Weight, Height, and Eruption of Deciduous Teeth

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Abstract:
The eruption of deciduous teeth, typically beginning around the first year of life, is a critical milestone in early childhood development. Adequate nutrition during infancy and early childhood is pivotal for the proper development of deciduous teeth. This review aims to examine existing literature on the relationship between weight, height, and the eruption of deciduous teeth. The search strategy was conducted across databases, such as PubMed and Scopus. A total of 142 articles were initially identified from the databases and after screened for duplicates, eligibility and relevance, six articles were included in this review. The timing of the first deciduous tooth eruption ranges from 7.9-10.1 months for underweight children, 7.8-8.7 months for normal weight children, and 6.3-8.2 months for overweight children. Children with short stature experienced their first deciduous tooth eruption between 8.8-9 months, which is considered late compared to children with normal stature (7.4-8.9 months) and tall stature (6.7-8.1 months). Despite variations in methodologies, classifications, and timings of weight and height measurement, the studies reviewed consistently demonstrate that children with underweight or short stature experience delayed deciduous tooth eruption compared to their normal-weight and normal-height peers. Further research is needed to explore the underlying mechanisms linking birth weight, height, and tooth eruption, as well as to develop effective interventions that can mitigate the adverse effects of poor nutrition on dental and overall health.

Keywords: weight, height, eruption, deciduous teeth, review.

Introduction
The eruption of deciduous teeth, typically beginning around the first year of life, is a critical milestone in early childhood development. The first deciduous tooth to erupt is often the lower central incisor, with timing varying from 6 to 13.5 months (Muthu et al., 2024). Several factors are suggested to affect the timing and sequence of deciduous teeth eruption, including genetic predisposition, gender, race, maternal age and smoking habits, breastfeeding status, parental socioeconomic level, and nutritional status (Fatemifar et al., 2013; Muthu et al., 2024; Shaweesh & Al-Batayneh, 2018; Wu et al., 2019; Zadzińska, Nieczuja-Dwojacka, & Borowska-Sturgińska, 2013; Żądzińska, Sitek, & Rosset, 2016). Proper timing and sequence of deciduous tooth eruption are essential for the development of speech, chewing efficiency, and the correct alignment and timing of permanent teeth (Poureslami et al., 2015; "Tooth eruption: The permanent teeth," 2006).

Adequate nutrition during infancy and early childhood is pivotal for the proper development of deciduous teeth. Previous studies have suggested that low birth weight and stunting are associated with delayed eruption of deciduous teeth (Gaur & Kumar, 2012; Wu et al., 2019). Furthermore, shorter birth length and stunting
are correlated with a reduced number of erupted deciduous teeth (Gaur & Kumar, 2012; Haddad & Correa, 2005). However, Möhlhenrich et al. found that the correlation between weight, height, and the timing of deciduous teeth eruption is significant only in girls, not in boys (Möhlhenrich, Korkmaz, Chhatwani, & Danesh, 2023). Similarly, Deepa et al. suggested that although there were differences in the mean age of first tooth eruption among children in different percentiles of weight and height, the correlation between these variables was not significant.

This review aims to examine existing literature on the relationship between weight, height, and the eruption of deciduous teeth. By synthesizing findings from various studies, we seek to identify gaps in current knowledge, and highlight the implications for future research and clinical applications.

Materials and Methods

The search strategy was conducted across multiple electronic databases, including PubMed and Scopus. The search strategy combined keywords such as "weight", "height", "deciduous teeth", "eruption". The potentially relevant studies had their full texts analyzed based on the inclusion and exclusion criteria.

Studies concerning the eruption of deciduous teeth and anthropometric measurement, such as height and weight, were included. This review encompassed studies from January 2014 to June 2024. Exclusions were made for book sections, conference proceedings, editorials, non-English articles, review articles, unavailable full-texts, and animal studies. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocols were followed in study selection, and duplicate articles were excluded.

In this study, the term "weight and height" referred to anthropometric measurements and growth indicators related to them. "Eruption of deciduous teeth" included the timing of eruption and the number of deciduous teeth within a specific timeframe. The extracted data included author(s) and year of publication, title, samples, study design, and key findings.

Results

A flow diagram of study selection is shown in Figure 1. A total of 142 articles were initially identified from the databases and checked for duplicates. After removing duplicates, 119 records were screened for relevance. Of these, 33 studies were excluded based on the following criteria: review and animal study design, non-peer-reviewed articles, and non-availability of full texts. 79 articles were excluded because they did not investigate the eruption of deciduous teeth or did not include height or weight information. Finally, six articles were included in this review.
<table>
<thead>
<tr>
<th>Authors</th>
<th>Title</th>
<th>Samples</th>
<th>Study Design</th>
<th>Key Findings</th>
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<tbody>
<tr>
<td>F. Neto &amp; Falcão, 2014</td>
<td>Eruption chronology of the first deciduous teeth in children born prematurely with birth weight less than 1500g</td>
<td>40 children with preterm birth from 5 months to the age of first deciduous tooth emerged</td>
<td>Longitudinal</td>
<td>Time of eruption for lower central incisors for children with preterm birth and birth weight under 1500g:</td>
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<td></td>
<td>- Children with normal birth weight for gestational age: 10.1±1.4 months</td>
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<td>- Children with low birth weight for gestational age: 9.4±2.2 months</td>
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<td>Fatemifar, Evans, &amp; Tobias, 2014</td>
<td>The association between primary tooth emergence and anthropometric measures in young adults: findings from a large prospective cohort study</td>
<td>2977 children from birth to 17 years of age</td>
<td>Longitudinal</td>
<td>Children with more number of paired teeth at the age of 15 months have a higher height and fat mass at the age of 17.</td>
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<td>Shaweesh &amp; Al-Batayneh, 2018</td>
<td>Association of weight and height with timing of deciduous tooth emergence</td>
<td>1756 children from 1 to 33 months of age</td>
<td>Longitudinal</td>
<td>The time range of deciduous teeth eruption based on gender-specific weight and height for-age:</td>
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<td></td>
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<td>- underweight: 7.9–31.5 months</td>
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<td>- normal weight: 7.8–29.6 months</td>
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<td>- overweight 6.3–26.5 months</td>
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<td>- short stature: 9.0–31.3 months</td>
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<td>- normal stature: 7.4–27.0 months</td>
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<td>- tall stature: 6.7–24.3 months</td>
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<td>Wu et al., 2019</td>
<td>Associations of maternal, perinatal and postnatal factors with the eruption timing of the first primary tooth</td>
<td>1109 children who were performed oral examination at 6, 9, and 12 months of age</td>
<td>Longitudinal</td>
<td>Delayed eruption of first deciduous teeth is correlated with low birth weight.</td>
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<td>Mennella et al., 2020</td>
<td>Early weight gain forecasts accelerated eruption of deciduous teeth and later overweight status during the first year</td>
<td>113 children from 0.5 to 12.5 months who randomized to be fed either cow milk formula or an isocaloric hydrolyzed protein formula for the first year of age</td>
<td>Randomized control trial</td>
<td>Early weight gain velocity in the &gt;75th percentile group had statistically significant more number of deciduous teeth erupted at 10.5 months compared to the &lt;25th and 25th–75th percentile groups (P = 0.002).</td>
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<td>Deepa, Reddy, Shilpa, Sushma, &amp; Maurya, 2021</td>
<td>Association of emergence time of first deciduous tooth with anthropometric measurements among infants of Kolar District, Karnataka</td>
<td>154 children from 5 to 12 months of age</td>
<td>Cross-sectional</td>
<td>Time of eruption for central incisors (lower or upper) for children with:</td>
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<td></td>
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<td>- underweight (&lt;3% percentile): 9.5 months</td>
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<td>- normal weight (3% - 50% percentile): 8.7 months</td>
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<td>- overweight (50% - 95% percentile): 8.2 months</td>
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<td>- short stature (&lt;3% percentile): 8.8 months</td>
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Based on the extracted data from the included studies (Table 1), five articles explore the timing of deciduous teeth eruption. Four of these articles specifically discuss the timing of the first deciduous tooth eruption, while one article examines the total duration for the eruption of all deciduous teeth. Most of the studies focused on birth weight (four articles), and two of the included studies explored birth height.

**Discussion**

Despite differences in methods, classification, and timing of weight measurement in the studies included in this review, all the studies consistently agree that children with low-birth weight experience later deciduous tooth eruption compared to their normal-weight peers. The timing of the first deciduous tooth eruption ranges from 7.9-10.1 months for underweight children, 7.8-8.7 months for normal weight children, and 6.3-8.2 months for overweight children (Deepa et al., 2021; F. Neto & Falcão, 2014; Shaweesh & Al-Batayneh, 2018). The eruption timing for underweight children falls into the late stage, while that for normal weight and overweight children falls into the normal stage category (Logan & Kronfeld, 1933; Lunt & Law, 1974).

An inverse relationship is also observed between height and the timing of first tooth eruption. In the studies included in this review, children with short stature experienced their first deciduous tooth eruption between 8.8-9 months, which is considered late compared to children with normal stature (7.4-8.9 months) and tall stature (6.7-8.1 months) (Deepa et al., 2021; Shaweesh & Al-Batayneh, 2018).

Birth weight can be a significant marker of health and developmental outcomes later in life and is a determinant of a child's survival ability (Wilcox, 2001). Low birth weight and height are indicative of poor nutrition, which can interfere with overall health and tooth growth (Wu et al., 2019). Deciduous teeth serve as placeholders for the growth of permanent teeth; therefore, delays in the eruption of deciduous teeth may affect the growth and development of permanent teeth (Poureslami et al., 2015).

Furthermore, children with higher weight gain are suggested to have earlier deciduous teeth eruption, and also at risk of becoming overweight in later life (Mennella et al., 2020). Early eruption of deciduous teeth and the presence of more erupted teeth during the first year of life can increase the risk of dental caries, as caries can attack teeth as soon as they begin to erupt (Otsugu et al., 2023).

Ensuring adequate nutrition from birth through early childhood is vital for promoting both optimal growth and timely tooth eruption. Further research is needed to explore the underlying mechanisms linking birth weight, height, and tooth eruption, as well as to develop effective interventions that can mitigate the adverse effects of poor nutrition on dental and overall health.

**Conclusion**

In conclusion, despite variations in methodologies, classifications, and timings of weight and height measurement, the studies reviewed consistently demonstrate that children with underweight or short stature experience
delayed deciduous tooth eruption compared to their normal-weight and normal-height peers.

**Conflict of Interests**

No conflict of interest.

**References**


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