

Determination Of Marginal bone Level in the Normal Primary Dentition

Hanan F. Abbas - Wassit University- Dept. of Medical College

مستوى حافة العظم السنخي في الاسنان اللبنية الطبيعية

حنان فاضل عباس – جامعة واسط / كلية الطب

الخلاصة

أن الهدف من هذه الدراسة هو تحديد مدى المعدل الطبيعي لمستوى حافة العظم السنخي في الاسنان اللبنية الطبيعية ١٢٠ طفل عراقي (٧ و ٨) سنوات (٦٠ ذكر و ٦٠ أنثى). المؤشرات تقاس باستخدام (DIXI2) برنامج الترتيب الذي تتركب آليا من برنامج Dimaxis. النتائج أظهرت ان معدل ارتفاع حافة العظم السنخي في الاسنان اللبنية الطبيعية هو 1.37 ± 0.48 ملم. ان مستوى ارتفاع حافة العظم السنخي في السطوح المقاسة تتراوح بين (٠.٥ - ٢.٥) ملم. أن المحصلة النهائية من هذا البحث أن مستوى حافة العظم السنخي الطبيعي في الاسنان اللبنية الخلفية يتراوح بين (٠.٥ - ٢) ملم. وان فقدان العظم يحدث عندما تكون مستوى حافة العظم السنخي < 2 ملم

Abstract

The aim of the present study was to establish the normal range for the radiographic distance between cemento-enamel junction and the marginal bone level in the primary dentition using bitewing digital images. The samples examined in this study were 120 Iraqi children 7 and 8 years old (60 male and 60 female). The parameters were measured using the DIXI2 configuration software, which is automatically installed from Dimaxis software.

Results showed that the mean of marginal bone height of the normal primary molars was $(1.37 \pm 0.48 \text{ mm})$. In addition, individual surfaces displayed distance ranging from (0.5-2.5).

It was concluded that the normal marginal bone level in posterior primary dentition was (0.0-2.0) and bone loss occurred when the distance between cemento-enamel junction and the marginal bone level more than 2 mm.

Introduction

Periodontal disease in primary dentition is generally limited to gingival tissue; however, deeper involvement is occasionally seen, destructive periodontal disease in primary dentition has been termed prepubertal periodontitis and is characterized by rapid destruction of periodontal tissues (1).

Different methods for the assessment of alveolar bone height have been commonly used in periodontal research and practice, either direct measurement with millimeter graded rulers or more elaborate method including the application of digital imaging and computer software programs (2).

The diagnostic criterion for marginal bone loss, however, has varied between the different studies from the use of a CEJ-MBL distance of >1 mm to a threshold of >3 mm (1). Kallestal and Matsson (1989) found that the CEJ –MBL distance for the various posterior surfaces averaged 0.5-1.0 mm and very seldom reached 2 mm in 18 year old individuals without clinical signs of periodontitis (3).

Materials and Methods

The sample:

The sample used in this study were 120 healthy children of 7 and 8 years of age, (60 male and 60 female) attending preventive department in College of Dentistry, University of Baghdad., with normal surfaces of primary molars. The total number of sites examined in this study was 478. All children were subjected to clinical examination. Every one was seated on dental chair and examined under artificial light. The sample was collected during a period starting from October/ 2006 to December/ 2006 .

Methods:

Clinical examination

Plaque Index (PII)

The assessment of dental plaque was made according to the plaque index (4), four surfaces of six Ramfjord teeth were examined and scored.

Gingival Index (GI)

The gingival condition at four surfaces of six Ramfjord teeth was assessed using criteria of gingival index (5).

Digital imaging:

Criteria for digital image inclusion and exclusion:

- ❖ Criteria for digital image inclusion: Digital image was considered acceptable for evaluation if fulfilled the following criteria:
 1. No overlapping of inter-proximal contacts.
 2. A clear image of cemento-enamel junction, marginal alveolar bone (6).
- ❖ Criteria for digital image exclusion:
 1. Exfoliating primary teeth: a tooth was considered to be exfoliating if the root resorption for one root surface advanced to the extent that the radiographic image of the periodontal ligament was no longer discernable (6).
 2. Permanent teeth undergoing eruption: a permanent tooth was considered to be under eruption if the cusp tip located supracrestally but not reached occlusion in the radiograph (7).

Bone level of these teeth and adjacent sites were not included in this study because of possible influences of the physiological condition on alveolar bone height (8).

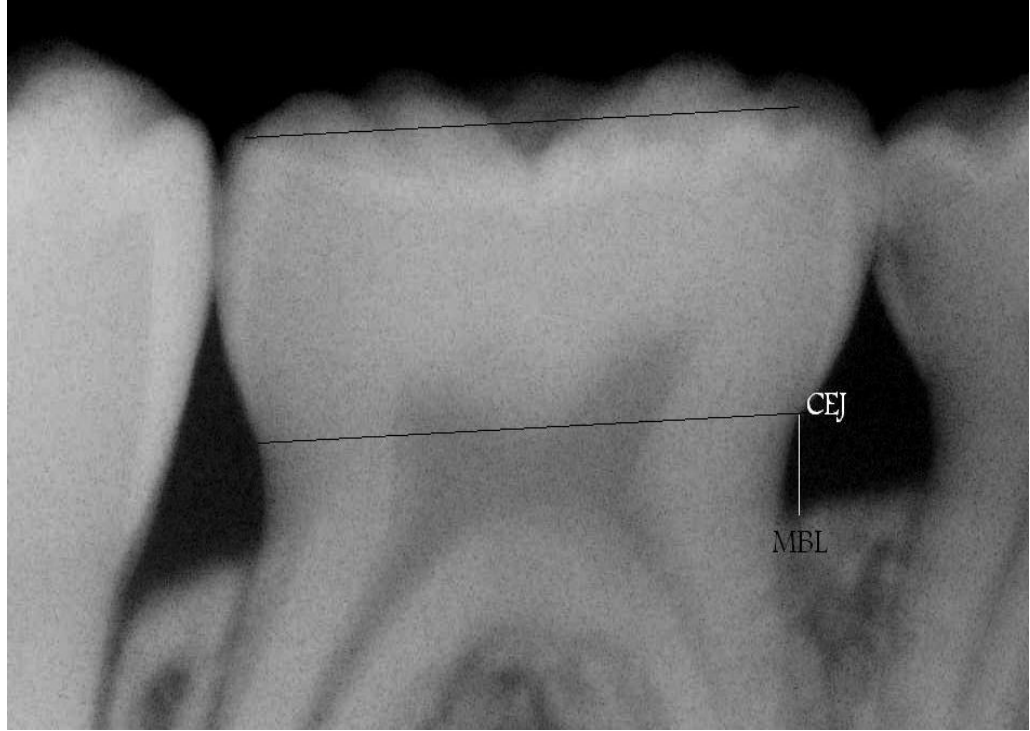
Measurement :

Assessment of Marginal bone level:

Cemento-enamel junction can be defined as that point where the outer edge of the enamel of the crown intersected the outer edge of the dentin of the root (9). Marginal bone level can be defined as the most coronal location of the bone margin adjacent to clearly visible periodontal ligament space (10). The distance between cemento-enamel

junction and marginal bone level was measured at the mesial and distal aspect of primary molars.

Marginal bone loss occurred when the distance between the cemento-enamel junction and marginal bone level more than 2 mm (11) as in the following figure.



Measurement between CEJ-MBL distance.

Data Processing:

Using the DIXI 2 configuration software which is automatically installed from Dimaxis Pro/Classic 3.2.1 software.

High resolution mode was used with pixel size 19 μm , sensor resolution of 26.3 lp/mm and image resolution of 26.3 lp/mm.

To obtain the measurement in mm, the following equation is used:

$$\text{Number of pixel} \times \text{pixel size} = \text{distance in millimeter}$$

The final reading was obtained by taking the mean of three readings.

Inter examiner Calibration of Imaging assessment

Twenty surfaces were examined by the examiner and a senior in oral radiography. The examination was applied by the same method used during the whole study. The differences in inter examiner calibration, were statistically analyzed using student t-test which was of non significant difference ($P>0.05$).

Results

The measurement of the distance between (CEJ-MBL) in the normal Primary posterior teeth was (1.37 ± 0.48 mm).

Table (1): Mean of (CEJ-MBL) distance in millimeters in male and female.

(CEJ-MBL) distance	Male	Female
Mean	1.33	1.38
\pm std	0.49	0.48

Table (2): Mean and distribution of distances of CEJ-MBL in all primary molars.

Surfaces	Mean (mm)	Distributions (mm)	Number of surfaces
All primary tooth surfaces	1.37	0	0
		0.5	52
		1.0	114
		1.5	142
		2.0	06
		2.5	14

Table (3): Bone level for maxillary primary teeth, means and distributions of distances CEJ-MBL for posterior tooth surfaces.

Surfaces	Mean mm	mm	Distributions number of sites
First primary molar	1.39	0.0	0
		0.5	16
		1.0	24
		1.5	34
		2.0	20
		2.5	8
Second primary molar	1.45	0.0	0
		0.5	10
		1.0	20
		1.5	48
		2.0	36
		2.5	8

Table (4): Bone level for mandibular primary teeth, means and distributions of distances CEJ-MBL for posterior tooth surfaces.

Surfaces	Mean mm	mm	Distributions number of sites
First primary molar	1.39	0.0	0
		0.5	18
		1.0	34
		1.5	36
		2.0	36
		2.5	2
Second primary molar	1.28	0.0	0
		0.5	18
		1.0	60
		1.5	34
		2.0	16
		2.5	4

Discussion

In epidemiological studies on the prevalence of periodontitis in children and adolescents, radiographic methods of measurement have frequently been used. In adolescents with permanent dentition the normal distance between CEJ and MBL has been shown to fall within the range of 0-2mm, and diagnostic threshold level for bone loss of >2mm has therefore been suggested (12). Marginal bone loss occurred when the distance between the cemento-enamel junction and Marginal bone level > 2 mm (11).

The range of marginal bone level in the normal primary molar was 0.5-2.5 this in disagreement with (8).

The mean of (CEJ-MBL) distance in this study was (1.37 ± 0.48 mm) this in agreement with Bimstine and Sockline(1988) and Sjodin and Matsson (1992) (13,8).

No significant differences between the mean of (CEJ-MBL) distance in male and female.

References

1. **Sjodin B, Matsson L.** Marginal bone level in the normal primary dentition. J Clin Periodontol 1992, 19,672-678.
2. **Persson GR, Falk H, Laurell L.** A retrospective radiographic outcome assessment study of intra-bony defects treated by osseous surgery or by bone graft procedure. J Clin Periodontol 2000, 27, 104-108.
3. **Kallestal C, Matsson L.** Criteria of assessment of interproximal bone loss on bitewing radiographs in adolescents. J Clin Periodontol 1989, 16, 300-304.
4. **Silness J, Loe H.** Periodontal disease in pregnancy. Correlation between oral hygien and periodontal condition. Act Odont Scand 1964, 22, 121-135.
5. **Loe H, Sliness.** Periodontal disease in pregnancy. Prevalence and severity. Acta-odont Scand 1963, 21, 533-551.
6. **Darby IB, Janet LU, Hanny C.** Radiographic study of the prevalence of periodontal bone loss in Australian school-aged children attending the Royal Dental Hospital of Melbourne. J Clin Periodontol 2005, 32, 959-965.
7. **Matsson L, Hjersing K, Sjodin B.** Periodontal condition in Vietnamese immigrat children. Swedish Dent J 1995, 19, 73-81

8. Sjodin B, Matsson L. Marginal bone level in the normal primary dentition. J Clin Periodontol 1992, 19,672-678.

9. Ardakani FE, Davari A, Goodarizpour D. Evaluation of the diagnostic of advantage of intraoral D and E film for detecting interproximal caries. J Contemp Dent Pract 2004, 4(5), 58-70.

10. Persson RE, Tzannetou S, Feloutzis AG, Bragger U. Comparision between panoramic and intra-oral radiographs for the assessment of alveolar bone levels in a periodontal maintenance population. J Clin Periodontol 2003, 30, 833-839.

11. Sjodin B, Matsson L. Marginal bone loss in the primary dentition. A survey of 7-9- year-old children in Sweden. J Clin Periodontol 1994, 21, 313-319.

12. Zhang S, Ren WG, Zhou L. Risk factors of alveolar bone loss in primary teeth, A master thesis, Department of Pediodontics, Peking University School of Stomatology, 2006.

13. White SC, Pharoah MJ. Oral radiology principles and interpretation, 5th edition, Mosby, 2004, pp. 325.

Recived (24/2/2009)
Accepted (27/10 /2009)