforations with smooth internal surfaces were observed (Figure 3c — left), except for

some postmortem breaks along the margins of the lesion. On the external rib surface, an oval perforation measuring 17 mm in maximum length and 7.4 mm in maximum height was present. The lesion margins were found to be smooth and labiated, with porosities observed along the right margin and the upper edge of the perforation (see Figure 3c — right).

At the distal end of the diaphyses of the right radius and ulna, lytic lesions were present in the cortical bone, particularly accentuated in the radius, where there was extensive destruction of the medial portion of the diaphysis. The elongated erosion (13.5 mm in maximum length) exhibited postmortem breakage, with the exception of the upper margin, which displayed labiated edges. This erosion extended from the initial point to the metaphyseal line, resulting in the destruction of the internal trabecular structure of the radius (Figure 2d).

In the lower limbs, the neck of the right femur exhibited four circular lytic lesions (4.3–7.1 mm diameter), one located on the superior margin of the neck and the other three, larger, on the metaphyseal surface of the greater trochanter (Figure 2h). These lesions affected the cancellous bone of the femur, with the precise morphology of their margins remaining ambiguous. In a similar manner, the greater trochanter exhibited two lytic lesions that had been extensively altered by postmortem breakage. Lytic lesions were also observed in the distal third and epiphysis of the left fibula and

in the proximal epiphysis of the left tibia. The latter displayed a postmortem break along the medial side, exposing a lytic cavity (5.4 mm diameter) in the medial condyle, which extended internally and exhibited a perforation at the superior aspect of the condyle (Figure 2i). A similar cavity was observed at the proximal end of the fourth right metatarsal, consisting of an oval-shaped perforation (6.1 mm in diameter) with margins alternating between sclerotic areas and porosity along the entire external perimeter of the cavity. The cavity facilitated observation of the internal structure, thus revealing complete destruction of the cancellous bone extending along the diaphysis.

In contrast to the rest of the other bones, both ilia exhibited proliferative lesions on the gluteal surface, restricted to the area of muscle attachment. These consisted of porotic new bone formations with macroporosity along their superior margins (Figure 2.1 [yellow] and Figure 2e).

The individual exhibits evidence of *cribra orbitalia* (Figure 4b), *cribra humeralis*, and *femoralis* (Figure 4c), as well as signs of enamel hypoplasia in the form of two horizontal bands (Figure 5b). The estimates suggest that these disruptions occurred at 4 and 5 years of age.

Optical microscopy of the molar buccal surfaces was hindered by a resin layer from mummification, preventing proper microwear analysis. However, digital microscopy at 140x enabled clear identification and quantification. The second right lower molar showed low striation density (TN = 65) with an aver-

age length of 368.46 μm . Striations were mostly vertical (66.15%), followed by mesiodistal (26.15%), horizontal (6.15%), and distomesial (3.07%; Figure 5c). Calculated indices were $\text{NV}/\text{TN} = 0.66$, $\text{NH}/\text{TN} = 0.06$, and $\text{NH}/\text{NV} = 0.09$. The lower left first incisor had 54 long striations (265.67 μm), primarily vertical (70.37%), with mesiodistal (18.51%) and horizontal (9.26%) orientations (Figure 5d). Striations were wide, averaging 19 μm .

4. Discussion

4.1. Differential diagnosis

Taphonomic processes may create a similar appearance, known as pseudo-pathology, particularly erosions that can lead to misdiagnosis of osteolytic lesions patterns. Additionally, the bone's fragility is more noticeable in the axial skeleton, which includes postmortem fractures, particularly in the spinal vertebrae, making it challenging to fully characterize the lesion pattern. Another limitation was the inability to apply radiological techniques, which could have provided information on the internal extent of the lytic lesions in the radius, tibia, and metatarsal of the individual from Qubbet el-Hawa. Nevertheless, the labiated borders of certain lytic lesions indicate a multifocal pathological pattern rather than taphonomic processes.

In the clinic, lytic lesions similar to those usually found have a differential diagnosis with subacute and pyogenic osteomyelitis, fungal infections (such as aspergillus and candida osteomyelitis), Langerhans cell histiocytosis (LCH), neo-

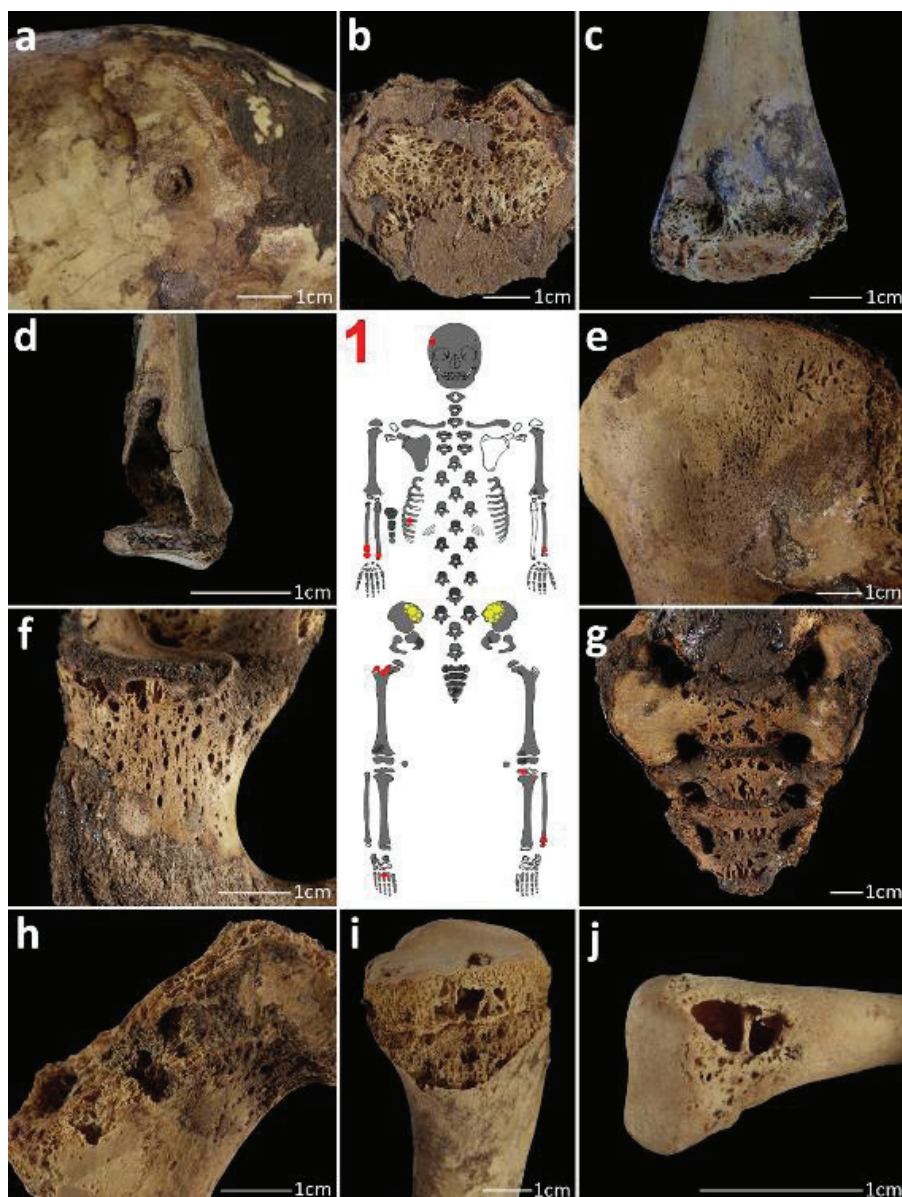


Figure 2. Bone lesion pattern of the 10.5 to 14-year-old individual: 1. Skeletal preservation: red dots = lytic lesions; raster = porotic areas and frame porosities; yellow points = proliferative lesions. a. Lytic lesion on the right parietal. b. Loss of trabecular structure on the internal surface of the manubrium. c. Porosity in the coronoid fossa. d. Lytic lesion and trabecular bone loss in the left radius. e. New bone formation on the gluteal surface of the right ilium. f. Porosity in the tubero-acetabular sulcus of the right ischium. g. Macroporosity in the vertebrae of the sacrum. h. Multiple erosions in the neck of the right femur. i. Lytic lesion on the medial border of the proximal epiphysis of the tibia. j. Lytic lesion at the proximal end of the fourth right metatarsal.

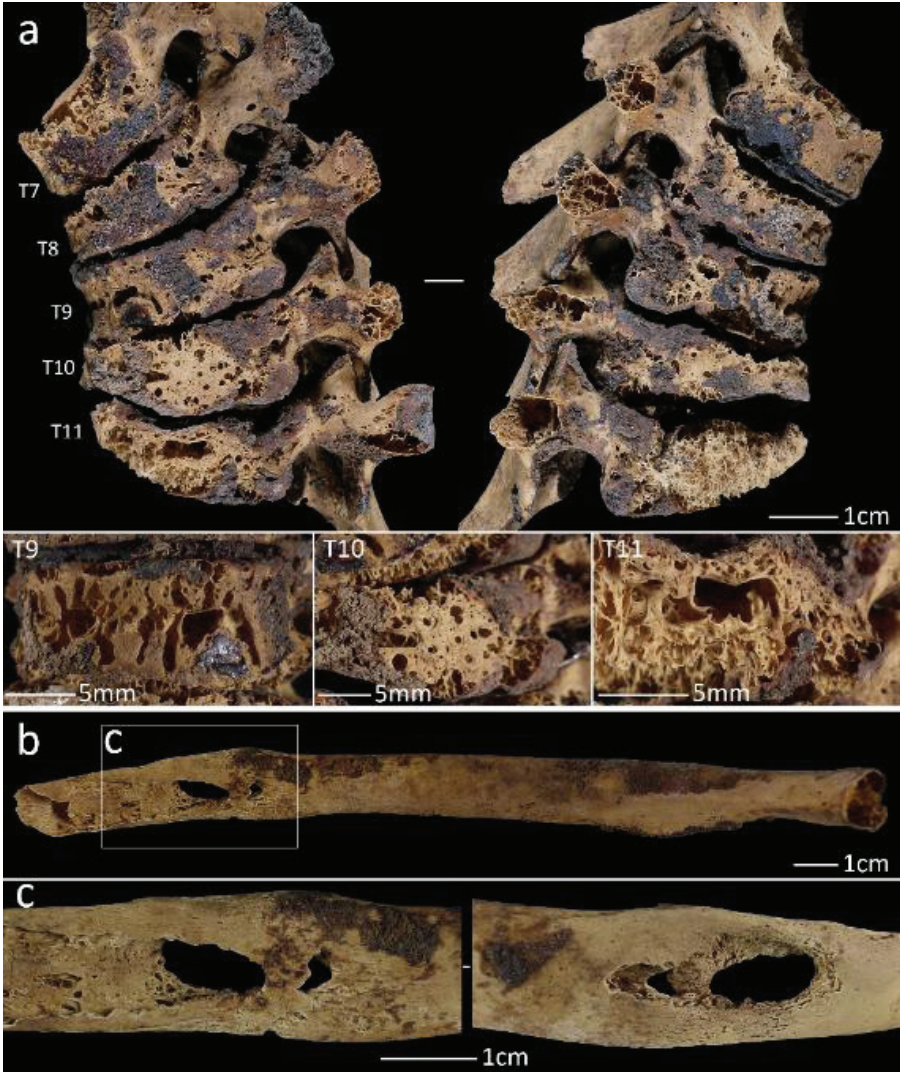


Figure 3. Pathological lesions in the thorax. a. Lateral views of the lower dorsal sector (T7–T11) with detailed images of the vertebral bodies showing macroporosity (T9), porosity (T10), and loss of trabecular structure (T11). b. Lytic lesion at the sternal end of the right sixth rib. c. Detailed images of the visceral (left) and external (right) surfaces of the same rib, showing the labiated margins of the lesion.

plasms (such a Ewing sarcoma, aneurysmal bone cyst, neuroblastoma, and giant cell tumour), as well as tuberculosis osteomyelitis (Rasool, 2001; Morris et al.

2002; Teo and Peh, 2004; Kanoun et al. 2007; Costelloe and Madewell, 2013; Hirji and Saifuddin, 2014; Katragkou et al. 2017; Alasaad et al., 2024). However, analysis of

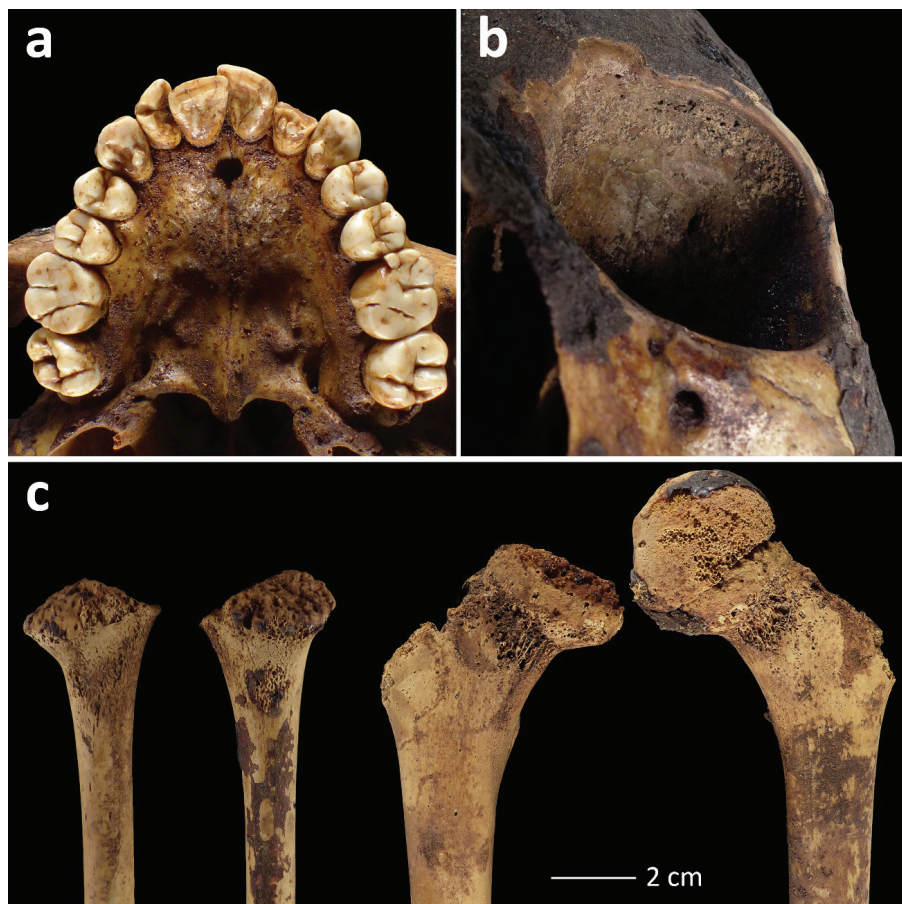


Figure 4. a. View of the teeth in situ of the maxilla; b. Cribr orbitalia on the roof of the left orbit; c. Bilateral porosities on the humeri (cribra humeralis) and femurs (cribra femoralis).

the dry bones reveals smoothed edges of certain lesions in the cranium, rib, and metatarsal, with restricted margins. This finding eliminates the possibility of neuroblastoma (Morris et al., 2002) and LCH, as the latter does not typically involve multiple bones (Huang et al., 2013). This phenomenon is also observed in the remaining appendicular skeleton of the individual, comprising the radius, ulna,

tibia, and fibula. Notwithstanding the extent of the lesions in the long bones, the absence of periosteal reaction and the size of the erosions do not affect the normal morphology of the bone. Consequently, the following conditions can be excluded: Ewing Sarcoma (Ozaki et al., 2015); aneurysmal bone cyst (Freiberg et al., 1994); and giant cell tumour (Puri et al., 2007). As is well documented, fungal

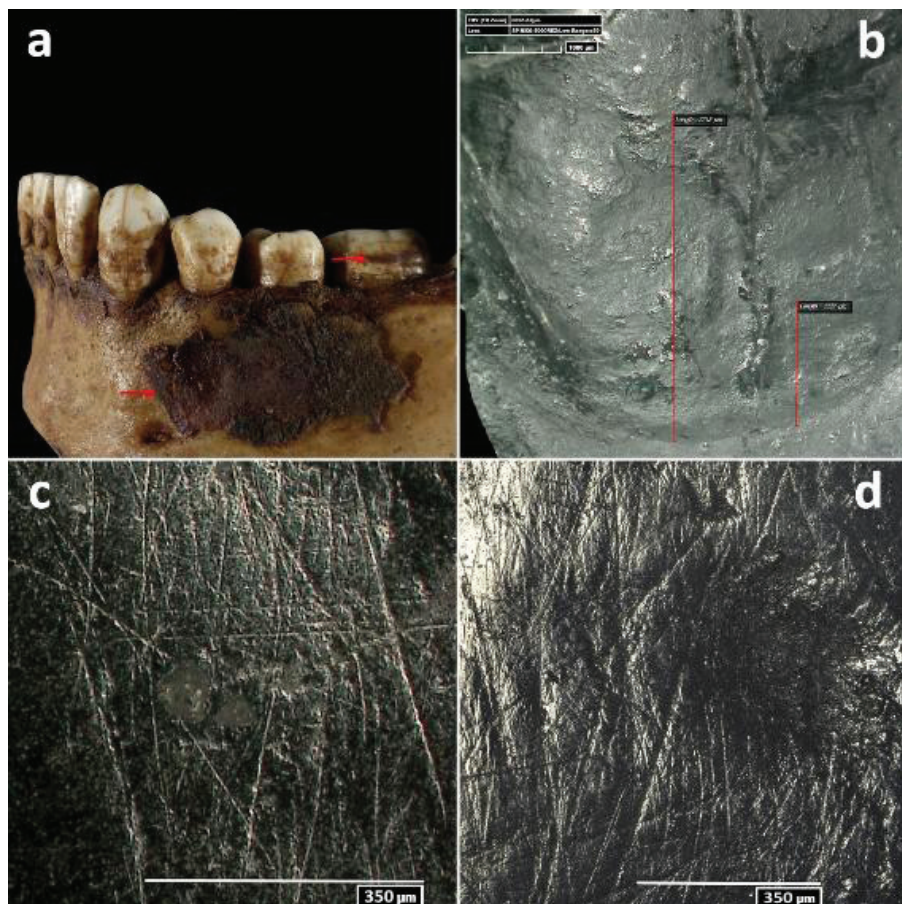


Figure 5. a. Lateral view of the mandible showing enamel hypoplasia of lower left canine, with remnants of mummified soft tissue (red arrows); b. Metric traits of enamel hypoplasia obtained with the 3D digital microscope (KH-8700 3D; 50x magnification); c. Striations on the buccal surface of the lower second molar (Zeiss Axioscope A1; magnification: 140x), d. Striations on the buccal surface of the lower left central incisor (Zeiss Axioscope A1; magnification: 100x).

infections can affect vertebrae, ribs and epiphyses of long bones, with the potential for the development of abscesses and bone destruction (Katragkou et al., 2017). However, it is improbable that such infections would manifest as generalized osteopenia of the axial skeleton, as evidenced in the QH adolescent.

The multifocal pattern can exclude subacute type osteomyelitis, such as Brodie's abscess, which typically presents with metaphyseal localization in long bones (tibia and femur) and a lytic morphology similar to the current erosions (Kanoun et al., 2007; Takeuchi et al., 2017; Sari et al., 2019). Furthermore, the

absence of spinal lesions (abscesses) in the individual suggests that pyogenic osteomyelitis is unlikely (Mylona et al., 2009), supporting hematogenous dissemination of tuberculosis as the most probable diagnosis.

4.2. Tuberculosis lesion pattern

The presence of hematopoietic marrow in non-adults facilitates the spread of the foci and lesion pattern observed in the individual's cranium, thorax, and metatarsal bone (Alfer, 1892; Huang et al., 2001; Rasool, 2001; Fonseca-Santos, 2005). In adolescents with secondary tuberculosis due to hematogenous dissemination, characteristic findings include lesions located in the epiphyses of the long bones and generalized osteopenia, which is more pronounced in the axial skeleton but also detectable in the appendicular skeleton (Rasool, 2001; Cruz and Starke, 2007; Wainwright, 2014). This may explain the presence of different lesions in the cranium (Kumar et al., 2002). The multifocal pattern and cavities (sizes and morphology) in the long bones have been observed on ribs (Huang et al., 2001) and tibia (Kao et al., 2010). In addition, cystic cavities with metaphyseal expansion in the epiphyses of long bones — such as those located in the femoral neck, radius, and most clearly in the tibia of the present case — can be explained by pressure necrosis of granulation tissue and the direct action of bacilli (Morris et al., 2002). Furthermore, lesions observed in adolescent

individuals, such as QH, have been documented in clinical literature (Alfer, 1892; Haygood and Williamson, 1994; Dhammi et al. 2003; Teo and Peh, 2004; Hosalkar et al. 2009). In the present case, that observed locations suggest hematogenous tuberculosis dissemination, although some of the identified lesion sites and their morphology differ to some extent from those documented in the paleopathological literature. Therefore, it is important to refer to clinical cases that may support the diagnosis of tuberculosis for specific skeletal lesions (Table 1).

As shown in Table 1, the chronic lesion pattern observed exhibits characteristics that are consistent with those typically seen in tuberculosis, albeit with slight variations comparable to those observed in dry bone. The lesions align with those documented in palaeopathological and clinical literature, although some localisations are exclusive to the latter. In the cranium, the lesion has a labiate margin but does not present a periosteal reaction around the orifice as seen in other cases (Dawson and Robson, 2012), neither with the same extension as some cases (Ortner, 2003; Pálfi, 2012). Nor endocranial lesions (Hershkovitz et al., 2002; Lewis, 2004; Abegg et al., 2020; Spekker et al., 2024), although some adolescent individuals have also shown an absence of endocranial involvement (Gooderham et al., 2020). The same applies to the lytic lesion of the fourth metatarsal, which, although a common location in children during the first decade of life (Cruz and

Table 1. Description of the bone lesions of the QH individual and their association with tuberculosis in clinical cases and in the palaeopathological literatura.

Location	Type of lesion (clinical analytical assessment)	Description of lesion in the QH individual	TB lesion characteristics (clinical studies)	Similar lesions in children reported in Paleopathology
Cranium (Fig. 2a)	Focal erosion (common)	The orifice in question is characterized by labiate edges in the right parietal region. This condition affected both tables.	This is a common occurrence in adolescents and is frequently observed in the parietal region. In some cases, new bone formation may be observed in the vicinity of the orifice (Teo and Peh, 2004; Bulkstra, 2019).	Dawson and Robson (2012)
Radius (Fig. 2d) and ulna	Infiltrative (common)	The distal end of the diaphysis (metaphyseal and epiphyseal area) had an osteolytic lesion. The edges of the bone were labiate, and there was trabecular destruction.	Bone cysts with diaphyseal expansion (infiltrative) have been observed in long bones (Rasool, 2001; Teo and Peh, 2004). This location has been reported in clinical sources (Hakimi et al, 2008; Agarwal, 2020)	Dabernat and Crubézy (2011)
Ilium (Fig. 2e)	New bone formation (common)	A proliferative lesion was observed on the posterior aspect of the lateral surface.	This location is less common than the iliac fossa, but it could correspond to abscesses in other muscles in the vicinity (Elishafie et al., 2013), including the gluteus (Toda et al, 1998; Ludwig and Lazarus, 2007).	No documented cases
Low spine (Fig. 3a)	Macroporotic and trabecular bone loss (common)	The presence of porosities interspersed with large holes (macroporosities) precluded the possibility of considering them lytic lesions.	Hypervascularisation and osteopaenia of the vertebral bodies have been documented (Teo and Peh, 2004).	Mays et al. (2002); Klaus et al. (2010); Pálfi (2012); Mariotti et al. (2015); Masiu et al. (2023); Spekker et al. (2024)
Long bone (Fig. 2c)	Pits (common)	Pits were present in the cortical bone of the metaphyseal and epiphyseal areas of the long bones.	Generalised osteopaenia affecting long bones is characterised by alterations in the trabecular and cortical bone structure (Haygood and Williamson, 1994; Teo and Peh, 2004).	Gooderham et al. (2020); Masiu et al. (2023); Larentis et al. (2023)

Location	Type of lesion (clinical analytical assessment)	Description of lesion in the QH individual	TB lesion characteristics (clinical studies)	Similar lesions in children reported in Paleopathology
Sternum (Fig. 2b), ischium (Fig. 2f), and sacrum (Fig. 2g)	Pits and trabecular bone loss (common)	The cortical bone (spine and ischium) exhibited extensive porosity, while the trabecular structure of the sternum was lost.	The process of demineralisation is associated with the localisation pattern of the bone marrow (Rasool, 2001).	Formicola et al. (1987); Gooderham et al. (2020); Sparacello et al. (2017); Spekker et al. (2024)
Rib (Fig. 3b)	Focal erosion (common)	The lesion exhibited labiate margins and a minor periosteal reaction at the edges.	Hematogenous foci were most prevalent in the area near the osteocartilaginous border. A lytic lesion with fusiform enlargement and smooth borders was observed, except where trabeculae were exposed (Huang et al., 2001; Fonseca-Santos, 2005).	Mays et al. (2002); Matos et al. (2011); Pálfi (2012); Dangvard et al. (2019); Libor et al. (2023)
Femoral neck (Fig. 2h)	Focal erosion (uncommon)	The bone tissue had been eroded in the neck and metaphyseal area of the greater trochanter. There was no evidence of tubular expansion.	Infection may originate in the head, neck, acetabulum, or greater trochanter (Lynch et al., 1982; Mohideen and Rasool, 2013; Shenoy et al., 2013; Mahomed et al., 2023). Small erosions are a common occurrence (McNeur and Pritchard, 1955).	No documented cases
Tibia (Fig. 2i) and fibula	Focal erosion (common)	A unilateral lesion was identified in the metaphyseal area and tibial plateau.	Destructive areas in the tibial plateau are particularly prevalent in non-adults (Kao et al., 2010; Agarwal et al., 2016). This is attributed to the entrapment of tubercle bacilli in the small arterioles of the metaphysis (Morris et al., 2002).	Mays et al. (2002); Dabernat and Crubézy (2011); Dangvard et al. (2019)
Metatarsal (Fig. 2j)	Infiltrative (common)	A cystic cavity with labiate borders was present, devoid of bone formation or osteitis.	The cystic cavity expands through the diaphysis with labiate outer edges, although it is surrounded by sclerosis, this is referred to as spina ventosa (Dhammi et al., 2003; Kumar et al., 2003).	No documented cases

Starke, 2010), lacks the periosteal reaction and thickening that produce the characteristic imaging appearance of *spina ventosa* (Kumar et al., 2003), typically observed in chronic infections occurring before the age of five (Goldblatt and Cremin, 1978; Rasool, 2001). This pattern suggests a later onset of infection, possibly after early childhood. The lesions indicate a chronic process, although the lack of further development may be related to the adolescent's death. Nevertheless, tuberculosis is primarily a lytic disease, and periosteal reaction is not present in all cases (Morris et al., 2002).

The individual exhibits a slight thinning of the vertebral bodies in the lower spine, although this cannot be considered pathognomonic due to the absence of the characteristic lesion of Pott's disease. Such lesions are, however, less frequently observed in adolescents than in children during the first decade of life (Cruz and Stake, 2010; Ortiz et al., 2025). Despite the absence of pathognomonic features of tuberculosis, the vertebral bodies display macroporosity consistent with hypervascularisation associated with the disease (Baker, 1999; Teo and Peh, 2004), particularly during the early stages of spinal tuberculosis (Baker, 1999; Mariotti et al., 2015). Similar patterns have also been reported in adolescents of comparable age to the Qubbet el-Hawa individual (Pálfi, 2012; Mariotti et al., 2015; Masiu et al., 2023; Spekker et al., 2024).

The adolescent from Qubbet el-Hawa exhibits pathological conditions as-

sociated with episodes of physiological stress (cribra and enamel hypoplasia). The individual presents porous lesions on the humerus, femur, and orbital roof, defined as *cribrous syndrome* (Miquel-Feucht et al., 1999), although the concomitance of these lesions remains a matter of debate. Likewise, a correlation between such porous lesions and enamel hypoplasia has been reported (Kozak and Krenz-Niedbala, 2002; Obertová and Thurzo, 2008), although establishing a common aetiology for these conditions in archaeological remains is challenging, making it difficult to determine whether they are linked to the disease affecting this individual. Nevertheless, recent studies have identified the presence of similar porous lesions in individuals with tuberculosis, particularly *cribra orbitalia* (Kyselíková et al., 2015; O'Donnell et al., 2020; Gomes et al., 2022), suggesting that these may represent a manifestation of the disease (Blondiaux et al., 2015). Pulmonary tuberculosis can interfere with erythropoiesis and iron metabolism, leading to hypoxia and anaemia, which may in turn result in *cribra orbitalia* (Gomes et al., 2022). Moreover, such lesions are common among non-adults from the necropolis of Qubbet el-Hawa (De la Torre and Jiménez-Serrano, 2023) and, as in the present case, may indicate episodes of nutritional or metabolic deficiency during childhood, which could have rendered the individual more susceptible to infectious diseases of this kind.

Moreover, other authors have argued that advanced osteopenia, such as

that observed in this individual, may be caused by prolonged immobility (Santos and Roberts, 2001; Sparacello et al., 2016), as well as by reduced size of the long bones (Mansukoski and Sparacello, 2018). Moreover, extended periods of immobility may exacerbate both conditions (Gooderham et al., 2020). This could account for the discrepancies between the dental age estimation and the lower age estimation based on the long bones. However, demineralisation and bone mass loss can also result directly from tuberculosis itself (Teo and Peh, 2004; Sparacello et al., 2016), and therefore cannot be ruled out as a manifestation of the disease. Despite this, the QH adolescent was likely immobile, severely debilitated, and dependent on care — either to move or to feed him — due to the advanced state of the lesions. Such loss of mobility may have further aggravated both growth impairment and osteopenia. In addition, tuberculous osteomyelitis involving the growth plates, as evidenced in the radius, ulna, femur, tibia, and fibula, can cause disturbances in the longitudinal growth of the bones (Aufderheide and Rodríguez-Martín, 1998; Hiddema et al., 2012).

4.3. Dental microwear considerations

The dental microwear pattern provides insight into the dietary habits of this individual. The most suitable tooth to determine dental microwear pattern is the lower first molar. However, resin residue from the mummification process

and tissue mummification on the buccal enamel has not been removed (Figure 4a), preventing the visualization of dental microwear features on the lower first molar. Therefore, the lower second molar, with low striation density, was the most suitable for analysis, although its short functional period may have influenced the results.

Nevertheless, a low density of microwear features in the occlusal surfaces was recorded in a population of Predynastic Egyptians from Hierakonpolis (Gamza and Irish, 2010), indicating that this individual may follow the same pattern already documented at Hierakonpolis. The predominant orientation of the striations is vertical, with the length of the striations standing out. Scarce, long, and vertical striations have been associated with diets that include large meat components or even secondary products of animal, origin such as dairy (Organ et al. 2005; Romero et al. 2013). The toughness of meat requires a shearing movement of the mandible, which can result in the formation of longer and vertical striations (Pérez-Pérez et al., 1994). However, the presence of striations with mesiodistal (26.15%) and horizontal (6.15%) orientations may indicate the consumption of certain vegetal items in the diet. The results of the different indexes calculating the relationship between vertical and horizontal striations support a high carnivorous component in the diet.

Conversely, the presence of scarce, long, wide, and vertical striations on the

lower incisors suggests an animal-based diet and possible exogenous grit in food (Ungar and Spencer, 1999; Hernando et al., 2024). In addition to the microwear features, the first and second molars of this adolescent show exposed dentine in all cuspids, which indicates the presence of abrasive or fibrous items in the diet. The presence of environmental sand cannot be ruled out, potentially explaining both striation width and significant occlusal wear in the QH adolescent.

Malnutrition, whether preceding or following disease onset, is a significant factor in the progression and severity of tuberculosis, as well as in the mortality of infected individuals (Brigden et al., 2015; Sinha et al., 2021). Tuberculosis can also induce malnutrition through impaired protein absorption (Schwenk and Macallan, 2000); however, the individual appears to have maintained a diet high in animal protein. A protein-high diet, particularly one abundant in meat, may have influenced the progression and severity of tuberculosis, as well as mortality (Sinha et al., 2021). Protein supports the immune system in combating skeletal spread (Wilbur et al., 2008), and vitamin A and zinc from meat show modest benefits in patients with tuberculosis (Karyadi et al., 2002), although causality is debated (Mehta et al., 2011; Jaganath and Mupere, 2012). This adolescent, of medium-high social status, may have survived early-stage tuberculosis due to a beneficial diet.

5. Conclusions

The multifocal pattern, morphology, and location of the bone lesions are highly consistent with tuberculosis with hematogenous spread. Despite this, the present case displays variations in the pattern of lesions when compared with those most frequently documented in non-adults within the palaeopathological literature. This discrepancy is likely because published cases tend to focus on individuals exhibiting pathognomonic features, particularly when spinal osteomyelitis, Pott's disease, dactylitis, or *spina ventosa* are clearly expressed. In contrast, the Qubbet el-Hawa adolescent highlights the heterogeneity of the tuberculous lesion pattern in children, as also noted in clinical reports. In such cases, comparison with clinical evidence has been essential for recognising the morphological diversity of the lesions and their distribution pattern, as well as for identifying less common localisations, thereby strengthening the diagnosis of tuberculosis.

Although infectious diseases, including tuberculosis, were probably widespread in Ancient Egypt, the limited number of documented skeletal cases may reflect both the high lethality of these conditions and the relatively low proportion of tuberculosis infections that produce bone lesions. The QH adolescent, with privileged access to quality food, may have survived longer, developing chronic lesions. Furthermore, the excellent state of preservation allows us to understand the lesion pattern, which may aid future diagnoses in dry bone.

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References

- Abegg, C.; Dutour, O.; Desideri, J.; Besse, M. 2020. Cases of *serpens endocrania symmetrica* in young individuals from neolithic western Switzerland: description and interpretation. *International Journal of Osteoarchaeology*, 30(3): 401–409. DOI: 10.1002/oa.2863.
- Agarwal, A. 2020. Paediatric osteoarticular tuberculosis: a review. *Journal of Clinical Orthopaedics and Trauma*, 11(2): 202–207. DOI: 10.1016/j.jcot.2020.01.005.
- Agarwal, A.; Gupta, N.; Mishra, M.; Agrawal, N.; Kumar, D. 2016. Primary epiphyseal and metaepiphyseal tubercular osteomyelitis in children: a series of 8 cases. *Acta Orthopaedica Belgica*, 82(4): 797–805.
- Alasaad, H.; Dir, D.; Mhanna, S. A. A.; Muhammed, H. 2024. Solitary distal tibia tuberculosis in a child, effectively treated by chemotherapy following surgery: a case report. *International Journal of Surgery Case Reports*, 115: 109289. DOI: 10.1016/j.ijscr.2024.109289.
- Alfer, C. 1892. Die häufigkeit der knochen und gelenktuberkulose in beziehung auf alter, geschlecht, stand und erblichkeit. *Beiträge zur Klinischen Chirurgie*, 8: 277–290.
- AlQahtani, S. J.; Hector, M. P.; Liversidge, H. M. 2010. Brief communication: the London atlas of human tooth development and eruption. *American Journal of Physical Anthropology*, 142(3): 481–490. DOI: 10.1002/ajpa.21258.
- Aufderheide, A.; Rodríguez-Martín, C. 1998. *The Cambridge encyclopedia of human paleopathology*. Cambridge, Cambridge University Press.
- Baker, B. M. 1999. Early manifestations of tuberculosis in the skeleton. In: Pálfi, G.; Dutour, O.; Deák, J.; Hutás, I. (eds.). *Tuberculosis: past and present*. Budapest-Szeged, Golden Book–TB Foundation: 301–311.
- Baker, B.; Dupras, T. L.; Tocheri, M. W. 2005. *The osteology of infants and juveniles*. Texas, A&M University Press.
- Bendrey, R.; Martin, D. 2022. Zoonotic diseases: new directions in human–animal pathology. *International Journal of Osteoarchaeology*, 32(3): 548–552. DOI: 10.1002/oa.2975.
- Blondiaux, J.; de Broucker, A.; Colard, T.; Haque, A.; Naji, S. 2015. Tuberculosis and survival in past populations: a paleo-epidemiological appraisal. *Tuberculosis*, 95: S93–S100. DOI: 10.1016/j.tube.2015.02.002.
- Botella, M. C.; Guimarey, R.; Rubio, Á. 2021. Analysis of physical anthropology. In: Jiménez-Serrano, A. (ed.). *Results of the 2019 research season at Qubbet el-Hawa*. Egiptología – Colección Arqueologías. Jaén, Editorial Universidad de Jaén: 67–76.

- Brigden, G.; Furin, J.; van Gulik, C.; Marais, B. 2015. Getting it right for children: improving tuberculosis treatment access and new treatment options. *Expert Review of Anti-infective Therapy*, 13(4): 451–461. DOI: 10.1586/14787210.2015.1015991.
- Buikstra, J. E. 2019. *Ortner's identification of pathological conditions in human skeletal remains*. 3rd edition. London, Academic Press.
- Costelloe, C. M.; Madewell, J. E. 2013. Radiography in the initial diagnosis of primary bone tumors. *American Journal of Roentgenology*, 200(1): 3–7. DOI: 10.2214/AJR.12.8488.
- Crubézy, É.; Legal, L.; Fabas, G.; Dabernat, H.; Ludes, B. 2006. Pathogeny of archaic mycobacteria at the emergence of urban life in Egypt (3400 BC). *Infection, Genetics and Evolution*, 6: 13–21. DOI: 10.1016/j.meegid.2004.12.003.
- Cruz, A. T.; Starke, J. R. 2010. Pediatric tuberculosis. *Pediatrics in Review*, 31(1): 13–26.
- Cruz, A. T.; Starke, J. R. 2007. Clinical manifestations of tuberculosis in children. *Paediatric Respiratory Reviews*, 8(2): 107–117.
- Cunningham, C.; Scheuer, L.; Black, S. 2016. *Developmental juvenile osteology*. London, Academic Press.
- Dabernat, H.; Crubézy, É. 2011. Multiple bone tuberculosis in a child from Predynastic Upper Egypt (3200 BC). *International Journal of Osteoarchaeology*, 20(6): 719–730. DOI: 10.1002/oa.1082.
- Dangvard, D.; Milner, G. R.; Kolmos, H. J.; Boldsen, J. L. 2019. Tuberculosis in medieval and early modern Denmark: a paleoepidemiological perspective. *International Journal of Paleopathology*, 27: 101–108. DOI: 10.1016/j.ijpp.2018.11.003.
- Dawson, H.; Robson, K. 2012. Childhood tuberculosis: a probable case from Late Medieval Somerset, England. *International Journal of Paleopathology*, 2(1): 31–35. DOI: 10.1016/j.ijpp.2012.04.001.
- De la Torre, Y. 2019. *La reutilización de los espacios funerarios de la tumba QH33 durante el Reino Nuevo y la Baja Época*. PhD dissertation. Jaén (España), University of Jaén.
- De la Torre, Y.; Jiménez-Serrano, A. 2023. *A decade of excavations in Qubbet el-Hawa: the results of the University of Jaén*. Colecciones Arqueológicas, Universidad de Jaén.
- Dhammi, I.; Kumar, A.; Singh, S.; Aggarwal, A.; Kumar, S. 2003. Multifocal skeletal tuberculosis in children: a retrospective study of 18 cases. *Scandinavian Journal of Infectious Diseases*, 35(11–12): 797–799. DOI: 10.1080/00365540310017177.
- Donoghue, H.; Lee, O.; Minnikin, D.; Gurdyal, S. B.; Taylor, J. H.; Spigelman, M. 2010. Tuberculosis in Granville's mummy: a molecular re-examination of the earliest known Egyptian mummy to be scientifically examined and given a medical diagnosis. *Proceedings of the Royal Society B – Biological Sciences*, 277: 51–56. DOI: 10.1098/rspb.2009.1484.
- Drobish, I.; Ramchandrar, N.; Raabe, V.; Pong, A.; Bradley, J.; Cannavino, C. 2022. Pediatric osteoarticular infections caused by *Mycobacterium tuberculosis* complex: a 26-year review of cases in San Diego, CA. *The Pediatric Infectious Disease Journal*, 41(5): 361–367. DOI: 10.1097/INF.0000000000003447.
- Elliot-Smith, G.; Ruffer, M. A. 1910. *Pott'sche krankheit an einer ägyptischen mumie aus der zeit der 21. dynastie (um 1000 v. Chr.)*.

- Zur historischen Biologie der Krankheitserreger. Heft 3. Giessen, Verlag von Alfred Töpelmann (vormals J. Ricker).
- Elshafie, K. T.; Al-Hinai, M. M.; Al-Habsi, H. A.; Al-Hattali, M. S.; Hassan, O.; Al-Sukaiti, R. 2013. A massive tuberculosis abscess at the erector spinae muscles and subcutaneous tissues in a young man. *Sultan Qaboos University Medical Journal*, 13(4): 601. DOI: 10.12816/0003325.
- Fonseca-Santos, J. 2005. Tuberculosis in children. *European Journal of Radiology*, 55(2): 202–208.
- Formicola, V.; Milanesi, Q.; Scarsini, C. 1987. Evidence of spinal tuberculosis at the beginning of the fourth millennium BC from Arene Candide cave (Liguria, Italy). *American Journal of Physical Anthropology*, 72(1): 1–6. DOI: 10.1002/ajpa.1330720102.
- Freiberg, A. A.; Loder, R. T.; Heidelberger, K. P.; Hensinger, R. N. 1994. Aneurysmal bone cysts in young children. *Journal of Pediatric Orthopaedics*, 14(1): 86–91.
- Galbany, J.; Martínez, L. M.; Pérez-Pérez, A. 2004. Tooth replication techniques, SEM imaging and microwear analysis in primates: methodological obstacles. *Anthropologie*, 42(1): 5–12.
- Gamza, T.; Irish, J. 2010. A comparison of archaeological and dental evidence to determine diet at a Predynastic Egyptian site. *International Journal of Osteoarchaeology*, 22(4): 398–408. DOI: 10.1002/oa.1214.
- Goldblatt, M.; Cremin, B. J. 1978. Osteo-articular tuberculosis: its presentation in coloured races. *Clinical Radiology*, 29: 669–677. DOI: 10.1016/S0009-9260(78)80198-6.
- Gomes, R. A.; Petit, J.; Dutour, O.; Santos, A. L. 2022. Frequency and co-occurrence of porous skeletal lesions in identified non-adults from Portugal (19th to 20th centuries) and its association with respiratory infections as cause of death. *International Journal of Osteoarchaeology*, 32(5): 1061–1072. DOI: 10.1002/oa.3132.
- Gooderham, E.; Marinho, L.; Spake, L.; Fisk, S.; Prates, C.; Sousa, S.; Oliveira, C.; Santos, A. L.; Cardoso, H. F. 2020. Severe skeletal lesions, osteopenia and growth deficit in a child with pulmonary tuberculosis (mid-20th century, Portugal). *International Journal of Paleopathology*, 30: 47–56. DOI: 10.1016/j.ijpp.2020.03.002.
- Goodman, A. H.; Rose, J. C. 1990. Assessment of systemic physiological perturbations from dental enamel hypoplasias and associated histological structures. *American Journal of Physical Anthropology*, 33(S11): 59–110.
- Hakimi, M.; Hashemi, F.; Zare, A.; Hassan, A.; Kosari, H. 2008. Tuberculous osteomyelitis of the long bones and joints. *Indian Journal of Pediatrics*, 75: 505–508.
- Haygood, T. M.; Williamson, S. L. 1994. Radiographic findings of extremity tuberculosis in childhood: back to the future? *Radiographics*, 14(3): 561–570. DOI: 10.1148/radiographics.14.3.8066272.
- Hernando, R.; Moreno-Ibáñez, M. Á.; Carbonell, E.; Cebrià, A.; Daura, J.; Díez-Canseco, C.; Edo, M.; Fullola, J. M.; Oms, F. X.; Ramírez-Pedraza, I.; Sanz, M.; Subirá, M. E.; Tornero, C.; Vergès, J. M.; Lozano, M. 2024. Eating through time: understanding dietary practices across late prehistory in the northeastern Iberian Peninsula. *American Journal of Biological Anthropology*, 184(4): e24950. DOI: 10.1002/ajpa.24950.
- Hershkovitz, I.; Donoghue, H. D.; Minnikin, H. E.

- May, H.; Lee, O. Y. C.; Feldman, M.; Galili, E.; Spigelman, M.; Rothschild, B. M.; Bar-Gal, G. K. 2015. Tuberculosis origin: the Neolithic scenario. *Tuberculosis*, 95: 122–126. DOI: 10.1016/j.tube.2015.02.021.
- Hershkovitz, I.; Greenwald, C. M.; Latimer, B.; Jellema, L. M.; Wish-Baratz, S.; Eshed, V.; Dutoir, O.; Rothschild, B. M. 2002. *Serpens endocrania symmetrica* (SES): a new term and a possible clue for identifying intrathoracic disease in skeletal populations. *American Journal of Physical Anthropology*, 118(3): 201–216. DOI: 10.1002/ajpa.10077.
- Hiddema, W. B.; Barnard, B. W.; Bouaicha, W.; Hurter, D.; van der Linde, G. D.; van der Westhuizen, C. A.; Yero, P. B. 2012. Infantile tuberculous osteomyelitis of the proximal tibia involving the growth plate. *SA Orthopaedic Journal*, 11(3): 84–87.
- Hirji, H.; Saifuddin, A. 2014. Paediatric acquired pathological vertebral collapse. *Skeletal Radiology*, 43(4): 423–436. DOI: 10.1007/s00256-013-1792-3.
- Holloway, K. L.; Link, K.; Rühli, F.; Henneberg, M. 2013. Skeletal lesions in human tuberculosis may sometimes heal: an aid to palaeopathological diagnoses. *PLoS One*, 8(4): e62798. DOI: 10.1371/journal.pone.0062798.
- Holloway, K. L.; Henneberg, R. J.; De Barros Lopes, M.; Henneberg, M. 2011. Evolution of human tuberculosis: a systematic review and meta-analysis of paleopathological evidence. *Journal of Comparative Human Biology*, 62: 402–458.
- Hong, L.; Wu, J. G.; Ding, J. G.; Wang, X. Y.; Zheng, M. H.; Fu, R. Q.; Li, W. B.; Peng, W. X.; He, W. F.; Sun, Q. F. 2010. Tuberculosis ósea multifocal: experiencia en diagnóstico y tratamiento. *Médecine et Maladies Infectieuses*, 40(1): 6–11. DOI: 10.1016/j.med-mal.2009.03.004.
- Hosalkar, H. S.; Agrawal, N.; Reddy, S.; Sehgal, K.; Fox, E. J.; Hill, R. A. 2009. Skeletal tuberculosis in children in the Western world: 18 new cases with a review of the literature. *Journal of Children's Orthopaedics*, 3(4): 319–324. DOI: 10.1007/s11832-009-0184-7.
- Huang, C. Y.; Su, W. J.; Perng, R. P. 2001. Childhood tuberculosis presenting as an anterior chest wall abscess. *Journal of the Formosan Medical Association*, 100(12): 829–831.
- Huang, W. D.; Yang, X. H.; Wu, Z. P.; Huang, Q.; Xiao, J.; Yang, M. S.; Zhou, Z. H.; Yan, W. J.; Song, D. W.; Liu, T. L.; Jia, N. Y. 2013. Langerhans cell histiocytosis of the spine: a comparative study of clinical, imaging features, and diagnosis in children, adolescents, and adults. *The Spine Journal*, 13(9): 1108–1117. DOI: 10.1016/j.spinee.2013.03.013.
- Jaganath, D.; Mupere, E. 2012. Childhood tuberculosis and malnutrition. *The Journal of Infectious Diseases*, 206(12): 1809–1815.
- Jiménez-Serrano, A.; Sánchez-León, J. C. 2015. A forgotten governor of elephantine during the twelfth dynasty: Amen. *Journal of Egyptian Archaeology*, 101: 117–130.
- Jiménez-Serrano, A.; Martínez, J. L.; De la Torre, Y.; Barba, V.; Bardonova, M.; Montes, E.; García, L. M.; Alba, J. M.; Zurinaga, S.; López, M. J.; Morales, A.; Botella, M. C.; Alemán, I.; Rubio, Á.; Sáez-Pérez, M. P.; López-Obregón, T.; Miró, S. 2016. Proyecto Qubbet el-Hawa: las tumbas 31, 33, 34aa, 34bb, 35n, 35p y 122. Octava campaña. *Boletín de la Asociación Española de Egiptología*, 25: 12–15.
- Kanoun, M. L.; Khorbi, A.; Khmiri, C.; Tebourbi, A.; Haddad, N.; Boughzala, W.; Maitig, M.

- B.; Chebil, M.; Hachem, A.; Essadem, H. 2007. Diagnosis and treatment of Brodie's abscess in adults: about twenty cases. *La Tunisie Médicale*, 85(10): 857–861.
- Kao, H. K.; Yang, W. E.; Shih, H. N.; Chang, C. H. 2010. Physeal change after tuberculous osteomyelitis of the long bone in children. *Chang Gung Medical Journal*, 33(4): 453–460.
- Karyadi, E.; West, C. E.; Schultink, W.; Nelwan, R. H. H.; Gross, R.; Amin, Z.; Dolmans, W. M. V.; Schlebush, H.; Van der Meer, J. W. M. 2002. A double-blind, placebo-controlled study of vitamin A and zinc supplementation in persons with tuberculosis in Indonesia: effects on clinical response and nutritional status. *The American Journal of Clinical Nutrition*, 75(4): 720–727. DOI: 10.1093/ajcn/75.4.720.
- Katragkou, A.; Fisher, B. T.; Groll, A. H.; Roilides, E.; Walsh, T. J. 2017. Diagnostic imaging and invasive fungal diseases in children. *Journal of the Pediatric Infectious Diseases Society*, 6(suppl_1): 22–31. DOI: 10.1093/jpids/pix055.
- Kelley, M.; El-Najjar, M. 1980. Natural variation and differential diagnosis of skeletal changes in tuberculosis. *American Journal of Physical Anthropology*, 52: 153–167. DOI: 10.1002/ajpa.1330520202.
- Klaus, H. D.; Wilbur, A. K.; Temple, D. H.; Buikstra, J. E.; Stone, A. C.; Fernandez, M.; Wester, C.; Tam, M. E. 2010. Tuberculosis on the north coast of Peru: skeletal and molecular paleopathology of late pre-Hispanic and post-contact mycobacterial disease. *Journal of Archaeological Science*, 37(10): 2587–2597.
- Kozak, J.; Krenz-Niedbala, M. 2002. The occurrence of cribra orbitalia and its association with enamel hypoplasia in a medieval population from Kolobrzeg, Poland. *Variability and Evolution*, 10: 75–82.
- Kritsaneepaiboon, S.; Andres, M. M.; Tatco, V. R.; Lim, C. C. Q.; Concepcion, N. D. P. 2017. Extrapulmonary involvement in pediatric tuberculosis. *Pediatric Radiology*, 47(10): 1249–1259.
- Kumar, I.; Kumar, A.; Singh, S.; Aggarwal, A.; Kumar, S. 2003. Multifocal skeletal tuberculosis in children: a retrospective study of 18 cases. *Scandinavian Journal of Infectious Diseases*, 35(11–12): 797–799. DOI: 10.1080/00365540310017177.
- Kumar, R.; Pandey, C.; Bose, N.; Sahay, S. 2002. Tuberculous brain abscess: clinical presentation, pathophysiology and treatment (in children). *Child's Nervous System*, 18: 118–123. DOI: 10.1007/s00381-002-0575-2.
- Kyselicová, K.; Šebest, L.; Beňuš, R.; Bognár, C.; Šarkan, M.; Dörnhöferová, M. 2015. Skeletal manifestation of tuberculosis in the medieval population of Borovce (8th–12th century AD, Slovakia) in relationship to the occurrence of long bone changes and cribra orbitalia. *Česká Antropologie*, 65(2): 16–22.
- Lalueza, C.; Pérez-Pérez, A.; Turbón, D. 1996. Dietary inferences through buccal microwear analysis of middle and upper Pleistocene human fossils. *American Journal of Physical Anthropology*, 100(3): 367–387. DOI: 10.1002/(SICI)1096-8644(199607)100:3<367::AID-AJPA5>3.0.CO;2-R.
- Larentis, O.; Pangrazzi, C.; Tonina, E. 2023. Osteological evidence of possible tuberculosis from the early medieval age (6th–11th century), northern Italy. *Heritage*, 6: 4886–4900. DOI: 10.3390/heritage6070260.
- Lewis, M. E. 2018. *Paleopathology of children: identification of pathological conditions in*

- the human skeletal remains of non-adults.* London, Academic Press.
- Lewis, M. E. 2011. Tuberculosis in the non-adults from Romano-British Poundbury camp, Dorset, England. *International Journal of Paleopathology*, 1(1): 12–23. DOI: 10.1016/j.ijpp.2011.02.002.
- Lewis, M. E. 2007. *The bioarchaeology of children: perspective from biological and forensic anthropology.* Cambridge, Cambridge University Press.
- Lewis, M. E. 2004. Endocranial lesions in non-adult skeletons: understanding their aetiology. *International Journal of Osteoarchaeology*, 14(2): 82–97. DOI: 10.1002/oa.713.
- Libor, C.; Hajdu, T.; Szeniczey, T.; Kovacs, L. O.; Kunos, L.; Mateovics-Laszlo, O. 2023. "Tuberculosis on the spot" – discussion of a probable sternal tuberculosis from a late medieval cemetery from Hungary. *Tuberculosis*, 143: 102410. DOI: 10.1016/j.tube.2023.102410.
- Lin, Y. S.; Huang, Y. C.; Chang, L. Y.; Lin, T. Y.; Wong, K. S. 2005. Clinical characteristics of tuberculosis in children in the north of Taiwan. *Journal of Microbiology, Immunology, and Infection*, 38(1): 41–46.
- Lozano, M.; Gamarra, B.; Hernando, R.; Cepe-ruelo, D. 2022. Microscopic and virtual approaches to oral pathology: a case study from El Mirador Cave (Sierra de Atapuerca, Spain). *Annals of Anatomy – Anatomischer Anzeiger*, 239: 151827. DOI: 10.1016/j.aanat.2021.151827.
- Ludwig, B.; Lazarus, A. A. 2007. Musculoskeletal tuberculosis. *Disease-a-Month*, 53(1): 39–45.
- Lynch, A. F. 1982. Tuberculosis of the greater trochanter: a report of eight cases. *The Journal of Bone and Joint Surgery*, 64(2): 185–188.
- Mahomed, N.; Kilborn, T.; Smit, E. J.; Chu, W. C. W.; Young, C. Y. M.; Koranteng, N.; Kasznia-Brown, J.; Winant, A. J.; Lee, E. Y.; Sodhi, K. S. 2023. Tuberculosis revisited: classic imaging findings in childhood. *Pediatric Radiology*, 53(9): 1799–1828. DOI: 10.1007/s00247-023-05648-z.
- Mansukoski, L.; Sparacello, V. S. 2018. Smaller long bone cross-sectional size in people who died of tuberculosis: insights on frailty factors from a 19th- and early 20th-century Finnish population. *International Journal of Paleopathology*, 20: 38–44. DOI: 10.1016/j.ijpp.2017.12.005.
- Mariotti, V.; Zuppello, M.; Pedrosi, M. E.; Bettuzzi, M.; Brancaccio, R.; Peccenini, E.; Morigi, M. P.; Belcastro, M. G. 2015. Skeletal evidence of tuberculosis in a modern identified human skeletal collection (Certosa Cemetery, Bologna, Italy). *American Journal of Physical Anthropology*, 157(3): 389–401. DOI: 10.1002/ajpa.22727.
- Masiu, R.; Pedersen, D. D.; Hill, L.; Steyn, M. 2023. The association between skeletal lesions and tuberculosis in a pre-antibiotic South African sample. *International Journal of Paleopathology*, 40: 20–32. DOI: 10.1016/j.ijpp.2022.11.001.
- Matos, V.; Santos, A. L. 2006. On the trail of pulmonary tuberculosis based on rib lesions: results from the human identified skeletal collection from the Museu Bocage (Lisbon, Portugal). *American Journal of Physical Anthropology*, 130(2): 190–200. DOI: 10.1002/ajpa.20309.
- Matos, V.; Marques, C.; Lopes, C. 2011. Severe vertebral collapse in a juvenile from the graveyard (13th/14th–19th centuries) of the São Miguel Church (Castelo Branco, Portugal):

- differential palaeopathological diagnosis. *International Journal of Osteoarchaeology*, 21(2): 208–217. DOI: 10.1002/oa.1125.
- Mays, S.; Fysh, E.; Taylor, G. M. 2002. Investigation of the link between visceral surface rib lesions and tuberculosis in a medieval skeletal series from England using ancient DNA. *American Journal of Physical Anthropology*, 119(1): 27–36. DOI: 10.1002/ajpa.10099.
- McNeur, J. C.; Pritchard, A. E. 1955. Tuberculosis of the greater trochanter. *The Journal of Bone and Joint Surgery. British Volume*, 37(2): 246–251. DOI: 10.1302/0301-620X.37B2.246.
- Mehta, S.; Mugusi, F. M.; Bosch, R. J.; Aboud, S.; Chatterjee, A.; Finkelstein, J. L.; Fataki, M.; Kisenge, R.; Fwazi, W. W. 2011. A randomized trial of multivitamin supplementation in children with tuberculosis in Tanzania. *Nutrition Journal*, 10: 1–9.
- Miquel-Feucht, M. J.; Polo-Cerdá, M.; Villalain-Blanco, J. D. 1999. El síndrome cribroso: cribra femoral vs. cribra orbitalia. In: Sánchez, J. A. (ed.). *Actas del V Congreso Nacional de Paleopatología*. Alcalá la Real, Asociación Española de Paleopatología – Ayuntamiento de Alcalá la Real: 221–237.
- Mitchell, P. 2003. The archaeological study of epidemic and infectious disease. *World Archaeology*, 35(2): 171–179.
- Mohideen, M. A. F.; Rasool, M. N. 2013. Tuberculosis de la región de la articulación de la cadera en niños. *SA Orthopaedic Journal*, 12(1): 38–43.
- Morris, B.; Varma, R.; Garg, A.; Awasthi, M.; Maheshwari, M. 2002. Multifocal musculo-skeletal tuberculosis in children: appearances on computed tomography. *Skeletal Radiology*, 31: 1–8. DOI: 10.1007/s00256-001-0439-y.
- Morse, D.; Brothwell, D. R.; Ucko, P. J. 1964. Tuberculosis in ancient Egypt. *American Review of Respiratory Disease*, 90(4): 524–541.
- Muradali, D.; Gold, W. L.; Vellend, H.; Becker, E. 1993. Multifocal osteoarticular tuberculosis: report of four cases and review of management. *Clinical Infectious Diseases*, 17(2): 156–209.
- Mylona, E.; Samarkos, M.; Kakalou, E.; Fanourgiakis, P.; Skoutelis, A. 2009. Pyogenic vertebral osteomyelitis: a systematic review of clinical characteristics. *Seminars in Arthritis and Rheumatism*, 39(1): 10–17.
- Obertová, Z.; Thurzo, M. 2008. Relationship between cribra orbitalia and enamel hypoplasia in the early medieval Slavic population at Borovce, Slovakia. *International Journal of Osteoarchaeology*, 18(3): 280–292. DOI: 10.1002/oa.937.
- O'Donnell, L.; Hill, E. C.; Anderson, A. S.; Edgar, H. J. H. 2020. Cribra orbitalia and porotic hyperostosis are associated with respiratory infections in a contemporary mortality sample from New Mexico. *American Journal of Physical Anthropology*, 173: 721–733. DOI: 10.1002/ajpa.24131.
- Organ, J. M.; Teaford, M. F.; Larsen, C. S. 2005. Dietary inferences from dental occlusal microwear at Mission San Luis de Apalachee. *American Journal of Physical Anthropology*, 128(4): 801–811. DOI: 10.1002/ajpa.20277.
- Ortiz, G. J.; Delgado, J.; Ramírez, T.; Galeano, M. A.; Barnafi, N.; Pillaca, O.; Corral, G. 2025. Osteoarticular tuberculosis: imaging findings in pediatric patients. *Pediatric Radiology*, 55(1): 104–114. DOI: 10.1007/s00247-024-06092-3.
- Ortner, D. J. 2008. Differential diagnosis of skeletal lesions in infectious disease. In: Pinhasi,

- R.; Mays, S. (eds.). *Advances in human paleopathology*. Chichester, Wiley: 189–214.
- Ortner, D. J. 2003. *Identification of pathological conditions in human skeletal remains*. San Diego, Academic Press.
- Ozaki, T. 2015. Diagnosis and treatment of Ewing sarcoma of the bone: a review article. *Journal of Orthopaedic Science*, 20: 250–263. DOI: 10.1007/s00776-014-0687-z.
- Pálfi, G. 2012. Juvenile cases of skeletal tuberculosis from the Terry Anatomical Collection (Smithsonian Institution, Washington, DC, USA). *Acta Biologica Szegediensis*, 56(1): 1–12.
- Pérez-Pérez, A.; Lalueza, C.; Turbón, D. 1994. Intraindividual and intragroup variability of buccal tooth striation pattern. *American Journal of Physical Anthropology*, 94(2): 175–187. DOI: 10.1002/ajpa.1330940203.
- Puri, A.; Agarwal, M. G.; Shah, M.; Jambhekar, N. A.; Anchan, C.; Behle, S. 2007. Giant cell tumor of bone in children and adolescents. *Journal of Pediatric Orthopaedics*, 27(6): 635–639. DOI: 10.1097/BPO.0b013e3181425629.
- Rasool, M. N. 2001. Osseous manifestations of tuberculosis in children. *Journal of Pediatric Orthopaedics*, 21(6): 749–755.
- Reid, D. J.; Dean, M. C. 2006. Variation in modern human enamel formation times. *Journal of Human Evolution*, 50(3): 329–346. DOI: 10.1016/j.jhevol.2005.09.003.
- Resnick, D. L.; Kransdorf, M. J. 2005. *Bone and joint imaging*. Philadelphia, Pennsylvania, Elsevier Saunders.
- Rinaldo, N.; Zedda, N.; Bramanti, B.; Rosa, I.; Gualdi-Russo, E. 2019. How reliable is the assessment of porotic hyperostosis and cribra orbitalia in skeletal human remains? A methodological approach for quantitative verification by means of a new evaluation form. *Archaeological and Anthropological Sciences*, 11: 3549–3559. DOI: 10.1007/s12520-019-00780-0.
- Roberts, C.; Buikstra, J. E. 2003. *The bioarchaeology of tuberculosis: a global view on a reemerging disease*. Gainesville, University Press of Florida.
- Romero, A.; Ramírez-Rozzi, F. V.; De Juan, J.; Pérez-Pérez, A. 2013. Diet-related buccal dental microwear patterns in Central African Pygmy foragers and Bantu-speaking farmer and pastoralist populations. *PLoS One*, 8(12): e84804. DOI: 10.1371/journal.pone.0084804.
- Rubio, Á.; Jiménez-Brobeil, S. A.; Sánchez-Barba, L. P.; Laffranchi, Z.; Molina, F. 2017. Posibles casos de tuberculosis y brucelosis en poblados argáricos de Galera (Granada). *Trabajos de Prehistoria*, 74(1): 168–180.
- Ruffer, M. A. 1921. *Studies in palaeopathology of Egypt*. Chicago, University of Chicago Press.
- Santos, A. L.; Roberts, C. A. 2006. Anatomy of a serial killer: differential diagnosis of tuberculosis based on rib lesions of adult individuals from the Coimbra identified skeletal collection, Portugal. *American Journal of Physical Anthropology*, 130: 38–49. DOI: 10.1002/ajpa.20160.
- Santos, A. L.; Roberts, C. A. 2001. A picture of tuberculosis in young Portuguese people in the early 20th century: a multidisciplinary study of the skeletal and historical evidence. *American Journal of Physical Anthropology*, 115(1): 38–49. DOI: 10.1002/ajpa.1054.

- Sari, A.; Dinçel, Y. M.; Erdogdu, I. H.; Sayiner, H. S.; Agir, I.; Çetin, M. Ü. 2019. Tuberculosis osteomyelitis of the tibia mimicking Brodie abscess: a case report and review of the literature. *SAGE Open Medical Case Reports*, 8: 7. DOI: 10.1177/2050313X19869455.
- Schwenk, A.; Macallan, D. C. 2000. Tuberculosis, malnutrition and wasting. *Current Opinion in Clinical Nutrition & Metabolic Care*, 3(4): 285–291.
- Shenoy, K. S.; Jeevanavar, S. S.; Baindoor, P.; Mannal, S.; Shetty, S. V. 2013. Recurrent tuberculosis of greater trochanter and its bursa. *Case Reports in Orthopedics*, 2013: 570956. DOI: 10.1155/2013/570956.
- Silvano, F. 1980. Le reticelle funerarie nell'Antico Egitto: proposte di interpretazione. *Egitto e Vicino Oriente*, 3: 83–97.
- Sinha, P. K.; Lönnroth, A.; Bhargava, A.; Heysell, S. K.; Sarkar, S.; Salgame, P.; Rudgard, W.; Boccia, D.; Van Artsen, D.; Hochberg, N. S. 2021. Food for thought: addressing undernutrition to end tuberculosis. *The Lancet Infectious Diseases*, 21(10): e318–e325. DOI: 10.1016/S1473-3099(20)30792-1.
- Sparacello, V. S.; Roberts, C. A.; Kerudin, A.; Müller, R. 2017. A 6500-year-old middle neolithic child from Pollera Cave (Liguria, Italy) with probable multifocal osteoarticular tuberculosis. *International Journal of Paleopathology*, 17: 67–74. DOI: 10.1016/j.ijpp.2017.01.004.
- Sparacello, V. S.; Roberts, C. A.; Canci, A.; Moggi-Cecchi, J.; Marchi, D. 2016. Insights on the paleoepidemiology of ancient tuberculosis from the structural analysis of postcranial remains from the Ligurian neolithic (northwestern Italy). *International Journal of Paleopathology*, 15: 50–64. DOI: 10.1016/j.ijpp.2016.08.003
- Spekker, O.; Kiss, P. A.; Kis, L.; Király, K.; Varga, S.; Marcsik, A.; Schütz, O.; Török, T.; Hunt, D. R.; Tihanyi, B. 2024. White plague among the “forgotten people” from the Barbaricum of the Carpathian Basin—cases with tuberculosis from the Sarmatian-period (3rd–4th centuries CE) archaeological site of Hódmezővásárhely–Kenyeré-ér, Berczkitanya (Hungary). *PLoS One*, 19(1): e0294762. DOI: 10.1371/journal.pone.0294762.
- Stone, A. C.; Wilbur, A. K.; Buikstra, J. E.; Roberts, C. A. 2009. Tuberculosis and leprosy in perspective. *American Journal of Physical Anthropology*, 140(S49): 66–94. DOI: 10.1002/ajpa.21185.
- Strouhal, E. 1999. Ancient Egypt and tuberculosis. In: Pálfi, G. Y.; Dutour, O.; Deák, L.; Hútas, I. (eds.). *Tuberculosis: past and present*. Budapest, Golden Book Publisher: 453–460.
- Strouhal, E. 1991. Vertebral tuberculosis in ancient Egypt and Nubia. In: Ortner, D. J.; Aufderheide, A. C. (eds.). *Human paleopathology: current syntheses and future options*. Washington, D. C., Smithsonian Institution: 181–194.
- Takeuchi, N.; Matsumoto, Y.; Okada, T.; Hanada, M.; Bekki, H.; Iwanoto, Y. 2017. Brodie's abscess of the radius in a child. *The Journal of Hand Surgery*, 22(2): 244–247. DOI: 10.1142/S0218810417720169.
- Taylor, J. H. 2001. Patterns of colouring on ancient Egyptian coffins from the New Kingdom to the Twenty-Sixth Dynasty: an overview. In: Davies, W. (ed.). *Colour and painting in Ancient Egypt*. London, The British Museum Press: 164–182.
- Teo, H. E.; Peh, W. C. 2004. Skeletal tuberculosis in children. *Pediatric Radiology*, 34: 853–860. DOI: 10.1007/s00247-004-1223-7.

- Toda, K.; Yasunaga, Y.; Takemoto, S.; Terada, Y. 1998. MR image and CT scan of a tuberculous abscess in the gluteus maximus muscle. *Computerized Medical Imaging and Graphics*, 22: 425–427. DOI: 10.1016/S0895-6111(98)00046-9.
- Ungar, P. S.; Spencer, M. A. 1999. Incisor microwear, diet, and tooth use in three Amerindian populations. *American Journal of Physical Anthropology*, 109(3): 387–396. DOI: 10.1002/(SICI)1096-8644(199907)109:3<387::AID-AJPA7>3.0.CO;2-F.
- Wainwright, H. C. 2014. Histopathology. In: Davies, P. D. O.; Gordon, S. B.; Davies, G. (eds.). *Clinical tuberculosis*. Boca Raton, CRC Press: 79–82.
- Wilbur, A. K.; Farnbach, A. W.; Knudson, K. J.; Buikstra, J. E. 2008. Diet, tuberculosis, and the paleopathological record. *Current Anthropology*, 49(6): 963–991.
- Wirth, T.; Hildebrand, F.; Allix-Béguec, C.; Wöbeling, F.; Kubica, T.; Kremer, K.; Niemann, S. 2008. Origin, spread and demography of the *Mycobacterium tuberculosis* complex. *PLoS Pathogens*, 4(9): e1000160. DOI: 10.1371/journal.ppat.1000160.
- Zink, A. R.; Molnár, E.; Motamedi, N.; Pálffy, A.; Marcsik, A.; Nerlich, A. G. 2007. Molecular history of tuberculosis from ancient mummies and skeletons. *International Journal of Osteoarchaeology*, 17: 380–391. DOI: 10.1002/oa.909.
- Zink, A. R.; Sola, C.; Reischl, U.; Grabner, W.; Ras-togi, N.; Wolf, H.; Nerlich, A. G. 2004. Molecular identification and characterization of *Mycobacterium tuberculosis* complex in ancient Egyptian mummies. *International Journal of Osteoarchaeology*, 14(5): 404–413. DOI: 10.1002/oa.724.
- Zink, A. R.; Grabner, W.; Reischl, U.; Wolf, H.; Nerlich, A. G. 2003. Molecular study on human tuberculosis in three geographically distinct and time-delineated populations from ancient Egypt. *Epidemiology & Infection*, 130(2): 239–249. DOI: 10.1017/S0950268802008257.
- Zink, A. R.; Grabner, W.; Reischl, U.; Szeimies, U.; Nerlich, A. G. 2001. Molecular analysis of skeletal tuberculosis in an ancient Egyptian population. *Journal of Medical Microbiology*, 50: 355–356. DOI: 10.1099/0022-1317-50-4-355.

Not written on the records: a rare case of ipsilateral disappearance of the femoral head and neck and other bone abnormalities on a female skeleton from the Luís Lopes Collection (Lisbon, Portugal)

Não escrito nos registos: um caso raro de desaparecimento ipsilateral da cabeça e colo do fémur e outras anomalias ósseas num esqueleto feminino da Coleção Luís Lopes (Lisboa, Portugal)

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Abstract This article aims to describe a paleopathological case consistent with a paediatric hip joint trauma, discussing its aetiologies and lifelong implications, such as limb asymmetry and osteoarthritis. The case studied is a well-preserved skeleton of a female individual (Museu Nacional de História Natural e da Ciência, Universidade de Lisboa) who died in Lisbon in 1954, at the age of 54. The bone changes were macroscopic and radiologically studied, complemented by a differential diagnosis. The study revealed ante mortem absence of the left femur head and neck, marked shortening and narrowing of the left os coxae, and alterations in the acetabulum.

Resumo Este artigo tem como objetivo descrever um caso paleopatológico consistente com um traumatismo da anca em idade pediátrica, discutindo as suas etiologias e implicações a longo prazo para a vida do indivíduo. O caso estudado é um esqueleto bem preservado de um indivíduo do sexo feminino (Museu Nacional de História Natural e da Ciência, Universidade de Lisboa) que faleceu em Lisboa, em 1954, com 54 anos de idade. As alterações ósseas foram estudadas macroscópica e radiologicamente e complementadas com o diagnóstico diferencial. O estudo revelou ausência ante mortem da cabeça e do colo do fémur esquerdo, acentuado encurtamento e estreitamento do coxal

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Additionally, an atrophy of the left lower limb was observed, except for the metatarsals and toes, torsion of the right femoral neck, and severe right knee osteoarthritis. A traumatic fracture affecting the acetabulum and the proximal femur during the developmental stage of the individual's life may account for the spectrum of changes observed in the post-cranial skeleton, albeit other conditions, such as septic arthritis of the hip, were also considered in the differential diagnosis. These fractures likely disrupted the blood supply, leading to necrosis and subsequent resorption of the femoral head, associated with adjustments in the shape of the acetabulum and atrophy of the lower limb. Trauma in a still immature skeleton can significantly impact the affected individual's life, as it may lead to pernicious secondary complications.

Keywords: Paleopathology; pelvic fracture; disuse atrophy; bone asymmetry; impairment.

Introduction

Differential diagnosis is a complex, yet crucial, step in understanding the nature and burden of disease in a skeletal population (Mays, 2018). Researchers employ several methods, with the comparative approach being the most common. Anatomical skeletal collections, such as the Lisbon Identified Skeletal Collection (aka Luís Lopes), have been widely used to develop and test hypotheses regarding the morphology of lesions and patterning of skeletal involvement and possible

esquerdo e alterações no acetábulo. Observou-se ainda atrofia por desuso do membro inferior esquerdo, com exceção dos metatársicos e falanges dos pés, torção do colo do fêmur direito e osteoartrose severa no joelho direito. Uma fratura traumática que afetou o acetábulo e a extremidade proximal do fêmur esquerdo durante a fase de desenvolvimento ósseo do indivíduo poderá explicar o espectro de alterações observadas no esqueleto pós-craniano, no entanto, outras condições, como artrite séptica da anca, foram também consideradas no diagnóstico diferencial. É provável que essas fraturas tenham interrompido o fornecimento de sangue, levando à necrose e subsequente reabsorção da cabeça femoral, associada a ajustes na forma do acetábulo e atrofia do membro inferior. Casos de trauma pediátrico podem impactar fortemente a vida do indivíduo afetado, já que podem gerar complicações perniciosas.

Palavras-chave: Paleopatologia; fratura da bacia; atrofia por desuso; assimetria óssea; invalidez.

association with the cause-of-death of individuals (e.g., Matos and Santos, 2006; Marques et al., 2021). This collection is large, and skeletons are almost complete, including a high number of young individuals, and representing a wide diversity of bone manifestations of disease (individuals were not selected for conspicuous lesions). Moreover, for nearly 800 individuals, the collection has data on the cause of death, and the great majority of adults were assembled before modern therapies were available to the population. How-

ever, like other reference collections, it also presents limitations that may bias the application of the comparative methods and the interpretation of results. It lacks a complete clinical historiography of individuals. Although the information on the cause of death is known, the cause of the lesions is not. Moreover, it does not inform whether other non-lethal conditions co-existed at the time of the death or if diseases distinct from the cause of death affected the individuals and ultimately the skeleton (Brickley and Ives, 2008; Mays, 2018). Accordingly, the study of pathological cases derived from modern reference collections is not as straightforward and poses challenges, like those encountered in the study of archaeological human remains. The present case study exemplifies the abovementioned limitations. It describes a case of conspicuous lower limb asymmetry (not listed in the death certificate) resulting from an ipsilateral femoral head and neck ante mortem disappearance on an adult female skeleton from the Luís Lopes Collection — Museu Nacional de História Natural e da Ciência, Universidade de Lisboa (NMNHC) who died of psychotic schizophrenia. Further goals include the description and interpretation of additional upper limb asymmetries and craniocervical anomalies and their possible relationship with the cause-of-death. Ultimately, it aims to discuss the impact of joint disease on a developing skeleton and the ways the bone tissue has adjusted to and recovered from the injury.

Lower limb asymmetry and its multiple aetiologies

Lower limb asymmetry (LLA), also termed leg length inequality (or discrepancy/disparity), is defined as the difference in lengths of paired limb extremities (Brady et al., 2003; Golightly et al., 2007). LLA can be classified as anatomical when the discrepancy is caused by shortening or lengthening of a bone or a group of bones, or functional, when no physical shortening of the bones of the lower limb exists, which might occur following joint contractures or foot mechanics dysfunctions (Morscher, 1977; McCaw and Bates, 1991; Brady et al., 2003). Anatomical LLA may have a congenital aetiology related to structural and non-structural defects (e.g., aplasia, hypoplasia, or proximal focal femoral deficiency, hip dislocation, Klippel-Trenaunay-Weber Syndrome, and neurofibromatosis) or an acquired origin (Lessa, 2011; Sánchez et al., 2013). Some commonly acquired aetiologies include infection, particularly septic arthritis of the hip (Zhan et al., 2023), and trauma, such as epiphyseal growth plate (or physis) injury and diaphyseal fractures with marked overriding of bone fragments (Morscher, 1977; Brady et al., 2003; Sánchez et al., 2013).

Septic arthritis is a bacterial, viral, or fungal infection of the synovium and adjacent tissues that often affects the large joints of the lower limb (i.e. hip, knee, and ankle) (Burt et al., 2013; Rutz and Spoerri, 2013; Pääkkönen, 2017). Most cases develop by haematogenous spread of bacteria, particularly *Staphylococcus aureus*

and respiratory pathogens. Other routes include local dissemination from an osteomyelitis focus or direct inoculation from penetrating injury (Rutz and Spoerri, 2013; Nannini et al., 2023). Bacterial septic arthritis of the hip is more frequent in children of the male sex and can severely damage the hip joint, femoral head and neck or growth plaque, resulting in an apparent leg length discrepancy due to malposition of the limb (Cheng and Lam, 1996; Spiegel et al., 2007). Septic arthritis of the paediatric hip joint is an uncommon condition (Nannini et al., 2023), and its diagnosis in archaeology can be difficult because there is no feature unique to the condition (Buikstra, 2019). Bone trauma involving the epiphyseal growth plates accounts for 18%-30% of paediatric fractures. It primarily affects the distal femoral and tibial physis and may cause arrested growth, often leading to lower limb asymmetry and bone deformities in adults (Shaw et al., 2018).

Material and methods

The skeleton (MB61:00562) under analysis belongs to a female individual aged 54, who died in the city of Lisbon, in 1954, with psychotic schizophrenia listed as the cause of death. There is no medical history of the individual beyond the cause of death. The skeleton is well-preserved and almost complete (Table 1). The skeleton was examined macroscopically, and the hip and lower long bones were radiographed. The metric analysis was performed mainly on the long bones, with an osteometric board,

a digital calliper, and a tape measure following Bass (1995) and Buikstra and Ubelaker (1994). All procedures were concluded with the differential diagnosis, and the Istanbul terminology framework was used (Appleby et al., 2015).

Description of the lesions

Exuberant bone changes were noticed in the left acetabulum and proximal femur. The left acetabulum showed an atypical configuration characterized by a shallow and discontinuous cavity, encircled by an irregular, thick rim of bone (Figure 1). The space of the ossification centres of the innominate is still visible. Scattered foci of bone porosity and hypertrophic bone formation are also discernible. No clear acetabular fossa and lunate surface were identified. An irregular patch of newly formed bone was identified at the attachment site of the ilioc muscle in the iliac fossa, accompanied by torsion of the pubic ramus towards the central axis (Figure 2). A close inspection of the left femur revealed the absence of the head and neck with complete obliteration of the proximal region (Figure 3), which exhibited small areas of porous bone and eburnation and new bone formations, like osteophytes. A mediolateral constriction and an anterior-posterior bowing were observed on the femoral shaft. An abnormally increased angle of inclination was observed in the neck of the right femur.

The macroscopic analysis of the female skeleton revealed pelvic and limb asymmetries (Tables 1 and 2). Marked

Table 1. Characterization of the biological and paleopathological profile of the MB61-00562 female skeleton.

Biographic data	Collection ID: MB61-00562, Luís Lopes Collection, Museu Nacional de História Natural e da Ciência (NMNHC), Universidade de Lisboa. Biological profile: Female, 54-year-old at the time of death. Birthplace and date: Lisbon, year of 1899. Place of death and date: Lisbon, year 1954. Occupation: “doméstica”, which can mean either a housekeeper or housewife. Cause of death: Psychotic schizophrenia.
Bone preservation	The skeleton is well-preserved and almost complete. Only the hyoid, the left fibula, and some bones of the hand and feet are missing. Some teeth were lost post mortem (right central incisor and left lateral incisor).
Skull bones and ribs	Congenital defects on the base of the cranium and the cervical vertebrae. Ante mortem trauma on the nasal bones (healed) and on three rib shafts (unhealed): presence of thin layers of new bone near the edges of the broken bones.
Upper limb bones	Limb discrepancies in terms of length, breadth, and bone shaft circumference — e.g., clavicle (right shorter than the left one), radius and ulna (left shorter than the right one) (Table 2, supplementary material). Enthesal changes: right humerus (i.e., latissimus dorsi, pectoralis major, and teres major); right and left humerus (i.e., common extensor origin), right and left radius (i.e., biceps brachii) and ulna (i.e., triceps brachii).
Lower limb bones	Limb discrepancies in all bone dimensions — i.e., femur, tibia, patella, and foot bones (calcaneus, talus, and navicular). Right bones are larger — e.g., the left calcaneus is 3.6 mm shorter, and the talus is 2.6 mm. The metatarsals show symmetrical length and width. An osteophyte exists on the lateral head of the first metatarsals, more prominent on the left side (Table 2, supplementary material). Marked shortening and narrowing of the left <i>os coxae</i>. Shallow acetabulum with no clear acetabular fossa and lunate surface. Absence of the left femoral head and neck and anterior-posterior bowing of the left and right femur shaft. Joint changes: right knee joint (severe osteoarthritic changes — i.e., marginal and surface osteophyte formation, porosity, eburnation, and changes in the joints contour on the femur, tibia, and patella), left hip (with eburnation), right hip (without eburnation), second cuneiform, right calcaneus, talus and navicular (deformation and osteophytes), two middle and distal feet phalanges (fusion and marginal lipping at the proximal end). Enthesal changes: psoas major and iliacus, gluteus medius and maximum and soleal line, but more prominent in the great trochanter of the right femur.



Figure 1. Lateral view of the left hip bone, with a shallow, irregular, and discontinuous acetabulum, MNHNC:MB61:00562, Luís Lopes Collection, Universidade de Lisboa (image: M. Amendola, Universidade de Lisboa).



Figure 2. Medial view of the left hip bone, with an irregular patch of newly formed bone at the attachment site of the iliacus muscle, MNHNC:MB61:00562, Luís Lopes Collection, Universidade de Lisboa (image: M. Amendola, Universidade de Lisboa).



Figure 3. Anteroposterior radiograph of the left femur showing ante mortem absence of the femoral head and bone densification on the proximal extremity MNHNC:MB61:00562, Luís Lopes Collection, Universidade de Lisboa (image: FMV, Universidade de Lisboa).

asymmetries in height and width were visible in the *os coxae*, with the left being shorter than its contralateral (172 mm compared to 192 mm). Diaphyseal and condylar breadth differences were observed in the femur and tibia: the right-side bones' diaphyses and epiphyses are

larger in all dimensions (Figures 4 and 5). For instance, the right bone midshaft circumference is 74 mm and the left is 65 mm, the right circumference below the trochanter is 87 mm and the left is 70 mm. Similar asymmetries were observed on the patellae and tarsal bones,

but the metatarsals and phalanges are symmetrical. Minor limb discrepancies were noticed in the upper limb bones, although the left-side bones were, in general, shorter, narrower, and with less pronounced muscle attachments when compared with the ones on the right side. The only exception was found for the clavicle, where the right is shorter, but the sternal extremity is much larger. The sternoclavicular joints are asymmetrical in size and form.

In addition to limb discrepancies, pronounced osteoarthritic changes were evident in the right knee, characterized by exuberant osteophyte formation and articular deformation (Figure 5). Osteoarthritis is also present in the right tarsal bones, more severe in the talonavicular articulation. No signs of osteoarthritis were observed on the left knee or tarsal bones. However, joint changes (porosity and/or lipping on the articulation margin) were observed on both shoulders



Figures 4 and 5. Anterior and posterior aspects of the femurs. The right femur displays a short, valgus neck, anterior-posterior bowing, and degenerative alterations on the distal extremity; while on the left there is atrophy along the shaft and on the distal articulation, MNHNC:MB61:00562, Luís Lopes Collection, Universidade de Lisboa (image: M. Amendola, Universidade de Lisboa).

Table 2. Measurements on the post cranial skeleton according to the standards in Buikstra and Ubelaker (1994) and Bass (1995).

Bone	Measurement	Right (mm)	Left (mm)	%	Asymmetry
Clavicle	Length	131.00	141.00	92.91	-7.35
	Circumference at midshaft	35.00	36.00	97.22	-2.82
	Sagittal diameter at midshaft	10.50	11.70	89.74	-10.81
	Vertical diameter at midshaft	9.00	10.60	84.91	-16.33
	Maximum diameter at the sternal end	27.00	22.20	121.62	19.51
	Maximum diameter at the acromial end	21.20	25.00	84.80	-16.45
Scapula	Height	144.00	150.00	96.00	-4.08
	Breadth	101.00	103.00	98.06	-1.96
	Glenoid cavity height*	35.40	33.80	104.73	4.62
	Glenoid cavity breadth*	26.30	25.40	103.54	3.48
Humerus	Maximum length	279.00	279.00	100.00	0.00
	Epicondylar breadth	52.30	52.60	99.43	-0.57
	Vertical diameter of head	42.00	40.20	104.48	4.38
	Maximum diameter at midshaft	25.50	24.00	106.25	6.06
	Minimum diameter at midshaft	15.10	14.50	104.14	4.05
	Midshaft circumference	69.00	66.00	104.55	4.44
	Least circumference of the shaft*	61.00	60.00	101.67	1.65
Radius	Maximum length	201.00	194.00	103.61	3.54
	Anterior-posterior diameter at midshaft	10.90	10.40	104.81	4.69
	Medial-lateral diameter at midshaft	13.90	13.70	101.46	1.45
	Head maximum diameter*	18.80	18.60	101.08	1.07
	Maximum distal epiphyseal breadth*	29.70	28.20	105.32	5.18
Ulna	Maximum length	224.00	216.00	103.70	3.64
	Minimum circumference	38.00	39.00	97.44	-2.60
	Height	192.00	172.00	111.63	10.99
Os coxae	Iliac breadth	151.00	145.00	104.14	4.05
	Pubis length**	68.70	77.00	89.22	-11.39
	Ischium length**	70.50	68.60	102.77	2.73
	Acetabulum: maximum height*,**	49.30	36.00	136.94	31.18
	Acetabulum: maximum width*,**	45.90	42.40	108.25	7.93
	Width of sciatic notch	46.90	40.40	116.09	14.89

Bone	Measurement	Right (mm)	Left (mm)	%	Asymmetry
Sacrum	Height of auricular surface	51.00	48.80	104.51	4.41
	Width of auricular surface	17.30	17.00	101.76	1.75
Patella	Maximum height	34.00	32.40	104.94	4.82
	Maximum width	40.50	33.80	119.82	18.03
Femur	Length at the greater trochanter**,**	360.00	352.00	102.27	2.25
	Epicondylar breadth	68.00	62.00	109.68	9.23
	Head vertical diameter	40.60			
	Antero-posterior subtrochanteric diameter	23.40	22.10	105.88	5.71
	Medial-lateral subtrochanteric diameter	26.70	21.10	126.54	23.43
	Midshaft circumference	74.00	65.00	113.85	12.95
	Circumference below the trochanter	87.00	70.00	124.29	21.66
	Length	319.00	317.00	100.63	0.63
	Maximum proximal epiphyseal breadth**	78.00	57.70	135.18	29.92
	Maximum distal epiphyseal breadth	46.80	40.20	116.42	15.17
Tibia	Maximum diameter at the nutrient foramen	25.30	24.00	97.31	-2.73
	Medial-lateral diameter at the nutrient foramen	23.30	17.00	132.39	27.87
	Circumference at the nutrient foramen	75.00	67.00	111.94	11.27
	Maximum length	305.00			
Calcaneus	Maximum length	66.9	63.3	105.69	5.53
	Middle breadth	35.7	31.6	112.97	12.18
Talus	Maximum length	52.3	49.7	105.23	5.10
	Width of the talus	36.8	35.0	105.14	5.01
Metatarsals	MT1 length*	58.30	58.1	100.34	0.34
	MT1 base D-P width	25.20	24.50	102.86	2.82
	MT1 base L-M width	18.60	16.30	114.11	13.18
	MT2 length*	69.0	70.7	97.60	-2.43
	MT3 length*	64.99	65.34	99.46	-0.54
	MT4 length*	62.49	60.93	102.56	2.53
	MT5 length*	58.05	58.21	99.73	-0.28

Asymmetry is calculated as: $\frac{|(Rt-Lt)/((Rt + Lt)/2)| \times 100}{}$. A positive value indicates a larger right dimension. *Bass (1995); **Approximate measurement.

and elbows, as well as in some rib heads and tubercles. Signs of degenerative disc disease, such as pitting on the inferior and/or superior surfaces of the vertebral bodies, marginal osteophytes, and anterior body compression (e.g., T3, T5 and T7) were observed along the spine. Abnormal flattening of several spinous processes, particularly those of C7, T10-T12 and L2-L4, accompanied by right lateral bending of the lumbar segment, was also noticed. The right calcaneus, in the dorsal area, shows remodelled lamellar bone. There is a lateral extension of the distal articulation of the left first metatarsal. Furthermore, evidence of ante mortem trauma was observed on the nasal bones as well as on three rib shafts: one left rib and two right ribs. Of the right ribs, both display multiple fractures, and one of these right ribs exhibits two unhealed fractures, with layers of newly formed bone near the fractured edges.

Bone variations were observed in several bones of the axial skeleton: three were observed at the craniocervical joint, namely a bilateral precondylar tubercles with a depression and an incomplete bone bridging on the occipital bone, and a unilateral left retrotransverse foramen on the atlas. Moreover, the spinous process of the S1 is bifid, the twelfth left rib is rudimentary (the right one is not present), and there are also some alterations on the skull, for instance, the sutures are completely open, and the frontal grooves are unusually marked on the right side. On the feet, a bilateral partial coalition of the

third metatarsal and the third cuneiform, and pedal symphalangism in two toes were identified (Mann et al., 2016).

Discussion

The marked asymmetry and acetabular changes of the left *os coxae* seem consistent with a paediatric pelvic fracture with premature closure of the triradiate (epiphyses) cartilage (TC).

In the present case, it is possible that the injury occurred before the complete formation of the acetabulum and epiphyseal union (11-16 years of age), eventually associated with a crushing fracture (see: Scuderi and Bronson, 1987; Heeg et al., 1988; Vassalou et al., 2018). The bone changes observed on the left proximal femur are consistent with a diagnosis of femoral neck fracture, possibly of type III: cervicotrochanteric (or basicervical), according to Delbet classification (see: Dial and Lark, 2018; Palocaren, 2018).

A displaced femoral neck fracture is a rare clinical condition in children (Song et al., 2013), with long-term morbidity, and a potential cause of life-long disabilities (Mirdad, 2002; Neri and Lancellotti, 2004; Lovell, 2016). Complications include avascular necrosis (AVN) (Mirdad, 2002), non-union, varus malunion of the hip, and premature osteoarthritis (Bucholz and Rathjen, 1985; Curate et al., 2011; Palmu et al., 2013). In the case of basicervical fractures, they account for approximately 35% of paediatric hip fractures and carry a 20% risk of developing avascular necrosis of the femoral head (Dial and Lark,

2018). Fracture type and age are the most significant predictors of AVN. In children, the risk increases with age (Moon and Mehlman, 2006). As the proximal extremity of the femur articulates smoothly with the acetabulum, the femoral head was not present ante mortem. Post-traumatic resorption of the femoral head occurred and impacted the development of the left hip joint, as it is necessary for normal acetabular development, namely for its characteristic concavity or cuplike shape (Scuderi and Bronson, 1987; Heeg et al., 1988; Scheinfeld et al., 2015).

Both the acetabulum and femur injuries may be related. The rarity of the lesions, their skeletal position (a single blow, for instance, would affect both bones at once), and their remodelled state are highly consistent with a common origin. It is pertinent to mention that TC fractures often occur in association with concomitant pelvic ring injuries, proximal femoral fractures or femoral shaft fractures, post-traumatic acetabular dysplasia, femoral head subluxation and/or necrosis, and osteoarthritis (Badina et al., 2013; Gänsslen et al., 2013; Vassalou et al., 2018). Other severe complications include hip pain, pelvic tilt and asymmetry, and lower limb shortening, the latter condition conducive to altered gait and claudication (Galos and Doering, 2020; Dong et al., 2021). The lesion in the iliac muscle is typical of heterotopic ossification (HO), whose most common aetiology is soft tissue trauma (acute or multiple minor injuries) followed by ossification produced by damage

to the muscle or periosteum (Waldron, 2009). HO is more commonly seen on the long bones (Assis and Garcia, 2023).

As mentioned, the bilateral asymmetry observed, for instance, in the size of the femoral condyles seems to support a common origin of both femoral and acetabulum lesions and an early in life occurrence. Knüsel (2000) mentions that a limb disability in a growing individual will affect both diaphyseal and articular dimensions, whereas disabilities occurring in mature individuals will be reflected in diaphyseal measurements only. Femur length is not substantially asymmetrical; thus, one may assume that the proximal epiphysis of the femur was closed or closing, which in females occurs between 14–16 years old (Cunningham et al., 2016).

In addition to trauma, other conditions (e.g., tuberculosis, syphilis, cancer metastasis, sickle cell disease, poliomyelitis, and congenital hip dysplasia — see Table 3) were considered and ruled out from the differential diagnosis.

However, septic arthritis of the hip bone produces intense inflammatory reactions that can result in severe complications, including osteomyelitis and joint ankylosis, which were not observed, and in the worst outcomes, systemic sepsis. Even so, the fact that it may be accompanied by osteonecrosis and complete loss of the femoral head and neck, as well as LLA, makes it impossible to completely rule it out of the differential diagnosis. Zhan et al. (2023) published a case of septic arthritis of the hip with some features

Table 3. Differential diagnosis of the bone anomalies and changes observed in the MB61-00562 female skeleton.

MB61-00562 Main paleopathological features:
Marked asymmetry of the left <i>os coxae</i> with acetabular changes/absence of the left femoral head and neck.
Differential diagnosis: acetabulum and intracapsular fracture at a young age. The marked asymmetry of the left <i>os coxae</i> , the absence of a true acetabular fossa, and the presence of a shallow and irregular acetabular rim seem compatible with a case of premature closure of the triradiate cartilage. After trauma, premature closure may result from the formation of a bony bridge across the epiphysis due to the ossification of an existing hematoma or of a displaced bone fragment (Scuderi and Bronson, 1987 and authors herein). An early-age proximal femoral fracture, followed by head reabsorption, is the best explanation for the absence of femoral head, robusticity asymmetry in the upper and lower limb, and severe knee osteoarthritis on the opposite side.
Conditions not completely ruled out from the differential diagnosis:
Septic arthritis — although SA has been considered thoroughly, a post-septic hip has a multitude of presentations, including avascular necrosis (Vidigal et al., 1998), hip arthritis, and limb shortening, there is a lack of evident signs of infection, like new bone formation or cloacae (Zhan et al., 2023), and the hip remains mobile. Ankylosis is a common consequence of SA (Waldron, 2009). The degenerative changes seen in the left acetabulum, left femur proximal extremity, and right distal femur exhibit significant similarities, such as joint surface exostoses and advanced stages of hypertrophic bone formation (Ortner, 1968; Buikstra, 2019), thus, it is reasonable to assume a common aetiology.
Conditions ruled out from the differential diagnosis:
Tuberculosis, syphilis, and cancer metastasis — none of their most distinctive features were observed in the skeleton. No signs of lytic or proliferative lesions were observed on the skull, ribs, vertebrae, or long bones (Waldron, 2009; Buikstra, 2019).
Sickle cell disease — can cause osteonecrosis of the femoral head, but in clinical cases, the manifestation is often bilateral (Daltro et al., 2018), which was not observed in the present case.
Poliomyelitis — conditions that cause limb paralysis during childhood (in a growing skeleton) may induce limb asymmetry. In these cases, the affected limb is often much shorter and gracile than its antimer. This condition also predisposes bone to fragility fractures (Liverse et al., 2008; Waldron, 2009; Novak et al., 2014). However, in the present individual, the difference is mainly related to robusticity in the shaft and proximal and distal ends of the bone, and not bone length.
Congenital hip dysplasia — the most common features — e.g., a false, but round, oval, or crescent-shaped acetabulum were not observed. Moreover, it is not associated with head disappearance (Mitchell and Redfern, 2008).

similar to the 562 case. In both individuals, the affected acetabulum concavity is shallow. Both show sclerotic bone, but in the Zhan et al. (2023) case, the destruction of the acetabulum was much more pronounced, and the authors identified signs of infection, such as several cloacae in the acetabulum and porous bone formation on the proximal femur, which we could not identify. Zhan et al. (2023) acknowledge that conditions secondary to trauma could produce similar pathologies, but no fractures were identified in their case (see Buikstra, 2019). Not many examples of fractures with evidence of infection exist in the archaeological record (Buikstra, 2019). A possible explanation is that individuals would not survive long enough for remodelling to occur. The non-occurrence of open fractures in the past does not seem a plausible hypothesis. A key distinguishable feature in septic arthritis is that the edge or margin of the affected bone is less sharp than in other forms of arthritis (Burt et al., 2013), but there are no features of septic arthritis that are unique to the condition (Buikstra, 2019).

In paleopathology, the identification of childhood trauma in the adult skeleton is challenging (for a review see: Verlinden and Lewis, 2015; Lewis, 2018). Limb asymmetry/deformity is regarded as an indirect indicator of physeal trauma and arrested growth in children (Lewis, 2018). Some examples regarding the upper limb bones have been published in the palaeopathological literature (e.g., Glencross and Stuart-Macadam, 2001).

However, to our knowledge, no cases affecting the hip bone have been reported to date. This female also displayed nose and rib fractures. Although it is not possible to know if all fractures occurred in the same event, it is still interesting to note that this woman suffered injuries in different bones in her lifetime.

Impact of bone changes on the individual's life

The observed bone lesions provide evidence of a life characterized by enduring disability, yet also by resilience. An early-age trauma episode, albeit restricted to the left hip, must have had a bigger impact on the biomechanics of the lower limb. LLA may cause joint instability since it alters gait symmetry and the dynamics of the locomotor system during weight bearing. For example, the slight torsion and increased inclination angle of the right femoral neck – coxa valga, can be interpreted as a compensatory mechanism. The presence of eburnation (although a small patch), bone of increased density (sclerotic), and osteophytes on the proximal left femur, indicating the formation of a pseudo-joint, aligns with the likelihood of mobility to some extent, potentially with the assistance of a cane or crutch (Belcastro and Mariotti, 2000; Redfern and Austin, 2020). As all the lower limb bones of the left side, including the femur, tibia, patella, and tarsals, exhibit a smaller size, except for the metatarsals and toes, it is reasonable to infer that walking was greatly compromised. The

column is also affected by osteopenia. Reduction of muscle mass can be seen after the use of a sling or crutch to maintain the limb in suspension. In fact, immobility alone, even for short periods, impacts virtually all body systems (e.g., musculoskeletal, physiological, metabolic, respiratory, and even mental) because they do not function in isolation (Tilley, 2015). Even in healthy older adults, bed rest has been shown to cause muscle wasting within 10 days and more than 1% loss in bone density within the vertebral column (Parry and Puthuchear, 2015). However, some weight was still borne on the left foot to compensate for the uneven leg length, which could explain the lack of asymmetry on the metatarsals and the MT1 distal joint extension (Lovell, 2016). Additionally, the pronounced disparity in length between the right and left clavicle (in humans, the clavicle of the dominant side is usually shorter; Mays et al., 1999), coupled with a bias towards right-side asymmetry in the attachment areas of the pectoralis major and teres major muscles, suggests a history of unequal loading with greater demands on the right side. However, both shoulders and elbows show degenerative changes. Moreover, one cannot exclude a possible relationship between this female's LLA and the severe osteoarthritis manifest in her right knee and some tarsal bones. Dixon and Campbell-Smith (1969) in their examination of clinical cases of LLA identified a heightened incidence of degenerative joint changes in the longer limb's knee in comparison to the shorter limb.

Finally, the anomalies observed at the base of the cranium seem to be developmental in origin and possibly arise from a failure in bone segmentation. Clinically, these defects may be asymptomatic or, if responsible for stenosis of the artery, may provoke significant discomfort, including migraines, vertigo, confusion, altered consciousness, or motor weakness. It is meaningful to note that the cause-of-death listed in this case was psychotic schizophrenia, and several studies have found a high percentage of minor physical anomalies, particularly around the head and neck, among schizophrenic patients (McGrath et al., 1995; Compton and Walker, 2009; Tsehay and Shitie, 2020). The explanation for this association is that both result from genetic and environmental disturbances on development that occurred during the intrauterine and perinatal periods that predispose to developing schizophrenia. Despite the relationship between these craniocervical anomalies and some neurological symptoms, including being on bed rest during most of the day (Lvov et al., 2017), it is impossible to know for sure if their presence has affected the mental health of this woman.

Conclusion

The article described a spectrum of bone changes observed in a female skeleton from the Luís Lopes Collection, 20th-century Lisbon, who died from psychotic schizophrenia. Despite being an identified case, the available information contributed little to the differential diagnosis.

It was difficult to establish any definitive connection between the cause of death listed and the bone changes observed on the left hip, which portrays some of the limitations of the reference collections. Even so, the present case is relevant to palaeopathological knowledge. It described a rare case of an acetabulum and intracapsular fracture that occurred at a young age (before acetabulum fusion was completed) and was responsible for the absence of the femoral head, severe lower limb asymmetry, and knee and tarsal osteoarthritis on the opposite side. It also discusses the health significance of a cluster of minor congenital defects on the base of the skull and cervical region. The bone lesions reveal a life marked by permanent impairment but also by resilience. This female survived a severe hip injury that likely occurred before adulthood, probably being cared for by family or community members during the period of recovery, but resumed her mobility, although with severe limitations, after the injury healed. This case holds palaeopathological significance as it informs researchers about a spectrum of bone changes that can be used for diagnosing hip trauma in growing individuals during periods with limited access to modern professional healthcare, as was the situation throughout human history and remains the reality in many countries today.

Conflict of interests

The authors disclose no conflict of interest.

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References

- Appleby, J.; Thomas, R.; Buikstra, J. 2015. Increasing confidence in paleopathological diagnosis – application of the Istanbul terminological framework. *International Journal of Paleopathology*, 8: 19–21.
- Assis, S.; Garcia, J. 2023. A rare femoral heterotopic bone formation in a 14th–19th century female skeleton from Constância (Portugal). *International Journal of Paleopathology*, 40: 93–98. DOI: 10.1016/j.ijpp.2022.12.004.
- Badina, A.; Vialle, R.; Fitoussi, F.; Damsin, J. P. 2013. Case reports: treatment of traumatic tri-adiate cartilage epiphyseodesis: what is the role of bridge resection? *Clinic Orthopaedic Related Research*, 471(11): 3701–3705. DOI: 10.1007/s11999-013-3054-z.
- Bass, W. M. 1995. *Human osteology: a laboratory and field manual*. 4th edition. Columbia, Missouri Archaeological Society.

- Belcastro, M. G.; Mariotti, V. 2000. Morphological and biomechanical analysis of a skeleton from roman imperial necropolis of Casalecchio di Reno (Bologna, Italy, II-III c. AD). A possible case of crutch use. *Collegium Antropologicum*, 24(2): 529–539.
- Brady, R. J.; Dean, J. B.; Skinner, T. M.; Gross, M. T. 2003. Limb length inequality: clinical implications for assessment and intervention. *Journal of Orthopaedic & Sports Physical Therapy*, 33(5): 221–234. DOI: 10.2519/jospt.2003.33.5.221.
- Brickley, M.; Ives, R. 2008. *The bioarchaeology of metabolic bone diseases*. Oxford, Academic Press.
- Bucholz, R. W.; Rathjen, K. 1985. Concomitant ipsilateral fractures of the hip and femur treated with interlocking nails. *Orthopaedics*, 8(11): 1402–1406. DOI: 10.3928/0147-7447-19851101-13.
- Buikstra, J. E. (ed.). 2019. *Ortner's identification of pathological conditions in human skeletal remains*. London, Academic Press.
- Buikstra, J. E.; Ubelaker, D. H. 1994. *Standards for data collection from human skeletal remains*. Arkansas Archaeological Survey Research Series No. 44. Fayetteville, Arkansas Archaeological Survey.
- Burt, N. M.; Semple, D.; Waterhouse, K.; Lovell, N. C. 2013. *Identification and interpretation of joint disease in paleopathology and forensic anthropology*. Springfield, Charles C Thomas Publisher.
- Cheng, J. C. Y.; Lam, T. M. 1996. Femoral lengthening after type IV B septic arthritis of the hip in children. *Journal of Pediatric Orthopaedic*, 16: 533–539.
- Compton, M. T.; Walker, E. F. 2009. Physical manifestations of neurodevelopmental disruption: are minor physical anomalies part of the syndrome of schizophrenia? *Schizophrenia Bulletin*, 35(2): 425–436. DOI: 10.1093/schbul/sbn151.
- Cunningham, C.; Scheuer, L.; Black, S. 2016. *Developmental juvenile osteology*. 2nd edition. London, Academic Press.
- Curate, F.; Assis, S.; Lopes, C.; Silva, A. M. 2011. Hip fractures in the Portuguese archaeological record. *Anthropological Science*, 119(1): 87–93. DOI: 10.1537/ase.100211.
- Daltro, G.; Franco, B. A.; Faleiro, T. B.; Rosário, D. A.; Daltro, P. B.; Fortuna, V. 2018. Osteonecrosis in sickle cell disease patients from Bahia, Brazil: a cross-sectional study. *International Orthopaedics*, 42(7): 1527–1534. DOI: 10.1007/s00264-018-3905-z.
- Dial, B. L.; Lark, R. K. 2018. Pediatric proximal femur fractures. *Journal of Orthopaedics*, 15(2): 529–535. DOI: 10.1016/j.jor.2018.03.039.
- Dixon, A. S. T.; Campbell-Smith, S. 1969. Long leg arthropathy. *Annals of the Rheumatic Diseases*, 28(4): 359–365.
- Dong, Y.; Wang, J.; Qin, J.; Nan, G.; Su, Y.; He, B.; Cai, W.; Chen, K.; Gu, K.; Liang, X.; Yan, G.; Wang, Z. 2021. Retrospective analysis of traumatic triradiate cartilage injury in children. *BMC Musculoskeletal Disorders*, 22(1): 674. DOI: 10.1186/s12891-021-04565-2.
- Galos, D.; Doering, T. A. 2020. High-energy fractures of the pelvis and acetabulum in pediatric patients. *Journal of the American Academy of Orthopaedic Surgeons*, 28(9): 353–362. DOI: 10.5435/jaaos-d-19-00082.
- Gänsslen, A.; Hildebrand, F.; Heidari, N.; Weinberg, A. 2013. Acetabular fractures in children: a review of the literature. *Acta Chirurgiae Orthopaedicae et Traumatologiae Čechoslovaca*, 80(1): 10–14.
- Glencross, B.; Stuart-Macadam, P. 2001. Radiographic clues to fractures of distal hu-

- merus in archaeological remains. *International Journal of Osteoarchaeology*, 11(4): 298–310. DOI: 10.1002/oa.565.
- Golightly, Y. M.; Allen, K. D.; Renner, J. B.; Helmick, C. G.; Salazar, A.; Jordan, J. M. 2007. Relationship of limb length inequality with radiographic knee and hip osteoarthritis. *Osteoarthritis and Cartilage*, 15(7): 824–829. DOI: 10.1016/j.joca.2007.01.009.
- Heeg, M. I. N. N. E.; Visser, J. D.; Oostvogel, H. J. 1988. Injuries of the acetabular triradiate cartilage and sacroiliac joint. *The Journal of Bone and Joint Surgery, British Volume*, 70(1): 34–37. DOI: 10.1302/0301-620X.70B1.3339056.
- Knüsél, C. 2000. Bone adaptation and its relationship to physical activity in the past. In: Cox, M.; Mays, S. (eds.). *Human osteology in archaeology and forensic science*. Cambridge, Cambridge University Press: 381–401.
- Lessa, A. 2011. Daily risks: a biocultural approach to acute trauma in pre-colonial coastal populations from Brazil. *International Journal of Osteoarchaeology*, 21(2): 159–172. DOI: 10.1002/oa.1118.
- Lewis, M. 2018. *Paleopathology of children: identification of pathological conditions in the human skeletal remains of non-adults*. London, Academic Press.
- Lieverse, A. R.; Metcalf, M. A.; Bazaliiskii, V. I.; Weber, A. W. 2008. Pronounced bilateral asymmetry of the complete upper extremity: a case from the early neolithic Baikal, Siberia. *International Journal of Osteoarchaeology*, 18(3): 219–239.
- Lovell, N. C. 2016. Tiptoeing through the rest of his life: a functional adaptation to a leg shortened by femoral neck fracture. *International Journal of Paleopathology*, 13: 91–95. DOI: 10.1016/j.ijpp.2016.03.001.
- Lvov, I.; Lukianchikov, V.; Grin, A.; Sytnik, A.; Polunina, N.; Krylov, V. 2017. Minimally invasive surgical treatment for Kimmerle anomaly. *Journal of Craniovertebral Junction & Spine*, 8(4): 359–363. DOI: 10.4103/jcvjs.JCVJS_73_17.
- Mann, R. W.; Hunt, D. R.; Lozanoff, S. 2016. *Photographic regional atlas of non-metric traits and anatomical variants in the human skeleton*. Springfield, Charles C. Thomas Publisher.
- Marques, C.; Roberts, C.; Matos, V. 2021. Cancers as rare disease: terminological, theoretical, and methodological biases. *International Journal Paleopathology*, 32: 111–122. DOI: 10.1016/j.ijpp.2020.12.005.
- Matos, V.; Santos, A. L. 2006. On the trail of pulmonary tuberculosis based on rib lesions: results from the human identified skeletal collection from the Museu Bocage (Lisbon, Portugal). *American Journal of Physical Anthropology*, 130(2): 190–200. DOI: 10.1002/ajpa.20309.
- Mays, S. 2018. How should we diagnose disease in palaeopathology? Some epistemological considerations. *International Journal of Paleopathology*, 20: 12–19. DOI: 10.1016/j.ijpp.2017.10.006.
- Mays, S.; Steele, J.; Ford, M. 1999. Directional asymmetry in the human clavicle. *International Journal of Osteoarchaeology*, 9(1): 18–28.
- McCaw, S. T.; Bates, B. T. 1991. Biomechanical implications of mild leg length inequality. *British Journal of Sports Medicine*, 25(1): 10–13. DOI: 10.1136/bjism.25.1.10.

- McGrath, J. J.; Van Os, J.; Hoyos, C.; Jones, P. B.; Harvey, I.; Murray, R. M. 1995. Minor physical anomalies in psychoses: associations with clinical and putative aetiological variables. *Schizophrenia Research*, 18(1): 9–20. DOI: 10.1016/0920-9964(95)00016-X.
- Mirdad, T. 2002. Fractures of the neck of femur in children: an experience at the Aseer Central Hospital, Abha, Saudi Arabia. *Injury*, 33(9): 823–827. DOI: 10.1016/S0020-1383(02)00013-X.
- Mitchell, P. D.; Redfern, R. C. 2008. Diagnostic criteria for developmental dislocation of the hip in human skeletal remains. *International Journal of Osteoarchaeology*, 18(1): 61–71. DOI: 10.1002/oa.919.
- Moon, E. S.; Mehlman, C. T. 2006. Risk factors for avascular necrosis after femoral neck fractures in children: 25 Cincinnati cases and meta-analysis of 360 cases. *Journal of Orthopaedic Trauma*, 20(5): 323–329.
- Morscher, E. 1977. Etiology and pathophysiology of leg length discrepancies. In: Hungerford, D. S. (ed.). *Leg length discrepancy: the injured knee*. Progress in Orthopaedic Surgery, vol. 1. Berlin, Springer-Verlag: 9–19. DOI: 10.1007/978-3-642-66549-3_2.
- Nannini, A.; Giorgino, R.; Bianco Prevot, L.; Bobba, A.; Curci, D.; Cecchinato, R.; Peretti, G. M.; Verdoni, F.; Mangiavini, L. 2023. Septic arthritis in the pediatric hip joint: a systematic review of diagnosis, management, and outcomes. *Frontiers in Pediatrics*, 11: 1311862. DOI: 10.3389/fped.2023.1311862.
- Neri, R.; Lancellotti, L. 2004. Fractures of the lower limbs and their secondary skeletal adaptations: a 20th century example of pre-modern healing. *International Journal of Osteoarchaeology*, 14(1): 60–66. DOI: 10.1002/oa.686.
- Novak, M.; Čavka, M.; Šlaus M. 2014. Two cases of neurogenic paralysis in medieval skeletal samples from Croatia. *International Journal of Paleopathology*, 7: 25–32. DOI: 10.1016/j.ijpp.2014.06.002.
- Ortner, D. J. 1968. Description and classification of degenerative bone changes in the distal joint surfaces of the humerus. *American Journal of Physical Anthropology*, 28(2): 139–155.
- Pääkkönen, M. 2017. Septic arthritis in children: diagnosis and treatment. *Pediatric Health, Medicine and Therapeutics*, 18(8): 65–68. DOI: 10.2147/PHMT.S115429.
- Palmu, S. A.; Lohman, M.; Paukku, R. T.; Peltonen, J. I.; Nietosvaara, Y. 2013. Childhood femoral fracture can lead to premature knee-joint arthritis: 21-year follow-up results: a retrospective study. *Acta Orthopaedica*, 84(1): 71–75. DOI: 10.3109/17453674.2013.765621.
- Palocaren, T. 2018. Femoral neck fractures in children: a review. *Indian Journal of Orthopaedics*, 52(5): 501–506. DOI: 10.4103/ortho.IJOrtho_404_17.
- Parry, S. M.; Puthuchear, Z. A. 2015. The impact of extended bed rest on the musculoskeletal system in the critical care environment. *Extreme Physiology & Medicine*, 4(1): 16: 1–8. DOI 10.1186/s13728-015-0036-7.
- Redfern, R. C.; Austin, A. 2020. Ankylosis of a knee joint from medieval London: trauma, congenital anomaly or osteoarthritis? *International Journal of Paleopathology*, 28: 69–87. DOI: 10.1016/j.ijpp.2019.10.002.
- Rutz, E.; Spoerri, M. 2013. Septic arthritis of the paediatric hip: a review of current diagnos-

- tic approaches and therapeutic concepts. *Acta Orthopaedica Belgica*, 79(2): 123–34.
- Sánchez, S.; Ortega, X.; Baar, A.; Lillo, S.; De la Maza, A.; Moenne, K.; Escaffi, J.; Pérez, C. 2013. Asimetría de extremidades inferiores: evaluación por imágenes en la edad pediátrica. *Revista Chilena de Radiología*, 19(4): 177–186. DOI: 10.4067/S0717-93082013000400007.
- Scheinfeld, M. H.; Dym, A. A.; Spektor, M.; Avery, L. L.; Dym, R. J.; Amanatullah, D. F. 2015. Acetabular fractures: what radiologists should know and how 3D CT scan aid classification. *Radiographics*, 35(2): 555–577. DOI: 10.1148/rg.352140098.
- Scuderi, G.; Bronson, M. J. 1987. Triradiate cartilage injury: report of two cases and review of the literature. *Clinical Orthopaedics and Related Research*, 217: 179–189.
- Shaw, N.; Erickson, C.; Bryant, S. J.; Ferguson, V. L.; Krebs, M. D.; Hadley-Miller, N.; Payne, K. A. 2018. Regenerative medicine approaches for the treatment of pediatric physeal injuries. *Tissue Engineering, Part B Review*, 24(2): 85–97. DOI: 10.1089/ten.teb.2017.0274.
- Song, K. S.; Ramnani, K.; Cho, C. H.; Bae, K. C.; Lee, K. J.; Son, E. S. 2013. Ipsilateral femoral neck and shaft fracture in children: a report of two cases and a literature review. *Journal of Orthopaedics and Traumatology*, 14(2): 147–154. DOI: 10.1007/s10195-012-0188-9.
- Spiegel, D. A.; Penny, J. N.; Banskota, A. K.; Shrestha, O. P. 2007. *Sequelae of septic arthritis of the hip*. Seattle, Global-HELP publications.
- Tilley, L. 2015. *Theory and practice in the bioarchaeology of care*. New York, Springer.
- Tsehay, B.; Shitie, D. 2020. Minor physical anomalies among schizophrenic patients as a biomarker of its developmental origin in Northwest Ethiopia. *Neuropsychiatric Disease Treatment*, 16: 2491–2497. DOI: 10.2147/NDT.S275582.
- Vassalou, E. E.; Karantanis, A. H.; Raissaki, M. 2018. Imaging of traumatic injuries of the paediatric pelvis and hip. *Hellenic Journal of Radiology*, 3(3): 20–40.
- Verlinden, P.; Lewis, M. 2015. Childhood trauma: methods for the identification of physeal fractures in nonadult skeletal remains. *American Journal of Physical Anthropology*, 157(3): 411–420. DOI: 10.1002/ajpa.22732.
- Vidigal, Jr. E. C.; Vidigal, E. C.; Fernandes, J. 1998. Avascular necrosis as a complication of septic arthritis of the hip in children. *International Orthopaedics*, 21(6): 389–392. DOI: 10.1007/s002640050192.
- Waldron T. 2009. *Palaeopathology*. Cambridge, Cambridge University Press.
- Zhan, X.; Shao, J.; Zhu, Y.; Yeh, H. 2023. A case of septic arthritis of the hip in Central Plains, China, during the Western Han Dynasty (3rd century BCE–1st century CE). *International Journal of Paleopathology*, 40: 87–92. DOI: 10.1016/j.ijpp.2022.12.007

Réplica do sapato do “gigante Guyposcoano”: ressignificação do objeto nas coleções da Universidade de Coimbra

Replica of the ‘Guyposcoano giant’s’ shoe: re-signification of the object in the collections of the University of Coimbra



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Resumo No acervo do Museu da Ciência da Universidade de Coimbra, herdeiro do Museu de História Natural e do Museu Antropológico, conserva-se a réplica do sapato direito de Miguel Joaquín de Eleicegui Ateaga (1818–1861), conhecido como “gigante Guyposcoano”, cuja estatura seria 2,42 m. Este homem tornou-se figura de destaque em exposições públicas, percorrendo cortes europeias, cidades e vilas. O presente estudo reconstrói a trajetória deste objeto, desde a sua produção até à incorporação nas coleções universitárias, e reflete sobre o seu valor enquanto testemunho histórico, científico e museológico. O sapato em pelica

Abstract In the collections of the Science Museum of the University of Coimbra, heir to the former Museum of Natural History and the Anthropological Museum, there is a replica of the right shoe of Miguel Joaquín de Eleicegui Ateaga (1818–1861), known as the “Guipuscoan giant”, whose stature is reported to have been 2.42 m. He became a prominent figure in public exhibitions, travelling through European courts, cities and villages. This study reconstructs the trajectory of this object, from its production to its incorporation into the university collections, and discusses its value as an histori-

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verde, com 39,5 cm de comprimento, 13 cm de largura e 11,5 cm de altura, foi confeccionado pelo sapateiro António Claudino e fez-se acompanhar por um manuscrito do Pároco António José Afonso, atestando a sua autenticidade e a estada de Miguel Joaquín em Sintra, em julho de 1844. O objeto foi posteriormente averbado no inventário de 1881 do Gabinete de História Natural da Universidade de Coimbra. Decorridos 181 anos desde a passagem de Miguel Joaquín por Portugal, esta investigação revela como este artefacto documenta a sua presença no país, reforçando o conhecimento sobre as coleções da Universidade de Coimbra e promovendo a revalorização deste testemunho singular do património museológico.

Palavras-chave: Gigantismo; séc. XIX; Museu da Ciência; Miguel Joaquín de Eleicegui Ateaga; Altzo; Espanha.

Introdução

No acervo do Museu da Ciência da Universidade de Coimbra (MCUC), herdeiro do Museu de História Natural e do Museu Antropológico, existem muitos objetos cuja informação disponível é escassa, limitando-se por vezes a uma referência no inventário. Nalguns casos, foram realizados estudos que acrescentaram dados relevantes e permitiram enquadrar alguns destes espécimes. A título de exemplo, podem mencionar-se os trabalhos sobre um bastão em dente de narval (Martins, 1999/2000), um esqueleto de hipopótamo (Rufino e Tavares, 2018) ou a coleção frenológica (Pereira, 2020).

cal, scientific and museological witness. The shoe, made of green leather and measuring 39.5 cm in length, 13 cm in width and 11.5 cm in height, was crafted by the shoemaker António Claudino and accompanied by a manuscript by the parish priest António José Afonso, attesting to its authenticity and to Miguel Joaquín's stay in Sintra in July 1844. Later recorded in the 1881 inventory of the Cabinet of Natural History, this artefact documents his presence in Portugal, deepens knowledge of the University of Coimbra's collections and supports the reappraisal of this singular piece of museological heritage.

Keywords: Gigantism; 19th century; Science Museum; Miguel Joaquín de Eleicegui Ateaga; Altzo; Spain.

Tomando como referência a proposta de Alberti (2005: 560) de seguir a “vida” ou “carreira” metafórica dos objetos, das suas trajetórias às relações que estabelecem, é possível compreender a história dos museus e revelar novos sentidos, tanto nas peças de proveniências remotas quanto nos artefactos mais comuns.

O presente estudo tem como objetivo divulgar a pesquisa que permitiu conhecer a história da réplica do sapato de um indivíduo conhecido como o “gigante Guyposcoano” e, subsequentemente, reconstruir a trajetória desse homem, cuja condição patológica o projetou como um “gigante profissional” de noto-

riedade internacional. Esta investigação procura refletir sobre a ressignificação das coleções museológicas, evidenciando de que modo objetos como este sapato, além de sua dimensão histórica, mostram a relatividade dos olhares que se estabelecem em diferentes épocas.

O ponto de partida: descrição do sapato

O sapato em análise apresenta 39,5 cm de comprimento, 13,0 cm de largura e 11,5 cm de altura. Foi manufaturado em pelica verde, raso, com biqueira retangular e recorte no peito do pé que forma uma espécie de paleta (Figura 1). O calcanhar, ligeiramente alteado, exhibe dois ornamentos arredondados. A sola, em couro, foi cosida manualmente às paredes da estrutura, cujo interior é forrado em tecido de algodão de cor creme.

O exemplar foi acompanhado por um pequeno livro manuscrito (Figura 2), redigido por António José Afonso, à época

ca Pároco da Igreja de Nossa Senhora da Encarnação, em Lisboa, no qual atesta a sua autenticidade. Apesar do livro original se ter extraviado, a fotocópia existente permite analisar o conteúdo que aqui se transcreve:

Certifico que no dia 20 de Julho de 1844 fui a Villa de Cintra ver um Gigante que para ali tinha vindo no dia 17 do m.mo mez e anno e se foi no dia 22 do m.mo. Era Hespanhol, natural de Guipuscoa, e o maior que tem aparecido em Lisboa e p^a conservar uma memoria da sua grandeza pedilhe que me vendesse um çapato uzado, porem recusou, dizendo não ter demais: mandei chamar um çapateiro, este levou a craveira, mas não chegou e tomou medida para um papel, e me que fez por ella este çapato que he do m.mo talhe e da m.ma materia dos que elle Gigante trazia.

Por esta deligencia me fizeram pagar tres vezes mais do que se costumava que erão 160 r por pessoa. Este Gigante no dia 18 do



Figura 1. Réplica do sapato direito do “gigante Guyposcoano”: 39,5 cm de comprimento, 13 cm de largura e 11,5 cm de altura (MCUC.ANT.90.10.46). [Fotografia de Sandra Santos]

dito mez foi ao Paço a chamado da Rainha que então ali se achava a qual lhe deu uma peça de (antigam.te) 6400 r nesse tempo 7.500 r e hoje 8.000 r.

Era todo proporcionado e bem feito, vi que tinha de alto 64 polegadas e com um chapeo alto na cabeça lhe passava p. baixo do braço q. elle estendia horizontalmente e não lhe tocava outros mais altos que eu fizirão a m.ma experiencia e não lhe chegavão ao braço.

Não era impostor na sua altura nem grossura porque os çapatos que usava erão tais como este, sem salto algum e o chapeo era de meia copa.

O Conde de Cea que ali se achava disse que conservava um osso da perna (canela) de um gigante o maior de que havia noticia, mandou-o buscar confrontou-se com o do Guipusciano Gigante e vio-se que este era maior. Tirei a medida do palmo e da altura que conservei alg.m tempo em uma regoa, mas em 1846 levou-me descaminho, conservando este çapato que mandei fazer ao dito çapateiro Claudino de S. Pedro de Penaferrim fazendo-lhe passar certidão na solla do m.mo çapato, cuja letra por estar apagada pelo tempo a avivei mas conservando todas as palavras e letras. Tudo aqui dito fica o Attesto e Certifico in fide Sacerdotis. E para memoria passo esta que assigno e juro. Parochial Igr.a de N. Senhora da Encarnação de Lisboa.

30 de Dezembro de 1855

O P.e Thesoureira e Coad.jor

António J.e Affonso [assinatura autógrafa]

De acordo com o manuscrito, o “gigante Guypuscoano” seria natural da

província de Guipuzcoa, no País Basco, e teria permanecido em Sintra entre os dias 17 e 22 de julho de 1844. Em 18 de julho foi chamado ao Paço, a pedido da Rainha D. Maria II¹. Dois dias depois, em 20 de julho, o Pároco António José Afonso assistiu à atuação naquela vila e, impressionado com a estatura do indivíduo, solicitou-lhe a venda de um sapato usado. Como não possuía outros sapatos, o Pároco encomendou a António Claudino, mestre sapateiro de São Pedro de Penaferrim (antiga freguesia do concelho de Sintra), a confeção de um exemplar idêntico, reproduzido com o mesmo talhe e material. A medida foi obtida em papel porque a craveira era demasiado pequena e o custo do sapato foi três vezes superior ao habitual.

Relativamente à presença em Sintra do Conde de Seia (antiga grafia: *Cea*) aquando da exibição do gigante naquela vila, regista-se a sua comparação com outro indivíduo de grande estatura, do qual guardava um osso da perna, possivelmente uma tíbia. Segundo o relato, o homem ali exibido superava as medidas do anterior, não sendo, contudo, mencionada a sua identidade. Presume-se que o Conde de Seia fosse D. António Manuel de Menezes (1788–1848), 1.º Conde de Seia, título nobiliárquico criado por D. João VI, Par do Reino e Capitão de Fragata da Armada Real, em 13 de maio de 1820 (Lemos, 2020).

¹ D. Maria II (Rio de Janeiro, 4.5.1819–15.11.1853), cujo nome completo era Maria da Glória Joana Carlota Leopoldina da Cruz Francisca Xavier de Paula Isidora Micaela Gabriela Rafaela Gonzaga.

Certifico que no dia
20 de Junho de 1844 fui a
visita de dentro ver um gigante
te que para ali tinha vin-
do no dia 17 do m^{to}. m^{to} can-
no, e se foi no dia 22 do m^{to}.
Era Hypanhot, natural da
Guaymas, eo maior que
tem apparecido em Lisboa e
p^{to} lembrar uma memo-
ria da tua grandezza pe-
dithe m^{to} vendesse um la-
pato arado, por um m^{to} de
coi, o mesmo m^{to} de
mais: mandei chamar
um capaturo, este levou

levou a Cravira, mas
nao chegou, e tornou a des-
da p^{to} um papel, em
per por ella este capato que
he do m^{to}. lathe, cham^{to}. m^{to}.
teria das que elle gigante
travira.

Por esta diligencia me
fizerao p^{to} mais tres vezes
mais do que se costumava
que fora 160^{to} p^{to}.
Este gigante no dia
18 do m^{to}. m^{to} foi ao p^{to}
achamado da Rainha que
estada ali se achava a qual
he de uma p^{to} de gan

teigante.) 6400^{to} m^{to} e m^{to}
pro 7.500^{to} e hoje 8.000^{to}.
Era todo, e proporcionado, e
ap^{to} p^{to}, e que tinha de
alto 64 p^{to} e com um
cheguo p^{to} na labia the
prop^{to} p^{to}. o laiso do braço
q^{to} elle entendia orizantal-
mente e na the loca e
a outras mais altas que as
p^{to} e m^{to}. e p^{to} m^{to}.
e na the chamada ao braço.
Mas era insignificante na sua
altura e na sua p^{to}.
que as lap^{to} de que era
na e na the como este, tem

aprego i juro. Parochu-
al S^{ro} de N. Senhora da
Encarnação de Lisboa.
30 de Dezembro de
1855
O P. Thomez.oador
Antonio J. P. P. P.

Para além deste manuscrito, datado de 30 de dezembro de 1855, nota-se a preocupação do Pároco em reforçar a autenticidade do objeto através de uma inscrição na sola do sapato. Redigida a tinta preta, a nota de julho de 1845, assinada

por António Claudino, confirma a veracidade da confeção (Figura 3). Este detalhe acrescenta um significado especial ao objeto, revelando não apenas o cuidado em preservar a memória da sua origem, mas também a intenção de garantir a credibi-

lidade do testemunho material. Transcreve-se de seguida o texto manuscrito:

António Claudino

Mestre çapateiro residente no lugar e freguesia de S. Pedro de Cintra certifico e juro em como no dia 20 de julho de 1844 foi à vila de Cintra a casa de Manoel Espanhol a rogos do Padre António Affonso para tomar a me[d]ida a um gigante natural da Provincia de Guiposcoa na Hespanha que para ali tinha vindo no dia de dezacete do mesmo mez e anno e se foi no dia 22.

Aqual me[d]ida lhe tomei no pe não pela craveira por não chegar mas para papel tomando as medidas do comprimento d'altura do pe bem os calcanhares(?) pelo qual mandou o dito Padre fazer em Lisboa huma versão(?) por honde eu mesmo fis este çapato em grande cuidado tudo o que deixo disto escrito(?) e juro sub graça do meu sustento.

São Pedro de Penaferrim.

Dezassete de Julho de 1845

António Claudino [assinatura autógrafa]

A qualidade do texto e da caligrafia da inscrição na sola do sapato pode suscitar dúvidas quanto à autoria, especialmente considerando o contexto educativo de Portugal em meados do século XIX. Estima-se que, nessa época, a taxa de analfabetismo no país rondasse os 75%, sendo ainda mais elevada nas zonas rurais e entre as classes sociais menos favorecidas (Magalhães, 1996). Neste contexto, é plausível que um mestre sapateiro tivesse competências limitadas. Torna-se, assim, possível que tenha

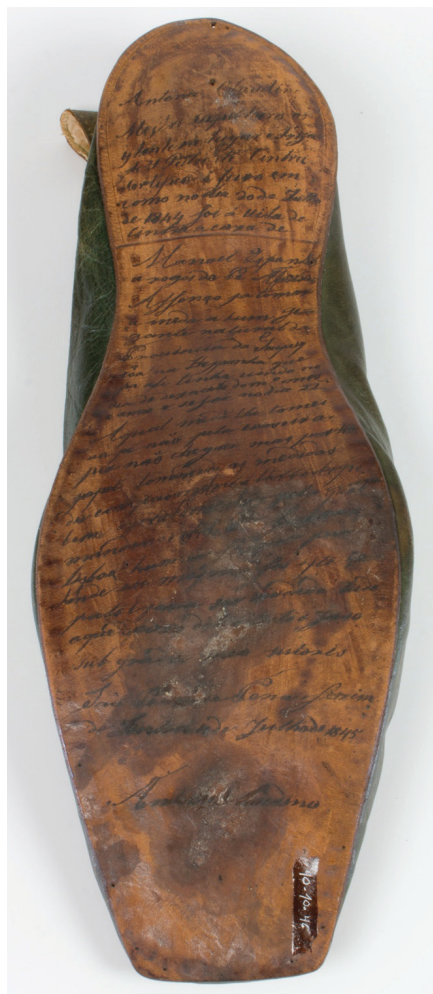


Figura 3. Certificado de autenticidade escrito na sola do sapato assinado pelo mestre sapateiro António Claudino. [Fotografia de Sandra Santos]

contado com a assistência de uma pessoa com maior domínio da escrita para redigir a inscrição, prática comum entre quem não dominava as letras. No entanto, o Pároco António José Afonso apenas afirma, no manuscrito datado de 1855 (Figura 2), que por a letra “estar apagada

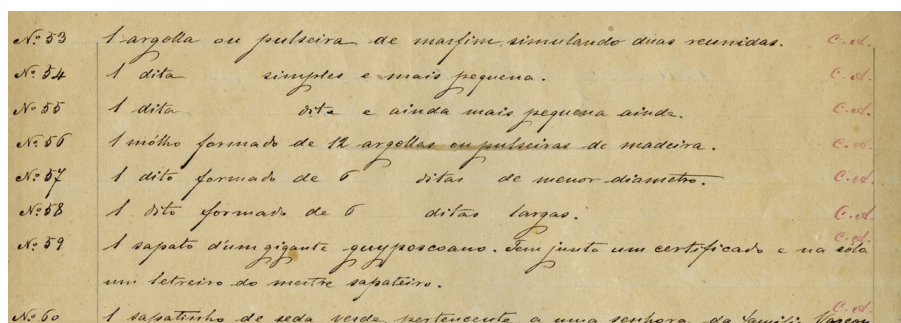


Figura 4. Descrição do sapato do “gigante Guyposcoano” patente no inventário de 1881 do Museu de História Natural.

pelo tempo a avivei, mas conservando todas as palavras e letras”.

O sapato e o Museu de História Natural

Deduz-se que a oferta da réplica do sapato ao Museu de História Natural da Universidade de Coimbra tenha ocorrido em data próxima, ou posterior, a 30 de dezembro de 1855, indicada no manuscrito. O sapato surge pela primeira vez no inventário de 1881²: *Inventário dos objectos existentes na colecção ethnographica do Museu em Novembro de 1881*, com o número 59 e a referência na margem direita à *Coleção Antiga* (C.A.), escrita a vermelho, onde se pode ler: *1 sapato d'um gigante Guyposcoano. Tem junto um certificado e na sola um letreiro do mestre sapateiro* (Figura 4). O sapato permaneceu sem registo de número de inventário até 1990 (111 anos mais tarde), data em que recebeu o atual registo

(MCUC.ANT.90.10.46) e foi descoberta a sua identidade neste inventário histórico, deixando o anonimato.

Esta investigação conferiu ao objeto um novo estatuto no Museu contribuindo para novas trajetórias, conteúdos históricos e científicos multidisciplinares.

A etiqueta que acompanhava este testemunho (Figura 5), hoje bastante danificada, apresenta a seguinte legenda:

Portugal.

Sapato que um sapateiro de Cintra por nome de António Claudino fez em Julho de 1844 por medida tirada ao pé de um gigante hespanhol, natural de Guipuzcoa. Este gigante espunha-se ao publico em Cintra e tinha 64 polegadas de altura.

Pe Ant.º José Affonso [assinatura autógrafa]

Recorde-se que o Gabinete, ou Museu, de História Natural da Universidade de Coimbra foi criado pela Reforma Pombalina de 1772, como anexo à Faculdade de Filosofia Natural, sendo instalado, em 1775, no Colégio de Jesus (Simões et al., 2013). Tendo sido o primeiro museu públi-

² Documento manuscrito, não assinado, existente no Museu da Ciência da Universidade de Coimbra. Pode ser consultado no artigo *O contexto museológico da antropologia da Universidade de Coimbra, uma síntese histórica* (Amaral et al., 2013: 155–156).

homem cuja estatura excedia, em muito, a média da população da época: media 64 polegadas de altura. A correspondência dessa medida para o sistema métrico não é de determinação imediata. A definição de polegada, atualmente em vigor, equivalente a 25,4 mm, foi estabelecida apenas em 1959. Durante o século XIX, em Portugal, tal como noutros países, existiam múltiplas unidades de medida e fatores de conversão, e mesmo depois da implantação do metro continuaram a ser utilizadas. O metro passou por várias etapas de definição e oficialização, tendo sido depositado o protótipo em platina — o *Mètre des Archives* — nos Arquivos da República Francesa em 1799 (Pellegrino, 2024). Em Portugal, o sistema métrico decimal foi oficialmente adotado por decreto de D. Maria II, em 13 de dezembro de 1852, tornando-se obrigatório a partir de 20 de junho de 1859, nomeadamente para facilitar as transações comerciais, apesar de que continuou a não ser universalmente utilizado (Pellegrino, 2024).

As razões que terão levado o Pároco Afonso a solicitar ao gigante um dos seus sapatos — pelo qual pagou um valor considerável — bem como a redigir e assinar o respetivo documento apenas em 1855, onze anos após o dia em que se encontraram, permanecem incertas. Do mesmo modo, não é clara a motivação de António Claudino ao inscrever na sola 1845, isto é, um ano após a apresentação de Miguel Joaquín em Sintra. Poder-se-á inferir, relativamente à primeira questão, que o Pároco terá solicitado o fabrico do

sapato com o intuito de preservar a memória da grandeza física deste homem. Tal prática encontra paralelo nas coleções exibidas em gabinetes de curiosidades ou nas então designadas “monstruosidades da natureza” do século XIX, em que as doenças em humanos, animais ou plantas, ou fenómenos excecionais eram frequentemente valorizados como relíquias ou provas materiais de raridades da natureza. Neste contexto, o sapato adquiriria uma dimensão simbólica, funcionando como evidência da passagem de um gigante por Portugal e, simultaneamente, como testemunho da experiência direta do Pároco Afonso perante essa figura singular.

Quer a biografia dos objetos, quer a trajetória dos indivíduos constituem abordagens que oferecem contributos relevantes para a história da ciência (Alberti, 2005). Esta réplica, contrariamente a outros objetos, não teve vida própria pois a sua confeção foi encomendada e enviada ao Museu de História Natural, com documentação específica que o validava, assegurando, assim, uma ligação duradoura entre pessoas e objeto.

O ato de colecionar obedece, em si mesmo, a uma predisposição construtiva do ser humano na sua relação com o mundo que o envolve, estabelecendo-se, assim, uma ligação intrínseca entre o sujeito e o objeto. Como refere Alberti (2005: 564) “[c]oletar era civilizador; posteriormente, doar a um museu digno garantia que tal ato permanecesse visível na perpetuidade”.

De acordo com o processo de classificação proposto por Pearce (1992: 68-88), podem identificar-se, no contexto museológico, coleções de carácter testemunhal: objetos que eram recolhidos pelo facto de representarem o diferente ou o exótico, servindo posteriormente como testemunhos materiais das paragens, povos e territórios visitados.

O percurso museológico deste espécime, por não apresentar informações precisas quanto à data e ao responsável pela sua incorporação, enquadrou-o no Gabinete de História Natural da Universidade de Coimbra, no núcleo designado por *Colecção Antiga* (Baptista, 2000: 14; 33). Ao que foi possível apurar, foi exibido pela primeira e única vez no Museu de História Natural, em 2000, integrado na exposição *Gabinete de História Natural – Revivências* (Martins, 2000: 21-22).

Para além de um sapato

Através de leitura de um artigo publicado na revista *Neurosciences and History* alusivo ao esqueleto de um *Gigante da Extremadura*, nascido em Espanha no século XIX (Giménez-Roldán, 2018), chegou-se à referência do gigante proveniente de Altzo (Guipúzcoa). Esta coincidência, associada à menção da sua passagem por Portugal, permitiu concluir que o gigante referido pelo Pároco Afonso seria Miguel Joaquín de Eleicegui Ateaga, nascido a 10 de julho de 1818 na vila de Ipintza de Altzo Azpi e falecido no mesmo local a 20 de novembro de 1861. Era filho de Miguel António Eleicegui

Argaya (1790–1872) e Ignácia Antónia Ateaga Irazusta (1785–1829), quarto de nove irmãos (Gómez, 2018: 51–54).

A primeira referência de relevo à sua pessoa data de 15 de janeiro de 1843, no jornal madrileno *El Corresponsal*, escrita por um subscritor de Tolosa, que descrevia um jovem de estatura excecional (2,09 m), filho de uma família numerosa residente em Altzo (*El Corresponsal*, 1843: 4).

A sua carreira iniciou-se a 19 de março de 1843, em Donostia, e continuou em Madrid³, em setembro do mesmo ano (Gómez, 2018: 69–70). O modelo de exibição mantinha-se constante: apresentava-se em residências localizadas em ruas centrais, cobrando uma ou duas moedas por espectador. Posteriormente, exibiu-se em França e Inglaterra, em teatros, hotéis, cafés e salas de espetáculo, anunciado por cartazes e periódicos locais, nunca em circos ou barracas de feira (Gómez, 2018: 74).

Miguel Joaquín recebeu diferentes apelidos conforme o país onde se encontrava: em Espanha, “Gigante Guipuzcoano”, “Gigante Espanhol”, “El Gigante Vasco”, “El Gigante de Altzo”, “El Gigante de Altzo (Guipúzcoa)”, “Gigante acromegálico”, “Gigante profesional del mundo del espectáculo”; em Portugal, “Gigante Hispanhol”; em França, “*Géant Espagnol*”; e em Inglaterra, “Spanish Giant” ou “Spanish Goliath” (Gómez, 2018: 19–20).

Segundo a *Revista Universal Lisbonense* de 5 de junho (1844a: 509), o gi-

³ Múgica (1896: 410) afirma que a primeira exibição foi em Bilbao.

gante chegou a Lisboa «fresquinho, é melhor disseramos frescão, de Guipuzcoa... D. Joaquim Eleizegui é o seu nome. O seu comprimento (como poderão verificar os que à porta da casa nº 53 na praça de D. Pedro [atual Rossio] pagarem 100rs) 92 polegadas hispanholas: a sua largura de unha a unha, abertos os braços, ainda maior que o seu comprimento: o seu todo muito proporcionado: as suas forças brutas, mas o seu genio pacífico. Quem o vê não imagina como um barbeiro ha-de poder quando lhe vier a barba (porque os seus vinte e dois annos ainda a não tem⁴) escanhoar e pentear aquillo sem andaimos. O espectador faz sem querer, sobre a sorte d'este ente privilegiado, reflexões muito melancolicas... Ignoramos ainda os pormenores da sua biographia: as dimensões do pae e da mãe... a copia das suas refeições, os seus passatempos, e o em que mais frequentemente se intertém uma cabeça moradora n'uma região tão superior à nossa». Terminando a nota com "[a] exhibição d'este philisteu é todos os dias desde as onze da manhã até ás duas da tarde".

A 13 de junho de 1844 a mesma *Revista Universal Lisbonense* (1844b: 522) volta a noticiar algumas particularidades acrescentando que «nasceu de paes de uma estatura para menos de regular; tem 7 pés e 9 polegadas de altura; desde a extremidade de uma e outra mão 8 pés e 4 polegadas; alcança com a mão a altura de 10 pés e 2 polegadas; o seu pé tem de com-

prido 17 polegadas e meia; o seu palmo 14 polegadas».

A 11 de julho de 1844 (*Revista Universal Lisbonense*, 1844c: 569) informa a iniciativa como *Outro Espectáculo Novo*: «Corre por certo que na corrida de toiros do proximo domingo, no mesmo campo de Sancta Anna⁵, figurará o famoso gigante hispanhol que os nossos leitores já conhecem. Se assim for, teremos provavelmente outro escusado e deshumano passatempo como o de domingo precedente, porque o gigante — homem ainda e mais pacífico do seu natural que o gigante — bruto, falto de forças corporaes e parecem-nos que também da ligeireza indispensavel para semelhantes exercícos: mas como todo o empenho é cevar bem a rede para pescar com que encher as trincheiras e a bolsa, attenta a credulidade do vulgo necio e ocioso, ninguem dirá que não seja a coisa muito bem calculada»⁶.

Nestes artigos a popularidade da figura de Miguel Joaquín é destacada indicando diversos dados interessantes, locais onde se apresentou, estatura, custo das entradas e horários. A publicação releva a largura dos braços, proporções corporais, força física e temperamento pacífico, bem como a exibição diária entre as 11h e as 14h. Da passagem por Sintra não se conseguiu obter outras referências, para além das transmitidas pelo sapato, não tendo

⁴ Miguel Joaquín cumpria em 1844 a idade de 26 anos não correspondendo ao anunciado.

⁵ Situado em Lisboa, na freguesia de Arroios, designado por Campo dos Mártires da Pátria desde 1879.

⁶ Gómez (2018: 98) coloca em causa que Miguel Joaquín tenha chegado a pisar a arena "y que todo fueram meras habladurías". Se assim foi porque terá sido anunciado?

sido possível saber se a Rainha D. Maria II, então com 25 anos, estaria em Sintra ou se Miguel Joaquín, à época com 26 anos, foi visitá-la a Lisboa. De igual modo se desconhece se Lisboa e Sintra foram os únicos locais em que esteve em Portugal. Gómez (2018: 98–99) coloca inclusive uma possível viagem ao Porto para ali se exibir, mas também não foi possível apurar dados que o comprovem.

A 11 de julho de 1844, a revista anunciou-o como “Outro Espectáculo Novo” na corrida de toiros em Santanna, destacando novamente a sua força física e temperamento pacífico, embora sugerindo alguma insuficiência para a prática de exercícios de tourada (*Revista Universal Lisbonense*, 1844c: 569).

Num documento dirigido à Rainha Isabel II (Espanha), datado de 19 de outubro de 1853, Miguel Joaquín solicita a abolição ou dispensa do imposto de 10% cobrado sobre a exibição pública de gigantes, o que não lhe foi concedido (Oses, 1974: 197–199). O documento esclarece que nenhuma das autoridades locais das diferentes capitais europeias, incluindo Portugal, lhe exigira retribuição sobre o preço de um real por pessoa ou meio real para soldados e crianças.

Desse manuscrito podem extrair-se diversas notas de interesse: registou ter 11 palmos e 3 polegadas de estatura e pesar 15 arrobas e a idade indicada, 28 anos, não corresponderia à data da assinatura da petição, quando teria 35 anos. A idade de Miguel Joaquín e as referências às medidas ao longo do

seu percurso apresentam discrepâncias: aparentemente a idade não é atualizada enquanto a altura aumenta dependendo do local e da data das exposições. Esta prática, tinha como objetivo aumentar o impacto do espetáculo e atrair o público.

Neste contexto, coloca-se a questão da fiabilidade da estatura referida pelo Pároco Afonso. Contudo, a descrição que acompanha o sapato sugere que foi confeccionado à escala, refletindo proporcionalmente o tamanho real do pé. Esta evidência material permite, pelo menos em parte, corroborar as dimensões corporais, ainda que os registos escritos apresentem variações ou exageros típicos das práticas de exibição do século XIX. Assim, o sapato funciona como prova tangível, complementando os relatos históricos que, isoladamente, devem ser interpretados com cautela. Não obstante, é importante salientar que os valores das medidas publicados ao longo dos anos podem variar, dependendo da unidade utilizada — palmo castelhano, palmo catalão, pés ou polegadas. Apesar das diversas conjecturas, os registos gravados na pedra da Igreja de São Salvador, em Altzo Alzpi, consignados por Múgica (1896: 412–413), e posteriormente verificados por Ibaibarriaga (1979: 170–171), indicam que Miguel Joaquín terá atingido uma altura de 2,42 m. À data do seu falecimento, contudo, não foi possível registar com precisão a sua estatura (Gómez, 2018: 214–215).

No início da pesquisa desconhecia-se a identidade do “gigante Guyposcoano” que esteve em Sintra em 1844.

Decorridos mais de dois séculos do seu nascimento sabe-se que esta réplica do sapato é um dos muitos objetos que testemunham a sua estatura excecional. São disso exemplo o *molde de madera de haya de una sola pieza del pie izquierdo, con puntera apuntada que termina en un corte recto. Utilizada para la confección del calzado de Miguel Joaquín Eleicegui conocido como el Gigante de Alzo; 36 (long) x 11 (alt.) cm*⁷ (Museo San Telmo, San Sebastian — Ref^a E-003484). Este molde, apesar de não especificar a data em que foi manufaturado, tem 36 cm de comprimento e a réplica existente na Universidade de Coimbra realizada aos 26 anos, 39,5 cm. Também nas representações deste homem se observa um modelo de sapato semelhante ao que aqui se apresenta.

Entre as diversas iniciativas para a recuperação da sua memória destacam-se:

— No final de 2017, o lançamento do filme *Handia* (gigante, em língua basca), codirigido por Aitor Arregi e Jon Garaño, que retrata a vida de Miguel Joaquín Eleizegui Arteaga, enfatizando o seu gigantismo, as exposições públicas e a vida familiar⁸. Apesar de se tratar de uma obra de ficção, por vezes afastada da realidade histórica

(Gómez, 2018), revisitou a figura, tornando-a acessível ao grande público.

— Em 2018, o livro de Luís Ángel Sánchez Gómez — *El Gigante de Altzo: un vasco mítico (aunque muy real) en la Europa del siglo XIX*⁹ — constitui uma pesquisa biográfica exaustiva e documentada. O autor dedica vários capítulos a desmistificar mitos e lendas, explorando a trajetória de Miguel Joaquín em diversas localidades e países. No caso de Portugal, embora seja referida a passagem por Lisboa em 1844, Gómez não menciona a sua presença em Sintra.

A ideia veiculada por alguns autores (Múgica, 1896: 411; Ibaibarriaga, 1979: 192, 197), segundo a qual Miguel Joaquín teria sido uma dupla vítima — do seu corpo e dos familiares ou intermediários que o obrigaram a exhibir-se em troca de compensação financeira —, é contestada por Gómez (2018: 250–253): *Joaquín acepta y acierta; era su mejor opción; gana sus buenos dineros, sin demasiado esfuerzo*. Se a itinerância de Miguel Joaquín ocorreu por vontade própria, ou por imposição de terceiros, permanece desconhecida. Não obstante, a evidência documental sugere que não terá morrido na miséria. Nos testamentos por ele outorgados em 1853 e 1861 (Oses, 1974: 199), deixou 24.000 réis ao irmão e 15.000 réis ao sobrinho. Além disso, segundo Múgica (1896: 411), à data do seu falecimento os fundos acumulados ascendiam a 2.500 pesetas.

⁷ Património Cultural, Museo San Telmo. Disponível em <https://apps.euskadi.eus/emsime/catalogo/objeto-horma/ciuVerFicha/museo-43/ninv-E-003484>.

⁸ A película ganha em 2018 o maior número de troféus (dez estatuetas), no Prémio Goya, nas principais categorias: melhor ator revelação, melhor montagem, melhor direção de produção, melhor direção artística, melhor direção de fotografia, melhor figurino, melhor maquilhagem, melhores efeitos especiais, melhor roteiro original e melhor música original.

⁹ Neste livro são indicados outros homens e mulheres contemporâneos portadores de gigantismo ou nanismo.

Diagnóstico retrospectivo

Existem várias hipóteses acerca da doença que terá afetado Miguel Joaquín, sendo as mais frequentes o gigantismo ou a acromegalia e a tuberculose pulmonar como causa da sua morte (Oses, 1974; Ibaibarriaga, 1979; Herder, 2012; Chapman, 2017; Giménez-Roldán, 2018; Gómez, 2018). A análise da literatura disponível relativamente à progressão do seu crescimento é variável, breve e, por vezes, contraditória, tendo sido a primeira referência publicada em 1847, da autoria de Juan Iztueta (Gorosabel, 1862: 25–26; Múgica, 1896: 410–414; Ibaibarriaga, 1979: 141–216; *in* Gómez, 2018: 38), religioso carmelita que registou periodicamente no lintel da igreja de Altzo Azpi a sua altura.

Segundo Gómez (2018: 60), Miguel Joaquín terá iniciado um crescimento acelerado por volta dos 20 anos, evoluindo rapidamente e despertando atenção pela sua estatura desmesurada: *da un estirón brutal... y ya no para*. O próprio descrevia-se como *un aborto de la naturaleza* (Oses, 1974: 199) eventualmente refletindo a percepção social da sua condição física.

Os diagnósticos retrospectivos são difíceis e nem sempre conclusivos, particularmente se baseados em descrições. No entanto, o conhecimento sobre as doenças que afetaram este indivíduo está mais próximo de ser atingido, uma vez que os vestígios osteológicos foram identificados num ossário da localidade natal. Até então, o esqueleto era considerado desaparecido. Diversos autores haviam

proposto hipóteses para esse desaparecimento (Múgica, 1896; Giménez-Roldán, 2018; Gómez, 2018), incluindo especulações sobre uma possível venda, à qual a família se teria oposto, ou mesmo o roubo da campa (Goikoetxea, 2017). Tais narrativas alimentaram mitos e contradições em torno da figura de Miguel Joaquín. A realidade foi mais simples, a necessidade de reutilização da sepultura, prática comum nos espaços funerários, como igrejas e cemitérios, levou a transladação deste indivíduo para um ossário.

O estudo em curso pelo médico Francisco Etxeberria e sua equipa, cujos resultados preliminares foram apresentados no *XVI Congreso de la Asociación Española de Paleopatología*, em 2022, apontam para o diagnóstico de gigantismo hipofisário e escoliose degenerativa (Herrasti et al., 2022). O gigantismo hipofisário é uma condição rara, geralmente causada pela produção excessiva da hormona do crescimento, etiologia descoberta por Cushing e publicada em 1912, cinquenta e um anos depois da morte de Miguel Joaquín.

Considerações finais

Decorridos 170 anos sobre a data inscrita na sola da réplica do sapato pertencente ao “gigante Guyposcoano”, o presente estudo revelou novos dados sobre o objeto e sobre o homem, figura que permaneceu anónima nas coleções do Museu de História Natural da Universidade de Coimbra pelo menos desde 1881. Essa singularidade justificou a emissão de dois certificados de auten-

ticidade que acompanhavam o sapato: o primeiro, escrito na sola do sapato e assinado em 1845 pelo sapateiro António Claudino, e o segundo redigido pelo Pároco António José Afonso em 1855.

Miguel Joaquín de Eleicegui Ateaga devido às suas dimensões excecionais, com uma estatura estimada de cerca de 2,42m, despertou grande curiosidade e admiração, deixando uma marca indelével na história dos chamados “gigantes”. Realizou diversas viagens e exposições públicas, em cortes europeias, cidades e vilas, nas quais o seu corpo e imagem eram apresentados — voluntariamente ou não — mediante pagamento.

Para além de contribuir para o enriquecimento do conhecimento sobre as coleções da Universidade de Coimbra, este trabalho demonstra a fiabilidade da réplica do sapato e acrescenta um novo elemento ao percurso itinerante descrito por Gómez (2018), confirmando a passagem do “gigante Guyposcoano” por Sintra. Falecido em 1861, aos 43 anos, a sua vida e morte continuam a suscitar interesse científico, histórico e museológico, tanto na comunidade académica como junto do público em geral.

Espera-se que o Museu da Ciência da Universidade de Coimbra reconheça a “grandeza” deste homem, preservando e divulgando a réplica, bem como incluindo as informações obtidas por esta pesquisa nos seus catálogos. Respeita-se, assim, a sua memória ao longo dos séculos, contribuindo para o aprofundamento do conhecimento e valorização do património.

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Referências bibliográficas

- Alberti, S. J. 2005. Objects and the museum. *Isis*, 96(4): 559–571.
- Amaral, A. R.; Martins, M. R.; Miranda, M. A. 2013. O contexto museológico da antropologia da Universidade de Coimbra, uma síntese histórica. In: Fiolhais, C.; Simões, C.; Martins, D. (eds.). *História da Ciência da Universidade de Coimbra*. Coimbra, Imprensa da Universidade de Coimbra: 129–166.

- Baptista, M. T. 2000. O gabinete de história natural — revivências. In: *Gabinete de História Natural - Revivências*. Coimbra, Museu Zoológico da Universidade de Coimbra: 9–17.
- Ceríaco, L. M. P.; Brigola, J. C. P.; Oliveira, P. 2013. Os monstros de Vandelli e o percurso das coleções de história natural do século XVIII. In: Fiolhais, C.; Simões, C.; Martins, D. (eds.). *História da Ciência da Universidade de Coimbra*. Coimbra, Imprensa da Universidade de Coimbra: 121–132.
- Chapman, I. M. 2017. *Gigantismo e acromegalia*. [Online]. MSD-Manuals. [Acedido em 12-2-2020]. Disponível em: <https://www.msdmanuals.com/pt-pt/profissional/dist%C3%BArbios-end%C3%B3crinos-e-metab%C3%B3licos/dist%C3%BArbios-hipofis%C3%A1rios/gigantismo-e-acromegalia>.
- Cushing, H. 1912. *The pituitary body and its disorders: clinical status produced by disorders of the hypophysis cerebri*. Philadelphia, JB Lippincott.
- Doyal, L.; Muinzer, T. 2011. Should the skeleton of “the Irish giant” be buried at sea? *British Medical Journal*, 343: d7597.
- El Corresponsal. 1843. *Un gigante*. Madrid, 15.02.1843: 4. [Acedido em 30-1-2020]. Disponível em: <https://hemerotecadigital.bne.es>.
- Giménez-Roldán, S. 2018. The giant of Extremadura: acromegalic gigantism in the 19th century. *Neurosciences and History*, 6(2): 38–52.
- Goikoetxea, A. 2007. *El gigante ha vuelto a Altzo. Una escultura a tamaño natural, cerca de dos metros y medio, de Miguel Joaquín Elícegui preside la plaza de la localidad a la que dio fama*. [Acedido em 7-2-2020]. Disponível em: <https://www.elmundo.es/elmundo/2004/07/21/cultura/1090404000.html>.
- Gómez, L. Á. S. 2018. *El gigante de Altzo: un vasco mítico (aunque muy real) en la Europa de siglo XIX*. Donostia/San Sebastián, Disputación Foral de Gipuzkoa.
- Gorosabel, P. 1862. *Diccionario histórico-geográfico-descriptivo de los pueblos, valles, partidos, alcaldías e uniones de Guipúzcoa*. Tolosa, Imprenta de Pedro Gurruchaga.
- Herder, W. W. 2012. Acromegalic gigantism, physicians and body snatching. Past or present? *Pituitary*, 15(3): 312–318.
- Herrasti, L.; Etxeberria, I.; Miras, S.; Alonso, E.; Lambacher, N.; Raffone, C.; Mendiluze, L.; Tidball-Binz, M.; Yuste, R.; Almorza, K.; Etxeberria, F. 2022. Manifestaciones morfológicas del hueso en un caso de gigantismo hipofisario y escoliosis degenerativa. *XVI Congreso de Paleopatología* [Comunicação oral]. Girona, Asociación Española de Paleopatología.
- Ibaibarriaga, H. G. 1979. Miguel Joaquín de Eleicegui Ateaga: el gigante de Alzo (1818-1861). *Boletín de la Real Sociedad Vascongada de los Amigos del País*, 35(1–2): 141–216.
- Lemos, E. C. M. 2020. *António Manuel de Menezes*. [Acedido em 2-2-2020]. Disponível em: <https://www.geni.com/people/Ant%C3%B3nio-Manuel-de-Menezes-1-%C2%BA-Conde-de-Seia/6000000020267375512>.
- Magalhães, J. P. 1996. Ler e escrever no mundo rural do antigo regime. Um contributo para a história da alfabetização e da escolarização em Portugal. *Análise Psicológica*, 4(14): 435–445.

- Martins, M. R. 2000. Coleções etnográficas do Museu Antropológico da Universidade de Coimbra, 1774–1874. In: *Gabinete de História Natural — Revivências*. Coimbra, Museu Zoológico da Universidade de Coimbra: 19–24.
- Martins, M. R. 1999/2000. Dente de narval: um bastão de autoridade. *Antropologia Portuguesa*, 16/17: 7–42.
- Martins, M. R.; Santos, A. L.; Miranda, M. A.; Matos, V. 2009/2010. Body modification and paleopathological evidence in the iconography from the 'Philosophical Travel' to Brazilian Amazonia' by Alexandre R. Ferreira (1783–1792). *Antropologia Portuguesa*, 26/27: 239–257.
- Mirabeau, B. A. S. 1872. *Memória histórica e comemorativa da Faculdade de Medicina*. Coimbra, Imprensa da Universidade.
- Múgica, S. 1896. El gigante de Alzo. *Euskal-Eria. Revista Bascongada*, 35: 410–415.
- Oses, J. A. Á. 1974. Un documento del gigante de Alzo. *Munibe*, 26(34): 197–199.
- Pearce, S. 1992. *Museums, objects and collections: a cultural study*. Leicester, Leicester University Press.
- Pellegrino, O. 2024. *Escrita das unidades de medida e grandezas de medição*. Lisboa, Memórias da Academia das Ciências de Lisboa.
- Pereira, H. 2020. The phrenological collection of Gama Machado in the Science Museum, University of Coimbra: from private foundation to university collection. *Journal of the History of Collections*, 32(1): 39–48.
- Raminelli, R. 1998. Ciência e colonização: viagem filosófica de Alexandre Rodrigues Ferreira. *Revista Tempo*, 6: 157–182.
- Revista Universal Lisbonense. 1844a. Gigante. 5 de junho, vol. III, série IV, 3022: 509.
- Revista Universal Lisbonense. 1844b. Gigante. 13 de junho, vol. III, série IV, 3049: 522.
- Revista Universal Lisbonense. 1844c. Gigante. 11 de julho, vol. III, série IV, 3157: 569.
- Rufino, A. C. F.; Tavares, A. C. P. 2018. Interpeleções de um esqueleto de hipopótamo no Museu da Ciência da Universidade de Coimbra. *Aula, Museos y Colecciones de Ciencias Naturales*, 5: 47–56.
- Simões, C.; Casaleiro, P.; Mota, P. G. 2013. O Museu da Ciência: uma colecção científica do século das luzes. In: Fiolhais, C.; Simões, C.; Martins, D. (eds.). *História da Ciência da Universidade de Coimbra*. Coimbra, Imprensa da Universidade de Coimbra: 117–128.

Dynamics of constructing belongingness. An interplay between genealogy and tradition in constructing identities: a Sidama example^a

Dinâmicas de construção do sentimento de pertença.
Interação entre genealogia e tradição
na construção de identidades: um exemplo Sidama



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Ambaye Ogato Anata^{1,2*}

Abstract The article explores the various ways of identification among the Sidama people of Ethiopia. It shows how various narratives about common origin are constructed and feed into the process of identification. It also presents how an identity could be changed with a framework of tradition giving a completely different affiliation with other clan groups. The research employed an extended ethnographic fieldwork in order to understand the processes of ethnic identification among the Sidama.

Keywords: Sidama; identification; genealogy; clan.

Resumo O artigo explora as diversas formas de identificação entre os Sidama na Etiópia. Mostra como as narrativas sobre origem comum são construídas e contribuem para o processo de identificação. Demonstra também como uma identidade pode ser alterada dentro de um quadro de tradição, proporcionando uma filiação completamente diferente à de outros grupos de clãs. A investigação baseia-se num trabalho de campo etnográfico prolongado que permite compreender os processos de identificação étnica entre os Sidama.

Palavras-chave: Sidama; identificação; genealogia; clã.

^a This article is fully grounded in my anthropological fieldwork that I carried out for a year in 2009 while doing my PhD at the Max Planck Institute for Social Anthropology, Germany. Over the course of that period, I conducted in-depth interviews, undertook sustained participant observation, and participated in rituals and public gatherings, generating a rich ethnographic record of social practices and dynamic everyday life. The analysis is further informed by my sustained and ongoing engagements in the region.

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Background of the people

Today, the Sidama are found in the northeast of the former Southern Nations, Nationalities and People's Regional State (SNNPRS) and the current Sidama regional State (Figure 1). The boundaries of the Sidama are the Oromia region in the north, east and southeast, the Gedeo zone in the south, and the North Omo zone in the west. The Sidama regional State lies between latitude 5° 45' north and longitude 38° and 39° east, constituting a total area of 76,276 square kilometres. The topography ranges from 500 to 3,500 meters above sea level, and the area generally has a mean annual temperature of 18 degrees centigrade and a mean annual rainfall of 1,253 mm.¹

The Sidamaland is the home of the Sidama people. It was structured as an awraja administrative unit within the Sidamo Province from the time of its incorporation (1893–94) until 1991. Since 1991, it has become one of the zones in the Southern Nations, Nationalities and People's Regional State (SNNPRS) and later on became the 10th regional state by overwhelmingly voting for autonomy in a November 20, 2019 referendum.

The Sidamaland is located about 270 kilometres south of Addis Ababa. It stretches north–south along the international all-weather road that connects Nairobi (Kenya) to Addis Ababa. The northernmost point of the Sidamaland consists of the city of Hawassa, which,

as mentioned above, is both the administrative capital of the Sidama zone and the SNNPRS capital.²

For a long time the majority of the Sidama practised mixed farming and animal husbandry.³ The practice of mixed farming is still evident today. In the zone's lowlands, pastoralism has been very important to the livelihood of the Sidama.⁴ Hamer (1987) also points out that the Sidama practise subsistence agriculture and simultaneously keep cattle. As Girma (2001: 4) states, 'Sidama lowlanders of the western and northwestern borderlands, like their Arssi neighbors to the northwest, are largely pastoralists'. The production of *Ensete ventricosum* is a very important element of the Sidama economy. Before the incorporation of the Sidama into the 'modern Ethiopian empire', the Sidama had a tradition of keeping large herds of cattle, and coffee was grown mainly for local consumption and exchange with neighboring ethnic groups on a small scale (Ababu, 1995).

Introduction

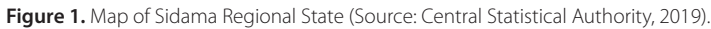
Hypotheses about the early history and movement of the Sidama people are marred by controversy. Most assertions are based on conjecture, and secondary sources such as the oral stories of elders cannot be corroborated by archaeologi-

¹ Sidama Administrative Zone, 1–8.

² See also Vecchiato (1985), *Culture, health and socialism*.

³ *Ibid.*, 63.

⁴ Almaw (1999), *A historical survey of the Arsi-Sidama conflicts (1935–1974)*.



from Arabia or Asia by crossing the Red Sea (see Ullendorff, 1960; C. G. Seligman, 1966; Stanley, 1970; Braukämper, 1978; Hammer, 1987). Other writers dismiss the Hamitic hypothesis, arguing that the presumption of an 'outside Africa origin' of the Cushitic peoples of northeast Africa is an attempt to externalize African achievements. These opponents of the Hamitic hypothesis contend that the Cushites are indigenous peoples, particularly in northeast Africa (Tadesse, 1972; see also Almaw, 2005). As indicat-

ed in Almagw (2005: 1–3), scholars such as Taddesse (1972) and Sergew (1972) placed the Sidama in northeast Africa during the Axumite period around the third century AD, relying on the mention of names similar to Sidama in the inscriptions and evidence of interactions of the Sidama with the Axumite kingdom in the second half of the third century AD.

Weighing the relative merits of the above arguments is not an objective of this article. Nevertheless, because the article investigates the elements of identification among the Sidama ethnic group, it is pertinent to discuss the narratives about Sidama common origins. The first section of this chapter explores how the common awareness of shared origin and history, as narrated by elders, serves as a source of Sidama ethnic identification. In doing so, it is possible to identify the historical process through which the Sidama came to develop a unified ethnic identity based on a shared history of common ancestors.

Narratives of common origins and Sidama identification

One expression of Sidama ethnic identification and group formation is through common descent, i.e., common genealogies. By tracing their line back to a common ancestry, the Sidama construct relationships among different clan groups who consider themselves Sidama. Yet the common origin discourse of the Sidama ethnic group is far from simple, since no concrete or definitive

evidence exists to verify it. Some of the existing meager literature on the Sidama only adds to the perplexity regarding the origin, early history and movement of the people. The casual mention of the people in early studies fails to provide even a common name for the people. For example, Hamer (1987) in his early work referred to the Sidama as Sadama, and Braukämper (1978), unclear as to who the Sidama were, sometimes referred to the ‘Sidama-Hadiya’. Despite such shortcomings, I have used these texts at length because most of their assertions about the origin history of the Sidama are quite similar to the oral stories that I was told during my fieldwork⁵.

In these oral stories, most elders regard all Sidama as the descendants of two putative ancestors, Bushe and Maldea, who served as nodes for all of the major Sidama clans. Most elders can recite their genealogies back to Bushe and Maldea. Elders have mentioned that Sidama genealogies go back even further than Bushe and Maldea, but they were unable to recount them. Some sources add the Hoffa as an additional progenitor of Sidama ethnic groups, but this is not the view of most Sidama, who consider the Hoffa as a different clan and Bushe and Maldea as the sole progenitors.

Viewing Bushe and Maldea as the

⁵ By the time of my fieldwork and writing, I have not used a publication by Jensen, Pauli and Straube on Sidama which is published in 2022. However, works of the aforementioned scholars has an in-depth insight on Sidama.

mythic founders of the Sidama reflects a deeply rooted narrative that projects a sense of shared ethnic identity. Because the Sidama have a patrilineal descent system, all individuals belong to their father's clan, meaning that theoretically both men and women should be able to trace their ancestry back to a common male ancestor who was linked to either Bushe or Maldea. From many discussions during my fieldwork, I discovered that knowing one's own genealogical lines is very important. Knowledge about one's 'root' (*sircho*), and in effect one's relatives, is a source of pride and security for many people. This is evidenced, in addition to the narratives, by the sayings that people frequently use. For example, in the Garaha Gando area, one of my interlocutors said: '*Fixa hoggino manchi illamassi xerito gobara ku'lano*' – 'One who does not have a relative, traces his genealogies from a distant country'. Emphasizing the importance of knowing one's genealogy and relating to one's ancestors as relatives, another interlocutor said: '*Fixa missino ger-echo farosse gobbanni worte galitano*' — 'A sheep that has a lot of relatives sleeps by putting its tail outside its coat' — i.e., one gains a sense of security when one knows one's relatives and, by extension, one's genealogy. While the latter interlocutor spoke the above saying in a joking manner, he added that, as he was originally from the Kewena clan, he knows his genealogy properly and has passed this knowledge to his children. When I asked this interlocutor why he maintains

his strong links with the Kewena clan by going to their clan associations (*idir*), while at the same time living among and identifying himself with the Hawella clan, he replied, '*fixa hoginohu wi'lanni herre ol-lamano*' — 'A person who does not have relatives cries while fighting' (discussion with Lalade A. Gambura, 2010).

An elder in Garaha Gando said: '*hi'ra habe diko xonitanno ku'la habinoti cimesa xonitanno*' — 'A lady who failed to sell out her items curses the market; when she fails to explain her problems, she curses an elder'. The elder clarified this saying by relating it to a person's desire to receive a fair verdict in a Sidama elders' (*Songo*) meeting. He said that some people fail to express their problems properly — that is, they fail to argue their case in a convincing way — and the elders deliver a verdict against them, since they base their decisions on what they have heard and the available evidence. The complainant in turn 'curses' the elders, blaming them for the verdict. The saying is meant to emphasize the knowledge about one's genealogy is as important as being able to tell one's story in front of a jury which could decide the outcome of the verdict (discussion with Wakyo Kawe, Garaha Gando, 2009).

In addition to invoking sayings to emphasize the importance of knowing one's genealogy and relatives, elders also took to reciting their genealogical lines, with the intention of reaching as far back as Bushe and Maldea. On a couple of occasions, I have witnessed elders, in trying

to recount their genealogical lines, failing to repeat what they said earlier and then cringing and being laughed at by friends. On these occasions they blamed old age for their forgetfulness. Such attempts to establish connection with a progenitor, even if they are derailed by failing memory, are nonetheless significant and offer practical advantages to the person who manages to identify himself with a progenitor. This coincides with Geertz's (1973: 259) analysis: 'One is bound to one's kinsman, one's neighbor, one's fellow believer, ipso facto; as the result not merely of personal affection, practical necessity, common interest, or incurred obligation, but at least in great part by virtue of some unaccountable absolute to the very tie itself'.

Regardless of their clan affiliations, political and religious beliefs, and ways of life, the Sidama strongly believe themselves to have originated from common ancestors. Such a conception of Sidamaness, according to elders, therefore seems immutable. This sort of essentialist/primordialist conception of Sidamaness that is anchored in the Bushe–Maldea 'hypothesis' is open to question, however, and can be disputed, as we shall see later with regard to the process of fission and fusion that has occurred among the Sidama. Nonetheless, all clans are considered the natural product of those who share the same 'bloodline' from these common origins. As such, Sidamaness is an ascriptive feature of individuals, not a social construction.

In accordance with the Bushe–Maldea common origin narrative, six clan groups trace their ancestry from Bushe and seven clan groups from Maldea. It is unclear, however, what sort of relationship these two common progenitors had. While trying to explain the relationship between them, Maccani (1989: 128) cites the following from one of his interlocutors:

'Maldea' is a spurious son, he is not pure... If a Sidama girl (*semo*), who is given as a bride, leaves her first husband (*muttara*) and lives with another man, she is not this man's '*semo*' but is called '*gursumete*'. When she has her first child with this other man, this child is called *Siwila*, that is from Iron, this child is spurious. If these spurious children begin a new clan they are no longer considered direct descendants of Bushe but spurious children (*siwilu oso* = children from iron).

Some elders, while claiming Bushe and Maldea as their mythical ancestors, consider them as the first beings of the creator, Bushe made from the earth and Maldea made from iron. Other elders argue that Bushe and Maldea were the progenitors, but not the first beings (interview with Wakyo Kawe, Garaha Gando, 2009; see also Markos et al., 2011⁶).

Yohannis (2008: 13) appears to endorse the Bushe–Maldea narrative, noting: 'Genealogically, the Sidama people

⁶ I have consulted the draft version, which was given to me by Ambassador Markos Tekle, the lead researcher for the book. The book was published in 2011, after I had completed most of my analysis.

are descendants of two first forefathers: Bushe and Maldea that comprise thirteen major sub-groups. The descendants of Bushe are: Malga, Yaanase, Shabbadino, Harbee, Harbagoona, Asaraado, Holloo, Garbicho and Haadicho whereas the descendants of Maldea include Alatta, Haweela, Qeweena and Sawoola. These major sub-groups in turn consist of many sub-divisions'. His argument fails to include any mention of the Hoffa. Maccani (1989: 125) concurs with Yohannis, although his categorization is more general, placing some clans as subgroups of his main eight groups: 'Their [Sidama's] mythical ancestors were Bushe and Maldea. From these two ancestors, 8 main groups were born: Faqisa (subgroups: Yanase, Shabadino, Harbe, Harbegona, Asarado), Hollo (and Garbicco), Malga, Hadicco, and Awacco; and from Maldea: Alatta (and Qevena), Savola and Hawela. Each one of these groups honours its family founder with sacrifices and offerings, usually on his tomb'.

Hamer (1987: 22–23) reiterates the epic mythological line that is recounted by elders concerning the origin story:

...The accounts suggest that Maldea and Bushe left the Dawa River together and arrived at approximately the same time in the land between Lakes Awasa and Abaya. On the other hand, several of the accounts indicate that Bushe and his father followed their cattle in search of better grazing land, until the cows discovered land with which they were especially content. This land was so fertile that

they decided to farm, though they had apparently not practiced agriculture during their stay along the Dawa River. In another version, Bushe and Gugi (the son of the brother of Bushe's father) were keeping cattle together at the Dawa River. Both agreed that Bushe should go north to farm while Gugi remained behind to care for the cattle. Later, when Bushe became successful in farming, he sent a request to Gugi for his cattle, which Gugi refused. From that time the descendants of Gugi and Bushe became enemies⁷.

Hamer's explanation should be considered carefully, as he includes the Guji among those who accompanied the early 'progenitors' of the Sidama and alludes to them as having a close blood relationship. The Sidama (specifically the Hawella clan), during the Luwa ceremony, give due respect to the Guji Oromo ethnic groups who are living among them by symbolically placing a separate bowl (Shafeta) alongside other bowls that represent different Hawella sub clans in the ceremony. This process is meant to show unity and solidarity among the subclans and in doing so accommodates the Guji as one of 'them'.

In addition, Hamer (1987: 23–24) states: Sidamoland, according to mythology, was originally inhabited by the Hoaffa, whose origins are uncertain. These people were ruled by the tyrant named Galel-

⁷ Throughout my article I write 'Gugi' as 'Guji', as do most other contemporary authors.

ciord [sic]. The narrative history indicates that he and the Hoaffa forced Bushe's and Maldea's descendants back toward the Dawa River. Nevertheless they returned, perhaps in greater numbers, and eventually an uneasy truce seems to have been established. The relationship was unsatisfactory, as indicated in the account by the demands for tribute and various forms of degradation imposed by the Hoaffa. Examples of the latter included requests to produce a rope of sand, to make a heavy mixing board out of a bush, or to transport fresh cow's milk by hand over a great distance before it could cool. The descendants of Bushe and Maldea always responded with great cleverness to these stratagems and managed to outwit the Hoaffa. The relationship ultimately became untenable. But it is uncertain as to whether the final break came because of increasing numbers of descendants of Maldea and Bushe, the tyranny of the Hoaffa, or a combination of the two. In any event, through use of stealth, the Sadama managed to trick the Hoaffa into a test of arms, in which the Hoaffa were defeated.⁸

Hamer appears to contend that the descendants of Bushe and Maldea tried to come to this area but faced resistance from the Hoffa. In their second attempt they came and lived with the Hoffa, but they ultimately found the situation un-

bearable. Accordingly, the Bushe and Maldea ancestors finally revolted against their subjugation by the Hoffa and subsequently 'annihilated' and/or integrated with the original pre-Bushe-Maldea settlers (the Hoffa).

The above assessment by Hamer is consistent with what many elders related concerning the early settlement of the Sidama in the area and the subsequent confrontation with the Hoffa groups. Almost all of the elders whom I interviewed recounted that there were a group of people called the Hoffa occupying what is now known as Sidamaland when the Sidama arrived. These elders concurred that the Sidama lived under the harsh rule of the Hoffa for some time, but eventually the Hoffa rule became so oppressive that it caused the Sidama to revolt and subdue the Hoffa. Some elders even go as far as to argue that the present language of the Sidama derives from the Hoffa language (see also Maccani, 1989: 125–26).

Some interlocutors argued that because the *Gerarsha*, a war song sung by the Sidama to recount heroic deeds, is in the Oromo language, this indicates that the original language of the Sidama, before they adopted their current language, was Oromo. Other elders rejected such an argument as a political attempt by certain people to establish the dominance of the Oromo over the Sidama. These elders assert that the Arssi Oromo have been traditionally hostile to the Sidama people (discussions with Kamisso Yotora and Harisso Hagirssso, Hawassa, 2009). Histori-

⁸ Unlike Hamer I spell 'Hoaffa' as 'Hoffa' and 'Galelciord' as 'Gelloicha Orde', in line with narratives from my interlocutors in the field.

cally there have been numerous raids and counter-raids, resulting in many deaths, that are viewed as an imperative to display 'pride and gratification' (Girma, 2001: 66) and to fulfill the 'rite of passage' in the *Luwa* ceremony. In light of such conflicts, when the Sidama sung the *Gerarsha*, the lyrics were intended to defame, insult and diminish their Arssi Oromo counterparts, and for this reason they are sung in the Oromo language so that the Arssi, who are considered 'hostile neighbors', understand what the Sidama are singing about them.⁹ Girma (ibid.) supports this argument, claiming 'the reason for [composing the *Gerarsha* in the Oromo language] to be a deliberate attempt to terrify the Arsi and to convey the message to them in their own language'.

Accordingly, in the Sidama tradition a Sidama will not kill a fellow Sidama and make a *Gerarsha*, as *Gerarshas* are meant for 'hostiles' or 'enemies'. In this case, because the Sidama have been long time 'enemies' of the Arssi Oromo, the making of the *Gerarsha* can be interpreted as establishing a boundary. This is, if a person is killed and someone makes a *Gerarsha* against him, the killer is displaying 'otherness' to separate himself from the deceased. In other words, the analytical framework of boundary formation and establishing differentiations, put forward

by Barth (1969a; 1969b), may be relevant here. Also, this war song seems to clearly reinforce 'emic categories' and categorization (Schlee, 2004).

The view of some 'politically conscious' interlocutors is that the progenitors of the Sidama were originally Oromo language speakers who adopted the Hoffa language. However, while the strong Cushitic relationship of the two languages should be acknowledged, the assertion that a conquering Sidama group adopted the language of the conquered (the Hoffa) while the surrounding group continued to speak the Oromo language is, at the least, puzzling, if not outright misleading. Therefore, the oral stories suggesting that the Sidama annexed the Hoffa and then annihilated them should be closely studied. Let us consider that the current Sidamaland is surrounded by Oromo-speaking people. The Oromo are one of the largest ethnic groups in Ethiopia, and if in fact the Sidama spoke Oromo before their defeat of the Hoffa, difficult questions are raised: If the Sidama were Oromo speakers originally, why should they abandon Oromo for the language of the Hoffa, whom they had defeated? What could explain that only the Sidama switched to the Hoffa language, when almost all of their neighbours are Oromo-speaking Oromo?

While the door remains open for further study, both of the claims above with regard to the origins of the Sidama language — that the Oromo-language war songs of the Sidama indicate that the

⁹ According to my interlocutors the Sidama and the Arssi who live along the borders have a good knowledge of both Sidama and Oromo languages. Moreover, despite the conflicts, there are trade activities and intermarriage between the two ethnic groups.

Sidama originally spoke Oromo, or that the Sidama spoke in the language of the Hoffa after defeating them — do not appear to hold up to investigative scrutiny, based on my fieldwork and data. Moreover, many interlocutors directly refuted such ideas. Yet I leave this relevant question open to further research.

Returning now to the earlier discussion concerning common origin narratives, a recent study cautions that the hypothesis that regards Bushe and Maldea as the keystone of Sidama origin should not be taken at face value — rather, it is a myth constructed loosely on historical precedents (Markos et al. [draft] 2011). For example, the name Bushe (which comes from Busha in the Sidama language, meaning ‘earth’ or ‘dirt’) is used simply because the earlier Sidama ancestors, during their search for fertile land, dug out a hole and they returned the dug out soil to the same hole and found that soil did not fit. They moved to another area until they came to their current place where the dug out soil (earth) perfectly fitted back in the hole they dug and concluded that this (the current land) is a better land for them to settle. Accordingly, these early ancestors bore the name ‘Bushe’ (ibid.: 17). This same myth is also told by Hawella clan members of the Garaha sub clan to describe how their predecessors settled in the area the Hawella currently occupy (interview with Wakyo Kawe, Garaha Gando, 2009; interview with Egata Anata, Garaha Gando, 2009).

When elders reach the end of what they

can remember concerning their genealogies, they say *‘hakki ka’a ilama borajju bakkotenni’*¹⁰ *meentu meesanetenni gu-dino’* — ‘genealogies that go beyond this have been wiped out [eradicating] by the slave’s rod, and women have eradicated them with an axe’. In other words, the elders avoid recounting more distant genealogies by establishing a myth that threatens people who attempt to discuss a time before Bushe and Maldea. In one example, they say that some people who have dared to do so developed wings and flew away (i.e., disappeared) (Markos et al. [draft] 2011: 18).

In light of the different narratives, it becomes clear that establishing Bushe and Maldea as the first progenitors of the Sidama is debatable, and that a search for the first progenitors of the Sidama may in fact go further back in time than the sixteenth century and Bushe and Maldea. Nonetheless, despite reasons for doubt, the myth of common origin that centers on Bushe and Maldea as the first progenitors of the Sidama, and which espouses them as the seeds from which Sidamanness has grown, remains the dominant narrative, and serves as a framework for ethnic identification among Sidama ethnic groups. In this regard, it is not the historical, verifiable accuracy of the information about the original ancestors, but rather the common conception among

¹⁰ The phrase *‘borajju bakkotenni’* translates literally to ‘by the slave’s jaw’.

the Sidama about such ancestors, that is significant in constructing layers of ethnic identification. It is this disposition to accept a common set of ideas and in turn to perpetuate them through generations by word of mouth that lays the foundation for the process of identification. Although arguments continue to be made asserting the existence of the Sidama before the sixteenth century, the lack of compelling evidence and documentation that can trace the Sidama beyond the time of Bushe and Maldea has convinced many people that there is no reason to doubt Bushe and Maldea as the first progenitors.

The prominence of this narrative has also been endorsed by the team of scholars who have embarked on writing a history of the Sidama people. Their study was under way during the time of my fieldwork, and we interviewed some of the same interlocutors. According to these interlocutors and to the present findings of the scholars' study (which is ongoing as of this writing cited in the article as Markos et al. [draft] 2011.), the Bushe and Maldea common origin narrative overrides all others. Beyond the assertion that Bushe and Maldea were brothers begotten by Manna, however, the stories fade as one attempts to investigate further into the pre-Bushe-Maldea period. One reason is that, as mentioned earlier, there is a myth warning that he who speaks of a time before Bushe and Maldea will be afflicted by disease. The underlying intention of this myth appears aimed at protecting the claim that all Sidama clans descended

from either Bushe or Maldea and that all other groups have also been constituted under this all-encompassing umbrella.¹¹

Whatever the truth of the Bushe-Maldea narrative, I argue that it serves as an important node of Sidama ethnic boundary formation. If we speak of it in the context of 'boundaries', the Bushe-Maldea narrative constitutes a dominant common origin boundary that is constructed and persistently maintained by the Sidama. Moreover, following Geertz (1973: 261–263) the narrative serves as a 'social marker' of Sidamaness.

Stanley (1970: 216) takes a slightly different view of the common primordial Sidama ancestors. Unlike the authors mentioned above, he maintains that there are three putative ancestors of the Sidama — Bushe, Maldea and Hoffa — from which the thirteen clans or 'sub tribes' (as Stanley refers to them) descended. Harkening back to the Bushe-Maldea common origin myth, the narratives describe how the Sidama fought the Hoffa settlers when they arrived at their present land, but Stanley suggests that the Hoffa therefore formed a third source of Sidamaness in the eyes of certain segments of Sidama society. This further complicates the origin construction, adding to the difficulty of establishing a definite answer to the question of the true origins of the Sidama.

¹¹ Unlike the findings of the group of researchers to whom I refer above, my interlocutors (elders) rarely mentioned Manna while talking about their ancestors.

Stanley (1970: 217) also sets forth another narrative relating to the relationship between Bushe and Maldea:

The grouping of sub-tribes (segments) according to the common forefathers is significant on the one hand because such group may be exogamous with respect to the rest of the tribe There is also another tradition according to which the name Sidama derives from a common ancestor Side. Side's son was Selenia and Selenia's son was Maldea, however the relation between Side and Bushe, Hame, and Dadda is not indicated.

Although Stanley asserts such a relationship, I have not been told similar narratives by my interlocutors, and my fieldwork data reveal no compelling evidence to support the validity of this relationship.

Betana (1983: 56) appears to support Stanley's placement of the Hoffa alongside Bushe and Maldea in the Sidama common origin myth. Further, he considers the Hoffa as a main branch of Sidama, which actually preceded Bushe and Maldea, i.e., earlier than the sixteenth century. Moreover, Betana (*ibid.*: 54–55) argues that the idea that the Sidama came to the present area in the sixteenth century is due to the fact that some elders count back eighteen generations; however, he adds that other elders can trace their genealogies back as many as thirty generations, which thus leads him to doubt the validity of the thesis suggesting the Sidama arrived at their present area no earlier than the sixteenth century. He also ar-

gues that if, as many people assert, it was the Sidama who prevented the massive Oromo movement into the area in the sixteenth century, there is no way they could have checked such a mighty force had they been but newly established in the area. He contends that only a well-organized and well-settled force could have stood up to the swift and powerful Oromo in any kind of military engagement. While Betana was unable to provide a definitive explanation for when and how the Sidama arrived in their present area, he has made compelling arguments that call for a deeper investigation of certain common assumptions.

To sum up this line of inquiry, there are two major theses with regard to the origin of the Sidama. The dominant story contends that all Sidama clans descended from Bushe and Maldea. The less-pervasive variant, espoused by some scholars, suggests that all current Sidama clans descended from Bushe, Maldea and the Hoffa. These two variants taken together constitute the notion of Sidamanness that we can observe today among the Sidama ethnic group. In other words, each person who claims to be a Sidama connects their genealogy to one of these three putative ancestors. Despite the varying narratives, the Sidama maintain a firm attachment to their primordial roots, confirming, as Geertz (1963: 109) asserts, 'the longing not to belong to any other group'.

Processes of identifications

Baumann (1999: 140) contends, 'all

identities are identifications, all identifications are dialogical'. Likewise, the process of ethnic identity formation underscores the identification of people with certain logics that they perceive to be plausible. There has to be this dynamic of plausibility to appeal to a certain category. As we have observed, there is a continuous attempt by the Sidama to make different sorts of connections and identifications to any of the three supposed progenitors. Moreover, from the different narratives we can see that what Roosens (1989: 86) calls the 'genealogical dimension of ethnic belonging' is significant among the Sidama ethnic group. Whether these genealogical ties are real or merely conjectured, the very notion of identifying oneself with one of the three progenitors plays a very significant role in the process of Sidama ethnic identification. Thus, regardless of a common ancestry being proven valid or invalid, 'ethnic actors believe that membership is a matter of shared biological descent' (Gil-White, 1999: 803).

Yet this narrower view of historical origins and the politics of identity based on a sense of common origin overlooks the fact that the Sidama once constituted a much larger group than those who are considered Sidama today. The current impetus toward 'essentializing' Sidamaness tends to deny any possible links to other ethnic groups, some of whom claim to have been Sidama or to have had Sidama connections in the past. More comprehensive views, which describe identity as being in a constant

state of flux, are in line with Schlee's seminal book, *Identities on the move* (1989). For instance, there is evidence to indicate that the notion of Sidama ethnic identity is not fixed, but rather subject to a process of fusion and fission. Zerihun (2010; unpublished) indicates that the Alaba ethnic group claims a connection to the Sidama. Although I have not made an intensive study of the Tambaro, my encounters and brief discussions with people from that ethnic group during the Ethiopian Nations, Nationalities and People's Day celebration suggest that the current Tambaro ethnic groups had Sidama origins.¹² For example, from the discussions I had with them they trace their genealogy as follows (Figure 2):

If we accept the proposition of Hamer, which is supported by many elders, that the 'founder' of the Guji Oromo, Guji (elders say Gujo), was 'the son of the brother of Bushe's father', then embracing the idea

¹² While I was doing fieldwork in 2009, I met a group of people from Tambaro who came to Hawassa in order to celebrate Ethiopian Nations, Nationalities and People's Day. The celebration took place in Dire Dawa, but all ethnic groups from the SNNPRS were welcome to gather in Hawassa and then depart to the host region. Taking advantage of the opportunity I interviewed a group of people about their origins. I realize this constituted a limited and anecdotal sampling, but it became clear that the now different and distinct Tambaro ethnic group asserts that they were once Sidama. If such assertion is true, it again suggests that the concept of a fixedness of identity is disputable and can be explored further in line with Schlee's (1989) *Identities on the move*. The diagram I have provided in this regard should not be considered authoritative, but it is intended to show how different claims of cross-ethnic connections can be traced.

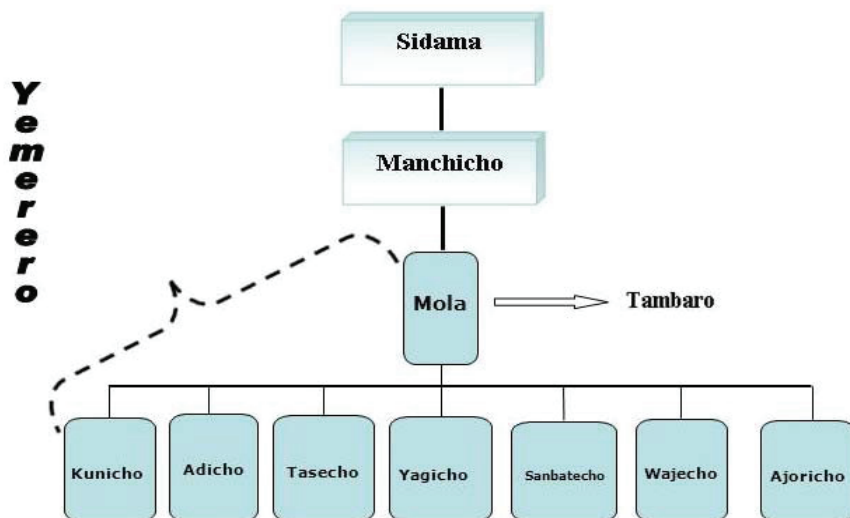


Figure 2. A rough sketch depicting a claim of some Tambaro interlocutors with Sidama.

that Bushe and his descendants were the basis of Sidama ethnic identity and Guji and his descendants the basis of Guji Oromo identity may pose a challenge to the very argument of ‘essence’ and ‘givenness’ with regard to ethnic identity. The dominant narrative among elders that places the Hoffa as the pre-Bushe–Maldea settlers in present-day Sidamaland, and as people who were later subjugated by the Sidama, further calls into question the notion of ‘givenness’ of Sidama ethnic identity. Therefore, if Sidamaness is in fact a fusion of various elements of the storylines of the elders, it suggests that the argument that centers on an ‘essence’ of ethnic identity can be supplanted by this alternate process of Sidamaness as an integration of different groups.

Despite its powerful appeal, the ar-

gument of ‘essence’ potentially becomes even more porous when we consider the different mechanisms of integration of the ‘non-Sidama’ into the Sidama ethnic category, which were narrated to me by elders during my fieldwork. According to my interlocutors, an individual who is not Sidama can be integrated or be taken in as a Sidama. For example, elders mentioned adopting children or even adults as their own by what they called *ununancho* or *ununa kana*, which literally means to ‘suckle at the breast’. The construction of a new Sidama identity in this case can be created through an elaborate ceremony, whereby the would-be father declares the ‘outsider’ to be his son from the time at which he ‘suckles at his breast’. A feast is prepared for the ceremony, including the making

of 'honey wine' (*Malawo*) for the people who will witness the integration process. During the feast, the 'outsider' rises and performs the symbolic 'suckling at the breast' of the would-be father, whereby the would-be father declares the 'outsider' to be his son from that moment, and the 'son' is integrated into the clan of his new father and assumes his new Sidama ethnic identity (discussions with Sirko, Egata, Wakayo et al., 2009; 2010).

Schlee (2008: 151) states: 'One may be compelled to include individuals and groups in the group defined as "us" whom one would really prefer not to include and be forced to do so by the demands of consistency in sticking to the system of social categories or one conventionally accepted mode of identification'. Put simply, despite the claims of those people who wish to project an 'essence' or 'givenness' onto their ethnic identity, the process of fusion and fission plays a crucial role at the center of construction of ethnicity.

The Comaroffs (1992: 60) state: 'while ethnicity is the product of specific historical process, it tends to take on the "natural" appearance of an autonomous force, a "principle" capable of determining the course of social life'. Likewise, what we draw from the Bushe–Maldea narrative or the Bushe–Maldea–Hoffa narrative is that ethnicity is not a definitive, ready-made essence but rather a construction based on the concepts of people. This assertion of a more fluid nature with regard to one's identity can be seen in the following case study, related to me by of

one of my key interlocutors, which illustrates how clan affiliations can change.

CASE STUDY OF SIRKO/WAYESO

After the incorporation of the Sidama into the Ethiopian empire, a small child named Anata who belonged to the Kewena clan but lived among the Hawella clan territory fled Sidamaland with his mother, Dasse Fara, to live among the Arssi Oromo, where they felt relatively safe from the crushing demands of the feudal regime. Anata grew up in the Arssi Oromo territory, and eventually reached the age when his mother began to look for a wife for him. During her search she became acquainted with a family who also had fled Sidamaland. Among this family she met a woman, Lenteta, who had left Sidamaland after being divorced from her first husband, with whom she no longer got along, and returned to live with her parents. Anata's mother found the woman likeable and negotiated for her to marry Anata. Anata and Lenteta were married in Sirka in the Arssi Oromo territory. Unfortunately, although Anata's mother was eager to have a grandchild, the newlyweds did not produce a child for quite a few years. After much fretful waiting by all in the family, Lenteta became pregnant and gave birth to Sirko (my interlocutor). The newborn child was named Sirko in remembrance of the hardship Anata and his mother had experienced fleeing the feudal regime and the generosity of the Arssi Oromo, who had hosted them in Sirka (*shirka*) (see

Figure 3).

After time had passed, they came to believe that the feudal oppression had lessened in the villages in ‘Sidamo province’. Anata, Lentata, and their young son Sirko returned to Sidamaland and settled near the Wosha sub district (kebele) in the Wondo Genet area.

While living in Wosha, Lentata fell out with her husband, Anata, and left him, taking Sirko with her. She returned to her first husband with the child. He welcomed her back, and also welcomed the son whom he did not know and to whom he had no biological connection. Only later did Anata learn that Lenteta had in fact returned to her first husband, along with the child. After many futile efforts to get back his only son, whom he loved dearly because of their shared resemblance, Anata convened a meeting with elders to negotiate the return of Sirko.

During the meeting with the elders, Anata pleaded his case, telling them how the child was born during their exile and that the child was only conceived after many difficult miscarriages, and that there was no possible way anyone could

connect the child to Lentata’s former husband to whom she had returned. Despite his compelling factual evidence, which clearly showed that Sirko was indeed his biological son, the elders decided that Anata should drop his complaint, and thus the son was officially handed over to his new father.

A sheep was slaughtered, and the child received a new name, Wayeso. He was officially accepted as a new member of the clan of his foster (*siwila*) father, Weta Chule, by denouncing — ‘washing away’ — his biological clan affiliation through a cleansing ritual (*logo*) (see Figure 4). He became one of the Hawella clan in Wome sub clan of the Hawella and Lemicho lineage, thereby adopting his new father’s clan, sub clan and lineage (see Figure 6). As tradition demanded, Sirko — now Wayeso — was given an inheritance (*eqqa*) in the new settlement area of Murancho.

Wayeso continues to live in the Murancho area and has had seven wives. His wives are Bedaro Ribisso, from Hawella (murancho) clan; Safaye Hankamo, from the Malga clan; Dukaa Hatiya, from the

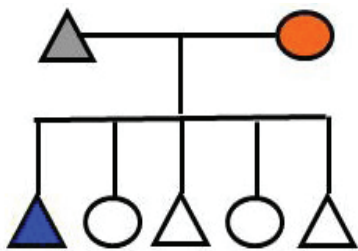


Figure 3. Biological relationship of Sirko.



Figure 4. Constructed relationship of Sirko.

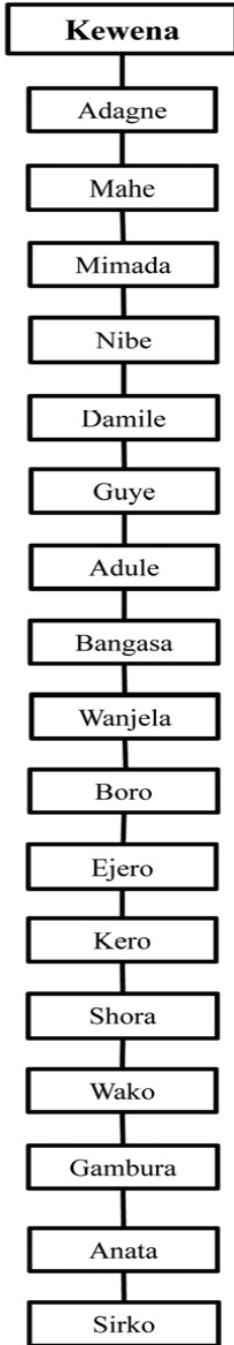


Figure 5. Sirko's biological genealogy.

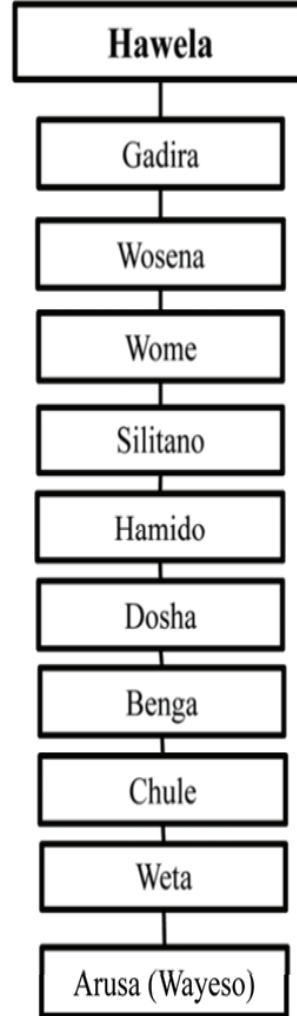


Figure 6. Sirko's new and constructed genealogy.

Yanase clan; Galgale (Wayeso calls her Malga), from the Guji Oromo ethnic group; Harime Wachifo, also from the Guji Oromo; Warite, from the Alata clan; and Bukure Baraso, from the Kewena clan. His

last wife, Bukure, still lives with him.

What is interesting here in terms of Wayeso's ability to marry is that, had he remained with his biological father (Anata), who was from the Kewena clan (see Figure 5), he would not have been allowed to marry his last wife (who is also from the Kewena clan) but he could have married all of the other six wives. I asked Wayeso if he could marry Anata's daughter — in other words, his biological sisters (in this case half-sisters). I asked this because his adopted clan, the Hawella and specifically the Wome sub clan (see Figure 6), is allowed to marry girls from the Kewena clan. To my surprise, he said that he could, although it would be very difficult for him psychologically, because he had very close ties with his biological father, Anata. He said that although tradition would not stop him from marrying Anata's children, as his biological relationship had been made null by the cleansing ritual and his former clan ties had thus been 'deconstructed': 'if I marry Anata's daughters, deep inside me I would feel as if I am eating my own flesh'.

The above case study demonstrates how the tradition allows for the construction of a new clan identity for individuals, which in turn challenges the notion of the immutability of identity. At the same time that same tradition allows for the deconstruction of already existing identities. Although the Sidama attribute 'a certain ineffable significance ... to the tie of blood' (Shils 1957: 142), the case study demonstrates how clan affiliation can be manip-

ulated, reconstructed and deconstructed. It should be noted, however, that despite such room for switching and manipulation of identity, the Sidama continue to project their identity as a 'given' and as something 'natural' that will not change.

Summary and conclusion

This paper has shown the different elements of identification among the Sidama ethnic group. First, it discussed the narratives concerning the Sidama common origin, as told by the elders, in particular the two main variants. One variant claims that Bushe and Maldea are the first progenitors of the Sidama people, and all of the various Sidama clans descend from either Bushe or Maldea. The Hoffa are pre-Bushe-Maldea settlers who later were integrated into the Sidama and thus acquired Sidamaness. According to the other main variant, the Hoffa arrived at the current settlement area first, later to be joined by the descendants of Bushe and Maldea, and therefore all three are the putative ancestors of the Sidama.

The paper also indicates how the process of identification can be influenced by the context and can vary based on different sets of variables. Thus, the notion of 'essence' with regard to ethnic identity must be viewed cautiously. It is also shown that how an individual based on various circumstances could construct a new clan identity and perpetuate this newly constructed identity. Such arrangements of creation, inclusion and exclusion of identities into and out of a group are

supported by various cultural practises that exist among the people. Based on the different stories from my fieldwork, I argue that ethnic identity and identification is constantly in a state of being constructed and perpetuated by individuals and groups. Thus, multiple layers of identification can exist, and one layer of identification does not void or preclude another, with so many factors pertaining to identity simultaneously in play. Thus, the process of creation, inclusion and exclusion of members always underpins the processes of ethnic identification.

The case from Sidama aligns with broader anthropological insights offered by Guenther Schlee (1989; 2004; 2009), who argues that identities are consciously invoked and strategically mobilized depending on social circumstances. Such phenomena show that identity to be a flexible resource, activated for cohesion, alliance building, and ethnic boundary management.

The paper also posited that there are always accommodative cultural mechanisms that would open up the seemingly 'unmalleable walls' of identification even to the extent of including 'others' into the in-group as evidenced by the process of 'Ununa Kana' or suckling of a breast. Such accounts from Sidama underscore that identity is enacted through everyday practices — through rituals, kinship negotiations, and other mechanisms. These practices continually reaffirm, challenge, or recreate the meaning attached to belonging. Also, the Sidama account reveal

that identity is not merely inherited but also earned through different mechanisms, displayed, and sometimes strategically reinvented. The examples from Sidama profoundly demonstrate how identities remain coherent not only because of fixed genealogical truths, but because they are constantly reproduced through rituals and shared cultural repertoires.

In conclusion, the Sidama ethnographic material makes clear that ethnic identity is not a timeless inheritance but a dynamic social project — crafted, contested, and continually renewed. The Sidama show that belonging is shaped as much by lived practices as by ancestral narratives, and that the boundaries of identity expand or tighten according to some existential needs, contexts, and cultural strategies. Their example powerfully illustrates a central anthropological insight: that ethnic groups are not natural, bounded entities but fluid, relational formations forged through human agency and historical imagination. By revealing the subtle interplay of memory, practice, and power in Sidama identification, this study affirms that identities endure not through rigidity but through their capacity to be reinterpreted, reconfigured, and reanimated across generations.

References

Archival and oral sources

- Anata, E. (2009; 2010). Personal Interview, Garaha Gando, Ethiopia.
- Gambura, A. Lalade (2010). Personal Interview, Garaha Gando, Ethiopia.

- Hagirsso, Harisso (2009). Personal Interview, Hawassa, Ethiopia.
- Kawe, Wakyo (2009). Personal Interview, Gara-raha Gando, Ethiopia.
- Sirko (2009; 2010). Personal Interview, Ramada, Ethiopia.
- Yotora, Kamisso (2009). Personal Interview, Hawassa, Ethiopia.

Published sources

- Ababu, A. 1995. *A history of Yirgalem town and its environs, 1933 to 1974*. M.A. thesis, Department of History, Addis Ababa University.
- Almaw, K. 2005. *A history of the Sidama people, c.1889–1971*. M.A. thesis, Department of History, Addis Ababa University.
- Almaw, K. 1999. *A historical survey of the Arsi-Sidama conflicts (1935–1974)*. Senior Essay, Department of History, Addis Ababa University.
- Barth, F. (ed.). 1969a. *Ethnic groups and boundaries: the social organization of culture difference*. Oslo, Universitetsforlaget.
- Barth, F. 1969b. Introduction. In: Barth, F. (ed.). *Ethnic groups and boundaries: social organization of cultural difference*. Oslo, Universitetsforlaget: 9–38.
- Betana, H. 1983. *Sidama Hezbuna Bahilu* [Amharic language version]. Addis Ababa, Bole Printing Press.
- Braukämper, U. 1978. The ethnogenesis of the Sidama. *Abbaya*, 9: 123–30.
- Comaroff, J.; Comaroff, J. 1992. *Ethnography and the historical imagination*. Boulder & Oxford, Westview Press.
- Geertz, C. 1963. The integrative revolution: primordial sentiments and civil politics in the new states. In: Geertz, C. (ed.). *Old societies and new states*. New York, Free Press: 105–57.
- Geertz, C. 1973. After the revolution: the fate of nationalism in the new states. In: Geertz, C. (ed.). *The interpretation of cultures*. New York: Basic Books: 234–254.
- Gil-White, F. 1999. How thick is blood? The pot thickens: if ethnic actors are primordialists, what remains of the circumstantialist/primordialist controversy? *Ethnic and Racial Studies*, 22(5): 789–820.
- Girma, N. 2001. *The Arsi and the Sidama: a history of inter-ethnic relationship along their border lands ca. 1900–1995*. M.A. thesis, Department of History, Addis Ababa University.
- Hamer, J. 1987. *Human development: participation and change among the Sadama of Ethiopia*. Alabama, The University of Alabama Press.
- Jensen, A. E.; Pauli, E.; Straube, H. 2022. *The Sidaama*. Berlin, LIT Verlag.
- Maccani, B. 1989. *The Sidama: aspects of the Sidama culture*. Awasa, Catholic Mission of Tulo.
- Markos, A. et al. 2011. *Ye Sidama biher Tarik ena Bahil* [Amharic version]. Draft. Addis Ababa, Bole Printing Press.
- Roosens, E. 1989. *Creating ethnicity: the process of ethnogenesis*. London, Sage Publications.
- Seligman, C. G. 1966. *Races of Africa*. London, Oxford University Press.
- Sergew Hable Sellassie. 1972. *Ancient and medieval Ethiopian history to 1270*. Addis Ababa, United Printers.
- Schlee, G. 2008. *How enemies are made: towards a theory of ethnic and religious conflict*. New York, Berghahn Books.
- Schlee, G. (ed.). 2004. *Ethnizität und Markt: zur ethnischen Struktur von Viehmärkten in Westafrika*. Köln, Rudiger Koppe Verlag.

- Schlee, G. 1989. *Identities on the move: clanship and pastoralism in northern Kenya*. Manchester, Manchester University Press.
- Shils, E. 1957. Primordial, personal, sacred and civil ties: some particular observations on the relationships of sociological research and theory. *British Journal of Sociology*, 8(2): 130–45.
- Stanley, S. 1970. The political system of Sidama. In: Pankhurst, R.; Chojnacki, S. (eds.). *Proceedings of the Third International Conference of Ethiopian Studies*, Vol.3. Addis Ababa, Institute of Ethiopian Studies: 215–28.
- Taddesse, T. 1972. *Church and state in Ethiopia 1270–1527*. Oxford, Oxford University Press.
- Ullendorff, E. 1960. *The Ethiopians: an introduction to the country and the people*. Oxford, Oxford University Press.
- Vecchiato, N. L. 1985. *Culture, health and socialism in Ethiopia: the Sidamo case*. PhD dissertation in Social Anthropology, University of California.
- Yohannis, L. 2008. *The quest for self-determination in Ethiopia: the law and the practice on the right to statehood with specific reference to the Sidama*. LLB Degree in Law thesis, Ethiopian Civil Service College Institute of Federalism and Legal Studies.
- Zerihun, D. 2010. *Ethnography and ethno-history of Tambaro*. Southern Nations, Nationalities, and Peoples' Regional State. Hawassa, Institute of Nationalities Study.

R E C E N S Õ E S

B O O K R E V I E W S

Pluralismo tecnológico e cosmologia: por uma nova filosofia da tecnologia na China



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Hui, Yuk. 2016. *The question concerning technology in China: an essay in cosmotechnics*. Falmouth, Urbanomic.

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Admitindo a pluralidade de regimes ontológicos e de formas de se relacionar com a Natureza — como sugerem alguns proponentes da chamada “virada ontológica” na antropologia, como Philippe Descola (2013 [2005]) e Eduardo Viveiros de Castro (2014 [2009]) —, será possível admitir uma pluralidade de regimes tecnológicos, solidários de tradições ontológicas e cosmológicas distintas? Esta é uma das questões centrais que atravessa o livro do filósofo chinês Yuk Hui, *The question concerning technology in China: an essay in cosmotechnics* (2016). O título do livro alude ao texto de Heidegger (1977 [1954]), no qual o filósofo alemão analisa a questão da téc-

nica como um dos problemas centrais da metafísica ocidental. Como muitos intelectuais asiáticos, conscientes do papel da tecnologia e da ciência moderna no processo de transformação dos ideais tradicionais, Yuk Hui compartilha da crítica heideggeriana à instrumentalização da Natureza, mas ao mesmo tempo julga que é necessário recontextualizar o problema, para produzir uma crítica imanente da modernidade, tomando a China como modelo. Este livro é uma leitura indispensável não apenas para os filósofos e antropólogos especialistas no estudo da cultura chinesa, mas também para aqueles interessados no problema da técnica em geral, na China ou alhu-

res, pois inaugura novos caminhos para pensar o problema da técnica em sua relação com outros aspectos da cultura, como a cosmologia.

Outro problema que o autor se coloca é o de explicar por que as técnicas se diversificam, assumindo formas e ritmos de desenvolvimento variados, em diferentes contextos históricos e geográficos, apesar da tendência universal para concretizar-se em artefactos mecanicamente eficazes, que exteriorizam funções do organismo. Este problema foi elaborado aproximadamente nestes termos pelo antropólogo e pré-historiador André Leroi-Gourhan (1971 [1943]; 1973 [1945]) há mais de setenta anos. Segundo o antropólogo, a “tendência” daria conta de explicar as convergências técnicas, uma vez que todas as culturas estão sujeitas às mesmas leis da matéria, que limitam o número de soluções possíveis para problemas técnicos semelhantes. “O facto técnico”, em contrapartida, tenta explicar a origem da referida diversidade. O facto técnico está ligado às contingências do meio interno (história e cultura) e externo (clima, geografia e relações internacionais) de cada sociedade. A interação entre ambos daria lugar a diferentes linhagens tecnológicas, que realizam a tendência num contexto histórico e geográfico definido. Yuk Hui considera que esta explicação não é completamente satisfatória e indica a necessidade de se pensar as técnicas em conexão com a cosmologia, um caminho que não foi suficientemente explorado por Leroi-Gourhan.

Ao contrário da tendência dominante de se pensar a técnica como um conceito universal e imanente a todas as sociedades, Yuk Hui propõe a hipótese de que o conceito de “técnica” nunca existiu na China, ao menos no sentido moderno. De facto, todas as culturas criaram meios eficazes para garantir a sua respectiva subsistência, mas o sentido ontológico que é atribuído à técnica na tradição ocidental não é tão simples de ser universalizado. Por definição, a técnica busca estabelecer o domínio instrumental da Natureza. Sendo assim, ela supõe a cisão ontológica entre a Natureza e a Cultura. Este modelo “naturalista”, para usar a classificação de Philippe Descola, teria triunfado no Ocidente somente a partir do século XVII, embora a técnica goze de um estatuto privilegiado no Ocidente desde a Antiguidade: a figura mítica de Prometeu, o herói que roubou o fogo dos céus para oferecê-lo aos homens, simbolizava a origem da técnica como uma transgressão da ordem divina. Nenhuma figura semelhante se encontra na cosmologia tradicional chinesa, onde a técnica não pode ser isolada do esforço para estabelecer a harmonia entre a ordem moral (a Terra) e a ordem cósmica (o Céu). Para dar conta desta relação, Yuk Hui cunhou o neologismo cosmotécnica.

Cada cosmologia inaugura uma maneira particular de conceber a relação dos seres humanos com a Natureza, cuja mediação prática se dá por meio da técnica. Neste sentido, o naturalismo é uma cosmotécnica particular, uma cosmo-

logia que concebe a técnica segundo o modelo da filosofia da Natureza. Em contrapartida, tanto o confucionismo quanto o taoísmo buscam integrar a técnica numa filosofia moral. Uma parte considerável do livro é dedicada a analisar a relação dialética entre termos centrais da filosofia chinesa, como *Qi* e *Dao*.¹ Ao invés de fazer uma exposição estática destes conceitos, buscando traduções aproximadas no léxico ocidental, Yuk Hui demonstra como eles assumiram sentidos diferentes ao longo da história, através da relação dinâmica com outros termos. O *Dao* é um dos princípios fundamentais da filosofia chinesa. O seu sentido original é “caminho”, mas esta definição não esgota o seu sentido metafísico. O mesmo é válido para *Qi*, que pode ser traduzido por “instrumento” ou por “utensílio”, mas que adquire uma conotação abstrata no jargão filosófico. Através deste fio condutor, o autor traça uma arqueologia do pensamento chinês sobre a técnica. Seu objetivo é compreender as razões culturais que fizeram com que a absorção da tecnologia moderna acabasse por produzir um conflito entre o pensamento e a prática, exemplificado no colapso da unidade entre *Qi* e *Dao*.

O processo de modernização e de globalização produziu nos últimos dois séculos uma sensação de desenraizamento, ligada à perda do fundamento

cosmológico. Segundo o autor, a modernidade aparece na China como o resultado de um processo exterior, que emerge do conflito entre duas historicidades distintas. Sob muitos aspectos, a tecnologia desenvolvida na China (da Antiguidade até o século XVI) foi mais “avançada” do que a tecnologia desenvolvida na Europa no mesmo período, mas o surgimento da ciência moderna modificou a relação entre a teoria e a prática, desencadeando um avanço tecnológico sem precedentes. É necessário compreender as causas que impediram que a ciência moderna surgisse na China e que, em última instância, determinaram a forma como ela foi absorvida. Como nota Yuk Hui, esta pergunta foi há muito formulada pelo sinólogo e historiador da ciência Joseph Needham (2013 [1969]). Needham oferece um retrato complexo da civilização chinesa e considera o concurso de múltiplas causas para esta relativa estagnação, dentre elas a organização económica e política. No entanto, a hipótese na qual Yuk Hui se detém é de natureza cosmológica. Needham apresenta a hipótese de que a ciência moderna não surgiu na China porque o pensamento tradicional, baseado num modelo “organicista”, era incompatível com a exploração sistemática da Natureza. No pensamento organicista, o universo é concebido à imagem do organismo: cada ser está ligado a todos os outros num sistema hierárquico de ressonâncias. A ciência moderna, em contrapartida, supõe a possibilidade de isolar os fenómenos para estabelecer uma relação

¹ Todas as expressões em chinês citadas no texto estão em Mandarim (Putonghua), a língua oficial chinesa, e foram transliteradas em Pinyin, o sistema oficial de romanização.

causal de natureza mecânica.

Após as derrotas nas Guerras do Ópio (1839–1842, 1856–1860), houve um esforço ativo para absorver a tecnologia ocidental, com o intuito de fortalecer o poder bélico. Inicialmente acreditava-se que era possível integrar a tecnologia sem abalar o sistema de pensamento. Alguns filósofos chegaram até mesmo a incorporar o vocabulário da física moderna para traduzir conceitos próprios da filosofia chinesa, produzindo verdadeiras quimeras metafísicas. Ao longo do século XX, diferentes movimentos reiteraram a necessidade deste esforço de “modernização”, acompanhados da tentativa teórica de conciliar o avanço tecnológico com o sistema de pensamento tradicional. Mou Zongsan (1909–1995) é uma figura central desse período e um dos maiores representantes do Novo Confucionismo. Ele se apropria do vocabulário kantiano para fundar uma metafísica moral coerente com os ideais do confucionismo (Billioud, 2012), mas este projeto idealista nunca foi adotado a nível institucional. A partir de 1949, a obra de Engels *A dialética da natureza* (2020 [1925]) torna-se o fundamento dos novos estudos sobre ciência e tecnologia na China, fortalecendo o projeto desenvolvimentista e a visão instrumental da Natureza.²

² Para Engels, o trabalho humano figura como etapa do movimento dialético de oposição e transformação interior à própria matéria, modificando a própria relação inicial do ser humano com a Natureza. Para uma discussão mais detalhada sobre a introdução e o impacto de Engels na China, ler:

A ênfase na produtividade e na eficiência, em detrimento dos aspectos morais associados às técnicas, causou uma inversão do sistema cosmotécnico. Aos poucos, o modelo organicista foi substituído pelo modelo mecanicista da ciência moderna e o discurso científico ameaçou tornar-se o único discurso válido para compreender a relação dos seres humanos com a Natureza. Como superar este conflito? A segunda parte do livro consiste numa tentativa de recriar uma cosmotécnica adequada para os tempos atuais, capaz de refletir sobre as questões ambientais, mas, como esclarece o autor, não se trata de um retorno a modos de pensamento tradicionais. Ao contrário da visão teleológica da tecnologia, que propõe um destino único para todas as culturas e que encobre as dinâmicas coloniais de dominação, Yuk Hui propõe um pluralismo tecnológico. A tecnodiversidade — conceito explorado em sua coletânea de artigos com o mesmo nome: *Tecnodiversidade* (2021) — é o correlato da biodiversidade no domínio da tecnologia, pois somente uma mudança de perspectiva sobre a relação entre Natureza e tecnologia pode prevenir o colapso ecológico do planeta.

Seguindo as reflexões de Bernard Stiegler, o autor propõe que a recusa de tematizar a tecnologia é um dos traços distintivos da modernidade, que culminou com os excessos da Revolução

Translating STS in China: disciplinary struggles and future prospects (Santos et al., 2023).

Industrial. A emergência da tecnologia como problema filosófico — a passagem do inconsciente tecnológico para a consciência reflexiva — é característica do período atual, afetando até as populações mais afastadas do nosso planeta, que também se veem diante do desafio de preservar as suas práticas e meios de subsistência tradicionais, apesar do avanço monolítico do capitalismo. A tecnologia deixa de ser uma força anônima, agindo subterraneamente apesar dos sujeitos, para se tornar um problema de ordem pública. Gerir os efeitos da modernidade e abrir novas formas de conceber o futuro é uma tarefa do nosso tempo. Não basta opor o local ao global, como uma forma passiva de resistência — visto que o local também é um produto da modernidade —, mas é preciso abordar o inconsciente tecnológico à luz das especificidades históricas e culturais locais, rejeitando o enquadramento da Natureza como uma fonte inesgotável de recursos.

Para Yuk Hui, a superação da modernidade implica uma pluralidade de ritmos tecnológicos, em oposição à sincronização mecânica da vida humana sob o eixo tecnológico global. A superação ou suprassunção (*Aufhebung*) da modernidade não se resume a uma alternativa entre a negação da tecnologia ou a negação da tradição. Ao invés de propor o retorno a uma suposta origem ou pureza cultural — movimento reacionário, adotado por Heidegger e pelos filósofos da Escola de Kyoto —, Yuk Hui propõe uma reapropriação e reinterpretação da tec-

nologia moderna por meio da tradição. Na China, a criação de novas escolas de pensamento emergiu sempre dos esforços para reinterpretar as categorias metafísicas tradicionais, como resposta a crises políticas e ideológicas. Yuk Hui faz o mesmo movimento, ao deslocar sutilmente o sentido de *Qi* e *Dao* para endereçar os problemas contemporâneos.

O penúltimo capítulo abre uma reflexão sobre o Antropoceno, momento em que as máquinas ampliaram o poder de atuação da humanidade sobre a Natureza, produzindo efeitos em escala geológica. Ao longo do século XX, a China conduziu um processo acelerado de industrialização, para se tornar um dos principais agentes de antropização da Terra. A China contemporânea, com as suas diversas tecnologias de automação, oferece uma imagem reveladora da modernidade, mas a ruptura forçada com a tradição é acompanhada de nostalgia pelo antigo ideal de harmonia entre o Céu (*tian*) e a Terra (*dì*). A tecnologia moderna tem consequências cosmológicas palpáveis, colocando em risco diversas formas e estilos de vida. As escolhas técnicas, portanto, não são redutíveis ao cálculo material. É preciso assumir a responsabilidade moral diante dos outros seres, para restituir o equilíbrio cosmotécnico. Para retomar o vocabulário taoísta, o caminho (*Dao*) não é um instrumento, um mero intervalo entre dois pontos, mas o instrumento (*Qi*) deve seguir o caminho, pois — como na cerimônia do chá ou na prática da caligrafia — o caminho é um fim em si mesmo.

Para além das longas digressões metafísicas, que talvez não interessem senão a alguns poucos leitores, a questão central do livro é uma questão eminentemente antropológica, que pode abrir novos programas de pesquisas, a saber: como diferentes cosmologias conceitualizam a relação com a tecnologia, e como as práticas tradicionais podem ajudar a enfrentar a crise ambiental? O livro possui uma dimensão programática e oferece mais problemas do que soluções, mas por isso mesmo é um livro fecundo, digno de ser lido.

Referências bibliográficas

- Billioud, S. 2012. *Thinking through confucian modernity: a study of Mou Zongsan's moral metaphysics*. Leiden, Brill.
- Descola, P. 2013 [2005]. *Beyond nature and culture*. Chicago, Chicago University Press.
- Engels, F. 2020 [1925]. *Dialética da natureza*. São Paulo, Boitempo.
- Heidegger, M. 1977 [1954]. *The question concerning technology and other essays*. New York, Garland Publishing: 3–35.
- Hui, Y. 2021. *Tecnodiversidade*. São Paulo, Ubu.
- Leroi-Gourhan, A. 1971 [1943]. *L'homme et la matière*. Paris, Albin Michel.
- Leroi-Gourhan, A. 1973 [1945]. *Milieu et technique*. Paris, Albin Michel.
- Needham, J. 2013 [1969]. *The grand titration: science and society in east and west*. London, Routledge.
- Santos, G. D.; Sharif, N.; Xing, J. L. 2023. Translating STS in China: disciplinary struggles and future prospects. *Engaging Science, Technology, and Society*, 9(1): 23–49.
- Viveiros de Castro, E. 2014 [2009]. *Cannibal metaphysics: for a post-structural anthropology*. Minneapolis, Univocal Publishing.

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Public square dancing, agency, and meaningful aging in urban China



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Huang, Claudia. 2025. *Dancing for their lives: the pursuit of meaningful aging in urban China*. Rutgers University Press
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Global population aging has prompted older adults to reimagine what it means to grow old. In China, rapid urbanization and large-scale layoffs from state-owned companies have positioned roughly 100 million retired urban women as “socially old,” who take up *guangchangwu* (public square dancing)¹, to, as the local saying goes, “struggle for their lives” (p. 1). Claudia Huang’s book offers an ethnography of lived experiences of these dancing middle-aged and old women, a group often overlooked in scholarship and public discourse, and of the social contexts that

shape their everyday worlds.

This book centers on how retired urban women go outside to “struggle for their lives.” Huang explores the challenges they face, the resources available to them, and the broader purposes behind their efforts. The central argument frames retirement of these urban women not as a stage of social decline but as an active pursuit of *weidao* (life’s flavor), including sensory enjoyment, friendship, and modest forms of self-cultivation, through collective dance. Drawing on an anthropological life-course perspective and on the cultural construction of age, Huang shows how the Western paradigm of “successful aging” is translated in China’s

¹ All Chinese expressions cited in the text are in Putonghua, the official Chinese language, and are transliterated in the official Pinyin system.

official discourse as *jiji yanglao* (active aging), which emphasizes self-responsibility, productivity, and an “ageless” ethos; such framing risks stigmatizing those who are frail or chronically ill as having “failed” at aging. In response, Huang advances a *weidao*-centered framework of “meaningful aging,” that situates agency as collective and affective, to rewrite the agency and aging values of retired women in urban China. Methodologically, the study draws on ethnographic fieldwork conducted in Chengdu between 2014 and 2018. Public square dancing varies by venue, degree of public visibility, dance genre, and intensity. Huang conducted participant observation with two contrasting dance teams: the Dancing Beauties, an indoor, fee-based group, and the Sunset Dance Group, a community team that meets in a public park.

The first two chapters situate retired urban women’s agency within socialist and post socialist change since the 1950s. Chapter 1 asks why so many of them dance in public. Through dancer’s life history, Huang shows how congregational dancing becomes a medium through which women who lived through rustication, the *danwei* system, and subsequent layoffs begin to ask what they want, remake the self, and rebuild social networks after decades of disruption. Chapter 2 examines the dancers’ marginalized public image and their self-understandings. *Dama*, literally “big aunt,” is a stigmatizing title applied to urban women, typically aged 50 to 70,

who engage in collective leisure; their public activities are often framed by media and younger cohorts as noisy or unbecoming (Zhang, 2022). They are associated with permed and dyed hair, bright scarves, and selfie sticks. This ensemble counters gendered stereotypes while circulating emotional capital in friendship-based social interactions. Rather than accept the role of the virtuous mother/grandmother or the market’s “tender girl/ripe woman” binary, *dama* rework age and gender norms through a distinctive aesthetic and peer intimacy.

In Chapters 3 and 4, Huang conceptualizes square dance as a peer-governed arena where *dama* negotiate their roles within the family amid the reorganization of gender and generational relations in post-socialist China (Santos and Harrell, 2017). Maintaining friendships with peers outside the family becomes a way to gauge and limit self-sacrifice for the family, especially in grandchild care, and to push back against China’s “inverted” family structure (chapter 3). When they cannot readily imagine or plan a positive future for elder care under eroding state guarantees and unstable family support, the Sichuan phrase “*shua yi tian, suan yi tian*” (“play one day, count one day”) captures *dama*’s mix of bitterness, humor, and denial (chapter 4).

Chapter 5 analyzes state attempts to discipline square dancing and how *dama* find flavor (*weidao*) and freedom under an authoritarian state. Three cases show how the state tries to insert itself

into everyday practice: state-imposed choreography rejected by dancers; a state-organized competition prescribing a single Tibetan song; and a rural village head funding a local square dance team. While formalized, replicable art forms have shaped square dancing, processes of standardization, review, and appropriation have not extinguished *weidao*; dancers have leveraged them to enhance visibility and access to resources.

Dancing for their lives is theoretically careful and ethnographically rich. It links life-course anthropology with studies of leisure, embodiment, and relocates the value of aging from productivity to affective and collective practice. It sustains thick description through years of participant observation with two groups and makes methodological reflexivity visible. As the conclusion notes, the scale of traditional public square dancing may contract under the combined pressures of the pandemic governance legacy, postponed retirement, and pension strains. Yet the underlying pursuit of emotional connection, bodily vitality, and everyday self-cultivation will not disappear. Urban older women will continue to choreograph new rhythms and invent new rituals within temporal interstices, micro-spaces, and digital platforms, co-shaping the next phase of China's "flavorful aging" alongside the state and the market. I concur with Huang's call, resonant far beyond China, that in an expanding global "silver society," old age should be recognized as a frontier of social innovation and cultural

production, rather than merely a policy burden or the passive object of care.

The book's main contribution lies in clarifying the meaning of congregational dance and the forms of agency it enables. Friendship-based leisure emerges as peer-governed community-based social infrastructure that organizes time, mutual aid, and access to public space in late life. The interlocutors, however, are mobile, urban retirees in Chengdu with relatively stable leisure windows and some discretionary income. While Huang explicitly justifies leaving men aside, the framework leaves out elders with significant disability, home-bound older adults, and those in acute economic precarity. A second limitation concerns voice in intra-household bargaining. In Chapters 3 and 4, reconstructions of intergenerational negotiation rely mainly on dancers' accounts; perspectives from spouses, adult children, or in-laws receive limited treatment. Future work could widen the lens to include less mobile and low-income elders, and to bring in household members' viewpoints while attending to elderly-care welfare infrastructures. Such extensions would help specify when, and for whom, "meaningful aging" can be sustained.

This book will be of considerable value to scholars and students in anthropology, sociology, gerontology, and China studies, as well as to policymakers seeking innovative perspectives on aging. Its vivid ethnographic storytelling, accessible prose, and concise length

make it well suited for use in advanced undergraduate and graduate seminars.

References

- Santos, G. D.; Harrell, S. (eds.). 2017. *Transforming patriarchy: Chinese families in the twenty-first century*. Seattle, University of Washington Press.
- Zhang, J. 2022. Joyful singing in parks: encounters, appropriations, and contradictions in the dynamic of state governance in urban China. *Antropologia Portuguesa*, 39: 103–128. DOI: 10.14195/2182-7982_39_5.

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Writing with empathy: reflections on Tamara Jacka's Ginkgo Village



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Understanding the distant “other” — across boundaries of geography, nationality, class, and gender — has always been a tricky issue in anthropology. To build inclusive and empathetic narratives that embrace “the other” as equally human and worthy of respect, Australian anthropologist Tamara Jacka has placed “empathy” at the center of her ethnographic and life-history research in Ginkgo Village (a pseudonym). To achieve this, Jacka adopted a hybrid methodological approach that merges ethnography, historical analysis, and self-reflection. She aimed to foster an empathetic understanding of how villagers in Henan Province, central-eastern China, experi-

enced historical change in their everyday lives, presenting detailed reflexive materials on her and her research assistants’ fieldwork experiences in Ginkgo Village between 2015 and 2019.

The book adopts an intentionally non-linear structure, with the author employing fragmented episodes of daily life as entry points to interrogate broader narrative frameworks. There are nine chapters in addition to the introduction. Chapter 1 provides an overview of the village’s physical environment, demographic structure, and governance. Building on this foundation, Chapters 3, 4, and 8 focus respectively on textiles and attire, fertile land, and motherhood, fore-

grounding how rural women's gendered roles are situated within and shaped by the dual spheres of production and reproduction. For example, through Gao Xiuhua's memories of ceaseless weaving and sleepless nights at the spinning wheel, Chapter 3 reveals how women's unpaid and undervalued labor sustained rural households during collectivization. The remaining chapters (2, 5, 6, 7, and 9) examine both traditional and transforming aspects of village life through folk narratives, festival rituals, clan structures, and spatial arrangements. Chapter 2, for instance, uses ghost legends to reveal how historical collective trauma continues to haunt the village in "ghostly" form through the medium of folk narrative.

Ginkgo Village is a bold attempt to "challenge conventional notions of what constitutes 'knowledge' and of how best to build and communicate it" (p. 7). Across the nine chapters, eight stories are fictional yet rooted in actual fieldwork encounters. These stories are primarily grounded in ethnographic interviews, with only minor details — such as descriptions of fleeting moments of unease — being fictionalized. The incorporation of fictional details aims to immerse the reader in a re-enactment of fieldwork that is evocative, representative, and emotionally resonant. Additionally, the main character interacting with villagers, Laoshi, is modeled on Jacka herself, while the assistant character Li Wei is a composite of two real assistants. The main body of the book is virtually devoid

of obscure terminology, as theoretical discussions are primarily placed in footnotes and appendices. As Jacka notes in a recent interview (Loubere and Jacka, 2024), this writing strategy is an attempt to narrow the gap between the researcher/writer, the reader, and the villagers by making her writing more engaging and accessible. By innovating a more accessible approach to knowledge production, Jacka aims to resist the elitism of knowledge production and strive for broader public education and empowerment.

The debate about the distance between the researcher and "the other" in knowledge production is embodied in the Reflexive Turn in anthropology. Since the 1980s, anthropologists have begun to question the depiction of the researcher as an "objective and neutral observer," starting a larger discussion about the role of reflexivity in fieldwork research and the impact of the anthropologist's position on the construction of knowledge (Rosaldo, 1993; Behar and Gordon, 1995; Abu-Lughod, 2008; Clifford and Marcus, 2010). As early as Jacka's work in 2006, reflections on identities and experience were exemplified: "It is not individuals who have experience, but subjects who are constituted through experience" (p. 12). Since experience is narratively constituted rather than empirically compiled, objective accounts alone are inadequate; empathy and hybrid writing are essential to grasp and convey experiential depth (Narayan, 1993; 1997). In *Ginkgo Village*, the statement "empathy

is a vital form of knowledge, built more effectively through storytelling than through factual analysis or argument" (p. 7) endorses this conviction, revealing the motivation for the book.

As a way of grasping the inexpressible, empathy fosters emotional proximity between the researcher or reader and the interviewee. However, it still needs to be wary of the subtle differences between empathy and projection. Projection involves an unconscious emotional transfer from one person to another, which can distort the understanding of the interviewee's experience (Tronto, 1993; Noddings, 2013). In *Ginkgo Village*, Jacka seems to face a similar challenge and acknowledges the complexities of building empathetic understanding.

In Chapter 8 (Motherhood), Li Wei (a pseudonym for Jacka's two assistants) was able to empathize and connect with Tan Zimei in a way that Laoshi (Jacka) could not. The text explicitly suggests that one reason for this failure in connection is that "Tan Zimei reminded me too much of myself at that age" (p. 227). This "age" refers to the parallel hardships faced by both Jacka's mother, Tan Zimei, and Jacka herself in relation to motherhood. At 19, Jacka's mother, overwhelmed by guilt following the tragic death of her son Tommy in a train accident, channeled her emotional distress toward her family members, particularly Jacka. After Jacka became a mother, she continued to care for her child Misha by herself despite suffering severe physical trauma

during childbirth, including a torn perineum and damaged spine. Jacka and her mother, Tan Zimei, experienced life through vastly different struggles, yet motherhood was the thread that united them. This projection guided by motherhood was so profoundly influential that it was difficult to establish a connection with Tan Zimei: "I should have done more to draw on that connection and deepen it, but I wasn't brave enough. Empathy was too painful" (p. 229).

In fact, Tan Zimei's experience bore limited resemblance to that of Laoshi. The timidity and sensitivity displayed by Tan Zimei stemmed from her past experiences of being forced into hiding and facing financial ruin. These hardships were compounded by the public humiliation she endured for having a second and third child, as she navigated the tension between traditional Chinese expectations of bearing a son and the restrictive One-child Policy. As Jacka described in *Ginkgo Village*, she grew up in a middle-class home and attended the top university in the country for her studies. She had no experience of material deprivation or the discrimination that had impacted Tan Zimei's youth. When Laoshi entered Tan Zimei's room, Jacka reflected that her bourgeois feminist brain subconsciously popped up with contradictory feelings of sympathy and contempt: "Your clothes are cheap and nasty, your house is a mess" (p. 217).

This contradiction reminded me, as a reader, that empathy sometimes can

slip into projection. As a metaphor, projection implies inserting oneself into another's situation, yet it frequently distorts rather than elucidates the other's reality by substituting the observer's own internal referents (van Dijke et al., 2020). This is closely related to what Spivak (2023) called "false representation": when intellectuals claim to speak for the subaltern, they often end up reinforcing their authority. As she wrote, "Representing them, the intellectuals represent themselves as transparent" (p. 70). Nevertheless, as D'Andrade (1995) criticized the Reflexive Turn in anthropology, infinite criticism of the possibility of representing marginalized perspectives has resulted in an excessive preoccupation with intellectual discourse, which also diverts attention from the actual lives and struggles of marginalized groups.

Debates over whether scholars can adequately represent the subaltern point to a key drawback of the Reflexive Turn: researchers risk over-reflecting and becoming overly preoccupied with their own positionality in the field. This illustrates a subtle yet notable flaw in Jacka's work. While the book offers a valuable ethnographic record of changing rural life in central-eastern China, it also reads as a personal journey of self-exploration and healing, occasionally blurring the line between analytical observation and introspective narrative. Jacka is careful not to fall into the trap of narcissism, but the risk is there, and nowhere in the book can we find reflections on the dangers of

over-reflection and excessive attention to the researcher's self.

Ginkgo Village is a highly accessible book that can be used in undergraduate and graduate courses in anthropology and China studies to introduce qualitative approaches to social transformation and discuss questions of reflexivity in ethnographic research. More than a record of rural life in China over the past decade, this book also challenges conventional modes of anthropological academic writing. By enhancing its readability, the book advances efforts to reconcile theoretical ambition with reader-friendly narrative forms.

References

- Abu-Lughod, L. 2008. *Writing women's worlds: bedouin stories*. Berkeley, University of California Press.
- Behar, R.; Gordon, D. A. (eds.). 1995. *Women writing culture*. Berkeley, University of California Press.
- Clifford, J.; Marcus, G. E. (eds.). 2010. *Writing culture: the poetics and politics of ethnography*. Berkeley, University of California Press.
- D'Andrade, R. 1995. Moral models in anthropology. *Current Anthropology*, 36(3): 399–408.
- Jacka, T. 2006. *Rural women in urban China: gender, migration, and social change*. 1st edition. New York, Routledge.
- Jacka, T. 2024. *Ginkgo village: trauma and transformation in rural China*. Canberra, ANU Press.
- Loubere, N.; Jacka, T. 2024. Ginkgo village: a conversation with Tamara Jacka. *Made in China Journal*, 9(2): 180–187.

- Narayan, K. 1997. *Mondays on the dark night of the moon: Himalayan foothill folktales*. New York, Oxford University Press.
- Narayan, K. 1993. How native is a “native” anthropologist? *American Anthropologist*, 95(3): 671–686.
- Noddings, N. 2013. *Caring: a relational approach to ethics and moral education*. Berkeley, University of California Press.
- Rosaldo, R. 1993. *Culture & truth: the remaking of social analysis*. Boston, Beacon Press.
- Spivak, G. C. 2023. Can the subaltern speak? In: Cain, P. H.; Harrison, M. (eds.). *Imperialism: critical concepts in historical studies*, volume III. Abingdon, Routledge: 171–219.
- Tronto, J. 1993. *Moral boundaries: a political argument for an ethic of care*. New York, Routledge.
- van Dijke, J.; van Nistelrooij, I.; Bos, P.; Duyndam, J. 2020. Towards a relational conceptualization of empathy. *Nursing Philosophy*, 21(3): e12297. DOI: 10.1111/nup.12297.

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One Health: ciência, atitude ou moralidade?



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Vivemos entre fronteiras. Um espaço onde é impossível traçar uma barreira concreta, epistemologicamente definida, entre pessoas, animais e os múltiplos ambientes que coabitamos. É neste contexto que o conceito *One Health* vem ganhando força no meio académico, com relevância acrescida após a pandemia de SARS-CoV-2 (COVID-19). Trata-se de uma abordagem colaborativa, transdisciplinar e multissetorial, que une visões macro e micro de um conjunto alargado de ciências para repensar a saúde, reconhecendo como indivisíveis as conexões entre humanos, ambiente e animais (Cassidey, 2016; Woods, 2022), procurando soluções específicas para problemas con-

cretos que contribuam para um melhor “bem-estar” a todos os níveis bióticos.

As fronteiras entre os diferentes reinos desvanecem (Haraway, 2007; Giles-Vernick et al., 2013) quando a agenda social, mediática e científica é dominada por temas como o amplo crescimento populacional, as mobilidades em massa, a destruição maciça do meio ambiente e as alterações climáticas decorrentes do rápido aquecimento global, entre outros. Debates que levantam desafios não só metodológicos, mas contextuais, nos quais a ciência deve compreender a saúde e a doença, como amplas cosmovisões culturais. Que se cruzam nos resultados das alterações ambientais,

como o aparecimento de novas alergias, a resistência bacteriana a antibióticos, o aumento drástico dos valores neoplásicos na população, o incremento das infeções e saltos zoonóticos (Woolhouse et al., 2012), os quais se podem traduzir em novas condições pandémicas numa sociedade pós-pandémica.

A *One Health* permite o desenvolvimento de novas metodologias e abre espaço para um olhar subjetivo que contempla factos sociais, económicos, tecnológicos, políticos e históricos, os quais alteram e moldam as relações biológicas — do homem aos animais, dos múltiplos ambientes aos vírus e bactérias — formando um todo indivisível, inseparável, que precisa de ser estudado como tal. Nesse sentido, através dela, propõem-se a reformulação das alter-ontologias (Descola, 2013), de modo que a saúde e a doença — tradicionalmente tidas como dualidades analíticas cartesianas — não se restrinjam ao espaço de ação da biomedicina ou aos olhares puramente fisiológicos.

É neste abrangente e complexo contexto social e científico, marcado pela rutura com as antigas visões dualistas, que surge a monografia *“One Health – uma saúde: um contributo da universidade”*, publicada pelo Instituto de Ciências Biomédicas Abel Salazar (ICBAS) em parceria com a Universidade do Porto (U. Porto Press). Trata-se de um livro de formato académico, que pretende extrapolar o mundo da academia, conforme enunciam os próprios autores. Composto por um total de dezanove textos

— dos quais cinco abordam visões específicas de especialistas (da biologia à medicina, passando pela bioquímica e pelas engenharias), três textos institucionais dos editores e dirigentes do ICBAS (que delineiam o modo e as novas políticas científicas para a consolidação de um instituto *One Health*) e, por fim, onze estudos de caso (em formato de artigo) com temas muito bem definidos, que permitem ao leitor perceber a real aplicação do conceito na resolução de problemas contemporâneos em diversas áreas de investigação (das hepatites à aquacultura, passando pelas cirurgias, pelo atendimento em ambulatório ou por estudos ecológicos de abelhas melíferas).

O livro segue como formato e modelo uma outra publicação semelhante, de 2023, dirigida pelo Conselho Nacional de Ética para as Ciências da Vida (CNECV), que, com o mesmo objetivo de levar a *One Health* para fora da academia, compilou diferentes artigos das ciências aplicadas e sociais, nos quais o tema é amplamente discutido (Ramalho-Santos e Horta, 2023). Nessa edição do CNECV, o ICBAS, através do seu presidente Henrique Cyrne Carvalho, apresentava as bases de um novo mestrado em *One Health* e abria portas a esta publicação (Carvalho, 2023), que surge como forma de divulgação tanto do mestrado quanto do Instituto, apresentando um certo regionalismo científico ao elogiar a própria cidade do Porto como uma cidade a tornar-se *“One Health”* — onde o conceito, curiosamente, emerge como um adjetivo descritivo,

quase moralizador, e não como um processo de reflexão e aplicação científica.

Proponho, neste texto, uma análise crítica ao livro sob a égide da lente antropológica — uma ciência pilar na construção do “hexágono” *One Health*, composto pela *One Medicine* (medicina humana e veterinária), pelas ciências biológicas e ecológicas, pelo direito, pela ética, pelo digital e pelas ciências sociais, com foco na antropologia.

A *One Medicine* interpreta, repensa, trata e traduz a etiologia da saúde e da doença com base no contacto direto com os pacientes, seja em contexto cirúrgico ou ambulatorio, dando palco a interpretações socioeconómicas e socio-culturais. A biologia e a ecologia fornecem as bases da investigação primária que a *One Medicine* aplica, estendendo-se desde os laboratórios de biologia celular e farmacologia até ao terreno, seja nas pesquisas ecológicas ou no estudo dos diversos biomas. O direito e a ética, enquanto unidades independentes, traçam o plano aplicável de novas políticas públicas que reformulem o modo como vivemos em comunidades cada vez mais multiespécie, onde temas como a engenharia genética, os tratamentos monoclonais e as produções agrícolas alternativas ganham novos e complexos contextos à luz do social, do direito administrativo e internacional, e do direito da saúde e do ambiente — enquanto unidades inseparáveis (Pereira, 2023).

A antropologia, como ciência social de base transdisciplinar, assume um pa-

pel fulcral na construção epistemológica e metodológica das aplicações *One Health*, e na incursão do digital na mesma. O seu percurso, com mais de 30 anos de trabalho de campo na antropologia médica, permite o acompanhar e participar ativamente em histórias de resistência, de sofrimento e de resiliência, conhecendo os factos económicos, políticos e históricos que moldam o mundo biológico, sem cair em reducionismos simplistas. Trazendo assim as narrativas locais para primeiro plano, dando voz aos “atores negligenciados” — que pouco podem dizer sobre a sua saúde e o seu corpo — através de olhares contextuais, processuais e holísticos, revelando uma nova forma de compreender *in loco* a antiga dualidade saúde-doença e as falsas fronteiras entre animais, pessoas e ambientes (Farmer, 1999; Singer, 2009; Amato et al., 2019; Varanda e Théophiole, 2019). Trata-se de uma ciência comunitária, que se propõe a ouvir e que, ao mesmo tempo, demonstra uma capacidade ímpar para lidar com conflitos sociais e biomédicos, sobretudo na abordagem de doenças emergentes e pandemias (Abramowitz, 2017) — ou seja, um olhar antropológico de campo, para vírus, bactérias, protozoários, parasitas, genes e microbiomas — um olhar social para o mundo micro.

A monografia *“One Health – Uma Saúde: um contributo da universidade”* pode ser dividida em três visões paralelas, não agrupadas e paradoxais. As visões diferem entre si no sentido ontológico, encarando a *One Health* como um pal-

co científico e social completamente distinto. A primeira visão pode ser considerada um olhar inovador e transdisciplinar, evidenciado por textos como “abordagem do biólogo”, “abordagem do médico” e estudos de caso como a análise da “Hepatite E”, “bem-estar animal”, “*One Nutrition*”, “linfomas e expressão de pesticidas”, “casos clínicos” e “ética”. Estes artigos apresentam uma dimensão integradora e colaborativa, em que as vozes das diferentes ciências — do mundo biológico ao mundo cultural — são tidas em conta num plano contínuo. Os paradigmas biológicos são contextualizados de forma histórica, económica, tecnológica e política, onde o social constitui o palco de uma genómica complexa e dialética (Faria et al., 2012; Pineda Peña et al., 2016).

A economia circular, conceito central nos artigos analisados, emerge como uma abordagem inovadora para repensar o uso de recursos, minimizando desperdícios e promovendo a sustentabilidade. Este conceito está intrinsecamente ligado à perspetiva *One Health*, que reconhece na prática interconexão entre saúde humana, animal e ambiental. Nos textos, essa ligação é bem desenvolvida, demonstrando as múltiplas influências entre estes domínios e a necessidade de abordagens transdisciplinares para compreender e enfrentar os desafios contemporâneos.

A abordagem médica e o papel do cirurgião são destacados como fundamentais para traduzir os princípios de *One Health* em práticas concretas. A análise de “casos clínicos”, permite compreen-

der como essa abordagem se materializa em soluções reais para problemas de saúde. Um exemplo disso, é o estudo sobre a “síndrome do edifício doente”, que ilustra como fatores ambientais, nomeadamente do planeamento urbanístico, impactam diretamente a saúde humana, exigindo intervenções que incorporem conhecimentos de diversas áreas, que se estende do consultório ao terreno.

A monografia termina com um estudo de caso sobre ética, que apresenta uma elevada densidade teórica, discutindo criticamente a construção do conceito de *One Health*, os seus desafios e dinâmicas. Esta análise revela as tensões inerentes à aplicação do conceito em diferentes contextos e destaca a necessidade de um debate contínuo sobre as suas implicações. Ao explorar estes aspetos, os artigos reforçam a importância de uma visão integrada e colaborativa, que considere tanto os avanços biomédicos quanto as realidades socioculturais, de modo a promover uma saúde verdadeiramente global e sustentável — tendo em conta diferentes níveis e escalas de atuação.

A segunda visão, hegemónica na monografia, principalmente através dos textos institucionais, estendendo-se a longos artigos, é o olhar da moral. Aqui, a *One Health* deixa de ser um modo de trabalho científico — uma epistemologia que nasce da voz da transdisciplinaridade e que desenvolve metodologias de trabalho — para se tornar uma moral, ou seja, uma valorização de atitudes, reduzida a um sentimento que “todos os cien-

tistas devem ter”, ou a uma forma básica de comunicação da ciência. Nestes textos que contemplam os ensaios institucionais (prólogo, introdução e epílogo), a “abordagem do bioquímico, engenheiro e veterinário” e o estudo de caso do “iodo” — verifica-se uma redução do conceito *One Health* ao mundo biológico, e muitas vezes aos mecanismos laboratoriais, onde o conceito que interliga comunidades e cosmovisões e que permite um pensamento contextual é restringido a um conjunto de reações químicas num tubo de ensaio, sem considerar a aplicabilidade da investigação, limitando-se a uma lógica pautada exclusivamente na escolha do reagente.

A *One Health* é uma prática distinta que intercala, por um lado, os ensaios de laboratório e, por outro, a realidade da floresta; une as culturas de bactérias *in vitro* à comunidade. Trata-se de um todo que não pode ser reduzido. Assim, muitos dos artigos abordam apenas as metodologias clássicas — essenciais e corretas para fazer ciência —, mas que não se inscrevem no paradigma de pensamento e trabalho *One Health*. Na perspectiva que apresentam, a *One Health* é vista como uma atitude do cientista, uma forma de divulgação para além da comunidade académica, quase como uma “moda” que embeleza artigos e relatórios. A monografia evidencia a dificuldade de intercalar temas, de pensar em diferentes abordagens e contextos, e de ter uma visão transdisciplinar à qual cada estudo desta área deveria obrigato-

riamente subscrever-se (Bersacola et al., 2021). Tal desajuste reflete o que se verifica na articulação de políticas sobre o tema entre organizações internacionais de investigação e saúde, onde os mesmos dilemas são abordados em relatórios conjuntos, mas sem uma articulação efetiva das políticas públicas emergentes (Cassidy, 2016; Woods, 2022).

Apesar da união no pensamento da *One Health* como uma moral — isto é, um conjunto valorativo de ações —, cada artigo configura um campo de batalha próprio, reivindicando o respaldo do trabalho ético em *One Health*. Seja na “abordagem do veterinário”, que ignora a base da *One Medicine* e traz para a veterinária todos os modos de fazer *One Health*, ou na “abordagem do bioquímico”, que se contrapõe reduzindo essa mesma moral à reação química de um processo fisiológico em laboratório.

Todos os artigos, sejam de abordagem específica ou de estudo de caso, tocam os principais temas que dominam a agenda científica da *One Health*: o aumento das zoonoses — responsáveis por 75% de todas as doenças emergentes (Jones et al., 2008) —, com a respetiva ocorrência de saltos virais com potencial pandémico crescente, e o aumento da resistência bacteriana a antibióticos, como risco de extensão dessa resistência a fungos e protozoários. Nas análises propostas, os conceitos biológicos são alvo de extrapolações sociais, por vezes pouco claras, em que as ciências sociais — como a antropologia, embora referida

em todos os artigos como parte fundamental — nunca são realmente consideradas ou descritas, de forma a demonstrar contribuições concretas. As zoonoses e a resistência bacteriana a antibióticos ocorrem em múltiplas escalas e temporalidades (por vezes ao longo de milhares de anos de evolução) e manifestam-se na relação multiespécies (Narat et al., 2017; Finlay et al., 2021) — entre humanos, ambientes e animais —, fenómeno que se intensifica com o aumento da população global e com os desafios concretos impostos pela globalização, ao nível do espaço e das dinâmicas urbanas.

A resistência bacteriana a antibióticos, bem como a interação com o próprio microbioma humano — temas frequentemente referidos ao longo da monografia — permitem-nos refletir sobre a forma como os humanos constituem parte de sistemas biológicos mais amplos, inseridos numa convivência complexa e interdependente com outros organismos (Abbott, 2016), tal como ocorre com a “viroesfera”, que constitui parte do DNA humano, composta por DNA viral (Duarte et al., 2025).

Desta forma, percebe-se que este campo necessita das ciências sociais, nomeadamente das ferramentas antropológicas, que possibilitam a compreensão da vida social dos vírus e demonstram como as circunstâncias sociopolíticas, económicas, históricas, ecológicas e biológicas são relevantes para a propagação de microrganismos (Giles-Vernick et al., 2013; Varanda e Santos, 2023), cuja imprevisibilidade

biológica, juntamente com o medo social e cultural do desconhecido, gera contextos de elevada incerteza e tensão coletiva, colocando as políticas públicas na obrigação de gerir uma batalha entre o mundo do medo e o da biologia. Tais abordagens são pouco exploradas e amplamente negligenciadas nos diversos artigos, onde a redução à explicação da barreira proteica viral culmina, na “atitude” do investigador, numa dita moral *One Health*.

O paradigma apresentado, ao longo da monografia, tenta romper com a antiga abordagem clássica que considerava que, em certos ambientes ecológicos, as infeções zoonóticas só afetavam a população quando epidemiologicamente significativas (Keck e Lynteris, 2018). Tal tentativa revela-se muitas vezes ineficaz, devido à insuficiente exploração dos contextos sociais e das vozes oriundas do terreno. Trata-se de uma narrativa puramente biológica que não pode ser combatida sem, juntamente com os ensaios de laboratório, integrar a visão da comunidade e os processos holísticos que incluem um novo olhar sobre a própria ciência, o que culmina — mesmo que involuntariamente — numa explicação meramente moral de uma atitude, de carácter quase judaico-cristão, que não só invalida a ciência, como afasta uma compreensão integral dos fenómenos sociais e biológicos do mundo contemporâneo, configurando uma espécie de autofagia das ciências.

Uma visão tendencial dos múltiplos estudos de caso apresentados, mesmo

daqueles que integram a primeira visão “integradora e transdisciplinar”, é o esquecimento da realidade local, que as ciências sociais trazem para debate, privilegiando realidades globais muitas vezes tão abstratas que se tornam cognitivamente incompreensíveis. Tal visão, hegemónica na monografia, apresenta uma *One Health* que parece servir apenas ao contexto humanitário, abordado de forma idílica. Onde os trópicos são colocados em oposição entre a beleza e os novos males patológicos da humanidade (King, 2002). Esquecendo a realidade ocidental e o aumento de doenças crónicas, tais como diabetes, obesidade — sobretudo na comunidade juvenil —, hipertensão arterial e outras doenças cardiovasculares. Para além disso, a *One Health* pode e deve desempenhar um papel central na investigação primária, na prevenção e tratamento, e na ligação à comunidade e aos seus múltiplos, e cada vez mais, intrincados fatores de risco.

A última visão, ontologicamente distinta, prende-se com um conjunto de artigos, nomeadamente estudos de caso sobre “saúde mental”, “ecologia das abelhas melíferas” e “aquacultura”, nos quais o conceito *One Health* é completamente esquecido, não sendo apresentada qualquer definição do mesmo. Trata-se de um conjunto de artigos exclusivos das respetivas áreas que, apesar de publicados numa monografia sobre *One Health*, não abordam o tema, limitando-se a áreas de pesquisa do próprio ICBAS que foram incluídas.

No estudo dedicado à “saúde mental”, observa-se uma abordagem que se distancia da lógica científica convencional predominante nas demais secções da monografia. A temática é explorada a partir de perspectivas mais subjetivas, recorrendo, por exemplo, à ideia de “banhos de natureza” como possíveis estratégias terapêuticas. Embora seja importante reconhecer e valorizar diferentes formas de compreender e tratar a saúde mental, é necessária cautela para que tais propostas não resultem na simplificação de uma problemática complexa, nem no valorizar da crença para lá da biomedicina. Além disso, torna-se fundamental refletir sobre os limites entre a valorização de pluralismos médicos, a interdisciplinaridade e o risco de dissolução de critérios metodológicos que sustentam o rigor das ciências sociais e biomédicas. A proposta da *One Health*, enquanto estrutura integradora, pressupõe o diálogo entre saberes diversos, mas sem que isso implique a oposição entre diferentes campos de conhecimento ou a desqualificação de abordagens clássicas — que neste projeto devem integrar-se numa voz única.

Nos estudos sobre “abelhas melíferas” e “aquacultura”, investigações de particular relevância, evidencia-se uma ênfase no bem-estar animal, o qual, por si só, não constitui uma abordagem *One Health*. O bem-estar animal é um campo independente, com avanços significativos na área das ciências biológicas, mas para se integrar nos estudos *One Health*, a reflexão deve ser mais abrangente,

abordando, quer a nível macro como micro, seja em laboratório ou em campo, a saúde e a doença, de animais, humanos e ambientes, como meios profundamente interligados. O que não é demonstrado em nenhum dos artigos.

Mais uma vez, verifica-se nestes textos uma forte influência da *One Health* enquanto moral na prática científica, encarada como uma atitude do investigador que, através da comunicação científica, deve levar tal postura à população em geral, numa atitude que se espera recebida e adotada. Tal visão contrasta com as fundamentações dos paradigmas científicos atuais, nos quais a ciência afasta de si a moral, a atitude ou a crença — aspetos que devem ser tidos em conta, sobretudo nos estudos de comunidades e na aplicação das ciências laboratoriais em campo, usando metodologias como a etnografia, mas que não devem integrar a sua ontogénese, sob pena de enviesamento. Ciências como a antropologia devem estudar e considerar as visões sociais e culturais da ética, da moralidade e da crença e como estas moldam a saúde e a doença, sem incorporar princípios morais *a priori*, permanecendo abertas ao conhecimento e à tradução dos diversos mundos.

Uma das maiores limitações, transversal à monografia, é a falta de abordagens sobre o digital e a Inteligência Artificial (IA), o que evidencia uma lacuna crítica na incorporação de áreas fundamentais tanto para o desenvolvimento de práticas laboratoriais inovadoras

como para a promoção da saúde digital e personalizada. A análise dos sistemas de IA, que inclui o estudo dos seus vieses e limitações, revela a necessidade urgente de integrar essas tecnologias nos paradigmas tradicionais da investigação biomédica e social, de forma a melhorar diagnósticos, tratamentos e estratégias de prevenção. Além disso, a ausência de estratégias robustas para a implementação de uma ética eficaz na sua utilização sublinha a importância de repensar as metodologias de investigação, promovendo um diálogo que articule dados laboratoriais com as complexas dinâmicas socioeconómicas e culturais.

A monografia *“One Health – uma saúde: um contributo da universidade”* evidencia a importância de publicações deste género, que servem como espelho dos debates atuais na área da *One Health*, revelando tanto os avanços como as limitações das abordagens ainda emergentes. Apesar das críticas dirigidas à redução do conceito a uma moral e à ausência de integrações profundas com o campo social, analisadas pela lente antropológica, deve destacar-se a importância do livro pela sua capacidade de reunir uma multiplicidade de vozes e perspetivas, confirmando o seu valor enquanto ferramenta para a reflexão e para o progresso científico. É inegável que a *One Health*, enquanto contexto prático de resolução de problemas, carece de uma base teórica mais robusta, que atribua uma dimensão epistemológica e integre ontologias de pensamen-

to coerentes, para o desenvolvimento de novas metodologias, sobretudo no que diz respeito à incorporação das ciências sociais, particularmente da antropologia, que pode oferecer uma compreensão mais holística e crítica das dinâmicas que perpassam as interações entre humanos, animais e ambientes. Assim, embora o rumo à transdisciplinaridade se revele desafiante, o livro apresenta-se como um contributo significativo, estimulando o diálogo e apontando para o caminho a percorrer na integração entre práticas científicas e teorias sociais, que apesar das múltiplas falhas deve ser bem-vindo, analisado e estudado. No caminho para uma ciência *One Health* sem fronteiras.

Referências bibliográficas

- Abbott, A. 2016. Scientists bust myth that our bodies have more bacteria than human cells. *Nature*. DOI: 10.1038/nature.2016.19136.
- Abramowitz, S. 2017. Epidemics (especially Ebola). *Annual Review of Anthropology*, 46(1): 421–445.
- Amato, K. R.; Maurice, C. F.; Guillemin, K.; Giles-Vernick, T. 2019. Multidisciplinarity in microbiome research: a challenge and opportunity to rethink causation, variability, and scale. *BioEssays*, 41(10): 1900007. DOI: 10.1002/bies.201900007.
- Bersacola, E.; Parathian, H.; Frazão-Moreira, A.; Jaló, M.; Sanhá, A.; Regalla, A.; Saíd, A. R.; Quecuta, Q.; Camará, S. T.; Quade, S. M. F. F.; Jaquite, S. M.; Lopes, A. G.; Patrono, L. V.; Ramon, M.; Bessa, J.; Godley, B. J.; Bonneaud, C.; Leendertz, F. H.; Hockings, K. J. 2021. Developing an evidence-based coexistence strategy to promote human and wildlife health in a biodiverse agroforest landscape. *Frontiers in Conservation Science*, 2: 735367. DOI: 10.3389/fcsc.2021.735367.
- Carvalho, H. C. 2023. Uma universidade, uma saúde – a incorporação do conceito no ensino superior. In: Ramalho-Santos, J.; Horta, S. (eds.). *One Health: um planeta, uma saúde, uma ética*. Lisboa, Conselho Nacional de Ética para as Ciências da Vida: 219–228.
- Cassidy, A. 2016. One medicine? Advocating (inter)disciplinarity at the interfaces of animal health, human health, and the environment. In: S. Frickel, S.; Albert, M.; Prainsack, B. (eds.). *Investigating interdisciplinary collaboration: theory and practice across disciplines*. New Brunswick, Rutgers University Press.
- Descola, P. 2013. *Beyond nature and culture*. Chicago, University of Chicago Press.
- Duarte, R. R. R.; Nixon, D. F.; Powell, T. R. 2025. Ancient viral DNA in the human genome linked to neurodegenerative diseases. *Brain, Behavior, and Immunity*, 123: 765–770. DOI: 10.1016/j.bbi.2024.10.020.
- Faria, N.; Hodges-Mameletzis, I.; Silva, J. C.; Rodés, B.; Erasmus, S.; Paolucci, S.; Ruelle, J.; Pieniazek, D.; Taveira, N.; Treviño, A.; Gonçalves, M. F.; Jallow, S.; Xu, L.; Camacho, R. J.; Soriano, V.; Goubau, P.; de Sousa, J. D.; Vandamme, A.-M.; Suchard, M. A.; Lemey, P. 2012. Phylogeographical footprint of colonial history in the global dispersal of human immunodeficiency virus type 2 group A. *Journal of General Virology*, 93(4). DOI: 10.1099/vir.0.038638-0.
- Farmer, P. 1999. *Infections and inequalities: the modern plagues*. Berkeley, University of California Press.

- Finlay, B. B.; Amato, K. R.; Azad, M.; Blaser, M. J.; Bosch, T. C. G.; Chu, H.; Dominguez-Bello, M. G.; Ehrlich, S. D.; Elinav, E.; Geva-Zatorsky, N.; Gros, P.; Guillemin, K.; Keck, F.; Korem, T.; McFall-Ngai, M. J.; Melby, M. K.; Nichter, M.; Pettersson, S.; Poinar, H.; ... Giles-Vernick, T. 2021. The hygiene hypothesis, the COVID pandemic, and consequences for the human microbiome. *Proceedings of the National Academy of Sciences*, 118(6): e2010217118. DOI: 10.1073/pnas.2010217118.
- Giles-Vernick, T.; Gondola, Ch. D.; Lachenal, G.; Schneider, W. H. 2013. Social history, biology, and the emergence of HIV in colonial Africa. *The Journal of African History*, 54(1): 11–30. DOI: 10.1017/S0021853713000029.
- Haraway, D. J. 2007. *When species meet*. Minneapolis, University of Minnesota Press.
- Jones, K. E.; Patel, N. G.; Levy, M. A.; Storeygard, A.; Balk, D.; Gittleman, J. L.; Daszak, P. 2008. Global trends in emerging infectious diseases. *Nature*, 451(7181): 990–993. DOI: 10.1038/nature06536.
- Keck, F.; Lynteris, C. 2018. Zoonosis: prospects and challenges for medical anthropology. *Medicine Anthropology Theory*, 5(3): 1–14. DOI: 10.17157/mat.5.3.372.
- King, N. B. 2002. Security, disease, commerce: ideologies of postcolonial global health. *Social Studies of Science*, 32(5–6): 763–789. DOI: 10.1177/030631270203200507.
- Narat, V.; Alcayna-Stevens, L.; Rupp, S.; Giles-Vernick, T. 2017. Rethinking human–nonhuman primate contact and pathogenic disease spillover. *EcoHealth*, 14(4): 840–850. DOI: 10.1007/s10393-017-1283-4.
- Pereira, A. G. D. 2023. “One Health” – o direito da saúde em transição. In: Ramalho-Santos, J.; Horta, S. (eds.). *One Health: um planeta, uma saúde, uma ética*. Lisboa, Conselho Nacional de Ética para as Ciências da Vida: 159–168.
- Pineda-Peña, A.-C.; Varanda, J.; de Sousa, J. D.; Theys, K.; Bártolo, I.; Leitner, T.; Taveira, N.; Vandamme, A.-M.; Abecasis, A. B. 2016. On the contribution of Angola to the initial spread of HIV-1. *Infection, Genetics and Evolution*, 46: 219–222. DOI: 10.1016/j.meegid.2016.08.009.
- Ramalho-Santos, J.; Horta, S. (eds.). 2023. *One Health: um planeta, uma saúde, uma ética*. Lisboa, Conselho Nacional de Ética para as Ciências da Vida.
- Singer, M. 2009. *Introduction to syndemics: a critical systems approach to public and community health*. Hoboken, Jossey-Bass.
- Varanda, J.; Santos, J. M. 2023. It was not the perfect storm: the social history of the HIV-2 virus in Guinea-Bissau. *Tropical Medicine and Infectious Disease*, 8(5): 261. DOI: 10.3390/tropicalmed8050261.
- Varanda, J.; Théophile; J. 2019. Putting anthropology into global health: a century of anti-human African trypanosomiasis campaigns in Angola. *Anthropology in Action*, 26(1): 31–41.
- Woods, A. 2022. One Health: a “more-than-human” history. In: Braverman, I. (ed.). *More-than-One Health: humans, animals, and the environment post-covid*. London, Routledge: 27–40.
- Woolhouse, M.; Scott, F.; Hudson, Z.; Howey, R.; Chase-Topping, M. 2012. Human viruses: discovery and emergence. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 367(1604): 2864–2871.

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In memoriam

— Fernando José Pereira Florêncio (1959–2025)

Antropólogo, africanista e pedagogo



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O Fernando Florêncio foi um antropólogo africanista que marcou a sua geração. Reconhecido como um etnógrafo criterioso, destacou-se também como um pedagogo notável, de trato fácil, sempre voluntarioso e com um sentido de humor apurado. O Fernando era um africanista raro, com uma vasta e rica experiência de terreno. Contribuiu para a compreensão crítica das autoridades tradicionais e das suas dinâmicas no processo de construção do Estado. As várias vivências de campo nestas áreas do globo, em especial a sua passagem como coordenador da missão de Direitos Humanos da União Europeia no Ruanda, marcaram profundamente a sua biografia, produção académica e pedagogia. Com um percurso académico firmemente enraizado na etnografia, o seu trabalho notabilizou-se por considerar diversos universos epistemológicos — antropologia, história e ciência política — desafiando assim fronteiras disciplinares, ao mesmo tempo que resgatava vozes frequentemente silenciadas. O Fernando era igualmente conhecido por ser um orador brilhante, e apesar da sua exigência junto dos alunos, foi o professor mais vezes galardoado com o Prémio Malinowski, atribuído pelos alunos da antropologia da Universidade de Coimbra (UC).

Fernando José Pereira Florêncio nasceu a 2 de agosto de 1959 em Barcarena. O interesse pelos temas políticos, sociais e religiosos, advém de percursos familiares anteriores, contribuindo ainda a sua vivência no Liceu de Oeiras nos anos do

25 de abril de 1974. Em 1985 estuda antropologia, licenciando-se em 1990, seguindo depois para o mestrado em Desenvolvimento Económico e Social em África, ambos no ISCTE. A guerra civil em Angola ‘empurra-o’ para Moçambique, onde estudou o processo de transformação social veiculado pelo Estado pós-colonial no mundo rural, entre os Ndaus, no distrito do Búzi, província de Sofala, Moçambique. O terreno foi uma experiência transformadora, que como diria mais tarde: O campo foi “*a mãe de todas as batalhas. A primeira. As outras tu já vais, já sabes, já antecipas algumas coisas, corriges muitos dos outros disparates... A primeira, não. Vais virgem, completamente. Cru, virgem, ingénuo.*” (Gonçalves, 2022). Isso mesmo se vislumbra nas inúmeras histórias que partilhava como instrumento pedagógico durante as aulas, algumas das quais se encontram plasmadas nos seus textos de reflexão etnográfica.

Em 1995 volta ao terreno africano, mas desta feita sob outra capa: observador e chefe de equipa e, posteriormente coordenador do contingente de observadores da missão europeia de Direitos Humanos inserida na *United Nations Human Rights Mission For Rwanda* (1995–1997). Esta passagem pelo Ruanda, nos anos do genocídio, marca-o pelo pior que vivenciou, notando que foi ‘a experiência que moldou toda a postura emocional, intelectual e profissional seguinte’. Sobre este período, o Fernando falou sempre de forma reservada, publicando ainda menos. O único trabalho acadé-

mico, “Uma história de violência sob as brumas des Virunga. Morte e poder no Ruanda” saiu nos *Cadernos de Estudos Africanos* (Florêncio, 2011). É um ‘estado-da-arte’ sobre a relação entre etnicidade, Estado e poder, e é leitura obrigatória para melhor compreender a contemporaneidade na região dos Grandes Lagos, em África. As circunstâncias da morte de um colega de missão impulsionaram-no a regressar a Portugal, para junto da família. Além disso, redireciona-o para a academia. Segue-se, o doutoramento em Estudos Africanos pelo ISCTE, efetuado entre 1998–2003 — *Autoridades Tradicionais vaNdaui, Estado e Política Local em Moçambique*, publicado mais tarde em livro (Florêncio, 2005). A decisão de prosseguir os estudos com o doutoramento no ISCTE seguiu-se à recusa de um convite para o realizar no King’s College London, pois, tal implicaria voltar ao Ruanda.

O seu último terreno africano, efetuado entre 2005–2007, já como professor da Universidade de Coimbra (UC). Neste trabalho, centra-se nas autoridades tradicionais Ovimbundo do planalto central de Angola no município do Bailundo. Contudo, a relação entre grupos étnicos e estado é ampliada, integrando temáticas como o pluralismo jurídico e religiosidades tradicionais. Mas, mais uma vez, o terreno não foi fácil, o que se traduziu em publicações analítica e etnograficamente valiosas das quais destaco — “No Reino da Toupeira. Autoridades Tradicionais do M’balundu e o Estado Angolano”, capítulo no livro *Vozes do Universo Rural: Reescre-*

vendo o Estado em África (Florêncio, 2010).

O seu trajeto académico inclui ainda uma longa experiência pedagógica, bem como o exercício de vários cargos de gestão académica. Em 2002, ainda enquanto estudante de doutoramento, iniciou a sua atividade de docente no então Departamento de Antropologia da UC. Nestes anos iniciais, partilhará aulas, como assistente, com os Professores Manuel Laranjeira Areias e Jacques Houart. Em 2004, passa a professor auxiliar da UC e nos 20 anos seguintes será regente de mais de duas dezenas de unidades curriculares. Foi, ainda, coordenador dos três níveis de estudo — licenciatura, mestrado e de doutoramento —, para além de coordenador de Erasmus. Os colegas sabiam que era presença assídua e constante nos seminários e eventos de antropologia, quer fossem estes de antropologia social e cultural ou biológica.

Esta dedicação refletia-se numa presença diária no departamento, com porta do gabinete sempre aberta. Também marcava sempre presença nos jantares de curso e nas galas dos estudantes. Por isso, ser habitual que alunos de licenciatura, mestrado ou doutoramento parassem no seu gabinete para dialogar sobre questões académicas ou sobre o trabalho de campo. Tanto os estudantes como o Núcleo de Estudantes de Antropologia da Associação Académica de Coimbra (NEA/AAC) recorriam frequentemente ao Fernando, cooptando-o para as suas atividades académicas, para ser o docente responsável pelos convívios ou até para

ajudar nas aulas-fantasmas para os ca-loiros. O Fernando deixa ainda um vasto grupo de doutorandos em várias áreas temáticas, distribuídos por diversas universidades, tanto nacionais como estrangeiras. Um legado que reflete o alcance do seu saber, mas sobretudo a sua capacidade de acompanhar, com sensibilidade e liberdade, os alunos nos anos solitários do doutoramento. Para além da investigação e docência, participou ainda em várias de direções — Direção da Associação Portuguesa de Antropologia (APA); Centro em Rede de Investigação em Antropologia (CRIA) e coordenação do polo de Coimbra; Direção do Centro de Estudos Africanos (CEA) do ISCTE; e APECER — Academia para o Encontro das Religiões e Culturas da Universidade de Coimbra.

Nos anos de 2018–2019, vislumbra-se uma transformação na carreira do Fernando, marcada pela reaproximação a África à distância, através de outras tangibilidades. Fá-lo revisitando a sua experiência de terreno por um lado, por outro respondendo a solicitações para escrever sobre história, religião e cultura material. Esta mudança relaciona-se com vários fatores. A novas unidades curriculares que ministra na licenciatura nomeadamente: *Antropologia da Religião e Etnografia e Trabalho de Campo*; a sua sabbática em 2018–2019 onde inicia o estudo sobre o culto da Rainha Santa Isabel, que abandonará na epidemia; os diversos pedidos de contribuições académicas: sobre religião e cultura material, e a participação regular nos eventos da APE-

CER entre 2019–2025. Entre 1995–2007 as suas produções académicas centram-se em Moçambique, ganhando Angola atenção entre 2008–2017, enquanto os anos entre 2018–2025 verifica-se uma viragem para temáticas de religião e cultura material, bem como revisitações etnográficas. O vislumar da existência de outros públicos interessados nas suas experiências de terreno com temas religiosos em África força-o a desenrolar o novo das autoridades tradicionais, relegando o foco da política, e colocando no centro o cariz religioso destas. Destacam-se os capítulos de livro “A Religião Tradicional do Kongo. Entre Fetichismo e Resistência” do livro *Visto de Coimbra, O Colégio de Jesus entre Portugal e o Mundo* (Florêncio, 2020), bem como o texto “Religiões Étnicas: entre Tradição e Mudança”, integrado na obra *História das religiões. Da Origem dos Deuses às Religiões do Futuro* (Florêncio, 2023). O seu último livro *O Povo Ovimbundu. Angola: a partir das coleções da Universidade de Coimbra*, que partilhou autoria com Maria do Rosário Martins, marcará um outro deambular por Angola, desta feita através de cultura material (Martins e Florêncio, 2025).

Os seus textos são pautados por uma base etnográfica forte, com estadias prolongadas, um uso extensivo da observação participante, de olhares multidisciplinares e uma análise clara, e, nunca ideológica. As cores da etnografia levam o leitor para o terreno, tal é o detalhe vivencial e a cacofonia de vozes (locais), na maioria dos casos de pessoas que de

outro modo ficariam ‘fora’ da história. O resultado são análises interdisciplinares, não-exotizantes, longe das visões ideológicas e maniqueístas que ele criticava e tentava desmontar. “A etnografia não é filha menor da antropologia” recorda-nos ele na sua monografia (Florêncio, 2005).

Mas o legado do Fernando perpassa os títulos académicos. O seu percurso é um testemunho de uma postura atenta, reflexiva e muito ética face às comunidades que estudou, aos alunos com quem trabalhou e com todos os colegas com quem privou. Ele ficará na nossa memória como alguém profundamente humanista muito dedicado à antropologia e aos estudos africanos. A sua ausência deixa um vazio imenso, mas o seu trabalho, e o seu exemplo, continuarão a inspirar gerações de estudantes, colegas e investigadores. Cabe-nos a nós, na academia, dar a conhecer o seu trabalho e a honrar o legado que nos deixou.

Referências bibliográficas

- Florêncio, Fernando. 2023. Religiões étnicas: entre tradição e mudança. In: Gouveia Monteiro, J. (ed.). *História das religiões: da origem dos deuses às religiões do futuro*. Lisboa, Manuscrito: 47–71.
- Florêncio, Fernando. 2020. A religião tradicional do Kongo: entre fetichismo e resistência. In: *Visto de Coimbra: O Colégio de Jesus entre Portugal e o mundo*. Coimbra, Imprensa da Universidade de Coimbra: 251–285. <https://doi.org/10.14195/978-989-26-1871-5>.
- Florêncio, Fernando. 2011. Uma história de violência sob as brumas des Virunga: morte e poder no Ruanda. *Cadernos de Estudos Africanos*, 21: 71–97.
- Florêncio, Fernando. 2010. *No reino da Toupeira: autoridades tradicionais do M’Balundu e o estado angolano*. In: Florêncio, F.; Dias, A. M.; Ribeiro, G. M.; Jauana, H.; Gonçalves, J. M.; Lourenço, V. A. (eds.). *Vozes do universo rural: reescrevendo o estado em África*. Lisboa, Centro de Estudos Africanos/ISCTE-IUL & Gerpress: 79–175.
- Florêncio, Fernando. 2005. *À procura dos mambo vaNdau: estado e autoridades tradicionais em Moçambique*. Lisboa, Instituto de Ciências Sociais.
- Gonçalves, João. 2022. Pessoas: Fernando Florêncio. *CRIAções* [Online]. Lisboa, Centro em Rede de Investigação em Antropologia (CRIA). [Acedido em 17-11-2025]. Disponível em: https://www.uc.pt/site/assets/files/786800/criacoes_pessoas_fernando_florenco_09_2022.pdf.
- Martins, Maria do Rosário & Florêncio, Fernando. 2025. *O Povo Ovimbundu. Angola: a partir das coleções da Universidade de Coimbra*. Coimbra, Imprensa da Universidade de Coimbra.

Florêncio, Fernando. 2011. Uma história de

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McElroy, A.; Townsend, P. K. 2004. *Medical anthropology in ecological perspective*. 4th edition. Boulder, Westview Press.

Obra colectiva

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Collective work

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Fagundes, N. J. R.; Bonnatto, S. L.; Callegari-Jacques, S. M.; Salzano, F. M. 2002. Genetic, geographic, and linguistic variation among South American Indians: possible sex influence. *American Journal of Physical Anthropology*, 117(1): 68-78.

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