# Morphological Dental Age Estimation Technique - A Review

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*ABSTRACT:*

*Age is one of the basic variables, which assume a significant function in each part of life. Individual recognizable proof is a significant part of forensic medicine and dentistry. Age, sexual orientation, race, etc is utilized for distinguishing proof of an individual. Sequential age, as recorded by enrollment of birth date, is alluded all through a person's life. Age is a significant factor in clinical practice; examination and courtroom. Significant dental pieces of information once disregarded are progressively used to unravel the wrongdoing. Age is assessed based on ordered age and bone age, dental age, mental age, and others. Dental age is viewed as imperative as tooth advancement shows less changeability than other formative highlights and furthermore low fluctuation corresponding to sequential age. Thus, dental age is viewed as essential in building up the age of a person. Diverse morphological phases of mineralization relate with the distinctive formative stages. This paper audits different parts old enough assessment like morphological, biochemical, and radiographical strategies and its extension and constraint.*

*Key Words:  Forensic odontology, Dental age, Gustafson's Method, Anthropology*

## INTRODUCTION:

Numerous anthropologists have examined the age frameworks, where age is regularly a significant sorting out standard. Age frameworks incorporate conventional age classes of people of comparable mathematical age, age grades or formative stages dependent on social and organic turn of events, and relative periods of individuals.[1] Body improvement isn't totally connected with natural and sequential age. As a rule, ordered age and natural age may not be the equivalent, because of the formative varieties. Henceforth, various boundaries, for example, dental age, bone age, mental age, and different factors, for example, menarche, voice change, stature, and weight are considered as intermediary pointer for organic age and body improvement. Dental advancement is more dependable as a pointer of organic development in kids. Dental development is more applicable as it is less influenced by dietary and endocrine status. Despite the fact that there are numerous strategies for age assessment Demirjian strategy has been utilized all around with fitting modifications.[2]

## HISTORY:

The first known attempts that pre-owned teeth as a marker old enough started from Britain. In the mid nineteenth century, in light of financial downturn because of the mechanical insurgency, juvenile work and criminality were serious social issues. Edwin Saunders, a dental specialist, was the first to distribute data with respect to dental ramifications in age assessment by introducing a pamplet named "Teeth A Test of Age" to the English parliament in 1837.[3]

**MORPHOLOGICAL METHOD:**

Morphological methods are based on assessment of teeth (ex-vivo). Hence, these methods require extracted teeth for microscopic preparation.

**Gustafson's Method (1950)**

Gustafson (1950) and Thoma (1944) described the age changes occurring in the dental tissues and noted six changes related to age. They are:

Gustafson suggested the last two changes. In the method proposed, each sign was ranked and allotted 0, 1, 2, 3 points. The point values of each age-change are added according to the following formula:

$A_n + P_n + S_n + C_n + R_n + T_n = points.$

The exact equation calculated was: $y = 11.43 + 4.56x$, where, $y$ = age and $x$ = points according to the formula above. The error of estimation as calculated by Gustafson (1950) was ±3.6 years.

Disadvantage: Cannot be used in living person.[3]

Morphological strategies depend on appraisal of teeth (ex-vivo). Subsequently, these strategies require removed teeth for tiny readiness.

Gustafson's Technique (1950)

Gustafson (1950) and Thoma (1944) depicted the age changes happening in the dental tissues and noted six changes identified with age. They are:

a. Attrition of the incisal or occlusal surfaces due to mastication

b. Periodontitis

c. Secondary dentin

d. Cementum apposition

e. Root resorption

f. Transparency of the root

Gustafson recommended the last two changes. In the strategy proposed, each sign was positioned and dispensed 0, 1, 2, 3 focuses. The point estimations of each age-change are added by the accompanying formula

$A_n + P_n + S_n + C_n + R_n + T_n = Points.$

The specific condition determined was: $y = 11.43 + 4.56x$, where, $y$ = age and $x$ = focuses as indicated by the formula above.

Disadvantage : Can't be utilized in living person.[3]

**Dalitz Method (1962)**

Dalitz reconsidered Gustafson's method and recommended a 5-point framework from 0-4, rather than the 4-point framework that was recently utilized. This change was proposed so as to give a somewhat more prominent precision. The outcomes indicated that root resorption and secondary cementum arrangement could be dismissed. Other criterias attrition, periodontitis, secondary dentine (S) deposition, and transperency of the root (T) of the 12 anterior teeth, are related appreciably to age and to a comparable degree. Dalitz proposed this beneath recipe. E = 8.691 + 5.146A + 5.338P + 1.866S + 8.411T

Disadvantage: It doesn't consider bicuspids and molar teeth.[3]

**Bang and Ramm Method (1970)**

They found that the root dentine seems to become transparent during the third decade beginning at the tip of the root and progressing coronally with age. It was discovered that, transparency of the root dentin advances coronally from the tip of the root during the third decade. Best advatage of the method of the strategy is that acceptable outcomes are acquired by measuring intact roots only.[3]

**Johanson Method (1971)**

Age changes were separated into seven unique stages (A0 - A3) and assessed for same six models, mentioned earlier, attrition, secondary dentine development, periodontal attachment loss, cementum apposition, root resorption, and apical translucency. Johanson made a more definite investigation of the root transparency and expressed that it is all the more clear when the thickness of the ground part of the tooth was 0.25 mm.

The following formula was recommended: Age = 11.02 + (5.14 × A) + (2.3 × S) + (4.14 × P) + (3.71 × C) + (5.57 × R) + (8.98 × T)[3]

**Maples Method (1978)**

This method suggested the use of two criteria only of the total six Gustafson recommended-(secondary dentine formation and root transparency), and that make the method more accurate and simple.[4]

**Solheim Method (1993)**

Solheim utilized five of the progressions that Gustafson suggested (attrition, secondary dentin, periodontitis, cementum apposition, and root transparency) and included another three new changes that demonstrated a huge relationship in various kinds of teeth. The three new age-related changes were surface harshness, shading, and sex [3,5]

**SCOPE FOR FUTURE RESEARCH:**

For age assessment dependent on age, identity/race we have to create explicit guidelines. Further investigations are needed to check validity, dependability, and applicability of this technique in various populaces over the world.[6,7]

**CONCLUTION:**

One of the most significant sub-disciplines of forensic sciences is age assessment and is of principal significance in medico-lawful issues. The widening wildernesses of dentistry have accepted the dental specialist as a specialist observer in lawful room procedures and in the field of legal sciences. Dental surgeon assumes a significant function in age assessment. The primary goal is to acquire the best normalized technique for lawful, clinical age assessment, which is conceptive, basic and dependable, that we can apply in living and dead.

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