

Background

- Dental age estimation relies on tooth development and eruption, compared to established reference standards. Utilized in clinical dentistry, forensics, and legal matters.¹⁻⁴
- Commonly used methods: Demirjian, Willems, Moorrees, and London Assessment (LA) methods.⁵⁻⁸
 - Varying accuracy when applied to various populations due to multiple factors influencing dental development (food security, socioeconomic status, ethnicity).⁹⁻¹⁴
- Conflicting findings on socioeconomic status and dental development.¹¹
- Food insecurity may lead to obesity (associated with accelerated dental development) or malnutrition (associated with delayed dental development).^{12, 14}
- LA method represents first method explicitly based on a diverse sample.⁸
 - Utilizes the modified Moorrees method.
 - Atlas, reference chart, and online calculator.
 - Praised for accuracy, especially with minority populations.¹⁵

Hypothesis and Objective

Objectives:

Evaluate if ancestry, SES, and food security have an impact on dental development separately.

Evaluate the accuracy of a commonly used dental age estimation method in a diverse urban population.

Null Hypothesis:

H₀1: There is no difference in dental development amongst ancestry groups.

H₀2: There is no difference in dental development by socioeconomic status.

H₀3: There is no association between food security/insecurity and dental development.

H₀4: There will be no difference in chronologic age and calculated dental age.

Methods

- Participants: Established patients aged 5-17 years and their parents at University of Illinois Chicago Pediatric Dentistry and Orthodontic clinics.
- Recruitment: Subjects who met inclusion and exclusion criteria (Table 1) were approached to complete a two-part survey on familial ancestry, socioeconomic status, and food security.
- Panoramic images analyzed using the London Dental Atlas Assessment after intra-examiner calibration.
- Statistics: descriptive statistics, Shapiro-Wilk test, Kruskal-Wallis, Wilcoxon signed-rank test.

Inclusion Criteria

- Age: 5-17.9 years
- Panoramic image on file within the last 6 months
- Height and weight (from the day of panoramic image)
- Language spoken: English or Spanish

Exclusion Criteria

- History of endocrine, metabolic, or other growth disorders
- History of endogenous obesity
- History of tooth extraction, jaw surgery, or orthodontic treatment
- Craniofacial anomalies or trauma, malformation of teeth
- Disease affecting number of teeth
- Presence of pathology, oral disease, conditions, or history of medical treatment affecting dental development and/or number of teeth

Table 1 Inclusion and exclusion criterias

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Results

- Sample (n=44): Female (60.9%), Hispanic (69.5%), low SES (77.2%), food secure (68.2%).
- LA overestimated age by an average of 1.4 years in this sample (p<0.001) (Figure 1).
- No statistical significance Δage across ancestry groups (p=0.64) (Figure 2).
- No statistical significance Δage across SES groups (p=0.56) (Figure 3).
- No statistical significance Δage across food security groups (p=0.56) (Figure 4).

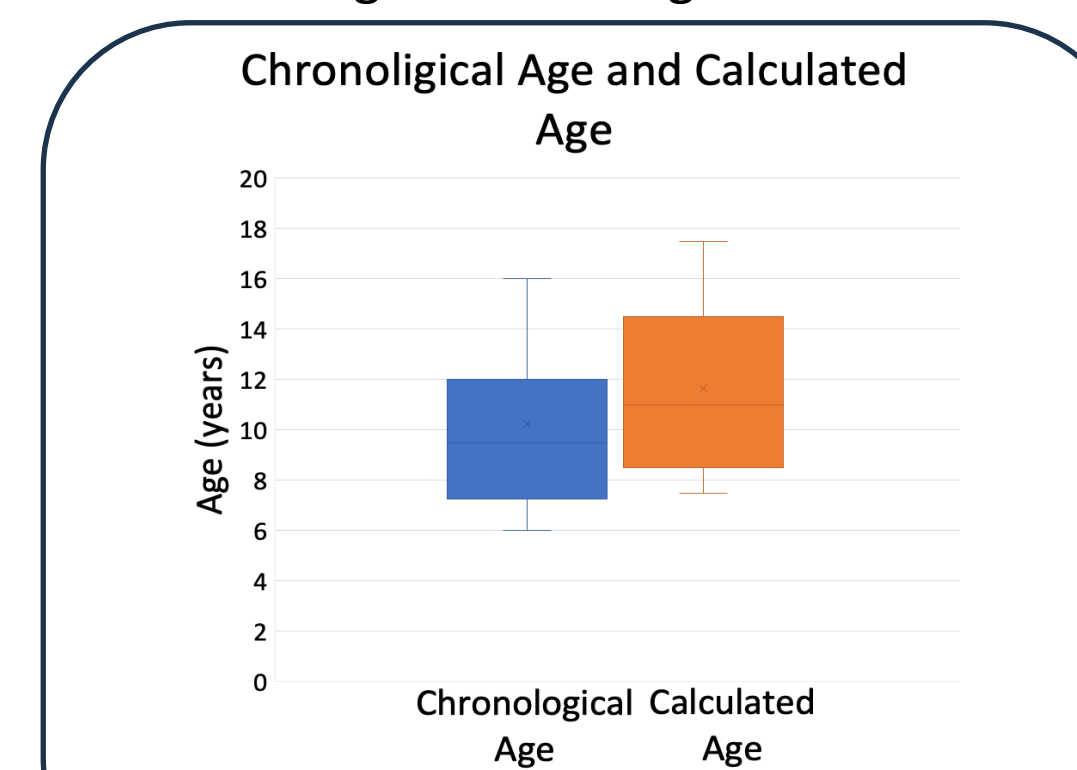


Fig. 1: Boxplot showing chronological age and LA calculated age (p<0.001)

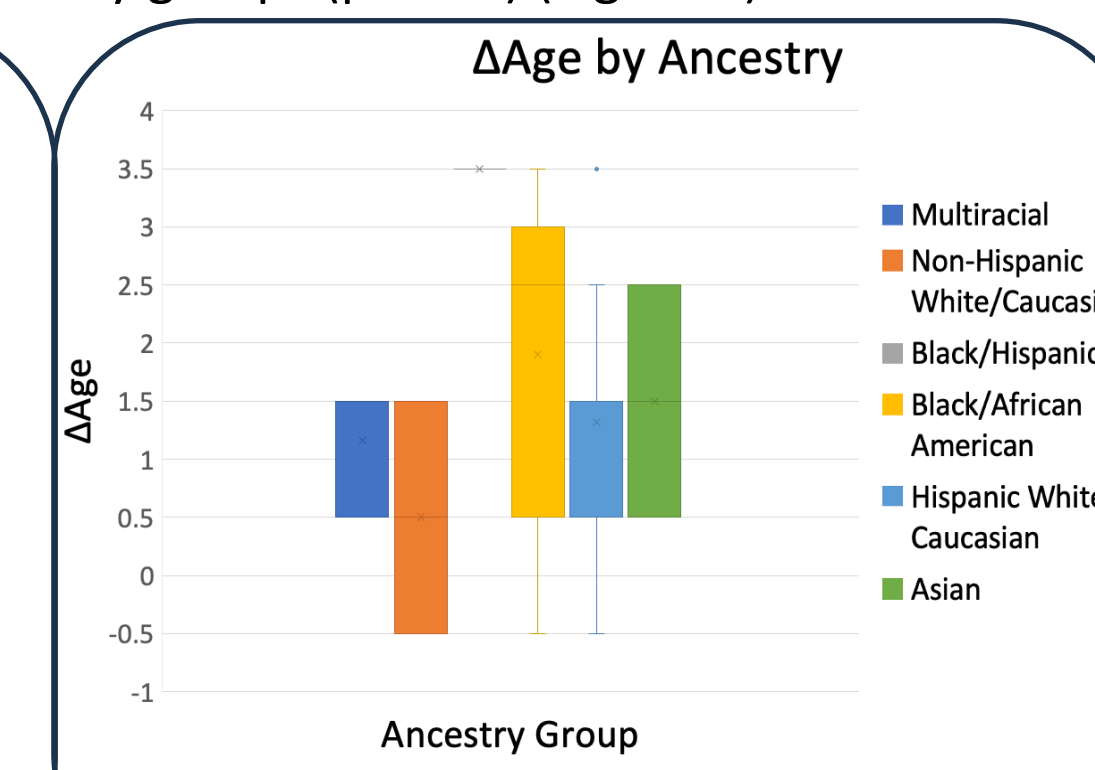


Fig. 2: Boxplot showing relationship between Δage and ancestry group (p=0.64)

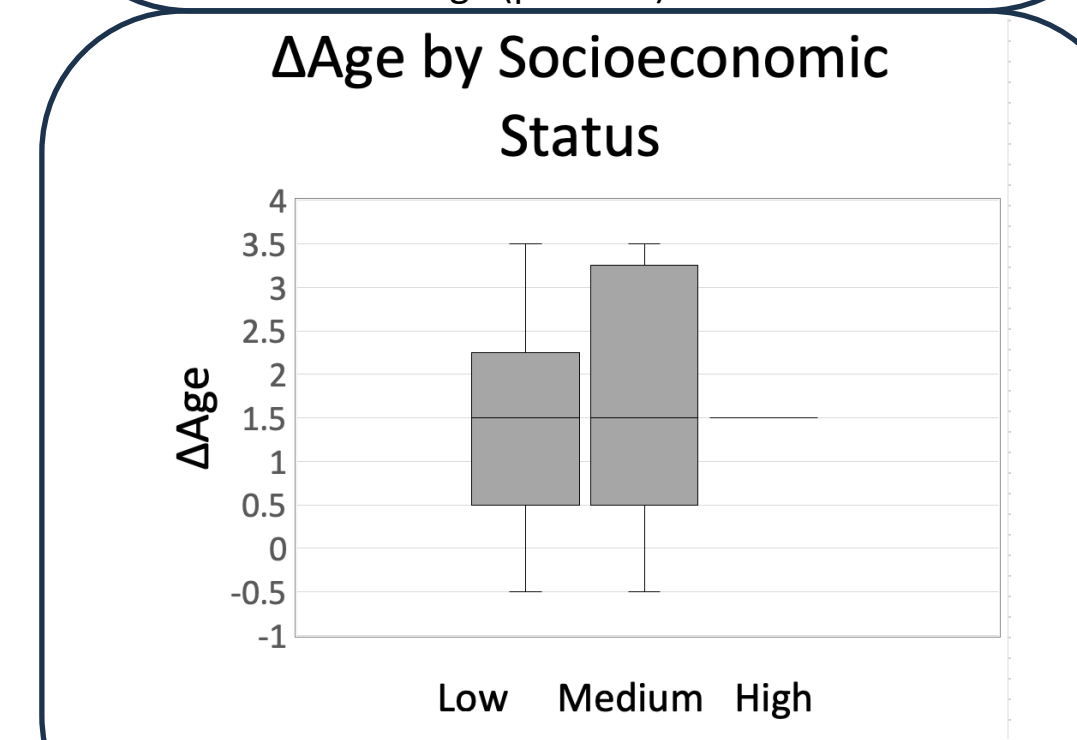


Fig. 3: Boxplot showing relationship between Δage and SES group (p=0.56)

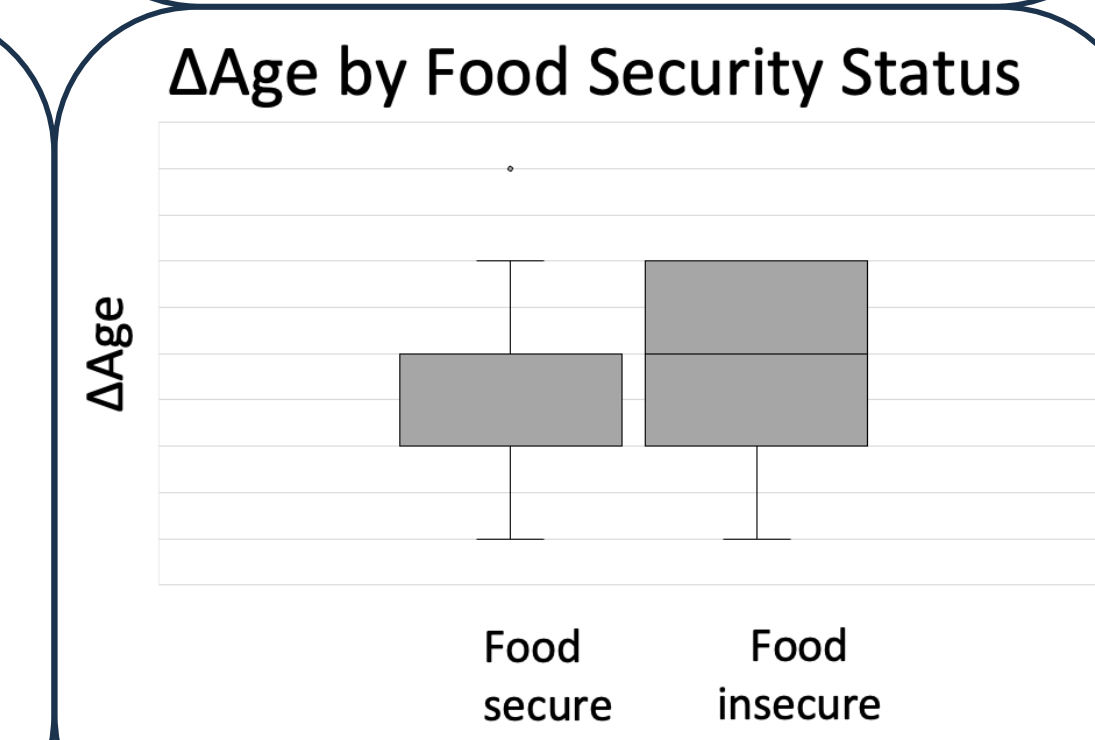


Fig. 4: Boxplot showing relationship between Δage and food security status (p=0.56)

Conclusions

These preliminary results suggest that the timing of dental development is a multifactorial process likely driven by a multitude of genetic and environmental factors and that the LA method may not be an accurate method of calculating dental age in this contemporary urban population.

References

