A REVIEW OF HYPODONTIA

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Abstract: *This literature review examines hypodontia in terms of its classification, prevalence, etiology, associated anomalies, clinical consequences, and treatment approaches. Various classification systems have been proposed, including those based on inheritance patterns, number of missing teeth, and severity. The prevalence of hypodontia is low in primary dentition but more variable in permanent dentition, influenced by factors such as ethnicity and gender. The most frequently missing tooth is the third molar, followed by mandibular second premolars and maxillary lateral incisors. The etiology is multifactorial, involving genetic, epigenetic, and environmental components. Hypodontia is often associated with other dental anomalies. Its management typically requires a multidisciplinary approach involving multiple dental and medical specialists.*

INTRODUCTION

Hypodontia refers to the congenital absence of one or more teeth, excluding third molars, in either primary or permanent dentition. It results from disturbances during early tooth development and is considered one of the most common dental developmental anomalies. Various terms have been used interchangeably with hypodontia, including tooth agenesis and congenitally missing teeth.

Classification

Hypodontia can be categorized using several criteria. It may occur as an isolated condition or as part of a hereditary pattern, with inheritance modes such as autosomal dominant, autosomal recessive, or X-linked.

Based on the number of missing teeth:

- Hypodontia: fewer than six missing teeth
- Oligodontia: six or more missing teeth
- Anodontia: complete absence of teeth

Severity-based classification includes:

- Mild (1–2 missing teeth)
- Moderate (3–5 missing teeth)
- Severe (6 or more missing teeth)

It may also be classified as syndromic or nonsyndromic (isolated).

Prevalence

Primary Dentition

Hypodontia in primary teeth is uncommon, with reported prevalence generally below 1%. However, absence of primary teeth often increases the likelihood of missing permanent successors.

Permanent Dentition

The prevalence in permanent dentition varies widely across populations, typically ranging from approximately 2% to 10% (excluding third molars). Differences may be influenced by ethnicity, age groups, and research methodology. Females tend to be affected slightly more often than males.

Distribution of Missing Teeth

The third molar is the most commonly absent tooth. Among the remaining dentition, the teeth most frequently missing are:

- Mandibular second premolars
- Maxillary lateral incisors
- Maxillary second premolars
- Mandibular incisors

Patterns of tooth absence may vary between populations, but mild hypodontia is the most prevalent form.

Etiology

The causes of hypodontia are complex and multifactorial. Genetic factors play a major role, with involvement of genes such as MSX1, PAX9, and AXIN2, which are essential in tooth development.

Environmental influences may also contribute, including trauma, infections, radiation exposure, systemic diseases, and disturbances during pregnancy. In many cases, hypodontia results from an interaction between genetic predisposition and environmental triggers.

Genetic Factors

Research suggests that tooth development is largely controlled by genetic mechanisms. Hypodontia may occur as part of inherited conditions or independently within families. It can follow different inheritance patterns, including autosomal dominant and recessive forms.

Mutations in specific genes have been associated with different patterns of missing teeth, particularly affecting premolars and molars.

Environmental Factors

External factors such as early trauma, infections affecting tooth germs, radiation therapy, and systemic illnesses can disrupt normal tooth development. Prenatal influences, including maternal health and medication use, may also contribute.

Syndromic Hypodontia

Hypodontia may be associated with various syndromes, including ectodermal dysplasia, cleft lip and palate, and Down syndrome. In such cases, tooth agenesis is part of a broader pattern of developmental abnormalities.

Associated Dental Anomalies

Hypodontia is frequently linked with other dental conditions, such as:

- Microdontia
- Impacted canines

- Taurodontism
- Tooth transposition and rotation
- Reduced alveolar bone development

Alterations in tooth size and shape are also commonly observed.

Tooth Size and Shape Variations

Patients with hypodontia often exhibit smaller teeth and altered crown morphology. The degree of size reduction is generally related to the severity of the condition. Changes in tooth shape, such as peg-shaped lateral incisors, are also frequently reported.

Clinical Implications and Management

Hypodontia can significantly affect oral function, aesthetics, and psychological well-being, particularly when anterior teeth are missing.

Management is complex and depends on multiple factors, including:

- Severity and pattern of missing teeth
- Patient age
- Occlusion and facial structure
- Patient expectations

Treatment options include orthodontic space closure, prosthetic replacement (dentures, bridges, implants), and sometimes surgical interventions.

A multidisciplinary approach is essential, involving general dentists, orthodontists, prosthodontists, oral surgeons, and other specialists to achieve optimal outcomes.

Conclusion

Hypodontia is a common yet complex developmental condition with diverse causes and clinical presentations. Effective management requires accurate diagnosis and coordinated care across multiple disciplines.

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