FLORIDA BIOARCHAEOLOGY: PAST, PRESENT, and FUTURE

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Introduction

The practice of bioarchaeology in Florida is a significant one, as it allows anthropologists an opportunity to gaze into the lives of individuals living in the southeastern peninsula of the United States during the thousands of years of native occupation and European colonization. Over the past 20 years, bioarchaeologists have analyzed human remains dating from the Early Archaic to the Mission periods. Through observations of trauma and pathology, stable isotope analyses, and DNA analyses, bioarchaeologists strive to answer questions regarding demography, population interaction, diet, health, violence, activity, and behavior of past inhabitants of Florida.

In an effort to situate the bioarchaeology of Florida within the general field, we synthesize in this article past and current research and offer prospection for future work with human remains in the state. We first detail the beginnings of archaeology in Florida, and the initial public and governmental interests regarding the area's past occupants. Next, it is essential to consider regional and taphonomic issues in preservation of human skeletal remains and then summarize the time scale of bioarchaeological work. Past and present research programs in Florida bioarchaeology are then discussed in depth by research topic, including questions asked and methods used. Where possible, we note the location at which skeletal collections are currently stored. The future of Florida bioarchaeological study in an era following the Native

American Graves Protection and Repatriation Act (NAGPRA) is also explored, including how new alliances between tribes and researchers can open a path to utilizing modern methods on previously excavated ancestral materials and new collections.

Early Archaeological Interest

In the mid-nineteenth century, archaeology was a primarily antiquarian discipline, and in the United States there was growing interest in the native peoples living in North America before European arrival. While this mainly consisted of exploring shell middens and examining broken pieces of pottery, it was the beginning of the study of Florida's past populations.

Of the early skeletal excavations, G.M. Sternberg created the most detailed report. Sternberg excavated shell mounds, and he was the first to uncover a burial area in Alabama associated with Northwest Florida based on ceramic similarities (Sternberg 1876; Willey 1949). In the first third of the 20th century, Jeffries Wyman and later his student, C.B. Moore, and S.T. Walker each conducted a large amount of work uncovering archaeological sites, and each excavated both material culture and skeletal remains (Wyman 1868, 1874; Walker, 1883; Moore 1893; Moore and Mitchem 1999a, 1999b; Willey 1949). Walker focused on the Florida-Alabama coast, while Moore's work extended throughout the Southeast and was heavily documented (Walker 1883; Moore 1892, 1893; Moore and Mitchem 1999a, 1999b; Moore and Sheldon 2000). Further, New Deal funds were allotted to the Works Progress Administration, which supported numerous excavations across the country, including in Florida (Means 2015). Although dating of the materials was imprecise and cultural connections were not always correct, these early researchers and their projects stimulated interest in Florida's past and in the study of archaeology.

Bone Preservation and Taphonomy in Florida

Florida is not known for its preservation potential of human skeletal remains. The majority of the State's groundwater is acidic in nature, with a median pH of ~5.8 across the state (Copeland et al. 2009; Sprinkle 1989). This is due to the fact that much of Florida's groundwater is supplied through rainfall, which often has a lower pH because it has not come into contact with as many alkaline materials as has water that has been transported over land. Other factors contributing to pH include agricultural runoff and an increase in the commercial growth of conifer trees, both of which create more acidic groundwater (Binkley et al. 1989; Copeland et al. 2009). Florida's sandy topsoil results in relatively quick drainage which, when combined with the acidic rainwater, leaches the mineral matrix from bone and aids in the overall disintegration of the remains. Florida's high temperature and generally humid/wet conditions also make it an ideal breeding ground for fungi and microbes that aid in diagenesis of bone (Hedges 2002). Northwest and central portions of Florida, however, consist mostly of limestone facies that both contain groundwater and serve to neutralize the acidic quality of the water as it is denatured during the dissolution of the carbonates within the surrounding bedrock (Tihansky and Knochenmus 2001). These karst environments often create sinkholes that fill with water and provide excellent areas of preservation. Remains that have been recovered from karst sites have had some of the best preservation in the Southeast, due in part to the anoxic environment and the denaturing of the water within them. Other factors beneficial to preservation in Florida stem from the postmortem treatment of the dead. At the early Archaic Windover mortuary pond site in central Florida, bodies were staked underwater in a karst environment, which kept the remains from being exposed to microbes and fungi. Over time, the remains were covered by sediment deposition and

peat, which further protected and preserved them (Gordon and Buikstra 1981; Stojanowski et al. 2002). In short, preservation of bone throughout most of Florida is not ideal, but a few limestone karst regions in central and northwest Florida provide some of the best preservation conditions in the southeastern United States.

Early Archaic through Contact Period

The rich cultural history of Florida begins during the Ice Age (Hemmings 2004; Hrdlička 1918; McFadden et al. 2012), and finds are representative of every cultural era known to New World archaeology (Milanich 1994; Weisman 2003). Frank Hamilton Cushing's 1896 work at the Key Marco site (8CR49) prior to destruction is considered to be remarkable by modern standards (Cushing 2000). The Horr's Island 1-6 sites (8CR37-42), which are close to the Key Marco site, are thought to be related to the destroyed site (Russo 1991). Aleš Hrdlička's (1918) work at the Vero Man site marked progress towards contemporary methodologies in the field. While an important find, the analysis of the antiquity of Vero Man was highly controversial and spurred a career-long disagreement between Hrdlička and Oliver Hay (Mitchem 2006). Hrdlička strongly believed the remains to be recent, while Hay (1918) continually argued that Vero Man was contemporaneous with the Pleistocene megafauna recovered from the same stratigraphic context. However, the use of modern dating methods and decorated mammoth remains from the site recently confirmed the older age estimations of the remains (McFadden et al. 2012; Purdy et al. 2011). Excavations are currently underway at the Vero site, led by Dr. Jim Adovasio and Dr. Andy Hemmings. So far, no human remains have been encountered during this renewed research (Hemmings et al. 2015).

Research with skeletal collections in Florida continued into the mid-twentieth century (Goggin 1952), including revisiting the St. John's River site excavated by Wyman in 1875, (Wyman 1875; Rouse 1951). Nearly a decade later, marine biologist Eugenie Clark's and avocational diver Bill Royals's investigation of a human skull containing brain matter at Warm Mineral Springs (8SO19) (Royal and Clarke 1960) sparked a series of investigations. Later studies confirmed the validity of the age of the find dating to approximately 10,000 years B.P. (Clausen et al. 1975).

Other sites where human remains have been encountered include Horr's Island (8CR37-42) (Russo 1991; Hutchinson et al. 2016), Warm Mineral Springs (8SO19) (Clausen et al. 1975), Gauthier (8BR193) (Carr 1981), Republic Groves (8HR4) (Wharton et al. 1981:76), Bay West (8CR200) (Beriault et al. 1981), Tick Island Cemetery (8VO24) (Bullen 1972), Melbourne (8BR47) (Gidley and Loomis 1926), Lake Monroe (8VO53) (Wyman 1875; Goggin 1952), Wakulla Springs Lodge (8WA329) (Tesar and Jones 2000), Cutler Ridge (8DA2001) (Carr 1986), Buck Key (Hutchinson 1992; Marquardt 1992a, 1992b), Useppa Island (Griffin 1949; Hutchinson 1999; Marquardt 1999a, 1999b; Milanich et al. 1984), Tierra Verde (Hutchinson 1993a, 2004; Norr 2004), and Galt Island (Hutchinson et al. 2016).

The extraordinary find of numerous individuals at the Windover Site (8BR246) has produced an immense amount of data from the Archaic period, later used for palaeopathological analyses. Researchers have been busy with these collections since their excavation in the early 1980s by Florida State University. Nearly half of the remains were excavated, with many more individuals left within the peaty pond (Doran and Dickel 1988; Stojanowski et al. 2002; Stone et al. 1990). FSU continues to house the skeletal material, while the brain matter is housed at the C.A. Pound Laboratory at the University of Florida (R. Wentz, personal communication). One of

the key studies of the Windover population focused on differential health outcomes between males and females in order to gain insight into social roles and status within the population (Wentz et al. 2006).

Publications after the year 2000 include work from Little Salt Spring by Rachel Wentz and John A. Gifford (2007) and Windover by Stojanowski et al. (2002), Tomczak and Powell (2003), Berbesque and Doran (2008), and Wentz (2011). The 2014 Southeastern Archaeological Conference featured a single bioarchaeological research presentation from Florida – an investigation of remains from the Canaveral National Seashore Reserve, an area in close proximity to the Windover Site (Miyar and Pawn 2014).

Bioarchaeologist Dale Hutchinson analyzed the native Archaic population of 429 individuals from a burial mound at the Palmer site (8SO2), among others, in order to understand the diet, health, and subsistence patterns of individuals living in the area (Hutchinson and Larsen 2001; Hutchinson 2004). Most bioarchaeological investigations spanning the Paleo-Indian and Archaic periods, however, appear to show a propensity to work with the Windover Collection, since the pond represents a uniquely large sample of individuals in comparison to other Archaic sites and even to skeletal collections from other time periods. Other wet sites such as Little Salt Spring have yielded fewer individuals (Clausen et al. 1979), yet further research at these sites could produce more human remains, possibly allowing for larger-scale demographic and pathological studies. Additional investigation combined with collections gathered at other sites would add to the narratives formed from data collected at Windover. The large sample size of individuals from this Archaic Period mortuary pond could serve as an interesting cross-reference for other research in the region.

Elgart and Paule (2013) and Gold (2006) conducted osteological studies on Manasota Period (500 B.C-A.D. 800) populations from Yellow Bluffs Mound (8SO4), a burial mound on Sarasota Bay, and Dunwoody (8CH61) to determine whether the health of the population was similar to those living in the Archaic, Woodland, and later Contact periods. Through a palaeopathological analysis, both collections displayed few signs of skeletal or dental stress, and only one instance of violence (non-lethal) was found. This indicated that both sites had adequate access to resources and did not commonly experience inter- or intra-group violent encounters. Comparisons to other pre-contact skeletal collections resulted in similar findings of health and stress levels.

Bioarchaeologists conducting research in Florida have generally focused on later time periods, however, such as the Contact and the later Spanish Mission periods. Dale Hutchinson (2006a, 2006b) has studied skeletal remains from Tatham Mound (8CI203), an important site including a population both immediately preceding and during the early years of contact between native populations and Spanish colonists. Remains from Tatham Mound are curated by the Florida Museum of Natural History. Hutchinson's large body of work includes extensive research on nutrition, health, and behavior of native Florida populations at Tatham and beyond (Hutchinson 1992, 1993a, 1993b, 1996, 2004, 2006a, 2006b; Hutchinson and Mitchem 1996, 2001; Hutchinson et al. 1998, 2016; Hutchinson and Larsen 2001). Clark Larsen and colleagues have studied the effects of Spanish colonization of the native peoples of *La Florida*, the name for the region that is now composed of parts of Northern Florida and Georgia, by comparing pathologies and performing multiple stable isotope analyses in pre- and post-Contact populations (Larsen et al. 2001; Larsen 2001). In conjunction with other biological anthropologists, Larsen has also produced a corpus of research focusing on Native American adaptations to diseases and

stress brought about by the Spanish as well as diet and nutrition during and after contact (Larsen 1991, 2000, 2001, 2002a, 2002b, 2005a, 2005b; Larsen et al. 1996b, 2007; Organ et al. 2005; Stojanowski et al. 2007). Chris Stojanowski has performed extensive biodistance research with skeletal metric and non-metric traits from remains dating to the Contact and Spanish mission periods to investigate gene flow between regional native populations and later European and Native American groups (Knudson and Stojanowski 2008, 2009; Stojanowski 2005a, 2005b, 2010, 2011, 2013).

Post-contact work has also been done. The Quad Block Site (8HI998) site near Tampa, which was persistently occupied from the Archaic to modern day, has a mixture of Native American, European, and possibly African individuals. While many of the excavated skeletons were poorly preserved due to environmental factors and subsequent human activity, Wienker (1984) was able to find levels of pathology and violent blunt and sharp-force injuries that are likely indicative of the Second Seminole War.

Although bioarchaeological research in Florida has ranged across the state and through time, most of the work has focused on the Contact-era and historical skeletal samples from sites with good preservation. The contributions of these analyses to our understanding of the people of Florida are detailed below, gathered into three main research themes: population interaction, diet and health, and violence.

Diet and Health

Most bioarchaeological research in Florida concerning diet and health is focused on the arrival of the Spanish and the effects that these people and their culture had on the native populations of Florida. Historical accounts detail, for example, the transmission of smallpox

among the natives after the Spanish arrival, but the total consequences to native health were much more extensive. Using a native work force, the Spanish increased agricultural production, leading to nutritional deficiencies in the natives as a result of the new, imbalanced diet.

Bioarchaeologists such as Larsen (2000, 2002a, 2002b, Larsen and Sering 2000, Larsen et al. 2007) and Hutchinson (1993a, 1993b, 2004, 2006a, 2006b; Hutchinson et al. 1998; Hutchison and Larsen 2001) in particular have researched diet and health among the native populations of Florida pre- and post-Contact, focusing especially on changes related to intensification of maize agriculture.

İşcan (1983) analyzed the post-Archaic, pre-Contact Margate-Blunt population from southeastern Florida for demography and disease. He found results similar to those above, yet a few individuals displayed serious pathological issues, such one individual with periosteal lesions that had spread throughout the upper and lower limbs, and another with severe treponemal disease of the left tibia.

Larsen and Sering (2000) observed skeletal pathologies on populations from the Georgia Bight, a region consisting of islands that span from coastal North Carolina to Port Canaveral in Florida, in pre-Contact versus post-Contact as well as pre-agricultural and post-agricultural contexts. Frequencies of porotic hyperostosis and cribra orbitalia in four temporal periods were used as proxies for nutritional changes and anemia. None of the individuals in the pre-Contact, pre-agriculturalist Georgia Bight population exhibited porotic hyperostosis or cribra orbitalia, and the pre-Contact agriculturalist grouping also had a relatively low frequency (less than 10 percent). There was an elevated frequency within the Contact period, and the severity increased over time. The highest frequency was in late Contact period juveniles, with over 50 percent affected by these anemic lesions.

Hutchinson and colleagues (1998) also observed regional variations in carbon and nitrogen isotopes in bone samples following the adoption of maize agriculture by the indigenous populations of Northern Florida and the Gulf Coast. Prior to Spanish contact, maize was scarcely utilized among the indigenous populations. The isotopic analysis, however, revealed through higher carbon isotope values that there was an overall rise in maize consumption among the indigenous populations in Florida following Spanish arrival and missionization.

Less plentiful but equally important are bioarchaeological studies of diet in the pre-Contact period of Florida. Focusing on native occupation prior to Spanish arrival, Andrea Cucina and Mehmet İşcan (1997) studied a mortuary population at Fort Center (8GL13) (A.D. 200-800). Cucina and İşcan correlated frequencies of linear enamel hypoplasia (LEH) within the mortuary population with social status, which was based on analysis of material culture, with the assumption that individuals of a higher status would exhibit better overall health. They found that upper central incisors were most often affected by LEH and therefore that the high status individuals at Fort Center were not exempt from stress. İşcan and colleagues (1989) also conducted trace element analysis, specifically of magnesium, copper, manganese, and zinc, to determine subsistence patterns in a prehistoric Florida population. Spectrographic analysis was utilized in an effort to obtain direct evidence of diet. Testing four populations on the central eastern coast and within central inland Florida dating from the Archaic to post-Contact periods, İşcan and colleagues found that each group had access to similar resources and shared similar elemental values. For example, high levels of magnesium were indicative of nut and berry consumption, and there was a continuity of diet over time.

Lorraine P. Saunders' (1972) master's thesis focused on creating a complete osteological analysis of the remains from the Archaic period Republic Groves site (8HR4) in central Florida.

Her research included a pathological analysis of the cranial and post-cranial skeletons, as well as analysis of dental pathologies associated with health and diet. Within this population, Saunders found evidence of porosity of the cranium, which was attributed to childhood disease, and was found to be the most frequent pathology in the population. Arthritis of the temporomandibular joint, osteoarthritis, and dental attrition were some of the other pathologies found in the skeletal population, but in lower frequencies. Saunders attributed the severe dental attrition and periodontal disease to the consistency of the native diet and the porosity to a lack of necessary nutritional iron, which led to cases of childhood anemia.

Bethany Turner and colleagues (2005) conducted a comparative study on the McKeithen site (8CO17) and Leslie Mound site, both in north Florida and curated by the Florida Museum of Natural History, in which they utilized stable isotope analysis of both carbon and oxygen in an effort to reconstruct weaning trends and dietary changes of the Weeden Island culture and the subsequent Suwannee Valley culture. The McKeithen site was inhabited from A.D. 145-785 and consisted of Mounds A, B, and C. Mounds B and C contained interments and exhibited a non-local and elite ceramic assemblage, whereas Mound A did not have any interments and exhibited more local, utilitarian pottery. For this study, Turner and colleagues studied the teeth of seven individuals from Mound C, the teeth of one individual thought to be of elite status from Mound B, and the teeth of three individuals from Leslie Mound. They found that there were no significant differences in carbon isotopic signatures among these samples and there was an overlap in the oxygen isotopic signatures between Mound C and the individuals from Leslie Mound. Mound B was distinctly different in carbon isotopic signature when compared to the other two. The Mound C and Leslie Mound individuals consumed a diet of C_3 plants, while the individuals at Mound B displayed signatures consistent with a diet containing C_4 plants. Mound

B also produced lower than expected oxygen isotope values, which Turner and colleagues attribute to residence in a non-local region before occupying the McKeithen site. All other individuals studied grew up locally, and there was dietary continuity between the Weeden Island culture at the McKeithen site and the Suwannee Valley culture at the Leslie Mound site.

Recently, Hutchinson and colleagues (2016) examined previously collected skeletal remains with new methods of carbon and nitrogen stable isotopic methods to test whether the Calusa of southeastern Florida had a complex, hierarchical society without the implementation of agriculture. Using multiple lines of nutritional evidence, they compared human isotopic ratios from several coastal sites to associated local marine, faunal, and botanical values to determine that humans were not consuming maize, the primary staple of the southeastern U.S. Their data support previous assumptions that the Calusa subsisted on primarily marine and terrestrial animals, and further bolster the idea that the Calusa collected non-maize related plants to supplement diet.

Diet and disease studies of the skeletal record provide us great insight into the lives of past peoples. From the examples above, we can see clues regarding malnutrition, differential access to resources, and social status. These data combined with information on physical violence can expand our knowledge of the prehistoric and historic lifeways of Floridians.

Population Interaction

The crux of Florida bioarchaeology, at least in the last few decades, has been the investigation of diet and disease as illustrated above, as these were the questions that the informal *La Florida* bioarchaeology project, headed by Clark Larsen, sought to answer. Much

less work had been done, however, on population interaction, or the relationships between the natives and the Spanish as evidenced by their bones.

Mark Griffin first addressed northern Florida population interaction through biological distance in his MA thesis (1989) and Ph.D. dissertation (1993). Biological distance employs multiple statistical methods to assess phenotypic traits of the cranium or teeth in a non-destructive manner. In this way, gene sharing and therefore population interaction can be statistically modeled. Griffin (1993) found that the mission populations of the Guale that were in close proximity to one another were closely related.

Christopher Stojanowski has built on these early assessments of population interaction in a number of publications, most notably his 2005a and 2013 books. Utilizing skeletal samples and field notes from mission cemeteries across Florida, he has looked at whether gene flow was present between local native groups, as well as between Spanish colonizers and the native groups through odontometric data.

Stojanowski reassessed the Guale skeletal collections Griffin analyzed and added populations from Timucua and Apalachee provinces as well as additional coastal and inland samples. In order to test a longstanding hypothesis about the ethnic differences among the Guale, the Timucua, and the Yamasse, Stojanowski investigated dental morphology, disease, and patterns of burial in numerous cemeteries. Notably, the changes in phenotypic variability that Stojanowski identified using biodistance techniques did not have one singular pattern across the populations. For example, whereas the mission population at Santa Catalina de Guale (9LI13) on St. Catherine's Island in Georgia increased in phenotypic variation and was therefore in the midst of a demographic transition, the mission population at Santa Catalina de Guale (8NA41) on Amelia Island, Florida shows a decrease in phenotypic variability that indicates demographic

collapse (Stojanowski 2005a). In short, Stojanowski's ability to correlate biological traits with archaeological information reveals native reactions to missionization and colonialism were not always the same.

Building on population interaction through biological distance, Stojanowski has also dealt with the larger anthropological question of ethnogenesis in Florida, particularly of the Seminole. Social organization can be identified through kinship and determination of residence patterns after marriage, which Stojanowski has done by looking at pre- and post-Contact skeletal samples (Knudson and Stojanowski 2008). His idea of ethnogenesis, or the formation of a new social identity through an amalgamation of culture and genes of previously unrelated groups, also plays a key role in his understanding of how Spanish contact changed the various native populations of La Florida over extended periods of interaction (Stojanowski 2011). Whereas in pre-Contact Northern Florida, there were three major groups – the Apalachee, Guale, and Timucua – after 1650 dramatic changes in these indigenous communities led to entrance into a liminal stage of ethnic identity followed by a sort of amalgamation into a new Seminole identity. This was accomplished through intermarriage, which created polyethnic communities in both Florida and Georgia (Knudson and Stojanowski 2009). Rather than seeing the Seminole as migrants to Florida, Stojanowski traces their ethnogenesis to the mid-seventeenth century, when the skeletal record shows vast amounts of gene sharing throughout the region prior to coalescence of a syncretic Seminole identity.

Biological distance data, in concert with archaeological and historical information, can provide insight into the changing lives of native populations resulting from contact with the Spanish. Although they are a comparatively recent development in the bioarchaeology of Florida, biodistance studies have revealed new information not only about the native populations

but also about the larger picture of population interaction in this area. These studies are non-destructive and minimally invasive which may assist in future research collaborations with Native American tribes, thus allowing a greater amount of data to be obtained and, in turn, a greater understanding of the history of Florida. Future research in this vein should focus on applying these methods to historic native Florida populations in order to understand more fully the changes brought about by Spanish colonization. As Stojanowski's work (2005a, 2005b, 2010, 2011, 2013) has revealed complex interactions through both time and space, applying these methods broadly to historic native populations in the South may also provide interesting synthetic information previously unknown about those peoples, which in turn furthers the collaborative knowledge of American history.

Physical and Structural Violence

Healed and unhealed injuries to bone can be assessed in order to understand trauma and violence in a population. There are few published reports of trauma in the bioarchaeological record of Florida, however. Hutchinson (2004, 2006a, 2006b) found that the skeletal remains from the Palmer site (8SO2), Mission San Luis de Talimali (8LE4), and Tatham Mound (8CI203) exhibit evidence of blunt, projectile, and sharp-force trauma. At the Palmer site, Hutchinson found that men exhibited long bone and post-cranial fractures at a higher percentage than women. The cranium appeared to be the most frequently affected by violence, followed by long bones such as the ulna and humerus. All of the individuals studied presented cases of blunt force trauma and fractures, and most of them had begun to heal or had already healed (Hutchinson 2004).

The singular published case of a Contact period archaeological gunshot wound in Florida comes from Mission San Luis de Talimali (Larsen et al. 1996a). Among an estimated 600 burials at the site, 75 individuals were excavated and only seven were interred in coffins. Moreover, one of the individuals might have been important to the community due to the close proximity of the burial to the altar of the church, and because this person was one of only three whose head was oriented to the west. More importantly, the same individual was the only one found with lead shot on one of the lumbar vertebrae. The shot did not enter the bone, which suggested that it was a wound to abdominal soft tissue. The skull of this individual was too damaged for estimation of sex, but using the overall robusticity of the skeleton and pelvic morphology, the individual was biologically male.

Hutchinson (2006a) found more evidence of trauma from the Contact period at the Tatham Mound site. Skeletal fractures were uncommon at Tatham, with only four cases of post-cranial trauma and no cranial injuries. A right scapula and a left humerus revealed injuries likely inflicted by a metal blade. Another left humerus presented significant damage, with a sharp injury that went halfway through the shaft. Hutchinson compared these injuries to those on Old World skeletal remains from battles from the fourteenth to sixteenth centuries. This comparison suggested that sharp trauma seen at Tatham was inflicted with a sword, making it one of the earliest examples of direct injury due to the introduction of Old World technology to the New World (Hutchinson 1996, 2006a).

There is a paucity of significant evidence of trauma and violence dating to the Contact and Mission periods in Florida, in part due to the poor preservation of the skeletal remains in the matrix of the acidic soils of Florida. Since the available skeletal evidence does not corroborate ethnohistoric accounts of colonial brutality against the natives, this might suggest that the

Spanish quickly changed strategies, realizing that inflicting harm was not the best way to solve the problem of native resistance. Rather, bioarchaeological evidence may point to a different, more efficient Spanish strategy: structural violence.

Beyond simple physical trauma lie the elusive, complex, and far more devastating long-term consequences of structural violence. Structural violence is indirect, leaving its traces on the bones through the effects of marginalization or differentiation of social status. For example, malnutrition in impoverished communities can be inferred from the skeleton from enamel hypoplasia, porotic hyperostosis, cribra orbitalia, and other indicators, and the patterning of biological and cultural evidence can lead the bioarchaeologist to suspect structural inequalities within the culture (Klaus 2012). Incorporating direct and intended injuries with the indirect effects of forced dietary changes, changes in settlement patterns, and increased differentials of social status, it is possible to reveal the ways in which the health of one group is affected through their oppression by another, more socially powerful group. Bioarchaeological studies of structural violence have arisen recently with the work of researchers such as Haagen Klaus (2012), Debra Martin and colleagues (2012), and Ken Nystrom (2014). The theoretical orientation and methods proffered by researchers who deal with structural violence in the past are applicable to answering questions about the experiences of the natives of Spanish Florida and the rest of the Southeastern U.S.

For a social group to experience structural violence, subjugation of one group over another must exist. This power differential affects multiple health pathways of a population and can happen in either a direct and purposeful, or indirect and coincidental manner. For example, the Spanish reorganization of native settlements into the agriculturally based mission system (*reducción* or *congregación*) had the direct effect of moving their populations into overcrowded

living spaces and changing their heterogeneous subsistence patterns to a homogeneous, maize-laden diet. This indirectly caused an increase in dental disease through the increase of C₄ starches, a diminished nutritional intake, and heightened physical stress and disease levels from the increased agricultural work-loads (Larsen 2002b; Larsen et al. 2007). These effects exacerbated negative health outcomes of mental and physical stress, diseases, higher morbidity and mortality rates, and lowered birth rates and infant birth weights of native groups. In order to fully appreciate the level of these effects, multivariate methods need to be employed. For example, disease and general stress on the skeleton and dentition observed through standard osteological methods, coupled with isotopic analyses relating to diet and mobility and pathologies such as violent injuries, may reveal evidence of structural violence that can be further interpreted with assistance from the archaeological record and ethnohistoric data where available.

While structural violence is a relatively new term in bioarchaeology, both Hutchinson (2006a, 2006b) and Larsen (2002b) have used the idea in their research in Florida. Hutchinson's (2006a, 2006b) extensive work at Tatham Mound stands as a prime example of how to assess this type of violence. By thoroughly analyzing the osteological evidence and cultural context, it is possible to separate coincidental differential health outcomes from the phenomenon of structural violence. Though Hutchinson's study was focused on a group that may not have had much, if any, direct contact with the Spanish, there were still drastically negative health outcomes after the time of Contact. His analysis included an extensive comparison of the differences in diet, disease, and violent injury from pre- to post-Contact. Before the Spanish arrived in Florida, the local population of Tatham Mound displayed low levels of dental disease associated with maize-heavy diets, while post-Contact the frequency of carious lesions rose,

showing an increase in maize consumption. Additionally, the post-Contact group contained evidence for increased frequencies of non-specific skeletal stress, which can be indicative of increased health issues. Epidemic diseases that frequently accompany situations of rapid native depopulation are difficult, if not impossible, to see in the skeletal record, but there are instances of indirect evidence such as mass graves with no trauma or burial practices that deviate from normal treatment, that can lead bioarchaeologists to conclude the likeliness of epidemic disease presence (Hutchinson and Mitchem 2001).

Structural violence has been present throughout history, and bioarchaeological analysis is the primary way we can see its evidence in the archaeological record. This type of complex social analysis is most convincing when combined with other archaeological data and/or ethnohistoric accounts.

Future Directions

Florida bioarchaeology has experienced a shift in the past three decades, with research methods changing after the passage of NAGPRA in 1990. The years just prior to NAGPRA's implementation were known for animosity-fueled battles between Native Americans and archaeologists over the study of artifacts and human skeletal remains. Some researchers went so far as to claim that NAGPRA signaled the end of North American pre-colonial archaeology (Colwell-Chanthaphonh et al. 2010; Dongoske 1996). In the last 25 years, though, conflict between Native American tribes and non-indigenous researchers has eased, and now most scholars (Harms 2012; Kakaliouras 2008; Preucel et al. 2003; Rose 1996) feel that the legislation changed anthropology for the better. For example, reporting rules under NAGPRA required museums and universities to take stock of their artifacts and skeletons, which led to nearly 100

percent of the Native American remains being analyzed, up from just 10 percent pre-NAGPRA (Rose 1996).

NAGPRA also requires close collaboration and communication between researchers and tribes, which has been beneficial to anthropology. Frequent contact regarding repatriation materials increased many tribes' interest in their histories, and a new line of research, indigenous archaeology, arose as well (Kakaliouras 2012). Whether we take the meaning of indigenous archaeology as “with, for, and by” indigenous groups or more simply as collaboration between researchers and tribes (Colwell-Chanthaphonh et al. 2010), the fact that this archaeology is no longer being done in a one-sided manner is a welcome development.

In North America and beyond, today repatriation is the new normal. Most archaeologists who have vehemently opposed repatriation laws have either withdrawn from the field or have chosen to work in countries with fewer restrictions (Kakaliouras 2012). Native American tribes increasingly curate collections of their ancestral remains and artifacts, and many groups are willing to work in concert with archaeologists and biological anthropologists to broaden their understanding of the past (Kakaliouras 2012; Rose 1996; Wobst 2013). This new understanding has opened once closed doors to future collaborative research programs, which will become the future of North American archaeology. In Florida specifically, the Seminole and Miccosukee (previously of the Seminole) tribes are federally recognized. The Seminole have both a tribal archaeologist and bioarchaeologist, have created a museum where they professionally curate numerous documents and material items, and use connections with museums across the country to discover more about their past.

The bioarchaeology of Florida encompasses millennia of history and has been accomplished through a variety of analytical techniques, from standard osteological data

collection to biochemical analyses. The scope of research, however, is still somewhat limited. Emphasis has been placed on European contact and subsequent Spanish mission periods, both because bioarchaeologists are interested in understanding the changes instigated by colonization and because, due to preservation biases, the majority of excavated skeletal collections are from these periods. The effects of contact on native groups have been better studied than average indigenous lifeways before European arrival. In both periods, even with the small samples of prehistoric remains that are available, new work on diet, disease, trauma, biodistance, and morphological changes in the skeleton may reveal additional details of the everyday culture of Native Americans both pre- and post-Contact, which will in turn broaden our understanding of the New World. Undertaking this research with support of Native American tribes will be key to the future of Florida bioarchaeology.

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FIGURE 1 CAPTION: Map of Florida Archaeological Sites Mentioned