

Body Mass Index and Dental Age in Black Children



Sujatha Sivaraman, BDS, DMD, MPH; Daniel Kane, DMD; Shreekrishna Akilesh, DMD, MPH; Mary E. Northridge, PhD, MPH; Sallie Yassin, MS; Amanda Phan, DDS

NYU Langone Dental Medicine
Advanced Education in Pediatric Dentistry

INTRODUCTION

- As outlined by the American Academy of Pediatrics Committee on Nutrition, obesity remains the most prevalent chronic health condition in the pediatric population.¹
- Currently, 35.9% of Black children ages 2 to 19 are overweight or obese, compared with 31.7% of all children those ages. Among young Black children, 11.4% of those ages 2 to 5 already are obese.²
- Beyond the immediate health risks, obesity has been associated with accelerated linear growth and the early onset of puberty in females.³ In males, obesity may result in considerable variation in the timing of puberty (both accelerated and delayed).³ Recent studies also suggest that obese adolescents have early craniofacial growth, which may alter their diagnosis and timing of orthodontic treatment.³
- Hilgers et al. found a direct relationship between increased BMI and accelerated growth and dental development among children aged 7-15 years.³
- Chehab et al. evaluated the effect of obesity on dental development in Hispanic children. The obese/overweight group had a significantly greater mean difference between chronologic and dental ages than did underweight/average patients.⁵ However, neither study focused exclusively on the Black pediatric population.

PURPOSE

Using a retrospective chart review design, this study sought to explore associations among chronologic age, dental age, and body mass index (BMI) in Black children receiving dental care.

METHOD

The electronic dental charts of 611 Black children aged 6-16 years who received dental care at a Federally Qualified Health Center (FQHC) in Columbia, MO were reviewed. BMI was calculated from self-reported height and weight at visit intake and a panoramic radiograph was completed and uploaded to each patient's chart. Using the Demirjian maturity scale to assess dental age, panoramic radiographs were used for grading each stage of root development in each child's dentition. Chronologic age was calculated by the child's birthdate and date of panoramic radiograph. Participants were classified into 3 BMI groups: underweight (<5th percentile), normal weight (≥5th percentile and <85th percentile), and overweight/obese (≥85th percentile). For Table 1: BMI_calc (BMI calculated) is reported in kg/m². For Tables 1-3: AGEonDOS = age on date of service or chronological age and dental_age or dental age are reported in years.

Table 1. Demographic characteristics

	Overall
n	611
BMI_calc (mean (SD))	20.62 (6.03)
AGEonDOS (mean (SD))	9.58 (2.60)
ClientSex = Male (%)	290 (47.5)
dental_age (mean (SD))	11.93 (12.40)
bmi_percentile (%)	
Normal weight	277 (45.3)
Overweight	277 (45.3)
Underweight	57 (9.3)

Table 2. Demographic characteristics by BMI group

	Normal weight	Overweight	Underweight	p
n	277	277	57	
AGEonDOS (mean (SD))	9.14 (2.45)	10.00 (2.64)	9.70 (2.76)	<0.001
ClientSex = Male (%)	140 (50.5)	120 (43.3)	30 (52.6)	0.168
dental_age (mean (SD))	10.90 (10.43)	12.95 (13.76)	12.62 (15.40)	0.205

Table 3. Comparison of chronological age and dental age stratified by BMI group and gender, separately

Mean difference and paired sample t-test			
	Normal weight	Overweight	Underweight
n	277	277	57
AGEonDOS (mean (SD))	9.14 (2.45)	10.00 (2.64)	9.70 (2.76)
dental_age (mean (SD))	10.90 (10.43)	12.95 (13.76)	12.62 (15.40)
mean difference	1.89	3.27	3.26
p-value	0.002	0.0003	0.182
Mean difference			
	Female	Male	
n	321	290	
AGEonDOS (mean (SD))	9.58 (2.62)	9.58 (2.57)	
dental_age (mean (SD))	10.48 (2.72)	13.63 (17.93)	
mean difference	1.06	4.4	
p-value	<0.001	<0.001	

RESULTS

- A significant moderate correlation was found between chronologic age and dental age for the overall sample ($r=0.47$, $P<0.001$), with dental age substantially greater than chronological age.
- The mean difference between chronologic age and dental age for normal weight participants was statistically significant ($P<0.002$), with a mean difference of 1.89 years, as was the mean difference between chronologic age and dental age for overweight/obese participants ($P<0.0003$), with a mean difference of 3.27 years.
- Finally, no statistically significant associations between either chronologic age or dental age and BMI were found.

CONCLUSIONS

These findings may inform pediatric dentists in providing anticipatory guidance and orthodontic referrals for Black pediatric patients.

REFERENCES

- Daniels SR, Hassink SG; Committee on Nutrition. The role of the pediatrician in primary prevention of obesity. *Pediatrics*. 2015;136(1):e275-92.
- Ogden CL, Carroll MD, Curtin LR, Lamb MM, Flegal KM. Prevalence of high body mass index in US children and adolescents, 2007-2008. *JAMA*. 2010;303(3):242-9.
- Hilgers KK, Akridge M, Scheetz JP, Kinane DE. Childhood obesity and dental development. *Pediatr Dent*. 2006;28(1):18-22.
- Manjunatha BS, Soni NK. Estimation of age from development and eruption of teeth. *J Forensic Dent Sci*. 2014;6(2):73-6.
- Chehab DA, Tanbonliong T, Peyser J, Udin R. Association between body mass index and dental age in Hispanic children. *Gen Dent*. 2017;65(4):54-58.