Oral Health and Dietary Patterns in Late Mississippian Eastern Tennessee
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Introduction
Differences in the prevalence of dental pathological conditions, such as dental caries (cavities) can be used to assess status and gender-based dietary differences (Larsen, 1983; Powell, 1988). For example, females in agricultural populations often show a higher prevalence of dental caries than males, reflecting a dietary disparity; females consume more carogenic foods than males (Larsen et al., 1991; Lukacs, 1996). While gender differences can be correlated with a sexual division of labor, status differences in oral health may vary due to population-specific dietary variation (Powell, 1988; Cuina and Tiesler, 2003).

The steep-sided river valleys of southern Appalachia are ecologically heterogeneous and were home to intensive maize-agriculturalists in the Late Mississippian period (AD 1300-1500). These populations are part of simple two-tiered (i.e., elites and non-elites) chieftain level societies that were arguably socio-politically heterogeneous. In this study, we examine the dental health in four samples from three reservoirs: Tellico, Toqua (40MR6) and Citico (40MR7), Watts Bar: Cox (40HA19), and Chickamauga: Dallas (40HA1) (see map).

There are physiographic/ecologic differences between the reservoirs of Tellico, Watts Bar, and Chickamauga (see Schroedl et al., 1990). The patterns of oral health were assessed for each site and compared in order to determine whether there was a consistent pattern throughout the region. We anticipated some frequency differences; however, our results were more complex and socio-culturally meaningful.

Materials and Methods
To test these hypotheses, the permanent teeth of 339 adults (148 males, 193 females, 38 indeterminate sex) were examined for the presence of dental caries (Table 1). All individuals are from populations, which practiced maize agriculture with a sexual division of labor; males hunted and cleared agricultural fields, while females cultivated crops and prepared food (Hudson, 1976). In addition, social status differences characterized their society, evident in burial practices (Hudson, 1976). Individuals interred in the mound are considered high status (elite); those buried in village areas are considered low status (non-elite).

All teeth were examined for the presence of dental caries. Age and sex had been previously assessed using standard anthropological methods (Smith, 1982). Individuals with substantial dental wear were excluded from the study. Sex- and status-based comparisons were conducted. Chi-square tests of significance were used to compare the prevalence of pathological conditions between the groups. If sample sizes fell below five, Fisher’s Exact two-tailed test was used.

Results
For each site, there were no statistically significant sex-based differences in dental caries prevalence (p>0.05, Tables 2-3). Conversely, status-based comparisons revealed some significant results (Table 4). Citico and Toqua (both of Tellico Reservoir) demonstrated significantly greater rates of carious lesions in non-elites than in elites. Cox and Dallas did not show any significant difference.

Discussion
The lack of difference in caries prevalence for all sites between males and females suggests that they consumed a similar, if not identical diet. This pattern was noted regardless of status level. The results contradict other analyses of agricultural populations (e.g., Larsen et al., 1991; Lukacs, 1996), suggesting a different pattern of consumption for the region.

The overall trend evident in the results of the status-based comparison of dental caries indicates that non-elites had poorer oral health than elites in Tellico Reservoir, likely resulting from dietary differences. These results are similar to those from the previous study examining status-based differences in stress indicators at these sites (Betsinger, 2002). Site individuals had lower prevalence rates of stress indicators than non-elite individuals, suggesting better overall health for the high-status group.

The lack of difference in dental caries in the Watts Bar and Chickamauga Reservoir samples suggests more maize consumption by elites in these reservoirs compared to Tellico. This disparity may be due to different food preparation or controlled access to maize by elites due to the ceremonial or ritual significance of corn.

If age is inversely related to abundance, the pattern in the Tellico sample would suggest another food resource was reserved for the local elites. Independent research argues that this reserved resource was meat (Vanderwarker, 1995).

Summary
- No sites exhibit sex differences for dental caries.
- No status differences for dental caries in Chickamauga or Watts Bar Reservoirs (Table 4).
- Both samples of Tellico Reservoir display status difference in caries frequency. Independent evidence from Toqua suggests meat was differentially consumed by elites (Vanderwarker, 1999).

References Cited

Table 1: Demographic Data

Table 2: Sex Differences in Caries Prevalence - Village

Table 3: Sex Differences in Caries Prevalence - Mound

Table 4: Status Differences in Caries Prevalence

*Significant at ≤0.05 level