Role of Mesiodens and Mikrodontia in Forensic Identification: A Review

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ABSTRACT

Background: *Body identification is a crucial component in forensic investigations, particularly in instances involving unidentified remains. Forensic odontology is crucial for identification through dental examination. The existence of dental abnormalities is one of the features that is frequently employed for identification purposes. Mesiodens and microdontia are two anomalies frequently observed in the Mongoloid population. These aberrations can be utilised to distinguish persons for personal identification.*
Method: *This research is a literature review designed to analyse mesiodens and microdontia for Identification in forensic cases.*
Result: *Mesiodens is among the most prevalent supernumerary oddities. This abnormality is frequently observed in males and Mongoloid populations. Microdontia is an abnormality frequently observed in females and Mongoloid people.*
Conclusion: *Dental anomalies, including mesiodens and microdontia, can serve as identifying markers and exhibit a tendency towards specific genders and races, so contributing valuable information to forensic analysis.*

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INTRODUCTION

Forensic odontology is a study that integrates law and dentistry, functioning as a specialized profession pertinent to justice and the examination of dental evidence. Forensic odontology examines and assesses dental evidence from victims, suspects, and crime scenes. The forensic investigation must scrutinize every facet of the corpse's condition, including the presence of anomalous teeth.[1] Dental anomalies are highly valuable in forensic case identification, particularly in instances involving unidentified remains.[2] Dental abnormalities are categorized into four types: anomalies in number, shape, size, and structure. Anomalies in tooth count may manifest as a deficiency of teeth due to the absence of tooth buds (agenesis) or an excess of teeth (hyperdontia), resulting in one or more supernumerary teeth. This disease results from the disruption of the dental lamina during development.[3] Dental size abnormality, known as macrodontia when the teeth exceed normal size, and microdontia when they are less than usual. This may result from hereditary and environmental influences. Anomalies in tooth morphology, including gemination, fusion, concrescence, accessory cusp, taurodontism, and dilaceration, possess distinct etiologies. Certain traits may be indicative of specific populations.[4] Dental abnormalities in structure typically arise from disturbances in the formation and development of teeth.[1,3,5]

A mesiodens is one of the dental abnormalities that occurs most frequently. Mesiodens is an aberration characterized by an excessive number of teeth resulting from developmental growth disturbances. This disorder may impact either the maxilla or mandible, albeit it is most commonly observed in the maxilla.[5] The etiology of mesiodens remains ambiguous; nonetheless, certain ideas propose the influence of genetic, environmental, syndromic, and hyperproliferative elements associated with the dental lamina.[6] Mesiodens is observed to be more prevalent in males than in females and more frequent in the Mongoloid race compared to the Negroid race.[7] One frequent anomaly is the occurrence of diminutive anomalies, generally known as microdonsia. Microdontia frequently manifests in the second incisor of the maxilla, so it is commonly referred to as the lateral peg condition. The occurrence of microdontia in the maxillary lateral incisor is more prevalent in females.[8] Certain anomalies may serve as distinctive characteristics for the identification of unidentified individuals. Certain anomalies can also be beneficial in elucidating the prevalence of sex and race determination.[9]

METHODS

This research is a literature review designed to analyze age estimation using the Thevissen and ASA methods in the Indonesian population. Data collection was conducted by searching for scientific articles in several reputable and reliable databases, such as Google Scholar, PubMed, ScienceDirect, and Scopus.

The literature search focused on articles published within the last 10 years using a combination of relevant keywords, namely: “Identification,” “Mesiodens,” and “Microdontia.” The articles found were then screened based on inclusion criteria, original articles in Indonesian and English that specifically addressed age estimation and exclusion criteria, such as the full text was unavailable or short reports. Based on the screening results, 15 journal articles were deemed relevant and eligible for further review in this study.

DISCUSSION

Identification is a critical aspect of forensic examination, particularly in DVI incidents and with unidentified remains. Forensic odontology plays a crucial part in identification, as dental test results are analogous to fingerprint analysis, being unique to each individual.[10] Dental anomalies serve as distinguishing features for identification, as well as for fillings and dentures.[1,3] Nevertheless, some research indicates that specific dental defects can yield insights for race and gender identification based on their incidence. In the initial instance (Figure 1), a mesiodens is observed; this condition can be identified in an individual if there exist dental medical records or photographs that distinctly represent the upper jaw teeth, resulting in facilitating data comparison. According to the research by Qamar et al., mesiodens is more prevalent in males, which aligns with the cases observed in male subjects. Mesiodens occurs more frequently in the Mongoloid race than in the Negroid race.[7] The etiology of this health condition remains unconfirmed; nonetheless, multiple theories suggest that mesiodens may result from genetic influences, environmental variables, and hyperactivity of the dental lamina.[11] Certain investigations have indicated a correlation with syndromes like cleft lip and palate, cleidocranial dysplasia, and Gardner's syndrome. Nonetheless, the hyperactivity theory of the dental lamina remains the primary etiological hypothesis.[5,12]

In the second instance (Figure 2), the lateral incisor is smaller than normal and is referred to as the “peg lateral.” This disorder may serve as an identifying marker owing to its distinctive physical traits. Some research indicates that peg lateral is more common in females. [13,14] This aberration is frequently ascribed to genetic predisposition and results from environmental factors throughout growth and development. This abnormality is occasionally linked to genetic disorders.[15] Devasya and Sarpangala's research indicates that this condition may arise from disruptions during the morphodifferentiation phase of tooth development, influencing the morphology and dimensions of teeth while preserving their functionality and the integrity of ameloblasts and odontoblasts, leading to anomalies in tooth size or shape with normal enamel and dentin structures.[13] Additionally, the prevalence of these abnormalities is higher in mongoloid groups, as well as in the maxilla, in comparison to the mandible.[16]

CONCLUSION

Dental anomalies can serve as identification indicators for an unidentified individual. Certain dental abnormalities, such as mesiodens and microdontia, can yield additional information beneficial for forensic case identification. Mesiodens exhibits a greater incidence in males compared to females, although microdontia affecting the lateral incisor is more frequently observed in females. Both oddities are frequently observed in Mongoloid groups. This information aids in forensic analysis for the identification of an individual.

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