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Dental Health and Self-Reported Childhood Socioeconomic Status in the William M. Bass Donated Skeletal Collection

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INTRODUCTION

Research on health disparities in modern populations have shown that an individual's socioeconomic status (SES) strongly influences their level of participation in healthcare services, including dental services, with lower SES groups exhibiting the least amount of engagement in such services.[5,7] While this association between SES and healthcare has been established for living populations, it is unknown whether this pattern is observable in a skeletal population. This study assesses whether this trend is evident in the dentition of 185 skeletal donors in the William M. Bass Donated Skeletal Collection (WMB) at the University of Tennessee, Knoxville.

Socioeconomic status as it relates to health captures individual or group access to the primary resources required to achieve and sustain good health[1,4], thus directly connecting this social categorization to individual biology. Specifically, childhood SES is important to the study of dental health due to juvenile and infant susceptibility to health insults concurrent with rapid physical maturity influenced by one's socioeconomic standing.[3] Therefore, childhood SES may result in notable patterns in an individual's dental health which may leave signatures lasting into adulthood.

Dental work (e.g., fillings, tooth extraction) and dental pathology (e.g., caries, abscesses) are the primary indicators of dental health considered for this study, as they are presumably related to an individual's access to dental care. **It is expected that a higher frequency of pathology will correspond to a lower SES category. Frequency of dental work is also expected to correspond to SES, However it is unclear whether dental work is more tightly associated with low SES or access to dental healthcare (and presumably, high SES).**

MATERIALS AND METHODS

We included 185 skeletal donors belonging to groups of varying age, sex, and ancestry from the WMB collection. Only individuals with all or most of their dentition present were included in the sample. Antemortem documents include demographics as well as self-reported childhood SES, education level, and lifelong occupation data were collected from the WMB database. Self-reported childhood SES was scored on a scale of one (low income) to four (high income). Skeletons were evaluated for dental work and dental pathology on a presence/absence basis.

Self-reported childhood SES	Income[8]	Number of individuals
Lower Middle	$49,000 <	40
Middle	$50,000-69,000	42
Upper Middle	$70,000-99,000	86
High	> $100,000	17

Table 1: Income ranges for each socioeconomic status level based on data from the United States Census Bureau.[8]

Statistical analyses, Cochran-Armitage and Fisher's exact tests, were ran through the RStudio software to explore the relationships between dental work and dental health to SES.

RESULTS

- Cochran-Armitage tests indicate a significant relationship between the presence of dental pathology and SES ($p < 0.01$); specifically, higher SES groups exhibit a higher prevalence of dental pathology. Interestingly, no statistically significant relationship is observed between dental work and SES, nor between dental work and dental pathology ($p > 0.01$). These findings may indicate a limited relationship between SES and dental care in the WMB.
- Fisher's exact found a relationship between dental pathology and sex ($p = 0.008$). No such relationship was found between sex and dental work. This findings is consistent with previous research.6
- Almost all individuals (92.6%) had dental work present, whereas just over half (60.6) exhibited dental pathology.

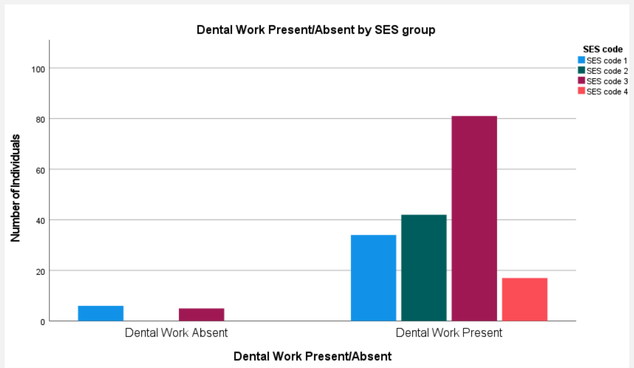

Figure 1: Percentage of dental work present (92.6%) to dental work absent (7.4%).

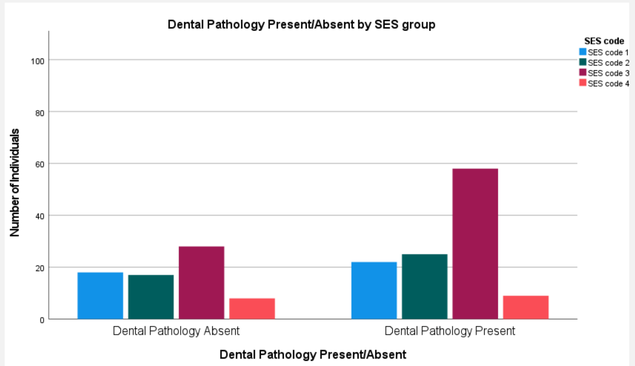

Figure 2: Percentage of dental pathology present (60.6%) to dental pathology absent (39.4%).

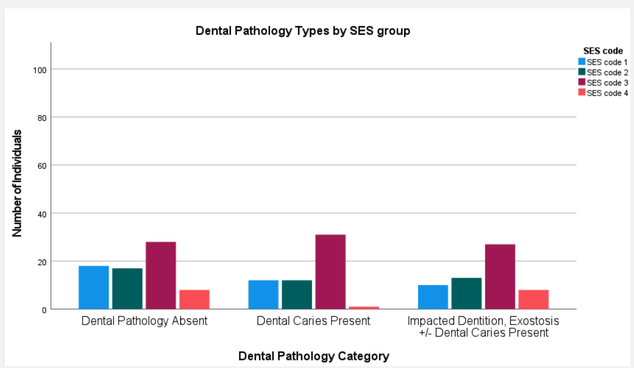

Figure 3: Breakdown of Dental Pathologies Present by SES Groups.

DISCUSSION

- **No significant relationship was observed between dental work and SES nor between dental work and dental pathology**, indicating that dental work and dental pathology are not mutually exclusive nor does the presence dental work appear to be influenced by socioeconomic status.
- Given that the antemortem data collected by the Forensic Anthropology Center at the University of Tennessee, Knoxville reflects childhood SES and is self-reported, current socioeconomic status may have been listed leading to a mismatch in our socioeconomic groups. Research has found that overall social mobility has declined in recent decades, meaning that an individual is likely to stay in the socioeconomic status level they inherited.[2] This points to the reported childhood-SES's given by WMB donors is most likely to reflect their SES at the time of their death. However, because data is self-reported, miscommunication about what SES means and an unwillingness to disclose personal financial information, even something nonspecific like SES, can lead to misrepresentation of donor SES in the WMB antemortem data collection.
- The population of the WMB is predominately comprised of older white males of Northeast Tennessee, typically of the middle-class. While this sample was random, this sample too followed the general demographics of the WMB. Future research should include more females to further explore the relationship between dental pathology and dental work with sex. Additionally, given that the WMB is a fairly homogenous population, greater diversity in age and ancestry are needed.

CONCLUSION

This study highlights the difficulty of integrating self-reported antemortem data, such as socioeconomic status, with skeletal evidence to infer social standing and therefore health of deceased persons, as biological anthropologists are often tasked to do. Future research should include more diverse modern population samples to better explore the impact of socioeconomic status on dental health.

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