Dental anomalies in permanent teeth and the associated etiological factors among fifteen years-old students in Basrah city\Iraq

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ABSTRACT

Background: Dental anomalies of teeth are major issue that contributes to dental problems encountered in general practice. The aim of this study is to measure the prevalence of dental anomalies and the associated etiological factors among 15 years old students in Basrah city –Iraq.

Materials and methods: The total sample composed of 1000 students (435 males and 565 females) from urban area selected randomly from different high schools in the city. Diagnosis of dental anomalies were recorded by present or absent, diagnosis and recording of enamel defects were done according to the criteria of WHO (1997).

Results: The prevalence of hypodontia was 4.6%, Females have higher prevalence than males (5.8% females and 3.0% males), talon cusp prevalence was 37.0% (males 38.6% and females 35.8%), the prevalence of microdontia was 1.4% (males were equal to females 1.4%), the prevalence of supernumerary teeth, fusion, macrodontia and gemination was 0.8%, 0.7%, 0.1% and 0.1% respectively.
The prevalence of enamel defects was 30.5%, demarcated opacities prevalence was 23.8%, it is the most prevalent type of enamel defects (males 20.5% and females 26.4%) followed by diffuse opacities 9.1% then enamel hypoplasia 0.4%.

Conclusion: This study revealed that secondary school students have dental anomalies, some of them with high prevalence, while other has very low prevalence.

Keywords: Dental anomalies, etiological factors, Basrah city. **(J Bagh Coll Dentistry 2017; 29(1):148-152)**

INTRODUCTION

Dental anomalies of teeth are not uncommon problem, anomalies of teeth number, shape and structure occur due to abnormal events in the embryological development of teeth that may be resulted from environmental and genetic factors during the morphodifferentiation or histodifferentiation stages of tooth development [1].

Anomalies of teeth shape include: fusion that can be defined as joining of two developing teeth germs, resulting in a single large tooth structure [2].

Gemination defined as the attempt of tooth bud to divide, that will resulted in the formation of tooth with a bifid crown and common root with root canal [3].

Talon cusp is a well-defined accessory cusp project from the cingulum or cemento-enamel junction to the incisal ridge of the upper or lower anterior teeth in both the deciduous and permanent dentitions [4].

Microdontia defined as a tooth that is much smaller than normal average size while macrodontia defined as a tooth that is much larger than normal average size [5].

Anomalies of the number of teeth include: hypodontia and supernumerary teeth, hypodontia defined as congenital lack of teeth that results from

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disturbances during tooth development in early stages [6].

Supernumerary teeth can be defined as extra teeth occurring in dental arch, more than twenty in deciduous dentition or more than thirty-two in the permanent dentition [3].

Enamel defects can be defined as any alteration that results from wide disturbances during the process of odontogenesis, these defects include diffuse opacities, demarcated opacities and enamel hypoplasia [7].

The etiological factors for the development of dental anomalies that had been studied include tooth trauma, deciduous tooth extraction, previous surgery in the jaw, low birth weight and systemic diseases [8] [9].

The aim of this study was to measure the prevalence of dental anomalies and find an association with the etiological factors.

MATERIALS AND METHODS

This study was conducted among high school students during the period from the middle of November 2014 till the beginning of April 2015 in Basrah city, Iraq.

In this study the sample consist of 1000 students aged 15 years old, the schools were randomly selected, and they were distributed in different geographical location in Basrah city.

Diagnosis of dental anomalies were recorded by present or absent, diagnosis and recording of enamel anomalies were done according to criteria of WHO 1997, questionnaire papers were distributed to the students to answer questions related to the etiological factors, these questions include if the students had exposed previously to tooth trauma, deciduous tooth extraction, previous surgery in the jaw and also were asked to try to locate the tooth or if they had low birth weight and any systemic disease .

Data entering and analysis was performed using SPSS version 21 computer software (Statistical Package for Social Science) in association with Microsoft Excel.

The tests that were used in this study include:

1. t-test.
2. Chi-square test.
3. Odds ratio.

RESULTS

Table (1) illustrates the distribution of the sample by gender, the sample consist of 435 males (43.5%) and 565 females (56.5%).

Table (2) demonstrates the total prevalence of the selected anomalies among the sample.

The prevalence of talon cusp was 37.0 %, demarcated opacities was 23.8 %, diffused opacities was 9.1 %, hypodontia was 4.6 %, microdontia was 1.4 %, supernumerary teeth was 0.8 %, fusion was 0.7 %, enamel hypoplasia was 0.4 %, macrodontia was 0.1 %, gemination was 0.1 % and any type of enamel defect was 30.5 %.

Table (3) shows the relationship between tooth trauma and dental anomalies which was non-significant statistically.

Table (4) illustrates the relationship between deciduous tooth extraction and dental anomalies by using Chi-square test, the results were non-significant statistically except the relationship between deciduous tooth extraction with demarcated opacities and any type of enamel defects which was significant statistically (p <0.001, p =0.022).

Table (5) shows the relationship between previous oral surgery and dental anomalies which was non-significant statistically.

Table (6) demonstrates that there is no significant relationship between low birth weight and dental anomalies.

Table (7) demonstrates that there is no significant relationship between systemic disease and dental anomalies.

Table 1: The distribution of the sample by gender

Gender	N	%
Males	435	43.5
Females	565	56.5
Total	1000	100.0

Table 2: The prevalence of the selected anomalies among the sample

Anomalies (total N=1000)	N	%	95% confidence interval
At least one tooth with Talon cusp	370	37.0	(34%to40.1%)
At least one tooth with Demarcated opacity	238	23.8	(21.2%to26.6%)
At least one tooth with Diffuse opacity	91	9.1	(7.4%to11.1%)
At least one tooth with Hypodontia	46	4.6	(3.4%to6.1%)
At least one tooth with Microdontia	14	1.4	(0.8%to2.4%)
At least one tooth with Supernumerary	8	0.8	(0.4%to1.6%)
At least one tooth with Fusion	7	0.7	(0.3%to1.4%)
At least one tooth with Enamel hypoplasia	4	0.4	(0.1%to1.0%)
At least one tooth with Macrodontia	1	0.1	(0.003%to0.6%)
At least one tooth with Gemination	1	0.1	(0.003%to0.6%)
At least one tooth with any type of enamel defect	305	30.5	(27.7%to33.5)

Table 3: The relationship between tooth trauma and dental anomalies

	Tooth trauma						
	Negative (n=963)		Positive (n=37)				
Anomalies	N	%	N	%	P	OR	95% CI for OR
At least one tooth with Hypodontia	44	4.6	2	5.4	0.69[NS]	1.19	(0.28 to 5.12)
At least one tooth with Microdontia	14	1.5	0	0.0	1[NS]	**	**
At least one tooth with Talon cusp	354	36.8	16	43.2	0.42[NS]	1.31	(0.68 to 2.54)
At least one tooth with Diffuse opacity	86	8.9	5	13.5	0.37[NS]	1.59	(0.61 to 4.2)
At least one tooth with Demarcated opacity	229	23.8	9	24.3	0.94[NS]	1.03	(0.48 to 2.22)
At least one tooth with any type of enamel defect	291	30.2	14	37.8	0.36[NS]	1.41	(0.71 to 2.77)

Note: The (**) means cannot be calculated.

Table 4: The relationship between deciduous tooth extraction and dental anomalies

	Tooth extraction						
	Negative (n=829)		Positive (n=171)				
Anomalies	N	%	N	%	P	OR	95% CI for OR
At least one tooth with Hypodontia	37	4.5	9	5.3	0.65[NS]	1.19	(0.56 to 2.51)
At least one tooth with Microdontia	12	1.4	2	1.2	1[NS]	0.81	(0.18 to 3.63)
At least one tooth with Talon cusp	306	36.9	64	37.4	0.9[NS]	1.02	(0.73 to 1.44)
At least one tooth with Diffuse opacity	77	9.3	14	8.2	0.65[NS]	0.87	(0.48 to 1.58)
At least one tooth with Demarcated opacity	180	21.7	58	33.9	0.001	1.85	(1.29 to 2.64)
At least one tooth with any type of enamel defect	240	29.0	65	38.0	0.022	1.5	(1.07 to 2.12)

Table 5: The relationship between previous oral surgery and dental anomalies

	Oral surgery						
	Negative (n=992)		Positive (n=8)				
Anomalies	N	%	N	%	P	OR	95% CI for OR
At least one tooth with Hypodontia	46	4.6	0	0.0	1[NS]	**	**
At least one tooth with Microdontia	13	1.3	1	12.5	0.11[NS]	10.76	(1.23 to 93.81)
At least one tooth with Talon cusp	366	36.9	4	50.0	0.48[NS]	1.71	(0.43 to 6.88)
At least one tooth with Diffuse opacity	89	9.0	2	25.0	0.16[NS]	3.38	(0.67 to 17.01)
At least one tooth with Demarcated opacity	234	23.6	4	50.0	0.1[NS]	3.24	(0.8 to 13.05)
At least one tooth with any type of enamel defect	300	30.2	5	62.5	0.06[NS]	3.84	(0.91 to 16.19)

Note: The (**) means cannot be calculated.

Table 6: The relationship between low birth weight and dental anomalies

	LowBirth weight[10] (<2Kg)						
	Negative (n=608)		Positive (n=17)				
Anomalies	N	%	N	%	P	OR	95% CI for OR
At least one tooth with Hypodontia	35	5.8	0	0.0	0.62[NS]	**	**
At least one tooth with Microdontia	8	1.3	0	0.0	1[NS]	**	**
At least one tooth with Talon cusp	222	36.5	4	23.5	0.27[NS]	0.53	(0.17 to 1.66)
At least one tooth with Diffuse opacity	50	8.2	1	5.9	1[NS]	0.7	(0.09 to 5.37)
At least one tooth with Demarcated opacity	145	23.8	3	17.6	0.77[NS]	0.68	(0.19 to 2.41)
At least one tooth with any type of enamel defect	179	29.4	4	23.5	0.79[NS]	0.74	(0.24 to 2.29)

Note: The (**) means cannot be calculated.

Table 7: The relationship between systemic diseases and dental anomalies

	Systemic disease						
	Negative (n=974)		Positive (n=26)				
Anomalies	**N**	**%**	**N**	**%**	**P**	**OR**	**95% CI for OR**
At least one tooth with Hypodontia	46	4.7	0	0.0	0.63[NS]	**	**
At least one tooth with Microdontia	13	1.3	1	3.8	0.31 [NS]	2.96	(0.37 to 23.49)
At least one tooth with Talon cusp	364	37.4	6	23.1	0.14 [NS]	0.5	(0.2 to 1.26)
At least one tooth with Diffuse opacity	89	9.1	2	7.7	1[NS]	0.83	(0.19 to 3.56)
At least one tooth with Demarcated opacity	230	23.6	8	30.8	0.4[NS]	1.44	(0.62 to 3.35)
At least one tooth with any type of enamel defect	295	30.3	10	38.5	0.39[NS]	1.44	(0.65 to 3.21)

Note: The (**) means cannot be calculated.

DISCUSSION

This study was designed to investigate the prevalence of dental anomalies among high school students aged 15 years old and study their relationship to the possible etiological factors.

The prevalence of hypodontia was 4.6% and this is lower than AL-Jourane[11] and Chung et al [12]. There was no statistically significant difference between hypodontia and the studied factors, in order to find an association between hypodontia and the studied factors a larger sample size should be taken or a follow up study about the patients that have the etiological factors to determine the presence of this anomaly. Talon cusp prevalence was 37.0% and this is higher than Danker et al[13] .This difference in the prevalence of talon cusp may be due to the fact that diagnosis of this dental anomaly in other study was based on radiographs solely without clinical examination and this might produce a false positive or negative diagnosis because talon cusps are easily discovered on radiograph as they present as V-shaped structure superimposed on the tooth but there is an exception to that which is a type 3 trace talon cusp that cannot be detected during radiographic examination [14].

In this study the prevalence of supernumerary teeth was 0.8% and this is lower than Thilander et al[15], it was difficult to study the relationship between supernumerary teeth and the studied factors due to the small number of this anomaly detected in the study and this may be attributed to the fact that most supernumerary teeth are impacted, asymptomatic and diagnosed incidentally during radiographic examinations, so panoramic radiograph is essential for detection of supernumerary teeth [16].

In this study the prevalence of fusion was 0.7% and this is higher than Al-Ani [17] and this is may be due to larger sample size that had been taken in this study than other studies.

In this study the prevalence of gemination was 0.1% and this is equal to the results of Neville et al[18].

The etiology of double teeth may be attributed to trauma, hereditary and environmental factors, the cause may be attributed to the force of physical pressure that are generated during growth resulted in contact between adjacent teeth germs and union before calcification [19].

In this study the prevalence of macrodontia and microdontia was 0.1% and 1.4% respectively, macrodontia and microdontia may be due to complex multifactorial interactions that include genetic and environmental factors occur during the long process of dental development [20].

The prevalence of enamel defects was 30.5% and this finding was lower than [21] demarcated opacities which appear the most prevalent type of enamel defect 23.8% (males 20.5% and females 26.4%) followed by diffuse opacities 9.1% then by enamel hypoplasia 0.4%.

There was no statistically significant relationship between enamel defects and the studied factors but there was significant relationship between tooth extraction, enamel defects and demarcated opacities, this is may be due to trauma that result from tooth extraction and cause disturbance in the process of matrix degradation which occur during matrix formation stage to provide suitable condition for the commencement of maturation [22].

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الخلاصة

الخلفية : ان الاشكال الشاذة التي تصيب الاسنان تعتبر قضية رئيسية تساهم في حدوث مشاكل في الأسنان والتي تواجه خلال الممارسة العامة. الهدف من هذه الدراسة هو معرفه نسبه انتشار الاشكال الشاذة للأسنان وعلاقتها بالعوامل المسببة لها بين الطلاب في عمر ١٥ سنة في محافظة البصرة-العراق.

المواد والطرق :تكونت العينة الكلية من ١٠٠٠ طالب (٤٣٥ من الذكور و ٥٦٥ من الإناث) جمعت العينات من المناطق الحضرية وقد اختيرت العينة عشوائيا من المدارس الثانوية المختلفة في محافظة البصرة. تم تسجيل التشخيص في شذوذ الأسنان من خلال وجود أو عدم وجود هذه الاشكال الشاذة. تم التشخيص وتسجيل تشوهات الميناء وفقا لمعايير منظمة الصحة العالمية (١٩٩٧).

النتائج : ان هذه الدراسة بينت ان انتشار نقص الأسنان الدائمية كان بنسبة ٤,٦ %, وان معدل الانتشار في الاناث أعلى من الذكور (٥,٨٠ % في الاناث و ٣,٠٠ % في الذكور) , ان انتشار تالون أعتاب كان بنسبه ٣٧ % (كانت النسبه في الإناث ٣٥,٨ % وفي الذكور ٣٨,٦ %), ان نسبه انتشار صغر حجم الاسنان كانت ١,٤ (كانت النسبه في الذكور ذاتها في الاناث ١,٤) , كما ان معدل انتشار الأسنان الزائده , الانصهار , ضخامة الأسنان وتضاعف الاسنان كان ٠,٨ %, ٠,٧ , ٠,١ , ٠,١ % و ٠,١ % بالتتابع. لقد اظهرت الدراسه ان معدل انتشار تشوهات الميناء ٣٠,٥ % , ان نسبه انتشار العتمه البيضاء ٢٣,٨ % , لقد كانت العتمه البيضاء هي النوع الاكثر انتشارا في تشوهات الميناء (نسبتها في الذكور ٢٠,٥ % بينما في الاناث ٢٦,٤%) تليها العتمة المنتشرة بنسبه ٩,١ % تليها نقص تصنع الميناء بنسبه ٠,٤ %.

الخاتمة : اظهرت هذه الدراسة أن الطلاب في المدارس الثانوية لديهم شذوذ في الأسنان , وان بعض هذه الحالات منتشرة بصوره واسعه, في حين ان بعض الحالات الشاذة الاخرى منتشرة بصورة منخفضة جدا.

الكلمات الدليلية :شذوذ الاسنان ,العوامل المسببة , مدينه البصرة.