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The Prevalence Of Enamel Defects Among The Students Of Secondary School (Age 14-17) In Baghdad/Alrosafa

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Abstract:

Aim of the study: To study the occurrence of enamel defects, the most common type and what gender is more affected on the students at the secondary school in Baghdad-Alrosafa.

Materials and methods: Eight hundred and fifty students in the secondary school in Baghdad-Alrosafa were included in this study without any systemic disease with a 425 male and 425 female aging from 14 to 17 years old. A diagnostic instrument probe, mirror, gloves and tweezer were used. All students were examined clinically for the presence of enamel defect like enamel fluorosis, amelogenesis imperfecta, enamel erosion, abrasion and attrition. T-test was used for statistical analysis.

Results: Results of the current study showed a high percentage of enamel defect occurring in females than in males and a high significant difference recorded at 17 years old in enamel fluorosis with an enamel attrition recording a higher percentage than other anomalies.

Conclusion: conclusion of study is that the enamel defect occurs in females more than males and molar teeth have a higher prevalence than other teeth. Attrition recorded a higher percentage than other defects followed by enamel fluorosis and the lower one is amelogenesis imperfacta.

Key words: enamel fluorosis, enamel attrition, amelogenesis imperfecta.

Introduction

The enamel is regarded as the hardest substance in the body. It serves as a wear-resistant to the outer layer of the crown. It also serves as a barrier that protects the tooth from chemical and physical forces which can injure the vital tissue in the dental pulp[19]. The Enamel is an organ that is formed by cells, the one that is responsible for the formation and mineralization is called ameloblast cell[1]. Amelogenesis is a process of enamel formation and is divided in to four stages according to the morphology and function of the ameloblast: presecretory, secretory, transition and maturation[2].

Enamel defect can be divided into demarcated opacity, diffuse opacity and hypoplasia. Hypoplasia is a reduction in enamel thickness that results from imbalance during the secretory phase of enamel matrix formation[3]. Hypo mineralization is a defect in quality that happens due to an imbalance in enamel mineralization during the maturation stage. The Enamel defect is an external defect that present as a shallow or deep fossa with or without horizontal groove characterized by a yellow, brownish or whitish area [4].

Deciduous and permanent dentition with enamel defects are associated with many factors which are divided into defects limited to one or few teeth when there is a localized defect (trauma, infection and radiation) and defects affecting the majority of teeth caused by an environmental factors and inherited defects[10].

Enamel matrix proteins such as amelogenin, ameloblastin, tuftillin and enamelin are secreted in early stages of enamel formation and late stages of mineralization therefore any defect in the codon of their formation can lead to a defect in enamel and can be inherited as a genetic mutation[5]. Enamel defects can be also caused by several metabolic conditions like infection, drugs, trauma and radiation [5].

Dental fluorosis is one type of an enamel defect caused by exposure to high concentration of fluoride or malnutrition during tooth development leading to an enamel with a low mineral and high porosity [6].Amelogenesis imperfecta is also another form of enamel defect affecting the entire ectodermal component and can affect primary and secondary dentition. It can be either autosomal recessive, autosomal dominant or x-linked mode of inheritance characterized by a brown enamel[7].Enamel erosion and attrition are a loss in the enamel structure due to interaction of chemical, biological and behavioral factors linked with acidity[20]. Enamel erosion occurs most frequently in the upper jaw, incisal edge, palatal surface and occlusal surface of the lower molar. [8]. Enamel abrasion is a mechanical loss of enamel structure due to the interaction with objects other than tooth contact with each other. Premolar and canines are the most affected teeth[9].

The aim of this study was to study the prevalence of enamel defects, the most common type and gender effect in students at the secondary school.

Material and method

Eight hundred and fifty students in the secondary school in Baghdad-Alrosafa were included in this study without any systemic disease with a 425 male and 425 female aging from 14 to 17 years old. A diagnostic instrument probe, mirror, gloves and twizzer were used. All students were examined clinically for the presence of enamel defect like enamel fluorosis, amelogenesis imperfecta, enamel erosion, abrasion and attrition. T-test was used for statistical analysis.

Results

The current study showed that 361 students had enamel defect including 237 females and 124 males. The molar teeth recorded a higher significant difference than other teeth and females recorded a significant difference than males, table(1) and fig (1).Enamel fluorosis occurs in females (67/96) more than in males (29/96) and recorded a high significant difference between females and males in the age of 16 and a significant difference at age of 15 years old, table (2) and fig (2).This study showed that enamel erosion recorded in females (29/51) and in males(22/51) nearly equal in males and females and there is a significant difference between males and females in day 17, table(3) and fig(3).Enamel attrition in this study recorded in females (140/211) and in males(71/211) also recorded a higher percentage at age of 17 and 16 years old and there was a high significant difference between females and males in the age of 17 years old with a significant difference at age of 15 years old as shown in table (4) and fig(4). Few cases of amelogenesis imperfacta recorded in this study at age of 14 years old as shown in table (5), fig (5).

Discussion

The study was conducted on middle school students for the ease of collecting cases and because they are more cooperative than other age, done in the secondary schools in Baghdad, Palestine Street with taking the consideration of the nutritional and socioeconomic status because of their importance in the tooth development in early stage. The enamel covers the teeth and separates them from oral environment and it gives the shape and contour of the teeth and protects the underlying tissue from injury **(11)**.The enamel defects have an effect on the occlusal function, esthetic and psychology, therefore, prevention and treatment of these cases are very important **(12)**.

The current study showed a high percentage of enamel defect occurring in females than in males and this may be a hormonal effect or an x-linked heredity of defect and this is disagree with (Tourino etal., 2016)**(13)**. Molar teeth with enamel defect occurs more than the other teeth as showed in this study and this agree with (Cruvinel etal.,2012).**(14)**

The current study illustrated that enamel fluorosis occur higher in females than in males and that may be due to swallowing dental paste or taking high dose of fluorosis and because of hormonal changes and uncontrollable not swallowing tooth paste at early age then affected on

tooth development and this agree with (Aggarwal etal.,2021) [(15)].

The enamel erosion in this study was shown to be increases with age and no significant difference between male and female only in 17 years old there is a significant difference between them and this is because drinking of acidic fluid and eating acidic food and decreased salivation[(16)] with ignorance of the harmful effects of certain foods.

Enamel attrition recorded higher percentage than other enamel defect due to the contact with the opposite teeth because of stress or presence of restorative material increased with age and has a high significant difference between females and males as shown in the current study and this disagree with (Thippanna and Ramu .2017) [(17)]

Amelogenesis imperfecta in the current study showed a low number may be because of the ugly appearance of the teeth, yellow, brown red or brown discoloration and very soft enamel[(18)] makes the patient seeks early for medical advice and treatment.

Conclusion

According to current study we can conclude that enamel defect occurs in females more than males and molar teeth have a higher prevalence than other teeth. attrition recorded a higher percentage than other defects followed by enamel fluorosis and the lower one is amelogenesis imperfacta

Conflicts of Interest

The author reported that there is no conflict of interest

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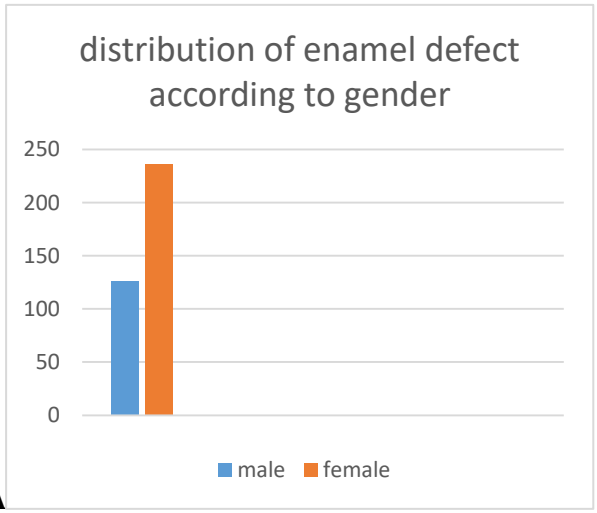
Table(1):distribution of enamel defects according to the gender and affected teeth

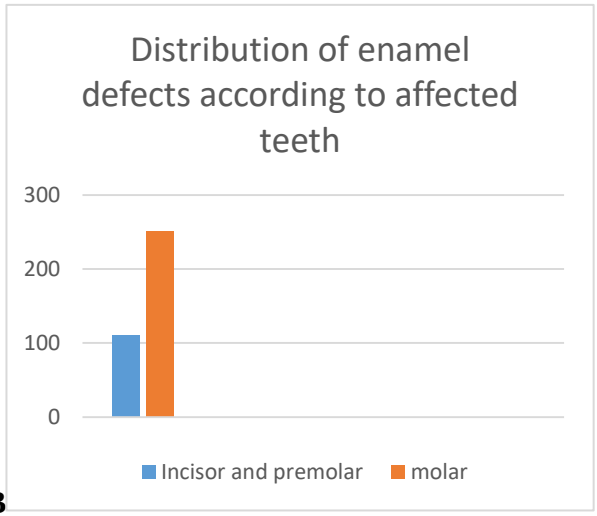
Type of tooth	Number of defect	Percentage%	P value	t-test	gender	Number of enamel defect	Percentage %	pvalue	t- test
Incisor and premolar	110	30.47%	0.00HS	5.71	Male	124/425	29.17%	0.02 S.	3.56
molar	251	69.33%			Female	237/425	55.76%		
total	361	42.47%			850	361	42.47%		

S (significant): pvalue <0.05

HS (high significant): pvalue<0.01



A



B

Fig(1):A: Distribution of enamel defects according to gender

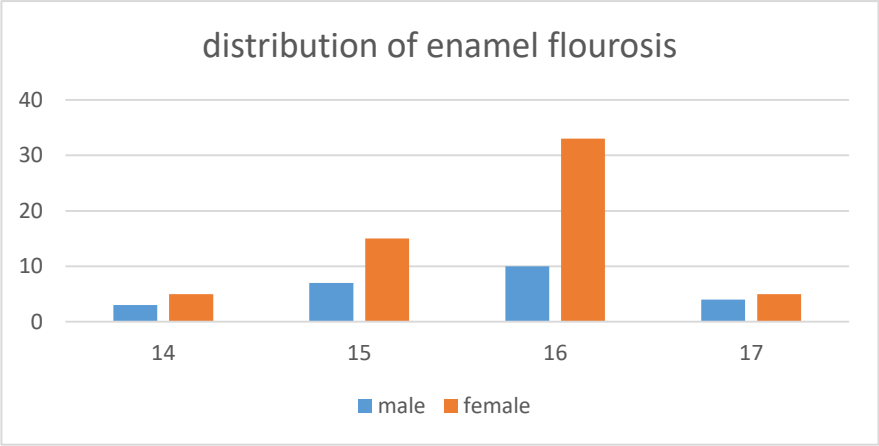
B: Distribution of enamel defects according to affected teeth

Table (2): Distribution of enamel fluorosis according to the total number of affected students with age and gender distribution.

age	gender	Number of Enamel fluorosis	Percentage%	P value	t-test
14	Male female	3/29 5/67	10.3 % 7.4 %	0.4	0.86
15	Male female	7/29 15/67	24.1 % 22.3 %	0.04 S.	2.47
16	Male female	15/29 42/67	51.7 % 62.6 %	0.00 H.S.	4.98
17	Male female	4/29 5/67	44.4 % 7.4 %	0.6	0.08
total	361	96	26.5 %		

S (significant): pvalue <0.05

HS (high significant): pvalue<0.01



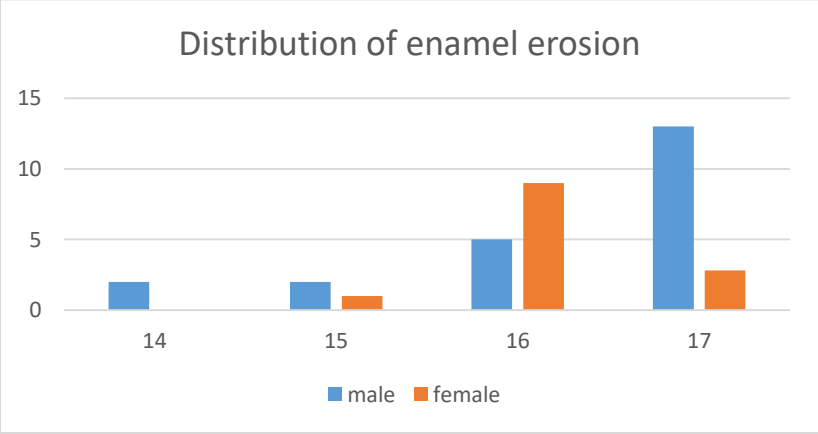
Fig(2): Distribution of enamel fluorosis according to age

Table (3): Distribution of enamel erosion according to the total number of affected students with age and gender distribution.

age	Gender	Number of enamel erosion	Percentage%	P value	t-test
14	Male female	2/22 0/29	9.09 % 0.00 %	0.9	0.13
15	Male female	2/22 1/29	9.09 % 3.44 %	0.7	0.41
16	Male female	5/22 9/29	22.72 % 31.03%	0.6	0.68
17	Male female	13/22 19/29	59.09 % 65.5%	0.04S.	3.6
total	361	51	14.1 %		

S(significant): pvalue <0.05

HS(high significant): pvalue<0.01



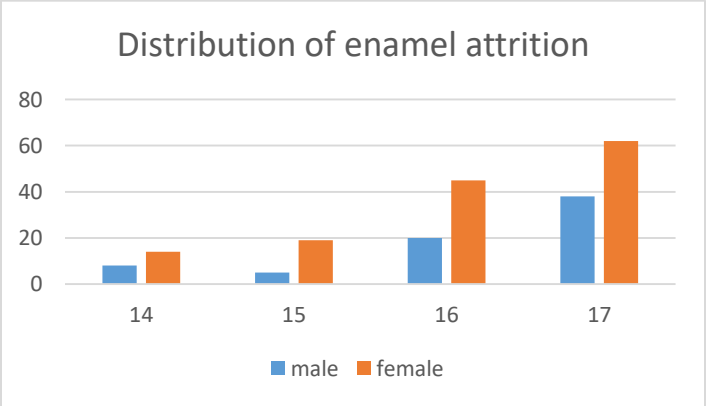
Fig(3): Distribution of enamel erosion according to age

Table (4): Distribution of enamel attrition according to affected students according to the total number of affected students with age and gender distribution.

Age	gender	Number of enamel attrition	percentage٪	P value	t-test
14	Male female	8/71 14/140	11.26 ٪ 0.1 ٪	0. 9	0.10
15	Male Female	5/71 19/140	7.04 ٪ 13.57 ٪	0. 03S.	3.21
16	Male female	20/71 45/140	28.16 ٪ 32.14 ٪	0.00 HS.	5.54
17	Male female	38/71 62/140	53.52٪ 44.28 ٪	0.00 HS.	5.59
total	361	211	58.4 ٪		

S(significant): p value <0.05

HS (high significant): p value<0.01



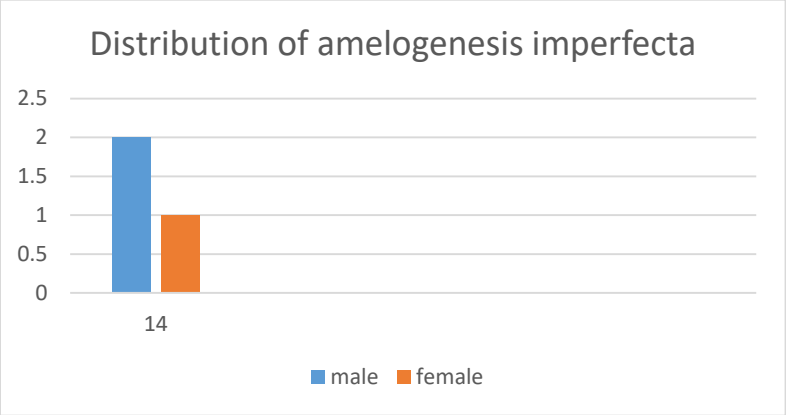
Fig(4): Distribution of enamel attrition according to age.

Table(5): Distribution of amelogenesis imperfecta according to affected students according to the total number of affected students with age and gender distribution.

age	gender	Number of amelogenises imperfecta	percentage٪	P value	t-test
14	Male female	2/3 1/3	66.66 ٪ 33.33 ٪	0.8	0.17
total	361	3	0.83 ٪		

S(significant): pvalue <0.05

HS (high significant): *p* value<0.01



Fig(5): Distribution of amelogenesis imperfecta