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**ORIGINAL ARTICLE**

## Age Determination on Impacted Teeth: A New Concept

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### ABSTRACT

Dental cementum is a vital tissue which demonstrates continuous opposition throughout the life of the tooth. This research is based on the coronal displacement of cementum, secondary dentin and transparency, with the aim of producing of identification table and BR regression equation for forensic odontology and anthropology age determination. The identification tables and BR were produced using the mutual relationship of the sum of point values and chronological age. BR regression equation could be used in forensic odontology in age determination.

**Keywords:** Impacted teeth, age, BR regression equation

### Introduction

Age estimation of a unknown person based on the examination of bodily remains could be performed either by osteological or stomatological methods. Because the teeth are frequently better preserved than other identification material, their use for identification of an individual's age death was very important. Dental aging received considerable attention within the field of dental anthropology as well as forensic medicine. Gustafson was first to devise the microscopic method for age estimation based on the histological examination of ground thin sections of teeth using a scale of 0-3 points.[1] Kilian's method was based on the subjective evaluation of six marker while Kashyap and Koteswara Rao's method was based on the quantitative evaluations of four markers.[2,3] Balwant Rai et al. method was based on five markers.[4] These method have been applied only in erupted teeth, not on impacted teeth.

It has been observed that coronal displacement of cementum in impacted teeth determined the age.[5] In the present study we focus on coronal displacement, transparency, secondary dentine in

impacted teeth for age determination.

### Materials and Methods

Our sample consists of freshly extracted impacted permanent teeth third mandibular molar (18-71 years) collected. In addition to the extraction date of the tooth and reason for extraction, the records containing the patient's date of birth and ethnicity. In all case, tooth extractions were performed as part of essential dental care. Additional care was taken in the extraction procedure to minimize damage to teeth; teeth which were broken during extraction were excluded from the study. The teeth were reused in running water and were placed in formalin solution for 17 days. The buccolingual ground sections were prepared from each specimen. The transparency and secondary dentine are measured as previous studies[1,4] while coronal displacement of following points:

0	when not or exact overlapping of enamel cementum
0.25	when overlapping of enamel by cementum 19 mm

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- 0.50 when overlapping of enamel by cementum 38 mm
- 0.75 when overlapping of enamel by cementum 54 mm
- 1 when cementum overlapping by 76 mm
- 2 When cementum overlapping the enamel by 152 mm
- 3 When cementum overlapping the enamel by 228 mm

The individual changes were classified using a 9 point scale (0, 0.25, 0.50, 0.75, 1, .....3) in this method. The ground sections were examined four times at low magnification.

All the statistical analysis were performed using SPSS version 11.0 and the Microsoft Excel 95.

**Results and discussions**

*Results*

The resulting formula of age calculation for relationship between sum of point value (Table I, graph I). Using the BR regression analysis was established as follows:

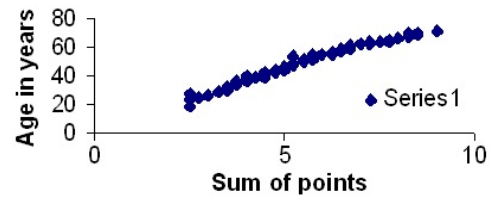
Age = 7.987 x sum of points – 2  
 This equation is also known as BR equation.  
 t = -4.361, p < 0.0001, r = 0.98

*Discussion and Conclusions*

The teeth used in the study have been collected from different places and were extracted for many reasons. This variety of origins was considered suitable for computing the formulas for age determination as it might better reflect the biological variation.

The best of my knowledge, this is first study which include three physiological change in impacted teeth in age determination. It has been recently reported that coronal displacement of cementum with age.[5] We had not included the attrition, cementum thickness, root resorption and periodontal attachment because for these change external stimulation i.e. environmental factor required. Impacted teeth are not affected by environmental factor so that BR regression equation might not change with environmental change. A linear positive correlation coefficient between three physiological marker in impacted teeth and chronological age (p < 0.0001, r = 0.98, table I, graph I). This BR regression equation could be used in forensic odontology in age determination.

We will planning to further study the ability of the model to describe the growth of people with different geographic and ethnic origins, using firstly samples of from various Asian or European nations and then teeth from other continents.



**Graph 1:**

**Table 1:** Identification table (for estimation of age with the use of point classification including coronal displacement of cementum, secondary dentine, transparency)

Sum of the points	Chronological age in years
2.5	18.3
2.5	23.5
2.75	24.6
2.75	25.2
3	26.4
2.5	27.5
3.25	28.2
3.25	29.1
3.5	30.3
3.5	31.7
3.5	32.5
3.75	33.4
3.75	34.3
3.75	35.8
4	35.9
4	36.7
4	37.5
4.25	38.6
4.25	38.7
4.5	39.2
4.5	39.8
4	40.5
4.5	41.3
4.5	42
4.75	42.1
4.75	43.4
5	43.5
5	44.6
5	46.3
5.25	47.5
5.25	47.5
5.25	48.2
5.25	49.3
5.5	49.4
5.5	50.1
5.5	50.9
5.75	51.2
5.75	52.3
5.75	52.6
5.25	53.7
5.75	54.4
6	55.3
6.25	55.6
6.25	56.5
6.5	56.9
6.5	57.4
6.5	58.2
6.75	59.1
6.75	60.8
6.75	61.8
7	61.9
7.25	62.1
7.25	63.7
7.5	63.9
7.5	64
7.5	64.1
7.75	64.3

**Table 1:** Continued

7.75	65.5
8	66.3
8.25	67.5
8.5	68.2
8.5	69.3
8.25	69.7
8.5	70.1
8.5	70.4
9	70.8

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