

Radiographic evaluation of mental foramen on the panoramic radiography

Nazar Gh JAMEEL*

ABSTRACT

The appearance and the location of the mental foramen have been evaluated on the panoramic radiograph of (83) adult patients with complete dentition. The most frequent appearance was a separated type of mental foramen (50.61%) followed by continuous (24.09%), diffuse (19.28%) and unidentified type (6.02%). The most common location of mental foramen in relation to the lower bicuspid teeth was below the apex of second premolar (53.85%), and it lied lower than the midway between the upper and lower border of the body of the mandible, and some what it lied at one third of distance from the mandibular symphysis to the posterior border of the ramus of the mandible.

Key Words: radiograph, mental foramen, panoramic.

الخلاصة

تم تقييم مظهر وموقع النقب الذقني في الصورة الشعاعية لـ (٨٣) مريض بالغ ذو أسنان كاملة، والنوع الأكثر شيوعاً للمظهر هو النوع المنفصل للنقب الذقني (٥٠,٦١%) تبعه النوع المتصل (٢٤,٠٩%) ثم النوع المنتشر (١٩,٢٨%) وأخيراً النوع غير المحدد (٦,٠٢%). والنوع الأكثر شيوعاً لموقع النقب الذقني حسب علاقته بالسن السفلي ذو الطرفين المستدقين كان أسفل قمة السن ما قبل الطاحن الثاني (٥٣,٨٥%)، ويقع إلى الأسفل ما بين الحد العلوي والسفلي للفك السفلي، وهو يقع نوعاً ما في الثلث الأول للمسافة من التصاق الفك السفلي للحد الخلفي لفرع الفك السفلي.

INTRODUCTION

The location of mental foramen is desirable to effect local anesthesia to the mental nerve and in endodontic treatment⁽¹⁾, in addition to the recent development of mandibular implant technique and the increasing frequency of orthognathic surgery have increased the possibility of surgical procedures near the mental foramen, make the location of mental foramen is important to the operator, when he is making a flap operation of the lower teeth to avoid cutting or damaging the mental nerve⁽²⁾.

Although the anatomical location of the mental foramen is centered vertically in the mandible, in the patients with complete dentitions⁽³⁾, it has been reported that the mental foramen was located horizontally between the apices of the lower premolars⁽⁴⁾. Other report stated that the mental foramen was located below the apex of the second premolar, the analysis of the vertical position of mental foramen on the panoramic radiographs show they are frequently positioned lower than expected⁽²⁾.

* Nazar Ghanim JAMEEL; BDS, MSc: Lecturer. Department of Oral and Maxillofacial Surgery, College of Dentistry, University of Mosul, Mosul, IRAQ.

Phillip and Weller⁽⁵⁾ in an evaluation of (75) dry adult human mandible, they are determined that the mental foramen in the region of the second premolar on each side, midway between the upper and lower border of the body of the mandible, the usual position of mental foramen is below the crown of second premolar.

Aim of this study is to evaluate and determine the relative radiographic location and appearance of the mental foramen on the panoramic radiography.

MATERIALS AND METHODS

Eighty three panoramic radiographs have been taken for adult patients with complete dentition. All radiographs have been made with the use of orthopan topography 10-E machine from (Siemens Corp-Germany) operated at (74) Kvp and (10) mA with the use of palmox high speed screen cassette.

The radiographic appearance of the mental foramen was evaluated according to the following classification⁽²⁾:

- 1-Separated type: in which the foramen is distinctly separated from the mandibular canal (figure 1).
- 2-Continuous type: which is continuous with the mandibular canal (figure 1).
- 3-Diffuse type: in which the foramen has indistinct border (figure 2).
- 4-Unidentified type: in which the mental foramen cannot be identified on the panoramic radiograph (figure 2).

The radiographic location of the mental foramen on the panoramic radiography in both vertical and horizontal planes was determined according to the relation of the foramen with the following anatomical landmarks (figure 3):-

- 1-Distance between the upper border of the foramen to the most upper border of the alveolar bone (A).
- 2-Distance between the lower border of the foramen to the lower border of the body of the mandible (C).
- 3-Distance between the posterior border of the mental foramen to the posterior border of the mandibular ramus (MR).
- 4-Distance between the anterior border of the foramen to the symphysis of the mandible (MS).

The vertical position of the mental foramen was determined according to the ratio A/C ⁽³⁾. The diameter of mental foramen (B) on the panoramic radiography and the relation of foramen to the apices of the roots of the bicuspid teeth have been determined also.

RESULTS

The location and appearance of mental foramen was evaluated on the panoramic radiographs of (83) adult patients with complete dentition; (48) females and (35) males.

The number and percentage of different types of appearance of the mental foramen were shown by the table (1), where the greatest percentage represented by separated type of mental foramen (totally about 50.61%) then followed by continuous type about (24.09%), and the lesser incidence of diffuse and unidentified types (19.28%, 6.02%) respectively.

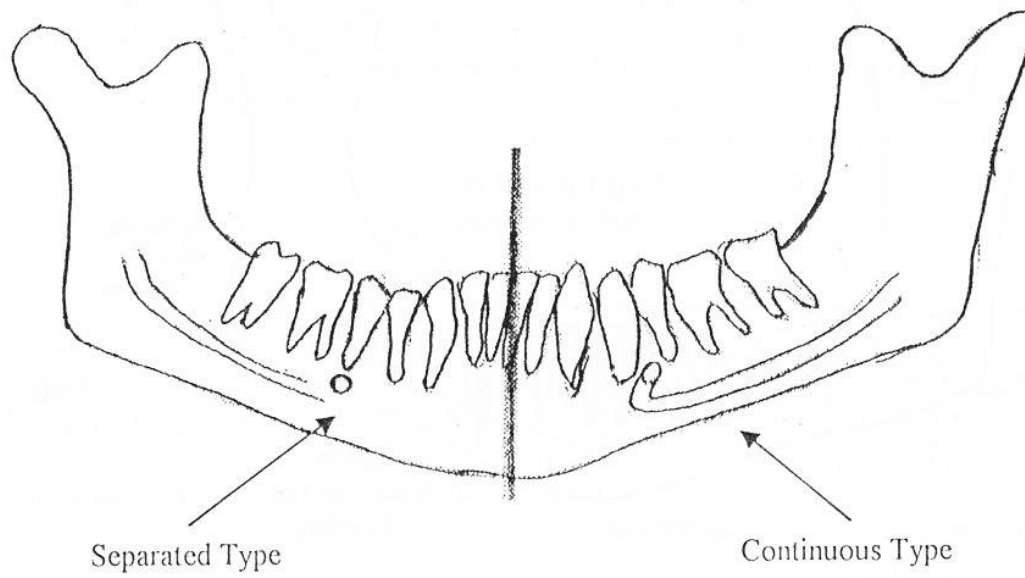


Figure (1): Diagram showing the separated and continuous types of the mental foramen

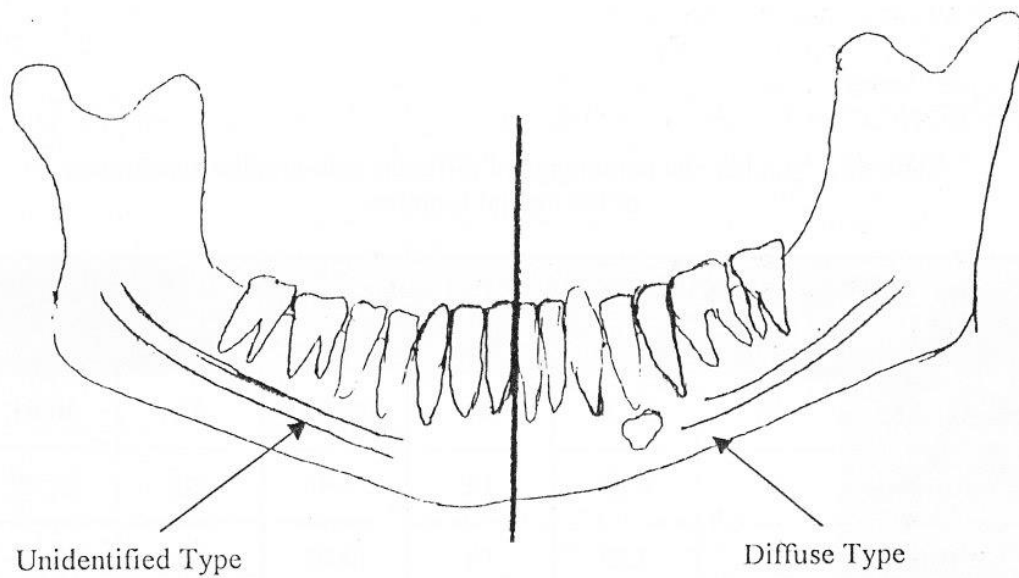


Figure (2): Diagram showing the diffuse and unidentified types of the mental foramen

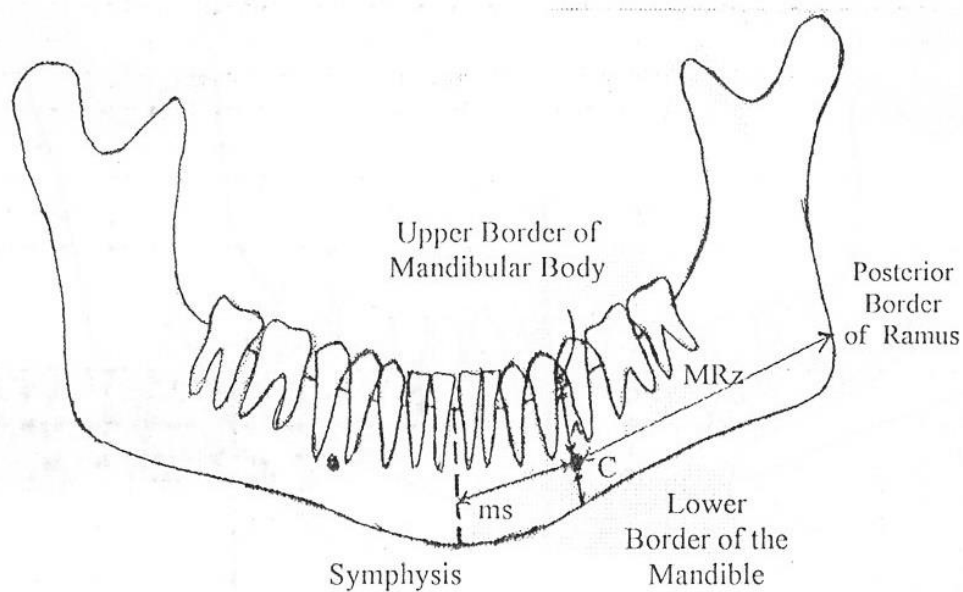


Figure (3): The distance measured from the mental foramen to the different anatomic landmarks of the mandible

Table (1): Number and percentage of different radiographic appearance of the mental foramen

Type	Male		Female		Total	
	No.	%	No.	%	No.	%
Separated	18	21.69	24	28.92	42	50.61
Continuous	8	9.63	12	14.46	20	24.09
Diffuse	6	7.23	10	12.05	16	19.28
Unidentified	3	3.61	2	2.41	5	6.02

The relative position of mental foramen in relation to the apices of the roots of the bicuspid teeth have been shown in the table (2), where the highest incidence of mental foramen is located below the apex of the root of the second premolar in both sexes (male 19.23% & female 34.62%, totally about 53.85%), the location of mental foramen between the apices of two bicuspid teeth forming about (35.89%) and only (10.26%) of cases were examined in this study shown that the mental foramen was located distal to the apex of the root of the second premolar. No case represent the location of mental foramen was to be mesial or below the apex of first premolar tooth

Table (2): Number and percentage of the relative radiographic position of the mental foramen in relation to the bicuspid teeth

Location	Male		Female		Total	
	No.	%	No.	%	No.	%
Mesial & Below First Premolar	—	—	—	—	—	—
Between the Two Bicuspid	13	16.66	15	19.23	28	35.89
Below the Second Premolar	15	19.23	27	34.62	42	53.85
Distal to the Second Premolar	4	5.13	4	5.13	8	10.26

The diameter of mental foramen radiographically range between (3.05 to 3.92 mm) in different types of foramen and the relative vertical position of mental foramen was shown by table (3), were it was located slightly below the midway of the distance measured from the upper border to the lower border of the body of the mandible, this can be identified from the ratio A/C in the table (3), were its more than (1) value (A: the distance between the upper border of the alveolar process of the body of mandible to the upper border of mental foramen, C: the distance between the lower border of the mental foramen to the lower border of the body of mandible).

Table (3): The relative radiographic vertical position of the mental foramen

Types	No.	A. Mean (mm) ± SD	B. Mean (mm) ± SD	C. Mean (mm) ± SD	A/C ratio
Separated	2	18.44 ± 0.876	3.05 ± 0.364	13.64 ± 1.017	1.351
Continuous	0	18.39 ± 0.791	3.09 ± 0.346	13.69 ± 0.835	1.343
Diffuse	6	18.51 ± 1.032	3.92 ± 0.982	13.22 ± 1.102	1.400

A : Distance between the upper border of mental foramen and upper border of mandibular body .

B : Diameter of the mental foramen .

C : Distance between the lower border of the mental foramen and lower border of the body of mandible

SD: Standard deviation .

Table (4) shown the relative horizontal position of mental foramen in relation to the symphysis and the posterior border of the ramus of the mandible, it was found that the mental foramen was located in one third of this distance from the symphysis to the posterior border of the ramus of the mandible.

Table (4): The relative radiographic horizontal position of the mental foramen

Types	MS Mean (mm) ± SD	MR Mean (mm) ± SD
Separated	37.59 ± 3.214	72.05 ± 5.402
Continuous	37.52 ± 3.535	71.075 ± 5.380
Diffuse	34.72 ± 3.453	72.39 ± 5.601

MS: Distance between the anterior border of mental foramen and the symphysis of mandible.

MR: Distance between the posterior border of mental foramen and the posterior border of the mandibular ramus.

SD: Standard deviation.

DISCUSSIONS

The radiographical findings of the mental foramen with the panoramic radiography, its appear in the different shape, the most frequent types, were the separated type (50.61%) then followed by continuous type, which is forming about (24.09%), this results come in agreement with the previous study made by Takashi and Sharon ⁽²⁾. The small incidence of diffused and unidentified types of the mental foramen (19.28% and 6.02% respectively) may be related to that of too great radiographic density, indistinguishable trabecular pattern and thin mandibular bone ⁽⁶⁾.

In relation to the lower bicuspid teeth, the mental foramen was located mainly below the apex of the second premolar in a percentage about (53.85%) and in a lesser incidence it was located between the apices of the roots of the first and second premolars (35.89%). These results supported by other reports stated that the mental foramen was located below the apex of the second premolar ^(1, 7).

A very small incidence of the mental foramen has been located radiographically distal to the apex of the root of the second premolar so that no any case could isolated to show the mental foramen was located below or mesial to the apex of the root of the first premolar (table 2).

The mean diameter of mental foramen in the different types is range between (3.05 - 3.92 mm), its shown a slight increase in its diameter in case of diffuse type of mental foramen, these findings are in agreement with other results reported previously ⁽²⁾.

As a localization of the mental foramen in a vertical and horizontal planes, we find that the foramen was positioned slightly below the mid way of distance measured

from the upper border of alveolar process to the lower border of the body of the mandible, these results have been reported by Takashi and Sharon⁽²⁾ in their study of location of the foramen on the panoramic radiography, where the other anatomical studies said that the mental foramen is located in the midway between the lower border of the mandible and the upper border of alveolar process.

In the horizontal plane, we find that the mental foramen was positioned in one third of distance measured from symphysis to the posterior border of the mandibular ramus, but anatomically the other reports said that the foramen was located in one forth of this distance from the symphysis of mandible⁽¹⁻⁷⁾. The difference in localization of mental foramen radiographically on the panoramic radiography from those anatomical studies, it may be as a result of lack of resolution of the image of panoramic radiography, variation in the degree of distortion and difference in the vertical and horizontal magnification⁽⁸⁾.

The location of mental foramen in the vertical and horizontal planes allows definition of a relatively small area in which the foramen most frequently is found.

CONCLUSIONS

- 1-The most frequent appearance of the mental foramen is the separated type, then followed by continuous, diffuse and unidentified type.
- 2-The most common location of mental foramen in relation to the apices of the roots of the bicuspid teeth, it was below the apex of second premolar.
- 3-The relative vertical position of mental foramen was slightly below than the midway between the upper and lower border of the body of the mandible.
- 4-In a horizontal plane, the mental foramen was located in one third of distance from the symphysis of the mandible to the posterior border of the ramus of the mandible.

REFERENCES

- 1-Wheeler RC. Dental Anatomy and Physiology. 4th Edn. Philadelphia, WB Saunders Co. 1969: 330-331.
- 2-Takashi Y, Sharon L. The appearance of mental foramen on panoramic radiographs. I. Evaluation of patients. *Oral Surg.* 1989; 68: 360-364.
- 3-Takashi Y, Sharon L. The appearance of mental foramina on panoramic and periapical radiographs. II. Experimental evaluation. *Oral Surg.* 1989; 68: 488-492.
- 4-Schaffer JP. Morris Human Anatomy. 10th Edn. Philadelphia, Blakiston. 1942: 106-107.
- 5-Phillips JL, Weller N, Kulid JC. The mental foramen. Part III. Size and position on panoramic radiographs. *J Endo.* 1992; 18(8): 38-386.
- 6-Fishel D, Buchner A, Hershkowitz A, Kaffe I. Roentgenographic study of the mental foramen. *Oral Surg.* 1967; 41: 682-686.
- 7-Williams PL, Warwick R. Grays Anatomy. Edinburgh, Churchill Livingstone. 1980 : 315.
- 8-MacDavid WD, Tronje G, Welander U, Morris C R. Imaging characteristics of seven panoramic x-ray units. II. The image layer. *Dentomaxillofac Radiology.* 1985; 8: 13-19.

The prevalence of geographic tongue in women taking oral contraceptive drugs

Zaydoon M KASIM*

ABSTRACT

The prevalence of geographic tongue in (120) women receiving oral contraceptive drugs was (15.8%) and the prevalence of the lesion in (120) women not receiving the drug was (2.5%), the duration of drug was significant and the uncontinuous use of drug show more effects than the continuous use. This suggested a hormonal factor in the etiology of the geographic tongue.

Key Words: geographic tongue, oral contraceptive drugs.

الخلاصة

بلغت نسبة اللسان الجغرافي في (١٢٠) امرأة تتناول أقراص منع الحمل الفموية (١٥,٨%) ونسبة نفس الحالة في (١٢٠) امرأة لا تتناول أقراص منع الحمل الفموية (٢,٥%). وكانت فترة تناول الدواء معنوية وظهر إن الاستخدام غير المستمر للدواء يؤثر أكثر من الاستخدام المتواصل في ظهور الحالة . وهذا يفترض عاملا هارمونيا في امراضية اللسان الجغرافي .

INTRODUCTION

Geographic tongue (erythema migrans, benign migratory glossitis, Wandering rash of tongue) is a benign inflammatory condition presents as red smooth arenas of atrophy of the filiform papillae surrounded by creamy white border on the anterior two third of the dorsum of the tongue⁽¹⁾. It shows rapid change in the location and the size of the red patches⁽²⁾. The lesion begins as a small white patch then develops a central erythematous atrophic zone and enlarges centrifugally⁽³⁾. Sometimes the geographic tongue occurs in combination with fissure tongue^(3,4).

Histologically the peripheral region shows hyperparakeratosis, spongiosis, acanthosis and elongation of epithelial rete ridges with infiltration of neutrophils into the epithelium. This intense neutrophilic infiltration may be responsible for the destruction of the superficial portion of the epithelium thus producing an atrophic reddened mucosa as the lesion progresses⁽³⁾.

Even though geographic tongue has been reported for many years, the etiology is still unknown. The following causes have been reported in literature:

1. Geographic tongue is a congenital anomaly^(1,2).
2. Geographic tongue is a region common to those patients who have tendency to develop recurrent acute inflammatory disease⁽⁵⁾.

* Zaydoon Mahmmud KASIM BDS, MSc: Lecturer. Department of Oral and Maxillofacial Surgery, College of Dentistry, University of Mosul, Mosul, IRAQ.

3. Geographic tongue is a sign of atropy ⁽⁶⁾.
4. Geographic tongue is associated with dermatological disease as psoriasis ^(6,7).
5. Geographic tongue is related to psychogenic factors as stress ⁽⁸⁾.

Waltimo ⁽⁹⁾ studied the relation of oral contraceptive drugs with geographic tongue. The geographic tongue of a 23 years old female was examined daily for one year. The phase of the oral contraceptive cycle appeared to have a marked effect on the initiation and duration of the lesion suggesting that hormonal factors may be relevant. The oral contraceptive drugs are of two types either combined containing oestrogen and progesterone or containing progesterone only. The oestrogen component gains its contraceptive efficacy by blocking ovulation by inhibiting the release of follicle-stimulating hormone and lutenizing hormone, while the progesterone enhance the viscosity of cervical fluid a change in the endometrial lining that make it unsuitable for egg implantation ⁽¹⁰⁾.

The objective of this study was to determine the prevalence of geographic tongue in females receiving oral contraceptive drugs and in females that do not receive the drug.

MATERIALS AND METHODS

The subjects of the study were the women that attend the department of family planning in Al-Batool Hospital in Mosul City, (120) women receiving oral contraceptive drugs were included in the study. Any woman with any medical problem was excluded from the study, each woman has case sheet, as below:

Age				
Duration of Drug Use	<input type="text"/>		Year	
The drug used		continuos	<input type="text"/>	not continuos
History of the lesion		Yes	<input type="text"/>	No
Clinical examination:				

In each case sheet the age in years for each woman was recorder. The duration (in years) of drug was also recorded and if she use the drug continuously or not and if she has history of geographic tongue (after prescribing the clinical picture of geographic tongue). In addition to that, the clinical examination was carried out on each woman. If the geographic tongue is present, its record +ve in the case sheet and if the condition is not present its record -ve in the case sheet.

Another one-hundred and twenty women who never used oral contraceptive drugs were examined for the presence of geographic tongue as a control group.

RESULTS

Table (1) shows the age groups and the number and the percentage of each group. The total number of examined women receiving oral contraceptive drugs was (120); their age range from (19-43) years. The same number of women who never use the oral contraceptive drugs aged between (17-44) years were also examined as a control group. The percentage of geographic tongue in women on oral contraceptive drug was (15.8%) while those who never use the drug were (2.5%).

Table (1): Age group with the number and percentage of geographic tongue in each group of women receiving and not receiving the oral contraceptive drugs

Age Group	Women Use Oral Contraceptive drugs			Women Never Use Oral Contraceptive Drugs		
	Number of Examined Women	Number of Women Have G.T.	% of G.T.	Number of Examined Women	Number of Women Have G.T.	% of G.T.
> 20	7	2	28.5	14	1	7.1
21 – 30	41	4	9.7	56	-	-
31 – 40	68	13	19.1	43	2	4.6
< 41	4	-	-	7	-	-
Total	120	19	15.8	12	3	2.5

Table (2) shows the duration of drug used with the number and percentage of each year. The duration (calculated in years) of each woman using the oral contraceptive drug was recorded. For the woman showing the geographic tongue, the duration ranged between (2-12) years. After using t-test, the duration of drug used was significant at (0.05).

Table (2): The duration of drug in year with the number and percentage of affected women with geographic tongue

Duration	No.	%
2 y	4	21
3y	3	15.8
4y	4	21
5y	2	10.5
6y	4	21
7y	1	5.3
12y	1	5.3

Five women (26.3%) who have geographic tongue use the drug continually while (14) women (73.7%) who have the geographic tongue use the drug not continually. Also (14) women (11.7%) on oral contraceptive drugs give history of the lesion.

DISCUSSION

This study is an attempt to find if there is any relationship between the use of oral contraceptive drugs and the appearance of geographic tongue. In literature, the authors give different prevalence of this lesion in normal individuals. The prevalence of geographic tongue in this study in the control group was (2.5%) and it is relatively in agreement with other studies carried out in Iraq. Al-Nori and Al-Talabani⁽¹¹⁾ give prevalence of (4%) in Baghdad, and Kasim⁽¹²⁾ give prevalence of (0.43%) in Mosul. The prevalence of the lesion in the women receiving oral contraceptive was (15.8%) and it is relatively high in comparison with the normal individual. Also the duration of the drug intake was highly significant. The continuity predisposes the appearance of the lesion and all the results indicate that the hormonal change can be an etiologic factor that influences the appearance of geographic tongue.

REFERENCES

1. Shafer WG, Hine MK, Levy BM. A Textbook of Oral Pathology, 4th Edn. Saunders Co, Philadelphia. 1983.
2. Banoczy J, Szabol L, Csiba A. Migratory glossitis: A clinical histologic review of seventy cases. *Oral Surg*. 1975; 39: 113-121.
3. Neville BW, Damm DD, Allen CM, Boygout JE. Oral and Maxillofacial Pathology. WB Saunders Co, Philadelphia. 1995.
4. Ghose LJ, Baghdady VS. Prevalence of geographic and placated tongue in 6090 Iraqi school children. *Community Dent Oral Epidemiol*. 1962; 120: 214-216.
5. Mark R, Czarny D. Geographic tongue: sensitivity to the environment. *Oral Surg*. 1984; 58: 156-159.
6. Marks R, Simons MJ. Geographic tongue – A manifestation of atopy. *Br J Dermatol*. 1979; 101: 159-162.
7. Yonnai FS, Phelon JA. Oral mucositis with features of psoriasis: report of a case and review of the literature. *Oral Surg Oral Med Oral Pathol*. 1997; 84: 61-67.
8. Redman RS, Vance FL, Gorlin RJ, Peagler FD. Psychological component in the etiology of geographic tongue. *J Dent Res*. 1996, 45: 1403-1408 (Cited by: Waltimo J. *Br Dent J*, 1991; 171: 94-96).
9. Waltimo J. Geographic tongue during a year of oral contraceptive cycles. *Br Dent J*. 1991; 171: 94-96.
10. Hersh EV. Adverse drug interactions in dental practice. *J Am Dent Assoc*. 1999; 130: 236-251.
11. Al-Nori AH, Al-Talabani N. Developmental anomalies of teeth and oral soft tissues among 14-15 years school children in Baghdad city with special reference to enamel defects. *Jordan Dent J*. 1993 ; 8 : 5-14
12. Kasim ZM. Developmental anomalies of teeth and oral soft tissue among 14-15 years old school students in Mosul city. MSc thesis, College of Dentistry, University of Baghdad, 1995.