

Age Determination from Dental Root

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Abstract

Identification of the living person and the dead is of paramount importance in forensic odontology practice routinely. Age estimation is one of the prime factors employed to establish identity. Estimating age from teeth is generally reliable as they are naturally preserved long after all the tissues and even bone have disintegrated. This paper describes 56 subjects where dental aging was used for identification by Bang and Ramm (BR) method. Roots were sectioned and BR method was employed. Estimated age was under age as compared to actual. This method may be used in forensic odontology for age estimation.

INTRODUCTION

The teeth are frequently better preserved than other material, their use for identification of an individual's age at death is very important. Dental aging received considerable attention within the forensic medicine and forensic odontology¹.

Kilian's method is based on the subjective evaluation of six markers², while Kashyap and Koteswara Rao's method is based on quantitative evaluation of four markers³. Our previous method is based on five markers⁴. All above methods required whole teeth which is not possible in certain cases. Hence, this research is based upon the transparency of root for age determination.

LEARNING OBJECTIVES

- Age estimation is a reliable method employed for establishing identity since teeth can be preserved for a longer period.
- Bang & Ramm (BR) system is a reliable forensic tool in cases where only root is present.
- The present study observed that age is underestimated by BR system and this should be supplemented by other tests.

METHOD AND MATERIALS

Our sample consists of 56 freshly extracted permanent teeth (aged 38-43 years) collected from Department of Oral and Maxillofacial Surgery, Govt. Dental College, Postgraduate Institute of Medical Science, Rohtak as well as Bhagwan Dental Clinic, Jind (Haryana), India. Acquired through extractions, the teeth were consecutively disinfected by formaldehyde solution for 17 days. Information about exact

date of birth of patient, date of extraction of tooth, type i.e. maxillary central incisor and lateral incisors were also collected. The teeth were first cleaned with pumice slurry and polishing brush in a slowly rotating hand piece. The teeth were then thoroughly washed under running water. Each tooth was cut (at cemento-enamel junction) into firstly two sections i.e. crown and root. The root was cut into two sections using a high diamond tipped disc (Dentsply, New Delhi, India). The sections were again rinsed under running water to clear them of debris and particles. Following grinding and dehydration, root sections were embedded in penta between a slide and cover glass for microscopic observation.

The ground sections were evaluated by BR technique i.e. translucency of root.⁵ Translucency is frequently not even in its distribution, and therefore it is recommended to take two measurements, T1 and T2, from each tooth section. A mean translucency length, in millimeters, T3 should be recorded combining both of the measurements obtained, i.e.

Figure 1

$$T_3 = \frac{T_1 + T_2}{2}$$

The ground sections were examined four times at low magnification. All the statistical analyses were performed

using SPSS (version 7.0).

RESULTS

Age determination from dentin translucency of dentin (root) is under estimated (approximation 3 to 4 years) as compared to actual age ($p < 0.01$, table I).

Figure 2

Table I: (Mean \pm SD) age estimation (in years) and actual age from root of maxillary control and lateral incisors

Sr. No.	Sample	(Mean \pm SD) of estimated age	(Mean \pm SD) of actual age
1	(n=21) maxillary control incisors	39.4 \pm 1.3	42.6 \pm 1.3
2	(n=35) maxillary lateral incisors	38.7 \pm 1.7	42.8 \pm 1.2

$p < 0.01$ at all.

DISCUSSION AND CONCLUSION

In forensic dentistry, determination of dental age using stages of tooth development to gauge an individual's degree of maturity is one of a few biologic methods for monitoring physiologic development, and the dentition arguable is the only system available from prior to birth to early childhood. Dental development can also be used to estimate chronological age, such as, age at death of an unidentified person or the age of a suspect without legal documentation at birth.

This study is important in case where only root present. It is well accepted that the amount of translucent dentine increases with age, with an expansion of translucency from the apical portion of tooth to the coronal.⁵ The Bang and Ramm (BR) system is used with extracted teeth can either be assessed for translucency whole or section.⁷ This study are useful in that they confirm the technique described by Band and Ramm using forensic material. BR technique is a reliable forensic tool.^{8,9}

It has been observed from the study underestimates age by this method. But the simple equipment, cost effectively, and ease to use in forensic odontology for age estimation. This method may be supplemented by results of other tests, or as in these cases, the absence of any other information suggesting that identification was erroneous. This technique should encourage forensic odontologist to attempt age determination within their case work requirements.

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CDE PROGRAMME

Q1. Which of the following methods used for age determination from root (root only, not whole tooth section)

1. Killian's method
2. Kashyap and Katewswara method
3. Rai, Dhatarwal and Anand method
4. Bang and Ramm method

Q2. Age determination from Bang and Ramm method

1. Underestimated
2. Absolute accurate
3. Over estimated
4. None of these

Q3. Effects of translucency of dentine with aging

1. Decrease
2. Increase
3. Decrease or increase
4. No change

Q4. Principles of Band and Ramm method is

4. 1

1. Translucency of dentine

5. 4

2. Cementum apposition

3. Secondary dentin formation

4. All of above

Q5. Bang and Ramm method is applied to

1. Whole tooth section

2. Root fragment as well as whole teeth

3. Root fragment only

4. All of above

Answer Key:

1. 4

2. 3

3. 2

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