

# Relationship and impact of obesity/malnutrition on dental skeletal maturation

## Abstract

**Introduction:** Child nutrition is a major concern worldwide that affects 1 in 12 children, representing a priority in Public Health. It has been documented it impacts all areas of a child's development, including their skeletal and dental development. This review addresses a series of related aspects about the available evidence on the association between malnutrition and childhood dental-skeletal development.

**Background:** Studies have been carried out in many parts of the world, some works consulted were carried out in Brazil, India, Italy and the United States. It can be considered that the topic has been approached internationally, having a multiethnic background, which raises questions regarding the influence that eco-epidemiological characteristics of the different places and the possible impact of associated epigenetic processes could have on this association to the problem addressed. Inconsistency in findings. There are some variations found between the results in the consulted studies regarding to the association between obesity/malnutrition and dental-skeletal development/chronological age, which may be to methodological approach, rather than epigenetic factors.

**Keywords:** child nutrition, skeletal, dental development, obesity, malnutrition

Volume 12 Issue 3 - 2022

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**Received:** October 17, 2022 | **Published:** October 28, 2022

## Introduction

Child nutrition is a major concern worldwide that affects 1 in 12 children, representing a priority in Public Health. It has been documented it impacts all areas of a child's development, including their skeletal and dental development. This review addresses a series of related aspects about the available evidence on the association between malnutrition and childhood dental-skeletal development.

Different methods have been used for assessment of child skeletal-dental development and its association to child malnutrition, such as Dual Energy X-Ray Absorptiometry, the use of the Body Mass Index, the assessment method of skeletal maturation through cervical vertebrae, as well as dental eruption chronology (skeletal-dental chronological age). The most analyzed disorders in literature are Obesity and Malnutrition and it has been sought to establish the association between them and skeletal-dental development through the aforementioned methods.

It has been posit analyzing based on available evidence, which are the methods that show a greater rigor to assess the association that exists between child nutrition and skeletal-dental development in order to be able to identify information that enables the construction of reliable and unbiased knowledge.

**Studies background:** Studies have been carried out in many parts of the world, some works consulted were carried out in Brazil, India, Italy and the United States. It can be considered that the topic has been approached internationally, having a multiethnic background, which raises questions regarding the influence that eco-epidemiological characteristics of the different places and the possible impact of associated epigenetic processes could have on this association to the problem addressed.

It is considered, after comparing materials and methods, that work methodology and clinical analysis is similar, being different in some cases the use of advanced equipment for dual X-ray Absorptiometry. The age groups studied in most of studies were 6-15 years old, with the Brazilian group being 6-11 years old,<sup>1</sup> the Italian group 6-12 years old,<sup>2</sup> and in the American studies 8 -17<sup>3</sup> and 10-15 years,<sup>4</sup> and the

Indian 6-13 years,<sup>5</sup> seeking to establish a relationship between the dental chronology of eruption, vertebral bone maturation and the use of body mass index to evaluate the influence of caloric intake on child skeletal-dental development.

## Inconsistency in findings

There is variation in the results regarding a possible association and impact of obesity/malnutrition on skeletal-dental maturation, since, in the available bibliography, the risk of delay in the dental chronology of eruption in children with malnutrition, with a higher risk in women rather than men, according to a study conducted in Brazil and associated with lower Body Mass Index.<sup>1</sup>

On the contrary, childhood obesity is associated with acceleration in dental eruption and at a macronutrient level, presenting a negative correlation with total fat consumption in the study carried out in Chicago, Illinois, also associated with Body Mass Index, but lacking data with regarding skeletal development and giving a minor role to the influence of Increased Caloric Intake, establishing a possible association with obesity through inflammation mechanisms.<sup>3</sup> The second study clearly measures the same factor, but concludes that the weight factor should be considered when diagnosing an orthodontic patient, since excessive calorie consumption does clearly influence the accelerated development of the child.<sup>4</sup> Similarly, these findings are supported by the study carried out in Navi Mumbai, India, which details that a lower Body Mass Index is related to a lower Chronological Age of dental eruption and therefore, dental eruption and vertebral maturation. cervical are delayed.<sup>5</sup>

The results presented by the Department of Neuroscience of the Nutrition Unit of the Tor Vergata Hospital, Rome, Italy contrast unevenly with previous studies, since they do not observe significant differences in the chronological age of dental eruption or skeletal-dental development. between the groups measured through the Body Mass Index and dual X-ray Absorptiometry, but there was a difference in groups of pre-obese and obese children, with skeletal age being greater than dental age. The researchers conclude that there is a remarkable relationship between the acceleration of skeletal-

dental development and the percentage of body fat measured by Absorptiometry.<sup>2</sup>

## Conclusion

Differences are observed in the results obtained between the analyzed studies; these differences can be seen in the weight given to the risk factors tentatively associated with child skeletal-dental development. These variations are possibly related to characteristics of methodological rigor inherent in the studies, which limits a clear interpretation of the different findings.

It is necessary establishing approach strategies that standardize the methodological aspects, related to its rigor and applied to studies carried out in different countries around the association that seeks to be established between obesity/malnutrition and childhood skeletal-dental development/chronology. The rigorous performance of these studies will also allow knowing the importance of epigenetic processes in the triggering of this health problem, in the different regions of the world.

## Acknowledgments

Thanks to Lourdes Magdalena Leal Gonzalez for her contributions to this article.

## Conflicts of interest

The author states there are no conflicts of interest.

## Funding

None.

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