SOUTHEASTERN CEREMONIAL COMPLEX
-EXTENT AND SITES-
Periods in Prehistory

- **Paleoindian Period**
  - 10,000+ to 8000 BC

- **Archaic Period**
  - 8000 to 1000 BC

- **Woodland Period**
  - 1000 BC to AD 1000

- **Mississippian Period**
  - AD 1000 to 1600

- **Historic Period**
  - AD 1600 to present

PERIODS IN PREHISTORY
MISSISSIPPIAN PERIODS

EARLY MISSISSIPPIAN
900-1100 AD

MIDDLE MISSISSIPPIAN
1100-1350 AD

LATE MISSISSIPPIAN
1350-1550 AD
LATE MISSISSIPPIAN CULTURE
Temple mounds and elite residences
AGRICULTURAL DEPENDENCE UPON CORN
Increasing settlements and population density
EMERGENCE OF ORGANIZED CHIEFDOMS
SOCIAL STRATIFICATION AND CRAFT SPECIALIZATION
CENTRALIZED POLITICAL AND RELIGIOUS CONTROL
ELABORATE RELIGIOUS CEREMONIALISM AND SYMBOLISM
Increasing warfare
LATE MISSISSIPPIAN
1350-1550 AD
LATE MISSISSIPPIAN
1350-1550 AD

EUROPEAN ARRIVAL
1539 AD
LATE MISSISSIPPIAN
1350-1550 AD

EUROPEAN ARRIVAL
1539 AD
ARRIVAL OF FIRST EUROPEANS

HERNANDO DE SOTO, 1539-1543
MISSISSIPPIAN LIFEWAYS END
LATE MISSISSIPPIAN MYSTERY
LATE MISSISSIPPIAN MYSTERY

MISSISSIPPIANS BEGIN TO DISAPPEAR STARTING ABOUT 1450 AD
LATE MISSISSIPPIAN MYSTERY

MISSISSIPPIANS BEGIN TO DISAPPEAR STARTING ABOUT 1450 AD

SITE ABANDONMENT CULTURAL COLLAPSE
LATE MISSISSIPPIAN MYSTERY

MISSISSIPPIANS BEGIN TO DISAPPEAR STARTING ABOUT 1450 AD

SITE ABANDONMENT CULTURAL COLLAPSE

MOST MISSISSIPPIAN CENTERS GONE BY 1500 AD, PREDATING EUROPEAN ENTRADA
LATE MISSISSIPPIAN MYSTERY

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SITE ABANDONMENT CULTURAL COLLAPSE

MOST MISSISSIPPIAN CENTERS GONE BY 1500 AD, PREDATING EUROPEAN ENTRADA

REASONS UNKNOWN
PROPOSED BY WILLIAMS (1983) TO DESCRIBE DEPOPULATION AND REGIONAL SITE ABANDONMENT BETWEEN 1450-1500 AD
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LARGE-SCALE AND CONTEMPORANEOUS
VACANT QUARTER HYPOTHESIS

PROPOSED BY WILLIAMS (1983) TO DESCRIBE DEPOPULATION AND REGIONAL SITE ABANDONMENT BETWEEN 1450-1500 AD

LARGE-SCALE AND CONTEMPORANEOUS

ENVIRONMENTAL, BIOLOGICAL, SOCIAL STRESSORS?
VACANT QUARTER
HYPOTHESIS

ENVIRONMENTAL?
VACANT QUARTER
HYPOTHESIS

ENVIRONMENTAL?

BIOLOGICAL?
VACANT QUARTER HYPOTHESIS

ENVIRONMENTAL?

BIOLOGICAL?

SOCIAL?
LATE MISSISSIPPIAN SITE: AVERBUCH (40DV60)
NORTHWEST OF NASHVILLE, TN
Dated to 1275 AD - 1450 AD

Non-mounded, defensively palisaded village

Maize agriculture

Three separate cemeteries, seventy structures

Structures located outside palisade destroyed by fire

645 graves with 880 individuals recovered from the three cemeteries and beneath structures

Averbuch
PALISADE
AVERBUCH

BIOLOGICAL AND CULTURAL STRESSORS INDICATING A POPULATION IN SEVERE CRISIS:
BIOLOGICAL AND CULTURAL STRESSORS INDICATING A POPULATION IN SEVERE CRISIS:

WITH THE EXCEPTION OF LARSON, LIFE EXPECTANCY IS AMONG THE LOWEST

FEMALES MORE SEVERELY STRESSED THAN MALES

ADULT STRESS WAS MOST INTENSE DURING EARLY ADULTHOOD (15.5 TO 30 YEARS)

LIFE EXPECTANCY: FEMALES 14.6Y, MALES 17.4Y
BIOLOGICAL AND CULTURAL STRESSORS INDICATING A POPULATION IN SEVERE CRISIS:

HIGH INFANT AND YOUNG ADULT MORTALITY RATES; APPROXIMATE MASSACRE ASSEMBLAGES
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HIGH INFANT AND YOUNG ADULT MORTALITY RATES; APPROXIMATE MASSACRE ASSEMBLAGES

30% SHOW LESIONS SUGGESTIVE OF INFECTIOUS DISEASES BLASTOMYCOSIS AND TB, 39% PRESENT EVIDENCE OF POROTIC HYPEROSTOSIS/CRIBRA ORBITALIA
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SIX INDIVIDUALS SHOW SIGNATURES OF SCALPING
VACANT QUARTER HYPOTHESIS
VACANT QUARTER HYPOTHESIS
RESEARCH QUESTIONS:

1. WHAT DOES THE DENTITION REVEAL ABOUT HEALTH STATUS?

2. WHAT POSSIBLE EFFECTS DO COLLAPSE PRECURSOR EVENTS HAVE ON HUMAN HEALTH?

3. WHAT CAN BE SAID ABOUT MATERNAL HEALTH AND THE FETAL ENVIRONMENT AT AVERBUCH?
DENTITION

MOST DURABLE TISSUE IN THE HUMAN BODY
DENTITION

THE ANALYSIS OF DENTAL CARIES AND ENAMEL DEFECTS IN ARCHAEOLOGICAL POPULATIONS HAS BEEN USED TO ADDRESS:

1) LEVELS OF HEALTH AND DISEASE
2) EFFECTS OF SPECIFIC DIETS TO ORAL HEALTH
3) TRENDS AND MODES IN DIET AND SUBSISTENCE PRACTICES
4) BIOLOGICAL AND TEMPORAL SHIFTS FROM FORAGING TO SUSTAINED AGRICULTURE
Progressive destruction of tooth structure (crown or root) initiated by microbial activity on the tooth surface
CARIES

MICROBIAL AGENTS (I.E., STREPTOCOCCUS MUTANS, LACTOBACILLUS ACIDOPHILUS)
Once dentin breached, potential for pathogenic bacteria to enter the body/bloodstream.
Exposure of pulp chamber creates high risk of infection with sequelae of abscess and destruction of the supporting bony structures.
Dental infection may result in serious complications, including meningitis, osteomyelitis, death.
MAIZE AT AVERBUCH
CARIES TRENDS FROM 75 FORAGING AND AGRICULTURAL ECONOMIES IN THE EASTERN WOODLANDS OF NORTH AMERICA
N = 313 ADULT DENTITIONS

MALE = 166 (53%)
FEMALE = 147 (47%)

(15-19 YEARS) = 52 (16.6%)
(20-29 YEARS) = 127 (40.6%)
(30-39 YEARS) = 66 (21.1%)
(40+ YEARS) = 68 (21.7%)

CEMETERY 1 = 230 (73.5%)
CEMETERY 2 = 52 (16.6%)
CEMETERY 3 = 31 (9.9%)

TOTAL TEETH PRESENT = 6922
TEETH ABSENT AMTL = 533
TOTAL TEETH ABSENT = 3092
CARIES AT AVERBUCH
Caries at Averbuch

Caries Incidence (at least one lesion per individual) = 234 (74.8%)

Absence of at least one confirmed carious lesion = 79 (25.2%)
Caries at averbuch

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Absence of at least one confirmed carious lesion = 79 (25.2%)

Multiple caries incidence = 228 (72.8%)

Singular caries or no caries = 85 (27.2%)
CARIES AT AVERBUCH

CARIES INCIDENCE (AT LEAST ONE LESION PER INDIVIDUAL) = 234 (74.8%)

ABSENCE OF AT LEAST ONE CONFIRMED CARIOUS LESION = 79 (25.2%)

MULTIPLE CARIES INCIDENCE = 228 (72.8%)

SINGULAR CARIES OR NO CARIES = 85 (27.2%)

NO SIGNIFICANT ASSOCIATION BETWEEN SEX AND PRESENCE OF AT LEAST ONE CARIOUS LESION
Caries at averbuch

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No significant association between sex and presence of at least one carious lesion

No significant association between cemetery and presence of at least one carious lesion
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NO SIGNIFICANT ASSOCIATION BETWEEN CEMETERY AND PRESENCE OF AT LEAST ONE CARIOUS LESION

SIGNIFICANT ASSOCIATION BETWEEN AGE AND PRESENCE OF AT LEAST ONE CARIOUS LESION
Caries at Averbuch

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No significant association between sex and presence of at least one carious lesion

No significant association between cemetery and presence of at least one carious lesion

Significant association between age and presence of at least one carious lesion
Disruption of enamel formation and deficiencies in enamel thickness resulting from disruptions in ameloblast activity during childhood, and traced to systemic stressors such as malnutrition and infectious disease.

Non-specific stress indicator that can be in response to a very specific stressor.
DEVELOPMENTAL DEFECTS OF ENAMEL
DEVELOPMENTAL DEFECTS OF ENAMEL
**HYPOPLASIAS AT AVERBUCH**

<table>
<thead>
<tr>
<th>Site</th>
<th>% with Hypoplasias</th>
</tr>
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<tbody>
<tr>
<td>Moundville</td>
<td>54%</td>
</tr>
<tr>
<td>(Powell 1988)</td>
<td></td>
</tr>
<tr>
<td>Lub bub Creek</td>
<td>61%</td>
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<tr>
<td>(Powell 1983)</td>
<td></td>
</tr>
<tr>
<td>Dickson Mounds</td>
<td>79%</td>
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<tr>
<td>(Goodman et al. 1980)</td>
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</tr>
<tr>
<td><strong>Averbuch</strong></td>
<td><strong>87%</strong></td>
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<tr>
<td>(Present Study)</td>
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</tbody>
</table>

**HYPOPLASIA FREQUENCIES IN MISSISSIPPIAN SITES**
HYPOPLASIAS AT AVERBUCH

DISTRIBUTIONS EQUAL BETWEEN MALES AND FEMALES BY AGE RANGE, WITH 85% OF THE HYPOPLASIAS CONTAINED WITHIN THE 2.5 TO 5 YEAR INTERVAL
HEALTH STATUS
SKELETAL RESEARCH AT AVERBUCH SHOWS “EVIDENCE FOR SEVERE ILL HEALTH, PERHAPS APPROACHING EPIDEMIC PROPORTIONS” (BUIKSTRA 1992:98).


1. WHAT DOES DENTITION REVEAL ABOUT HEALTH STATUS?

2. WHAT POSSIBLE EFFECTS DO COLLAPSE PRECURSOR EVENTS HAVE ON HUMAN HEALTH?

3. WHAT CAN BE SAID ABOUT MATERNAL HEALTH AND FETAL ENVIRONMENT AT AVERBUCH?
What does dentition reveal about health status?

High caries rates at Averbuch due to extreme reliance on maize.

Maize over-dependence had devastating health impacts including high caries and hypoplasia rates, as well as other likely illnesses (pellagra, nutritional deficiencies).

Why did they engage in abnormal maize utilization when they had access to a wide variety of other food resources?
HOW DOES COLLAPSE AFFECT HUMAN HEALTH?

While not generalizable to other “collapsing” populations, at least in this case we have a better picture:

DECLINING RESOURCES/INCREASING WARFARE

DANGEROUS ENVIRONMENT (Especially by the time palisade built over cemetery 3)

This likely meant the people of Averbuch were not safe foraging outside the village, which limited diet

OVER-RELIANCE ON A MAIZE-BASED SUBSISTENCE REGIME was disastrous in terms of dental health, with larger repercussions to overall health
3. MATERNAL HEALTH AND FETAL ENVIRONMENT

RELATIONSHIP OF FETAL AND CHILDHOOD STRESS AND THE RISK FOR EARLY MORTALITY?

VNC SIZE VARIATION

POSTCRANIAL AND DENTAL ASYMMETRY

TOOTH SIZE