

CHEATING DEATH IN PREHISTORY: PATHOLOGY, TRAUMA,
DISABILITY, AND CARE DURING THE ARCHAIC
PERIOD IN NORTH ALABAMA

by

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ABSTRACT

Bioarchaeological studies exploring provision of care for the disabled in prehistoric societies often have received criticism on the basis of lack of evidence or inadequate rigorous inquiry. The recently introduced bioarchaeology of care model alleviates these criticisms by providing a standardized methodology for the identification of care in the archaeological record. This study applies this new model for care research to a prehistoric Archaic Period population from the Mulberry Creek site (1Ct27) in North Alabama, exploring possible trends in care. This region has long been known to demonstrate evidence of violence in the past, but has never been examined in relation to what could be viewed as the opposite of violence: caregiving behaviors. It is argued that the use of a combination of skeletal, artefactual, mortuary, and ethnohistorical analysis can reveal important trends in disability and provision of care in prehistory. The results of this study show that care was occurring at the site during the Late Archaic Period, and suggest that the decision to provide care was likely linked to complex social and biological factors of individual and group identity. This information provides valuable insight into the treatment of disabled individuals in the past, and adds to our understanding of the peoples of prehistoric Alabama and the wider Southeastern United States.

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1. INTRODUCTION

The academic and analytical discourse regarding the origins of violence among humans has been present for decades. Within the prehistoric North American Southeast, violence has been recognized as a major force of cultural and behavioral change, as well as a fundamental component of everyday life during the Archaic and Mississippian periods. However, within this broader body of research into violence, the behaviors that could be regarded as the antithesis of violence, caregiving behaviors, have often been overlooked. In certain populations, cases of violent injury or death have been cited as evidence of a lack of care in the form of protection from harm. However, several cases from within the prehistoric Tennessee River Valley of North Alabama demonstrate that this seemingly clear dichotomy between care and violence is not as simple as is often believed. As will be demonstrated in the following chapters, it can now be shown that a violent death does not always preclude care at the individual level. Logically, based on this new insight, it seems that any bioarchaeological analysis for patterns of violence should consider the possible presence of caregiving behaviors, and vice versa.

The provision of care for those who are unable to care for themselves is one of the hallmarks of humanity, and has long been sought archaeologically as proof that the lives of ancient humans or hominins were not “solitary, poor, nasty, brutish, and short” as Thomas Hobbes (1651) described them. Past archaeological cases identifying ‘care’ have been met with resounding criticism leveled upon their tendency to equate ‘care’ with compassion and kindness, or to argue for the presence of care based solely on the survival of individuals with a severe

physical impairment (DeGusta, 2002; DeGusta, 2003; Dettwyler, 1991; Hublin, 2009; Lebel et al., 2001). However, in response to these criticisms, the recently developed ‘bioarchaeology of care’ approach (Tilley, 2015b; Tilley, 2017; Tilley and Oxenham, 2011) has provided a systematic framework for the identification, analysis, and interpretation of care and disability in the past.

The bioarcheology of care model incorporates evidence from numerous sources, seeking a holistic, contextually based approach to archaeological analysis. Skeletal evidence of care can provide important details for a biocultural approach to understanding prehistoric populations, and can also lend insights into human behavior both synchronically and diachronically. When osteological evidence is used in tandem with burial and grave good analysis, the complex relationship between the social and biological factors that contribute to the construction of disability emerge, and patterns of care can be identified.

This study is the first of its kind in more ways than one. First, it is the first use and application of this new methodology, the bioarchaeology of care, to the early prehistoric time period in the Southeastern United States, as well as within the state of Alabama. It is also the first time (to my knowledge) that this methodology has been applied to many individuals at a single prehistoric site.

Because of this, the project itself has grown and evolved throughout the course of research and has narrowed in on two major goals. First and foremost was to determine if care analysis could be applied to this population to identify care in this particular prehistoric group. Upon examination of specific cases, this goal was accomplished almost immediately. The first case analyzed, that of 1Ct27 8a provided the first attempt at care analysis, and ultimately, the first demonstrated case of active care in the Archaic Period of Alabama (Simpson, 2016).

However, as analysis progressed, it became clear that the bioarchaeology of care approach, as laid out originally by Lorna Tilley (Tilley, 2015b; Tilley, 2017; Tilley and Oxenham, 2011), was not fully equipped to deal with the complex considerations encountered during a comparative analysis of disability and care.

Typically skeletal analysis using the bioarchaeology of care methodology follows four clear steps: 1. describe, diagnose, document, 2. determine disability, 3. construct a model of care, and 4. interpretation (Tilley and Cameron, 2014, p. 6). However, as Tilley acknowledges, this method should not be used as a rigid framework for scientific analysis (Tilley, 2015b), but rather as a flexible guide to the step-by-step process of identifying and interpreting disability and care within the archaeological record. As the following chapters will demonstrate, Tilley's advice has been applied and adapted throughout the course of this analysis. By applying the approach to skeletal remains that had been preliminarily analyzed, the method has grown and evolved, incorporating features of other relevant methodological and theoretical approaches. However, still at the heart of this process is the argument that this research into past care and disability is both informative and necessary.

Past applications and adaptations of this methodology have focused on numerous cases from around the world, spanning hundreds of thousands of years (Boutin, 2016; Conlogue et al., 2017; Jolly and Kurin, 2017; Matczak and Kozłowski, 2017; Oxenham et al., 2009; Roberts, 2017; Schrenk and Martin, 2017; Tilley, 2015a; Tilley, 2015b; Tilley, 2017; Tilley and Oxenham, 2011; Tremblay Critcher, 2017; Wesp, 2017; Worne, 2017). Yet despite the distance between these cases through time and space, they are all unified by the goal of facilitating a better understanding of human life and behavior with eyes toward the past, present, and future of

our species. The research presented in this thesis seeks both to complement and augment the findings of these prior studies.

While it is acknowledged that the present study applies the bioarcheology of care model to only a small subset of human remains recovered from the Mulberry Creek Site, this initial application of the bioarchaeology of care at the Mulberry Creek site (1Ct27) has demonstrated the existence of multiple levels of health-related care occurring during the Archaic Period. The results presented here will suggest that a complex thought process was involved in the decision of community members to provide care to a physically impaired individual, a process based partially in logical thought, and partially in ideology. These results also seek to address the important and interesting question: in an environment in which life was hard, what was the purpose or reason for keeping someone alive when he or she became a burden or risk to the group as a whole? This is a question that warrants further inquiry.

The first chapter of this text provides an introduction to the bioarcheology of care beginning with an overview of archaeology of care and disability prior to its creation, detailing its design and implementation by Lorna Tilley (Tilley, 2015b; Tilley and Oxenham, 2011), and finally delineating necessary and complex terms like ‘care’ and ‘disability.’ Topics of identity in bioarchaeology are then explored, followed by an overview of the prehistoric Southeast, including all previously published cases of possible care.

The second chapter of this volume details the materials and methods used during this research. The organization of this section is out of necessity, somewhat out of the ordinary compared to a standard skeletal analysis or site overview. Each stage of Tilley’s bioarchaeology of care is covered, with the most detail accorded to the first stage of analysis which is arguably the least interpretive. The details of the methods used for the osteological analysis are provided,

followed by a more detailed examination of the biocultural context of the Mulberry Creek site during the Archaic Period. This context details lifeways of inhabitants with particular focus given to violence and mortuary behavior, as well as providing a short overview of past analyses of the skeletal population (Newman and Snow, 1942; Shields, 2003a).

The third chapter, results, first gives an overview of all identified cases of care at the site, before choosing to focus on three specific case examples, and details the first three stages of analysis with the goal of better illustrating research process and to facilitate interpretation. Case 1, burial 8a, details a relatively straight forward example of probable care for an older female from the Late Archaic Period. Cases 2 and 3, presented and discussed in tandem, illustrate the complex relationship between disability, care, and violence observed at the Mulberry Creek site. A consideration of the interactions between violence and care among these individuals highlights a major conclusion of this research: care and violence are complex behaviors and are not necessarily mutually exclusive within past groups.

The fourth chapter, discussion, delves into stage four of the bioarcheology of care and begins the process of interpreting the broader meaning of these examples of care. Ethnohistoric and archeological data are used to consider possible social or biological factors which might have motivated care for these individuals. Finally, in the conclusion chapter, potential sources of bias are considered before providing an overview of the potential significance and broader impact of this study, followed by some concluding thoughts on future directions for research on this subject and region.

2. BACKGROUND

The study of provision of care and disability within the archaeological record has undergone a major paradigm shift and proliferation of studies examining historic and prehistoric care in recent years, following the introduction of the bioarchaeology of care approach. By bridging the gap between biological and cultural anthropology as well as archaeology, this approach can be situated within what Hegmon (2003) described as a “processual-plus” approach, utilizing hard scientific data for complex social and ideological interpretations. Within bioarchaeology in general, the rapidly expanding body of approaches, often classified as ‘social’ or ‘biocultural’ bioarchaeology, seeks to transcend the dichotomy between quantitative conclusions and qualitative interpretation. Current research on disability using the bioarchaeology of care methodology (Tilley, 2015b; Tilley and Oxenham, 2011) falls within this group of research, and seeks to create a more holistic, fully-realized analysis and interpretation of disability, care, and identity in the past.

By starting with the material, and logically moving towards interpretation, the bioarchaeology of care seeks to avoid overreaching interpretation. In this way research conclusions are made conservatively and allow for possible elaboration in the future. The material correlates of identities based on human skeletal remains, mortuary context, grave goods, physical environment, and cultural context, are all considered in this analysis to better understand provision of care in the past.

Care and Disability in Archaeology before the Bioarchaeology of Care

In 1991 Kathy Dettwyler, a biocultural anthropologist, wrote an article for the American Journal of Physical Anthropology in response to a growing trend she had observed within anthropological literature. This piece *Can Paleopathology Provide Evidence for “Compassion”* criticized several specific interpretations which attributed emotional responses and “moral decency” (p. 375) to prehistoric humans and human ancestors. Dettwyler’s criticism focused on three cases within the paleopathological literature, and essentially underlined the inherent issues with placing a moral judgment on ancient behavior based on a modern perspective. Even when care could be demonstrated to exist, it was impossible to know what motivated the care provider in any specific situation.

The first case Dettwyler (1991) targeted, Shanidar 1 from Iraq, was one of the catalysts of the “Neanderthals as flower people” beliefs prevalent in the 1970’s (Solecki, 1971). This individual, a male who lived to the advanced age of approximately 40 years, survived despite multiple physical problems visible on his skeleton. It is widely accepted that he suffered from some sort of paralysis or deformity to the right arm, caused either by a healed fracture or a congenital abnormality of the humerus. Additionally, a healed skull injury likely resulted in blindness in the right eye, and possibly deafness (Trinkaus, 1983). These traumas all show a high degree of healing, and this along with the individual’s advanced age at time of death, led some to infer that Shanidar I relied heavily on support from within his group in the form of conspecific care. Thus, the argument made in this case was that Neandertals showed evidence of the “human” emotions of compassion, kindness, and love (Dettwyler, 1991; Hublin, 2009; Solecki, 1971).

One of the major ongoing issues with this interpretation of so called “human” emotions in Neandertals or ancient human groups, is that these emotions are not specific to humans at all. Since the 1970’s, multiple studies have demonstrated behaviors which could be interpreted as compassion or kindness in non-human primates (DeGusta, 2002; DeGusta, 2003) as well as other mammals, including elephants (Douglas-Hamilton et al., 2006), and Amazonian giant otters (Davenport, 2011; Fashing and Nguyen, 2011).

A Google Scholar search (date accessed 05/04/17) reveals that Dettwyler’s (1991) paper has been cited a minimum of 152 times over the years by sources covering a wide range of topics. However, Lorna Tilley (2015b) notes that the criticism Dettwyler (1991) provides is often misinterpreted as a belief that past disability and care can never, or should never be identified. This is not the case. Dettwyler is rather arguing that skeletal evidence of injury is not enough on its own to support complex interpretations of disability experience and the motivations of the care provider. It is thus argued that the analysis of disability and care must take a comparative, contextual approach (DeGusta, 2002; Knudson and Stojanowski, 2008; Roberts, 2000), and it was out of this understanding that the first clear standardized model for care analysis, the bioarchaeology of care, emerged.

The Bioarchaeology of Care

The ‘bioarchaeology of care’ model is a theoretical and methodological approach to the analysis of care within the archaeological record developed by Lorna Tilley and first detailed in her 2015 volume, *Theory and Practice in the Bioarchaeology of Care*. The original case example, a Neolithic individual from Vietnam, suffered from severe atrophy of the lower limbs, which likely would have resulted in total paralysis. Within this case, overall good health,

evidenced by a lack of malnutrition and secondary infection, as well as standard mortuary treatment, revealed very strong evidence of care in the archaeological record (Oxenham et al., 2009; Tilley, 2015b; Tilley, 2017; Tilley and Oxenham, 2011). Due to the severity of the physical impairment suffered by the individual, and clear evidence of long-term care and support, this presented an ideal opportunity to develop a standardized approach to care analysis in the past, resulting ultimately in the bioarchaeology of care model. It has been argued that any analysis of care must take a comparative approach (DeGusta 2002), and that the best analyses must take a “multidisciplinary and holistic approach” (Roberts, 2000, p. 57). The bioarchaeology of care seeks to do just this using four distinct stages of analysis (Figure 1).

Stage 1 involves documentation of the individual including demographic information, as well as pathology, and all associated context. Stage 2 involves an analysis of the clinical and mechanical/functional impacts of the specific pathology, which must largely rely on modern clinical literature. Stage 3 requires a synthesis of limitations to create a model of care provision that would have been necessary for the survival of the individual. Stage 4, the most problematic, requires an interpretation of the meaning of the provision of care and the implications for individual and group identity (Tilley 2015b; Tilley, 2016; Tilley, 2017).

The unique feature of the bioarchaeology of care model is the attempt to interpret the meaning of care provision within a larger archeological and biocultural framework, a feature which largely has been neglected in previous studies relating to care (Tilley, 2015b; Tilley, 2016; Tilley, 2017; Tilley and Cameron, 2014). By dividing the method into stages which divert interpretation until after osteological analysis, Tilley avoids any early attempt at delineation of the identity or motivation of the care provider. By also not equating care with compassion, the

bioarchaeology of care avoids the formation of broad, generalizing conclusions without sufficient evidence.

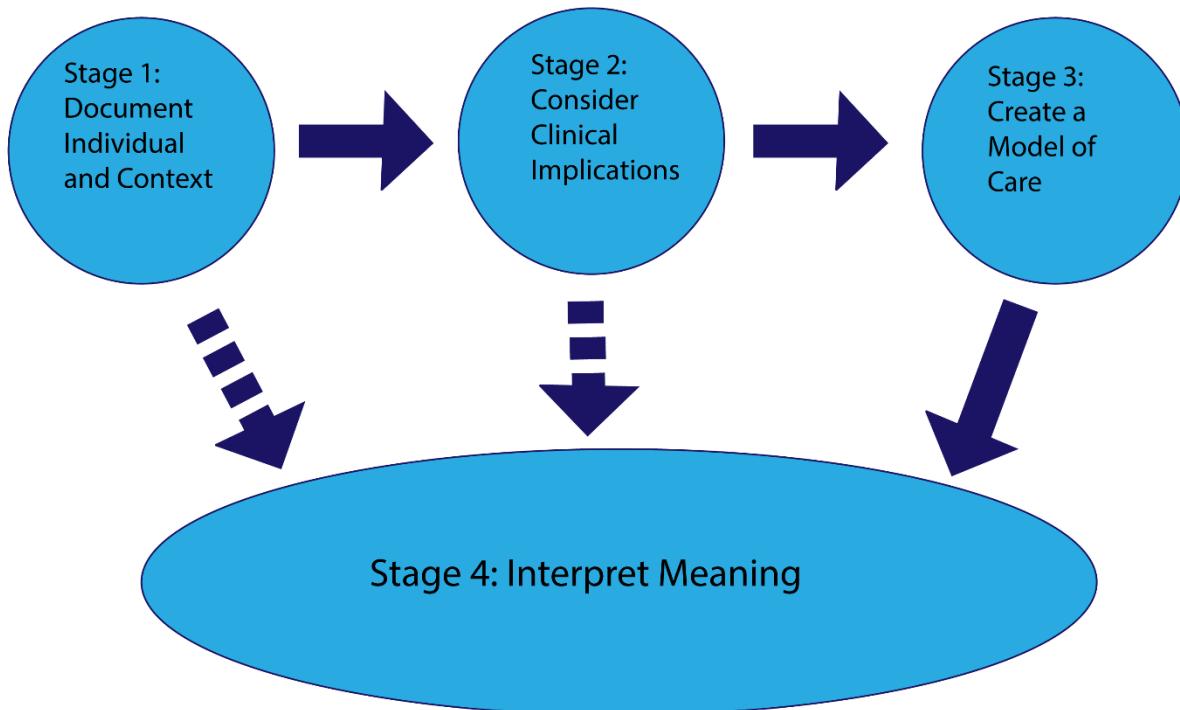


FIGURE 1. The four stages of the Bioarchaeology of care approach, adapted from Tilley (2015, p. 154)

In particular, this method underlines the need to outline the boundaries of social categories such as disability, as well as complex behaviors such as care among human groups. With this in mind, it is necessary to establish a clear definition of what “provision of care” or more basically “care” entails for the sake of this research.

Defining “Care” and “Disability”

In this instance, care is defined as “the delivery of assistance to an individual experiencing short, medium, or long-term disability as an outcome of pathology” (Tilley, 2015b,

p. 3). Notably, this term does not specify the motivation of care provider, nor does it require that a disability be severe or prolonged for care to occur. Thus, the care of a parent for their child, or the care of a fully paralyzed individual would both qualify as identifiable care in the archaeological record.

The bioarchaeology of care model further delineates care as either “accommodation” or “direct support”. Care in the form of accommodation is considered to be basic tolerance of difference within a population, while care in the form of direct support is typically classified as the support of overall health and facilitation of life “for a seriously incapacitating disability over a lengthy period of time” (Tilley, 2017, p. 30). ‘Direct support’ “refers to applied, practical assistance given to an individual experiencing a pathology rendering them temporarily or permanently incapable of performing one or more functions necessary for survival” (Tilley, 2015b, p. 79). Tilley (2015b, pp. 81-82) suggests the use of well defined ‘constants of care’ to break down care for prehistoric groups which has been adapted from Henderson’s (1964) interpretation of universal needs relating to the provision of nursing care. Some of the most general categories include provision of food and water, shelter, rest, safety, and hygiene.

Unlike ‘direct support,’ ‘accommodation’ cannot be as clearly broken down. Any specific conclusions relating to accommodation should not be made without contextualization, since individual circumstances are determined by the “impact of disease, acquired abilities and handicaps, personality, interpersonal relationships, domestic arrangements and general lifeways environment” (Tilley, 2015b, p. 84) which are all unique. It is this form of care that can provide the most insight into cultural practice and ideology, yet it can also be the most challenging to conclusively demonstrate in prehistory. It is recognized that past care can only be interpreted based on comparison to current physical, social, and cultural standards, and only in individuals

where some level of physical impairment and disability can be observed (Tilley, 2015b).

Because of this, it is also necessary to clarify the meaning of the term “disability.”

According to the World Health Organization, disability is “not just a health problem,” but rather “is a complex phenomenon, reflecting the interaction between features of a person’s body and features of the society in which he or she lives” (“WHO Health Topics: Disabilities,” 2016). Thus, a distinction must be made between ‘impairment’ and ‘disability’. Impairment refers exclusively to the direct medical condition and physical limitations, while disability relates to the “social category” or “lived experience” of the individual (Johnson, 2010, p. 140). For example, loss of a leg would create an impairment to normal mobility, however, the individual’s disability experience could be minimal depending on availability of prosthesis or group-specific cultural tolerances towards impaired mobility. Because of this, interpretations relating to care and disability in prehistory must be made conservatively, and only when sufficient evidence and context have been established (Tilley, 2015b). A major part of this contextual information within past groups relates to a full assessment of mortuary practice.

Identity in Bioarchaeology

There is little doubt that study of the physical body is central to bioarchaeology, however interpretation cannot stop here. The human skeleton has been described as both “durable” and “plastic”, capable of providing both “mutable and immutable” insights into past identity (Knudson and Stojanowski, 2008, p. 398). Recent years have seen a proliferation of arguments in favor of bioarchaeological approaches that consider skeletal individuals in relation to embodiment and lived experience, rather than discrete biological identities like genetic relatedness, sex, or ancestry (Agarwal and Glencross, 2011; Csordas, 1994; Knudson and

Stojanowski, 2008; Zuckerman and Martin, 2016). In this sense, the skeletal body must be studied as a direct representation of the processes that went into its creation, rather than a static snapshot of an individual at time of death (Joyce, 2005). This is a perspective integral to the bioarchaeology of care approach. Identity is regarded as nuanced, intersectional, and mutable over the course of an individual's life.

It has been pointed out that the social life, identity, and agency of a body can transcend the biological life span of the individual (Harre, 1991; Sofaer, 2011). In this way, the treatment of a body after death can be equally informative about group perception and belief, for example if skeletal elements are circulated and put on display (Thomas, 2000) or when the body is depicted in art (Joyce, 2005).

It is widely agreed that for an individual living within a group, identity is influenced both by self-perception, as well as the external perception of identity. This can often present challenges for bioarchaeological interpretation, particularly in prehistory. Each skeleton is the literal embodiment of an individual, as well as part of a group which can impose certain identities and experiences on its members. Some have argued that because mortuary practice is an act of the living, fully based in habitus, and does not necessarily provide any insight into the self-identification of the deceased individual (Tilley, 2015b), however, this is likely an oversimplification.

Reycraft (2005) identifies mortuary practice, along with several other cultural features, as examples of isochrestic style, taken-for-granted practices that tend to resist external influence at the group level. In this way, the details of traditional mortuary practice within groups can be viewed as a part of daily practice or habitus. Habitus, as originally defined by Bourdieu, is essentially the structures which help to regulate the behavior of group members through practice,

that is, norms, while still allowing for some variation through individual agency (Bourdieu, 1977). Care analysis views daily practice as the primary explanation for day-to-day care behavior; however, it places a greater emphasis on the role of agency than certain other perspectives.

Habitus, Agency, and the Question of Intentionality

For Bourdieu, agency is the capacity for an individual to change the social structures they inhabit, implying a basic level of intentionality and power. However, the level of awareness required on the part of the actor to categorize a behavior as ‘agency’ differs among archaeological theorists. Pauketat and Alt (2005), for example, refer to agency as something akin to “culture-making”. In this way, agency can be viewed as simply a deviation from the normative structures of habitus. Joyce (2005) provides an alternative example from her own study on citationality that considers the formative processes of an individual’s identity to be the result of habitus with minimal agency. In a discussion of Honduran concepts of femininity, she argues that embodiment is created during an individual’s life, only in reference to past illustrations or examples, seemingly ignoring the role of conscious, active individual or group agency within the greater structuring of life and identity. In this example, much as in Bourdieu’s (1977) version of habitus, any variation in replication of norms has to do with the skill of the practitioner, rather than an active choice to deviate from the norm.

The bioarchaeology of care, in contrast, places a much greater emphasis on the intentional role of agency in the creation of the embodiment of disability. Each individual case of care must be considered through a lens of individual and group agency. In each case of care motivated by disability, the individual choices of both caregiver and care recipient must match

up to allow for provision of care to occur. In this way, within Tilley's (2015b, pp. 127-128) framework, disabled individuals must be seen as "both actor and artefact," as "the 'creation' of those responsible for caregiving" and also as an actor partially responsible for the "health outcomes of the care provided." Thus, it is often impossible to identify or distinguish between cases where care was offered, but rejected by the subject, or in cases where care was given for a time, but rescinded or later rejected. In these cases, when the lived experience does not provide sufficient evidence of embodiment of active, deliberate care during life, treatment of the body after death becomes particularly important.

A disabled individual's identity can be a product of traditional group practice of care and treatment, but as previously stated, they also have the ability to assert agency to accept or reject the standard care offered to them. In individual cases where care can be demonstrated, collective agency can then be interpreted on behalf of the care provider(s), because it is recognized that the active provision of care is not a universal norm (Tilley, 2017). Each case of care represents a complex interaction of active choices and decisions on the part of the past group, and must be considered as such.

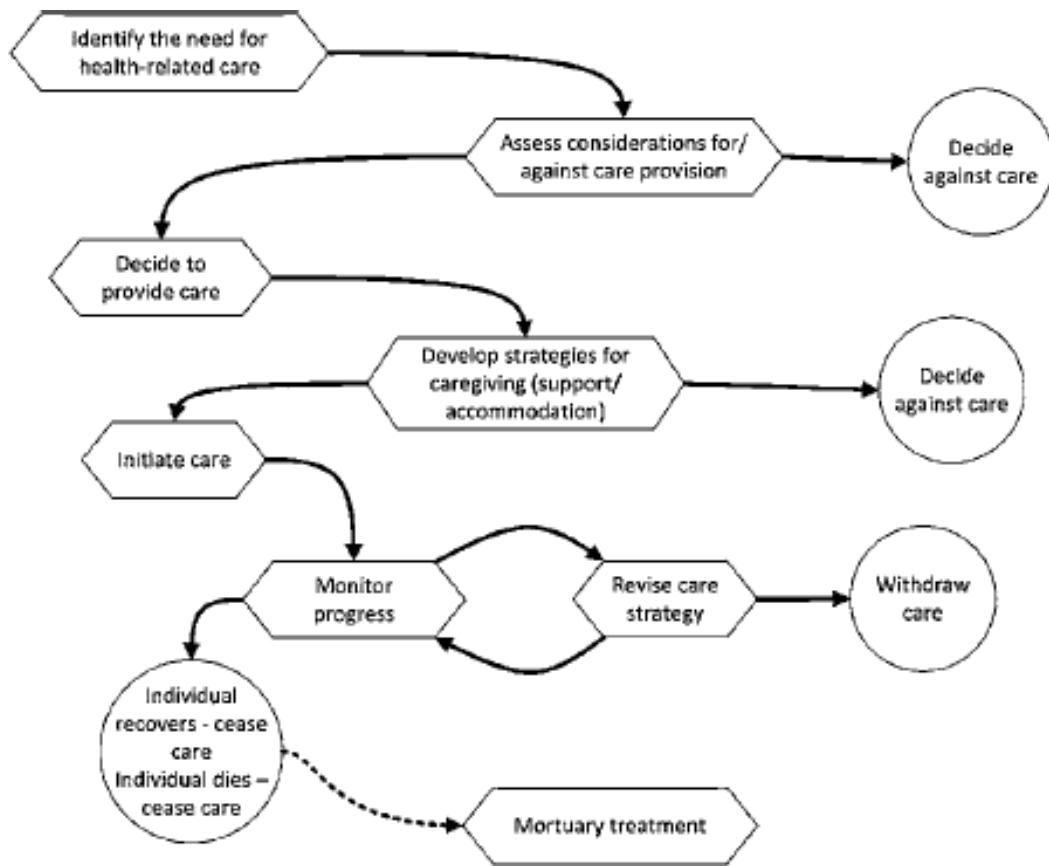


FIGURE 2. “Illustrating the complex process of agency and practice informing a possible case of care” (from Tilley 2017, p. 28)

Care in Prehistoric North America

Because of the complex nature of long term care giving processes and decisions, the identification of cases of care in early prehistory can be particularly challenging. Overall, cases in North America in which care has been argued are few (Dickel and Doran, 1989; DiGangi et al., 2009; Hawkey, 1998; Lovejoy and Heiple, 1981; Mann et al., 1998; Phillips and Sivilich, 2006; Tremblay Critcher, 2017; Wesp, 2017; Willett and Harrod, 2017; Worne, 2017) when one considers the large number of cases of physical limitation that have been studied in this area.

The most detailed study relating to care in the United States was undertaken by Hawkey (1998), which uses musculoskeletal markers, joint mobility estimates, and clinical disease

information to argue that an adult male, Gran Quivira 391 from New Mexico and dated to 1550-1672 AD, was severely disabled by systemic juvenile chronic arthritis. She goes on to argue that by the time of his death at around 40, he would have been almost completely immobilized, and would have required a high level of care. However, Hawkey does not seek to elaborate on the details of care provided in this case, nor does she seek to interpret the meaning of these behaviors within the cultural context on his Prehistoric Native American group.

Although potential cases of disability and care are also numerous within the prehistoric Southeast, there are similarly few examples of attempts to interpret the meaning of the survival of these individuals. Several cases have touched on the possibility of differential treatment for the physically different (Chronister, 2006; DiGangi et al., 2009; Mann et al., 1998; Snow, 1943), but often these insights are delivered with a sentence or two within a discussion or conclusion. Dickel and Doran (1989) were the first to articulate the possible existence of care within the prehistoric Southeast with an analysis of the case of ‘Windover Boy’, who suffered from spina bifida aperta during the Early Archaic period in Florida. In particular, they note the difficulty of keeping a severely physically impaired individual alive into adolescence within a highly mobile group and suggests “an ability and willingness to help and sustain the chronically ill and handicapped” within these early archaic groups (Dickel and Doran, 1989, p. 332).

Skeletal analyses from the Late Woodland Periods of Ohio (Lovejoy and Heiple, 1981) and Indiana (Phillips and Sivilich, 2006) also have yielded several instances of possible disability, and the supposition of care. Of most relevance for this study however, are previous indications of disability and possible care in Prehistoric Alabama and Tennessee.

Mann et al. (1998) provide an analysis of a female individual from the Alabama Mississippian Period site of Moundville, who seems to suffer from humeroradial synostosis with

absence of the ulna. Ultimately the fragmentary nature of this individual limits the conclusions somewhat, but it is argued that her survival into adulthood indicates group acceptance at the very least. (Mann et al., 1998)

DiGangi et al. (2009) explore a much more complete individual, a female with probable cartilaginous dysplasia and Osgood-Schlatter's disease (developmental anomalies which resulted in noted asymmetry of the arms) excavated from a Mississippian platform mound at the DeArmond site in East Tennessee. In this case care is briefly suggested, however much of the conclusion relates to the high-status mortuary treatment this individual received. Being buried on a platform mound (atypical for women in general) with grave goods has been suggested to signify importance within the community (Sullivan, 2006). DiGangi et al. (2009) ultimately conclude that the evidence indicates that this individual did not hold a negative status within the group, and was perhaps a valued member of society despite her disability. Overall, these cases, although they do not fully explore interpretations of care, do indicate a tolerance of disability within the Mississippian society, and future analysis will help to expand on this information even further.

Additionally, Heather Worne (2017) recently presented a case example of an older female with multiple pelvic injuries dating to the late prehistoric (Mississippian) period of the Middle Cumberland Region of Tennessee. This case from the Averbusch site served as the first application of the bioarchaeology of care within the region and although dating to a later, sedentary time period, it is particularly relevant to this analysis. The geographical proximity and cultural continuity between the MCR and the Tennessee River Valley of Alabama during the Mississippian period suggests that social and behavioral norms relating to disability and care also

could be similar. Worne acknowledges the presence of violence within the region which parallels behaviors seen in Alabama.

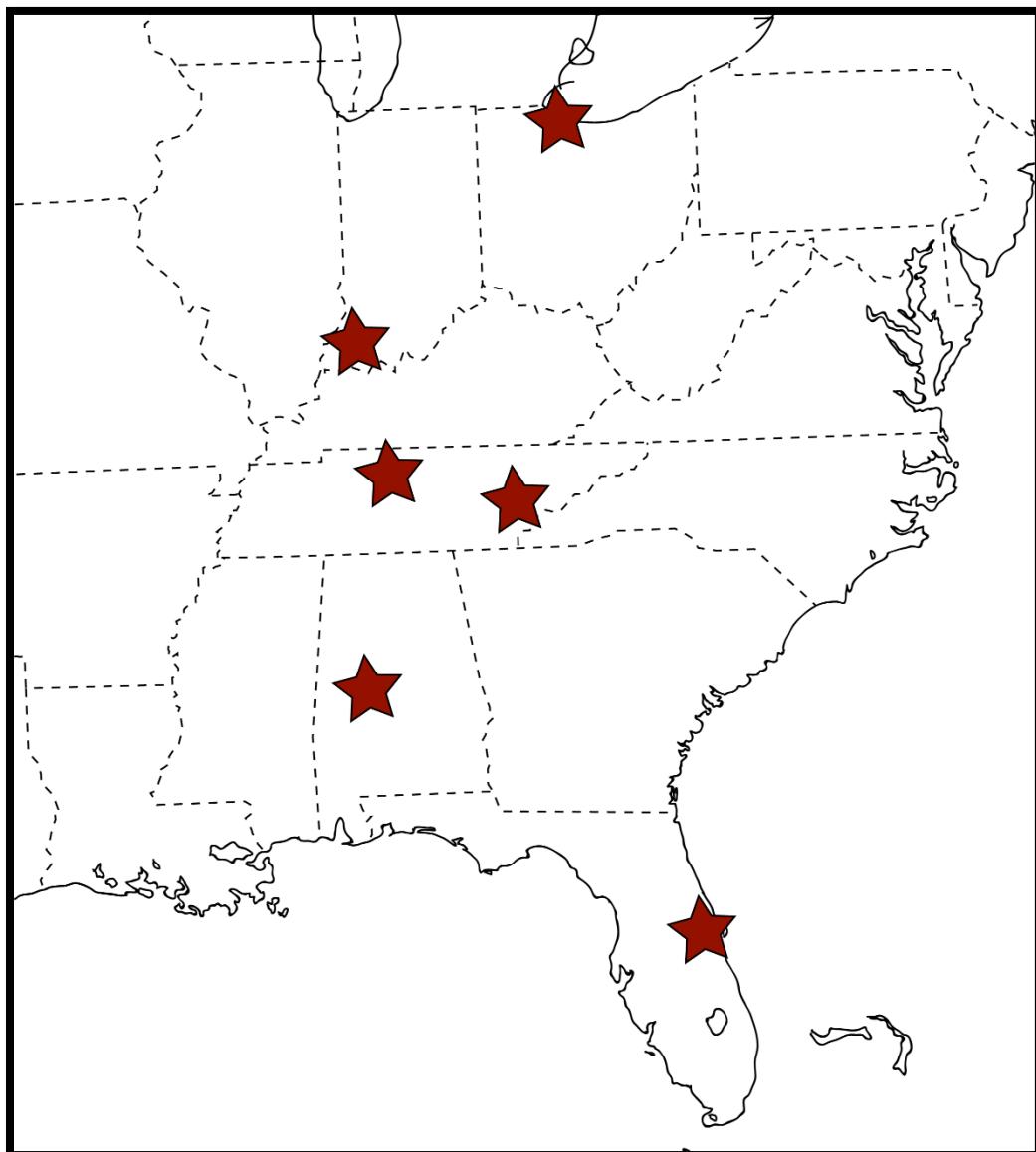


FIGURE 3. Map of Eastern North America showing the location of Native American sites where publications have mentioned potential cases of care.

In particular, this parallel helps to underline salient factors that must inform a bioarchaeology of care analysis within the Late Archaic Period, at the Mulberry Creek site in North Alabama. Because Averbusch, the site Worne examined, demonstrates evidence of permanent settlement and palisaded walls for defense, her interpretation of disability and care is much more complex than earlier prehistoric examples.

It has been argued that sedentism in the past might have facilitated the ease of accommodating disabled individuals, since impaired individuals can contribute to activities like production or processing even when mobility is impossible. Additionally, protection for an entire group, even the most vulnerable, is much easier with defensive architecture, features which are absent from the Archaic period in the Tennessee River Valley.

Thus, during the formation of this research project, it was decided that the most straight forward approach to identifying multiple potential cases of disability was to focus on the Archaic Period population of Mulberry Creek (1Ct27), and seek out probable mobility impairment. It is also of note that through a consideration of possible care and context, this study makes the argument that within these mobile or even semi-mobile groups with a high rate of violent death, the lack of evidence of violence in an individual can further support the argument for potential care.

Overview of the Archaic Period Southeast

The Archaic Stage in North American Prehistory is a very broad temporal category spanning the general time range of 10,000 to 3,000 years before present. Within the Southeast, it is typically sub-divided into three additional periods: Early Archaic (10-8,000 B.P.), Middle Archaic (8-5,000 B.P.), and Late Archaic (5-3,000 B.P.) (Brown, 1994; Sassaman and Anderson,

1996; Shields, 2003a; Walthall, 1980). Much of the broad Archaic Period is characterized by environmental and cultural transitions.

Following the Hipsithermal warming period, during the early Middle Archaic, settlement patterns within the Southeast were characterized by high mobility and short-term occupation of diverse environments (Carmody, 2010; Sassaman and Anderson, 1996; Shields, 2003a). During this time, the Tennessee River Valley transformed into an optimal environment for human inhabitants. Native American groups likely moved seasonally to take advantage of deer, mussel and nut resources concentrated in the region (Walthall, 1980).

By around 7,000 years ago, evidence of emerging complexity was visible throughout much of the Tennessee River Valley area. Regional exchange, intensification of shellfish exploitation, and human burials within shell mounds all mark a notable cultural transition and indicate corresponding social changes among these groups (Dye, 1996; Sassaman, 1995; Shields, 2003a). In particular, the emergence of shell mound burial practice has been interpreted in a variety of ways. Some have argued that the repeated use of a single mound burial site by these mobile groups would have served as an assertion of claim to the land (Sassaman, 1995; Walthall, 1980).

Most notably for this study, it was hypothesized that the act of purposeful burial within the mound would be suggestive of basic group membership for an individual during life and/or death. It is this Archaic time period which also shows some of the earliest evidence of the intensification of violence and warfare among these groups. Possibly caused by competition for limited or desirable resources, these practices continued into the Late Archaic and Mississippian Periods in the Tennessee River Valley and throughout Eastern North America (Bridges, 1996; Bridges et al., 2000; De Vore and Jacobi, 2016; Mensforth, 2001; Shields, 2003a; Smith, 1995a; Smith, 1996; Stewart, 2014; Walthall, 1980; Webb and DeJarnette, 1942).

With this general background well established, this study sought to apply the bioarchaeology of care approach to an Archaic Period site within the Tennessee River Valley of Alabama, with the ultimate goal of providing new insight into the lives of prehistoric Native American individuals and groups.

3. MATERIALS AND METHODS

As previously mentioned, the bioarchaeology of care approach is designed to be enacted at the individual level, thus before comparison could be undertaken each case in this study was considered on its own. Due to the fragmentary nature and differential preservation of the skeletal remains, each individual that was analyzed presented its own challenges and there was thus no single methodology applied in every case. Additionally, following each stage of analysis, certain individuals were eliminated from the sample based on the lack of demonstrable care or disability.

Sampling Strategy

This study utilized a cross-sectional design with purposive sampling drawing from the skeletal remains from the Mulberry Creek site (1Ct27), currently part of the collections housed at the Alabama Museum of Natural History's Laboratory for Human Osteology. These remains, excavated in the first half of the 20th century by the WPA, were analyzed recently in a NAGPRA skeletal inventory for basic demographics and pathological identification.

This most recent analysis of the skeletal remains revealed a population size of over 200 individuals (n=207), well beyond the number of burials documented in the field (n=130) by James Foster during excavation (Webb and DeJarnette, 1942). This disparity is not outside the ordinary for a high density, prolonged use mortuary site of this kind, and suggests that it was not uncommon for later burials to disturb pre-existing burials, thus resulting in the mixing of skeletal individuals. Because of this, only individuals identified as comprising a deliberate, relatively

undisturbed individual burial were utilized for potential care analysis, because strong context is integral to interpretation of disability and group treatment.

It is of note that during initial excavation, each skeletal individual was given a unique grave number designation, even in cases where it appeared that two sets of remains were associated or interred at the same time. Additionally, the remains of several individuals described in the original excavation reports (Webb and DeJarnette, 1942) were not part of the skeletal collection, and includes 1Ct27 Burials 6, 13, 66, 70, 103, 126, and 134. Absences such as this could be attributed to any number of things, however the most likely explanation relates to the acknowledged difficulty of field recovery at the site as well as the processing of the remains in the 1940's.

For this study, the written forms completed by the NAGPRA analysts in 2016 were consulted to first identify any individual with any sort of pathology or trauma on the lower half of the body, as well as anything listed as “severe” that showed some level of healing. In this way, individuals that demonstrated only perimortem or postmortem trauma were excluded. Following the initial identification, highly fragmentary individuals (i.e., those comprised of isolated skeletal elements suggesting ‘grave fill’ or intrusive grave disturbance), and individuals dating to the Mississippian period were then excluded. The temporal designations of the burials for the sake of this analysis were based on the assignments established by Ben Shields in 2003. Using grave goods, burial typologies, as well as depth of burial and placement within the mound, Shields classified eleven burials as “Middle Archaic,” seventy-three burials as “Late Archaic,” and thirty-five as “Mississippian” (Shields, 2003a, p. 91).

Because of the complex nature of disability as an identity, the decision was made to focus on Archaic Period individuals who would have suffered mobility impairment, as it was believed

that this would result in the most simple, conclusive identification strategy. However, because physical impairment can be the result of a single, major injury, or many minor injuries, consideration was not limited only to catastrophic pathologies of the lower limbs. In addition to pathology and trauma of the legs and feet, this initial sampling considered cases of severe spinal arthritis, endocranial infection, and multiple fractures to the ribs and arms. The individuals identified in this stage, thirty-seven in total (listed in Appendix A), were then subjected to the first stage of the bioarchaeology of care analysis.

Stage 1 of the Bioarchaeology of Care Analysis

The first stage of Tilley's bioarchaeology of care involves detailed analysis of the individual, cultural context, and specific pathology (Tilley, 2015b). Once a case had been selected for the sample, the skeletal remains were pulled from storage and reanalyzed for basic demographic information using standard osteological methods. Because these remains had previously undergone several skeletal analyses (Newman and Snow, 1942; Shields, 2003a), those records also were consulted to determine possible inconsistencies or specific details of focus for the construction of a full osteobiography.

Osteological Analysis

As previously mentioned, due to the fragmentary nature of each individual there was no single approach to aging or sexing a particular set of remains. In general, individuals were identified first as either juvenile or adult. Juveniles were then analyzed for indicators of age using several criteria, with priority given to fetal development, dental development (Buikstra and Ubelaker, 1994; Ubelaker, 1999), and epiphyseal closure when possible (Scheuer and Black,

2000). Because the reliable determination of sex can only occur after sexual maturity, juveniles were categorized simply as “subadult”, an additional designation for the variable of “sex”.

For adults, determination of biological sex was made with preference given to the diagnostic criteria of the pubic bone (Phenice, 1969), followed by additional standards for sexing from the pelvic girdle, or the skull if needed (Buikstra and Ubelaker, 1994; White et al., 2011). However, in numerous individuals from the final sample, due to advanced age or skull trauma or modification, sex determination from the skull proved to be unreliable, in such cases analysis of the femoral head (Bass William, 2005) or femoral midshaft circumference (Black, 1978) were used for determination of sex.

For aging a skeleton, priority was given to the pubic symphyseal surface (Brooks and Suchey, 1990; Buikstra and Ubelaker, 1994) with secondary preference given to the auricular surface of the ilium, and cranial suture closure for older individuals (Buikstra and Ubelaker, 1994). Epiphyseal fusion also was used to narrow the age range for young adult individuals; however, this was only done following a successful determination of biological sex, as the rates of fusion have been demonstrated to vary between males and females.

An estimation of stature for an adult was made only in instances where complete long bones were present, which was uncommon at Mulberry Creek. But, those calculations that were made used values from Trotter (1970) for Mongoloid males. Tools used for all measurements taken during this study include *DigitalAid* digital sliding calipers, cloth measuring tape, and an osteometric measurement board.

Each pathological condition noted on the bones was then fully documented and described, with particular attention given to possible biological or mechanical cause, as well as any other potentially associated conditions elsewhere in the body. A differential diagnosis was

then made whenever possible, through the use of textual sources (Aufderheide, 2011; Mann et al., 2016; Ortner, 2003; Waldron, 2008).

It is also of note that the NAGPRA guidelines currently regulating these specific remains from this specific archaeological site prohibit the publication of scientific photographs of these skeletal remains. With this in mind, a consideration of how to demonstrate skeletal examples of pathology was a major part of this data collection process. Ultimately, the decision was made to illustrate specific cases and skeletal elements to further support the discussion of probable disability and care. This was done by hand through digital drawing using a Wacom™ digital tablet and the Adobe Illustrator™ software package. For each skeletal element, particular focus was given to accurate detail of the condition or lesions. A detailed metric scale also was included in each illustration to demonstrate size of various features on each bone. Due to the time required for each image, only select examples were chosen for illustration at this time, however the process is ongoing and will serve as a record of unique cases within this population after the remains themselves have been returned for reburial to the modern Native American Tribal groups.

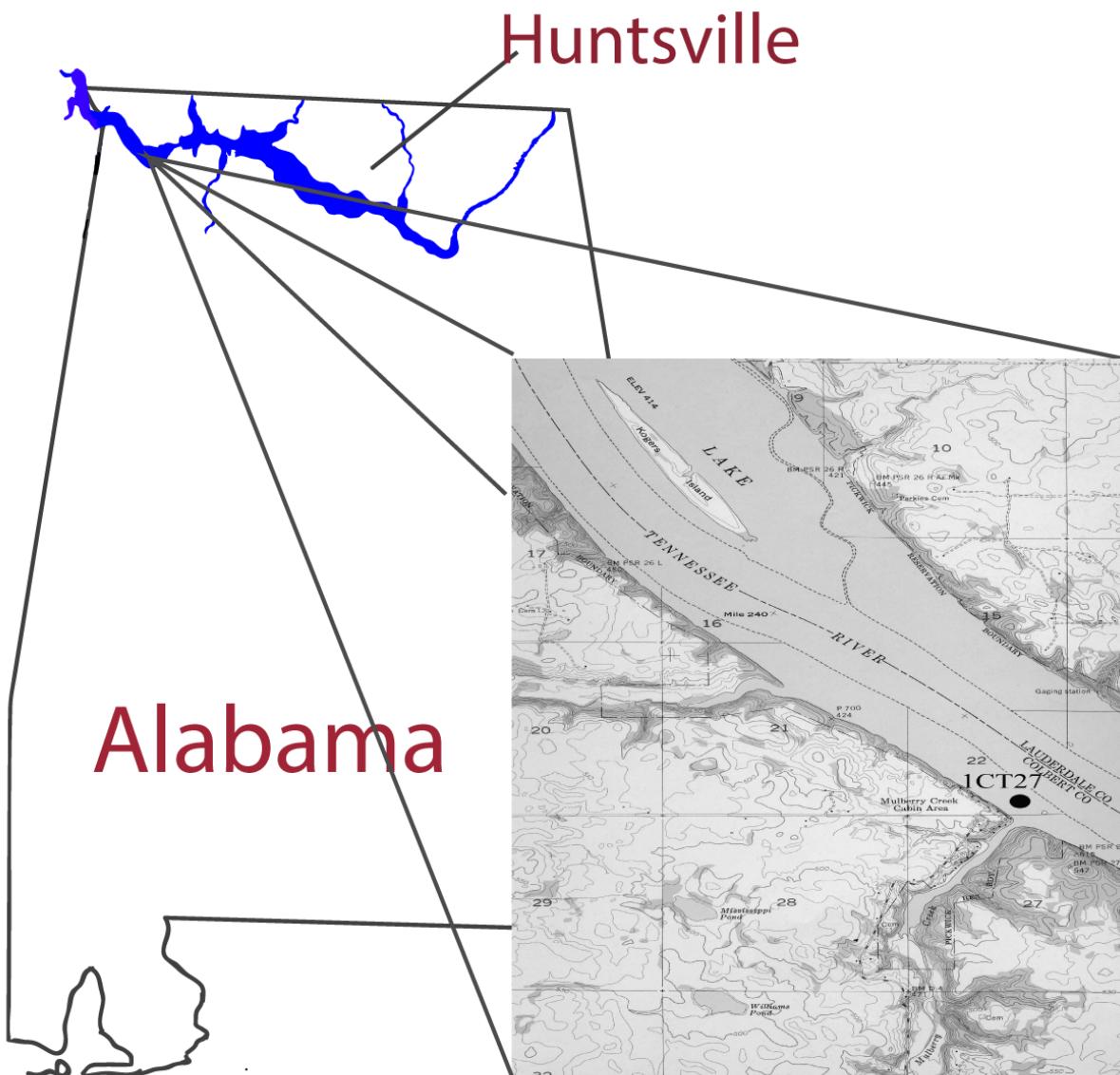
In order to seek trends in patterns of care in relation to the broader population of Mulberry Creek, all data collected during this study, and the data collected on the entire site population in 2016 was entered into the Statistical Package for the Social Sciences v24 (SPSS)™. Mobility impairment was categorized as either present or absent, with an additional category of not applicable, which was used for individuals of two years or younger, since developmentally, this group would not have been capable of normal unassisted mobility. This study was unable to undertake a full-scale re-assessment of burial typology, thus the original categories created by Webb and DeJarnette (1942) were used.

Additionally, a category of “AGESEXEXPRES” (adapted from Stojanowski 2013) was created to indicate ambiguity in the designations of sex or age group. An individual was given a value of 1 if one of these two demographic values was ambiguous or uncertain, a 2 if the remains were well preserved enough for a definitive designation for both sex and age, and a 0 if the remains were highly damaged or fragmentary thus preventing clear identification of age or sex. Individuals assigned a value of 0 were excluded following Stage 1 of this analysis.

Biocultural Context and Lifeways of the Mulberry Creek site

The overall geography and environment of the Tennessee Valley has been well covered in numerous other analyses of the region; however, a more detailed description of the Mulberry Creek site and its skeletal population is necessary before interpreting any instance of potential care.

The Mulberry Creek site (1Ct27), is a Pickwick Basin shell mound site located within the Tennessee River Valley of Northwest Alabama (see Figure 4). Taking its name from its close proximity to the confluence of Mulberry Creek and the Tennessee River in Colbert County Alabama, the site was excavated from 1936-37, prior to becoming fully submerged by Pickwick Lake following the completion of the Pickwick Landing Dam in 1938 (Shields, 2003a; Webb and DeJarnette, 1942). Burials at the site date primarily to the Middle and Late Archaic periods, with a Mississippian component (Shields, 2003a), although evidence suggests that initial site use began during the Early Archaic Period (Dye, 1996).



The mound itself was made up of shell deposits, roughly 20 feet deep, and showed evidence of a previous large structure of some kind supported by “a stone foundation just below the surface” (Webb and DeJarnette, 1942, p. 235). Stratigraphic analysis of the mound indicates that initial shell deposition occurred intermittently, with layers of alluvial sand and silt separating distinct shell lenses. This indicates seasonal occupation characterized by new shell deposition, interrupted by flooding of the river characterized by sand and silt deposition. Faunal remains from the site indicate that in addition to taking full advantage of the ample marine food resources available, the inhabitants of 1Ct27 also had access to deer and turtle (Webb and DeJarnette, 1942, p. 239). Unfortunately, botanical remains were not recovered from the site, however it is believed that these groups would also have been taking advantage of local nut resources, and participating in small scale cultivation beginning in the Late Archaic Period (Dye, 1996; Shields, 2003a; Walthall, 1980).

Clay floor and fire pit features were identified during initial excavation at Mulberry Creek, and are believed to correspond to Late Archaic period occupations (Sassaman and Ledbetter, 1996). This indicates that the site was, at times, inhabited by living individuals. Still, it is believed that the Late Archaic inhabitants at Mulberry Creek would have practiced some degree of seasonal mobility, likely corresponding to resource availability.

In the past, the Mulberry Creek site has been lauded as the epitome of an Archaic Period river shell mound site, due to the clear evidence of Middle Archaic violence, intensification of shellfish exploitation, and exotic trade items (marine shell) (Bridges et al., 2000; Dye, 1996; Walthall, 1980; Webb and DeJarnette, 1942). In 2003 Ben Shields provided a general examination of the site population focusing on demographics, general health and trauma, and

mortuary practice through time. This analysis concluded that the mortuary population within the mound was not selectively determined by factors such as age, sex or obvious status, and underlined the presence of a wide range of pathology and trauma (Shields, 2003, p. 152). This current study and the recent NAGPRA inventory also have identified many more cases of perimortem violence on the skull, and cut marks indicative of trophy taking or mortuary processing than previously identified at Mulberry Creek. Direct evidence of trophy taking behaviors (scalping) has now been documented during the Middle and Late Archaic Period at the site, whereas past analysis had been forced to infer trophy taking behavior during these time periods based on the absence of limbs (Shields, 2003a, pp. 113-122). Reconstruction of fragmentary skulls also has demonstrated numerous examples of skull trauma among males and females during the Middle and Late Archaic Period at Mulberry Creek. Although research into violence at this site and other sites in the Tennessee River Valley is ongoing, initial results have demonstrated that the levels and types of violence occurring among these groups were much higher and more varied than previously documented.

Evidence of Violence at Mulberry Creek

Violence within the Archaic Period Southeast and the Tennessee River Valley in general is a complex and evolving topic, which although not the primary focus of this research, is relevant to this study on care. In Tilley's analysis of the Man Bac burial, she identifies a lack of evidence of violence or trauma in this individual as a potential argument for the provision of care in the form of protection from harm (Tilley and Oxenham, 2011). This line of inquiry is particularly relevant in this analysis, since the Mulberry Creek site has long been identified as a site with well-established evidence of interpersonal violence during the Middle Archaic Period.

The mass grave at the site, comprised of individuals 83, 84, and 85, has been used as an argument for ritual killings, as well as inter or intra-group violence in the form of raiding (Bridges et al., 2000; Dye, 1996; Jacobi, 2007; Shields, 2003a; Stewart, 2014; Walther, 1980).

The presence of trophy taking behaviors in the form of scalping, ear collection, or limb removal is well documented during the Archaic Period, as well as within the Tennessee River Valley (Bridges, 1996; Bridges et al., 2000; De Vore and Jacobi, 2016; Jacobi, 2007; Padgett, 2007; Smith, 1995b; Stewart, 2014; Webb and DeJarnette, 1942) and the recent NAGPRA study, as well as this analysis, documented such practices at the Mulberry Creek site.

It is of note that this is a relatively recent insight from the Mulberry Creek site. Past considerations of this site and the Pickwick Basin in general have often utilized the analysis of Charles Snow and Marshall Newman completed in the 1940's. These analyses indicated a low level of mortality from violence in the Pickwick Basin, with the only conclusively identified cases being the four individuals associated with projectile point injuries, and no evidence of scalping or skull trauma. This seemed to indicate that violence was largely confined to simple conflict among individuals (Bridges et al., 2000, p. 55). However, in 2003 Ben Shields was able to identify several cases of potential violence beyond the individuals interred in the mass grave at the site, including Burial 88 from the Middle Archaic (Shields, 2003a, p.116), as well as burials 57 and 80, two older females from the Late Archaic Period. Shields (2003a, p.117) notes that the violence in the case of individual 80 occurred antemortem, showing some evidence of healing and skeletal reaction.

Additionally, the recent NAGPRA inventory as well as this analysis, identified a minimum of thirteen individuals at Mulberry Creek who show evidence of perimortem violence

or trophy taking behaviors, spanning the entire occupation of the site, comprised of both juveniles and adults, as well as males and females.

This new insight seems to suggest that violence and its related activities might have been much more central to the daily lives of these Archaic Period individuals than previously recognized. Ethnohistoric accounts detailing Southeastern Native American groups shortly after contact demonstrate a complex suite of warfare related behaviors. Marion Smith (1951 cited in Mensforth 2001) describes the American Indian Warfare complex as being made up of “*social contests, war parties, and mourning war*, along with a variant of the latter called *shame aggression war*”(Mensforth, 2001, p. 110). These variants of warfare served many different purposes including reinforcing social identities and cohesion at the intra and intergroup level, the accumulation of status through resources, and a way to externalize grief or shame (Mensforth, 2001, pp. 110-111). Analyses of cases from Kentucky, Ohio, Tennessee, and Alabama have for some time indicated a wide range of violent behaviors during the Late Archaic, well before the introduction of intensive agricultural practices, and the appearance of high density settlements (Mensforth, 2001; Mensforth, 2007; Shields, 2002; Shields, 2003a; Shields, 2003b; Smith, 1995a; Smith, 1996).

Thus, for the sake of this analysis, the perspective is taken that during the Archaic Period, these Native American groups in the Tennessee River Valley were already participating in institutionalized and ritualized violence in the form of formal multi-individual raiding parties, and trophy taking behaviors in the form of scalp, ear, and limb removal, assertions which all seem to be supported by skeletal evidence from Mulberry Creek and other sites in the region.

Mortuary practice: “My bones shall sleep in the great mound” (Swanton 1931, p. 26)

Although it is beyond the scope of this chapter to examine the entirety of the mortuary context at Mulberry Creek (a description of burial types and distributions can be found in Appendix B), it is important to underline that recent re-evaluation has revealed the presence of variability beyond what was noted in the original excavation reports of the 1930’s.

Primarily, it is beyond doubt that the site represents a deliberately created shell mound which was used repeatedly for intentional burial starting during the Middle Archaic, with a majority of burials dating to the Late Archaic, and tapering off during the Mississippian phase (Shields, 2003a; Webb and DeJarnette, 1942). The presence of such mounds across the Southeast has been well documented by archaeology, and is further supported by ethnohistoric accounts. Le Page Du Pratz (1774) details the accounts of early French in the Southeast, who upon encountering a burial mound on an island remarked at the massacre that must have occurred to form such a “heap of bones” (Du Pratz, 1774, p. 16). Thus, it is possible to consider the role of these mounds not merely as functional burial sites, but as an embodiment of life and death within the active landscapes of prehistoric Native American individuals and groups.

In 2003 Shields articulated the need for further clarification of Archaic mortuary practice within Alabama, and his research at the Mulberry Creek site took a demographic approach to considering possible relationships between the individual, type of interment, and presence of grave goods. He categorized individuals as adult male, adult female, or child under the age of 15 and utilized the burial forms completed by Foster during excavation to identify primary (flexed, sitting, extended, face down, and mass) or secondary graves (cremation, or bundle) (Shields, 2003a, p.92).

The initial excavation reports indicate that two separate periods of excavation occurred, the first of which uncovered 85 burials, after which flooding of the river caused damage to the mound and interrupted excavation. Following this interruption, work on the mound continued and at completion Webb and DeJarnette (1942) report a total of 134 burials of human remains recovered from the site. However, following this designation, the background on this site population becomes more complicated. They further report that of the 134, “24 were infant and children” and “30 were disturbed by aboriginal occupancy” (Webb and DeJarnette, 1942, p. 240). These categories were not further classified within the burial typology of the site, as it was believed “that in the case of infants the type of burial was not significant” (Webb and DeJarnette, 1942, p. 240).

The burial typologies assigned at this site are, for the most part, consistent with others within the region. Webb and DeJarnette (1942) identify consistency with the Long Branch Site (1Lu67), another Pickwick Basin shell mound site, with one notable addition. 1Ct27 is the first of the sites within the report that is identified as having the “sitting posture type burial:”

“In such a burial the body is supported by leaning the back against the wall of a pit, the knees are drawn up, and elevated to the level of the chin, the legs are closely flexed. The head probably is held erect by some form of support. Postburial slumping usually produces considerable change in the original position of the skeleton. The head usually falls forward and comes to rest in the pelvic cavity, the legs may spread apart leaving the feet under the shifted skeleton” (Webb and DeJarnette, 1942, p. 239).

Although it is not yet clear the significance of the sitting type burial, it can likely be viewed as a specific indication of individual or group identity, or characteristic of a period of time. Since this burial type is absent from the Middle Archaic component of the site (See Appendix B) the latter possibility seems probable, however, it is certainly possible that the typology could represent multiple meanings. In fact Adair, in his discussion of Creek and

Chickasaw customs, documented that Native Americans of the 1700's identified the sitting type burial as a past standard within their groups (Adair, 1930 [1775]; Swanton, 1946, p. 724).

Because of the clear intentionality represented by the act of burial within the mound context, it must be acknowledged that the inclusion of an individual within the mortuary population at this site supports an inference of tolerance and acceptance at the broader group level, and thus must be considered for any interpretation of disability and care in life. It must however be noted that several burials within the site population must be categorized as deviant or aypical. Although the extended, prone burial practice (interring an individual face down) is most often associated with highly marginalized or negative status within prehistoric Alabama and beyond (Snow, 1943), Mulberry Creek demonstrates the need to further reconsider meaning in relation to burial placement. It is important to note that although recent mortuary analysis (Shields, 2003a; Stewart, 2014) has resulted in a reclassification of burial typologies present at the site beyond the basic categories of the initial site reports (Webb and DeJarnette, 1942), there is still much to be gleaned from a more detailed consideration and interpretation of the burials at Mulberry Creek and within the broader region in general.

Typical mortuary practice at this site consists of varying degrees of flexed burials, often categorized as ‘semi-flexed’ or ‘fully flexed’ (Webb and DeJarnette, 1942). However, reassessment has indicated that burial practice at the site was much more nuanced than previously recognized.

Although typical ‘prone’ burial types are absent from the site, there are several burials at 1Ct27 which are categorized as ‘deviant’, including individuals 83, 84 and 85 who were included in the previously mentioned mass grave at the site. In contrast to the mass graves from three other Alabama sites discussed by Bridges et al. (2000, p. 54) who noted “neatly laid out” skeletal

individuals, the positioning of the remains at Mulberry Creek seems to be consistent with being “tossed” into the burial pit. Since these individuals show conclusive evidence of perimortem violence, their abnormal interment is argued to be the result of an unexpected raid, mass killing, or possibly torture (Jacobi, 2007; Stewart, 2014; Walthall, 1980).

There is also one individual at this site who is categorized as a “frog type burial” by the original reports (Webb and DeJarnette, 1942, p. 240). Although the connection is not made by Webb and DeJarnette (1942) the description of this burial typology is remarkably similar to a prone (face down) version of a commonly seen supine burial typology at the site. The deliberate placement of this particular individual seems to contrast with the haphazard placement of the individuals in the mass grave. It is thus argued that the deliberate “frog” placement of this individual could be viewed as stronger evidence of deviance *within* the group, rather than the necessary disposal of the body of a slain outsider or attacker.

In the past, non-traditional or ‘deviant’ mortuary treatment has often been cited as evidence for marginalized status and poor treatment, particularly if associated with physical difference (Chronister, 2006; Snow, 1943). Because deviant treatment has been identified within the Mulberry Creek population, standard mortuary treatment can be viewed as, at minimum, group acceptance, and possibly as positive status (DiGangi et al., 2009; Mann et al., 1998; Tilley, 2015a; Tilley, 2015b).

Following the conclusion of osteological analysis and a consideration of biocultural context at Mulberry Creek, the final portion of Stage 1 of this analysis consisted of a reassessment of the potential for care in each individual case. Following this, certain individuals were eliminated from further consideration due to the recognition that poor preservation or unknown provenience

would not allow for a full assessment of mobility impairment, disability or care. All individuals considered for stage 1 of analysis are listed in Appendix A.

Stage 2 of the Bioarchaeology of Care

The second stage of analysis using the bioarchaeology of care requires the identification of clinical and mechanical impacts of each specific pathology (Tilley, 2015b). For each individual pathology, clinical literature was consulted to identify potential impacts on day to day life, as well as disease experience. Because numerous individuals suffered from the same pathological conditions (for example fractures of ribs, or damage to tarsal bones), the process of assessing available clinical literature was somewhat simplified over time. Although clinical literature is rife with cases of severe pathology and trauma, particularly those resulting from car accidents, there is a shortage of documentation on the actual lived experience of sufferers for certain conditions. Modern medical intervention often results in the treatment of conditions before they can progress to the levels which would be seen in the prehistoric past. Thus, a full consideration of disease experience was not possible for every case or type of pathology.

This stage of analysis also underlined what has been discussed by previous care analyses (Schrenk and Martin, 2017), that differential diagnosis and specific disease etiology are not always integral to the identification of care. For example, severe widespread osteomyelitis manifests in much the same way whether it is caused by bacterial or fungal infection. Ancient populations would likely have had their own classificatory schema for various disease types, and it would be these perceptions, not modern medical knowledge, which would have had the most impact on potential disability experience and care.

At this point, each individual was once again reassessed to consider the likelihood that disability would have been experienced within the context of the Archaic Period at Mulberry Creek and the surrounding area. In particular, this stage of analysis required the incorporation of evidence of nutritional stress leading up to death, as well as evidence of trophy taking behaviors and perimortem violence. Much as at the end of Stage 1 of analysis, certain individuals were eliminated from further analysis at this time.

Stage 3 of the Bioarchaeology of Care

The third stage of analysis using the bioarchaeology of care requires the production of a model of care that was likely provided (Tilley, 2015b). This involved an incorporation of all the previous data relating to mechanical limitations as well as day-to-day required activities. Overall level of individual health was further assessed (nutrition, frequency of mild secondary infection, etc.) to create a model of the activities that would have required assistance, and the overall quality of care provided for each individual (when it is possible to infer). The primary pathological condition was categorized based on severity level to determine overall impact on mobility or day to day life. Following Stage 3 of analysis each case of possible care was considered in relation to both accommodation and direct support, and was assigned a value of ‘none’, ‘possible’, ‘probable’, or ‘definite’ for both types of potential care.

Stage 4 of the Bioarchaeology of Care

The fourth and final stage of analysis involves the interpretation of the meaning of care provision within the context of both individual and group identity (Tilley, 2015b). This stage involved a consideration of each case, as well as other examples within this study to compare

possible patterns and trends in provision of care, and what this could mean for a biocultural perspective on life at this site during the Archaic Period.

4. RESULTS

Analysis using the bioarchaeology of care method is never truly final. Stage four of the method for this project, interpretation, will no doubt continue to develop over time as new insights into the past lives of Native Americans at Mulberry Creek are revealed. However, the overall results of the first 3 stages of analysis can be reported at this time. Additionally, three individual cases will be considered in detail to illustrate overall meaning and results from the site.

Of the 37 individuals that were given direct osteological analysis, this study identified 16 cases of possible disability suggestive of potential care in the form of accommodation, and seven of these cases revealed possible care in the form of direct support. Of the 16 cases of possible accommodation during life, the majority date to the Late Archaic Period (n=14). Eight individuals were male (n=8), seven were female (n=7) and one was a juvenile (n=1). Most of these individuals were interred as fully flexed on their side (n=5), fully flexed on their back (n=4), or in the sitting posture (n=4), and seven individuals were identified as having grave goods (n=7), while eight did not (n=8).

Of the seven individuals who would possibly have received direct support, six dated to the Late Archaic (n=6), five were male (n=5), and six were female (n=6), and only one showed clear evidence of perimortem violence (individual 1Ct27 12). Four of these individuals were interred fully flexed on their side (n=4), one fully flexed on his back (n=1), and two in the sitting

position (n=2), with four individuals discovered with grave goods (n=4), and three without (n=3).

To better illustrate the method and results of this complex analysis, three cases have been chosen for detailed overview in the following sections. Two of these individuals are argued to be examples of probable direct support (1Ct27 8a, and 12), and one is used as a counter example to demonstrate one of many potential sources of complexity for a consideration of care within this mortuary population (1Ct27, individual 135).

Example 1: Mulberry Creek, Individual 8a

The primary set of remains from within burial 8, skeleton 8a, were originally recorded in the 1930's as belonging to an older adult male due to overall skull morphology. However, a recent reclassification of probable female was made based on pelvic morphology and femoral mid-shaft measurements. Analysis of the greater sciatic notch, as well as identification of a large pre-auricular sulcus were both suggestive of a female individual (Buikstra and Ubelaker, 1994). Additionally, the femoral mid-shaft circumference, 76mm, falls within the range of female individuals identified by Thomas Black within a similar population (Black, 1978). Due to the fragmentary nature of the remains, the final age of this individual is placed conservatively at forty plus years, well above the overall site mean age-at-death of twenty-two years.

Individual 8a is one of 28 individuals (134 total) reported in the original site report as being found in a “type 1a” round grave, and had no grave goods or associations. This burial type categorization, common among all the sites from the River Valley presented in the report, is characterized as “fully flexed on side” (Webb and DeJarnette, 1942, p. 185). However, as

previously mentioned, it has been suggested that the original categorization scheme for burials at the site did not include sufficient differentiation between different mortuary practices.

A direct examination of the original burial diagram for individual 8a indicates an extreme flexed position (see Figure 5). Although the extremities seem to be in approximate articulation, through macroscopic skeletal analysis, several cut marks were identified on the distal, posterior portion of the left humerus and the medial midshaft of the right femur. These cut marks, if made perimortem, could be suggestive of interpersonal violence, however, the lack of additional visible perimortem injury seems to support that these cuts are the result of postmortem disarticulation. In particular, the involvement of the elbow joint seems to suggest the goal of facilitating body placement.

This new interpretation of this burial could suggest that the individual was partially processed or disarticulated to facilitate the extreme flexed burial positioning. Because it appears that the hands and feet were fully articulated in-situ, it is not believed that the bones were fully de-fleshed, as in a typical bundle or basket type burial, however this example could be suggestive of a variant of this practice. Ethnohistoric accounts of later tribes in the region document the “bone pickers” of the Choctaw tribe, and suggest that this sort of practice, far from having negative connotations, could have been part of a standard burial treatment (Cushman and Debo, 1999, p. 165; Swanton, 1931). Walthall notes that early Mississippian burial practice has been characterized by fully-fleshed burial as well as “cleaned bones (often rearticulated), bundles, flexed burials, and cremations” (Walthall, 1980, p. 200). As previously mentioned, Mulberry Creek has documented cases of the latter three burial typologies, and this case could indicate the presence of the ‘cleaned rearticulated’ typology as well.

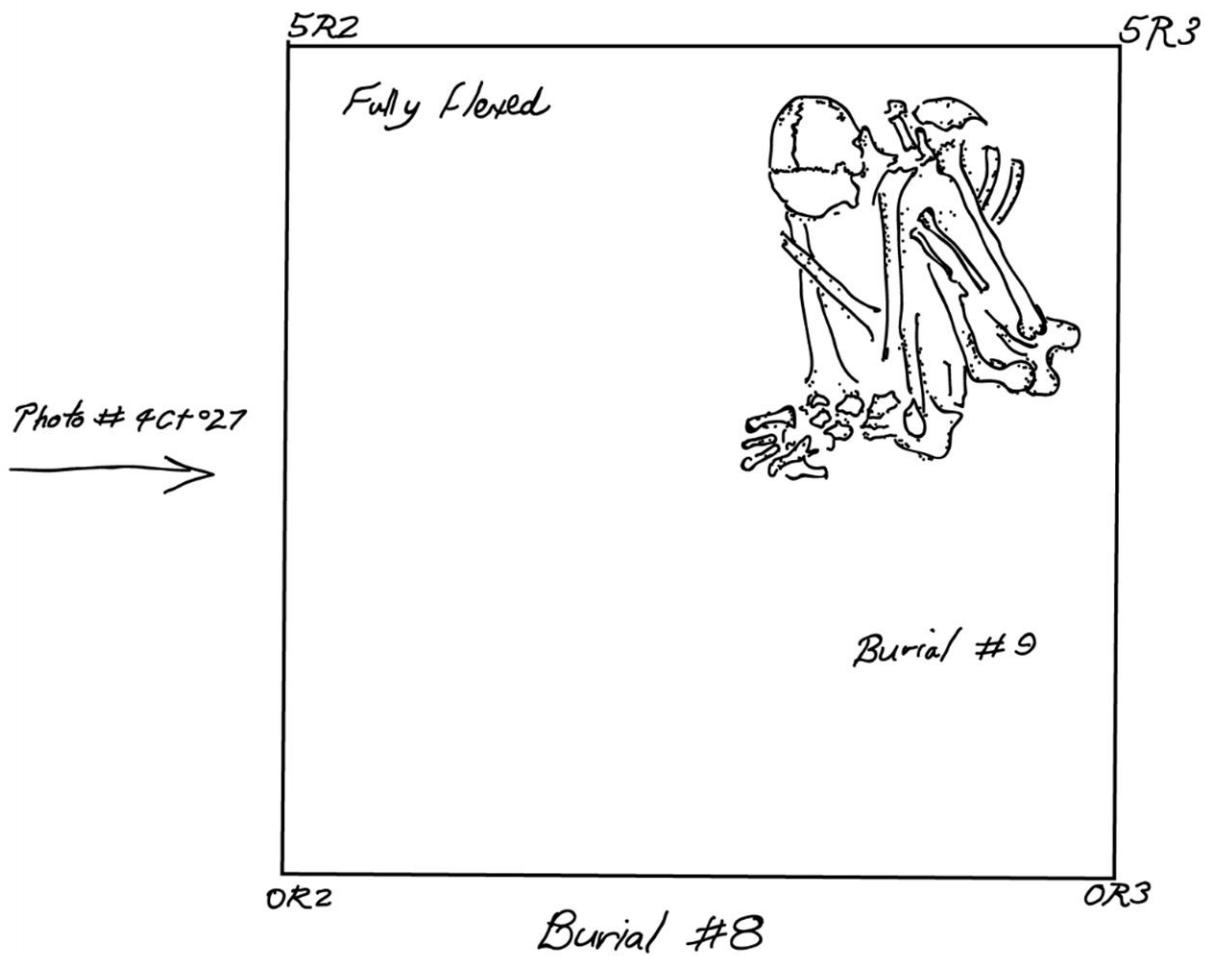


FIGURE 5. Burial map of 1Ct27, Burial 8. Illustrated after a scan of the original map drawing created by James R. Foster August 5, 1936. (Documents on file at the Alabama Museum of Natural History, Laboratory for Human Osteology)

Paleopathological Analysis

Individual 8a presents with several primary age-related pathologies, which although typical for her age-cohort within the population, could have contributed to her overall need for care. A button osteoma surrounded by two small round depressions are present on the frontal bone. It must be acknowledged that one of these depressions could be indicative of a lesion; however there are no further skeletal indications of definite etiology. Unfortunately, the remains, like most skeletal individuals at the site are fragmentary, thus impeding a total osteological analysis.

Her dental health is particularly poor, with only six heavily worn mandibular teeth remaining at death. Figure 6 demonstrates the severe alveolar resorption visible around the left mandibular molars. The portion of the maxillae present is completely edentulous, with total resorption of the alveolar processes resulting in a completely flat upper mouth. Evidence of damage to the bone surface is visible with macroporosity of the anterior margins of the palatine process, suggesting that damage caused by food consumption was ongoing at time of death. Despite this, no clear signs of resultant infection within the maxillary sinus could be observed. This heavy dental attrition in tandem with a lack of carious lesions or obvious infection can likely be attributed to a diet rich in shellfish, tree nuts, and seed plants, typical within the Late Archaic (Powell, 1985).



FIGURE 6. Mulberry Creek (1Ct27) skeleton 8a, left mandible. Left second and third molars (shown), and canine (not shown), were recovered. Illustration by Diana Simpson

This individual also demonstrates mild bilateral temporomandibular joint disease, commonly seen in older individuals who have suffered extensive tooth loss (Aufderheide and Rodriguez-Martin, 1998, p. 95). Moderate osteochondritis dissecans is present in the glenoid fossa of both the left and right scapula, and degenerative joint disease is also present throughout the spine, most severe on the superior and inferior surfaces of the bodies of the middle cervical vertebrae (Ortner, 2003; Waldron, 2008). Arthritic changes in this location has often been attributed to the use of a tumpline, carrying weight on the back using a strap around the forehead (Bridges, 1994), a practice documented historically among tribes in the region (Hudson, 1976; Swanton, 1946). All these indicators are suggestive of an active life, but are in no-way atypical for an older individual within this population.

The left arm also demonstrates damage which could be suggestive of repetitive activity or trauma. The superior margin of the coronoid process of the left ulna shows active osteochondritis on the joint surface, and the distal end shows flattening and roughening to the surface of the head, although the styloid process is unaffected. There is also evidence of osteochondritis of the third metacarpal of the left hand, with moderate to severe damage of the distal articular surface (Aufderheide and Rodriguez-Martin, 1998).

A well healed complete fracture is visible on the sternal portion of a fragmentary rib, and the proximal portion of the right fibular shaft shows evidence of a past fracture. Partially remodeled woven bone is visible around the circumference of the fibula, and mild to moderate periosteal reaction is present on both anterior tibia shafts. Severe osteoarthritis is visible on a fragment of a tibial plateau of indeterminate side, with visible eburnation and marginal destruction, possibly secondary to the pathology present in the hip (Waldron, 2008).

Both calcanei show healing lesions on the anterior process of the bone. These lesions, affecting the superior portion of the facet for the cuboid and extending onto the dorsal body of the bone, appear consistent with an avulsion type fracture. The location and nature of these lesions, visible in Figure 7, are suggestive of injury caused by excessive tension on the bifurcate ligament during plantarflexion (Heckman, 1991), although it is also of note that this population displays a high frequency on non-osseous tarsal coalition, a condition which has been linked to a number of possible causes including mechanical stress, or genetic predisposition (Afolayan et al., 2016; Imai et al., 2016; Mann et al., 2016).

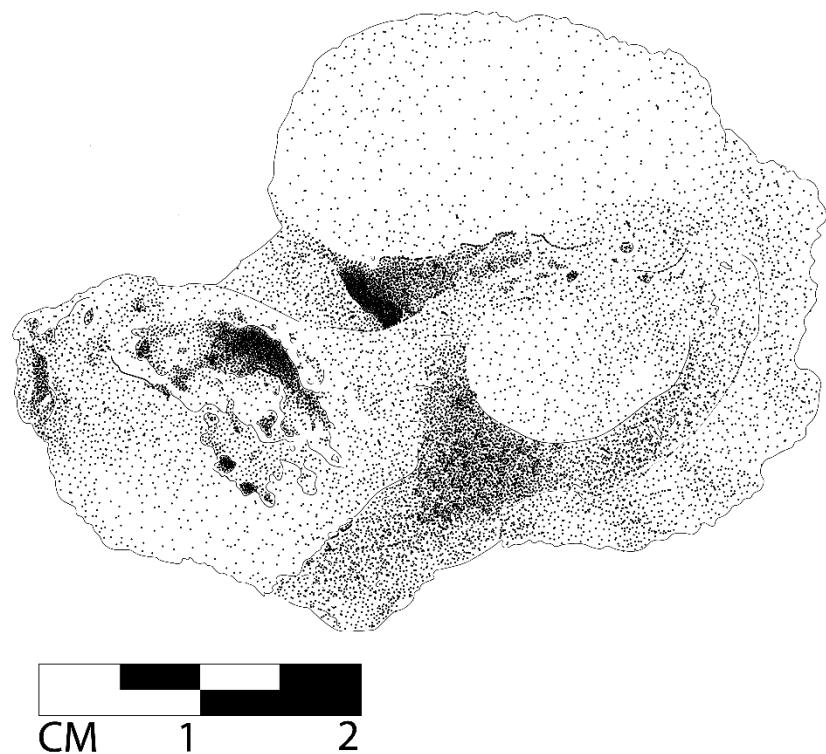


FIGURE 7. Mulberry Creek (1Ct27) skeleton 8a, anterior-medial view of right calcaneus. Illustration by Diana Simpson

The primary condition which would likely have required care in this case, originally identified as degenerative joint disease of the hips, has been further classified as a probable case of bilateral necrosis of the femoral head with resultant secondary osteoarthritis. Also known as ischemic or avascular necrosis of the femoral head (Aufderheide and Rodriguez-Martin, 1998, p. 89), this is a condition caused by a lack of blood supply to the area, and cannot be attributed to any single etiology as both traumatic and non-traumatic causes are recognized. Modern, non-traumatic cases are most commonly attributed to corticosteroid use or other modern risk factors within the clinical literature (Aufderheide and Rodriguez-Martin, 1998), however there has been some suggestion of a genetic predisposition (Roth et al., 2016, p. 165) and some cases can be linked to conditions such as lupus or diabetes (Aufderheide and Rodriguez-Martin, 1998, p. 89). However, the presence of additional traumatic injuries in 8a supports a diagnosis of secondary, traumatic avascular necrosis, most likely originating in the right hip joint as a complication of femoral fracture or dislocation (Miyamoto et al., 2016). This sort of injury has been attributed to a fall, a conclusion that could be further supported by the fibula and rib fractures present in this case. Damage of this kind can be related to osteoporotic bone weakening, a factor that cannot be discounted in this case due to the sex and age of the individual.

In individual 8a, the condition occurs bilaterally, however it is visibly more severe on the right side than the left (see Figure 8). During avascular necrosis, the femoral head becomes severely deformed, taking on a flattened ‘mushroom’ shape. The fovea capitis, the insertion point of the ligamentum teres, is often the site of least blood flow, and will often become enlarged in the early stages of the disease (Aufderheide and Rodriguez-Martin, 1998). Along with these changes, 8a’s right femoral head also shows evidence of extensive marginal lipping, and pitting to the entire surface of the head. This, in tandem with extensive damage to the acetabulum, seen

as destruction of the lunate surface, widening of the joint, and lipping, has resulted in secondary osteoarthritis in the form of small regions of eburnation on both the femur and acetabulum. As previously mentioned, the left femur also shows damage, with severe pitting and lipping present on both the femoral head and the left acetabulum, however there is no visible deformation of the shape of the head, and is thus in an earlier stage of necrosis.

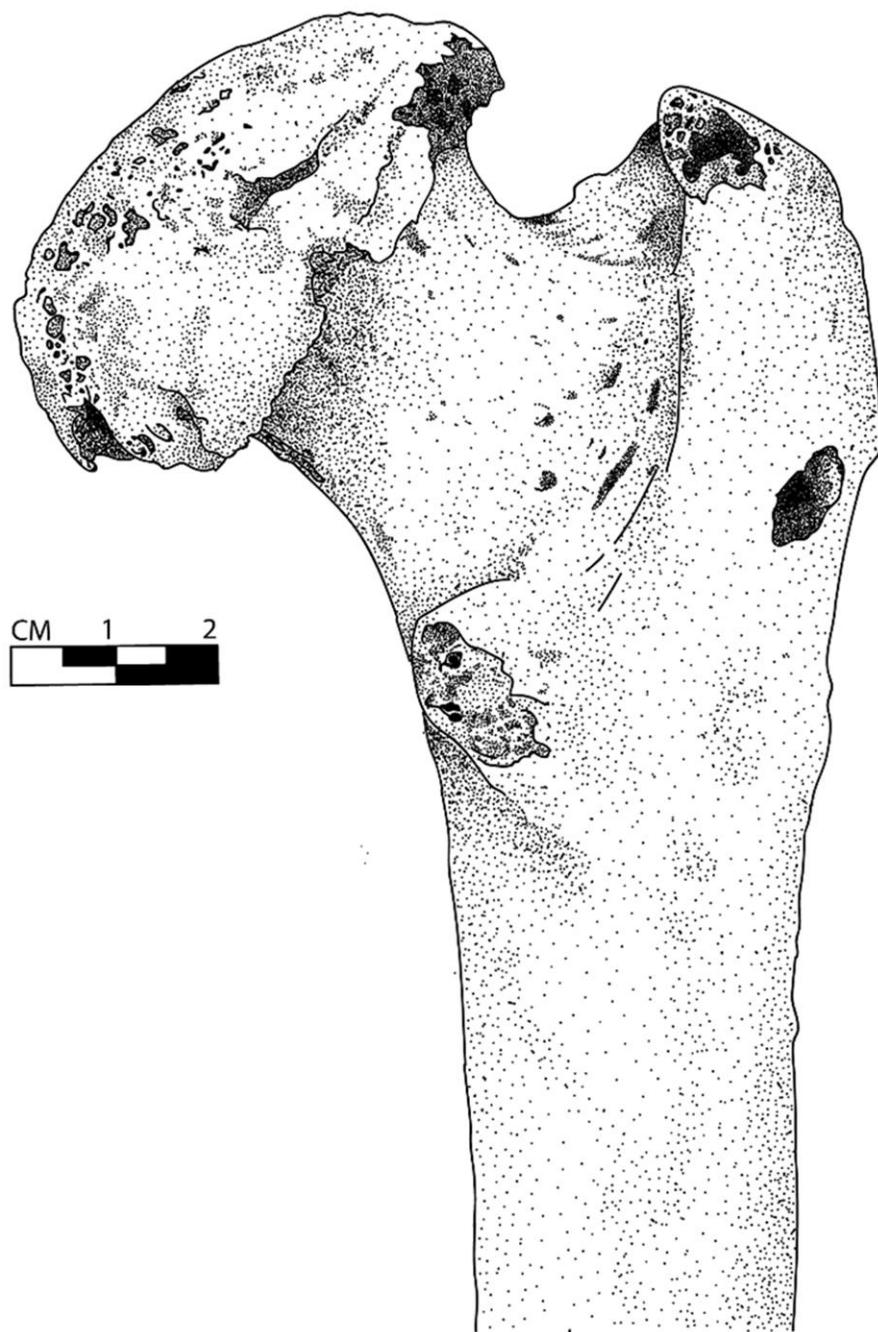


FIGURE 8. Mulberry Creek (1Ct27) skeleton 8a, right femur showing necrosis. Trochanteric damage is taphonomic. Illustration by Diana Simpson

Clinical Impacts: Establishing Disability for Individual 8a

For Stage 2 of the bioarchaeology of care, the need for care is considered through a consideration of disability (Tilley, 2017, p. 21). Primarily, clinical symptoms of each pathology or condition must be identified, secondarily an assessment must be made as to the probable care needed to survive or provided. In the case of individual 8a, there is little doubt that physical impairment existed, most likely at multiple times through her life. The fractures of her ribs, and leg would likely have resulted in pain and decreased ability for a time, however since these injuries were resolved at death, it is impossible to consider the process of care that might have occurred during her recovery. Rather she must be evaluated with respect to the injuries which were active or ongoing at time of death, most notably the ongoing damage to her hips.

Clinical study of necrosis of the femoral head typically relies on a classificatory schema known as the Association Research Circulation Osseous (ARCO) Classification (Van Thiel and Mather, 2015) to categorize the progress of the condition. Based on ARCO standards, 8a likely falls between stage three, “disruption of the normal round contour of the head and accumulation of sequestrum” (Lespasio et al., 2015, p. 1000), and stage four, “complete collapse of the femoral head [and] osteoarthritic changes of the hips joint” (Lespasio et al., 2015).

Modern studies of pain level among sufferers of osteonecrosis also have indicated a direct correlation between ARCO severity score, and reported overall pain level (Lespasio et al., 2015), indicating that 8a’s resting pain level would have increased over time, however clinical literature also suggests that mobility related pain becomes severe much earlier in the disease process (Hauzeur et al., 2016). All of this, in tandem with the resultant arthritic development indicates that walking would have been very painful for individual 8a.

Still, temporal estimates suggest that osteonecrosis, from time of onset, would have taken around four years, depending on activity, to reach the level of severity seen in 8a (Aufderheide and Rodriguez-Martin, 1998, p. 90). Based on the presence of partially healed damage to the calcanei, as well as arthritic eburnation of both the left hip and an indeterminate knee, it is clear she was mobile for a time, despite the pain occurring in both hips.

In particular, the bilateral damage to the calcanei, likely suggestive of extreme plantarflexion, are similar to other cases in which hip damage has resulted in the adoption of abnormal movements during locomotion, often resulting in extreme mechanical stress to the tarsals or metatarsals (Lovell, 2016). Injuries of this kind are underrepresented within the clinical literature, due to the difficulty of diagnosis based on radiographs alone (Gibbons and Cunningham, 2016). Sufferers (often women, due to the risk posed by high-heel shoes) report sharp pain distal to the lateral malleolus, and are typically unable to bear weight soon after injury (Hodge, 1999). An injury of this kind would have required, at minimum six weeks of immobilization, or possibly surgical intervention to heal completely. Thus, the lack of total healing of these injuries in 8a does not preclude care. The remodeling present on the margins of these lesions, and the severity of the degeneration present in the right hip support the conclusion that independent mobility was not occurring for some time before her death.

Based on total consideration of clinical factors, it is argued that within the social and environmental context of Mulberry Creek during the Late Archaic period, individual 8a would have experienced a period of ongoing and progressive disability leading up to her death.

Provision of Care for individual 8a

With this conclusion of Stage 2 of analysis in mind, Stage 3 of the bioarchaeology of care requires a synthesis of all pertinent information accumulated in the previous two stages to create a model for specific care provided. Because it is likely that the onset of 8a's disability would have been gradual, it is argued that a combination of care in the form of direct support and accommodation would have both been necessary at various stages of her extended disease progression.

There is little doubt that Native American groups during this period in the region lived active lives. The rocky terrain of the river banks and surrounding areas would have made mobility difficult, even for the ablest bodied individuals. Consequently, 8a would have required assistance with procurement of food and water on a daily basis. Although plant domestication and cultivation was emerging during the Late Archaic period, hunting and gathering were the primary source of nutrition. 8a shows no indication of severe or ongoing nutritional stress, suggesting that she was receiving sufficient nourishment prior to death, and supporting the argument that she received assistance in acquiring food and water. The poor state of her dentition could also indicate the need for specialized dietary accommodation or additional food processing to support overall nutrition; although it is recognized that her disability might not have influenced her ability to process food for herself after it was provided.

Mobility assistance also would have been required when traveling over long distances. It has been argued that Late Archaic groups enjoyed semi-sedentary lifestyles during the Archaic in the Southeast (Dye, 1996; Sassaman and Ledbetter, 1996; Shields, 2003a), but the severity and

duration of 8a's impairment would have made travel nearly impossible. Any level of seasonal or annual mobility would have required the assistance of others within the group.

A basic, preliminary model of care for individual 8a must incorporate, at the very least, daily assistance with basic tasks such as acquiring food and water, and maintaining normal mobility and hygiene. It is argued that 8a would have experienced basic group accommodation during the initial stages of osteonecrosis, and eventually direct support in the form of assistance with basic needs on a daily basis.

In this instance the lack of perimortem violent injury or trophy taking behaviors further supports the argument that she was receiving care leading up to time of death, when compared to the high rate of violence within the overall site population. However, incorporating this probable feature of prehistoric care raises the question of meaning in cases where an individual shows clear evidence of care as direct support, but also demonstrates perimortem violent injury. This is a question that is explored in examples 2 and 3.

Examples 2 and 3: Violence and Care?

Burial 12 at the Mulberry Creek site (1Ct27); dated to the Late Archaic Period component (5,000-3,000 BP) is identified as a male individual of 35-40 years of age. Although these remains are fragmentary, the recovered skeletal elements show minimal taphonomic damage, and age and sex determinations were made using pubic symphysis and auricular surface, as well as cranial suture closure.

This individual was interred in a round grave, supine, with legs folded up at his sides (see Figure 9). A minimum of eight individuals at the site were buried in this position, all dating to the Late Archaic Period. The burial pit of grave 12 seems to be associated with the

bundled remains of a 12-15-year-old individual (1Ct27 7), and grave goods associated with individual 12 include shell beads around the neck and a shell gorget pendant. These items would have been trade goods acquired perhaps through exchange with outside groups, and the rarity of such goods within the region and time period would possibly have been indicative of atypical status. This individual suffers from several age-related pathologies, including osteoarthritis of the knees, hips, and cervical vertebrae, as well as the right triquetral in the wrist. Severe TMJD is visible on both temporals, and a small bony tumor is present in the left frontal orbit.

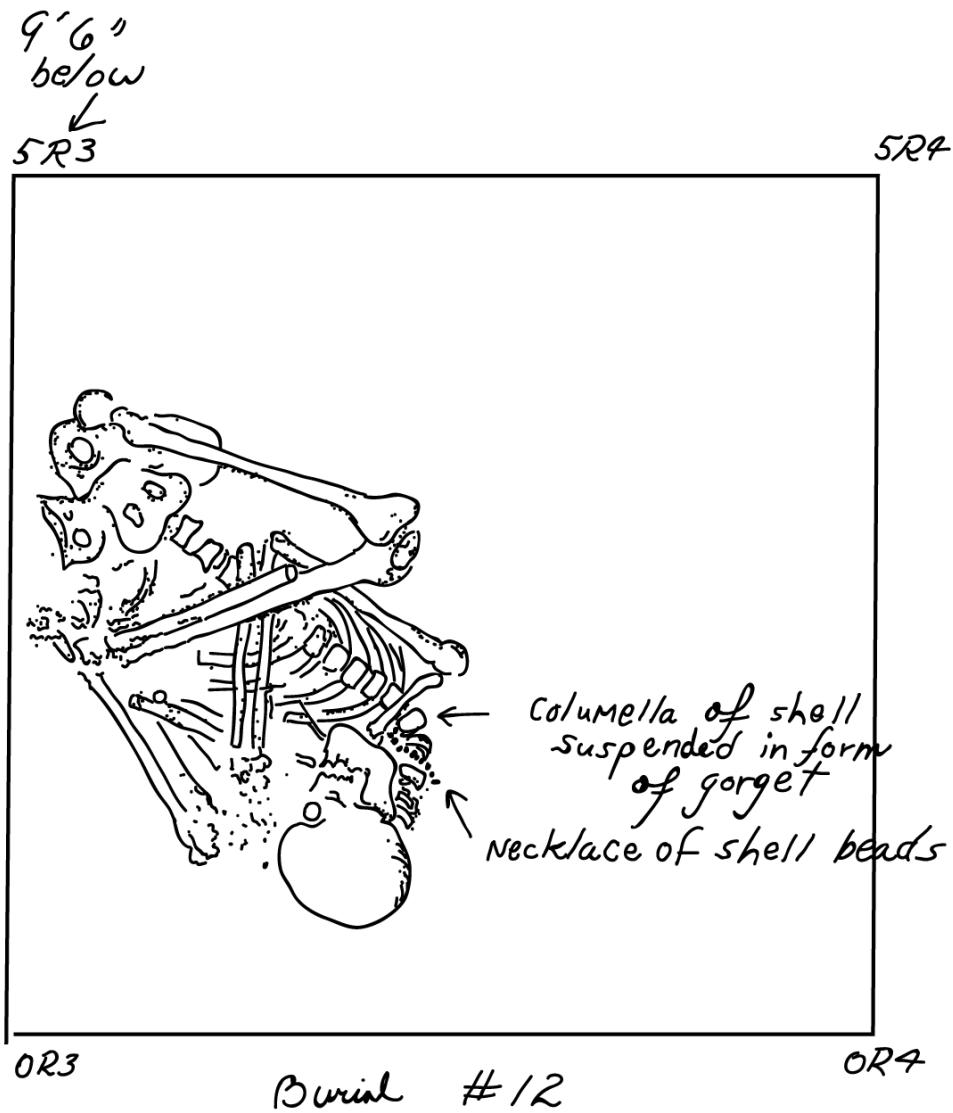


FIGURE 9. Burial map of 1Ct27, Burial 12. Illustrated after a scan of the original map drawing created by James R. Foster August 6, 1936. (Documents on file at the Alabama Museum of Natural History Laboratory for Human Osteology)

This individual was clearly suffering from severe, widespread infection of some kind prior to death. Acute osteomyelitis is visible in both the left and right calcanei, resulting in major destruction of the calcaneal tuberosity. Cloacae formation is visible bilaterally, although the destruction is visibly more severe in the right calcaneus, which also shows clear evidence of compression fractures on the anterior portion (see Figure 10). Flattening of the plantar surface and damage to the facet for the cuboid are visible. Unfortunately, the cuboid was not recovered, but fragmentary metatarsals suggest that the infection of the foot was not isolated to the calcanei.

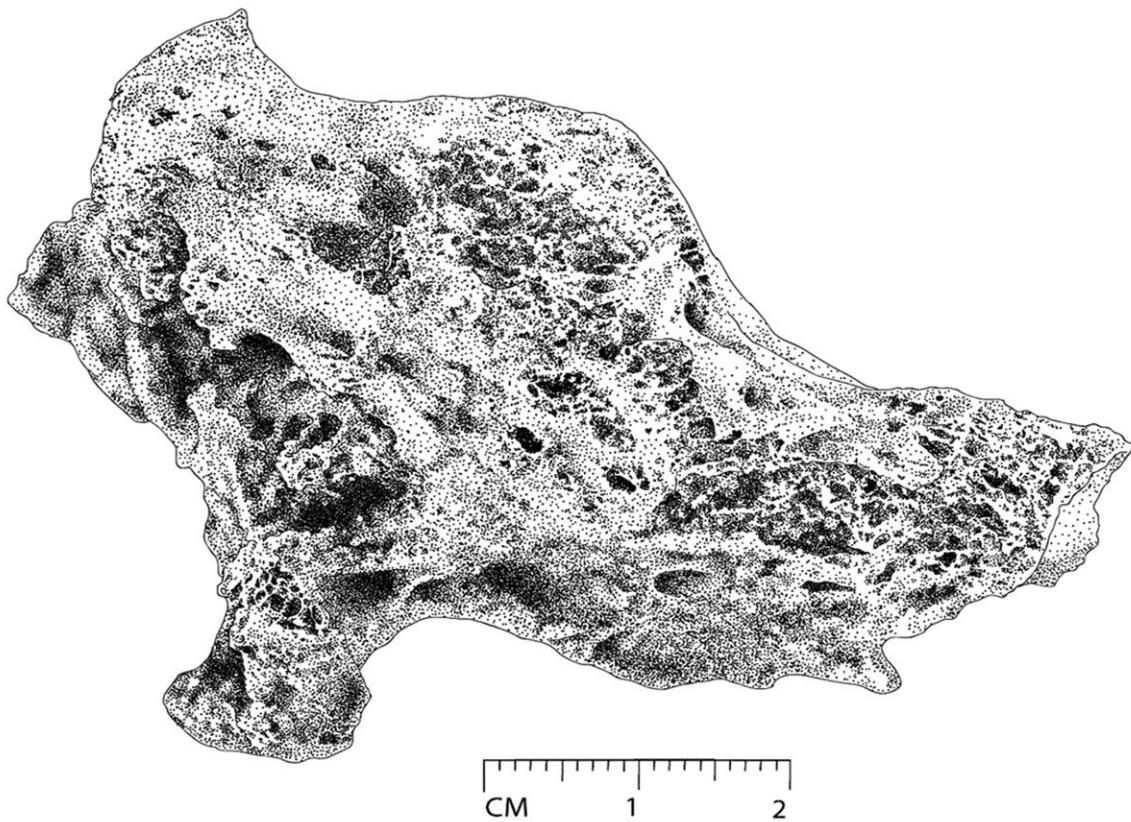


FIGURE 10. ICt27, Individual 12, right calcaneus (superior is up, posterior is left) showing compression to the anterior plantar portion of the bone, affecting the facet for the cuboid.
Illustration by Diana Simpson.

The compression damage seems to be indicative of a fall from a height greater than six feet, which has been identified as the most common etiology for fractures of this kind (Worsham et al., 2016). This is further supported by compression fractures of multiple fragmentary thoracic and lumbar vertebral bodies. Antemortem trauma is also indicated by healed fractures to the right fibula, right clavicle, left ulna and three fragmentary ribs, with non-union fractures present on the left radius and two additional fragmentary ribs.

Widespread severe periosteal reaction is also present throughout the body, with destructive lesions manifesting in tandem with proliferative reactive bone growth (see Figure 11) present on much of the post crania. Due to the lack of cloacae, a diagnosis of treponemal infection must be considered (Aufderheide and Rodriguez-Martin, 1998; Ortner, 2003), a possibility which is further supported by the presence of destructive lesions on the hard palate and maxillary sinus. Still, chronic non-suppurative osteomyelitis cannot be ruled out as an alternative diagnosis.

The likely cause of death in the case of individual 12 is evidenced by three distinct, perimortem, traumatic skull injuries, one of which is located at bregma, with two more at the juncture of the sagittal and lambdoidal sutures. Although the skull was fragmentary, a reconstruction of available fragments demonstrates clear evidence of beveling and radiating fractures indicating multiple blunt force trauma. One wound appears in a triangular shape, possibly consistent with a spiked ball club weapon, which was widely documented among Southeastern Native Americans by early ethnographers (Le Page du Pratz, 1774; Swanton, 1911; Swanton, 1931; Swanton, 1946) Despite the clear evidence of violence in this case, there is no definitive evidence of trophy taking behaviors. Unlike other individuals at Mulberry Creek (1Ct27) and surrounding sites, there are no visible cut marks on the skull or post-crana of

individual 12, which can be viewed as indicators of scalping or the harvesting of trophy body parts by survivors (Bridges et al., 2000; De Vore and Jacobi, 2016; Jacobi, 2007).

There can be little doubt that individual 12 would have experienced severe ongoing pain in relation to his numerous traumatic injuries. Although calcaneal fractures of this kind are somewhat rare within clinical literature, they are often associated with high morbidity and additional skeletal injury. Even with modern medical intervention, the most severe cases can require amputation (Worsham et al., 2016), and the degree of deformity seen in 12 indicates particularly severe damage and infection.

The widespread infection seen in this individual would have been progressive, and even without a single clear diagnosis is certain that it would have resulted in physical impairment and disability within his Late Archaic group.

As mentioned in the previous case, Prehistoric Native American groups in this region lived active lives. It is thus argued that any physical impairment resulting in immobility would have been experienced as disability. The level of healing visible on the fractures of the left ulna, right clavicle, and right fibula in this case suggest a period of immobility following initial injury, although the compression injuries and severe infection would have progressed or persisted despite any conceivable prehistoric intervention. This individual's pain would also likely have been severe and near-constant. Some modern sufferers of spinal compression have reported a decrease pain level when lying down, due to the alleviation of the effect of gravity (Dewar, 2015), although pain does return with activity.

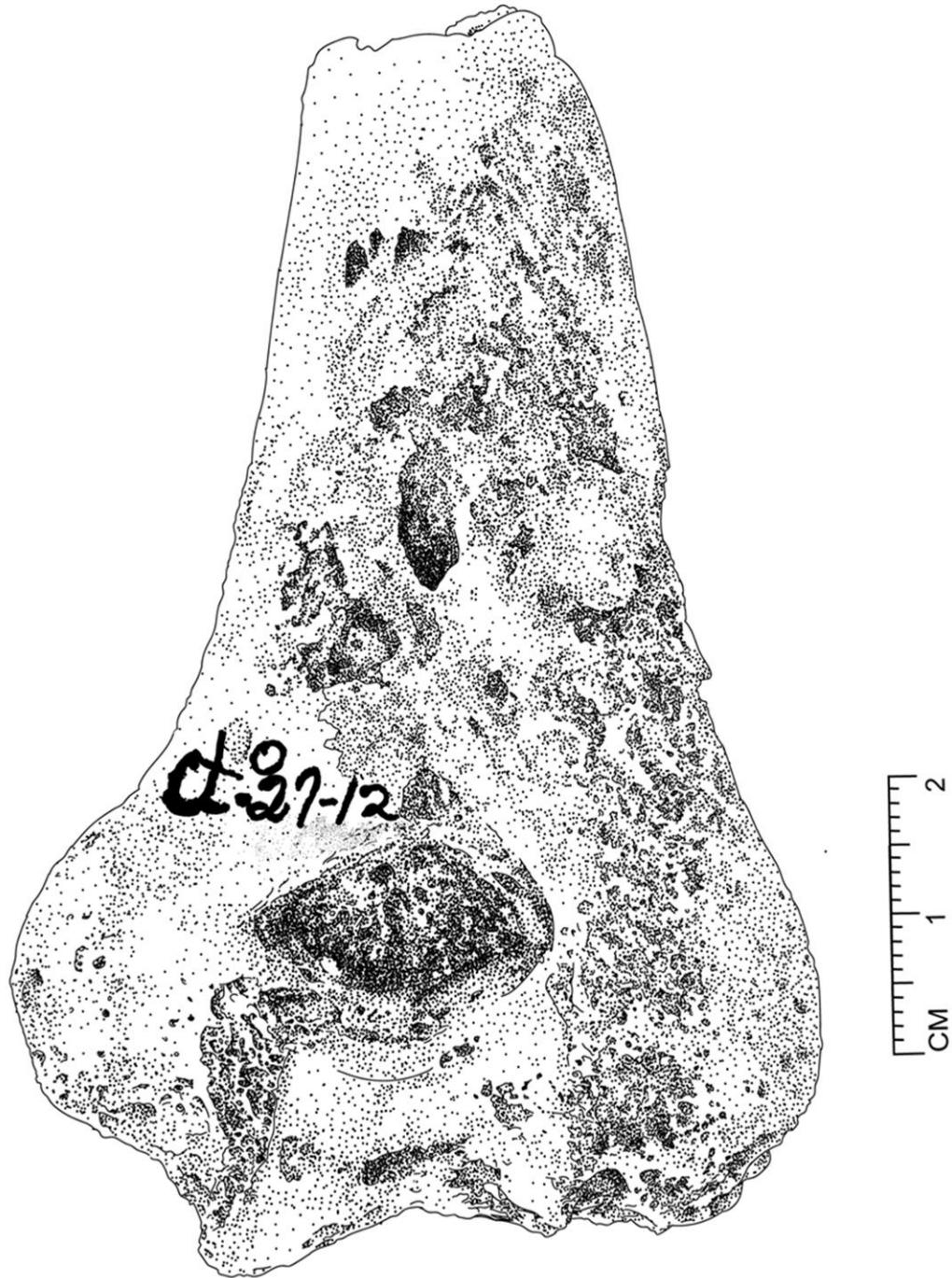


FIGURE 11. 1Ct27, Individual 12, posterior view of the right humerus, demonstrating destructive and proliferative lesions affecting the distal metaphysis as well as the facet for the ulna. Illustration by Diana Simpson

Much like in the first example presented (1Ct27 individual 8a) it is argued that individual 12 would have required assistance with the procurement of food and water on a daily basis for the duration of his infection, in addition to mobility assistance starting at the time of his calcaneal injuries. A more detailed interpretation of the circumstances of his death will be discussed later.

Next, we may consider example 3, Mulberry Creek individual 135. This male individual, 22-27 years of age, was buried supine, bent at the waist with his legs folded up over his torso (Figure 12). The placement of this body within the grave seems almost hap-hazard and suggests a possible connection to other similar body placements at the site, in particular individuals 83-85 within the mass grave. No grave goods were associated with this burial.

This individual shows evidence of porotic hyperostosis on much of the skull, which has been categorized as level 3, active using osteological standards. Outlined by Buikstra and Ubelaker (1994) this particular designation is characterized by “porosity with coalescence of foramina” (Buikstra and Ubelaker, 1994, p. 152) present on the outer surface of the skull, which was active and ongoing at time of death. The exact etiology of this pathology is still debated among osteologists, with some arguing in favor of B12 or folate deficiency (Walker et al., 2009), and others continuing to advocate for a consideration of the iron deficiency anemia explanation (Oxenham and Cavill, 2011). Still, it has been pointed out that the debate is somewhat a false dichotomy, in that both conditions have been demonstrated to occur simultaneously and often result from lack of dietary animal protein, high parasite load, or other pathological conditions (McIlvaine, 2015). Thus, for the sake of this analysis of care, this condition is simply regarded as the likely result of some sort of nutritional imbalance, suggesting that individual 135 might have been lacking in sufficient protein leading up to his death.

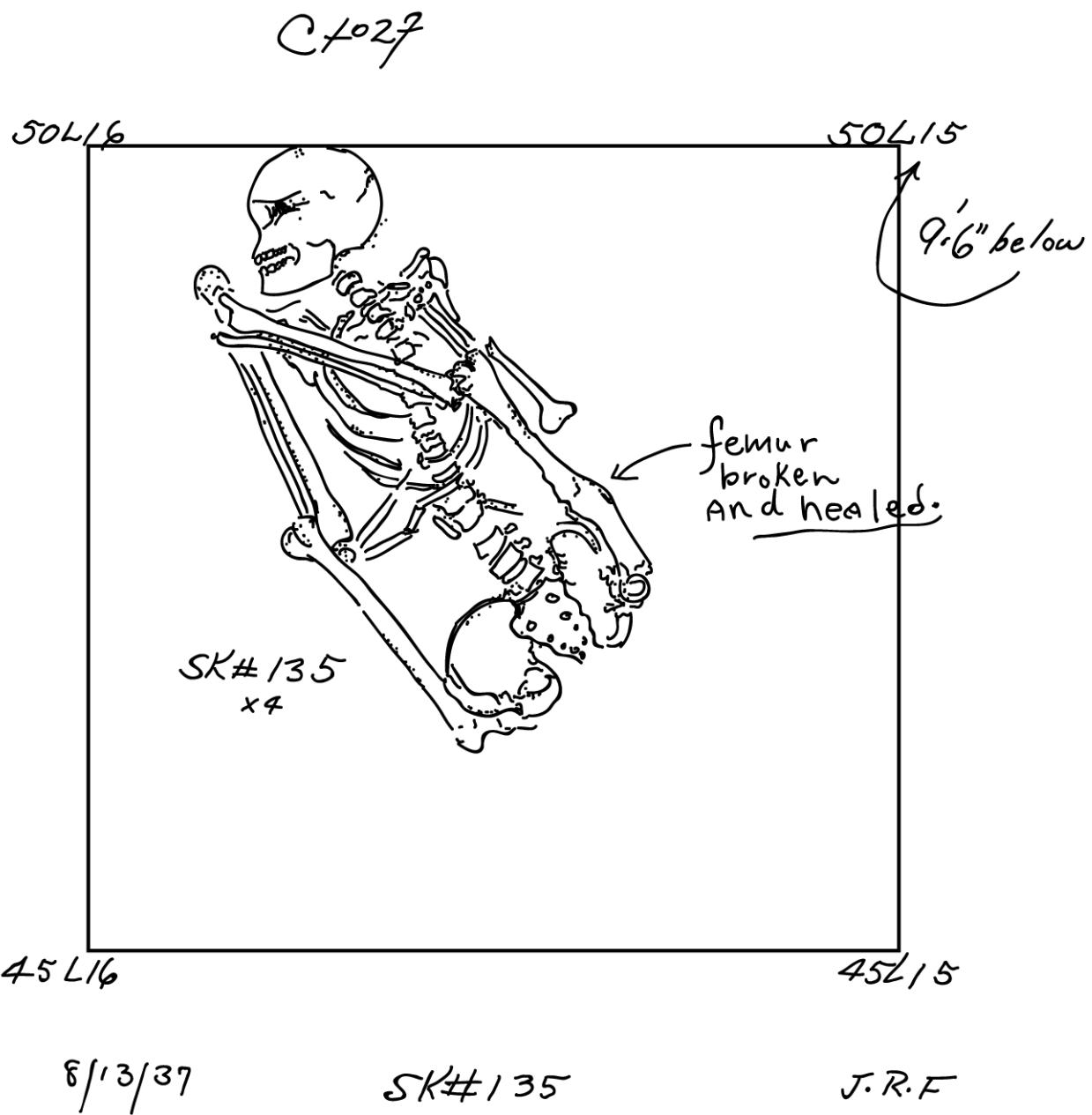


FIGURE 12. 1Ct27 Burial 135. Individual is bent at the waist with legs extended over the body resulting in placement of feet near the face. Illustrated after a scan of the original map drawing created by James R. Foster August 13, 1937 (Documents on file at the Alabama Museum of Natural History Laboratory for Human Osteology).

Additionally both scapular glenoid fossa demonstrate osteochondritis dissecans, which could be indicative of repetitive use and microtrauma of the shoulder joints (Aufderheide and Rodriguez-Martin, 1998, p. 81). This benign condition was commonly seen in the population of Mulberry Creek, and typically would not result in any impairment of function, although it might contribute to premature degenerative joint disease.

The most obvious condition in this case is a fully remodeled oblique fracture to the left femur (see Figure 13). Based on the shape of the bone, it is clear that the fracture was complete, and was not properly set following injury, as malalignment of the non-union has resulted in noticeable shortening of the femur when compared to the normal right femur. It is probable that compensating for this discrepancy in length would have altered 135's locomotion, and much as with the first example discussed in this section, might have contributed to damage present on the tarsal bones. The right navicular demonstrates osteophytes, and remodeling has occurred at the main insertion for the tibialis posterior. Similar injuries have been observed in individuals who might have had to walk on 'tip-toe' to compensate for an pathology of the leg (Lovell, 2016).

Although there is no evidence of projectile point wounds or blows to the skull in this individual, there is clear evidence of scalping cutmarks indicating perimortem violence and demonstrating that this individual was targeted for trophy taking after death.

Based on a total consideration of context and skeletal health in the case of individual 135, it was determined that this case did not provide clear evidence of severe impairment, or of active care leading up to time of death. In fact, much like the individuals interred in the mass grave at Mulberry Creek, it is argued that individual 135 likely represents a non-group member who was a casualty of a violent encounter.

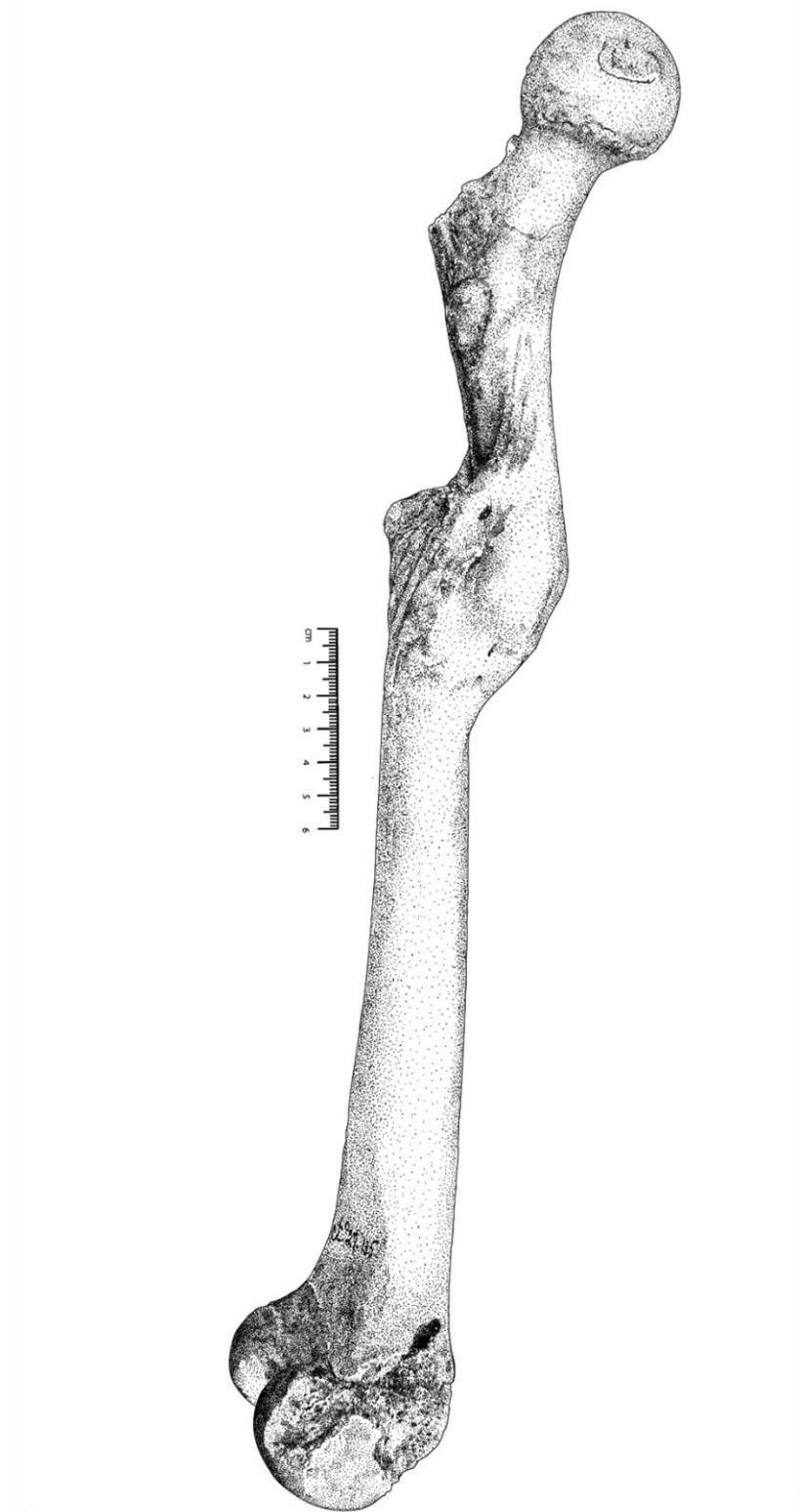


FIGURE 13. 1Ct27 individual 135, fully healed complete oblique fracture of left femur. Illustration by Diana Simpson.

Due to the favorable location of the Mulberry Creek Shell Mound, it is possible that 135 was part of an attack or raid on the occupying group which was seeking access to the valuable river resources. This argument is supported by 135's seemingly poor nutrition. Despite his probable mobility impairment, it is probable that he would have been capable of obtaining food among the ample shoals of shellfish around the mound, as most of the shells recovered from the site have been shown to originate from very shallow water (Dye, 1996). The strongest evidence for potential outsider status in this case is the lack of care afforded to this individual immediately following death. The lack of grave goods and haphazard placement of his body in the grave seem consistent with the practical need to dispose of a corpse with minimal effort, and contrasts with the meticulous deliberate placement of other deviant individuals at the site.

As one can see based on this case, demonstrable impairment or disability does not necessarily indicate care. A comparison of examples 2 and 3 (individual 12 and 135 respectively) indicate similarities in relation to a disability brought about by trauma, as well as the presence of perimortem violence. However, contextual analysis reveals significant differences in relation to probable care. Although it is likely that 135 would have received care during the healing process following his femoral fracture, secondary health markers and mortuary treatment do not support the argument for ongoing direct support leading up to death. Conversely, the circumstances of 12's death and the post-mortem treatment of his remains suggest the possibility that violence and care were not mutually exclusive within this population. This will be further explored in the discussion section of this volume.

5. DISCUSSION

With a preliminary conclusion of stage three of the bioarchaeology of care established, analysis progresses to the fourth and final stage, which is also arguably the most complex. Stage 4 deals with the interpretation of each case within the broader context of agency and identity at both the individual and group level, and thus should not be undertaken until the conclusions of the preceding stages have been well-established.

As mentioned in the previous section, most cases of possible accommodation during life dated to the Late Archaic Period. This could be the result of several factors. First of all, the Late Archaic Period component of the site yielded the largest number of burials (n=73) and it is reasonable to expect that this period also would yield the most cases of care. The presence of hearth features at the site has been viewed by some as evidence that small groups were inhabiting the shell mound location on a semi-permanent basis in the Late Archaic (Walthall, 1980), which if true would have simplified the process of active care for mobility impaired individuals. However, this interpretation of care also must consider the possibility that changing group perceptions might have led to an intensification of care practices during the Late Archaic Period in the Tennessee River Valley.

This is certainly within reason, considering the wealth of evidence for increasing social complexity during the time. The addition of non-utilitarian grave goods during this period at Mulberry Creek, as well as the inclusion of grave goods in the burials of juvenile individuals seems to suggest the possibility of changing views regarding status. Additionally, the

availability of resources and beginnings of production and trade might have minimized the actual lived experience of disability. In fact, Webb and DeJarnette (1942) suggest the possibility that the site was in use as a lithic production center for a time, based on the presence of large amounts of chert debitage. As was underlined earlier, it is probable that if mobility impaired individuals could have contributed to production of goods, their experience of socially constructed disability might have been minimal despite major physical impairment.

Still, despite this possible alleviation of disability experience, case examples 1 and 2 from this volume (1Ct27 Individuals 8a and 12) fall within the range of “severe” physical impairment (Tilley, 2017), meaning their diseases and traumas would have significantly impacted their daily lives. Thus, there can be little doubt that they would have been receiving care as direct support to sustain normal life. Although archaeological evidence suggests that resources were abundant during the Late Archaic, the gathering of nuts, hunting of game, or harvesting of shellfish would have been impossible for these individuals, particularly taking into consideration the uneven terrain of the Tennessee River Valley.

It is of note that both 8a and 12, as well as all other noted cases of probable direct support (individuals 26, 52, 76, 80, 92) were all aged at around 35 or above at time of death. Through a consideration of demographic data from Late Archaic sites in the Southeast (Kentucky and Tennessee), it has been estimated that typical life expectancy during the time was 19-24 years, although reaching this range often resulted in an additional 15-20 years of life (Shields, 2003a, p. 36). Thus, although it is not surprising for Late Archaic individuals to live into, and beyond the late 30’s, an interpretation of care during the Archaic must take this expected range into account.

What Drives Care, Social Status or Biological Identity?

It has been demonstrated that the act of providing care, even in a modern context, is rarely determined solely by the disability status of the care recipient. Rather, it is a complex intersection between the multifaceted identities of both care provider and care subject. With this in mind, it is likely that a full understanding of the meaning of disability, or the motivations driving care in prehistoric Alabama will never be attainable. However, this certainly does not preclude attempts to document such behaviors and actions in the past. By supplementing the results of this study of care with previous archaeological research in the region, as well as ethnohistoric accounts, several interesting trends begin to emerge.

Within all the identified cases of possible direct support from within the Mulberry Creek Archaic population, three of which were fully explored in this thesis, several salient factors of identity seem to stand out. As mentioned, all seven of these individuals who survived for an extended time with mobility impairment were older adults. It is thus possible that the elder status of these individuals was a motivating factor in the decision to provide them care.

Ethnohistoric accounts support this possibility, suggesting that Southeastern Native Americans valued elder men and women as the keepers of history, and a link to the past (Adair, 1930 [1775]; Hudson, 1976). Older women might have also held high status relating to ritual or symbolic beliefs. Adair (1930 [1775], p. 165) relates that old women played the role of care provider for injured warriors, having attained an identity status akin to what Gowland (2017) describes as ‘cultural androgyny’ during later life. It also is widely noted historically that elder women were integral to the birthing process among the Creeks and Choctaw of the Southeast (Swanton, 1946). In her interpretation of potential care for an older female from the Averbusch site in Tennessee, Worne (2017) cites iconographic depictions of the “Old-Woman-Who-Never-

Dies” as a possible ideological basis for care. These depictions of an older woman with a protruding or hunched over spine, make up part of the Mississippian cosmology and are often interpreted as representing an important maternal figure or deity who played a major role in the cycle of life (Sharp et al., 2011; Worne, 2017).

Similarly, older males were often revered for their past prowess and accomplishments as warriors, as well as for wisdom and knowledge (Bartram, 1928; Bartram, 1995; Hudson, 1976). Among the Creeks the oldest uncle of a clan or family group often served as disciplinarian and teacher to children as well as keeper of lore (Swanton, 1946, p. 716). For male warriors among these Southeastern groups, prowess in battle was often established based on the number of slaves taken, or the number of scalps harvested (Swanton, 1911, p. 125), with older males logically holding the highest honors. The leaders of the war parties among these groups would have been protected by the party members under penalty of death, although when injury was incurred by an elder or high status male, tribal doctors would have determined the course of potential care or treatment. Among many Southeastern groups this would, in some cases, have consisted of the decision to kill the afflicted individual (Bartram, 1995; Swanton, 1911; Swanton, 1931; Swanton, 1946). Within this research, it is argued that this is the most likely explanation for the perimortem violence present in example 2 (individual 12); not the result of intergroup violence, but rather what modern groups would describe as a ‘mercy killing’. Swanton reports that if a doctor among these historic tribes declared a patient too ill to recover, “he was killed without more ado” (Swanton, 1946, p. 725). Among the Creeks, this was viewed as an honorable death, and was often requested by elderly individuals who began to view themselves as a burden to the group (Bartram, 1995, pp. 119-120).

In the case of such deaths among leaders, it was common for additional group members to be killed to accompany the individual in the afterlife. The remains of these sacrificial victims or volunteers were then processed, bundled, and interred with the primary deceased individual (Swanton, 1946, p. 728). This phenomenon could provide another potential link to Mulberry Creek, individual 12, who was interred with the bundled remains of a juvenile individual. The inclusion of grave goods in this case could further indicate some sort of elevated status in death, and possibly in life. The shell beads and gorget included with individual 12 during burial represent luxury trade goods, likely obtained through exchange networks with coastal groups or specialized production centers. Although Shields (2003) noted that such objects of adornment begin to appear among the Late Archaic at Mulberry Creek, shells of this kind placed around the neck are only present in four Late Archaic Burials at the site, two subadults and two adult males. In addition, two additional Late Archaic adult males and one more subadult also had shell beads and pendants as grave goods, however in these individuals the items were located at or around the waist rather than the neck (Shields, 2003a; Webb and DeJarnette, 1942). The inclusion of goods of this kind at Mulberry Creek is argued to be suggestive of elevated status of some kind at time of death as perceived by the living group members; it also is possible that the placement location of these items on the body could be linked to additional identity factors within the group.

All these contextual factors suggest that individual 12 was most likely a high-ranking member of the Mulberry Creek community, rather than a slave or attacker, as might be inferred from the severity and nature of his injuries and cause of death.

It has already been stated that the Archaic Period of North Alabama can now be shown to demonstrate evidence of complex behaviors relating to violence, and it can now be argued that

complex caregiving behaviors also were present within this specific Late Archaic Population. In particular, the cases of care at the Mulberry Creek site underline the value of considering violence, disability, and care simultaneously when they are identified within the same population, as is the case within the Tennessee River Valley of North Alabama.

6. CONCLUSION

This research has demonstrated that an application of the bioarchaeology of care approach can delineate disability and complex caregiving behaviors within a prehistoric Native American population from North Alabama. It has been shown that care *was* occurring at Mulberry Creek during the Archaic Period, but also that care was not necessarily a foregone conclusion to disability status. The argument also is made that there is still much to be gained from further study of the skeletal populations of the Tennessee River Valley.

In the past, analyses for care have struggled to delineate cases where care might have been offered, but was either ineffective, or rejected by the disabled individual. This has led some to advocate for a community or population level approach to care analysis, although thus far this concept has only been implemented on historical populations, where detailed written records can be used in tandem with archaeological evidence (Tremblay Critcher, 2017; Wesp, 2017). This study has revealed that a robust contextual approach to care analysis in the Archaic Period Southeast can allow for the analysis of care to occur beyond the individual level among prehistoric populations as well.

This study has also revealed the close relationship between care and violence within this population, an assertion that can be further supported by ethnohistoric data. It has helped to underline that categorizing perimortem violence as present or absent could be oversimplifying the complex interaction between identity, group membership and behavior within these past populations. If such an approach were taken, individuals 12 and 135 from this research would be

categorized as equivalent, when it has now been established that the care and experiences of these two individuals was likely very different. This example underlines the importance of considering the embodiment of each individual through skeletal and contextual analysis, prior to seeking comparison.

Kindness and compassion, which have often been equated with care, are often considered to be the opposite of violence. I argue this is not the case. Care and violence are both acts, devoid of a single discreet motivation, unlike kindness and compassion which have an inherently positive connotation. Just as violence can have many diverse motivations or inciting forces so too can the act of providing care. In this way, the act and agency underlying care in the past can be approached in much the same way as the act and agency behind violence. This is why the conclusions of this research argue that patterns in care, not simply single cases, must be considered in much the same way as patterns of violence in the past.

Limitations

It must be acknowledged that this analysis is in no way exhaustive. This is in part due to the fragmentary nature of the skeletal remains, as well as the on-going status of the synchronic and diachronic analysis within the region. In many ways, this study helps to underline that care interpretation should be made very conservatively, and reassessed as further insights present themselves (Tilley, 2015b; Tilley, 2017).

The conclusions of a biocultural bioarchaeological analysis such as this are only as strong as the context from which they are drawn. In this instance, there is much that we have yet to learn about the lives of prehistoric Native Americans during the Archaic Period in this region. Certain bioarchaeologists have advocated for a multiscale approach to skeletal analysis,

focusing on the individual, the community, and the population for broader interpretive purposes (DeWitte and Stojanowski, 2015; Wood et al., 1992). Although ethnohistoric data can lend insight into potential past behaviors and meanings, it must be acknowledged that the large temporal disparity between European ethnographers and Archaic Period Native Americans makes an overreliance on such sources problematic.

Most bioarchaeologists today are well familiar with the “osteological paradox” (Wood et al., 1992), of which a central argument relates to issues of representativeness of prehistoric skeletal samples. Wood et al. (1992) identify the issues with the consideration of health. The authors note that skeletal indications of disease often manifest slowly, and so the individuals showing the most severe skeletal diseases might have in fact been the most robust, healthiest individuals in the living population. Thus, it is possible that the reason care is visible in older individuals and more so during the Late Archaic is that the individuals living during this time were healthier and stronger over all, thus the individuals identified as showing evidence of direct support simply represent the strongest of the strong. The ability to survive beyond the typical life expectancy of a population suggests a myriad of potential factors aiding in survival, possibly including, but not limited to, provision of care. Unfortunately, due to the fragmentary nature of the remains, and the terrible dental health of older individuals in this population, it is not possible to consider frailty and morbidity across the life course of these individuals.

It also must be acknowledged that the standards of what constitutes “severely impaired” often changes based on age group. In this respect, many elder individuals might be categorized as physically disabled by the standards held for younger individuals. Even in modern populations the elderly often suffer from higher frequencies of degenerative and age related pathologies such as arthritis, osteoporosis, or cancer, as well as accidental falls and fractures.

DeWitte and Stojanowski (2015), in discussing the osteological paradox (Wood et al., 1992), have criticized what they have seen as frequent failure to acknowledge and engage with the potential issues and weaknesses of bioarchaeological studies. I fully acknowledge that the Mulberry Creek skeletal population housed at the University of Alabama is in some ways non-representative. It cannot be inferred to be representative of the living population, nor does it represent a narrow chronological occupation period. However certain behavioral inferences can clearly be made using these remains.

Although the results of this study which examined a single site population did not allow for the analysis of trends based on statistical significance, they have supported the idea that such statistical analysis might be possible in the future. It also is probable that further insight into the interpretation and meaning of the cases presented here will emerge as future insight into the lives of prehistoric Southeastern Native Americans strengthens our understanding of the context in which these disabled people lived. Most of all, this research has indicated several particularly valuable lines of inquiry for future biocultural inquiry in the region both synchronically and diachronically. First, there could be expansion of this research through a broader examination of disability, care and experienced difference during life. Secondly, greater perspective into the details and complexity of violence could be examined within and among these groups. Finally, a total reanalysis and reinterpretation of mortuary practice in Prehistoric Alabama could be attempted. This final avenue of inquiry became particularly clear during this research, because mortuary treatment is a central line of evidence for the identification of group perception and care.

For example, at the start of this analysis, it was believed that burial practice reflective of difference within the region would consist of prone burials, or haphazard burial practice of some

kind. Rather, it now seems that a more valuable line of inquiry will relate to group membership status based on the deliberate nature of burial. Thus, “deviant” burial should perhaps be subdivided into intentional deviant placement, which might indicate deviance within the group, or accidental/haphazard interment which could be suggestive of the deviance of an outsider or non-group member.

It has been argued that research into trauma and violence in the past “provide not only a window into the past, but a way to imagine the future as well” (Martin and Osterholtz, 2016, p. 487). I assert that the study of disability and care are valuable analogs to this research and provide insight for the future in much the same way. It is central that these two subjects be studied and interpreted simultaneously when they are identified within the same population, as is the case in the prehistoric Tennessee River Valley of North Alabama. By taking a bottom up approach and using a social bioarchaeological perspective beginning at the level of the individual, it is possible to identify patterns and consider a broader biocultural and biosocial meaning of care and disability within prehistoric Alabama and beyond.

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APPENDIX A

TABLE 1. All individuals from Mulberry Creek (1Ct27) identified during initial case selection using 2016 inventory forms. The data depicted in table 1 reflects the most recent analyses of these remains. Gray rows indicate individuals identified as probable or definite perimortem violence or trophy taking, with shade of gray indicates the author's confidence in the potential identification (darker=higher confidence). It is of note that some cases of violence were not yet identified in previous publications.

Burial	Sex	AGE	AGESEXEXPRES	Burial Type	Grave Goods	Time Period	Care?
7	S	12-15	1	Juvenile-bundle	None	Late Archaic	Probable Accommodation
8a	F	50+	1	R1a	None	Late Archaic	Definite Accommodation, Probable Direct Support
12	M	35	2	R1b	Yes	Late Archaic	Definite Accommodation, Probable Direct support
22a*	M	35-45	1	Disturbed	None	Late Archaic	N/A
22a*	F	15-20	0	Disturbed	None	Archaic	N/A
25a	M	20-35	1	R1a	None	Late Archaic	Not sufficient to consider for care
26a	M	50+	1	R1a	Yes- Dog burial associated	Late Archaic	Probable Accommodation, Possible Direct Support
27a	M	25-30	2	Sitting	Projectile point associated	Late Archaic	No indication of care occurring
33	F		1	Frog	None	Late Archaic	Not sufficient to consider for care
34	F	40-45	2	Sitting	None	Late Archaic	Possible Accommodation
37a*	U	>18	0	Disturbed	None	Late Archaic	N/A
40a*	M	35-45	2	Partially Flexed	None	Mississippian	N/A

41*	S	Birth	0	Infant	None	Mississippian	N/A
45a	M	50-60	1	Sitting	None	Late Archaic	Not sufficient to consider for care
48a	F	35-45	1	Sitting	Yes- a few shell beads	Late Archaic	Possible Accommodation
51a*	F	40-44	2	Sitting	None	Mississippian	N/A
52a	M	30-35	1	Sitting	Yes- two stone axes, worked antler, turtle shell	Late Archaic	Probable Accommodation, Possible Direct Support
53	F	45-50+	1	R1a	None	Late Archaic	Not sufficient to consider for care
54a*	F	25-34	2	R1a	Yes- curved shell gorget, disk shell beads, crinoid beads	Late Archaic	N/A
55a	M	50+	2	Extended 3b	None	Unknown	Not sufficient to consider for care
56a	M	50+	2	Disturbed	None	Unknown	Possible Accommodation
57a	F	30-40+	1	Extended 3b	Yes- three flint knives, projectile point, 2 flint scarvers, hammerstone	Late Archaic	Possible Accommodation
58a*	F	35-45	1	R1a	Points by chin, turtle by hips	Late Archaic	N/A
62*	S	0.25-0.5	1	Infant	None	Late Archaic	N/A
63a	S	4-5	1	Infant	None	Late Archaic	Possible lack of care?
67a	F	45-50	1	Disturbed	None	Unsure	Not sufficient to consider for care
69a	F	35-45	1	R1b	None	Late Archaic	Possible Accommodation
72a	M	30-40	1	R1b	None	Late Archaic	Probable Accommodation
72c*	F	>18	1	Disturbed	None	Archaic	N/A
72g*	U	>18	0	Disturbed	None	Archaic	N/A
73a	F	40-50	1	R1a	Yes- Bone awl, antler	Late Archaic	Possible Accommodation

76a	M	30-40	2	Sitting	None	Late Archaic	Definite Accommodation, Probable Direct Support
77a	F	30-45	1	R1b	Yes- Two points	Late Archaic	Not sufficient to consider for care
80a	F	30-50+	1	R1a	Yes- Two engraved bone awls	Late Archaic	Probable Accommodation, Possible Direct Support
81	S	2-3	1	Disturbed	Yes- Cache of ten blades, bone awl	Late Archaic	Not sufficient to consider for care
91*	F	35-38	0	Disturbed	Yes- Drilled animal teeth	Late Archaic	N/A
92a	M	35-50	1	R1a	None	Middle Archaic	Definite Accommodation, Possible Direct Support
93	M	15-21	0	R1a	Yes- flint projectile point in thoracic cavity	Middle Archaic	Not sufficient to consider for care
96a*	U	13-14	0	Disturbed (Sitting?)	None	Mississippian	N/A
97a*	M	>18	0	Disturbed	None	Mississippian	N/A
99a*	U	35-45	0	R1a	None	Late Archaic	N/A
102a*	M	30-35	N/A	Disturbed (R1a?)	None	Mississippian	N/A
106d*	U	10-13	N/A	Disturbed	None	Mississippian	N/A
108a*	S	12-15	N/A	Extended 3a	None	Mississippian	N/A
114a*	M	45-55+	N/A	Partially Flexed	None	Mississippian	N/A
135	M	21-27	2	R1b	None	Late Archaic	Probable Accommodation

*Reflects individuals who were eliminated during the early stages of analysis due to not supporting clear evidence of care

APPENDIX B

TABLE 2. Explanation of burial typologies uncovered at Mulberry Creek (1Ct27).

Description of Burial Typology (Quotes taken from Webb and DeJarnette, 1942)	
Type R1a (round grave, fully flexed on side)	“The most frequent deposition of the body in the pit was in the fully flexed position usually on the left side.....The knees were drawn up near the chin and the arms were closely flexed with the hands near the face. This type of burial differed from the simple, fully flexed burial, since here the vertebral column was bent to conform to the curve of the grave. Thus, the head was bent forward nearly to touch the knees. It was conceivable that the body before deposition in the round grave was encased in wrappings of skins or textiles and tied in this form to make easy its placement in the small, round grave; or it may have been placed in the grave and forced to conform by bending the vertebral column and using extreme flexure of body as well as the limbs. In any case, the body fitted the grave pit very closely” (Webb and DeJarnette, 1942, pp. 183-184).
Type R1b (round grave, fully flexed on back)	“A second manner of placement of the body in round-pit burials was that in which the body, fully flexed, was placed on the back. This type...resulted in a very closely packed skeleton, which, except for placement, differed little from the fully flexed burial on the side. The chief difference to be noted is that in this type, since the bottom of the grave was flat, the vertebral column was comparatively straight” (Webb and DeJarnette, 1942, p. 184).
Type R1c (round grave, face down, “frog type”)	“The third form of round-grave burial occurred frequently enough to suggest that it is a type and not the result of accident or whim. In this burial, the body was placed face downward, the arms flexed under the body, and the legs completely flexed bur spread one to each side...Because the position of the bones of the skeleton closely paralleled the position of those of a from in the sitting posture, this type was given the not inappropriate designation of “frog burial” by the supervisor in charge of this site. It was evident that in this type the body had been intentionally placed face downward, and the legs were spread to make them conform to the circular pit” (Webb and DeJarnette, 1942, p. 184).

Type 2a (partially flexed on back)	<i>"The legs were bent at the hip with the thighs placed approximately at right angles to the body; the feet were well drawn up till the heels were near the pelvis. The pit, or grave, dug to receive these bodies was not circular and in general had no definite form, but it varied from the rectangular with rounded corners to the elliptical or triangular" (Webb and DeJarnette, 1942, p. 184).</i>
Extended 3a (fully extended)	This typology was simply defined as "body fully extended" (Webb and DeJarnette, 1942, p. 109) and appears to have been used for individuals buried both face down and face up throughout the 1942 report.
Extended 3b (extended, lower limbs bent back)	<i>"extended to the knees. The lower limbs were either closely flexed backward against the thighs or were folded over on top of them.... Such positions possibly could be attained by cutting the ligaments at the knees to allow reverse flexure" (Webb and DeJarnette, 1942, p. 185).</i>
Cremation 4a	Cremated remains which were deposited in burials, having been burned elsewhere (Webb and DeJarnette, 1942).
Cremation 4b	Cremated remains which demonstrate evidence of having been cremated <i>in situ</i> (Webb and DeJarnette, 1942).
Sitting Posture	<i>"These were burials of a body in a sitting posture in a small vertical pit. The body was evidently placed in a sitting posture by being leaned against the vertical pit wall. The legs were drawn up, heels against the buttocks, and knees under the chin, often stones were slipped into the pit to hold the body in this position. These pits were generally about 2 1/2 feet deep. It is possible that they were covered with bark and then shell piled over the top. It is doubtful if these graves were filled immediately with earth since postburial slumping usually permitted the head to fall forward and reach the pelvic cavity face downward. This could hardly happen if the grave was filled with earth at the time of burial. Usually the spinal column remains in anatomical order and in position so that there is usually no mistaking this type of burial" (Webb and DeJarnette, 1942, p. 112).</i>
Infant and Children	This burial type varied by site depending on the level of preservation of the remains of particularly young individuals, but were often " <i>not considered in the classification as the remains were fragmentary and the disposition was uncertain</i> " (Webb and DeJarnette, 1942, p. 185). However, this typology can be misleading throughout the report as in some instances the burial position of such individuals <i>was</i> noted making comparison between sites difficult.
Disturbed	These individuals were those categorized as uncertain provenience during initial excavation. This included burials deemed as having been disturbed by taphonomic processes (animals, floods, etc.) as well as subsequent interment practices taking place during prehistory. It also included individuals who were too fragmentary to be given a more specific designation, thus in some way, this category might be better considered as 'unknown' burial type.

TABLE 3. Tabulation showing distribution of burial types at the site from original excavations.
Reproduced from Webb and DeJarnette (1942, p. 240).

Burial types, site Ct° 27:	<i>From excavations before flood</i>	<i>From excavations after flood</i>	<i>Total</i>
Round grave, type 1a.....	20	8	28
Round grave, type 1b.....	8	1	9
Round grave, type 1c.....	1	0	1
Partially flexed, type 2a.....	2	3	5
Extended, type 3a.....	1	1	2
Extended, type 3b.....	4	4	8
Cremation, type 4a.....	2	6	8
Cremation, type 4b.....	1	0	1
Sitting posture type.....	14	4	18
Disturbed.....	15	15	30
Infant and children.....	17	7	24
Total.....	85	49	134

TABLE 4. Frequencies of various burial typologies through time at Mulberry Creek (1Ct27) from most recent data.

Burial Type	Middle Archaic	Late Archaic	Mississippian
Round 1a	4	22	1
Round 1b	-	9	-
Round 1c	-	1	0
Partially Flexed 2a	-	-	5
Extended 3a	-	-	2
Extended 3b	6	1	1
Cremation 4a	-	7	-
Cremation 4b	-	1	-
Sitting Posture	-	13	4
Infant or child	1	12	6
Disturbed	-	10	16

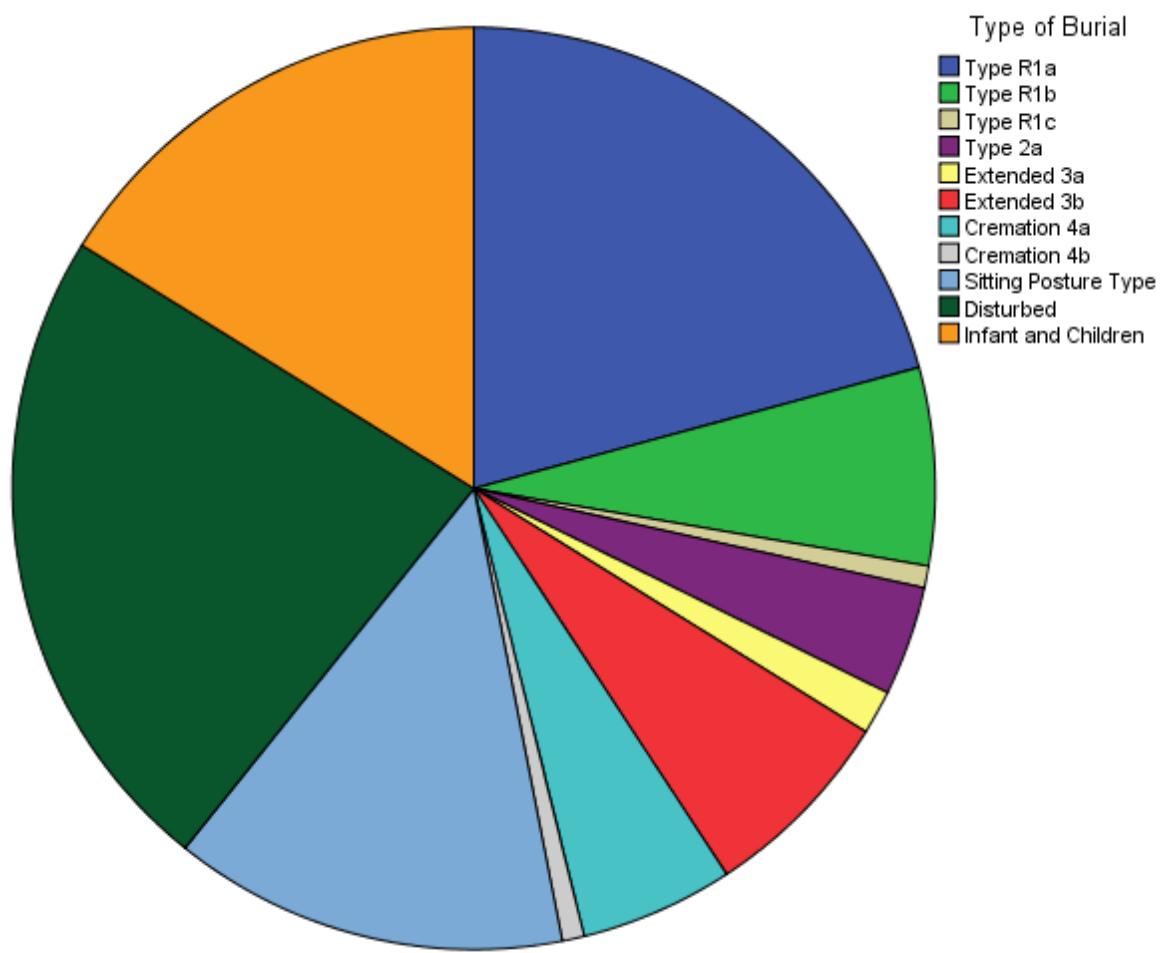


FIGURE 14. Pie chart showing the frequency of all burials types found at Mulberry Creek (1Ct27).

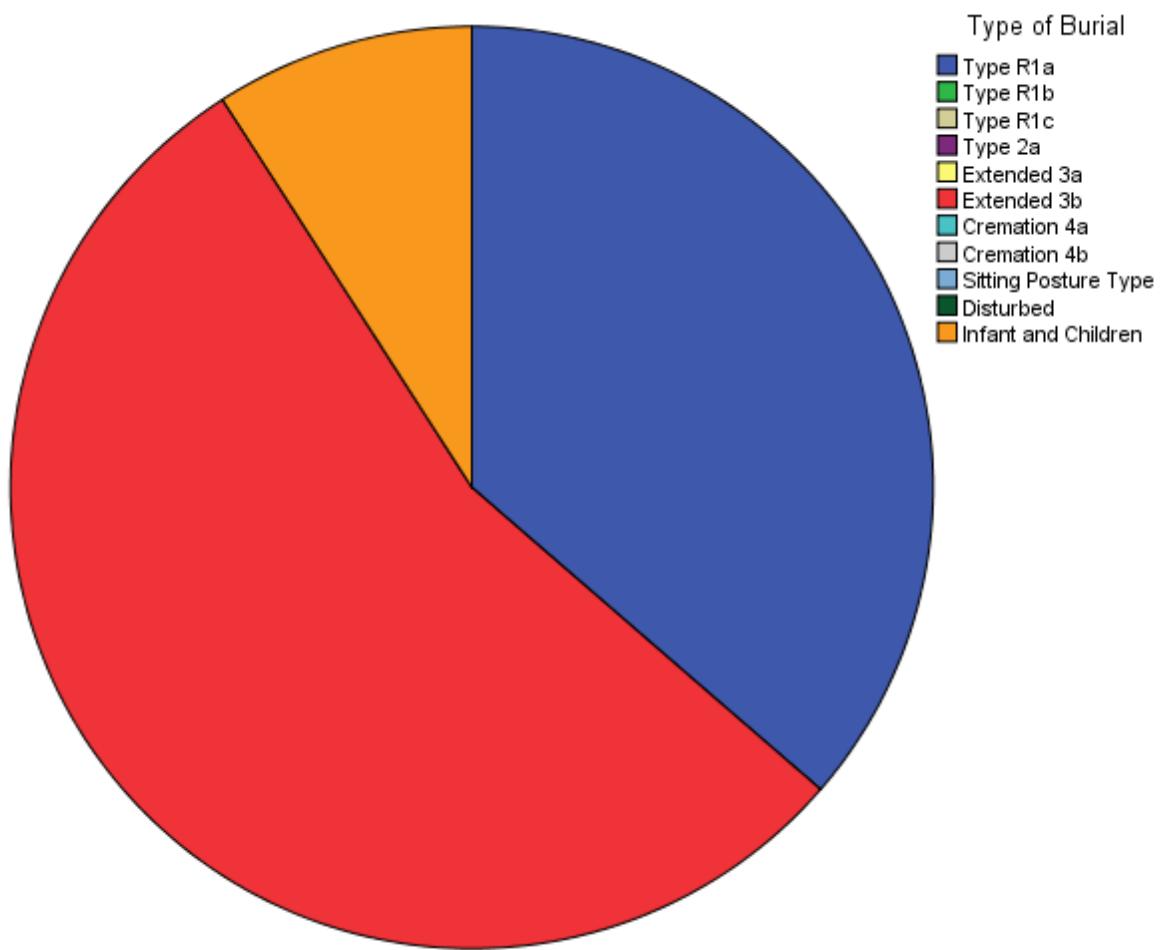


FIGURE 15. Graph showing the frequency burial types dating to the Middle Archaic at Mulberry Creek (1Ct27).

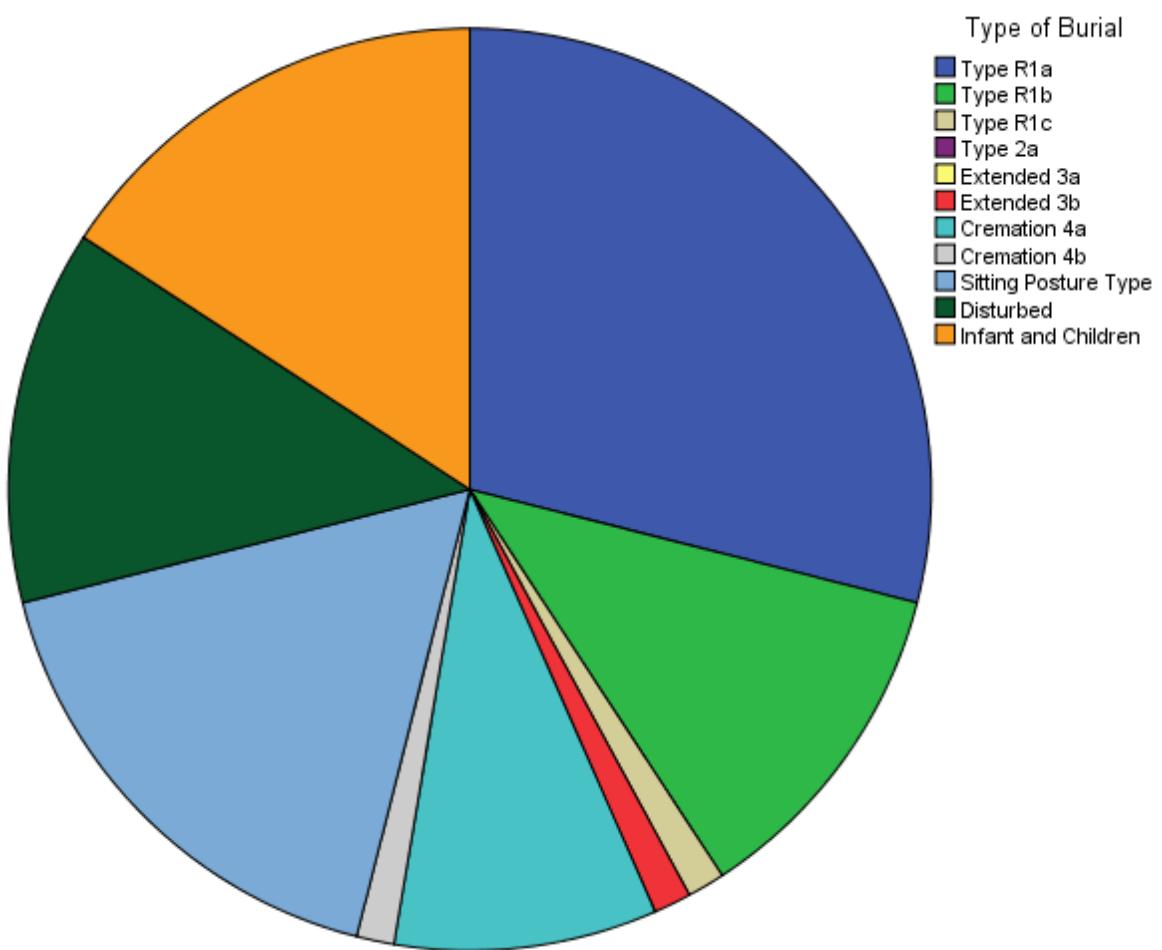


FIGURE 16. Graph showing the frequency burial types dating to the Late Archaic at Mulberry Creek (1Ct27).

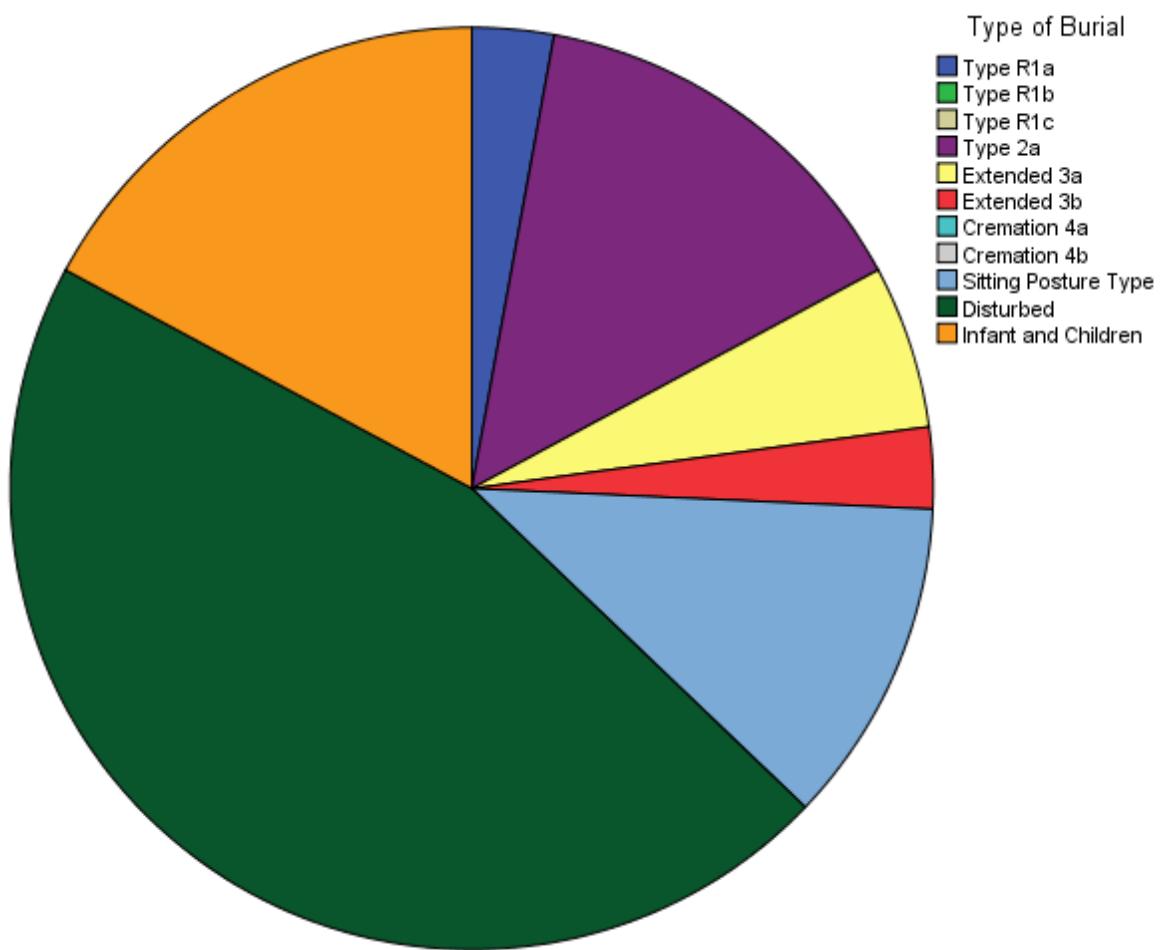


FIGURE 17. Graph showing the frequency burial types dating to the Mississippian Period at Mulberry Creek (1Ct27).