# Understanding the First Floridians

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Significant debate continues on the sources and timing of the peopling of the Americas as new materials are discovered and evaluated. Census seems to be Asian origin for early immigrants into the New World, arriving in several waves. We hypothesized that the earliest Floridians would exhibit traits of Asian ancestry and would be homogeneous given the relative contemporaneity of our dataset. To test these hypotheses, we gathered data on skulls from five early human sites in Florida: Bay West (~6830 BP), Little Salt Spring (~6180 BP), Republic Groves (~6520 BP), Warm Mineral Springs (~10500 BP), and Windover (~8120 BP). We measured and analyzed 31 variables and 1 cephalic index to determine ancestry and the presence or absence of unique groups across the sites. Our data show these skulls exhibit traits which support shared Asian ancestry for all five: pronounced supraorbital notches or foramina; wide, flaring mandible; moderately narrow nasal aperture; and broad overall facial shape. An ANOVA suggests four closely related subgroups within our sample (Bay West, Little Salt, Warm Mineral Springs, Republic Groves), and one distinct outlier (Windover) ($p=0.076$). These results suggest that four populations were quite similar to one another, despite representing the oldest and youngest material. Windover data suggest that those people were also from Asia but may have been separated from the parent population long enough to develop discrete craniofacial morphology. This difference may represent separate immigrations.

## Introduction

There has been significant debate across several allied disciplines, including anthropology, on the subject of the peopling of the Americas, namely, how did modern humans come to inhabit the New World and where did they come from? (Jantz & Owsley 2001; Lahr 1995; Neves et al. 2004; González-José et al. 2008). Did they arrive as one group and disperse or did they move into the New World in separate waves? Is it possible to identify the ancestral groups to whom these migrants were related? Florida is in a unique position to help address some of these questions because there are several early human sites from which testable material has been recovered.

To that end, I surveyed four separate collections of such material in 2017. These collections curate skeletal material from five early human archaeological sites in Florida. Together, these represent the earliest human migrants into our state known to date, and some of the earliest in the New World (Milanich 2004). Therefore, they are precisely the type of source for data which can help address this debate.

The goals of my study were to first gather empirical data on osteological material to establish probable ancestry of the groups by comparing my data to established global databases on human osteology. Second, to correlate any biological (morphological) relationships I documented between early native Floridian groups with similar mortuary practices. Since it is the living who bury the dead, those practices can shed light on shared beliefs and lifeways. I will combine the biological and cultural evidence to help determine who these people were and what they had in common culturally and biologically. Lastly, I aim to test the data gathered during this study to determine if they support, or conflict, with current models of peopling the New World. Some scientists have supported a traditionalist view of the initial human immigration into the New World (e.g., Bonatto and Salzano, 1997). They argue that these people crossed the Beringia land bridge from northeastern Asia to North America. Others suggest a “dual migration,” scenario of two distinct population movements from Siberia to South America (e.g., Schurr and Sherry, 2004). Kitchen et al. (2008) propose a “three wave hypothesis” with groups arriving from Siberia in three distinct migrations. Clearly, there is no consensus to date.

**Background**

I collected the data presented in this paper to test the above hypotheses. My study focused on osteological material collected from the following sites in Florida: Little Salt Spring, Republic Groves, Bay West, Warm Mineral Springs, and Windover. These sites were chosen because they represent the earliest-known people of the state, perhaps arriving as early as 11,000 years ago. Additionally, I chose these groups and sites due to a unique shared cultural practice of burying their dead in wetlands, often tightly bundled and staked in place.

**Methods**

The six sites from which skeletal material was sampled are specified in Table 1.

I gathered data on qualitative and quantitative data for this project. Many indicators of biological ancestry may be found in the skull. Likewise, evidence of age, sex, and lifeways also can be gleaned from the skull. The global databases of ancestry (e.g. Howells 1973a, 1973b, 1989, 1995) rely heavily on skull measurements, especially those of the facial region, in their rationale for creating ancestral groupings. Therefore, I focused primarily on collecting similar data.

Table 1. Sites and Specimens

| **Site** | **# of Skulls** | **Location Housed** |
|---|---|---|
| Little Salt Spring | 1 | University of Miami |
| Little Salt Spring | 7 | University of Florida |
| Republic Groves | 5 | Florida Atlantic University |

| | | |
|---|---|---|
| Bay West | 12 | University of Florida |
| Warm Mineral Springs | 4 | University of Florida |
| Windover | 42 | Florida State University |

**Morphological Visual Assessments**

Quantitative data were collected to compare out data to extant databases of global human variation, both in living and extinct populations. Initial measurements of each skull consisted of 32 quantitative measurements (see Table 2) and 49 qualitative variables (see example in Table 3). In some cases, the condition of the sample was such that not all variables could be assessed.

Table 2. Quantitative Measurements

| **Description** | **Symbol** |
|---|---|
| (glabello-occipital length) | GOL |
| (maximum cranial breadth) | XCB |
| (bizygomatic breadth) | ZYB |
| (basion-bregma height) | BBH |
| (basion-nasion length) | BNL |
| (basion-prosthion length) | BPL |
| (palate breadth, external) | MAB |
| (biauricular breadth) | AUB |
| (nasion-prosthion height) | NPH |
| (bifrontal breadth) | FMB |
| (nasal height) | NLH |

| **Description** | **Symbol** |
|---|---|
| (nasion-bregma/frontal chord) | FRC |
| (bregma-lambda/parietal chord) | PAC |
| (lambda-opisthion/occipital chord) | OCC |
| (mastoid height/length) | MDH |
| (nasion-occipital length) | NOL |
| (maximum frontal breadth) | XFB |
| (biasterionic breadth) | ASB |
| (bijugal breadth) | JUB |
| (bimaxillary breadth) | ZMB |
| (zygomaxillary subtense) | SSS |
| (nasion-frontal subtense) | NAS |

| | |
|---|---|
| (nasal breadth) | NLB |
| (orbit breadth, left) | OBB |
| (orbit height, left) | OBH |
| (biorbital breadth) | EKB |
| (interorbital breadth) | DKB |

| | |
|---|---|
| (cheek height) | WMH |
| (nasion-bregma/frontal subtense) | FRS |
| (bregma-lambda/parietal subtense) | PAS |
| (lambda-opisthion/occipital subtense) | OCS |
| Cephalic Index | CI |

The quantitative measurements included chords and subtenses of the cranium and face to determine projections and prognathism, as well as breadths and heights of features ranging from the nasal aperture to the orbits to the mandibular body to the palate. For missing data, extrapolated values for a larger sample size for the smaller groups were used.

Table 3. Skull Visual Assessment Data Table Template

| Category | Bone/Feature | Caucasoid-white | Caucasoid-Nordic | Caucasoid-Alpine | Caucasoid-Mediterranean | Negroid-black | Mongoloid-Asian | Mongoloid-East Asian | American Indian | Polynesian |
|---|---|---|---|---|---|---|---|---|---|---|
| **Nose** | nose form | narrow | | | | broad | | medium | medium | medium |
| | nasal bone size | large | | | | medium/small | | small | medium/large | medium |
| | nasals | highly arched, steeplelike | | | | low, flat | nasal overgrowth | | low, tented, nasal overgrowth | |
| | nasal profile | straight | straight | straight | straight | downward slant, straight/concave | straight | concave | concavo-convex | concave/concavo-convex |
| | nasal root | high, narrow | | | | low, rounded | low, ridged | | | |
| | nasion | depressed | | | | little or no depression | | | | |
| | nasal bridge form | high, narrow | | | | low, quonset hut | low | flat | medium/tented | medium |
| | nasal spine | pronounced, long, large, prominent, straight | | | | small, reduced | small | medium | medium, "tilted" | highly variable |
| | nasal sill, lower border-margin | very sharp (sill) | sharp | sharp | sharp | very dull or absent, guttered, troughed | flat, sharp | medium | medium | dull/absent |
| | nasal aperture, width, opening | narrow | narrow | moderately wide | narrow | wide | medium, narrow | | medium | |
| | **Total** | | | | | | | | | |
| | | | | | | | | | | |
| **Face** | face breadth | narrow | narrow | wide | narrow | narrow | very wide | | | |
| | face height | high | high | high | moderately high | low | high | | | |
| | forehead | | | | | rounded | | | | |
| | facial profile-(alveolar) prognathism | straight, very limited, reduced | | | | extreme, projecting, marked alveolar & facial | intermediate | moderate | moderate | moderate |
| | shape | narrow | | | | narrow | wide | | | |
| | eye orbits, orbital opening | angular | angular | rounded | angular | rectangular | rounded | | | |
| | orbital form | rhomboid | | | | rounded | | round | rhomboid | rhomboid |
| | lower eye border | receding | | | | receding | projecting | | | |
| | interorbital projection | high, prominent | | | | low | | very low | low | low |
| | zygomatics, malar form | small, retreating, reduced | | | | reduced | projecting, inferior projection | projecting | robust, flaring, projecting, inferior projection | projecting |
| | Zygomatic tubercle | | | | | | | | present | |
| | zygomaticomaxillary stuture | curved | | | | curved/angled | | angled | angled | curved |
| | **Total** | | | | | | | | | |
| | | | | | | | | | | |
| **Vault** | skull length | long | long | short | long | long | long | | | |
| | skull breadth | narrow | narrow | broad | narrow | narrow | broad | | | |
| | skull height | high | high | high | moderately high | low | middle | | | |
| | Browridges | heavy | | | | small | small | | | |
| | muscle marks | rugged | | | | smooth | smooth | | | |
| | vault-cranial sutures | simple | | | | simple | complex | | complex | complex |
| | cranial vault | high | | | | low | | | | |
| | postbregma | straight | | | | depressed | straight | | | |
| | sagittal arch, contour | rounded | rounded | arched | rounded | flat | arched | | low, sloping | |
| | wormian bones | | | | | | | | present | |
| | inion hook | present | | | | | | | | |
| | mastoid form | narrow, pointed | | | | oblique, posterior tubercle | | wide | wide | wide |
| | sagittal outline | high, rounded | | | | highly variable post-bregmatic depression | | high, globular | medium-low sloping frontal | medium |
| | General impression of the skull | large, moderately rugged, rounded | massive, rugged, elongated, ovoid | large, moderately rugged, rounded | small, smooth, elongated, pentagonoid to ovoid | massive, smooth, elongate, constricted oval | large, smooth, rounded | | | |
| | cranial form | medium | | | | long | | broad | medium-broad | highly variable |
| | mastoid process form | narrow, pointed, vertical | | | | very oblique, tubercle on posterior border | | wide | wide | wide |
| | **Total** | | | | | | | | | |
| | | | | | | | | | | |
| **Jaws and Teeth** | mandilble | medium, cupping below incisors | | | | gracile, oblique gonial angle | | robust | robust | robust, rocker form |
| | Jaws-chin | small, square, bilateral, projecting | | | | large, blunt, median, retreating | large | | blunt, median | |
| | chin projection | prominent | | | | reduced | | moderate | moderate | moderate |
| | chin form | bilateral | | | | median | | median | median | median |
| | ascending ramus | | | | | narrow, oblique | | | wide, vertical | |
| | palatal shape | parabolic/elliptical | narrow | moderately wide | narrow | hyperbolic, wide, parabolic | elliptical, moderately wide | parabolic/elliptical | elliptical/parabolic | parabolic |
| | palatal suture | straight, jagged | | | | arched/jagged | | straight/jagged | straight | highly variable |
| | upper incisors | spatulate, blade-form | | | | spatulate, blade-form | shovelled | shovelled | shovelled-shape | blade/shovelled |
| | incisor rotation | | | | | | | | present | |
| | dentition | small, crowded | | | | large molars | | | | |
| | edge-to-edge bite | overbite | | | | overbite | occlude edge-to-edge | | occlude edge-to-edge | |
| | **Total** | | | | | | | | | |

Sex was determined by visual assessments such as prominence of brow ridges and muscle attachments as well as overall size of the facial features and cranium.

Relative age was determined for each individual based on sutural closings and dental eruptions, categorized as:

1. a child is less than 12 years,
2. a teen or young adult is between the ages of 13 and 24 years old,
3. an adult is between 25 and 39 years old,
4. an older adult is between 40 and 59 years old, and
5. an elderly adult is 60 years of age or more.

All study material was photographed prior to assessment.

**Results and Discussion**

Life-history can be written in teeth and bones, including shared cultural adaptations. Most of the crania I studied also showed extreme dental wear on the occlusal (or biting) surface of the tooth. One individual’s dentition was more worn toward the buccal side, a finding which may suggest that the teeth were used as tools, a common practice in early people. Likely associated with the dental wear are the robust muscle attachments noted, particularly the temporal lines. A few of the individuals also showed abscessing around the external auditory meatus. Cribra orbitalia, lesions on the upper portion of the bony eye socket were also observed in two individuals from Little Salt Spring, as well as one individual from Bay West, as seen in figure 1 of LSS14051, a child from Little Salt Spring.

Figure 1. LSS14051 shows sign of cribra orbitalia.

Several of the individuals have supraorbital notches, as well as multiple foramina around the midpoint of the brow-ridges that spread in a distinct, almost V-shaped pattern (figure 2). These little holes in the bone may be linked to trauma, disease, or even vitamin deficiencies caused by food shortages (Krogman, 1986). These results suggest similar lifestyles, implying that the groups share a cultural background resulting in learned behaviors which would produce such anomalies.

Figure 2. LSS WR-1959-03 (left) exhibits multiple foramina around the midpoint and above supraorbital ridges.

Figure 3. RG 343 (right) shows examples of the pronounced supraorbital notches, a common finding in the study.

Two individuals exhibited evidence of possible trauma. One male, RG142, an adult male from Republic Groves, had a cleft-shaped piece missing from the anterior of the mandible (figure 4). This injury was in the process of healing, indicating that the individual survived whatever caused the fracture (Bass, 1987). LSS WR-1959- 002, an adult female from Little Salt Spring, had fracture lines on the lower border of the left eye orbit (figure 5) which also showed signs of healing. Again, these data suggest that the cultural practices of these earliest Floridians were sufficient to make some traumas survivable.

Figure 4. RG 142 exhibits a possible trauma on the anterior surface of the mandible.

Figure 5. LSS WR-1959-002 exhibits a possible trauma on the lower border of the left orbit.

Included in this analysis are the collections from the Florida sites. Many individuals of the separate collections, from across the geographical area of modern Florida, exhibited the same, or similar, traits, such as pronounced supraorbital notches (Figure 1) or foramina, a wide and flaring lower jaw (mandible), a moderately narrow nasal aperture, pronounced occipital buns, and a wide or broad overall facial shape.

These data in particular show shared ancestry in synchronic populations and a basal Asian origin (Bass, 2005 and Gill, 1998).

Included in this analysis are the distribution for sex and age listed in Table 4.

Table 4. Sex and Age Results

| | Master site # | # of skulls | Male | Female | Child, less than 12 years | Teenage or young adult, 13-24 years | Adult, 25-39 years | Older Adult, 40-59 years | Elderly, 50 years or more |
|---|---|---|---|---|---|---|---|---|---|
| Little Salt Spring | 8SO18 | 8 | 5 | 3 | 1 | | 6 | 1 | |
| Republic Groves | 8HR4 | 5 | 4 | 1 | | | 4 | 1 | |
| Bay West | 8CR200 | 12 | 7 | 5 | | | 9 | 3 | |
| Warm Mineral Springs | 8SO19 | 4 | 3 | 2 | | 2 | 2 | | |
| Windover | 8BR246 | 42 | 22 | 20 | | 11 | 11 | 14 | 5 |

Cephalic index (CI) is represented as the outcome, or dependent variable, below (Table 5) in the test of between-subjects effect. The data on sex differences were somewhat significant (p=0.076). Age was not at all significant (p=0.265). There was robust intra-individual variation.

Table 5. Tests of Between-Subject Effects - Age, Sex, and Average Cephalic Indices

| SourceSquares | Type III Sum of | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Corrected Model | 620.26[a] | 10 | 62.027 | 6.326 | .000 |

| | | | | | |
|---|---|---|---|---|---|
| Intercept | 76384.359 | 1 | 76384.359 | 7790.141 | .000 |
| SEX | 32.157 | 1 | 32.157 | 3.280 | .076 |
| AGE | 52.711 | 4 | 13.178 | 1.344 | .265 |
| Individual CatId | 424.888 | 5 | 84.978 | 8.667 | .000 |
| Error | 549.095 | 56 | 9.805 | | |
| Total | 377509.011 | 67 | | | |
| Corrected Total | 1169.363 | 66 | | | |

a. R Squared = .530 (Adjusted R Squared = .447)

I did an ANOVA (Analysis of variance) adjusting site identification CATID (Category ID) for sex and age, as well as a Post Hoc on CATID. The differences in the groups using CI as the outcome variable showed that the individuals from Windover differed significantly from the other sites in overall craniofacial morphology.

The combined data I analyzed suggest 3 - 4 discrete groups, with one exception. The sites of Bay West, Little Salt, Warm Mineral Springs, and Republic Groves are most closely related to one another. The four related groups are quite similar, despite representing the oldest and youngest material. The people from the Windover site most likely were not closely related to any of the people who occupied the four sites which form a cluster.


Figure 6. Location of studied sites in Florida (Dr. Linda Taylor and Monica Faraldo)

The distinct difference between the Windover people and the other groups suggests separate migrations. I hypothesize that they were separate because they lifeway differed significantly over a time span during which unique craniofacial morphology developed in response.

**Discussion and Summary**

The story of the first Floridians is written in their bones and teeth. A combination of the quantitative and qualitative (visual assessment) data have provided the following insights into who these people were. Many of the individuals share unique visually identified traits pertinent to establishing probable ancestry and relations.

Analyses to date suggest that they come from an ancestral population, likely somewhere in Asia. However, that population is not homogeneous. The data collected in this research seem to support that these early Floridians descended from separate ancestral populations living in that area. It may be that they separated in Asia prior to immigration or that they represent waves of immigration separated by thousands of years.

The groups in this study share several cultural traits as evidenced in similar dental wear patterns, existence of cribra orbitalia and multiple foramina, and healed fractures. These results suggest common cultural adaptations, such as foodways, health status, and effective care for the injured (Dickel 2002). They also appear to share mortuary practices, namely interment in wetlands.

The first steps in this research have opened several pathways for additional inquiry going forward. Ultimately, I hope to learn when and from where these early people came into this area. Were they one population who migrated and split or were they several waves from the same homeland? What helps explain the practice of wetland burials? DNA analyses, if suitable materials can be had, would answer definitively questions of ancestry and sex. Isotopic analyses can shed light on shared lifeways, such as food habits and migration histories. Comparisons with other groups who bury their dead in wetlands in other areas of the world (e.g., La Regla site in Costa Rica) can inform our interpretation of this behavior for the first people to walk into Florida.

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