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How Food Shapes Our Faces: Revisiting the Role of Diet, Mastication and Early Feeding Practices in Craniofacial Development: A Perspective

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Abstract

Craniofacial development is influenced by both genetic and environmental factors, with diet and masticatory function playing important roles in shaping facial growth. Reduced masticatory demands associated with modern soft, processed diets may contribute to smaller jaw dimensions and the increasing prevalence of malocclusion. This short communication reviews current evidence on the relationship between dietary consistency, mastication, and early feeding practices in craniofacial development, highlighting the importance of age-appropriate textured foods during infancy. Promoting effective chewing through appropriate dietary practices may represent a simple preventive strategy to support healthy orofacial growth, although further longitudinal studies are needed to confirm these associations.

Keywords: Craniofacial development; Mastication; Dietary consistency; Complementary feeding; Orofacial growth; Malocclusion.

Human Facial Morphology and the Role of Mastication in Craniofacial Development

Human facial morphology is determined by a complex interaction of genetic, epigenetic, environmental, and functional factors. Early anthropological observations by Price demonstrated that indigenous populations consuming traditional, minimally processed diets exhibited broader dental arches, well-developed jaws, and a lower prevalence of malocclusion than genetically similar populations exposed to refined Western diets (1). Building on these observations, Lin emphasized that dietary quality and food consistency may influence craniofacial development through both nutritional and biomechanical pathways (2). While concepts such as Marquardt's Mask and the golden ratio have been proposed to describe facial harmony, facial morphology is now recognized as the product of multiple interacting biological and environmental determinants. Contemporary evidence therefore supports considering diet and masticatory function as modifiable environmental influences rather than independent determinants of facial growth (3,4).

Masticatory Function and Craniofacial Growth

Masticatory function provides essential biomechanical stimuli for craniofacial growth by promoting bone remodeling, muscular development, and dentoalveolar adaptation. According to Frost's mechanostat theory, skeletal tissues adapt to functional loading, while experimental studies have demonstrated that increased masticatory loading enhances muscle activity, sutural growth, and bone apposition (5,6).

During infancy, the introduction of age-appropriate textured complementary foods is fundamental for the maturation of oral motor skills. Appropriate food textures facilitate the development of coordinated chewing and improve masticatory efficiency (7). Recent reviews further suggest that exposure to a variety of food textures during complementary feeding supports the development of food oral processing skills and healthy eating behaviours throughout childhood, although standardized clinical evidence remains limited (8,9). Similarly,

inadequate physiological wear of the primary dentition has been proposed as a clinical indicator of insufficient masticatory function and may be associated with an increased risk of permanent incisor malalignment (10).

Experimental evidence also demonstrates that mechanical loading enhances bone mineralization and calcification (11), reinforcing the concept that adequate functional stimulation contributes to normal craniofacial development. Conversely, the widespread consumption of highly processed, soft foods has substantially reduced masticatory demands in modern societies. This reduction in functional loading has been proposed as one of several environmental factors contributing to reduced jaw dimensions and the increasing prevalence of malocclusion (3,4). Although craniofacial development is multifactorial, encouraging age-appropriate textured complementary foods and promoting effective chewing may represent simple preventive strategies to support healthy orofacial growth. Well-designed prospective longitudinal studies are required to establish the long-term effects of dietary consistency on craniofacial development.

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Figure 1. Schematic representation of the evolution of the human diet and its relationship with craniofacial growth. Progressive dietary softening from prehistoric to modern societies has reduced masticatory loading, potentially influencing jaw development and increasing susceptibility to malocclusion.