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Lucayan–Taíno Burials from Preacher's Cave, Eleuthera, Bahamas

W. C. SCHAFFER,[a]* R. S. CARR,[b] J. S. DAY[c] AND **M. P. PATEMAN[d,e]**

[a] *Center for Bioarchaeological Research, School of Human Evolution and Social Change, Arizona State University, AZ 85281 USA*
[b] *Archaeological and Historical Conservancy Inc. (AHC), Davie, FL 33314, USA*
[c] *Research Atlantica Inc., Boca Raton, FL 33432, USA*
[d] *Antiquities, Monuments, and Museums Corporation (AMMC), The National Museum of The Bahamas, Nassau, New Providence, The Commonwealth of The Bahamas*
[e] *School of Planning, University of Cincinnati, Cincinnati, OH 45056, USA*

ABSTRACT In March 2007, three prehistoric skeletons were excavated and analysed from Preacher's Cave on the northern aspect of the island of Eleuthera in the Bahama archipelago. The human skeletal remains represent two males and one female dating to AD 800–1300. The first is a female in the 30s with mild osteoarthritis of the joints and spine and several healed fractures who may have been an important community elder. The second is a male in the 20s with Schmorl's nodes who may have been a shaman or even a victim of interpersonal violence. The third is a male in the mid to late 20s also with marginal osteoarthritis of the joints and spine who may have been a ceremonial leader and village headman. The high incidence of carious lesions implies a cariogenic diet possibly rich in starchy foodstuffs or even fructose. The presence of grave goods and plaited mats suggest that at least two individuals may have been of high status. This study emphasises the significance of caves to Lucayan–Taíno mythology, cosmology and mortuary practice. Copyright © 2010 John Wiley & Sons, Ltd.

Key words: degenerative joint disease; Lucayan–Taíno; mortuary practices; palaeopathology

Introduction

The Lucayans were the peoples indigenous to the Bahamian islands, including the Turks and Caicos (Figure 1). They are thought to be Ceramic-age colonisers from Hispaniola (modern-day Haiti and Dominican Republic) and Cuba, with Great Inagua or the Turks and Caicos as likely first settlements (Berman & Gnivecki, 1991; Winter & Gilstrap, 1991; Keegan, 1992; Granberry, 1993; Keegan, 1993; Keegan, 1994; Keegan, 1997a; Carlson, 1999). Some of the earliest evidence for the peopling of the Bahamas dates to approximately AD 700 on Grand Turk (Keegan, 1997a; Carlson, 1999). By at least AD 800 their expansion reached San Salvador (also known at Watling Island) (Berman & Gnivecki, 1995; Berman & Pearsall, 2000), and New Providence appears to be occupied by AD 900 (Bohon, 1999). At the end of AD 1100–1200, characteristics of Lucayan culture bear resemblance to the Taíno, a larger network of chiefdoms in the Greater Antilles and the northern Lesser Antilles. Hence they are referred to as the Lucayan–Taínos from this time onward until extinction. By the late 15th century, the Lucayan–Taínos inhabited each of the main Bahamian islands (Rose, 1987; Berman & Gnivecki, 1995; Keegan, 1997a; Berman & Pearsall, 2000).

The northern Antilles throughout the 15th century was a conglomerate of diverse ethnic and linguistic identities with varying socio-political units at disparate stages of complexity (Wilson, 1990, 2007). The Classic Taíno of Hispaniola, eastern Cuba and Puerto Rico were an amalgamation of complex, principal chiefdoms or *cacicazgos* that were maintained via exogamy, trade and combat (Keegan & MacLachlan, 1989; Wilson, 1990, 2007). Spanish accounts document social rank among Taíno society comprising individuals who conducted labour and others who commandeered resources (Moya Pons, 1973). Those who performed

* Correspondence to: Center for Bioarchaeological Research, School of Human Evolution and Social Change, Arizona State University, 900 S. Cady Mall, Tempe, AZ 85281, USA.
e-mail: wschaffe@asu.edu

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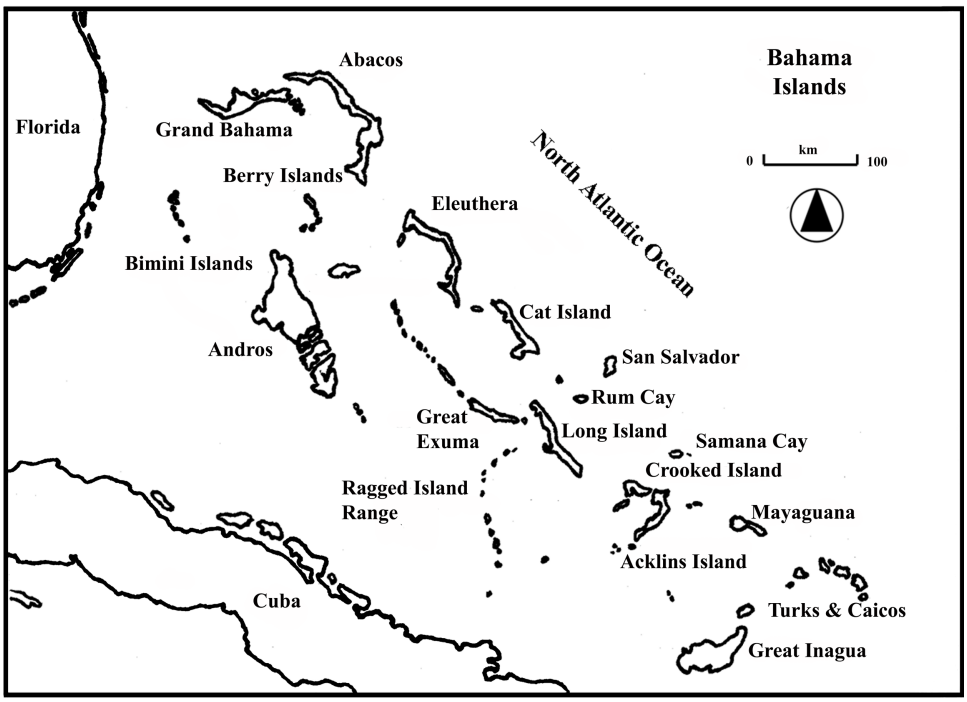

Figure 1. Islands in the Bahama archipelago, 21–27°30′ N and 69–80°30′ W (after Curran & White, 1995).

manual tasks related to procuring food and textiles were known as the *naboría*. The ruling *cacique* or chieftain managed these resources and was part of a governing class branded the *nitaíno* (see Moscoso, 1981). Other positions of power and authority included the *bebique* or shaman. This political structure and social influence likely extended to other areas of the Caribbean such as the Bahamas, Jamaica and central Cuba (Rouse, 1992; Wilson, 1990, 2007). Archaeological and ethnohistoric evidence suggests that the Lucayan–Taínos were organised in a similar fashion, but their socio-political organisation was less complex and not as commanding as the other major chiefdoms of the Greater Antilles (Keegan, 1992; Keegan, 1997a; Keegan, 1997b; Keegan *et al.*, 1998).

Christopher Columbus and his crew arrived at an island known to the Lucayan–Taínos as Guanahaní (Dunn & Kelley, 1989), which many researchers and historians believe to be the island he renamed San Salvador. Though the historical accuracy of the exact landfall is still debated due to disparities in translation and distance conversions (Fuson, 1983; Varela, 1984), Columbus was the sole European to observe first-hand Lucayan–Taíno lifeways (Keegan, 1992). He noticed the broad appearance of their foreheads that was a result of artificial cranial deformation, observed them in dugout canoes and witnessed their fishing and horticultural practices. Shortly after the Columbus landfall, the Lucayan–Taínos were enslaved and relocated to Hispaniola and the Pearl Islands near the coast of present-day Venezuela to labour in fisheries and mines (Sauer, 1966; Granberry, 1979; Granberry, 1980b; Granberry, 1981; Mártir de Anglería, 1989; Keegan, 1992; Gnivecki, 1995; Keegan, 1997a; Keegan, 2007). By circa AD 1520, they had been exterminated due to disease and slavery. The indigenous peoples of the Bahamas still remain as one of the most significant Amerindian populations as being one of the first Native American cultures with documented European contact.

Taíno mythology and cosmology

The bulk of our knowledge concerning Taíno cosmogony, mythology and perception of the cosmos derives from Catalan Hieronymite Fray Ramón Pané's account (Arrom, 1999) of the indigenous Macorix of the Vega Real on the northeastern aspect of Hispaniola in the late 15th century. While living among the natives and learning their language, the friar was able to piecemeal the many aspects of Taíno mythology and cosmology including the origin of celestial bodies and humankind as well as taboos and cultural norms.

Taíno numinousness can be loosely characterised as the presence of one overarching, omnipotent creator

coupled with idolatry of lesser, more accessible deities or *zemis* (also *çemís*, *cemís*, *semís*; see Bennett, 1989: 39; Oliver, 1997: 141, 152). A man named Yaya, as the myth goes, was heralded as the supreme being and primogenitor that created everything in the universe (Stevens–Arroyo, 1988: 98–100; Oliver, 1997: 144; Arrom, 1999: 13). The story of Yaya refers to the origin of the first ocean (*bagua*), and a mythological fish communion with all sources of life, thus reiterating the importance of aquatic life forms and fish in Taíno subsistence (Stevens–Arroyo, 1988: 98–100; Oliver, 1997: 144; Arrom, 1999: 13; Keegan, 2007: 60). This creation myth also discusses the banishment of Yaya's son, Yayael, which has implications for inferring post-marital residence rule in Taíno society (see Sued Badillo, 1975; Stevens–Arroyo, 1988; Keegan, 1992; Keegan, 1997a; Keegan, 1997b) as well as the saga of the stranger king that pervades anthropological literature (Frazer, 1911–1915; Hocart, 1969, 1970; Sahlins, 1985; more recently see Keegan, 2007).

The Taíno cosmos was ordered hierarchically, with Yaya as the supreme being and divine creator, and 12 *zemis* which were known as deified symbols, idols or gods that consequently had a greater impact on daily life (Table 1). *Zemis* were depicted as anthropomorphic, zoomorphic and even anthropozoomorphic icons made of a variety of material that included bone, clay, coral, cotton, shell, stone and wood (Oliver, 1997; Siegel, 1997). These deities were connections between the extrasensory world of humans and their environment, and associated with certain aspects of sacred and profane phenomena (Stevens–Arroyo, 1988). *Zemis* contained the blueprint of the cosmos, and a uniform code of ethics which the Taínos could use in an attempt to maintain the cosmic equilibrium amid their physical and spiritual realms. These idols have also been interpreted as eponyms denoting clan membership, lineal descent, and symbols dedicated to apotheosis of the ancestors (Fewkes, 1907; Rouse, 1948a; Rouse, 1948b; Rouse, 1982; Stevens–Arroyo, 1988; Siegel, 1997). Thus, Zemiism comprised a critical component of Taíno ideology and socio-political structure (Siegel, 1989; Oliver, 1992; Siegel, 1992; Siegel, 1996; Oliver, 1998).

An indelibly significant feature of Taíno cosmic geography and sacred landscape was caves. Caves played a major role in Taíno mythology and cosmogony including the perception of the afterlife and preservation of ancestral spirits. The Taínos believed the mountain known as Cauta contained two caves: one of which their ancestors emerged from known as Cacibajagua (Cave of the Jagua), and the other which was known as Amayaúna (Cave without Importance) where non-Taínos originated (Arrom, 1999: 5–6). The sun and moon also derived from a cave known as Iguanaboina, and in this cave two *zemis* known as Boinayel (rain-bearing clouds) and Márohu (without clouds) resided (Arrom, 1999: 17).

The Taínos believed that the 'house and dwelling place of the dead' was a place known as Coaybay (Arrom, 1999: 17–18), which housed the deceased ancestral spirit *opía* (Arrom, 1999: 19). Siegel (1997:

Table 1. Pantheon of Taíno Zemiism (after Stevens–Arroyo, 1988: 239)

Sex/gender and generation	Order of fruitfulness	Order of inversion
Male/masculine	*Yocahu[guamá]* Lord of the manioc plant; bitterness and strength; life of worker on earth; root symbolism	*Masquetaurie Guayaba* Lord of the dead; sweetness and delight; symbol of the guayaba berry; bat symbols
Twins generated from the male/masculine	*Baibrama* Guardian of workers; fire to clear earth for planting of manioc; fire of over for making cazabe	*Opiyelguobirán* Guardian of the dead privacy and felicity Dog God
	Baraguabael Guardian of plants, animals, and fish; replenisher of nature	*Corocote* Guardian of sexual delight romance, and spontaneity; picaresque spirit
Female/feminine	*Attabeira* Fertilising earth water in ponds, rivers and lakes Earth and serpent mother, protectress of childbearing and lactation	*Guabancex* Driver of wind and water, wind on sea, rider of the hurricane Mistress of the hurricane; the Amazon woman, menstruating, untamed and indomitable
Twins generated from the female/feminine	*Márohu* No clouds, announces the sun	*Guataúba* Thunder (and fire), announces the stormy rain
	Boinayel Son of the Grey Serpent, clouds, announces the fertilising rain	*Coatrisquie* Carrier of water to the mountains, drifting storm clouds

108) has defined a useful concentric model of the Taíno three-tier universe with an earthly plane in the centre bounded by a celestial vault above and subterranean waters below that is linked by revered caves. It is at the earthly plane, where caves reside, that portals to the underworld are located (see Beeker *et al.*, 2002). Therefore, the placement of the dead into caves and blue holes facilitated access to the underworld. The importance of the underworld was that it was a realm to centre the ancestors and collectively memorialise the dead (i.e. Coaybay), and it also represented a mythological return to the birthplace of all humankind (i.e. Cacibajagua).

Previous skeletal research

As aforementioned, caves played a fundamental role in Taíno mythology and cosmic geography. Therefore, it should be no surprise that caves represent a significant aspect of the Caribbean archaeological record. Caves also appear to have been very important to the prehistoric Bahamian natives. Bahamian caves contain a number of cultural features such as human burials, petroglyphs (Maynard, 1890; Hoffman, 1973; Winter, 1978b, 1991), faunal and botanical remains (Rainey, 1934: 27–29, 32–33; Winter *et al.*, 1999; Carr *et al.*, 2006), as well as a variety of organic materials that are not often preserved at open-air sites such as ceremonial seats for the ruling elite (i.e. *duhos*, *turéns*), canoes, a canoe paddle, a wooden mortar and a wooden bowl (De Booy, 1913; Joyce, 1919; Winter & Pearsall, 1993; Palmer, 1997; Winter *et al.*, 1999).

The cave systems of the Bahamas are characterised as wet or submerged caves (such as blue holes), dry caves or a combination of both with some parts above and below the water table. Wet caves can include intricate underground caverns making the ability to locate and access remains within them challenging and very dangerous (see Palmer, 1997). Human skeletal remains recovered from wet caves tend to be intact since the process of mineralisation is potentially accelerated, though associated artefacts, such as wood and pottery would need to be specially curated and slowly desiccated to ensure lasting preservation. In contrast, dry caves are generally easier to gain entry, but were often heavily damaged during the historic period from mining of bat guano for fertiliser and looting by collectors and treasure hunters (Rainey, 1934; Craton, 1986; Winter *et al.*, 1999).

Keegan (1992: 70–73) was one of the first researchers to systematically classify archaeological site types throughout the Bahamas and the Turks and Caicos using data from a number of previous archaeological surveys (De Booy, 1912, 1913; Rainey, 1934; Krieger, 1937; Goggin, 1939; Granberry, 1956; Granberry, 1957; Hoffman, 1967; MacLaury, 1968; Hoffman, 1973; Sullivan, 1974; Sullivan, 1976; Granberry, 1978; Sears & Sullivan, 1978; Winter, 1978a; Winter, 1978b; Granberry, 1980a; Sullivan, 1981; Keegan, 1982b; Keegan, 1983a; Keegan, 1983b; BAT, 1984; Keegan & Mitchell, 1984; Keegan, 1985; Hoffman, 1987a; Hoffman, 1987b; Hoffman, 1988; Keegan, 1988; Keegan & Sealey, 1988; Keegan *et al.*, 1990; Palmer, 1997). When categorising karst features, Keegan (1992: 70–71) placed caves and rock shelters in separate classes and distinguished burial caves (both wet and dry) from caves without documented evidence of human remains. Aarons and Riggs assembled an inventory of 111 cave sites (from Keegan, 1997a: 33), but much of this data lack specifics (i.e. wet versus dry, cave versus rock shelter). Recent research by author Pateman (2007) offers the most current inventory of prehistoric Bahamian burial caves (Table 2).

Brooks (1888) was the first to publish on archaeological human skeletal remains from the Bahamas, describing three crania previously removed from various cave sites on New Providence and the out islands. Later, Rainey (1934) conducted an archeological survey of the Bahamas under the auspices of the Yale Peabody Museum recovering skeletons from thirteen dry cave sites on the Abaco Islands, Eleuthera, San Salvador, Rum Cay, Long Island and Crooked Island (see also Granberry, 1955: 262–266; Granberry, 1978; Keegan, 1982b). Unfortunately Rainey's (1934)

Table 2. Documented Bahamian caves and burial sites[a]

Island	Keegan (1997)	Pateman (2007)	Aarons and Riggs[b]
Abacos	(2)	3(1)	14
Acklins Island	1(1)	—	2
Andros	3(1)	3(3)	8
Berry Islands	—	1	—
Cat Island	—	—	1
Crooked Island	3	3	5
Eleuthera	3	2 (6)	6
Grand Bahama	(2)	—	3
Inaguas	1	—	6
Long Island	4	4	15
Mayaguana	—	1	—
New Providence	10	3	9
Rum Cay	1	3	9
San Salvador	2	3	13
Turks and Caicos	8 (1)	—	20
Sub-total	36 (6)	26 (10)	111
Total	42	36	111

[a] Submerged cave/burial location in parentheses.
[b] See Keegan, 1997a: 33.

excavation notes pale in comparison to data generated in modern archaeological settings, but to be fair, he encountered numerous setbacks during his recovery efforts due to cave earth disturbances likely from pot-hunters and guano gatherers. Nonetheless, the human skeletal sample generated from Rainey's archaeological investigations is still today the largest on record from which to conduct osteological analysis on prehistoric Bahamian skeletons.

Over 40 years had passed before the prehistoric Bahamian skeletons housed at the Yale Peabody Museum from Rainey's excavations were analysed and a descriptive inventory completed replete with preliminary demographic and pathologic information (Keegan, 1982b). This summation was a landmark for skeletal studies in the Bahamas, since it was the first ever attempt to document this skeletal sample as well as nine burials from a cave located on Grand Bahama. However, issues of preservation, documentation and sample sizes precluded more viable results by which to make inferences about social organisation and ideology via mortuary data (Keegan, 1982b: 63–64). Later, Keegan & DeNiro (1988) revisited the Yale Peabody Museum collection to extract stable isotopic signatures ($\delta^{13}C$ and $\delta^{15}N$) from adult human bone collagen to reconstruct Lucayan–Taíno diet. Keegan & DeNiro (1988: 324–328) also tested marine and terrestrial organisms, from both modern and archaeological contexts, that were likely elements of prehistoric Bahamian subsistence to more appropriately interpret values gleaned from human bone collagen. Though their results demonstrated that nitrogen-isotopic values were more challenging to elucidate since the ranges for marine and terrestrial foodstuffs coincide (Keegan & DeNiro, 1988: 331, 333), carbon-isotopic values extrapolated were more easily interpretable. For example, a diet $\delta^{13}C$ value of $-11‰$ suggests dependence solely on marine food sources, a diet $\delta^{13}C$ value of $-25‰$ suggests dependence solely on terrestrial food sources and a diet $\delta^{13}C$ value of $-18‰$ suggests roughly equivalent contributions from both marine and terrestrial foodstuffs (Keegan & DeNiro, 1988: 330). Table 3 provides descriptive statistics of the diet $\delta^{13}C$ values obtained from adult human bone collagen of the individuals studied. Noticeably, the diet $\delta^{13}C$ values range from an estimated 64–78% dependence on terrestrial food sources ($-21.0‰$) to an estimated 67–81% dependence on marine food sources ($-14.6‰$) (Keegan & DeNiro, 1988: 330). The mean diet $\delta^{13}C$ values in all group categories ($\sim -18.0‰$) suggests that the prehistoric Bahamians consumed nearly identical proportions of both marine and terrestrial provisions.

Numerous human skeletal remains have been discovered in wet caves, notably at Sanctuary and Stargate Blue Holes on South Andros Island (Palmer, 1997). Human skeletons were recovered from Sanctuary Blue Hole by the late Rob Palmer in 1990 and 1991. This recovery lacked provenience and contextual information concerning the burials was not recorded. The remains were sent to the University of Florida for analysis. Skeletal remains of sixteen individuals (10 males, five females and one sub-adult) were inventoried and pathological conditions noted (Mack & Armelagos, 1992). Additional late 20th century skeletal research was also conducted by Winter *et al.* (1999) on human remains recovered from Major's Cave on Hog Cay, San Salvador.

Most recently, Pateman (2007) has also delved into the Yale Peabody Museum collection to further illuminate Lucayan–Taíno diet, health and mortuary practices. Pateman (2007) compiled biological profiles of age and sex as well as pathological information for all known prehistoric human skeletal remains from the Bahamas (i.e. Rainey, 1934; Keegan, 1982b; Mack & Armelagos, 1992; Carr *et al.*, 2006) (Table 4). His main research objective was to compare individuals interred in dry caves with wet caves by examining data sensitive to demographics, diet and overall health, and potentially use health status as a means to infer social status. This study yielded inconclusive results, and was further impaired by sample sizes and biases, as well as a general lack of contextual information

Table 3. Diet $\delta^{13}C$ values (in per mil ‰) of adult human bone collagen of Lucayan–Taíno individuals from the Bahamas (from Keegan & DeNiro, 1988: 327)[a]

Group	N	Mean	SE	SD	Min	Max	95.0% LCL	95.0% UCL
Males	7	−17.786	0.414	1.096	−19.100	−15.700	−18.799	−16.772
Females	6	−18.783	0.920	2.253	−20.800	−14.600	−21.148	−16.419
Unsexed	4	−18.325	1.044	2.089	−20.900	−15.800	−21.649	−15.001
Total	17	−18.265	0.424	1.749	−20.900	−14.600	−19.164	−17.366

[a] $+5 \pm 1.0$ ‰ was subtracted from raw human bone collagen values to account for fractionation factors between collagen and diet as recommended by indirect estimates in previous studies (see Keegan & DeNiro, 1988: 329). Lower confidence limits (LCL) and upper confidence limits (UCL) were generated using Systat for Windows (Systat Software Inc., 2007).

Table 4. Demographic information generated from known prehistoric Bahamian human skeletal samples (from Pateman, 2007: 6)

Age range	Male	Female	Unsexed	Total
0–5	—	—	—	2
6–10	—	—	—	4
11–15	—	1	—	1
16–20	—	5	—	5
21–40	12	9	—	21
41–60	11	6	—	17
61+	1	—	—	1
Adult	5	3	8	16
Total	29	24	8	67

in the current Bahamian bioarchaeological record (Pateman, 2007: 10).

Archaeological site background

Preacher's Cave is known as the landing site of the Eleutherian Adventurers who were the first English settlers of the Bahamas (Albury, 1975; Craton, 1986; Craton & Saunders, 1992). Although a few members of this small group of seventy people were recruited directly from 17th century England, most had already been living in the English colony of Bermuda before their voyage to the Bahamas. Motivated to follow the Puritan ministers of Bermuda, rather than the Royalist Anglicans, the emigrants named their new venture Eleutheria (Greek for freedom), but shipwrecked in 1648 just south of the reef system known as the Devil's Back Bone. They sought refuge in the cave for shelter and conducted religious services there.

The first archaeological assessment of Preacher's Cave was conducted in 1991 when the cave was visited as part of a cultural resource survey of north Eleuthera and as part of the development of the Spanish Wells Museum (Carr, 1991). A shovel test there identified intact cultural deposits and it was decided to return to conduct a more extensive sampling of the cave. In 1992 the Archaeological and Historical Conservancy and Research Atlantica conducted a joint investigation of the cave excavating eleven test units and uncovering a 17th century hearth feature and two European graves likely associated with the Eleutherian Adventurers (Carr *et al.*, 1993). These investigations also revealed a Lucayan component within the cave with the discovery of Palmettan Ostionoid ware sherds (Palmetto ware) (Hoffman, 1967; Hoffman, 1970; MacLaury, 1970; Sears & Sullivan, 1978). For two years during 2005–2007 a total of three excavations were conducted in Preacher's Cave as part of an expanded investigation which was to first, assess all possible cultural features associated with the Eleutherian Adventurers, and second, expand examination to the cave's rear chamber to assess any prehistoric remains that might occur. This phase of work resulted in 63 units being excavated resulting in nine additional human graves uncovered: two European and seven prehistoric. The most intact prehistoric graves (Burials 1–3) are described in this paper. For archival purposes, Burials 1–3 are also referred to as Burials 9-11/Individuals 1C–1E. This latest investigative effort has been detailed in several preliminary and interim reports (i.e. Carr *et al.*, 2006; Schaffer *et al.*, 2008). A final report on this expanded assessment is currently in preparation.

Methods

The three burials detailed in this paper were discovered in the back chamber of Preacher's Cave on the northern part of the island of Eleuthera in March 2007 (Figure 2). Standard practice for *in situ* documentation of primary burial positioning was conducted utilising previously published data (Ubelaker, 1999: 13–18). This included

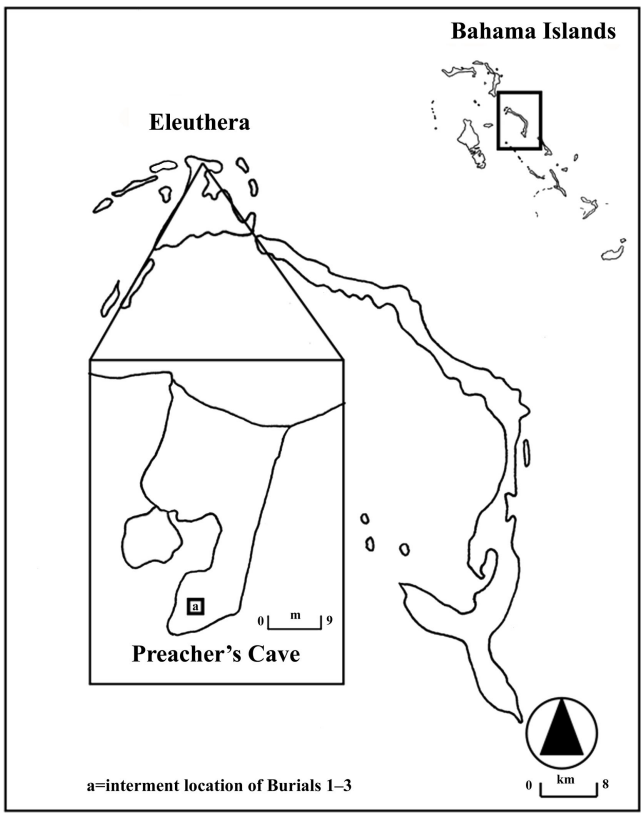

Figure 2. Plan map of the island of Eleuthera with inset of Preacher's Cave map.

the recording of angular positions of the arms, legs and head in respects to the torso, lower abdomen and appendicular segments as well as body placement (i.e. supine or prone, flexed or extended). The remains were recovered after plan map and contextual documentation was completed, then brought to the United States to be analysed by author Schaffer, and subsequently returned to The National Museum of The Bahamas. Data collection and skeletal inventory were carried out following procedures outlined in Buikstra and Ubelaker (1994). Skeletons detailed in this paper have all long bones fused and posterior dentition in functional occlusion. Ageing was conducted using a suite of methods including observations of the pubic symphyses, auricular surfaces, ectocranial suture closure, sternal rib ends and even the medial aspects of the clavicles (İşcan *et al.*, 1984, İşcan *et al.*, 1985; Lovejoy *et al.*, 1985; Meindl & Lovejoy, 1985; Suchey & Brooks, 1990; Scheuer & Black, 2000). Sexing was undertaken using the dimorphic features of the pelvis as well as the skull (Phenice, 1969; Ascádi & Nemeskéri, 1970; Buikstra & Mielke, 1985; Krogman & İşcan, 1986; Bass, 1987; White & Folkens, 1991; Ubelaker, 1999). Pathological analysis was aided by relevant literature (Hillson, 1996; Aufderheide & Rodríguez–Martín, 1998; Ortner, 2003; Waldron, 2008). Radiographs were taken when necessary courtesy of the Orthopedic Care Center, Aventura, Florida.

Materials

The contents of the three burials were recovered from fine moist beach sands after plan map and contextual

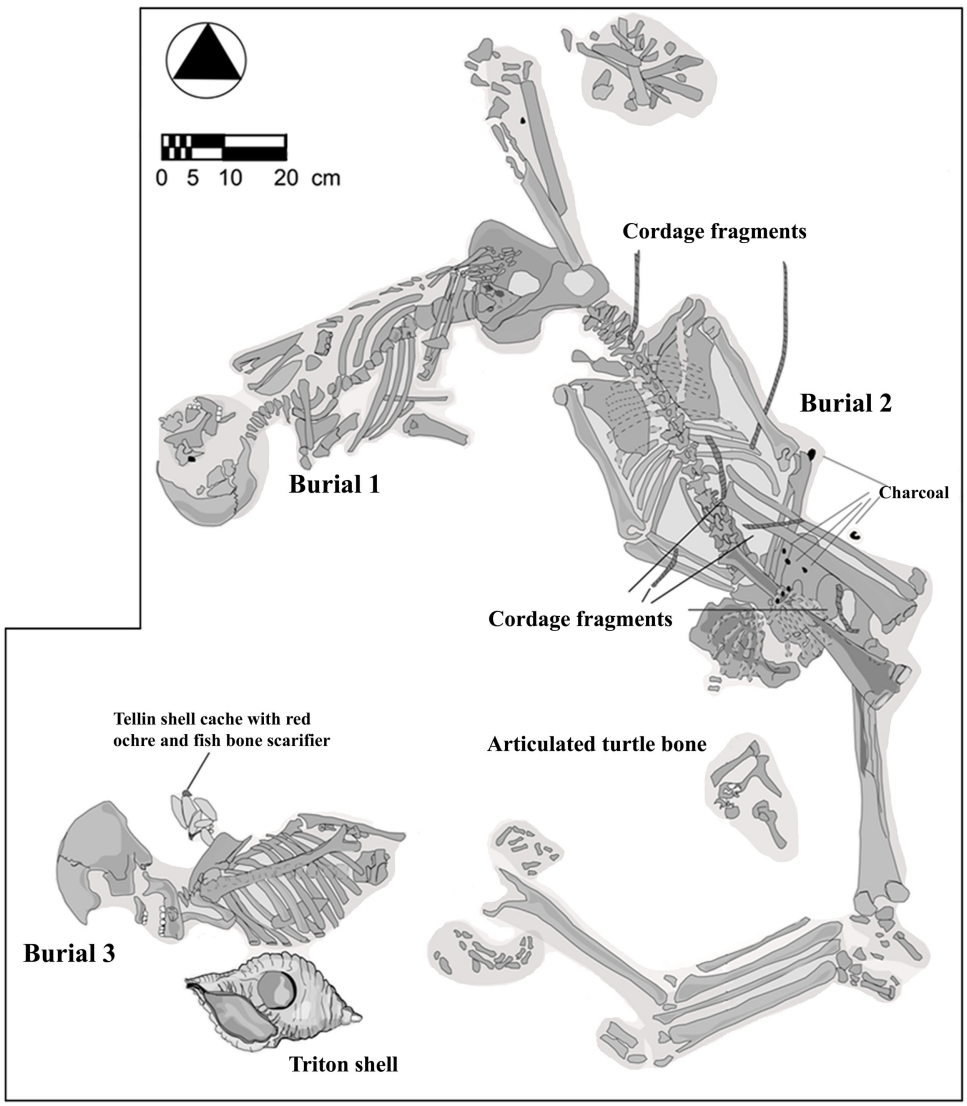

Figure 3. Plan map of Burials 1–3.

Table 5. Skeletal inventory and completeness

Burial	Sex	Age-at-death	Elements missing
1	F	30–35	Fibula (R)
2	M	20–25	Skull, C1, femur (L), patella (L), fibula (R), most foot bones
3	M	25–30	Radius (L), ulna (L), lumbar vertebrae (3–5), sacrum, pelves

Parentheses () denote side.

documentation (Figure 3). A skeletal inventory was conducted along with assembly of biological profiles (Table 5). The age ranges presented herein are narrow, within five years, though they could be slightly broadened. Regardless, these individuals were all aged as young adults (21–34 years of age) at or around the time of death (see Buikstra & Ubelaker, 1994: 9). Summations of gross skeletal, vertebral, and oral–dental pathology are located in Tables 6–8. Post-cranial metric data are provided in Appendix 1.

Radiocarbon dating of materials associated with archaeological deposits was conducted using the AMS method by Beta Analytic, Inc., Miami, Florida and marine shell calibrated by the MARINE04 database from a correction factor of -5 ± 20 years (Table 9). Burial 2 was interred first based on stratigraphic profiles, and the bones dated to AD 810–1010. Burials 1 and 3 are thought to date later. Skeletal remains from Burial 3 dated to AD 1040–1100 and 1120–1260, and shells interred with this individual have a mean date of approximately AD 1290. Bone from Burial 1 yielded a much earlier date, AD 230–410, though the authors believe this date is the result of sampling error or sample contamination. Since Burials 1 and 3 were interred with basketry, and basketry-impressed pottery is not found in the Bahamas until as early as AD 1000–1100 (Berman & Hutcheson, 2000), we currently believe that they are relatively contemporaneous, probably both dating to around AD 1050–1300 and even slightly later. The archaeological context and associated materials support the remains dating to the broad Ostionoid period (AD 600–1500). To date, the Preacher's Cave sample represents the most complete, and best preserved, archaeologically excavated prehistoric burials available for skeletal and mortuary analysis from the Bahamas.

Table 6. Gross skeletal pathology

Description	Burial(s) affected
Osteophytosis of centra	1
Traumatic arthritis	1
Osteoarthritis of vertebral facets	1, 3
Healed fractures	1, 3
Ribs	1
Vertebra	3
Schmorl's nodes	2

Table 7. Vertebral pathology

Vertebra	Burial 1	Burial 2	Burial 3
C1	OA	—	—
C2	OA	—	—
C3	—	—	—
C4	OA(L)	—	—
C5	OA(L)	—	—
T7	—	—	OA(R)
T8	—	—	OA(R)
T10	OP	—	OA
T11	OP	SN	OA
T12	OP	SN	—
L1	OP	SN	—
L2	OP	SN	OA(R)
L3	OP	SN	—
L4	OP	SN	—
L5	OA	—	—
S1	OA	—	—

OA = Osteoarthritis of vertebral facets (bilateral); Parentheses () denote side (unilateral).
OP = Osteophytosis of centra.
SN = Schmorl's node/sclerotic formation at site of nucleus pulpous.

Burial 1

Burial 1 contains the near complete skeleton of a young adult female approximately 30–35 years of age-at-death.

Table 8. Oral–dental pathology

	Burial 1		Burial 3		Total	
Description	*N*	%	*N*	%	*N*	%
Tooth presence						
Present	17	60.7	21	70.0	38	65.5
Antemortem loss	6	21.4	2	6.7	8	13.8
Postmortem loss	5	17.9	7	23.3	12	20.7
Caries						
Present	6	35.3	6	28.6	12	31.6
Absent	11	64.7	15	71.4	26	68.4
Minor	3	17.6	4	19.0	7	18.4
Advanced	3	17.6	2	9.5	5	13.2
Periodontal abscess						
Present	4	14.3	0	0.0	4	6.9
Absent	24	85.7	30	100	54	93.1
Alveolar resorption						
Slight	3	13.0	14	60.9	17	36.2
Moderate	1	4.3	0	0.0	1	2.1
Severe	3	13.0	0	0.0	3	6.4

Table 9. Preacher's Cave radiocarbon and diet $\delta^{13}C$ values (in per mil ‰) of adult human bone collagen samples[a]

Burial	Beta	Material	Date cal. AD	Median date cal. AD	$\delta^{13}C$
1	260751	Human bone	230–410	320	−21.8
2	260752	Human bone	810–1010	910	−17.1
3	260753	Human bone	1040–1100; 1120–1260	1070; 1190	−19.7
3	242393	Tellin shell	1190–1310	1250	−0.7
3	242394	Triton shell	1270–1400	1335	3.5

[a] Calibrated to $2-\sigma$ (95% probability). Marine shell calibrated using the MARINE04 database from a correction factor of -5 ± 20 years. $+5 \pm 1.0$ ‰ was subtracted from raw human bone collagen values to account for fractionation factors between collagen and diet as recommended by indirect estimates in previous studies (see Keegan & DeNiro, 1988: 3).

This individual may have been just slightly in the middle adult age range. Age was estimated not only from the pubic symphysis, but also by observations of ectocranial suture closure and sternal rib ends. Sex was determined from the features of the pelvis and skull. This individual was wrapped in a plaited mat and placed on the left side with the hands crossed resting on the anterior aspect of the pelvic girdle. A number of disturbances caused postmortem damage to the skull, arms and legs. The markings of the mat are differentially preserved on the shoulder girdles and craniofacial region (Figures 4 and 5). This pattern, though faint, can be directly compared to basketry-impressed Palmettan Ostionoid ware sherds (Palmetto ware) (Hoffman, 1967; Hoffman, 1970; MacLaury, 1970; Sears & Sullivan, 1978) that have been discovered at several Bahamian archaeological sites (Berman & Hutcheson, 2000). Images were sent to prehistoric Bahamian basketry expert Charlene Dixon Hutcheson for a preliminary analysis of key attributes (see Adovasio, 1974, 1977). In her review, she classified the markings as a 2 over 2 under (2/2) twill plaiting with noticeable shifts in the weave pattern from a variation caused by one larger element going in one direction followed by two identical narrower elements laying side-by-side going over and under together in unison in the opposite direction. This gave the plaited mat not only a uniform weave, but also a unique pattern unlike any other basketry-impressed pottery observed to date on San Salvador (Berman & Hutcheson, 2000). The basketry-impressed pottery assemblage documented on San Salvador contains only a single element going in each direction and acting as a unit. The material used for the Preacher's Cave basketry was most probably some type of palm frond since they would have been flexible

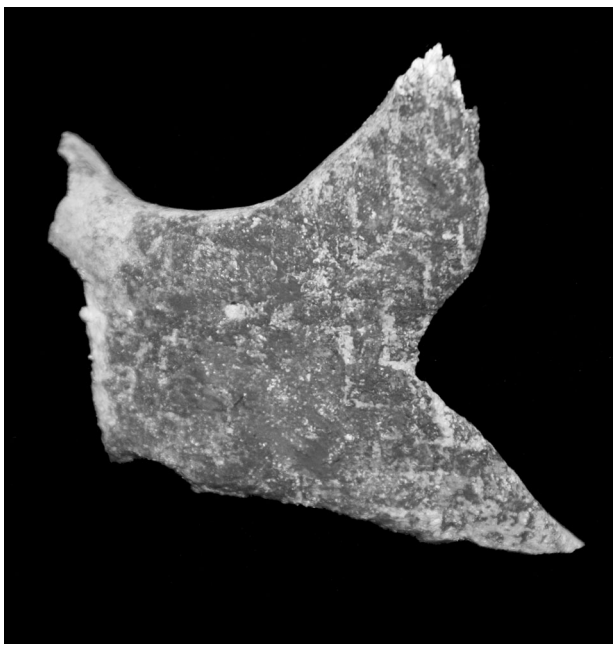

Figure 4. Anterior aspect of left zygomatic from Burial 1 with basketry markings.

Figure 5. Anterior aspect of right clavicle from Burial 1 with basketry markings.

enough to facilitate wrapping of the corpse and the markings appear to be thinner than split reeds or sedges (Charlene Dixon Hutcheson, personal communication). Interestingly, the basketry markings on the bone were likely preserved from the application of some type of dye (such as ochre) during basketry production or some other idiosyncratic treatment of the body that took place while the individual was encased in a plaited mat.

Frontal flattening is prevalent as a distinct marker of artificial cranial deformation. Thirty-five per cent of the teeth have carious lesions and periodontitis was active on the mandible and maxillae. Osteophytosis is moderate to severe in the lumbar region. Osteoarthritis of the vertebral facets is present in the cervical and lumbosacral regions. Appendicular arthritis is marginal in the joints of the shoulders and elbows. More severe osteoarthritis is present in the hands. Traumatic arthritis developed on the dorsal margin of the right wrist either from a pre-existing condition such as a fracture or delayed union of the styloid process epiphysis. Multiple healed rib fractures were also recorded.

Figure 6. *In situ* plan view of Burial 2.

Burial 2

Burial 2 consists of the nearly complete skeleton of a young adult male around 20–25 years of age-at-death (Figure 6). Age was estimated from the pubic symphysis and corroborated by examination of the auricular surfaces, sternal rib ends and medial aspects of the clavicles. Sex was determined solely from the features of the pelvis. This individual was found with cordage and cordage markings around the elbows, hands and torso; and interred face down with the hands crossed in front of the waist. The lower legs had been separated from the upper legs postmortem and placed on the individual, likely to make room to inter Burial 3. Notably the skull and atlas (C1) were absent. No ostensible signs suggest that this individual died from decapitation or strangulation. Most likely the skull was removed postmortem yet while still fleshed (see Dickel, 2002: 76).

Schmorl's nodes or depressions (Schmorl & Junghanns, 1971) as well as sclerotic bone formation at the sites of the nuclei pulposi are present on the lower thoracic and lumbar vertebrae. The most prominent depression is located on the superior aspect of T12. Typical involvement in late adolescents and even young adulthood is limited to one or two inter-vertebral joints, but in this case, it extends to several vertebrae. Several premature inter-vertebral herniations could be related to repetitive tasks associated with arduous labour and heavy lifting or even a major traumatic event or events (Mann & Murphy, 1990: 52). Scheuermann's kyphosis or juvenile disogenic disorder can also be considered, whereby abnormally weak end plates are incapable of withstanding the pressures generated within the disc spaces causing premature herniation (Scoles *et al.*, 1991; Maat & Mastwijk, 2000).

Burial 3

Burial 3 comprises the relatively complete skeleton of a young adult male 25–30 years of age-at-death. Age was estimated from ectocranial suture closure and sternal rib ends. Sex was determined exclusively from the skull. This interment was unique in that a discernible grave shaft was visible that included grave goods. This individual was also wrapped in a plaited mat, likely in the same manner as Burial 1, but in contrast, laid on the right side appearing parallel and as a mirror image. Parts of the left forearm, lumbar vertebrae, sacrum and pelves were missing, likely from an historic intrusion. An Atlantic trumpet triton (*Charonia variegata*) shell culturally modified with a circular disc removed from the body whorl was placed in front of the thorax. A cache of 29 sunrise tellin (*Tellina radiata*) shells encased a piece of red ochre and a fish bone scarifier that was situated just behind the shoulders (Figure 7). At the foot of this individual was the semi-articulated scapula, humerus and cervical vertebrae (C2–C7) of a sea turtle

Figure 7. *In situ* plan view of Burial 3.

(i.e. Cheloniidae) (Wyneken & Witherington, 2001; Irv Quitmyer, personal communication). Visible cut marks on the cervical vertebrae suggest that the head was severed from the neck as well as the neck from the carapace. Further study and radiometric dating of the sea turtle remains is warranted to further interpret this deposit as associated grave furniture.

The cranium exhibits artificial deformation of the fronto-occipital form. Twenty-nine per cent of teeth have carious lesions and periodontitis caused slight alveolar ridge reduction in both the mandible and maxillae. Osteoarthritis is prominent in the vertebral facets of the lower thoracic and lumbar regions. It is also marginal in the elbows and more severe pitting and osteoarthritic lipping is prevalent in the patellae. Trauma to the fifth thoracic vertebra in the form of a healed compression fracture is apparent, likely from a metabolic disorder causing depletion of bone mineral content (i.e. osteopenia, osteoporosis); concavity of adjacent vertebral bodies corroborated this assessment. The result of this compression likely caused slight kyphosis of the spinal column.

Discussion

All three individuals did not live past young adulthood (21–34 years), yet degenerative disease is evident. This implies a relatively active lifestyle which may have included canoeing, hauling fish weirs or basketry traps, spear fishing and processing cultigens. The pattern of degenerative disease is unique for each individual, giving credence to an occupational relationship, gender role, activity base or genetic disposition specific to that individual. Healed fractures, as noticed in Burial 1, also demonstrate recovery from environmental constraints. In the case of a healed vertebral compression fracture documented in Burial 3, a metabolic disorder or dietary deficiency such as osteopenia or osteoporosis can be inferred. In comparison to known skeletal studies of prehistoric Bahamians, Keegan (1982b: 58–59, 61) also observed osteophytosis of the lumbar vertebrae in three individuals from the Yale Peabody Museum collection. He noted pronounced osteophytosis, likely similar to the degenerative changes in the lumbar vertebrae of Burial 1, but in an adult male recovered from Wemyss Bite Cave on Eleuthera (#4685), which also included 'compression of the vertebral bodies, and possible decalcification of the vertebrae' (Keegan, 1982b: 59). Only when a systematic and quantified pathological analysis of the available Lucayan human skeletal material is completed will we begin to more precisely understand their behavioural adaptations to the Bahamian inter-island environment.

Archaeological data suggest that Lucayan–Taíno subsistence strategy was based not only on an assortment of marine and terrestrial resources relying primarily on fishing but also root-tuber cultivation, harvestable mollusks and arboriculture (Keegan, 1992; Keegan, 1997a; Berman *et al.*, 1999; Berman & Pearsall, 2000; Newsom & Wing, 2004). They not only caught an abundance of fish and mollusk species as well as terrestrial vertebrates, but they also harvested a number of cultigens such as manioc (*Manihot esculenta*), sweet potato (*Ipomoea batatas*), yautía or cocoyam (*Xanthosoma* sp.), arrowroot (*Maranta* sp.), llerh (*Calathea allovia*), yampee (*Dioscorea* sp.), maize (*Zea mays*) and cucurbits (*Cucurbita* spp.) (Rouse, 1963; Sauer, 1966; Sturtevant, 1966; Wing, 1969; Guarch, 1973; Wing & Reitz, 1982; Wing & Scudder, 1983; Keegan, 1986; Keegan & DeNiro, 1988; Newsom & Wing, 2004; Berman & Pearsall, 2008).

Oral–dental health can be utilised as a basic indicator of diet and subsistence as teeth are sensitive to their environment. For example, the prevalence of carious lesions on observable teeth has long been accepted as a way to measure degrees of carbohydrate consumption. Previous research has consistently shown that overall human populations reliant or partially reliant on agricultural foodstuffs have in general a higher percentage of dental caries than foragers (Turner, 1979; Milner, 1984; Larsen *et al.*, 1991; Larsen, 1997). During the agricultural revolution in eastern North America, temporal trends of increasing carious lesion frequency have led some researchers to deduce that in population samples with 7% or more carious teeth, reliance on maize is likely (Milner, 1984; Larsen *et al.*, 1991; Larsen, 1997). A greater frequency of carious lesions implies high cariogenic intake possibly from carbohydrates like simple sugars from domesticated plants; however, this may not always the case. Prominent frequencies of carious lesions should not automatically be labelled as groups dependent on domesticates. In some areas, such as the central Texas and the lower Pecos River valley, prehistoric hunter–gatherers have carious lesion frequencies similar to that documented for agriculturalists (Marks *et al.*, 1988; Hartnady & Rose, 1991; Bement, 1994; Sobolik, 1994). In these environments, the outcome of ingesting gummy, non-domesticated plants high in carbohydrates is widespread dental caries. The total prevalence of carious lesions on observable teeth from the small Preacher's Cave sample of merely two individuals is quite high at 31.6%. Other Ceramic-age population samples in the Caribbean have a comparatively lower frequency of carious lesions such as the Tutu site on St. Thomas in the U.S. Virgin Islands at 9.3% (Larsen *et al.*, 2002: 236), and 8.1% at the site of Anse à la Gourde on the island of Guadeloupe (Grand–Terre) in the Leeward Islands (Mickleburgh, 2007: 71). However, Burnett (2009) reports a similarly high rate of dental caries at 30.8% from a Ceramic-age site on Carriacou. Larsen *et al.* (2002) attributed their carious lesion frequency to a diet rich in the starchy tuber manioc, though stable isotope analysis showed evidence of a mixed subsistence of land and marine resources (Norr, 2002). Keegan and DeNiro (1988) reached similar conclusions when examining the mean diet $\delta^{13}C$ values of the Lucayan–Taíno individuals from the Yale Peabody Museum. Diet $\delta^{13}C$ values extracted from the Preacher's Cave material show that Burial 2 (-17.1 ‰) is well within the mean diet $\delta^{13}C$ values, suggesting a fairly equal proportion of marine and terrestrial food sources. On the other hand, Burial 1 (-21.8 ‰) and Burial 3 (-19.7 ‰) have the lowest diet $\delta^{13}C$ values of Lucayan–Taíno individuals sampled to date, and are outside the lower confidence limit (LCL) (see Tables 3 and 9). This signifies that Burials 1 and 3 consumed more land resources in comparison to all Lucayan–Taíno individuals currently sampled, and this may explain the high levels of carious lesions encountered at Preacher's Cave. Alternatively, the elevated frequency of dental caries can also be reflective of nondomesticated plant consumption high in carbohydrates like fruits, gums and saps.

Interpreting the mortuary patterns of a past group of people or culture and attempting to infer their socio-political organisation (such as egalitarian versus hierarchical) is oftentimes the most challenging task in archaeology. Though archaeologists such as Sears (1961) conducted similar investigations prior to the inception of what is commonly referred to as the Saxe–Binford research programme (Brown, 1981; Pader, 1982; Tainter, 1978; Brown, 1995), recognition for pioneering this approach has been repeatedly assigned to Saxe (1970) and Binford (1971). The underlying assumption of this approach is that variation in grave location, grave furniture and burial form (or lack thereof) is an indicator of the social role(s) of the deceased (Binford, 1971; Brown, 1971; Peebles, 1971; Peebles & Kus, 1977; Rothschild, 1979; Chapman & Randsborg, 1981; O'Shea, 1984). Later, Carr (1995) utilised a similar database (i.e. HRAF) also employed by Binford (1971) to demonstrate that philosophical–religious beliefs were a greater determinant of burial variation than social organisation, and that these beliefs, which often govern the perception of the soul and the afterlife, should be integrated into the theoretical approaches to mortuary studies. The recent work of Brown (2003, 2006) also calls attention to incorporating an approach to mortuary studies that views the layout of burial form as a cosmic narrative or cosmogram that exemplifies how the deceased were utilised for a ceremony reflecting collective beliefs. Thus, burial form and associated grave goods were deployed for a ritualistic and dramatic performance or ceremony that likely called upon particular myths using profound symbolic inference. Both the Saxe–Binford research programme (Brown, 1981; Pader, 1982; Tainter, 1978; Brown, 1995), and Brown's (2003, 2006) concept of the cosmogram will be applied to the present Preacher's Cave sample.

Some clues to deciphering the code encrypted in mortuary practices can be hidden in the ethnohistoric record, but most accounts detail the graves of the elite Taíno *caciques* and pay little attention to the inhumations of the commoners. For instance, Colón (1984: 106) discusses several burial practices—

specifically for the *caciques*—which includes opening the body to be dried by the flame and preserved whole, removing the skull, burying the body in a cave with bread and a *higüero* (gourd, calabash) of water, and placing them in a hammock or net bed. Fernández de Oviedo y Valdéz (1959: I:119) also elaborates that the chief's body was cloaked in cotton and situated on a ceremonial seat (*duho*) which was all encased in a wooden crypt. Though the Taínos had several tiers of leadership which would prove difficult to distinguish archaeologically that included a *matunherí* (supreme or paramount cacique), *babarí* (second-grade cacique), and *guaoxerí* (lowest-grade cacique or village headman) (Redmond & Spencer, 1994). Additionally, distinguishing between the interment of a chief or a shaman in the archaeological record might not be as straightforward either since Colón (1984: 106) describes the *cacique* as being dressed as a priest and likely responsible for shaman-like divination rites. Furthermore, much of the details from these historic documents are in specific reference to the natives of a particular area of Hispaniola or Cuba, and there was likely widespread variability in burial practices among socio-political groups on a single island, in addition to other polities on other islands throughout the Caribbean. Thus, researchers must be cognisant that the ethnohistoric record is extremely fallible, and supplanting these documents with the archaeological record of any island must be done with exceeding caution.

In terms of grave location variation, most, if not all, prehistoric burials in the Bahamas and Turks and Caicos are found in caves. These islands rest on a calcium carbonate (limestone) platform which contains a large number of cave and karst formations. Taíno burials have been found in middens within villages, formal cemeteries in close proximity to settlements, and caves (Rouse, 1948a; Boyrie de Moya, 1960; Veloz Maggiolo, 1972; Veloz Maggiolo *et al*., 1972; Morbán Laucer, 1979; Wilson, 1990). Cave burials have often been accorded high-status (Wilson, 1990: 22; Walker, 1993: 163; Curet & Oliver, 1998: 239), since burial caves are often adorned with petroglyphs. Applying this assumption to the Lucayan mortuary record is problematic because caves are the only context in which human burials have been located. What still remains is that the importance of caves to the prehistoric Bahamians is evident in the degree and nature of the cultural deposits that have been uncovered in them, and in turn, they probably represent significant aspects of prehistoric social and ritual organisation (Maynard, 1890; De Booy, 1912; Granberry, 1956; Granberry, 1978; Hoffman, 1973; Keegan, 1982b; Alegría, 1986; Stevens–Arroyo, 1988; Keegan, 1992; Keegan, 1997a; Keegan, 2007).

In investigating burial form, Rainey's (1934) notes and the files at Yale University require additional attention. A curious card on file at the Yale Peabody Museum is labelled 'central prone burial, in burial position' (see Peabody museum card file) for at least two individuals (#4695 and #4696) recovered from Gordon Hill Burial Cave #1 on Crooked Island (Keegan, 1982b: 60). An adult female was identified in this part of the collection that Keegan (1982b: 60) believes is likely the one detailed by Rainey (1934: 21–22) that was interred on the left side with the hands covering the pelvis and legs slightly flexed. These descriptions have some commonalities with the present Preacher's Cave sample.

Analysing Lucayan–Taíno grave furniture may provide us better insight to the social and ritual organisation of this prehistoric society. Themes relevant to their life histories and mythology are embellished in their ritualistic material culture (Oliver, 1997: 141). For instance, grave furniture from the sea (such as gastropods, mollusks and fish) could invoke the Taíno creation myth of Yaya, which included the creation myth of the sea (*bagua*), and a spiritual communion with fish (Stevens–Arroyo, 1988: 98–100; Oliver, 1997). Other types of grave furniture could infer rank, social status, or prestige. An intriguing find is one published by Joyce (1919) concerning a then recently acquired artefact by the British Museum. This was a brown wooden stool or *duho* with an effigy of a human head thought to be recovered from a cave on Eleuthera in the early 19th century (Joyce, 1919). Archaeological discoveries such as a *duho*, in direct association with human burials, would be consistent with chiefly rank described by Fernández de Oviedo y Valdéz (1959: I:119). Rainey's notes (1934:27–29, 32–33) contain a few details concerning a number of potentially associated grave deposits that yielded bird, conch, fish and hutia remains as well as pottery. Winter *et al.* (1999) describe the recovery of disturbed human skeletal remains, and a cultural deposit comprising decorated pottery, parts of a wooden bowl, as well as a number of seed, faunal and vertebrate remains. They propose that these remains and artefacts may have been placed there as an offering for the deceased ancestral elite interred within the cave (Winter *et al*., 1999). Regrettably, the nature, specificity, and degree of association of the aforementioned artefacts and cultural deposits with human cave burials are not clearly documented.

Unraveling the cryptogram that represents the prehistoric graves in the rear chamber of Preacher's

Cave is no small task. Burial 2 dates to AD 800–1000, a time in the Bahamian islands characteristic of social change and the moulding of new traditions in the Greater Antilles (Wilson, 1997, 2007). This grave may not be considered Lucayan–Taíno outright, but rather trans–Taíno, as Taíno influence at the time had not yet greatly influenced the socio-political structure of the Bahamas. Contemporary excavations in the southern Bahamian islands, though, point towards an Antillean Taíno presence that may have begun as early as AD 900 (Keegan, 1997b: 117). Burial 2 is also fraught with challenging and even conflicting data. First, evidence of cordage, twine or rope is a bit misleading in terms of its interpretation. This individual appears to be bound by cordage, possibly inferring captivity and unwilling participation, but this could have been part of his attire. Based on some of the ethnohistoric evidence, rope or cordage may have been the remnants of jewellery such as *cibas* that were worn on the arms and necks (Arrom, 1999: 10), though no associated shell or stone beads were found with this skeleton to corroborate that interpretation. Other historic examples include Colón (1984: 106) describing the process of mercy killing that specifically references strangulation. If this type of ritual was practiced and the individual subsequently interred, this would potentially preserve cordage markings which could be located archaeologically.

The imagery and folklore of binding in Taíno mythology can refer to *zemis* that dwell in caves such as Boinayel, Márohu and Opiyelguobirán, who are all depicted as bound up individuals. Boinayel and Márohu are *zemis* that announce the sun and rain. They are depicted in stone as tied up and perspiring. Opiyelguobirán is the *zemi* or spirit with an immediate connection to dogs, but is predominantly known as the Guardian of the Dead situated at the gates of the underworld and servant to the ancestral spirit (*opía*). As the legend of Opiyelguobirán is retold by Pané, this deity drifts away from houses at night and ventures into the jungle. People look for him, bring him back, bind him with rope, but Opiyelguobirán would revert back to the jungle (Arrom, 1999: 28–29). A wooden figurine from Santo Domingo in the Dominican Republic has been identified by Arrom (1974: 77, 1975: 101–106) as the *zemi* and dog spirit Opiyelguobirán on all fours (see also Stevens–Arroyo, 1988: 234–235). Another artefact from the Dominican Republic, a skull-like shell amulet, has also been suggestive of the chthonic deity (Roe, 1997: 131). Keegan (2007: 38–39) contends that a stone amulet from the Caicos Islands is the quintessential image of the dog spirit with the legs tied up and the arms hidden or absent. García Arévalo (1997: 114, 117) identifies this same artefact simply as an anthropomorphic stone pendent in the squatting position.

Burial 2 was interred prone or face down. Inhumations of this form are often difficult to precisely interpret. Arcini (2009: 33–34) recently gathered cross-cultural information concerning this phenomenon. She concluded that overall to be buried face down was not a culturally accepted burial position, and that these burials, more often than not, reflect individuals who deviated from cultural norms. For example, the Aymara of Andean South America bury witches and suicide victims exclusively in face down posture (Tschopik, 1946: 552). Among observations of 19th century Sisseton and related Wahpeton natives in parts of present day Minnesota and the Dakotas in the United States, homicide victims were reserved for burial in this manner (Bushnell, 1927: 23–24). Hall (1976: 362) discusses the occurrence of the face down posture as purposefully orchestrated to bemuse and mislead witches and ghosts of murder and suicide victims. These are specific actions that are taken, however superstitious, to ensure that the spirits of the dead do not disturb the living (Voegelin, 1944). Also in the United States, Fletcher and La Flesche (1972) recorded a tradition of face down burial amongst the early 20th century Omaha tribe native to Nebraska. This funerary custom, as well as cutting the soles of the victim's feet, was put into practice so that the apparition was dissuaded from revisiting the village and disturbing the community (Fletcher & La Flesche, 1972: 215).

Burials 1 and 3 are similar in that they are both associated with plaited matting or basketry markings, and dated to a timeframe that is consistent with increasing Taíno socio-political influence in the region (Wilson, 1990, 1997, 2007). The study of basketry and other materials associated with its manufacture can allow archaeologists to tap into the aspects of a past society's stylistic and symbolic behaviour, cultural affinity, trade and technology, to name a few (Weltfish, 1932; Adovasio, 1974, 1977; McGregor, 1992; Petersen, 1996; Geib, 2000; Soffer *et al.*, 2000). The present archaeological record seems favourable with basketry types as a means to infer archaeological traditions and social or ethnic identity since they have been shown to be sensitive to geographic locale (Adovasio, 1974, 1977, 1986; Croes, 1989; Pryor & Carr, 1995), and some have proposed that it can be used as a means to infer regional interaction among groups (Adovasio, 1974, 1977, 1986; Adovasio & Pedler, 1994).

In the Bahamas, basketry is most often preserved as impressions on pottery. These artefacts begin to show up in the archaeological record as early as the 11th

century and are more securely dated to the 12th century across a number of sites (Berman & Hutcheson, 2000: 422). Sites with occupation extending well into the AD 1400s and up to the 1500s demonstrate production of basketry (Rose, 1987: 331; Berman & Gnivecki, 1995; Keegan, 1997a: 49, 56, 83; Berman & Hutcheson, 2000: 422). Basketry markings were preserved well enough on the bones of Burial 1 to decipher some type of formal patterning, a 2/2 twill with multiple segments of different sizes woven in disparate directions (Charlene Dixon Hutcheson, personal communication). In comparison, on San Salvador, the only pattern documented is a 2/2 twill design with multiple segments of identical size woven in the same direction (Berman & Hutcheson, 2000). It is premature to speculate if an opposed weave direction pattern is exclusive to the manufacture of a burial mat or not; though, more samples of basketry shrouds recovered in the future could better fuel such a discussion. Interment with plaited mats, though, draws similarities to the passage penned by Colón (1984: 106) which describes the placement of a body, specifically a *cacique*, in a burial hammock or net bed. Yet it is problematic to assign chiefly rank from the discovery of a plaited mat with the evidence from the chronicles, since the extent to which basketry shrouding was practiced among people without leadership and authoritative roles at the chiefly level is unknown.

Basketry is a highly perishable commodity in the depositional environment due to elevated humidity, moisture and bacteria that is detrimental to its survival. Thus the preservation of basketry and associated organic materials in the Caribbean archaeological record is scarce at best. Preacher's Cave is the first instance of the archaeological recovery of basketry markings in Bahamian prehistory. In this case, the basketry markings were preserved because some type of alteration or replacement of the organic material likely took place. This suggests that after the manufacture of the basketry, some form of treatment followed, which could have included a dying, smoking or tanning process that gave it some colour. The appearance of the basketry markings on the bones recovered from Preacher's Cave are reflective of a combination of the organic material used to make the weave (such as palm fronds) and an additional material or process causing colouration (such as ochre). Though it is unclear if this alteration was employed during basketry production or post-production, and whether these modifications were ubiquitous or reserved for specific rituals like mortuary rites. The use of plaited mats in grave interments is likely related to a complex mortuary system that reflects the deceased's social role(s) in society, the appropriately prescribed regimen to release their souls to the land of the dead, and a course of gift-giving practiced by the mourners as a tribute to the deceased.

Uniquely, Burial 3 is the sole inhumation that is interred with associated grave furniture. By examining the grave goods we might be able to decipher some traces of Lucayan–Taíno social, ritual and cosmological organisation. Burial 3 was buried with a culturally altered Atlantic trumpet triton shell, a charm that comprises over two dozen sunrise tellin shells, a small nodule of red ochre and a fish bone pin, and possibly the remains of a butchered sea turtle. Grave furniture from both land and sea are present in this assemblage. Firstly, grave goods from the sea would probably call on themes relevant to the omnipotent creator Yaya and the creation myth of the first ocean as well as the story of Yayael which culminates as a spiritual union with fish (Stevens–Arroyo, 1988: 98–100; Oliver, 1997). Secondly, grave items from the land, such as the piece of ochre, not only easily represent Yaya, but also such *zemis* as the Earth and Serpent Mother Attabeira and other guardians of the earth and nature such as Yocahu and Baraguabael. Seashells likely implied specific themes recurrent in everyday life such as subsistence and used for ornamentation in Taíno lifestyle. These included decorative jewellery and shell beads suspended by twine and worn around many parts of the body (i.e. *cibas*).

Though likely too large to be a suspended adornment, a trumpet triton shell with an intriguing ovoid perforation in the body whorl was positioned in front of the chest cavity of Burial 3. The trumpet triton is a carnivorous mollusk that lives along coral reefs and in underwater caves that can reach great depths. In contrast, the queen conch (*Strombus gigas*) feeds on grasses and detritus along the coral reefs but in shallower waters on various substrates. Both were likely vital components of prehistoric Bahamian subsistence; however, the trumpet triton appears to be rarer in occurrence, both naturally in the present day Bahamian islands, and in Caribbean faunal assemblages from archaeological contexts which have consistently produced a greater frequency of queen conch shell (Crock *et al.*, 1995: 286; Hinds *et al.*, 1999: 123; Newsom & Wing, 2004). Their disparity in the archaeological record may be due to the fact that the queen conch is much easier to collect in the shallower waters along the coral debris, and the trumpet triton is scarcer and more difficult to capture since it is a predator and thrives sometimes in deeper waters. Accordingly, the occurrence of the rarer

trumpet triton versus the more common queen conch suggests that more effort was required to acquire the triton than the conch, and this could be an archaeological correlate of higher social status based on energy expenditure (Tainter, 1978). On the other hand, the occurrence of the trumpet triton could also have occupational implications, as the catching of the gastropod would necessitate skilful diving.

The cut hole in the body whorl of the trumpet triton interred with Burial 3 is not at the location below the spire and above the columella muscle attachment site that has been observed on culturally modified queen conch shells recovered from Caribbean pre-Columbian archaeological sites (Keegan, 1982a: 84). This could suggest that the puncturing of the triton trumpet to process meat, and even the queen conch, may have taken on different forms other than the one proposed by Keegan (1982a). It is unknown as to whether the meat from this trumpet triton shell was utilised for human consumption or discarded. The position of the cut hole is puzzling, and the nature of its purpose is speculative at best; yet, we must remember that this cultural modification may not be directly related to subsistence and could have served other purposes related to rituals or bead manufacture (see Chanlatte Baik, 1983). For instance, shells from species such as the queen conch, and even the trumpet triton were likely made into *fututos* or horns by removing the apex (see Stevens–Arroyo, 1988: 180). Shell horns would have then been not only integral for communicating, especially when tracking or distance travel in multiple groups, but also vital in making music and participating in *arietos* or ritual dances and festivals. The trumpet triton interred with Burial 3 could have been a pre-form horn since the apex was not removed, thus signifying a shell reserved for this individual that had never been played. The siphonal canal of this shell is closer to the mouth of this individual, and not the apex, and this detail may hinder the interpretation that this shell was indeed a pre-form horn. Alternatively, the symbolic usage of the queen conch and trumpet triton may have been employed to perpetuate some form of heraldry and maintained as coats of arms signifying some type of leadership role or even lineal descent. The trumpet triton also may have been used as a drinking cup, possibly one that was used in a libation ritual among group members. Along with the remains of a sea turtle, these two items may have been an offering of food and drink similar to the funerary custom briefly described by Colón (1984: 106) which included the placement of bread and a gourd of water in the grave.

Also included in the grave shaft of Burial 3 was a sunrise tellin shell cache that contained a small lump of red ochre and a scarifier made of fish bone. The 29 sunrise tellin shells in the cache may be a completely random enumeration or a purposeful calculation. It may be a mere coincidence that the number of shells within the cache is identical to the average days in a full lunar cycle (synodic month), or a valid interpretation of the denomination. As aforementioned, the Taínos believed that the moon originated from caves. The shell cache could be the symbolic manifestation of the moon's cycle that occurs during life as a tribute to restoring it to its celestial origin through death and interment within the cave. The sunrise tellin is renowned for its distinctive shell embossed with vibrant striations that appear to mimic the rays of the sun. Consequently, the sunrise tellin shell cache may refer to both the sun and moon, and a theme that includes a mythological return to the beginnings of the cosmos which took place in a specific cave (i.e. Iguanaboina).

The two other artefacts situated within the cache, the fish bone scarifier and piece of red ochre, along with the sunrise tellin shells, likely served as a paint or healing kit. Plants such as jagua (*Genipa americana*), anchiote or red onote seed (*Bixa orellana*), chica (*Arrabidaea chica*) and caraña or gumbo-limbo (*Bursera simaruba*) all yield colouring by which the Taínos could have mixed with oils and decorated their bodies, made rock paintings and in general, used it as an artistic pigment (Cruxent, 1955: 5–6; Sauer, 1966: 56; Valencia & Sujo Volsky, 1987: 130; Stevens–Arroyo, 1988: 41,138; Haviser, 1995; Keegan, 1997a: 6). It is logical to assume that any available colouring in the environment, such as red ochre, would accommodate the need for dye or pigment. This paint kit may have been used for art, in ceremonial gatherings or rituals, for body paint and for festivals (Fernández de Oviedo y Valdéz, 1959: I; Roe, 1982; Haviser, 1995; Keegan, 1997a; Keegan, 2007). Researchers have expressed that red ochre in the West Indies was mainly utilised for body and face paint, rock art and handling of the deceased (Keegan, 1994: 268; González Acabá, 1995: 269; Atkinson, 2001: 305). Specifically the colour red has been noted as a sign of blood, life and male virility (Roe, 1982; Keegan, 1997a, 2007). Ochre has been discovered at many Caribbean archaeological sites, both in archaeological and bioarchaeological contexts as early as the Archaic-age. At an Archaic burial site on Aruba, nearly half of the burials excavated contained a red colourant on the crania (Versteeg, 1991: 108), and Boerstra (1973) speculated that this was due to the application of red ochre. Haviser (2001: 111) has also mentioned body preparation and treatment of the deceased with red ochre and hematite occurring in Archaic period graves on the island of Curaçao. Others

such as Velo (1984) have suggested that ochre and hematite may have been used as medicine since iron salts are known to be a formidable and effective astringent and prevent bleeding (Wilcox, 1911: 203). Ethnohistoric evidence can also provide hints for a more precise interpretation of red ochre in the archaeological record. Just days after the first landfall, explorers came across a solitary man meandering in a dugout canoe offshore the Bahamian Islands (Dunn & Kelley, 1989: 85). The explorers brought him aboard and documented his possessions which included bread, a gourd of water and some red ochre swathed in leaves. Red ochre was interpreted by the Europeans as having some type of trade value amongst the indigenous peoples, as the native man was willing to exchange his red ochre for other goods such as clothing and coins.

Based on current available data, Burial 2 was the first to be interred, wrapped in cordage and buried face down. Both the themes of binding and confounding the ghosts to prevent wreaking havoc on the living align well with myths related to the *zemi* Opiyelguobirán, leading us to suggest that Burial 2 may have been a *behique* or shaman; more specifically, a psychopomp affiliated with a particular clan or sodality that had specific rights and duties which was to predominantly guide souls from the liminal state to the afterlife. This individual's head was also removed, presumably while still fleshed, and likely used for ancestral veneration and even Zemiism, as skulls were observed in Cuba by the Spanish at contact on posts in Taíno houses (Sanz, 1962). Peculiarly, most of the bones of the feet were also missing. At present it is uncertain whether the feet were modified perimortem or postmortem. It appears that at the very least, we can deduce that parts of the lower legs and feet were moved to make room for the final resting place of Burial 3. The extent to which the feet were ritualistically modified as an allusion to Opiyelguobirán, in similar ways practiced by the Omaha to prevent ghosts from haunting the living (Fletcher & La Flesche, 1972: 215), is also unknown. It is also possible that this individual could have been a victim of interpersonal violence who was tied up, possibly murdered, interred face down to bewilder the ghosts, and then the head removed as a trophy or for other ritual usage. Burials 1 and 3 were buried next though we cannot determine who was buried first. Both Burials 1 and 3 may have had similar social roles or status in life since they were both clad in plaited mats prior to interment. Burial 1 may have been a female with important social roles or rights and duties in the village essential to maintain homeostasis. This individual may have been an important elder or matriarch of the community, with power and influence not only due to her longevity, but also possibly due to a status she may have garnered through matrimony as the first wife or favourite wife of an influential male in the community. Burial 3 was not only wrapped in a plaited mat prior to inhumation, but interred with a variety of grave goods that include a trumpet triton and tellin shell cache with a small piece of red ochre and a fish bone scarifier. The trumpet triton shell likely bore several meanings. This seashell may have been a drinking cup used in life or specifically captured and killed for the mortuary ceremony, a coat of arms signifying lineage or leadership or a pre-form horn. The tellin shell cache not only appears to be a very important artefact or charm containing a number of goods useful and highly valued in daily life, but also possibly referring to a number of shaman-like divination rites or ceremonies which may have included funerary or healing rituals. These artefacts strongly suggest that Burial 1 may have been a ceremonial leader responsible for the maintenance of tradition and cosmological equilibrium, and possibly a village headman (i.e. *guaoxerí*) who was also a skilled artisan, diver and fisherman.

Summary and Conclusion

The present study is merely a glimpse of prehistoric Bahamian lifeways and mortuary practices. Though the remains from Preacher's Cave represent only a small sample of the once extant population, it is sufficient to hypothesise general parameters of health, physical activity and mortuary patterning of the Lucayans with the aid of the current bioarchaeological record, theoretical approaches to the analysis of mortuary practices and ethnohistoric documents.

Lucayan–Taíno grave location, body treatment, burial form and grave furniture were likely of ritual importance, held inherent symbolic meaning and helped reinforce group ideology (Siegel, 1989; Oliver, 1992; Siegel, 1992; Siegel, 1996; Oliver, 1997; Oliver, 1998). Likely all aspects of their lifeways appealed to an almighty creator, similar to Yaya, and this supreme being may have also been evoked in deathways. Belief in the journey from life to death, and the liminal state between the two must have been bolstered by an enumeration of fundamental myths with many of them probably centred on caves. Caves thus played an important part of their sacred ecology, of paying tribute to one or more *zemis* in a mortuary ceremony, and greater so, collective memoralisation of ancestors.

Cave and karst research, in conjunction with archaeological and bioarchaeological inquiry, not only

show great promise in broadening our knowledge of Bahamian prehistory, both in respect to practical information that can be gleaned from human skeletal remains concerning health and human behaviour (Larsen, 1987; Larsen, 1997; Steckel & Rose, 2002), but also details concerning funerary practices, social organisation and cosomology (Binford, 1971; Brown, 1971; Peebles, 1971; Chapman & Randsborg, 1981; Brown, 2003, 2006). At present, few detailed reports exist specific to problem-oriented bioarchaeological research (*sensu* Buikstra, 1977) on Lucayan remains, and still little is known in regards to their skeletal biology, adaptation to their environment and socio-political structure. Only until recently have the sizable assemblages been comprehensively inventoried (Pateman, 2007), yet issues with small sample sizes, preservation and documentation have deterred more conclusive interpretations (Keegan, 1982b: 63–64; Pateman, 2007: 10). Though these limitations seem formidable, it should not deter archaeologists and bioarchaeologists from seeking out caves that may hold substantial prehistoric cultural deposits and integrating new data with previous research throughout the Caribbean.

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APPENDIX 1. PREACHER'S CAVE POST-CRANIAL METRICS

Description	Burial 1		Burial 2		Burial 3	
	Left	Right	Left	Right	Left	Right
Clavicle						
Maximum length	152.00	142.00	—	152.00	131.00	130.00
Sagittal diameter at midshaft	10.60	10.50	—	11.80	11.50	11.90
Vertical diameter at midshaft	12.00	12.20	—	13.40	10.40	10.00
Midshaft circumference	40.00	38.00	—	40.00	35.00	34.00
Scapula						
Height	140.00	—	—	157.00	—	137.00
Breadth	96.00	98.00	—	101.00	95.00	96.00
Humerus						
Maximum length	295.00	—	—	299.00	297.00	—
Epicondylar breadth	57.50	—	67.00	—	58.00	58.00
Articular width	40.00	—	46.60	44.70	—	43.70
Maximum vertical diameter of head	44.70	—	—	47.20	—	—
Maximum transverse diameter of head	42.60	—	—	42.90	—	—
Maximum diameter at midshaft	22.60	—	—	24.60	21.80	—
Minimum diameter at midshaft	17.30	—	—	17.40	15.90	—
Minimum circumference, distal to deltoid	63.00	—	—	67.00	61.00	—
Radius						
Maximum length	228.00	229.00	251.00	252.00	—	—
Sagittal diameter at midshaft	10.80	11.40	12.30	12.50	—	—
Transverse diameter at midshaft	16.30	15.30	16.00	16.30	—	—
Ulna						
Maximum length	251.00	252.00	268.00	273.00	—	—
Dorso–volar diameter	12.90	12.50	14.70	14.30	—	13.00
Transverse diameter	15.80	15.60	15.30	17.40	—	16.60
Physiological length	217.00	216.00	236.00	238.00	—	—
Minimum circumference	40.00	42.00	39.00	40.00	—	—
Innominate						
Height	—	—	210.00	207.00	—	—
Iliac breadth	—	—	—	152.00	—	—
Pubis length	—	—	72.70	72.40	—	—
Ischium length	—	—	91.50	89.10	—	—
Femur						
Maximum length	—	—	—	427.00	—	—
Bicondylar length	—	—	—	421.00	—	—
Epicondylar breadth	—	—	—	81.00	—	—
Maximum diameter of head	—	—	—	43.90	—	—
Anterior–posterior subtrochanteric diameter	29.60	27.90	—	26.30	—	—
Medial–lateral subtrochanteric diameter	31.90	30.10	—	25.00	—	—
Anterior–posterior midshaft diameter	—	—	—	27.30	—	—
Medial–lateral midshaft diameter	—	—	—	25.00	—	—
Midshaft circumference	—	—	—	83.00	—	—
Tibia						
Condylo–malleolar length	—	—	—	360.00	—	—
Maximum proximal epiphyseal breath	—	—	77.00	77.00	—	—
Maximum distal epiphyseal breadth	—	—	—	53.00	—	—
Anterior–posterior diameter at nutrient foramen	—	32.60	29.90	32.50	33.20	33.50
Medial–lateral diameter at nutrient foramen	—	23.90	22.00	23.90	24.70	24.80
Circumference at nutrient foramen	—	91.00	85.00	91.00	91.00	93.00
Fibula						
Maximum length	—	—	351.00	—	335.00	—
Maximum diameter at midshaft	—	—	13.80	—	16.20	—
Calcaneus						
Maximum length	—	—	80.50	—	—	—
Middle breadth	—	—	43.50	—	—	—