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The Dental Midline at 13 Year of Age

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Abstract

The dental midline was examined for seven thousand 13 year olds selected from six Iraqi governorates. The intra-oral clinical examination assessed the presence of maxillary central diastema and any midline shift.

A maxillary central diastema of 1mm or more was found in 10.1% of the sample with a mean of 0.127 ± 0.005mm; being significantly more in Basrah, Najaf and Anbar. However, a maxillary central diastema of 2mm or more was found in only 2.4% of the sample.

Midline shift (≥1mm) was found in 44.8% of the sample with a mean of 0.712 ± 0.011 mm (22.8% to the right and 22.0% to the left side).

Introduction

Central Diastema is a space between the central incisors of the maxillary (common) or mandibular arch (relatively rare), which may be associated with the presence of a hyperplastic frenum, or tongue frenum in the case of mandibular diastema (Daskalogiannakis, 2000). It has also been called midline diastema, medial diastema or median diastema.

It is the most commonly studied spaced area, particularly the maxillary one. It is recorded in addition to spacing as a separate entity (Björk et al., 1964; Baume et al., 1973). Some investigators recommended the registration of diastema to the nearest whole millimeter only when it is ≥ 2mm (Björk et al., 1964; Summers, 1966; Baume et al., 1973; Ingervall et al., 1978; Mohlin, 1982), while a diastema of ≥0.2mm was recorded by Steigman and Weissberg (1985).

Björk et al. (1964) used a special instrument of different blade thickness, while Baume et al. (1973) recommended the use of Boley gauge or metric ruler, and later a dial gauge vernier or caliper was used (e.g. Kinaan, 1977; Steigman and Weissberg, 1985). The results of some studies on central diastema are listed in table 1.

Midline shift is incongruence between the midlines of the maxillary and mandibular dental arch and/or between them and the facial midline. It has also been termed midline discrepancy or midline displacement (Daskalogiannakis, 2000).

This feature is measured in different ways:

1- The midline shift of the mandible is recorded, using the midline of the maxilla as a reference line (Björk et al., 1964; Baume et al., 1973; Mohlin, 1982).
2- The distance between the maxillary and mandibular midline is measured (Summers, 1966).
3- Using the facial midline as a reference line to record maxillary and mandibular midline deviations (Jerrold and Lowenstein, 1990).
4- Comparing the maxillary dental midline with the mid of the philtrum (Al-Naddawi and Shereef, 1989).

The results of some studies on midline shift are listed in table 2.

Materials and methods

The sample included a total of 7176 intermediate school students 13 years of age. These students were taken from 6 governorates (cities and environs) in Iraq selected to cover the whole country geographically (Baghdad the capital, Ninevah, Basrah, Diyala, Anbar and Najaf) according to a multi-stage stratified sampling technique. Details of the

geographic distribution and sampling technique are given in Al-Huwaizi (2002).

After excluding the invalid case sheets and isolating the students with some sort of orthodontic treatment, the number of casesheets which entered the statistical analysis dropped to 6957 (Al-Huwaizi et al., 2002 a & b).

Table 1: Reported prevalences of maxillary central diastema.

Author	Sample			Diastema %	Definition
	Country	Size	Age		
Cons et al. (1978)	America	1337	15-18	16.5 5.3	≥1mm ≥2mm
Ingervall et al. (1978)	Sweden		21-54	2	≥2mm
Gardiner (1982)	Libya	479	10-12	1	any
Mohlin (1982)	Sweden	272	20-45	2 (F)	≥2mm
Steigman & Weissberg (1985)	Palestine	1279	12-14 14-16 16-18	19.2 17.3 11.3	≥0.2mm
Al-Naddawi & Shereef (1989)	Iraq	553	18-60	19.9 6.9	≥2mm
Abdulla (1996)	Iraq	200 200 200	13 15 17	15 16.5 11.5	Not mentioned
Brunelle et al. (1996)	American Whites American Blacks Mexican Americans		12-17	5.5 12.5 4.1	≥2mm
Batayine (1997)	Jordan	200 200 200	13 15 17	11.5 11 8	Not mentioned
Al-Dailami (2000)	Yemen	400 400	10-12 13-15	21.75 15	Not mentioned

Table 2: Reported prevalences of midline shift.

Author	Sample			Midline shift (%)	Definition
	Country	Size	Age		
Magnusson (1976)				18.9 (M) 13.2 (F)	
Cons et al. (1978)	America	1337	15-18	60.3 33.9	≥1mm ≥2mm
Ingervall et al. (1978)	Sweden		21-54	37 (M)	
Hoffding & Kisling (1978)			13-14	39	
Mohlin (1982)	Sweden	272	20-45	29.3 (F)	
Crabb & Rock (1986)				58	
Al-Naddawi & Shereef (1989)	Iraq	443	16-80	36.4	
Abdulla (1996)	Iraq	200 200 200	13 15 17	53 59 53.5	>0.5mm
Batayine (1997)	Jordan	200 200 200	13 15 17	50 57.5 46.5	>0.5mm
Al-Dailami (2000)	Yemen	400 400	10-12 13-15	54 50.75	>0.5mm

A separate recording of maxillary central diastema was made because it is frequently a separate clinical entity from generalized spacing. It was defined as the space between the two permanent maxillary central incisors. This measurement was made at any level between the mesial surfaces of the central incisors and was recorded to the nearest whole millimeter by a dental vernier (Cons et al., 1986). Later in statistical analysis diastema of 2mm or more were identified according to Björk et al. (1964).

Measurement of midline shift was made with the aid of a metric ruler or vernier. The distance from the midpoint between the two mandibular central incisors to the midpoint between the two maxillary central incisors in a horizontal (transverse) plane was recorded to the nearest whole millimeter with the student in centric occlusion (Baume et al., 1973). Later, midline shifts of 2mm or more were assessed statistically (Björk et al., 1964). In addition, the side towards which the mandibular teeth deviate was recorded as right or left (Björk et al., 1964; Baume et al., 1973).

Statistical analysis

Chi square test was used to assess the statistical difference between the two genders, urban and rural, and six governorates for the prevalence of maxillary central diastema and the direction of midline shift.

ANOVA test was used to assess the statistical difference between the mean midline shifts of the six governorates.

Student t-test was used to assess the statistical difference between the mean midline shifts of the two genders, urban and rural.

P levels of more than 5% were regarded as statistically insignificant.

Results

Maxillary central diastema

It was found in 10.1% of the sample being mostly 1mm in width (7.6%) and 2.4% was 2mm wide, while only 0.1% of the sample showed a diastema 3mm wide. The mean maxillary central diastema width was 0.127 ± 0.005mm.

Basrah showed the highest prevalence of maxillary central diastema (13.8%) followed by Najaf (11.0%) and Anbar (10.8%), while Diyala showed the least prevalence of central diastema (6.6%) as shown in table 3. These differences were statistically significant (X^2=30.978, d.f.=5, p<0.001).

Considering gender, urban females (10.9%) had significantly more maxillary central diastemae than urban males (8.4%) (X^2=5.955, d.f.=1, p<0.05). The opposite was true in the rurals, where males (12.5%) had significantly more central diastemae than females (8.6%) (X^2=13.623, d.f.=1, p<0.001). However, for the total sample the gender difference was statistically insignificant (X^2=0.860, d.f.=1, NS) as shown in table 4.

Considering residency, urban males were found to have significantly (X^2=15.117, d.f.=1, p<0.001) less maxillary central diastemae (8.4%) than rural males (12.5). On the other hand, rural females were found to have significantly (X^2=5.027, d.f.=1, p<0.05) more central diastemae (10.9%) than rural females (8.6%). But when grouping the two genders the difference between the urban and rural students was statistically insignificant (X^2=1.417, d.f.=1, NS) as shown in table 4.

Midline shift

Midline shift was found in 44.8% of the sample, which is mostly of 1mm while midline shifts of 2mm or more were found in 18.7% of the sample (Table 5).

Anbar showed the highest mean midline shift (0.758 ± 0.032) followed by Basrah (0.739 ± 0.031) and Diyala (0.727 ± 0.031), while Ninevah showed the least mean midline shift (0.683 ± 0.030) as shown in table 5. These inter-governorate differences when tested by ANOVA test were found to be statistically insignificant (F=1.077, d.f.=5, 6951, NS).

Males showed comparable mean midline shift values (0.710 ± 0.016) to females (0.715 ± 0.016) as shown in table 6. This gender difference was statistically insignificant for urbans, rurals and total sample (Table 7).

Rural males and females (0.735 ± 0.017) showed a higher mean midline shift than urban males and females (0.690 ± 0.016) as shown in table 6, however these differences were statistically insignificant for males, females and total sample (Table 7).

Considering the direction of midline shift, 22.8% of the total sample showed midline shifts to the right side while 22.0% to the left side. Table 8 displays the direction of midline shift in the six examined governorates, and when tested by chi square test the difference was found to be statistically insignificant (X^2=3.402, d.f.=10, NS).

Males and females showed insignificant differences regarding the direction of midline shift for the urbans (X^2=0.007, d.f.=2, NS), rurals (X^2=0.002, d.f.=2, NS) and total sample (X^2=0.018, d.f.=2, NS) as shown in table 9.

Urbans and rurals showed insignificant differences regarding the direction of midline shift for the males (X^2=1.232, d.f.=2, NS), females (X^2=0.762, d.f.=2, NS) and total sample (X^2=1.966, d.f.=2, NS) as shown in table 9.

Table 3: Distribution (%) and mean (mm) of the width of the maxillary central diastema by governorate.

Central diastema		Baghdad N=1995	Ninevah N=991	Basrah N=989	Diyala N=994	Anbar N=995	Najaf N=993	Total N=6957
Percentage	1 mm	7.3	7.4	10.9	4.6	7.6	8.2	7.6
	2 mm	2.3	1.4	2.6	2.0	3.0	2.8	2.4
	3 mm	0.3	0.0	0.2	0.0	0.1	0.0	0.1
	Total	9.9	8.8	13.8	6.6	10.8	11.0	10.1
Mean		0.127	0.102	0.168	0.087	0.140	0.138	0.127
sem		0.009	0.011	0.014	0.011	0.014	0.013	0.005

Table 4: Distribution (%) and mean (mm) of the width of the maxillary central diastema by residency and gender.

Central diastema		Urban			Rural			Total		
		Male N=3477	Female N=3480	Total N=6957	Male N=3477	Female N=3480	Total N=6957	Male N=3477	Female N=3480	Total N=6957
Percentage	1 mm	3.4	4.7	4.0	4.8	2.4	3.6	8.2	7.0	7.6
	2 mm	0.8	0.7	0.8	1.4	1.8	1.6	2.2	2.5	2.4
	3 mm	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.1
	Total	8.4	10.9	9.6	12.5	8.6	10.5	10.4	9.7	10.1
Mean		0.100	0.127	0.113	0.155	0.126	0.140	0.127	0.126	0.127
sem		0.008	0.009	0.006	0.011	0.011	0.007	0.007	0.007	0.005

Table 5: Distribution (%) and mean (mm) of the amount of midline shift by governorate.

Midline shift		Baghdad N=1995	Ninevah N=991	Basrah N=989	Diyala N=994	Anbar N=995	Najaf N=993	Total N=6957
Percentage	0 mm	55.5	57.0	53.9	54.9	54.1	55.4	55.2
	1 mm	27.5	24.1	26.5	25.6	24.9	27.0	26.2
	2 mm	10.4	13.1	13.2	13.2	14.2	11.1	12.2
	3 mm	5.7	5.1	4.9	4.9	5.1	5.8	5.3
	4 mm	0.8	0.5	1.2	1.0	1.4	0.6	0.9
	5 mm	0.2	0.1	0.3	0.4	0.3	0.1	0.2
	≥1mm	44.5	43.0	46.1	45.1	45.9	44.6	44.8
	≥2mm	17.0	18.9	19.6	19.5	21.0	17.6	18.7
Mean		0.692	0.683	0.739	0.727	0.758	0.696	0.712
sem		0.021	0.030	0.031	0.031	0.032	0.030	0.011

Table 6: Distribution (%) and mean (mm) of the amount of midline shift by residency and gender.

Midline shift		Urban			Rural			Total		
		Male N=3477	Female N=3480	Total N=6957	Male N=3477	Female N=3480	Total N=6957	Male N=3477	Female N=3480	Total N=6957
Percentage	0 mm	56.1	56.0	56.0	54.2	54.5	54.3	55.1	55.2	55.2
	1 mm	26.2	25.9	26.0	26.5	26.1	26.3	26.3	26.0	26.2
	2 mm	11.8	12.1	11.9	12.6	12.4	12.5	12.2	12.2	12.2
	3 mm	5.2	5.0	5.1	5.2	5.9	5.6	5.2	5.4	5.3
	4 mm	0.7	0.9	0.8	1.1	0.9	1.0	0.9	0.9	0.9
	5 mm	0.1	0.2	0.1	0.3	0.3	0.3	0.2	0.2	0.2
	≥1mm	43.9	44.0	44.0	45.8	45.5	45.7	44.9	44.8	44.8
	≥2mm	17.8	18.2	18.0	19.3	19.4	19.3	18.5	18.8	18.7
Mean		0.685	0.696	0.690	0.735	0.734	0.735	0.710	0.715	0.712
sem		0.022	0.023	0.016	0.024	0.023	0.017	0.016	0.016	0.011

Table 7: T-tests between both genders and residencies (urban and rural) for the amount of midline shift.

	Gender difference			Residency difference		
	Urban	Rural	Total	Males	Females	Total
t value	0.335	0.044	0.198	1.558	1.174	1.931
d.f.	3481	3472	6955	3475	3478	6955
p level	NS	NS	NS	NS	NS	NS

Table 8: Distribution (%) of the direction of midline shift by governorate.

Midline shift	Baghdad	Ninevah	Basrah	Diyala	Anbar	Najaf	Total
Right	22.9	21.4	23.4	22.2	23.6	22.9	22.7
None	55.5	57.0	53.9	54.9	54.1	55.4	55.2
Left	21.7	21.6	22.8	22.8	22.3	21.8	22.1
Total	100	100	100	100	100	100	100

Table 9: Distribution (%) of the direction of midline shift by residency and gender.

Midline shift	Urban			Rural			Total		
	M	F	T	M	F	T	M	F	T
Right	22.3	22.3	22.3	23.4	23.1	23.2	22.8	22.7	22.8
None	56.1	56.0	56.0	54.2	54.5	54.3	55.1	55.2	55.2
Left	21.6	21.7	21.7	22.4	22.4	22.4	22.0	22.1	22.0
Total	100	100	100	100	100	100	100	100	100

Discussion

Maxillary central diastema

The 10.1% prevalence of maxillary central diastema is comparable to the 11.5% of Batayine (1997) but much lower than the 15% of Abdulla (1996) and Al-Dailami (2000) in their 13 year old samples.

This Iraqi figure is close to that of the Swedish population (Ingervall et al., 1978; Mohlin, 1982), but lower than that of the American population (Cons et al., 1978; Brunelle et al., 1996) and this may be attributed to ethnic differences (Table 1).

Basrah, Najaf and Anbar showed significantly more diastema than the other governorates. This also aids the previous suggestion of genetic differences.

Considering the total sample, gender differences were statistically insignificant which is in agreement with Al-Naddawi and Shereef (1989). On the other hand, Brunelle et al. (1996) found that males had significantly more diastema than females.

Midline shift

Midline shift was found in 44.8% of the sample. This figure is less than that given by Cons et al. (1978), Crabb and Rock (1986), Abdulla (1996), Batayine (1997) and Al-Dailami (2000); but it was higher than the findings of Magnusson (1976), Ingervall et al. (1978), Hoffding and Kisling (1978), Mohlin (1982), and Al-Naddawi and Shereef (1989). The reason for these vast differences is probably because of differences in criteria and methods of examination, and racial differences.

Considering the direction of midline shift, 22.8% of the total sample showed midline shifts to the right side while 22.0% to the left side showing an insignificant difference. While, Cons et al. (1978) found midline shifts on the right side (33.5%) more than on the left side (26.7%).

Males showed very comparable midline shift prevalence to that of females. This finding did not come in agreement with previous studies which showed the significant increase of midline shifts in males (Magnusson, 1976; Ingervall et al., 1978; Mohlin, 1982) or females (Al-Naddawi and Shereef, 1989). This may be because of the older age included in these studies.

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The Prevalence of Juvenile Periodontitis in Secondary School Students in Ninevah Governorate, Iraq

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Abstract

The aim of the present epidemiological study was to estimate the prevalence of localized juvenile periodontitis in a group of secondary school students aged 12 – 19 years old in Ninevah Governorate.

A sample of 2845 students [1815 (63.8%) males and 1030 (36.2%) females] was collected from secondary schools in different areas of Ninevah Governorate.

The procedure used to identify juvenile periodontitis was carried out in two stages. The first stage was screening the total students included in the study to identify possible positives. The second stage consisted of a full clinical and radiographic examination.

Results of this study revealed that the percentage of juvenile periodontitis for the total sample was 0.1%, for males the percentage was 0.11%, while for females it was 0.09%.

Introduction

Juvenile periodontitis (Aggressive Periodontitis (1)) is a disease of the periodontium, which occurs in an otherwise healthy adolescent (2); also called Periodontosis(3). The disease is characterized by the clinical picture of severe destructive periodontal disease, but it characteristically occurs in young individuals (3, 4, 5). Usually there are no obvious signs of accompanying gingival inflammation, and the disease can occur in persons whose oral hygiene appears to be reasonably good (3).

Juvenile periodontitis is divided into two major subdivisions: Localized and generalized juvenile periodontitis. Localized juvenile periodontitis affects first permanent molars and incisors and not more than one or two additional permanent teeth; while generalized juvenile periodontitis is more extensive, affecting first permanent molars and incisors as well as several teeth in other segments of the dentition.

Bear in 1971 (2) pointed out many characteristics that justify the classification of juvenile periodontitis as a distinct periodontal disease; age of onset (early puberty), affects females more than males, seems to cluster in families; rate of progression, rapid; lack of relationship between local etiological factors and presence of deep periodontal pockets; and distinctive radiographical pattern of alveolar bone loss.

There is no epidemiological study that carried out in Iraq to estimate the prevalence of juvenile periodontitis, so we decided to carry out an epidemiological study in Ninevah Governorate to estimate the prevalence of localized juvenile periodontitis in a group of secondary school students.

Materials and methods

The procedure used to identify juvenile periodontitis was carried out in two–stages. The first stage was screening the total students included in the study to identify possible positives. This was based on the measure of the depth of a pocket in certain index teeth (both upper central incisors and either left or right first maxillary molars (6, 7, 8)). The probed sites for each student

were mesiobuccally, distobuccally, distolingually and mesiolingually around the first molars, and mesiolabially and distolabially around the incisors. The depth of pocket measuring using Michigan O periodontal probe: If the depth of pocket is more than 5 mm at one or more points around the tooth then the tooth is considered positive (6, 9, 10).

If two or more teeth scored as positive, or one tooth was positive and the other was missing, then the subject was translated to the second stage examination. This stage consisted of a full clinical and radiographic examination. The diagnosis of the individuals as juvenile periodontitis was according to the criteria of Bear (2) and Saxen (8).

The sample selected was the students from secondary school aged 12 – 19 years from different areas of Ninevah Governorate.

Results

The total sample examined was 2845 students; 1815 (63.8%) males and 1030 (36.2%) females.

Three students only (2 boys and 1 girl) were identified as a positive from the initial screening, and at the second screening using clinical and radiographical examination, all the three students were diagnosed as juvenile periodontitis. The percentage of juvenile periodontitis for the total sample was 0.1%, for males was 0.11% and for females was 0.09%.

Discussion

This is the first Iraqi study to estimate the prevalence of juvenile periodontitis among adolescent aged 12 – 19 years.

The prevalence of juvenile periodontitis in this study was 0.1%. This result was in agreement with others reported the same prevalence (9, 11, 12); while other studies reported higher prevalence as a study by Nassar et al. (13) for Saudi population the prevalence was 0.42%. Barnett et al. (14) found a 2.4% prevalence rate in a population of 2167 individuals aged 13 – 30 years; and Cappelli et al. (5) reported in their study, among adolescent Hispanic population from South Texas aged 12 – 17 years, that the prevalence was 1.7%.

The prevalence of juvenile periodontitis according to gender was 0.11% and 0.09% for males and females respectively; that means a gender ratio of males to females was 1:1.2. This was in accordance with other studies (11, 12). This finding disagreed with the findings of other studies that find the higher prevalence in females (9, 13, 14, 15).

The diagnosis, prevention and treatment of localized juvenile periodontitis is very important and to be detected as early as possible. Before 1980's, many researchers thought that localized juvenile periodontitis to be a destructive disease of periodontium affecting permanent teeth. After that many studies have described advanced idiopathic alveolar bone destruction in the primary dentition of healthy prepubescent children (16, 17, 18). These findings challenge the classical definition of localized juvenile periodontitis. The documented association between localized juvenile periodontitis and the microorganism Actinobacillus actinomycetemcomitans (5, 18–22) may be helpful in diagnosis, along with other appropriate laboratory studies and the disease may exhibit abnormalities in host immune cell function (23). So that Lindhen et al. (24) stated that children diagnosed as localized prepubertal periodontitis in their primary teeth need for liaison between specialists in paediatric dentistry, periodontology, immunology and microbiology in order to diagnose prepubertal periodontitis and to establish a rational basis for treatment to prevent progression to juvenile periodontitis.

Waerhaug (25) proposed a regimen to control juvenile periodontitis by removing the pockets surgically and subgingival plaque was removed professionally at each three month recall. Patients were instructed in the thorough oral hygiene procedures that they need to carry out themselves. Those who responded well to these procedures kept the disease under control. Those who responded incompletely did not and the disease progressed. Waerhaug stressed that early diagnosis, which is not necessarily easy, is essential to successful treatment of the condition.

Once the condition of juvenile periodontitis has been correctly diagnosed, treatment and control procedures are no

different from those for patients with chronic destructive periodontal disease, just more intensive.

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Evaluation of the Shear Bond Strength of the Intraoral Porcelain Repair System with Different Surface Treatments (In Vitro Study)

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Abstract

Problem*: When clinical fracture of the ceramic veneer on ceramometal can be repaired, the need for remake can be eliminated.*

Purpose*: Investigated the effects of different surface treatments on the shear bond strength of an intraoral porcelain repair system.*

Materials & methods*: 120 Specimens were prepared in form of metal disks (8mm in diameter, 4mm height) and randomly divided into three surface groups: metal (A), porcelain (B) and metal Porcelain combined surface (C). Vivadent ceramic repair system was tested. Each group was divided into four subgroups according to the types of surface treatments applied all the samples were treated with Air –abrasion with Al_2O_3(50µm) 20 sec. then Subgroup* ***No.1*** *etch. With 37% phosphoric acid. for 15 sec, Subgroup* ***No.2*** *etch. With 37% phosphoricacid. for 4 min, Subgroup* ***No.3*** *etch. With 37% phosphoric acid. for 15 sec. + silane & Subgroup* ***No.4*** *etch. with 37% phosphoric acid for 4min + silane. Resin were applied to all the samples. Shear bond strength of 10 specimens for each subgroup were determined with a Zwick universal testing machine after storing in distilled water at 37^0C for 7 days, during this period thermocycling at 5^0C –55^0C for 300 cycles with 30 sec. dwell. The data were analyzed with analysis of variance and Duncan's multiple range test.*

Results: *There was no significant difference (P>0.05) in the bond strength among the different subgroups for metal groups. On the porcelain and metal porcelain combined surface groups, there was a significant difference (P<0.01) among the different subgroups for each group with best bond obtained with the application of silane agent for both groups.*

Conclusions: *Silane had no influence on bond strength of composite resin to metal surface with the best results obtained when the fracture was limited into porcelain and the use of silane agent dramatically enhance bond strength of composite resin to etched porcelain for 15 sec. in both porcelain group and metal porcelain combined surface group, but extending the etching time to 4 min. caused a decrease in the shear bond strength in porcelain group only.*

Introduction

Ceramic based restorations are an important part of dentist's armamentarium for durability and esthetic *(Latta & Barkemeier, 2000).* The porcelain–fused to metal restoration will remain one of the most common restorations in dentistry, however, with many variables that exist in fabrication and function of these restorations, there is also a potential for failure. This failure usually involve the porcelain portion of the restoration *(Rada, 1991).*Porcelain fracture is a serious and costly problem for each the patient and the dentist. The problem is more critical if the fracture crown is part of a multiunit restoration. Remarking the crown or fixed partial denture is often inadvisable and intraoral repair may be indicated *(Berksun & Saglam, 1994).* Repairing ceramic–based restorations can increase the clinical longevity of failed restoration and offer the dentist and patient a cost effective alternative to replacement. Newer porcelain repair systems show excellent adhesion durability of resin based composites to the fractured ceramic and exposed metal surface *(Latta & Barkemeier, 2000) (Haselton et al., 2001).* Retention of direct

resin composite can be provided by macromechanical, micromechanical, and chemical means. Macromechanical retention means creating undercut, and this can be done in every restorative material. Micromechanical retention can be produced by etching with acid (porcelain and composite) and by air abrasion (metal, porcelain, and composite). Chemical retention can be enhanced by silanization (Material containing oxides). Air abrasion has the advantage of being a simple and effective technique for creating a microretentive surface on every restorative material *(Roeters 2000).*

Materials and Methods

Samples Preparation

The samples were fabricated by cutting metal cylinder of wiron(R) 99 (Bego, Germany) with 8mm diameter and 15mm height, test specimens were prepared in form of metal disks (8mm in diameter, 4mm height).

Sample Grouping

Group A: This group consisted of 40 samples to test repairing strength with metal surface exposure only without any porcelain exposure.

Group B: This group consisted of 40 samples to test repairing strength with porcelain surface exposure. Samples were randomly selected for porcelain firing treatment. Opaquer layers and dentin porcelain were applied to the sample in a modified syringe tube with an 8mm internal diameter and 6mm height Fig (1).

Porcelain (Ivoclar, Liechtenstein) was added by using brush technique then the sample was dried, removed from the modified syringe and baked according to manufacturer's instructions. Thickness of porcelain was 2mm (±0.1mm) and the total sample thickness was 6mm (±0.1mm) (metal, opaque and porcelain).

Group C: 40 samples were selected to test the repairing strength with combination of porcelain and metal exposure. A semicircular spacing of 2mm depth was created on surface of metal sample.

Opaque layers and dentin porcelain were applied to the sample as in group B, using another modified syringe tube with an 8mm internal diameter and 4mm high Fig.(2)

Porcelain was vibrated and condensed on to the sample surface as densely as possible. The sample was dried, removed from modified syringe tube, and baked. Thickness of porcelain was 2mm (±0.1mm) and the total sample thickness was 4mm (±0.1mm).

The original metal surface, porcelain surface, and metal-porcelain surface samples were embedded with acrylic resin totally except its examined surface

Sample Distribution & Surface Treatment

The samples were divided into three groups according to the types of surface exposure, and each group was divided into four subgroups according to the types of surface treatments applied; each subgroup consisted of ten samples (Table 1).

Air Abrasion Treatment

The samples were held in specially designed stand with an angle of 60 degrees. Airflow handy instrument was used (EMS, Elctromedical system, SA, CH-1260-Nyon, Switzerland) with Al_2O_3, 50 µm particle size at air pressure (3.5) bar and a water pressure of (0.7) bar. The nozzle was moved with a small circular motion for 20 sec. The air abraded specimens were thoroughly rinsed for 15 sec. using an air/water spray to remove all remaining particles of the abrasion medium from the surface and dried for 5 sec. by oil free air from chair side syringe.

After surface treatment with air abrasion and acid etching, the bonding surface of all the samples was masked with water proof adhesive tap, approximately 0.1mm thick, and a 6mm in diameter holes were punched approximately at the center of each surface to create a standardized area for bonding tests.

Composite Application

The composite restorative materials of the repair system were placed with special device fabricated by the researcher for this purpose. This device consists of three parts metal cylinder, metal shaft and plastic transparent tube. This device applied a statical load of 300gm on the composite and from a composite cylinder of 6mm in diameter and limit the height of the cylinder to approximately 2mm.The plastic tube was slightly overfilled with Tetric ceram using plastic spatula and then the device was

positioned firmly in the hole area of the tape on the bonding surface. The device was held vertically using metal stand Excess composite was removed from around the tube with an explorer before polymerization. The composite cylinder was then polymerized with a visible light curing unit (Astralis5, vivadent, Austria) with light directed horizontally to the composite cylinder. Four curing sequences of 40 sec. from opposite sides of cylinder were completed. The total polymerization time for each specimen was 160 seconds.

Surface Roughness (Profilometer Test)

In order to examine the effects of air abrasion with Al_2O_3 on the microgeometry of the test surface, the specimens were analyzed in the Profilometer device (Perthometer, Germany) for determining and recording surface roughness Five specimens from group A and Five specimens from group B were examined by profilemeter before and after treatment, the surface roughness values before treatment were recorded as initial roughness (Table 2).

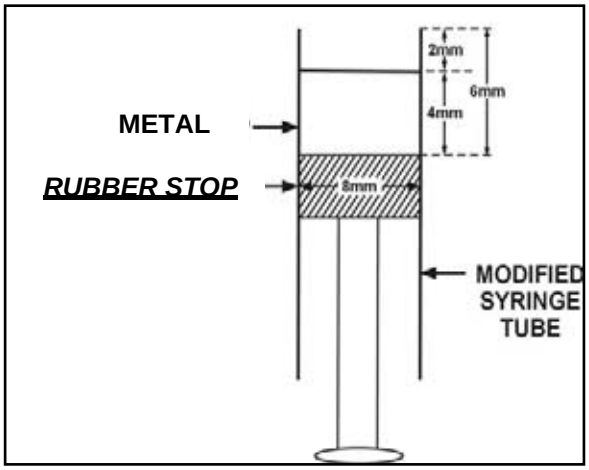

Fig (1) diagram of metal sample in modified syringe tube

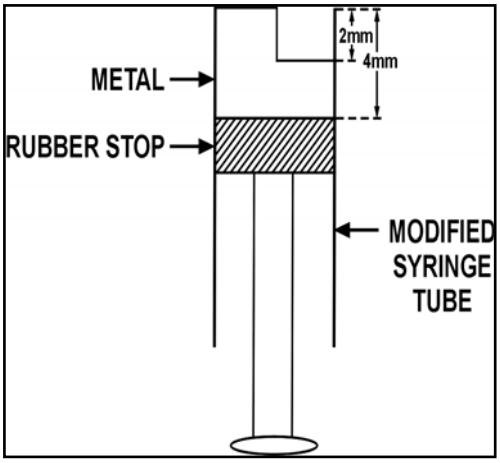

Fig (2) diagram of semicircular metal sample in modified syringe tube

Table (1) Samples Distribution& Surface Treatments

Subgroup No.	Surface treatment
A1, B1, C1	Air-abrasion with Al_2O_3 (50µm) 20 sec. + etch. With 37% phosphoric acid. for 15 sec
A2,B2, C2	Air-abrasion with Al_2O_3 (50µm) 20 sec. + etch. With 37% phosphoricacid. for 4 min
A3,B3,C3	Air-abrasion with Al_2O_3 (50µm) 20 sec. + etch. With 37% phosphoric acid. for 15 sec. + silane
A4,B4,C4	Air-abrasion with Al_2O_3 (50µm) 20 sec. + etch. With 37% phosphoric acid for 4min + silane

Table (2) means of surface roughness values µm before and after air abrasion

Type of surface	Before	After
Metal	0.144	0.68
Porcelain	0.502	2.124

Aging and Thermocycling

Bonded specimens of all the groups were stored in 37°C distilled water for 7 days. During this period thermocycling at 5°C-55°C (±2 °C) for 300 cycles with 30 seconds dwell was done. All groups were subjected to thermal cycling, using a thermocycling machine (Al-Qayssi, Iraq).

Testing Procedure (Shear Test)

Shear bond strengths were tested with Zwick universal testing machine (1454, Germany), using a stainless steel chisel–shaped rod, which was used to deliver the shearing force with across head speed of 5mm per minute. The chisel end of the rod was positioned at the interface between the sample surface and composite cylinder in metal group and porcelain group and along the interface between metal and porcelain in the metal –porcelain combined surface group. Fracture sites were visually examined to determined location or type of failure during debonding. The data were analyzed with analysis of variance and Duncan's multiple range test.

Results

The mean shear bond strength values of all the tested samples in Mpa and standard deviations are presented in the Table (3) and Fig (3).

GroupA, One-way ANOVA test was used and showed that there was no statistically significant difference (P>0.05) among the different subgroups so no further test is required. There was 100% adhesive failure between composite and metal surface during the debonding procedure for the four subgroups.

Group B, One-way ANOVA test was used and showed that there was a statistically highly significant difference (P<0.01) among the different subgroups. Duncan's multiple range test showed that there was statistically non–significant difference between B1 vs B2. While the rest represented high significant difference. There was 100% cohesive failure in the porcelain during the debonding procedure for subgroup B3 that yielded the highest bond strength. The percent of cohesive failure in porcelain decreased markedly for subgroup B4 that produced lowest strength than subgroup B3.Subgroups B1 and B2 had no cohesive failure in porcelain. All the failure in these two subgroups were adhesive between the porcelain and the composite resin, produced lower bond strength than the other two subgroups

Group C, One-way ANOVA test was used and showed that there was a statistically high significant difference (P<0.01) among the different subgroups, which needed a further statistical analysis by using Duncan's multiple range test, results showed that there was statistically non significant difference between C_1vsC_2. Also there was non significant difference between C_3 vs C_4. While the rest represented high significant difference. Examination of failure sites in both subgroups treated with phosphoric acid only (C_1&C_2) disclosed primarily adhesive between the metal –porcelain combined surface and the composite. There were two types of failure, 60% cohesive failure in porcelain and 40% adhesive failure between metal –porcelain combined surface and the composite for subgroup C_3 and the same percentages were found for subgroup C_4.Nevertheless, separation of material occurred at the metal –porcelain combined surface and composite interface in some samples (C_3, C_4) as with other two subgroups (C_1, C_2) but they yielded the highest bond strength than subgroups (C_1, C_2).

Discussion

For metal group**,** ANOVA test showed that there was no statistically significant differences (P>0.05) among the different subgroups, indicating that silane did not improve the bond strength of composite to metal surface and the bond strengths of porcelain repair system to metal surface were relatively strong with only air abrasion and etching for 15 sec., meaning that the bonds which were formed between the composite and metal surface were primarily mechanical and depended on the penetration of the resin into irregularities on the rough metal surface. *Chung and Hwang, 1997* believed that air abrasion removes unfavorable oxides, contaminates and increase surface roughness, thereby increasing surface energy and bonding surface area

For porcelain group**,** ANOVA test showed that there was a statistically high significant difference ($P<0.01$) among the different subgroups. Duncan's multiple range test of the data revealed that there was no significant difference between subgroup B1 and B2, indicating that extension of the etching period did not proportionally increase the bond strength, a finding that agrees with *Chen et al., 1998* although they used 2.5% hydroflouric acid, and reported that the resistance to fracture of the adhesive interface depended partly on mechanical interlocking between the bonding agent and etched porcelain. Also the results of this study indicated that without the application of silane agent, the bond strength of composite to porcelain was relatively weak and independent of the type of surface treatment. All specimens in these two subgroups failed by interfacial separation between composite and porcelain which agreed with *Lacy et al., 1988* who found that etching of porcelain surface without a silane agent provided no greater bond to composite than mechanical roughening with a fine diamond. On the other hand the results of this study disagreed with *Thurmond et al., 1994* who found that the durability of composite resin to porcelain bonds formed with chemical agent was markedly inferior to alteration of the porcelain surface with either aluminum oxide air abrasion or hydrofluoric acid or a combination of both. The Duncan's test showed a statistically significant difference between subgroups B1 and B3, indicating a positive effect of the application of silane to the roughened surface. The samples in subgroup B3 revealed cohesive failure of porcelain, where as the composite porcelain bond remained intact. These bond strength values may be related to the effectiveness of silane agent and the process of porcelain etching. This finding suggests that the bond between the composite and the porcelain is most likely to be more chemical and less mechanical. This finding agreed with the following researchers: *Aida et al., 1995* in their study found that the formation of siloxane bonds was important for adhesion between the composite resin and porcelain. *Kupiec et al., 1996* concluded that porcelain surface treatment with aluminum oxide air abrasion followed by hydrofluoric acid in conjunction with bonding regimens with a silane coupling agent generated the greatest bond strengths of composite to porcelain. The result of this study disagreed with *Thurmond et al., 1994* who reported that mechanical alternation of a porcelain surface is more important than agents that promote chemical bonding of composite resin to porcelain. The Duncan's test showed a statistically significant difference between subgroups B3 and B4, indicating that over etching negatively affect the bond strength, but the shear bond strength for these two subgroups was significantly higher than the other two subgroups. This finding agreed with *Chen et al., 1998* who reported that if the porcelain surface was over etched, bond strength would be adversely affected and the possible problems could be:

1. Difficulty in removing etchant and solvent water from the etched surface using chair side equipment.
2. Wettability of intermediate resin.
3. Post curing stress concentration due to complicated adhesive interface structure.

For metal–porcelain combined surface**,** there was no significant difference in bond strength between C_1 and C_2 indicating that without silane, extention of the etching time did not proportionally increase the bond strength. Also there was no significant difference in bond strengths between C_3 and C_4, but the shear bond strength for these two subgroups were significantly higher than the other two subgroups. This indicates that the bond strengths of porcelain repair system to metal porcelain combined fracture surface were relatively strong with silane applied, and according to the previous discussion regarding the activity of silane to the porcelain surface only it was concluded that the best bond between the metal porcelain combined fracture surface and the repair composite resin was related to chemical bond with porcelain instead of metal surface. This finding agreed with the following researchers: *Beck et al., 1990* reported that the best bond between the fractured surface and the repair composite resin was obtained with porcelain instead of metal surface and *Bercksun et al., 1993* reported

that because the success of the adherence depends on the amount of remaining porcelain surface, it was proposed to extend the bonding surface of the fractured porcelain to improve the bond strength of repair material.

Table (3) Mean SBS values & standard deviation for each group.

Groups	Subgroups	Mean MPa	S.D
Group A	A_1	7.192	0.9876
	A2	6.926	0.6305
	A_3	6.66	0.8909
	A_4	6.483	0.8699
Group B	B_1	7.298	0.7888
	B_2	7.016	0.7934
	B_3	15.948	0.7371
	B_4	14.985	0.5819
Group C	C_1	9.415	0.7049
	C_2	9.034	0.7444
	C_3	12.083	0.7958
	C_4	11.906	0.8937

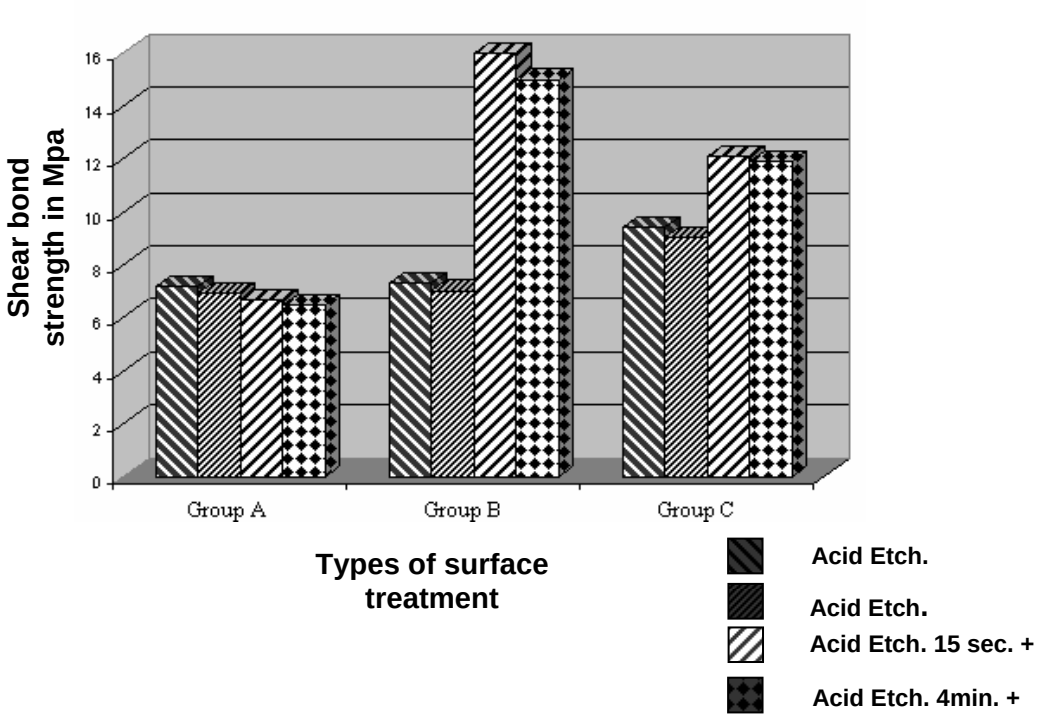

Fig. (3): bar chart according to the mean value of shear bond strength in Mpa for all the groups and sub groups

Conclusions

Under the conditions of this in vitro study, the following conclusions can be drawn:

Using composite resin to repair metal surface exposure treated with air abrasion for 20 sec.

* Different etching times (15sec.- 4min.) with or without silane did not affect shear bond strength.

Using composite resin to repair fracture in porcelain only treated with air abrasion for 20 sec.

* Different etching time (15sec.- 4min.) did not affect shear bond strength.
* Using silane agent significantly increased shear bond strength.
* Increase etching time from 15 sec. to 4 min. with silane agent decreased shear bond strength.

Using composite resin to repair fracture with both metal and porcelain combined surface exposure treated with air abrasion for 20 sec.

* Different etching time (15sec.- 4min.) did not affect shear bond strength.
* Using silane agent significantly increased shear bond strength.

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Buccally Malposed Canines in Yemen

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Abstract

The prevalence of buccally malposed canines of Yemenis was estimated in Yemen by intra-oral visual examination of 192 young adult subjects (118 males and 74 females). Their mean age was 20.9 years. 73 subjects of the whole sample had normal occlusion, while the rest had different classes of Angle's classification of malocclusion. Unexpectedly, the prevalence of the mandibular buccally malposed canine (8.9%) was higher than the maxillary buccally malposed canine (5.2%). Generally, buccally malposed canines were found higher in females than in males and mostly seen in class I Angle's classification.

Introduction

Most of clinicians agree that permanent canines are important for both esthetic and functional points of view and therefore, should be preserved whenever possible (Bishara et al. 1976).

However Dewell (1949) mentioned that no tooth is more interesting from a developmental point of view than the upper cuspid, of all teeth it has the longest period of development, the deepest area of development, and the most devious course to travel from its point of origin to full occlusion which makes it susceptible much longer to environmental influences, whether favorable or unfavorable. It is rarely congenitally missing and it is the final factor in securing contacting relations between all the teeth, which means it has to prepare by wedging action, part of space it requires in the dental arch.

Wheeler (1974) considered the upper permanent canine to be of a great value since it is placed in the 'corner' of the mouth, the longest tooth with the longest root, well anchored to the maxilla, supports the incisors and premolars, of low susceptibility to caries and of high functional and esthetic values.

On the other hand, Tully and Cryer (1969) mentioned that the unerupted and displaced canine is quite a common problem, while Foster (1975) stated that the permanent upper canine is probably the tooth which is most commonly develop in a wrong position. Kinaan (1981) reported that, the malposed canine forms the most common chief complaints in Iraq and in 1982, he found that 24% of orthodontic patients have their chief complain relating malposed canines.

Mitchell and Carter (2000) considered the following factors to be the possible causative factors for the maxillary canine displacement:

1-Displacement of the crypt.
2-Long path of eruption.
3-Short-rooted or absent upper lateral incisor.
4-Crowding.
5-Retention of the primary deciduous canine.

Review of available literatures has been presented that most of previous studies concentrated on the malposition of the upper canine. On the other hand, no information were found about the prevalence of buccally malposed canine in Yemen, therefore the aim of this study was to establish a base data information about the prevalence of buccally malposed canine in Yemen and to expand the scope of the information about the buccally malposed canine in the lower arch.

Materials and Methods

The sample of this study was composed of 192 young adult subjects (of Yemen origin) who were selected randomly from the students of the Colleges of Dentistry of both Thamar and Sana'a Universities in Yemen and their out-patients. 74 subjects of the sample were females while the rest 118 subjects were males. Their average age was 20.9 years. During the selection of the sample every subject having previous orthodontic treatment was excluded from the sample. Of the sample, 73 subjects had normal occlusion, while 119 subjects had malocclusion who were subdivided according to Angle's classification of malocclusion into the following classes:

Class l: The mesiobuccal cusp of the upper first molar occludes with the mesiobuccal groove of the lower first molar. In practice discrepancies of up to a half cusp width in either way were also included in this category.

Class ll: The mesiobuccal cusp of the lower first molar occludes distal to the Class l position, this was either:

- Division 1: with proclined maxillary central incisors and increased overjet.
- Division 2: with retroclined maxillary central incisors and normal overjet.

Class lll: The mesiobuccal cusp of the lower first molar occludes mesial to the Class l position.

Each subject in the sample was examined clinically (intra-orally) by the dental mirror and using visual examination (direct inspection of the upper and lower permanent canine regions) to record the buccally malposed canines (canines that are displaced outside the dental arches buccally).

Statistical analysis

The collected data was placed in tables and the following statistical analyses were done:

1- Descriptive analysis to obtain means and standard deviations for the age of the sample.
2- Calculation of frequencies for non-parametric variables.
3- Cross-tabulation of the variables with the classes of Angle's classification of malocclusion.
4- Chi-square test to examine any statistical association between the presence of malposed canines on one hand and sex and the class of malocclusion on the other.

P levels of more than 5% were considered as statistically insignificant.

Results

The prevalence of buccally malposed canine was higher in the lower arch (8.9%) than the in the upper arch (5.2%) as shown in table 1 and figure 1.

Concerning gender difference, the prevalence of buccally malposed canine was higher in females (upper=6.8%, lower=9.5%) than in males (upper=4.2%, lower=8.5%), however the differences between them were statistically insignificant in the upper arch (X^2=0.0186, d.f=1, N.S.) and in the lower arch (X^2=0.007, d.f=1, N.S.).

Concerning the distribution of buccally malposed canine according to the classes of malocclusion, upper malposed canines were more prevalent in class l and class ll division 1 malocclusions than in the other classes, however this difference was statistically not significant (X^2=6.144, d.f=3, N.S.), while lower malposed canines were more prevalent in class l and class ll division 1 malocclusions than in the other classes of malocclusion, however the differences among them were statistically not significant (X^2=1.436, d.f=3, N.S.) as shown in table 2.

Table 1: Prevalence of Malposed Canines in Yemen.

Gender	Sample No.	Age (yrs.)	Malposed Canine	
		Mean ± SD	Upper	Lower
Males	118	21.0 ± 1.9	5 (4.2%)	10 (8.5%)
Females	74	20.7 ± 1.7	5 (6.8%)	7 (9.5%)
Total	192	20.9 ± 1.8	10 (5.2%)	17 (8.9%)

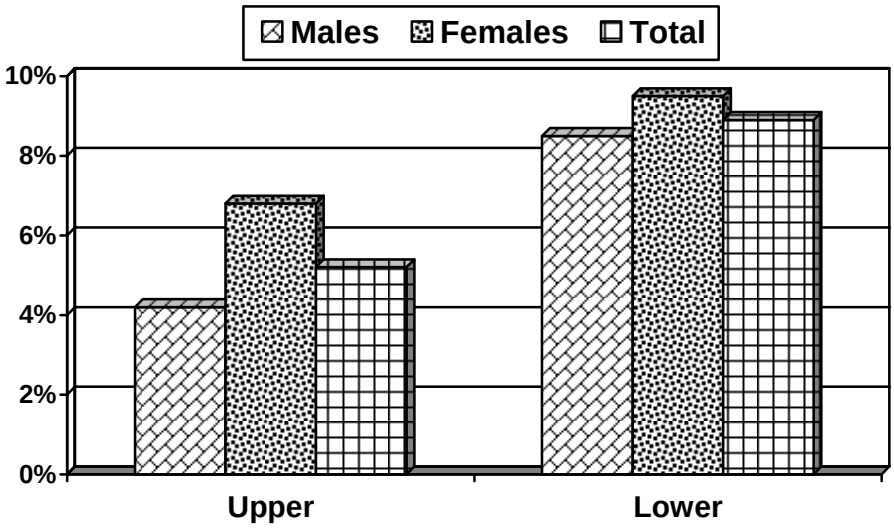

Figure 1: Distribution of buccally malposed canines in Yemen.

Table 2: Distribution of malposed canines according to Angle's classification.

Malocclusion	Malposed canine			Total
	Upper	Lower	None	
Class I	7 (8.9%)	15 (19.0%)	57 (72.2%)	79
Class II division 1	3 (10.0%)	1 (3.3%)	26 (86.7%)	30
Class II division 2	0 (0.0%)	1 (20.0%)	4 (80.0%)	5
Class III	0 (0.0%)	0 (0.0%)	9 (100.0%)	9
Total	10(8.1%)	17 (13.8%)	96 (78.0%)	123

Discussion

Buccally malposed canine is considered as one of the most common problems seen in orthodontic practice and it forms 24% of chief complaints of Iraqi orthodontic patients (Kinaan, 1982), in spite of that there are no studies that have dealt with buccally malposed canine of Yemenis, and their is limited information about buccally malposed canine in the lower arch even in other countries.

The age range of this sample was 14-27 years with an average age of 20.9 years to ensure that the examined subjects were passing the normal age at which the canine erupts as Ollöw et al. (1982) reported that the average age of canine eruption is 12 years 9 months for males and 12 years 3 months for females.

Maxillary buccally malposed canine was found in 5.2% of sample which is lower than the findings of Ghaib (1992) and Al-Huwaizi (2002) which were 8.3% and 6.5 % respectively, while mandibular buccally malposed canine was found in 8.9% of sample which is considerably higher than the finding of Al-Huwaizi (2002) which was 2.8%. These differences may be due to the difference in the race and the age of the sample of the previously mentioned studies, since both of them were done in Iraqi samples.

Unexpectedly, the prevalence of buccally malposed canine was higher in the lower arch than in the upper arch for both sexes (Table 1 and Fig. 1). This may be due to higher tendency for crowding in the lower than the upper arch (Lavelle, 1976; Mohlin, 1982; Laine and Hausen, 1985; Abdulla, 1996; Batayina, 1997; Al-Huwaizi et al. 2002a) as crowding of the teeth is considered as one of the common etiological factors that cause malpositions of the canines.

However, Al-Huwaizi et al. (2002b) found that buccally malposed canines were more prevalent in the upper arch than the

lower arch and this contradictory finding may be because of their younger age sample (13 years).

Helm (1968), Lavelle (1976) and Salonen et al. (1992) reported that crowding of the teeth is more common in females than males. This can explain that buccally malposed canine were more prevalent in females than males. This finding is partially in agreement with the finding of Ghaib (1992) who found higher prevalence of maxillary buccally malposed canine in females (8.9%) than males (7.8%) but contradicts those of Al-Huwaizi et al. (2002b).

Concerning the distribution of buccally malposed canines according to Angle's classification of malocclusion, it was more prevalent in class l than in other classes of malocclusion (for both arches). This is partially in agreement with the findings of Bass (1967), Kinaan (1982) and Ghaib (1992).

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Maxillary Arch Dimensions and Palatal Dimensions in Down's Syndrome (trisomy 21)

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Abstract

Maxillary arch dimensions and palatal dimensions (width, depth and height) of 50 patients with Down's syndrome were compared to 50 without Down's syndrome patients as control group. The age of the patients was 14-18 years old. The maxillary arch dimensions and palatal dimensions of patient's with Down's syndrome were smaller and narrower than control group.

Introduction

Down's syndrome is a genetic condition and people with Down's syndrome are first and foremost human beings who have recognizable physical characteristic and limited intellectual endowment which are due to the presence of an extra chromosome 21 (1).

The estimated incidence of Down's syndrome is between 1 in 1000 to 1 in 1100 live births. Each year approximately 3000 to 5000 children are born with this chromosome disorders (2).

Individuals with Down's syndrome need the usual health care screening procedures recommended for general population for example immunization (3).Health evaluation and dental treatment (4).

They are developed certain medical and dental problems, they have an increased risk of having certain congenital anomalies, such as congenital heart diseases, hearing loss, midfacial hypoplasia (under development), difficulty in breathing with narrow air way, defect in speech and language (5).

The orofacial features of individuals with Down's syndrome contribute to a variety of potential problems in regards to dental care. For example, the eruption of teeth is usually delayed and often occurs in an unusual order. Primary and permanent teeth may be missing. Small or misshaped teeth are found, and severe crowding can occur because of the small oral cavity so orthodontic treatment necessary. (6)

Mouth breathing related to small nasal airway contributes to fissured tongue and lips, periodontal disease can occur as early as the teen years so mouth brushing combined with dental visits every 6 months play a key role in preventing tooth loss (7-8).

The literatures suggest that these persons exhibit asymmetric micrognathic jaws, tooth malformations and congenital absence of teeth. However, the reported data are insufficient to permit an accurate assessment of the extent of these abnormalities and in addition to that there is no previous study in our country about the maxillary arch dimension in Down's syndrome by using study model so this study have been done to establish a base line data about this people.

Materials and methods

The sample

At the Center of Health Care for down's syndrome (Hibbat-Allah) center which located in Baghdad city, 150 patients' with down's syndrome have been examined and only 60 of them agree to take an alginate impression. Only 50 (25 male and 25 female) study model have been measured and others 10 were neglected either due to fracture of teeth or improper impression. The aged of the patients (14-18) years old.

A control sample of 50 (25 male and 25 female) was chosen with the same aged grouped.

Method

After the impressions were taken by alginate impression materials for both (Down's syndrome and control group), they casted by stone material then a plaster base have been done and the study model have been prepared in the manner described by Johnson and Baghdady (9).

The land marks have been pointed on them, the measurements of the study model include the following according to (F.D.I.) (10, 11) and Friel Seldon (12).

The following landmarks have been measured (Figure 1):

1. Incisal canine distance.
2. Canine molar distance.
3. Intercanine distance.
4. Intermolar distance.

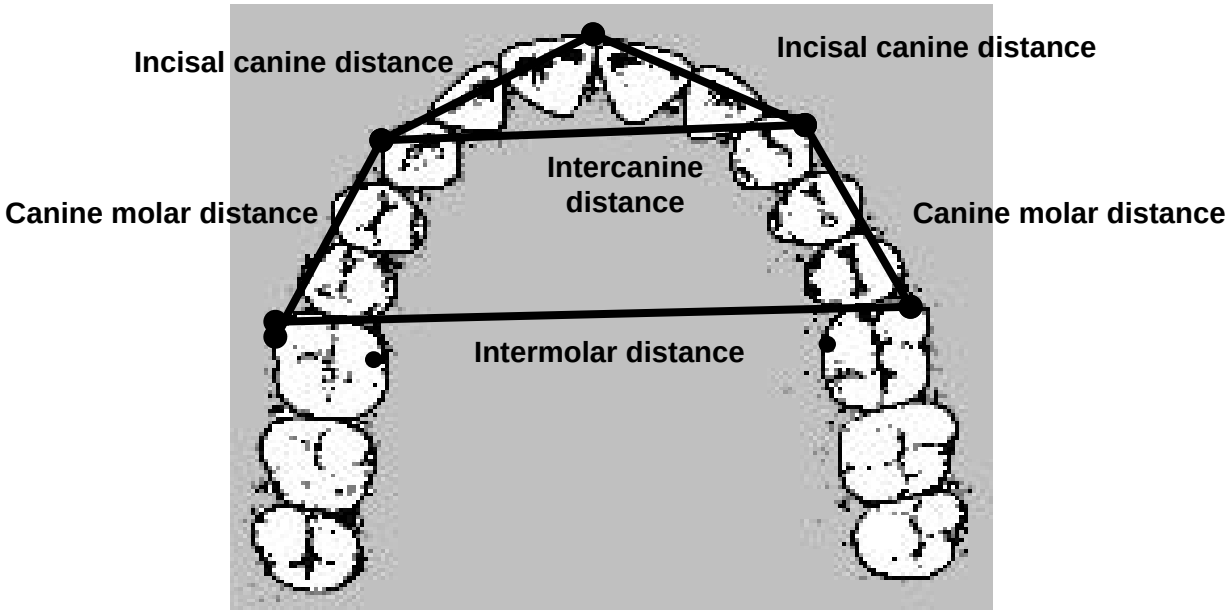

Figure (1): Dental casts landmarks.

All the above measurement by vernier (in millimeter).

5. Palatal width, depth and height have been measured in the same manner used by Westerman 1975 (12).

After the data have been collected the inter and intra examiner calibration have been done, the result show that there are no significant difference s between them by using a (t-test).

Also as there is no shifting in the midline as one of the specification of the sample so there was no significant difference between left and right side for both sex at ($P > 0.05$) so they are combined together. This is for the control and for Down's syndrome groups.

Results

The analysis of the dental models data showed that the majority of linear measurement s of control group were highly significant larger than those of Down's syndrome in both genders as shown in Table (1, 2).

Table (3) showed that there is a significant difference s between male and female in the mean of the variables in the Down's syndrome group it have been shown that male larger than female in all the variables.

Table (4) showed the mean values of the three palatal dimensions in male group.

Tab (5) shows the mean values of the three palatal dimensions in female group (control and Down's syndrome groups)

Table (6) shows a comparison between the present study and study of Westerman et al (1975) for the combined sample.

Table (1): The mean of linear measurement of upper arch (mm.) for both Down's syndrome and control group for male.

Variables	Down's syndrome (mm.)	Control	t-test
Incisal canine distance	16	19	H.S.
Canine molar distance	22	25	H.S.
Intercanine distance	30.4	32.4	H.S.
Intermolar distance	43.6	46.5	H.S.

Table (2): The mean of linear measurement (mm.) of upper arch for both Down's syndrome and control group for female.

Variables	Down's syndrome (mm.)	Control	t-test
Incisal canine distance	15.8	18.5	H.S.
Canine molar distance	21.5	24.7	H.S.
Intercanine distance	30	31.9	H.S.
Intermolar distance	42.1	45.3	H.S.

Table (3): A comparison between the mean of linear measurements (mm.) of the variables between male and female in Down's syndrome group.

Variables	M	F	t-test
Incisal canine distance	16	15.8	S.
Canine molar distance	22	21.5	S.
Intercanine distance	30.4	30	S.
Intermolar distance	43.6	42.1	S.

Table (4): Combined mean palatal dimensions (mm.) in group with Down's syndrome and control groups (male).

	Width (mm.)	Depth (mm.)	Height (mm.)
Down's syndrome	29.3	28.5	12.9
Control	31.9	31.8	14.5

Table (5): Combined mean palatal dimensions (mm.) in group with Down's syndrome and control groups (female).

	Width (mm.)	Depth (mm.)	Height (mm.)
Down's syndrome	29	28.1	12.7
Control	31.3	31.1	14.3

Table (6): Comparison between the present study and the study of Westerman for the combined sample.

	Width (mm.)	Depth (mm.)	Height (mm.)
Present study	29.1	28.3	12.8
Westerman et al.,1975	29.26	28.45	12.86
t-test	N.S.	N.S.	N.S.

Discussion

First of all it is very difficult to collect a sample of Cl I normal occlusion in Down's syndrome patients because during clinical examination the high incidence of Cl III dental arch relationships noted and this is in agreement with Gorlin's findings (1, 3). The increased occurrence of Cl III malocclusion in Down's syndrome can probably be attributed to any or all of the following; an underdeveloped maxilla, an enlarged and abnormally positioned tongue, or a relatively large and prognathic mandible (14, 15).

The result of the present study showed that the majority of linear measurements of control group were significant larger than those of Down's syndrome in both genders (Table 1, 2) at p> 0.05. This finding support the theory that the defects found in individuals with Down's syndrome are representive of faulty development in early embryonic life, Shapiro et al (16, 20) state that short stature, brachycephaly, hypoplasia of midface bones, it quite evident that the palatal abnormalities observed were not due to factors peculiar to maxilla or palate but were the result of effects on developing bones in general.

Table (3) showed that there is a significant difference between male and female in the mean of the variables in the Down's syndrome group and this is the same for control group, most of research showed That the arch dimension's in male larger than in female and this is due to the time of growth which is early in female than in male (17-18, 19, 20).

Table (4, 5) showed the mean values of the three palatal dimensions in both genders for both Down's syndrome and control groups. In the present study, palatal dimensions of the population with Down's syndrome were found to be smaller than those of the control population. These results are in agreement with the findings by Kisling (14) and Westerman (12). Genetic studies aid in understanding the complex mechanism of normal growth and development of palate since it seems that palate structure may be controlled or influenced by autosomal as well as sex-linked chromosomes. Johnson and Baghdady (9) found palatal height was higher in individuals with Turner's syndrome X0 (45X) when compared to population without Turner's syndrome. The present investigation however, shows that palatal height is lower in person's with Down's syndrome (47 XXX + 21 or 47 XY + 21) when compared to a population without Down's syndrome possibly a reduction in chromosome number results in increased palatal height and an increased chromosome number contributes to reduced palatal height. A comparison have been done between the present study and previous studies by Westerman et al (1975), table (6) showed that there is no significant difference at P> 0.05 in palatal dimensions that is mean the genetic and hereditary influence on the size and shape of the palate more than the environmental factor. From the above we can say that the abnormally small palates found in persons with Down's syndrome could obviously influence other dental finding's observed in these individuals including the high incidence of prognathism, negative overjet, reduced overbite, cross bite, open bite and evidence of the tongue habit (21).

Conclusions

1. There is no previous study in our country about the maxillary arch dimensions in Down's syndrome by using study model so this study have been done to establish a base line data about those people.
2. The control groups showed larger than those of Down's syndrome in both genders in all mean's of linear measurements of the maxillary dimensions.
3. The palatal dimensions in control group were larger than Down's syndrome group (width, depth and height).

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Oral Hygiene Status and Gingival Health of Children at Age 4 -12 Years in Baghdad

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Abstract

The aim of the study was to estimate the prevalence and severity of gingivitis and oral hygiene condition in Kindergarten and primary school children aged 4-12 years in Baghdad.

A sample of (193) child (108) of them aged (4- 6) in Kindergarten, (85) child aged (6-12) years in primary schools examined and using plaque index score by Silness and Loe and gingival index by Loe and Silness, calculus accumulation measured by using simplified calculus index by green and vermillion.

The results show that the mean plaque score for the first group of age was (0.44) while the second group was (0.96), the mean gingival score was (0.21) for the first group and (0.42) for the second group while the mean calculus score was (0.05) and (0.23) for the 1st and 2nd group respectively.

No sex variation had been noticed concerning the three scores. A highly significant was found between these two age groups concerning the three scores therefore oral health education for Kindergarten and school children is an essential activity for promoting and maintaining optimal oral health and preventing oral diseases.

Introduction

Health is a basic human right and oral heath is a significant component of general health. Epidemiological studies have formed the basis for estimating the need for dental care and developing recommendation for prevention and oral health care planning (Maush and Sheiham 1995, Scheinin et al 1970).

Data revealed that periodontal disease is one of the most widespread disease of mankind and varies from one community to another, periodontal disease is now recognized as a public health problem because of the high incidence and prevalence of the disease, the onset of the disease is being recognized more frequently among children than in the past (Lindhe 1985, Al–Sayyab 1989, Ali, 2001). It is generally accepted that oral hygiene is the most important etiological factor for the presence or absence of periodontal disease which begins at childhood as gingivitis and increasing in prevalence and severity to the early adolescent and may lead to the development of periodontal disease in adult population, (Harris & Christen 1994) but this correlation have been found to be weaker in young age group (Sherp 1964). So the aim of this study is to determine the prevalence and severity of oral hygiene status and periodontal disease in school children of Baghdad governorate and to obtain a base line data which can help in planning dental health service and can be used in future studies.

Materials and Methods

The sample consist of (193) child, 108 child at age (4-6) years from Kindergarten, 85 child at age (6-12) year from primary school, selected randomly from Kindergartens and primary school, of Kerkh and Rusafa in Baghdad governorate.

Clinical examination was carried out in the class room under natural day light using plane mouth mirror, sickle shape explorer to detect the dental plaque calculus & gingival health.

Indices used for assessment of dental condition were:

1. Plaque index by Silness & Loe (1964).
2. Gingival index by Loe & Silness (1963).

3. Calculus index – simplified calculus index by Green and Vermillion (1960).

Severity of gingival inflammation assessed as follows:

Score range	Severity of gingivitis
0.1 – 1.0	Mild
1.1 – 2.0	Moderate
2.1 – 3.0	Sever

Also amount of plaque accumulation assessed as follows:

Score range	Amount of plaque accumulating
0.1 – 1.0	Thin film of plaque
1.1 – 2.0	Moderate rate accumulating
2.1 – 3.0	Abundance of soft matter

Severity of calculus accumulating was assessed as follows:

O = No calculus

1 = Supragingival calculus covering not more than one third of exposed tooth surface.

2 = Supragingival calculus covering more than one third but not more than 2/3 of the exposed tooth surface.

3 = Supragingival calculus covering more than 2/3 of the exposed tooth.

Six Ramjord teeth were used for scoring, which are (3), (9), (12), (19), (25) and (28) using four surface of each tooth (Buccal, mesial, distal and lingual).

Statistical analysis

It includes mean and standard deviation for plaque, gingival and calculus indices. The differences in plaque score gingival health and calculus between age group and sexes were tested statistically by using t- test.

Results

Table 1 shows the distribution of the sample according to sex and age, which were divided into 2 age groups.

Table 2 shows the correlation of plaque index with age. Group 1 (age group 4-6 years) has its highest number in score one while the second group has its highest number in sore two.

Table 3 shows the correlation between plaque index and sex, which reveal a non-significant relationship between male and female and plaque accumulation.

Table 4 and 5 shows the correlation between gingival index with sex and age which were not significant and significant correlation respectively.

Concerning calculus a non significant correlation was found between calculus and sex (Table 6) and significant correlation with age (Table 7). Table 8 shows the number and percentage of children according to the severity of plaque accumulation, gingivitis and calculus accumulation.

Table 9 shows the mean and standard deviation of the total sample with the 3 level of scoring for PLI, G1, and Cal I.

The study reveal a highly significant difference between the two age–group concerning the three indices (Table 10) and a non–significant difference between male & female of the total sample (Table 11).

Table 1: The distribution of the sample according to sex and age.

Age	Males		Females		Total	
	No	%	No	%	No	%
4 – 6	36	33.3	72	66.6	108	56
6 -12	39	45.8	46	54.1	85	44
Total	75	38.8	118	61.1	193	100

Table 2: showing the correlation between plaque index and age.

	Age				Total		C.S. Corr. value P value
	1		2				
	No.	%	No.	%	No.	%	
0-1	91	71.1	37	28.9	128	100	0.393
1.1-2	15	26.3	42	73.7	57	100	P=0.000
2.1-3	2	25.0	6	75.0	8	100	HS

Table 3: showing the correlation between plaque index and sex.

	Sex				Total		C.S. Corr. value P value
	Females		Males				
	No.	%	No.	%	No.	%	
0-1	82	64.1	46	35.9	128	100	0.130
1.1-2	31	54.4	26	45.6	57	100	P=0.190
2.1-3	3	37.5	5	62.5	8	100	NS

Table 4: showing the correlation between gingival index and sex.

	Sex				Total		C.S. Corr. value P value
	Females		Males				
	No.	%	No.	%	No.	%	
0	120	60.7	66	39.3	168	100	0.069
1	13	59.1	9	40.9	22	100	P=0.527
2	1	33.3	2	66.7	3	100	NS

Table 5: showing the correlation between gingival index and age.

	Age				Total		C.S. Corr. value P value
	1		2				
	No.	%	No.	%	No.	%	
0	99	58.9	69	41.1	168	100	0.180
1	9	40.9	13	59.1	22	100	P=0.040
2	0	0.0	3	100	3	100	S

Table 6: showing the correlation between calculus index and sex.

	Sex				Total		C.S. Corr. value P value
	Females		Males				
	No.	%	No.	%	No.	%	
0	112	59.9	75	40.1	187	100	0.121
1	3	100	0	0	3	100	P=0.236
2	1	33.3	2	66.7	3	100	NS

Table 7: showing the correlation between calculus index and age.

	Age				Total		C.S. Corr. value P value
	1		2				
	No.	%	No.	%	No.	%	
0	108	57.8	79	42.2	187	100	0.198
1	0	0	3	100	3	100	P=0.020
2	0	0	3	100	3	100	S

Table 8: The number and percentage of children according to severity of PLI, GI and Cal I.

Index	Levels					
	1		2		3	
Statistic	F	%	F	%	F	%
Plaque	36	18.7	55	28.5	9	4.7
Gingival	36	18.7	63	32.6	29	15.0
Calculus	36	18.7	72	37.3	37	19.2

Table 9: The mean and standard deviation of the total sample according to severity of PLI, GI and Cal I.

Index	Levels					
	1		2		3	
Statistic	Mean	S.D.	Mean	S.D.	Mean	S.D.
Plaque	0.00	0.00	0.26	0.50	0.87	0.57
Gingival	0.00	0.00	0.13	0.33	0.31	0.57
Calculus	0.00	0.00	0.00	0.00	0.10	0.45

Table 10: Mean and standard deviation of PLI, GI and Cal I according to age group.

Index	Age by score	No.	Mean	S.D.	C.S. by t-test
Plaque	1	108	0.4432	0.4647	HS
	2	85	0.9631	0.5728	(0.000)
Gingival	1	108	0.2190	0.3855	HS
	2	85	0.4206	0.5442	(0.003)
Calculus	1	108	0.0509	0.1270	HS
	2	85	0.2312	0.4611	(0.000)

Table 11: The mean and standard deviation of PLI, GI and Cal I of the total sample by sex.

Index	Sex	No.	Mean	S.D.	C.S. by t-test
Plaque	Male	75	0.7696	0.6020	NS
	Female	118	0.6103	0.5511	(0.060)
Gingival	Male	75	0.2993	0.4821	NS
	Female	118	0.3131	0.4669	(0.884)
Calculus	Male	75	0.1080	0.3486	NS
	Female	118	0.1445	0.3212	(0.458)

Discussion

Periodontal disease is a degenerative disease of later life which is a slow, progressive disease extends over many years and the early stages are extremely common in children. In children, gingivitis is the most common periodontal disease, while evidence of alveolar bone distraction is rarely seen, therefore it is important to prevent the onset of periodontitis this or at least to slow its rate of progress in order that more people can retain their natural dentition.

This study found that plaque accumulation and gingivitis increases with age and this is in accordance with many studies as Weissenbach et al 1995; Al-Haddal 2002.

Concerning calculus only 3 children had calculus of score one and 3 of score 3 from the 2nd age group (6-12) and this a green with Al – Sayyab 1989; Al – Azawi; 2000 but disagrees with Emslie 1966, who showed that debries and calculus were higher at the ages of 5-9 years than 15- 19 years.

Concerning sex variation (PLI, G1, Cal1) no significant differences had been found between male & female for both groups and this agrees with Gupta 1964 but disagrees with other studies who reveal that girl had lower plaque; gingival and calculus mean than boys due to the fact that girls more concerned about their oralhygiene than boys (Khamrco and Abdal, 1988; Al – Alousi and Al – Sayab (1996).

Also this study reveal the most of the children under score two concerning plaque accumulation (28.9 %), and most of them had moderate gingivitis (32.6 %), only 6 children from the total sample had calculus this agrees with many Iraqi studies (Khamarco 1999, Al – Dahan et al 1999) in Urban areas.

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Dental Anxieties in Iraq

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Abstract:

Aims*: To adopt Dental Fear Questionnaire (DFQ), to the Iraqi population, and to verify the prevalence of dental anxieties in an Iraqi sample.*

Methods*: 266 people were asked to fill in the Dental fear questionnaire. 107 were dentist visitors and 159 students. Descriptive statistics; frequencies and percentages were used.*

Results*: Global complaints of dental fears was found in 176(66%) i.e. mild complaints 131(49%), 45 (17%) were severe. Majority were amongst age group 20-30 year; 184 (69%). Females constitute 156(59%). 179 (68%) were students and 202 (76%) were single. 203(76%) asked for treatment. 245(92%) had previous consultation to dentist. Psychiatric problems were declared in 18(7%). Family history of dentist problems was verified in 206(77%) and 107(40%) of dental fear. Previous psychological trauma was found in 26(10%). Dental fear of; pain was observed in 90(34%), Nausea in 36(14%) Shock in 17(6%), Drilling sound in 76(29%).*

Conclusions*: Dental anxieties are important to be considered in dentistry and psychiatric practice. Further studies are highly recommended to reduce these anxieties.*

Keywords*: Anxiety, Dental, fear, students, patients, Iraq.*

Introduction

Dental anxiety is a widespread phenomenon [1]. It is a common problem in dental health care. Many studies have examined Its prevalence [2,3], causes [4,5], symptoms [4,6], and consequences [7,8]. Studies report that more than 70% of the population were apprehensive while attending the dentist clinics, where as up to 15% regularly avoid dental care because of their anxiety [9,10]. In a study in which individuals were asked about commonly feared situations, dental anxiety ranked fifth and was reported by 20% of those questioned [11].

Different stimuli are found to be correlated with dental anxiety including sight and feeling of the anaesthetic needle and sight, sound and feeling of the drill [4]. However, there are a number of indications that do suggest that anxiety is a relevant factor in dental care, considering that anticipation of pain is a factor in patient's negative reactions to dentistry [4,6,12]. Phobic anxiety, and especially dental anxiety, is usually not considered to be an inborn reaction [13,14]. Moreover, Lautch [15], Bjercke et al [16] and Schuurs et al [17], found that patients with dental anxiety appeared to be more neurotic compared to ordinary dental patients. It has been reported that neurotic individuals are more prone to develop conditioned fears or phobias compared to non-neurotic people [18]. A majority of previous literature has found that an individual's past dental experience is important [5,19,20,21], if a person experiences emotionally traumatic dental treatments, these feelings may very well be the origin of perceived dental anxiety [22,23].The relationship and communication between dentist and patient may elicit strong negative feelings, which may contribute to the origin and manifestation of dental fear [21,24]. Bernstien et al [25] reported in a study among highly fearful individuals that negative dentist behaviors as well as dentist's personal attributes were, for a majority of the subjects, the cause of their fear. The theory behind, cognitively learned dental anxiety is that a person can be influenced by relatives, close friends or even mass media to obtain a negative image of dentist, and dental treatment,

which may be the origin of dental fear [19,26,27].

It is possible that many patients are anxious about the pain they expect as a result of marginal scaling and root planning.

In this study dental fears were studied in 266 Iraqi population and dental fear questionnaire were used [13].

Aims of study

1. To adopt Dental Fear Questionnaire (DFQ) to the Iraqi population
2. To verify the Prevalence of Dental anxiety in an Iraqi sample

Methods

Dental fear questionnaire was adopted on the Iraqi population. Reliability and valability measures were done. This questionnaire included 31 items, was translated to Arabic and retranslated to the English, steps for validity and reliability was performed, leading to a valid and reliable questionnaire in the Iraqi population.

Sample of 300 individuals was asked to fill in the questionnaire, only 266 were included, 107 patients from dental private clinics, 159 students from College of Dentistry Baghdad University.

Demographic variables were studied and clinical variables (Duration, past dental experience, psychiatric problems and previous psychological traumas) were studied. Descriptive statistics, frequencies and percentage were used.

Result and Discussion

Different factors such as demographic and biological characteristics, social and economic factors, individual habits and genetic characteristics are of prime interest in surveys of the distribution and prevalence of disease in human populations. Surveys on the prevalence of dental anxiety have, in large, used these design features.

Demographic data results (Age group, sex, occupation, marital status, qualification) are shown in table (1)

Age: The most age group was 20-30 years 184 (69%), followed by 31-49 years 27 (10%) and 41 years and above, 25 (10%). The most common age group was in the third decade of life which is consistent with most phobic age group ([28]), so the correlation between dental anxiety and age showed proportionally higher levels of dental anxiety compared to both younger and older individuals, it is a negative correlation with age which is consistent with other studies ([29,30]).

Sex: 156 (59%) of the sample were females. Females were significantly more likely to report a high dental anxiety, which also accord with a majority of findings in the literature ([9,31]).

Occupation: The majority of the sample were students 179 (68%), employees 56 (21%), unemployed 21 (8%) and businessman 6 (2%), which it means high level of dental anxiety reported in the students which does not fit with other study ([32]), he reported less dental anxieties among students. Discrepancy explained by a sampling error in our study, because of availability of candidates.

Marital status: It was found that 202 (76%) were unmarried (single, divorced …etc) and 64 (24%) were married.

Education: 193(73%) were highly educated (more than the secondary school qualification).

Clinical result (history of dental treatment, previous visit to dentist, past psychiatric problems and previous psychological trauma) are shown in table 2. Table 2 showed those who need dental treatment 203 (76%), 245 (92%) had previous visit to the dentist, 18 (7%) with psychiatric problem and 26 (10%) had previous psychological trauma.

Global complaints of dental fears were found in 176 (66%) i.e. mild complaints 131 (45%) and 45 (17%) were severe complaints (Table 3)

Global Severity of Symptoms of Dentist fears

The differences between the mild and severe dental anxiety may be due to some less tangible factors such as interview technique, cultural differences or subtle differences in the formulation of the question asked [32].

Family history (family history of dental problems, physical illness, psychiatric problem, fear of dentist, past psychiatric problem). Table 4 showed 206 (77%) with previous dental problem, 107 (40%) had dentist's fear.

Fears related to dental clinic showed those who had fear due to drilling sound 76 (29%) and dental pain were 90 (34%) considering that anticipation of pain is a factor in patient's negative reaction to dentistry as shown in table 5.

High anxious patients were more afraid of pain than their low anxiety counterpart, [4,12] Nausea 36 (13%), Shock 17 (6%), while fear of dentist appointment 121 (45%), Next dental visit 122 (46%). This study is in favor with other studies indicating that the majority of dentally high anxious persons attribute their anxiety to traumatic experience during previous dental treatment ([15]), and that was found true; i.e. the last two fears appointment and next dentist visit and due to the deficient exposure time during first visits and it is expected to be less after prolonged exposure during dentist longer sessions[28] percentages were higher than of those of pain, drilling, shock and nausea because dental fear (anxiety) increased after attending the clinic, while check up visit becomes lower for the fact that this visit may be without work in the oral cavity.

Table (6) showing fear due to the sequence of dental treatment, that the fear due to drilling teeth was the highest percentage 221 (83%) which is in accordance with other literature [33], followed by fear of dental impression 183 (69%), sounds of surgical instruments 152 (57%), dental x- ray 148 (56%), chair light 140 (53%) and scaling of the teeth 103 (39%) and that is the lowest percentage in the sample, because they are attending dental clinics for their interest and are more prepared for the dental procedures.

It is expected that patients are more fearful than the dental students, so it is suggested to have a separate studies on students and patients samples, in addition to further community study.

Limitation of the study: This study included a mixed students and patients sample.

Conclusion

Dental anxieties are important to be considered in Dentistry and Psychiatric practice, further studies to be done to find best measures to reduce these fears.

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Table 1: Demographic variables (N = 266)

Variables		Frequency	Percent%
Age group	10-20	30	12
	21-30	184	69
	31-40	27	10
	41- above	25	10
Sex	Female	156	59
	Male	110	41
Occupation	Student	179	68
	Employee	56	21
	Business man	6	02
	Home wife	21	8
	Unemployee	4	1
Marital status	Married	64	24
	Unmarried	202	76
Qualification	<secondary school	73	27
	>secondary School	193	73

Table 2: Clinical results

Variable		Frequency	%
Dental treatment	No	61	23
	Yes	203	77
	Total	264	100
Previous visit to dentist	No	20	8
	Yes	245	92
	Total	265	100
Past psychiatric problems	No	248	93
	Yes	18	7
	Total	266	100
Previous psychological trauma	No	240	90
	Yes	26	10
	Total	266	100

Table 3: Global complaints of dental fears

	Frequency	Percent
0 (none)	90	34
1 (mild)	131	49
2 (severe)	45	17
Total	266	100

Table 4: Family history

		No	Yes	Total
Dental problem	Freq	60	206	266
	%	23	77	100
Physical illness	Freq	160	106	266
	%	60	40	100
Psychiatric problem	Freq	253	13	266
	%	95	5	100
Fear of dentist	Freq	159	107	266
	%	60	40	100
Past psychiatric problem	Freq	248	18	266
	%	93	7	100

Table 5: Fears related to dental clinic (N = 266)

		Frequency	Percent %
Pain	No	176	66
	Yes	90	34
Noise	No	230	87
	Yes	36	13
Shock	No	249	94
	Yes	17	6
Drilling	No	190	71
	Yes	76	29
Dentist appointment	No	145	55
	Yes	121	45
Next dental visit	No	144	54
	Yes	122	46
Dental checkup visit	No	153	58
	Yes	113	42
Other	No	240	90
	Yes	26	10

Table 6: Fear of dental procedures (N = 266)

Variable		Frequency	Percent
Dentist chair light	No	126	47
	Yes	140	53
Surgical instrument sounds	No	114	43
	Yes	152	57
Dental x- ray	No	118	44
	Yes	148	56
Dental Scaling	No	163	61
	Yes	103	39
Drilling teeth	No	45	17
	Yes	221	83
Denture impressions	No	83	31
	Yes	183	69

Silicone-Light Body as a Relining Impression Material for Existing Complete Dentures (Accuracy and Preferability)

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Abstract

This study was an attempt to deal with the evaluation of accuracy and preferability that might be founded during utilization of silicone impression material (light body) as a relining impression material for edentulous patients.

All the cases that were subjected to this study were selected from newly constructed lower complete dentures that have been commonly made by using of Zinc-oxide Euginol impression paste as a final impression material, and failed to provide fit denture (poor retention).

The results of the study showed highly significant results supported the method of using silicone (light body) as a relining impression material due to their accuracy of providing accurate retention for the existing complete denture and to their preferability by the dentists, technicians and patients, due to their ease in preparation and uses in the dental clinic, laboratories and good tolerated by the patient mouth.

Introduction

Dentures which have been in use for a prolonged period often become ill-fitting because of changes such as continuing bone resorbtion which have taken place in these circumstances, rather than produce new dentures, relining the existing dentures might be considered an alternative[1]. Also as apart of improving the fit of an existing dentures, or new dentures, relining impression may be required.

Relining involves replacement of tissue surfaces of an existing denture base material to the fitting surface of a denture to improve its adaptation to the tissues, this procedure require an impression to be obtained, using the existing denture as impression tray[2]. And if the denture is to be relined, the impression material is removed from the denture; the tissue surface is cleaned to enhance bonding between the existing resin and relined resin material.

It is important to use prosthetic material with certain properties in order to achieve clinical success and patient acceptance. In the impression practice of the different fields of dentistry silicone are the most widely used impression material for facial restorations[3].

Special attention should be taken with respect to the impression procedure, mode of retention, sealing at the prosthesis border[4].

Many different types of materials have been used successfully for making final impressions such as zinc-oxide paste, poly-ether, silicone impression materials. The elastomeric impression materials can record the shape of soft tissues accurately if they are adequately supported by an accurately fitted tray[5]. Silicone elasomerics was used for further improvement in sealing at maxillofacial prosthesis border[5].

Elastomeric impression materials play a major role in their successful application as a high accuracy impression materials. These materials are introduced into the mouth as a viscous liquid with carefully adjusted flow properties. The setting reaction then converts them into viscoelastic solid. The flow behavior of the solid form is also quite important if an accurate impression is to be obtained[2].

For the lower denture, the preparation for the relining is done by eliminating of the undercut area and correction of the peripheral form by border molding and taking of the impression by zinc-oxide euginol impression paste[1].

Aims of the Study

This study aim to evaluate the accuracy of silicone impression material (light body) as alternative impression material for relining lower complete dentures for patients undergoing poor retention of their existing dentures which have been done previously by Z.O.E impression material as a final impression material.

Materials and Methods

The cases which was subjected to this study was twenty cases of newly constructed lower complete dentures which were obviously showed poor retention or ill-fitting dentures (by insuring that there were not any interfering with the frenum or any over extensions of the borders.

All of the dentures were relined with heat-cured acrylic resin in the conventional method of curing.

The relining impression material used in this study was condensation silicone type (Ormasil light body- Major prodotti S.P.A Italy made) which was used according to the manufacturer instruction.

Important preparations

Before taking relining impression by the existing dentures we should consider the following important preparations:

1. Ensuring of presence of healthy tissues of the patient mouth.
2. Relieving or removing of any undercuts from the dentures.
3. Ensuring clearance from any displacing to the soft tissue of the denture bearing area and the peripheries of the dentures.
4. Substituted any short extension flange and molding the borders by using tracing compound.
5. Vertical relations did not consider due to unpresence of loss of vertical dimension, that the dentures were new.

After these important preparations have been finished, the silicon impression material (light body) has been prepared and mixed according to the manufacturer instructions, and spread over the existing prepared denture to work look like special tray. Then the impression was taken by using closed mouth method in centric occlusion until the final setting time of the impression material was reached. Then the impression should be poured by stone gypsum material not before (15 min) from the time of removal from the patient mouth. The impressions sent to the dental lab to process them by the conventional method of curing heat curing acrylic resin.

Results

Each case of the 20 cases have been noticed and evaluated by two dentists and confirmed by acceptance of the patient to determine if there is any change in the status of retention between the previous poor retention which have been made by using Z.O.E impression versus the same existing dentures which have been relined by using silicone impression material (light body).

The results of the study (table 1) showed that ninety cases of the total twenty cases was noticed and evaluated as very good retention.

The only one case from the total number that showed poor retention was happened due to any error might be happened in the dental labs.

Discussion

A strong possible reasons found to be able to enforce some dentists to use silicone impression material as relining impression, even there are many dentists still preferring Zinc oxide Euginol impression paste for relining dentures, supported by the idea of accuracy of Z.O.E.

However it has been noticed (table -2-) that highly percentage of patients and there is no any exaggeration if we say that all the edentulous patients prefer using silicone impression material in all impression practice for the reasons of tolerance in contrast with the Z.O.E. impression which might be cause sensation of the lips and sticking with the face, and also good sight of preparation of silicone impression material. By other hand technicians also prefer using silicones as relining impression material over Z.O.E impression for the reason of ease of removing from the cast and facilitation of the bonding of added resin with the old resin of the existing denture base.

While the Z.O.E might be left sticks particles to the stone cast that might be

shaved during removing and lead to inaccurate denture. So we may expect more accurate dentures of those might be relined by silicone impression material due to the provided facilities to the dental labs and technicians and good toleration by the patient.

In concern to the dental clinic and the dentists it seem to be more easiest to prepare and also the impression can be repeated easily in case of using silicone impressions and without terrible to the patient due to its sight of preparation.

More over silicone impression material as elastomeric impression material they can record the shape of soft tissues accurately if they are adequately supported by an accurately fitted tray (Boucher's 1997) (i.e.) existing denture could be consider as a fitted tray and can be very successful to support silicone impression material adequately.

Conclusions

The results of using the silicone impression material as relining impression for existing dentures seem to be very encouragement method. And also it can be considered as alternative final impression material. Besides the Z.O.E impression material without any hesitation and might be the first choose of final impression material, due to its accuracy and preferibility by the patient, technicians and most of the dentists.

Further study might be needed for more details and confirmation.

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Table 1: Show the difference of retention and the accuracy of using silicone as relining impression material.

Types of the impressions	Total No.	Retention	
		Satisfactory	Unsatisfactory
Z.O.E imp.	20	-	20 *need for relining*
Silicone imp. (light body) ***(for the existing dentures)***	20	19	1

Table 2: Show the preferability of using silicone impression material for relining dentures among different populations.

Subjects	No	Preferablity of	
		Silicones imp.	Z.O.E imp.
Dentists	30	20	10
Technicians	15	15	-
Patients	20	20	-

Lower Anterior Crowding and its relationship to Periodontal Disease

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Abstract

This study was undertaken to determine the role of mandibular anterior crowding in the etiology of inflammatory periodontal diseases. The sample consisted of 89 dental students with an age range of 21 years, 29 students with moderate lower anterior crowding, 30 with severe lower anterior crowding and 30 students with normal alignment. The periodontal conditions of the students were measured (PLI, GI, RI& GE); gingival enlargement was measured according to Seymour's method. The results in this study have shown that there's a strong relation between the lower anterior crowding and the periodontal condition of the students, and that there was no significant difference between males and females.

Introduction

Periodontal disease is not a single pathologic entity. It is a term describing a number of inflammatory and degenerative diseases which affect the supporting structures of the teeth. The relationship between dental crowding and inflammatory periodontal disease is complex, with much apparently conflicting evidence (Smith, 1947; Poulton and Aaronson, 1961; Beagrie and James, 1962; Gould and Picton, 1966; Alexander and Tipnis, 1970; Ainamo, 1972; Buckley, 1972; Sandali, 1973; Geiger et al, 1974; Geiger and Wasserman, 1976; Buckley, 1980; Waerhaug, 1980; Buckley, 1981 and Proffit and Ackerman 1985). These conflicts are at least partly due to the multitude of variables, such as individual differences in motivational patterns for oral hygiene maintenance (El – Mangoury 1981) , age range and sex of the subjects , oral regions affected (maxillary versus mandibular, anterior versus posterior), systemic health conditions , experimental designs, application of statistics, and different diagnostic criteria .

The purpose of the present study is to evaluate the role of mandibular anterior crowding in the etiology of inflammatory periodontal disease.

Material & method

The sample consisted of 89 students, 59 students with lower anterior crowding and 30 students with normal alignment taken from the forth year grade of the college of dentistry, Baghdad university. Their age range was 20 to 22 years with a mean age of 21 years. These students were selected according to certain points:

1. The student should have a class 1 angle's classification.
2. The student should have a complete permanent dentition in the intermolar area.
3. The student should have no missing teeth except for the third molars.
4. The student should have no previous orthodontic history.
5. The student should be free of any systemic disease.
6. The student should have no breathing problem, those who are mouth breathers were excluded.
7. The student should have no smoking habits.
8. The student should be unmarried (only for females).

The sample was sub divided in to 2 groups males and females, the male group consisted of 44 students while the female group consisted of 45 students and each group was divided into three subgroups.

Group 1 is the males with severe lower anterior crowing.

Group 2 are the males with moderate lower anterior crowding.

Group 3 are the males with normal alignment.

Group 4 are females with severe lower anterior crowding.
Group 5 are the females with moderate lower anterior crowding.
Group 6 are the females with normal alignment.

Study model casts was made for each student for measuring the amount of lower anterior crowding and the amount of gingival enlargement.

Lower anterior crowding was registered when a deviation of at least 2 mm per segment was diagnosed (Bjork et al, 1964 and FDI, 1973).

The moderate crowded cases had a discrepancy of up to 4 mm .and the severely crowded cases had a discrepancy of more than 4 mm. (Leighton & Hunter 1982).

The periodontal condition was measured for each patient in all groups as follows:

1. The plaque index (PLI) :(Silness and Loe, 1964).
2. Gingival index (GI): (Loe and Silness, 1963).
3. Retention index (RI) :(Loe, 1967).
4. Assessment of the gingival enlargement was done on the models by using the vernia by the method described by Seymour in (1985).

The statistical analysis of the data in this study included:

1. The mean and the standard deviation for all the groups. (Table 2)
2. The mean and the standard deviation after uniting males and females. (Table 4)
3. Differences between males and females using the t-test. (Table 3)
4. Difference between the crowding levels using ANOVA test (Table 5)
5. LSD test for difference between the groups. (Table 6)

Table 1 shows the distribution of males and females in the groups.

Male	Female
15 student with normal alignment	15 student with normal alignment
14 student with moderate lower anterior crowding	15 student with moderate lower anterior crowding
15 student with severe lower anterior crowding	15 student with severe lower anterior crowding

Results and discussion

After the statistical analysis of the data, (Table 2 & 3) showed that there was no significant differences in the PLI, GI, RI, GE between males and females in relation to the crowding levels (sever, moderate and normal or the control group).

Table 5 shows that differences were significant between crowding levels and the periodontal parameters in all groups (PLI, RI, GI). This is in agreement with (Smith, 1947; Poulton and Aaronson, 1961; Ainamo, 1972; Buckley, 1972, 1980 & 1981; Sandali, 1973 and Waerhaug, 1980). Indicating that undesirable tooth position obviously perpetuates, exaggerates, and perhaps even causes periodontal pathosis.

While the GI index was non significant between crowding levels this is in agreement with (Beagrie and James,1962; Geiger,1962; Gould and Plicton,1966; Alexander and Tipnis, 1970; Geiger et al, 1974; Geiger and Wasserman, 1976 and Proffit and Ackerman, 1985).

Table 6 shows differences in the GE, PLI, RI between groups(1&2),(1&3), (2&3) which was significant in all groups except for the RI between groups (2 & 3) which was non significant , this is in agreement with El – Mangoury et al (1987) .

Difficulty in maintaining oral hygiene can result in a greater accumulation of the dental plaque which is considered a primary etiologic agent in inflammatory periodontal disease .Improper proximal contact leads to narrowing of embrasures and disruption of the periodontal-disease susceptible “col”. this leads to gingivitis, periodontitis, and possibly pathologic tooth migration.

The progressive nature of these conditions presents a valid indication for the orthodontic elimination of mandibular anterior crowding as an integral part of preventive periodontics. It is the authors' belief that "unraveling" crowded anterior teeth orthodontically improves the patient's periodontal status as well as the more noticeable dentofacial esthetics.

Nevertheless, it must be emphasized that orthodontic care is not a panacea for periodontal problems. Further studies are needed. Furthermore, it is fundamental that statistical interpretations of experimental results never "confirm" or "prove" a theory. Rather, the successful theory is tested and escapes being "disconfirmed" (Campell and Stanly 1966).

From this study we conclude that there's a strong relation between crowding and periodontal condition and degree of gingival enlargement.

Table 2 shows the mean and standard deviation for all groups.

	group	number	mean	Stan. deviation
GE	1	15	25.600	27.433
	2	15	10.667	18.821
	3	15	0.000	0.000
	4	15	16.933	23.505
	5	14	9.643	15.614
	6	15	0.000	0.000
PLI	1	15	2.230	0.594
	2	15	1.856	0.577
	3	15	1.360	0.632
	4	15	2.244	0.703
	5	14	1.629	0.762
	6	15	1.400	0.787
GI	1	15	3.883	6.274
	2	15	1.930	0.637
	3	15	1.517	0.544
	4	15	2.221	0.794
	5	14	1.679	0.771
	6	15	1.409	0.799
RI	1	15	2.097	0.566
	2	15	1.689	0.555
	3	15	1.422	0.572
	4	15	2.173	0.720
	5	14	1.677	0.858
	6	15	1.438	0.774

Table 3 shows the difference between males and females.

crowding	GE	PLI	GI	RI
severe	T= 0.929 NS	T=0.057 NS	T=1.018 NS	T= -0.324 NS
moderate	T=0.159 NS	T=0.910 NS	T=0.958 NS	T=0.043 NS
Control group	T=0 NS	T= -0.152 NS	T=0.436 NS	T= -0.064 NS

Table 4 shows the mean and standard deviation of males and females as a total.

		number	mean	Std. deviation
GE	Severe	30	21.267	25.484
	Moderate	29	10.172	17.046
	control	30	0.000	0.000
PLI	Severe	30	2.237	0.639
	Moderate	29	1.746	0.670
	Control	30	1.380	0.701
GI	Severe	30	3.052	4.474
	Moderate	29	1.809	0.703
	control	30	1.463	0.674
RI	Severe	30	2.135	0.638
	Moderate	29	1.683	0.704
	control	30	1.430	0.669

Table 5 shows the difference between the crowding levels.

		Sum of squares	df	Mean square	f	Sig.
GE	Between gp	6788.220	2	3394.110	10.823	0.000
	Within gp	26970.0	86	313.605		
	total	33758.2	88			
PLI	Between gp.	11.099	2	5.549	12.327	0.000
	Within gp.	38.715	86	0.450		
	total	49.814	88			
GI	Between gp.	41.800	2	20.900	2.958	0.057
	Within gp.	607.594	86	7.065		
	total	649.394	88			
RI	Between gp.	7.649	2	3.825	8.512	0.000
	Within gp.	38.641	86	0.449		
	total	46.290	88			

Table 6 shows the LSD test for difference between groups.

Dependence	Group1	Group 2	Mean differ.	Std. error	Sig.
GE	1	2	11.094	4.612	*
	1	3	21.267	4.572	***
	2	3	10.172	4.612	*
PLI	1	2	0.491	0.175	**
	1	3	0.857	0.173	***
	2	3	0.366	0.175	*
RI	1	2	0.452	0.175	*
	1	3	0.705	0.173	***
	2	3	0.253	0.175	NS

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Time and Order of Eruption of Permanent Teeth for Children and Adolescents in Mosul City, Iraq

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Abstract

The aims of the study were to determine the time and sequence of eruption of permanent teeth. Also to determine the differences in timing of tooth emergence according to side, jaw and gender variation.

Timing and sequence of eruption were studied cross–sectionally in a group of (2391) children and teenagers from Mosul City, Iraq: (1296) males and (1095) females ranging age from (4–16) years. The data were statistically analysed using Karber's analysis in order to compute the mean and standard deviation of emergence.

The results showed that there are no statistical differences between the mean time of corresponding right and left teeth in both genders. The finding of the study demonstrated that the mandibular teeth emerge before their maxillary opposing teeth in both genders with the exception of the premolars where the order is reversed.

The results also demonstrated that the females have their permanent teeth to emerge earlier than those of males. The differences between the two genders are clearly seen in the eruption of mandibular canine. The females acquired all their permanent teeth to emerge in shorter time span than males (difference 1.8 months).

A specific sequence of permanent teeth emergence was found in both arches and for each gender. In general, the emergence of permanent teeth starts with the emergence of mandibular first molar and ended with the maxillary second molar.

Introduction

Eruption is a process whereby a tooth moves from its developmental position within the jaw to emerge into the oral cavity [(1)], while the tooth emergence is the clinical appearance of any part of the tooth crown in the oral cavity [(2)].

The tooth as a living functional organ passes through successive periods of development during its life cycle and this development results from an interaction of the oral epithelial cell and the underlying mesenchymal cells. From this interaction, (20) primary and (32) permanent teeth developed, and each developing tooth grows as an anatomically distinct unit [(3–5)].

The early development of the child's dentition occurs during the period when he is learning to walk, talk and adjust himself to his environment and established some degrees of independence; while the permanent teeth erupt when the child starts school around (5) years of age.

The timing of eruption of teeth is, however, of clinical significance to the practitioner and of considerable importance to the child dental health planning for diagnostic, preventive and therapeutic measures.

Many factors associated with eruption have been widely investigated. Suggested factors which causing differences might include race [(6)], environment [(7)], socioeconomic condition [(8)], climate [(9)], hereditary factors [(10)], systemic factors [(11)] and local factors [(12, 13)].

Many studies have been conducted throughout the world concerning dental development and timing of permanent teeth emergence. All of which agreed that a wide

margin of variation existed between population groups [14–18].

Various statistical procedures have been used for the analysis of data on teeth emergence time, which is usually being expressed as the arithmetic means by using Karber's method [19, 20], or using Probit's analysis [14, 16, 18, 22].

The aim of this study was to determine the times of emergence of permanent teeth for Iraqi children from Mosul City by using Karber's model, and to determine the sequence of eruption of permanent teeth emergence.

Materials and Methods

The investigation was conducted on a cross–sectional study of kindergarten, primary and intermediate school children. The schools were randomly selected from the city center of Mosul City. In order to obtain a random sample, Mosul City was divided into four zones. Two zones on the right bank of Tigris River separated by Ninevah street and its continuation. The other two zones on the left bank of the river separated by Khairaldeen–Al–Omary street and its continuation. Three kindergartens, five primary schools and two intermediate schools were chosen from each zone. So the total number of schools examined were (40), representing different socioeconomic levels of the children in Mosul City center. The age of the children was calculated from the exact date of birth and was recorded in years and months.

The sample was consisted of (2391) children and teenaged: (1296) males and (1095) females, ranging age from (4–16) years. Any child with history of serious systemic disease was excluded.

After getting the approval from the Ministry of Education to conduct this study, the school authorities have been in contact and the purpose of the study was explained to them to ensure full cooperation. The oral examination was performed in classrooms. The students were examined seated in ordinary chair under the normal daylight.

The teeth were recorded as emerged or not in a special case sheet that also includes other information: Age, gender and medical history. A tooth was defined as emerged when any part of its crown pierced the gingiva. The probe was used to be sure from the crown emergence when any suspection exists [16, 23], since no radiological examination was made, any congenital missing tooth was recorded as non–emerged. The extracted permanent teeth were recorded as emerged.

It was very important that the examiner reviewed each day's case sheet collected on the same day for completeness and accuracy of recording [24]. During this review, the age of each child was calculated by subtracting the birth date from the examined date and then the age of the child determined according to the nearest month.

The interval of rest for teeth can be found as has been used by Hellman [25] as the longest period between the eruption of two successive permanent teeth.

The mean eruption time for permanent teeth was calculated according to Karber's method as investigated by Cronfield and Mantels [26] and used by Hayes and Mantels [27] compute the eruption date. The t–test was used for statistical significance.

Results

The sample consists of (2391) students between the age of (4–16) years, (1296) of the sample were males (54.20%) and (1095) were females (45.80%) (Table 1).

Table (2) showed the mean, standard deviation and standard error of time of eruption of permanent teeth for the total groups in the sample by gender, maxillary and mandibular teeth. The results indicated that the first permanent emerged tooth is the mandibular first molar at the age of (6.25) years in males and (6.12) years in females. The first mandibular molar and mandibular central incisor begin to emerge earlier in females than in males, then the eruption of remaining teeth continued. The last tooth to erupt was the maxillary second molar at the age of (12.37) years for males and (12.09) years for females (Figure 1 a, b).

Table (3) shows the mean and standard deviation for each permanent tooth on the right and left sides of maxilla and mandible in each gender. The results of timing of permanent teeth emergence show that in all the situations the difference in mean emergence time between the right and left position for specific tooth type in each jaw

and for each gender was statistically not significant. Therefore, the data for both sides were combined together.

The period during which eruption took place is of approximately the same duration, for males (6.12 years) and for females (5.97 years). The difference between males and females was (1.8 months). The pattern of the eruption curve for both genders is nearly the same. The first tooth to erupt is the mandibular first molar and the last tooth is maxillary second molar.

The results indicated that the most mandibular teeth (central incisor, lateral incisor, canine, first molar and second molar) emerged earlier than opposing maxillary teeth for both genders. The difference was significant with central incisor, lateral incisor, canine and second molar for both genders. While there is no significant difference between emerged time of maxillary and mandibular first molars in females.

This trend is reversed with premolars emergence time in males: The maxillary first and second premolars emerged significantly before the mandibular antagonist.

In females also the maxillary premolars emerged before the mandibular antagonists with no significant difference between them (Table 4).

The greatest difference in the eruption time between the jaws for any individual tooth type occurred between the maxillary and mandibular central incisors of the males (11.64 months) and between maxillary and mandibular canines of the females (12.24 months).

The smallest difference in eruption time between the teeth of opposite jaws occurred with the eruption of the maxillary and mandibular first molar teeth in males (1.92 months) and the maxillary and mandibular first molar teeth in females (0.6 months) (Table 5).

Table (6) represents the difference in mean emergence time of permanent teeth between females and males. The results show that all maxillary and mandibular teeth emerged statistically significantly in females earlier than in males except mandibular lateral incisor the differences were not significant.

The smallest gender differences occurred in eruption of the mandibular lateral incisor (0.84 months).

The greatest gender differences occurred with eruption of the mandibular canine (6.72 months) (Table 7).

The interval of rest of permanent teeth in females occurred between the eruption of the maxillary lateral incisor and the maxillary first premolar (22 months). In males this period occurred between the maxillary lateral incisor and maxillary first premolar which was 20.8 months.

Figure (2 a, b) shows the sequence of eruption, using the mean plus and minus one and two standard deviation.

For females, the sequence of eruption for permanent teeth was as follows: For maxilla the first emerged tooth was first molar, followed by central incisor, lateral incisor, first premolar, second premolar, canine, then second molar. On the other hand in the mandible: The first tooth emerged was first molar, followed by central incisor, lateral incisor, canine, first premolar, second premolar and lastly second molar.

The sequence of eruption of permanent teeth for males, for the maxilla is the same as females, while in the mandible the only difference was the emerge of first premolar before canine.

Discussion

Among different methods available to study the dichotomous variable, the Karber's analysis was used in the current study. It is a simple and easy method of computing the mean age and standard deviation of tooth emergence by using both arithmetic age and logarithm of the age from birth. Also the computation needs to be done only once for any given set of data.

This study is possibly the first investigation of time of eruption of permanent teeth in Mosul City children by establishing the mean age of eruption for each individual permanent tooth.

The study of permanent teeth eruption provides useful information from the standpoint of physiological growth and development. In addition, it is of considerable importance in the diagnosis,

prevention and treatment of dental disease in children.

The age range of the examined children and adolescents for permanent teeth was chosen in a wide scale ranging from 4 years to 16 years in order to cover the clinical emergence age of both maxillary and mandibular permanent teeth except third molars because they have great variability in their development, emergence and time of occlusion [28].

A cross–sectional study was designed because the desired emphasis was on the accuracy of the emergence dates of permanent teeth and we attempt to include a greater sample size in comparison to many samples used in previous Iraqi studies.

In comparing the results with those from other countries, it must be determined that the studies have comparable bases; most studies have used comparable criteria for tooth emergence.

In this study, the emergence time of the permanent teeth in the right and left sides in both jaws for each gender have no statistical significant differences and this result was in agreement with other studies like [14, 18, 29]. The similarity in the emergence time of permanent teeth located in the right and left sides could be in general indicate a more stability in the permanent dentition development [30, 31].

Table (1): Distribution of the Sample by Gender and Age for Permanent Teeth

Age (Years)		Males		Females		Total
		No.	%	No.	%	
4	No.	101	49.51	103	50.49	204
	%	7.79		9.41		8.53
5	No.	95	48.72	100	51.28	195
	%	7.33		9.13		8.16
6	No.	150	62.76	89	37.24	239
	%	11.57		8.13		9.99
7	No.	98	46.23	114	53.77	212
	%	7.56		10.41		8.87
8	No.	106	52.22	97	47.78	203
	%	8.18		8.86		8.49
9	No.	133	56.60	102	43.40	235
	%	10.26		9.31		9.83
10	No.	128	57.14	96	42.86	224
	%	9.88		8.77		9.37
11	No.	152	56.72	116	43.28	268
	%	11.73		10.59		11.21
12	No.	126	55.26	102	44.74	228
	%	9.72		9.32		9.54
13	No.	90	56.60	69	43.40	159
	%	6.95		6.30		6.65
14	No.	59	53.64	51	46.63	110
	%	4.55		4.66		4.60
15	No.	43	51.19	41	48.81	84
	%	3.32		3.74		3.51
16	No.	15	50.00	15	50.00	30
	%	1.16		1.37		1.25
Total		1296	54.20	1095	45.80	2391

The comparison of eruption time of present study with many countries found that the timing of permanent teeth emergence to be nearly the same in comparison with the Canadian study which was conducted in North Western Ontario by Titley [29]. Although few differences could be occurred especially for premolars, while the emergence time for children in the present study found to be earlier when compared with Saudian children for the emergence of canines and premolars [15].

The emergence time of permanent teeth in this study found to be later than those reported for African children [14, 32]. Also, in comparison with Eskimo study in West Greenland by Boesen *et al*. [33] and study for European children by Eskeli *et al*. [18] with the exception for premolars which have earlier or nearly same emergence time.

Table (2): Mean Time of Eruption (μ) with Standard Deviation (SD) and Standard Error (SE) of Permanent Teeth of Children in Mosul City

Tooth Number		Males			Females			Both Genders		
		μ	SD	SE	μ	SD	SE	μ	SD	SE
Maxilla	1	7.46	0.75	0.0526	7.33	0.67	0.0439	7.39	0.71	0.0307
	2	8.52	1.02	0.0565	8.28	0.97	0.0509	8.40	1.01	0.0363
	3	11.51	1.20	0.0571	11.26	1.33	0.0622	11.41	1.26	0.0401
	4	10.26	1.45	0.0598	10.12	1.30	0.0612	10.20	1.39	0.0418
	5	11.28	1.50	0.0610	11.16	1.39	0.0636	11.24	1.44	0.0432
	6	6.41	0.71	0.0501	6.17	0.72	0.0449	6.32	0.74	0.0312
	7	12.37	1.44	0.0648	12.09	1.23	0.0619	12.25	1.34	0.0454
Mandible	1	6.49	0.66	0.0495	6.39	0.68	0.0445	6.51	0.75	0.0313
	2	7.77	0.95	0.0548	7.70	0.96	0.0512	7.73	0.94	0.0345
	3	10.8	1.01	0.0538	10.24	1.15	0.0571	10.56	1.11	0.0369
	4	10.65	1.13	0.0552	10.47	1.17	0.0573	10.58	1.15	0.0371
	5	11.65	1.45	0.0604	11.32	1.28	0.0604	11.51	1.38	0.0422
	6	6.25	0.85	0.05	6.12	0.70	0.0453	6.30	0.72	0.0362
	7	11.99	1.83	0.0679	11.82	1.66	0.0755	11.92	1.73	0.0523

Table (3): Different in Mean Emergence Time between Right and Left Sides of Permanent Teeth in Both Genders

Tooth Number		Males				Females			
		R	L	t–test	p	R	L	t–test	p
Maxilla	1	7.46	7.46	0	NS	7.33	7.33	0	NS
	2	8.52	8.52	0	NS	8.30	8.26	0.71	NS
	3	11.50	11.52	0.97	NS	11.29	11.22	1.04	NS
	4	10.28	10.25	0.45	NS	10.12	10.11	0.02	NS
	5	11.28	11.28	0	NS	11.13	11.18	0.74	NS
	6	6.40	6.41	0.25	NS	6.17	6.17	0	NS
	7	12.48	12.40	0.97	NS	12.09	12.09	0	NS
Mandible	1	6.48	6.49	0.20	NS	6.42	6.37	0.90	NS
	2	7.78	7.76	0.20	NS	7.70	7.70	0	NS
	3	10.81	10.80	0.09	NS	10.20	10.28	1.21	NS
	4	10.65	10.65	0	NS	10.48	10.46	0.28	NS
	5	11.63	11.66	0.40	NS	11.32	11.33	0.16	NS
	6	6.25	6.25	0	NS	6.10	6.14	0.35	NS
	7	11.91	12.06	1.59	NS	11.78	11.85	0.70	NS

R: Right L: Left

Table (4): Differences in Mean Age of Eruption Permanent Teeth between Maxillary and Mandibular Teeth in Both Genders

Tooth Number		Upper Mean ± SD	Lower Mean ± SD	t–test	p
Males	1	7.46 ± 0.75	6.49 ± 0.66	20.77	S
	2	8.52 ± 1.02	7.77 ± 0.95	15.65	S
	3	11.51 ± 1.20	10.80 ± 1.01	15.56	S
	4	10.26 ± 1.45	10.65 ± 1.13	7.31	S
	5	11.28 ± 1.50	11.65 ± 1.45	6.23	S
	6	6.41 ± 0.71	6.25 ± 0.85	3.89	S
	7	12.37 ± 1.44	11.99 ± 1.83	5.85	S
Females	1	7.33 ± 0.67	6.39 ± 0.68	20.23	S
	2	8.28 ± 0.97	7.70 ± 0.96	11.40	S
	3	11.26 ± 1.33	10.24 ± 1.15	18.27	S
	4	10.12 ± 1.30	10.47 ± 1.17	0.06	NS
	5	11.16 ± 1.39	11.32 ± 1.28	0.12	NS
	6	6.17 ± 0.72	6.12 ± 0.70	0.97	NS
	7	12.09 ± 1.23	11.82 ± 1.66	4.22	S

Table (5): Differences in Mean Age of Eruption of Permanent Teeth between Maxilla and Mandible in Males and Females

Teeth		1	2	3	4	5	6	7
Males	Maxilla	7.46	8.52	11.51	10.26	11.28	6.41	12.37
	Mandible	6.49	7.77	10.80	10.65	11.65	6.25	11.99
	Difference	0.97	0.75	0.71	0.39	0.37	0.16	0.38
Females	Maxilla	7.33	8.28	11.26	10.12	11.16	6.17	12.09
	Mandible	6.39	7.70	10.24	10.47	11.32	6.12	11.82
	Difference	0.94	0.58	1.02	0.35	0.16	0.05	0.27

Table (6): Differences in Mean Eruption Time of Permanent Teeth between Males and Females

Tooth Number		Males Mean ± SD	Females Mean ± SD	t–test	P
Upper	1	7.46 ± 0.75	7.33 ± 0.67	2.93	S
	2	8.52 ± 1.02	8.28 ± 0.97	4.85	S
	3	11.51 ± 1.20	11.26 ± 1.33	4.64	S
	4	10.26 ± 1.45	10.12 ± 1.30	2.31	S
	5	11.28 ± 1.50	11.16 ± 1.39	1.94	S
	6	6.41 ± 0.71	6.17 ± 0.72	4.88	S
	7	12.37 ± 1.44	12.09 ± 1.23	4.94	S
Lower	1	6.49 ± 0.66	6.39 ± 0.68	2.08	S
	2	7.77 ± 0.95	7.70 ± 0.96	1.42	NS
	3	10.80 ± 1.01	10.24 ± 1.15	12.00	S
	4	10.65 ± 1.13	10.47 ± 1.17	3.57	S
	5	11.65 ± 1.45	11.32 ± 1.28	5.63	S
	6	6.25 ± 0.85	6.12 ± 0.70	2.30	S
	7	11.99 ± 1.83	11.82 ± 1.66	2.36	S

Table (7): Difference in Mean Age of Eruption of Permanent Teeth between Males and Females

Teeth	1	2	3	4	5	6	7
Maxilla	0.13	0.24	0.25	0.14	0.12	0.24	0.28
Mandible	0.10	0.07	0.56	0.18	0.33	0.09	0.17

However, this difference may be due to local environmental factors such as texture of the food, the premature loss of deciduous teeth due to caries, the retention of infected deciduous teeth, or the health of the community or may be due to genetic differences, or may be related to racial variations [34].

The study demonstrated that the mandibular teeth emerge earlier than the corresponding maxillary teeth in both genders except for the premolars; the opposing is true. These results are in agreement with other studies as in Australia [35], Eskimo [36], Egypt [37], Japan [17] and North Ireland [38]; while other studies found different results as study in Saudi which carried out by El–Zahid and Hafez [15] who found that the maxillary and mandibular premolars have the same time of emergence especially for males. Another study found that all the mandibular teeth erupted earlier than the antagonist maxillary teeth [18].

In general, the advancement of the mandibular permanent teeth in their emergence than corresponding maxillary permanent teeth, could be attributed to the earlier formation of mandible during its embryonic development than maxilla [2].

The study revealed that the greatest differences in the eruption time between jaw occur between canine in females. This variation in the range of emergence for maxillary canine could be attributed to its long and tortuous path of eruption during its development. This variation in timing of canine emergence should be considered along with its possible effects on the alignment with other maxillary teeth [39].

The smallest differences in eruption time occurred in the first molars and they develop in their crypts in the line with and immediately behind the second deciduous molars. As these teeth emerge, they were guided the first molar into its position in the oral cavity [40].

The results of the present study show that statistically significant differences found between the males and females in the timing of maxillary and mandibular teeth emergence except lateral incisor with no significant differences, and show earlier teeth emerged in the females than the males. This run parallel with finding of other studies [15–18]. However, the gender differences in the present study are greater than those reported by Hoffding *et al*. [41], Eskeli *et al*. [18]. These gender variations in the emergence time among different studies could be explained by the racial differences between different populations [42].

The period of rest in the present study for females and males occurred between the emergence of the maxillary lateral incisors and maxillary first premolars, which found to be (22) months (1.8 years) for females and about (20.8) months (1.7 years) for males. These findings are in agreement with the study carried out by Jaswal [43] who also reported that this interval occurred between the maxillary lateral incisors and first premolars, but this period differed from that reported by Eskeli *et al*. [18].

Generally, these gender differences could be explained by the fact that females exhibit earlier physical development than the males [44]. Also, the females' permanent teeth found to have a complete root formation earlier than males' permanent teeth [43, 45].

In the present study, the sequence of permanent teeth eruption found is essentially the same for both males and females for maxillary arch which are 6 1 2 4 5 3 7, for mandibular arch for males sequence are 6 1 2 4 3 5 7, and for females 6 1 2 3 4 5 7.

The sequence of emergence for males are in agreement with the finding of other studies [17, 46], and for females are in agreement with finding of other studies [15, 17, 29].

According to the finding of this study, the emergence of permanent teeth in both genders began with the appearance of the mandibular first molar is due to the rapid rate of formation of the tooth (formation of enamel matrix and dentin begins at birth and enamel completed at 2–3 years) [40, 47]. While these findings found to be different from other studies which found that the sequence of emergence begin with the appearance of central incisor followed by first molar and lateral incisor, for the mandibular teeth, this sequence has been reported in Britain [48] and in Denmark [49], and eruption in this study ended by emergence of the maxillary second molars which start its calcification about (2–3) years and completion of the crown occurs about (7–8) years [40, 47], but some investigators found that eruption ended by the emergence of mandibular second premolar [19, 35, 50].

The study demonstrated that the mandibular canine emerges before mandibular premolar which is a desirable sequence because this sequence will aid in maintaining adequate arch length and in preventing lingual tipping of incisors [39]. Also, the study found the eruption of mandibular second premolar before the mandibular second molar which is also favourable for maintaining the length of the arch during transitional dentition [39].

Generally, the variation of the sequence suggested to be due to genetically determined differences in the teeth formation time between females and males [51].

In general, trends of permanent teeth emergence in the present study are similar to those of previous Iraqi ones [20–23]. The females have their permanent teeth to emerge earlier than the males, the mandibular teeth in both genders emerge before their opposing maxillary teeth except for the premolars, and also there are no differences in the emergence time between the right and left sides in both jaws and genders. The sequence of permanent teeth emergence is almost similar especially for the females in the maxilla and mandible.

The time of permanent teeth emergence found to be later in both genders when compared with the result reported by Al–Farhan [20], except mandibular central incisor for males which has the same emergence time. Also, the emergence time of permanent teeth in the present study found to be later in males but earlier in females with exception of some tooth types which found to be later when compared with the result of Daood [22] for Baghdady children.

The first and last tooth to emerge is the same with those reported by Al–Farhan [20] and Daood [22] but the total period during which the emergence of all permanent teeth (except third molars) took place was greater by (0.5) years for males and (0.24) years for females than Al–Farhan [20] and (0.46) years for males and (1.28) years for females than Daood [22].

The greatest jaw differences reported in the present study for canines of females are less than those differences reported by Al–Farhan [20]. For males, the differences reported for central incisor in the present study which found to be less than those reported by Al–Farhan [20]. For a lateral incisor, the greatest jaw differences in the present study for males are less than those reported by Daood [22]. In females, these differences are more than those reported by Daood [22].

The smallest jaw differences reported for the first molar in the present study found to be nearly the same to that reported by Daood [22] but in Al–Farhan study found to be for first molars for females and second premolars for males.

The gender differences reported in the present study for the mandibular canine as mentioned previously are lesser than those differences reported by Al–Farhan [20] and Daood [22]. The smallest gender differences reported were for the mandibular lateral incisor in the present study, while Al–Farhan [20] was maxillary premolar and the first molar in Daood study [22].

Regarding the sequences of permanent teeth emergence, it was found to be the same as Al–Farhan [20] and Daood [22]. Since great differences between life style nowadays and few decades ago, these differences include the texture of food, the general health care and other external factors that may lead to changes in the development of human dentition as a whole.

Generally, the result of permanent teeth emergence time (except third molars) in the present study are approximately the same for those reported by Baghdady and Ghose [23] and earlier than those reported by Ghaib [21], but the precise comparison is difficult to be done because only the number of years of child birth was used in their studies for computing the emergence time of permanent teeth without considering any month intervals.

Finally, the permanent teeth emergence remain as an example of growth parameter and both earlier and later emergence of the permanent teeth in both genders which found in the present study compared with previously mentioned Iraqi studies could be in general reflect variations during the stages of teeth formation.

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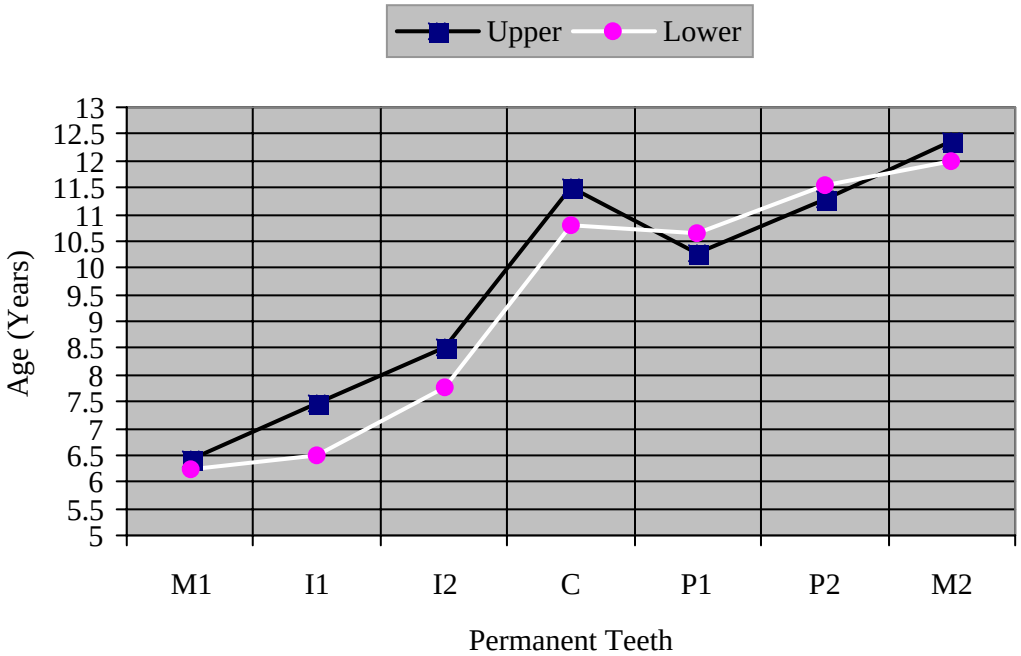


Figure (1a): Graph Showing Pattern of Eruption by Age and Arch of the Permanent Teeth in the Total Sample of Males

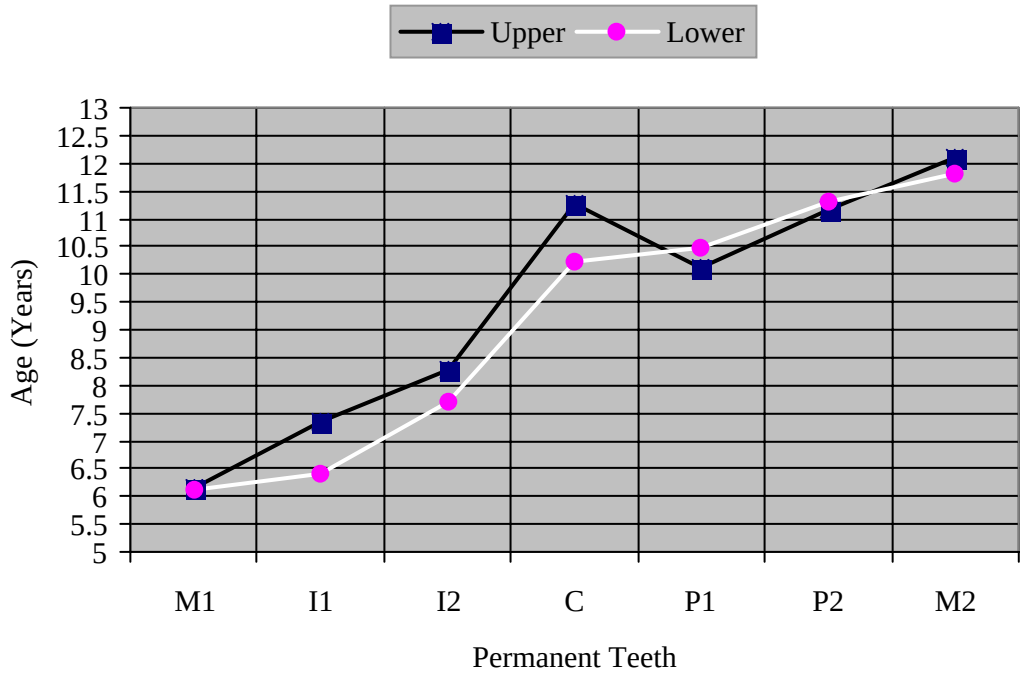


Figure (1b): Graph Showing Pattern of Eruption by Age and Arch of the Permanent Teeth in the Total Sample of Females

Figure (2a): Sequence and Range of Eruption Time in Males (Mean ± 2×SD) for Permanent Teeth

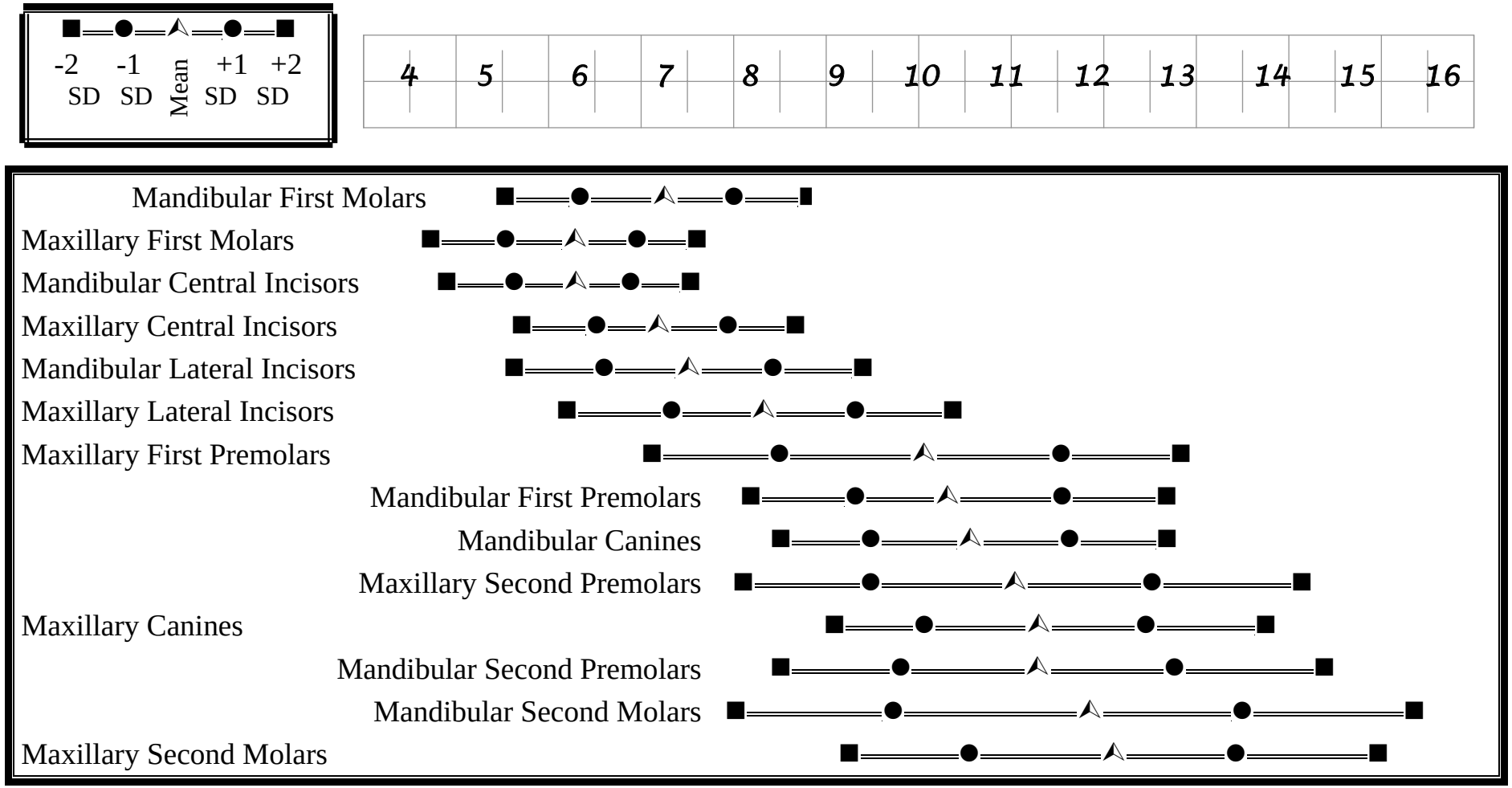
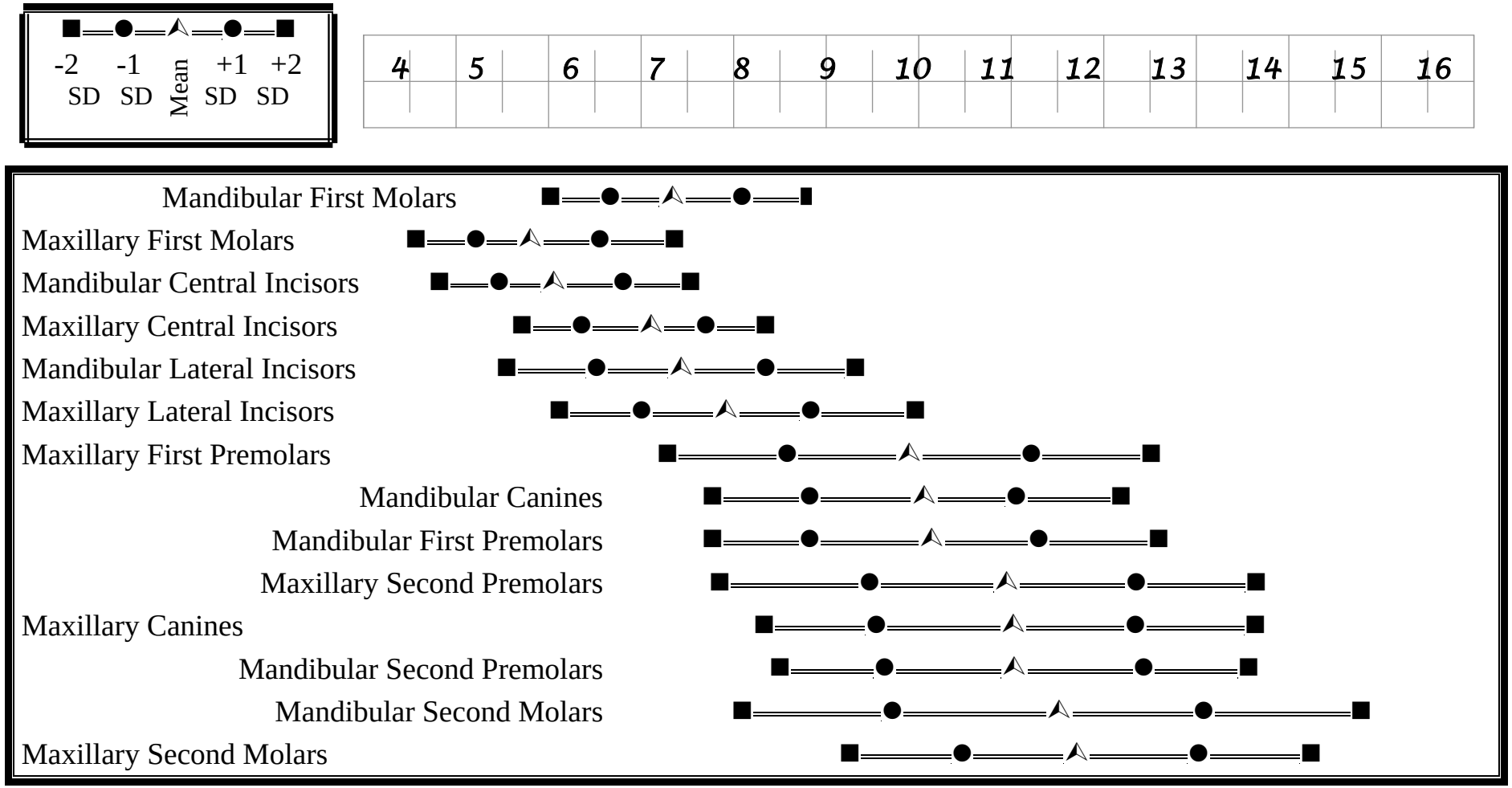


Figure (2b): Sequence and Range of Eruption Time in Females (Mean + 2×SD) for Permanent Teeth



Bacterial Dental Plaque in Orthodontic Patients

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Abstract

Plaque samples were collected and studied from orthodontic patients before and after placement of fixed orthodontic appliances.

The samples were assayed for changes in PH, microbial populations of aerobic, facultative, anaerobic. Significant increases in plaque PH and microbial populations were noted after placement of fixed other appliances. The decrease in plaque PH affect the growth of microorganisms.

Introduction

Many factors can influence the physical, chemical and biological characters of dental plaque, thereby favoring the development of dental caries or periodontal disease (Balen seifen. and Madonia 1969) (Huser, 1990 pettiu Arw 1997).

The nature of dental plaque alters by placement of appliance (Bloom, and Brown 1964). The appliance increase the volume of dental plaque and number of bacteira (Balensifen and Madonia .19 70) and their byproduct may cause higher incidence of gingival inflammation (Gibbon 19974, kilogstad 1994).

The most common types of plaque seem to occur when the balance between the microorganisms and the host is disturbed in some way and this related to the possible number of virulence factors (Hardie-JM 1992).

This study has been done on fixed orthodontic appliance which made of ametel alloy (stainless steel) which fixed to the tooth surface and applied force by either arch wire or auxilliariec or both of them (Jsaacson 1973 Rani 1995).

The effect of appliance on the reading of PH of saliva was studied and this affect the growth of microorganism.

Materials and Methods

Samples forty patients involved in this study at ages 8-11 years and 12-16 years age attending orthodontic clinic at college of dentistry, University of Baghdad. plaque samples (swabs) were collected and inserted immediately into nutrient broth (oxoid, England) for aerobic culture (Fingold and Baron 1986) and in thioglycollate broth for anaerobic cultures (wadsswarth, et al 1986). The swabs smeared on glass slides for staining with Gram's stain to detect the types of microorganisms (mellvillo and Russel 1981).

The nutrient broth that show turbidity after 24 hours were cultured on blood agar to detect the hemolytic and nonhemolvtic bacteria, chocolate agar (oxoid, England), MacConkey agar for isolation. Sabaurand's dextrose agar were used to isolate candida (cruickshank etal 1977, Musa 1994, Alttarby 1995) Mitis salivarius agar were used for oral streptococci, dfferent biochemical tests uses for identification of microorganisms like oxidase test , IMYIC test (Fingoland Baron 1986) catalas , fermentation of carbohydrates and coagulase (Marminsand Swain 1973) plaque samples were collected before and one month after the placement of appliance.

PH measurements

Saliva PH readings were made before and after orthodontic placements with electrode similar to the one wed by Stephan (Stephan, changes in hydrogen-ion concentration on tooth surfaces and in canons lesions JADA 27; 27/8-723, 1940). The PH meter was (schott Gerate- Model - CG7OJ, Germany) standardized by using a buffer of known PH before each test.

Results

Prevalence of microorganism all types of microorganisms have shown increase in number after orthodontic appliance (Fig 1). Few candida isolated before appliance (Table II). Facultative anaerobes and anaerobes show marked increate after placement in both sexes (Fig-1).

According to age two age groups were considered in this study 8-11 old (mixed dentition) and 12-16 years old (permanent dentition) in male at age 8-11 years have a marked increase in occurrence of microorganisms than at age 12-16 years (Table 2).

The percent of certain microorganisms increase after orthodontic placement especially lactobacillus, Neisseria, hemolytic streptococci (Table 3).

PH was measured 1 week and month after placement. The PH reading after one month were affected by the placement rather than the initial PH after one week of ass fitting of the appliance fig -1-. population mostly staphylococci, streptococci and lacto bacilli the orthodontic appliance provides media for the growth of facultative anaerjilc and for the propagation of anaerobic bacteria (Gwinnette, 1979, corbett etal 1981, nolet 1984, chong and Reindorf 1986, Huser, 1990, Paalantonion 1997, Helfgen and wiedeman, 1995). According to age the micro show increase in mixed dentition at the condition vary as teeth are lost and new one erupt (Rania 1995, March 1992) producing various environmental conditions which affect the growth of microorganism (Nolet, 1982, Schuister 1983).

According to the sex in table-2- the microorganisms isolated from male more than female probably due to less care in male for oral hygiene cause accumulation of microbial plague (Brown 1969, Schuster 1982) also eruption in female is earlier than in male so the microbe come in stable state and balance compared to male, stef, Arnberg, 1984).

The decrease in PH and low oxygen tension favor lactobacilli growth (Mosby, 1985). Omis and Kandow 1965 demonstrated a similar effect by placing a plastic plate on the palate of patients and show increased number of lacto bacilli due to food trapping.

This change in the PH is due to corrosion which occur in the stainless steel alloy when it dissolutes higher at particular point so the appliance will add a change in the polarity of this will affect the PH and We compared the effect of PH on microorganisms isolated the initial at (PH 6.5) and after one month (Ph 5) the M.O increase in per cent as the PH decrease (fig 1).

Discussion

Microbial plaque changes after orthodontic placement which result of inherent irregular ties as it may protect the plaque from the action of brushing and salivary flow (Balinese and Madonia 1970). Orthodontic placement into the mouth areas increase the retention of food debris and plaque and hence increase microbial counts, include lactobacilli and candida). Balinese and Madonia l970, Klenberg l979, Moist kondo l965).

The increase in percent of facultative and anaerobic bacteria due to alteration in the ecological system of the oral cavity as a resultant of orthodontic placement and hence introduce new stagnation areas available for bacterial colonization retention this agree with No let (l968)

Bacteria (Gwinnette, 1979, Corbett et al l981, nolet l984, Chong and Reindorf l986, Huser, l990, Palantonion l997).

(Helfegen and Wiedeman l995). According to age the micro show increase in mixed dentition at the condition vary as teeth are lost and new one erupt (Rania l995, March l992) producing various environmental conditions which affect the growth of microorganism (Nolet, l982, Schuister l983).

According to the sex in table –2- the microorganisms isolated from male more than female probably due to less care in male for oral hygiene cause accumulation of microbial plaque (Brown l969. Schuster l982) also eruption in females is earlier than in male so the microbe come in stable sate and balance compared to male, (Steif , Arnberg l984).

The decrease in PH and low oxygen tension favor lactobacilli growth (Mosby l985).

This change in the PH is due to corrosion which occur in the stainless steel

alloy when it dissolute higher at one particular point so the appliance will add a change in the polarity and this will change the PH (Al – January 2001).

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Table 1: Diagrammatic representation of the subgrouping variables of the sample subgrouping variables

Age	Gender	NO.
8-11	*Males*	*10*
	Females	*10*
12-16	*Males*	*10*
	Females	*10*

Table 2: Occurrence of microorganism according to age and sex

Plaque Sample	Age	Gender		Occurrence
		Male	*Female*	
Before banding	*8-11*	*6*	*4*	*Positive*
		4	*6*	*Negative*
After banding	*12-16*	*4*	*3*	*Positive*
		6	*7*	*Negative*
	8-11	*9*	*6*	*Positive*
		1	*4*	*Negative*
	12-16	*6*	*5*	*Positive*
		4	*6*	*Negative*

Table 3: Distribution of microorganisms isolated according to time of sampling

Microorganisms	Before placement	After placement	S.D.
Neisseria	*50%*	*70%*	*S*
Vellonella	*5%*	*11%*	*S*
∝-hemolytic streptococci	*40%*	*75%*	*H.S*
B-hemolytic streptococci			
Staphylococcus	*25 %*	*40%*	*S*
Diphtheria	*10%*	*25%*	*S*
Pepto streptococci	*5%*	*12%*	*S*
Lactobacillus	*30%*	*55%*	*S*
Candida	*80%*	*J7%*	*H.S*

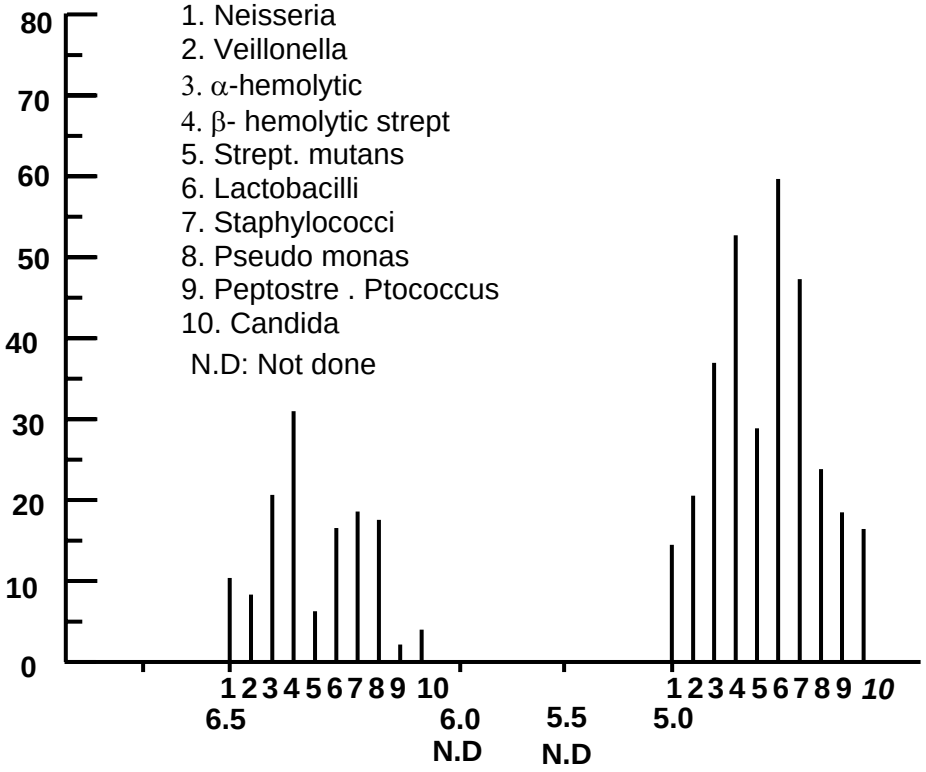

Fig 1: Diagrammatic representation of PH related to percent of M-O.

A Survey on Anterior Dental Irregularities

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Abstract

This study involved the intra-oral clinical examination of about seven thousand 13 year olds with no history of orthodontic treatment were selected from six governorates (Baghdad the capital, Ninevah, Basrah, Diyala, Anbar and Najaf). The largest irregularities of alignment in the maxillary and mandibular anterior segments were registered for each student.

Anterior irregularities of 1mm or more were found in more than half of the sample (59.5% maxillary and 49.2% mandibular), whereas anterior irregularities of 2mm or more were less prevalent (19.1% maxillary and 15.1% mandibular); being significantly more in rural students than urban ones and non-significantly related to gender and governorate.

Introduction

Anterior irregularities have commonly been recorded as either tooth rotations or displacement by several indices (Massler and Frankel, 1951; Bjork et al., 1964; Summers, 1966; Grainger, 1967; Salzmann, 1968; Baume et al., 1973).

On the other hand, Cons et al. (1978) measured alignment irregularities metrically for each contact site of the maxillary and mandibular incisors. Then he later added the concept of the largest anterior irregularity per arch as a part of the dental aesthetic index (Cons et al., 1986).

However, only seldom has the data been published in the articles because it was treated as part of the final index score and not as a separate entity. Therefore, this study was undertaken to elucidate this variable and compare with the slim literature present.

Materials and methods

A total of 7176 intermediate school students 13 years of age were taken from 6 governorates (cities and environs) in Iraq selected to cover the whole country geographically (Baghdad the capital, Ninevah, Basrah, Diyala, Anbar and Najaf) according to a multi-stage stratified sampling technique. Details of the geographic distribution and sampling technique are given in Al-Huwaizi (2002).

After excluding the invalid case sheets and isolating the students with some sort of orthodontic treatment, the number of casesheets which entered the statistical analysis dropped to 6957 as shown in Al-Huwaizi et al. (2002 a & b).

Irregularities may be either rotations out of, or displacements from, normal alignment (Figure 1). A separate measurement was made for the maxillary and mandibular incisal segments.

The four incisors were visually scanned to locate the greatest irregularity between adjacent teeth. The site of the greatest irregularity between adjacent teeth was measured using a metric ruler (Figure 2). The end ruler was placed in contact with the labial surface of the most lingually displaced or rotated incisor while it was held parallel to the occlusal plane and at right angles to the normal arch line. The amount of displacement was read from the labial surface of the adjoining tooth to the nearest whole millimeter.

Irregularities at the distal aspect of the lateral incisors in relation to the mesial aspect of the adjacent canine were also considered, if present (Baume et al., 1973; Cons et al., 1986).

Statistical analysis:

ANOVA test was used to assess the statistical difference between the means of the six governorates. T-test was used to assess the statistical difference between

the means of the two genders, urban and rural, and each pair of governorates.

The following significance levels were used: N.S. p>0.05
* 0.05>p>0.01
** 0.01>p>0.001
*** p<0.001

(a) Rotation

(b) Displacement

Figure 1: Examples of anterior intra-arch irregularities.

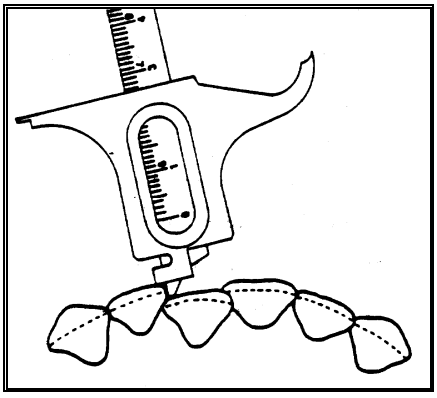

Figure 2: Measuring irregularities with a metric ruler or vernier.

Results

Largest maxillary anterior irregularity

Maxillary anterior irregularities were found in 59.5% of the sample. These irregularities were mostly of 1mm (40.4%) and 13.2% were 2mm, while only 5.9% of the sample showed irregularities of 3mm or more. The mean maxillary anterior irregularity was 0.867± 0.011mm (Table 1).

Anbar showed the highest mean maxillary anterior irregularity (0.952 ± 0.032mm) followed by Basrah (0.924 ± 0.031mm) and Najaf (0.911 ± 0.029mm), while Baghdad showed the least mean maxillary irregularity (0.796 ± 0.021mm) as shown in table 1. These differences are statistically significant as shown by ANOVA test (F=4.714, d.f.=5, 6951, p<0.001). The statistical significance of the differences between the governorates by using t-tests is shown in table 2.

Differences between males and females regarding the mean maxillary anterior irregularity were statistically insignificant for the urbans, rurals and total sample as shown in table 3 and 4.

Rural males and females had significantly more maxillary anterior irregularities (both in prevalence and mean) than urban males and females (Table 3). This was statistically significant for the males, females and total sample as shown in table 4.

Largest mandibular anterior irregularity

Mandibular anterior irregularities were found in 49.2% of the sample. These irregularities were mostly of 1mm (34.1%) and 12.6% were 2mm, while only 2.5% of the sample showed irregularities of 3mm or more. The mean mandibular anterior irregularity was 0.672 ± 0.010mm (Table 5).

Diyala showed the highest mean mandibular anterior irregularity (0.752 ± 0.025mm) followed by Basrah (0.745 ± 0.026mm) and Anbar (0.743 ± 0.027mm), while Ninevah showed the least mean mandibular irregularity (0.564 ± 0.024mm) followed by Baghdad (0.630 ± 0.018mm) as shown in table 5. These differences are statistically significant as shown by ANOVA test (F=10.250, d.f.=5, 6951, p<0.001). The statistical significance of the differences between the governorates by using t-tests is shown in table 6.

Considering gender differences, urban females (0.632 ± 0.018mm) had significantly higher mean mandibular anterior irregularity than urban males (0.554 ± 0.018mm). The opposite was true in the rurals, where males (0.793 ± 0.021mm) had significantly lower mean mandibular irregularities than females (0.709 ± 0.019mm). However, for the total sample, gender difference was statistically insignificant as shown in Table 7 and 8.

Rural males and females had significantly more mandibular anterior irregularities (both in prevalence and mean) than urban males and females (Table 7). This was statistically significant for the males, females and total sample as shown in table 8.

Table 1: Distribution (%) and mean (mm) of the largest maxillary anterior irregularity by governorate.

	Baghdad N=1995	Ninevah N=991	Basrah N=989	Diyala N=994	Anbar N=995	Najaf N=993	Total N=6957
None	45.9	42.3	36.9	38.1	38.8	35.6	40.5
1 mm	36.1	38.8	44.3	44.0	38.6	44.9	40.4
2 mm	12.6	13.1	11.8	12.6	14.6	15.0	13.2
3 mm	3.6	4.8	4.3	4.6	5.4	2.2	4.1
4 mm	1.6	0.8	1.9	0.6	2.1	1.7	1.5
5 mm	0.1	0.1	0.5	0.1	0.3	0.3	0.2
6 mm	0.1	0.0	0.2	0.0	0.2	0.2	0.1
Mean	0.796	0.834	0.924	0.859	0.952	0.911	0.867
sem	0.021	0.029	0.031	0.027	0.032	0.029	0.011

Table 2: T-tests between the governorates for largest maxillary anterior irregularity.

T-tests	Najaf	Anbar	Diyala	Basrah	Ninevah
Baghdad	***	***	NS	***	NS
Ninevah	NS	**	NS	*	
Basrah	NS	NS	NS		
Diyala	NS	*			
Anbar	NS				

Table 3: Distribution (%) and mean (mm) of the largest maxillary anterior irregularity by residency and gender.

	Urban			Rural			Total		
	Male N=3477	Female N=3480	Total N=6957	Male N=3477	Female N=3480	Total N=6957	Male N=3477	Female N=3480	Total N=6957
None	44.7	43.8	44.2	35.8	37.8	36.8	40.3	40.8	40.5
1 mm	38.3	40.2	39.2	43.7	39.4	41.5	41.0	39.8	40.4
2 mm	10.1	12.2	11.1	13.1	17.4	15.2	11.6	14.8	13.2
3 mm	5.2	3.0	4.1	5.0	3.2	4.1	5.1	3.1	4.1
4 mm	1.4	0.7	1.0	2.0	1.9	1.9	1.7	1.3	1.5
5 mm	0.1	0.2	0.2	0.3	0.2	0.3	0.2	0.2	0.2
6 mm	0.2	0.0	0.1	0.2	0.1	0.1	0.2	0.1	0.1
Mean	0.814	0.774	0.794	0.951	0.931	0.941	0.882	0.852	0.867
sem	0.023	0.020	0.015	0.023	0.023	0.016	0.016	0.015	0.011

Table 4: T-tests between both genders and residencies (urban and rural) for mean largest maxillary anterior irregularity.

	Gender difference			Residency difference		
	Urban	Rural	Total	Males	Females	Total
t value	1.311	0.600	1.337	4.199	5.148	6.587
d.f.	3481	3472	6955	3475	3478	6955
p level	NS	NS	NS	***	***	***

Table 5: Distribution (%) and mean (mm) of the largest mandibular anterior irregularity by governorate.

	Baghdad N=1995	Ninevah N=991	Basrah N=989	Diyala N=994	Anbar N=995	Najaf N=993	Total N=6957
None	54.0	57.0	47.0	44.3	46.8	52.2	50.8
1 mm	31.8	31.9	34.3	39.1	36.2	33.7	34.1
2 mm	11.8	9.1	16.3	13.9	13.4	12.3	12.6
3 mm	2.2	1.7	2.0	2.6	3.1	1.6	2.2
4 mm	0.3	0.3	0.4	0.1	0.5	0.2	0.3
Mean	0.630	0.564	0.745	0.752	0.743	0.639	0.672
sem	0.018	0.024	0.026	0.025	0.027	0.025	0.010

Table 6: T-tests between the governorates for mean largest mandibular anterior irregularity.

T-tests	Najaf	Anbar	Diyala	Basrah	Ninevah
Baghdad	NS	***	***	***	*
Ninevah	*	***	***	***	
Basrah	**	NS	NS		
Diyala	**	NS			
Anbar	**				

Table 7: Distribution (%) and mean (mm) of the largest mandibular anterior irregularity by residency and gender.

	Urban			Rural			Total		
	Male N=3477	Female N=3480	Total N=6957	Male N=3477	Female N=3480	Total N=6957	Male N=3477	Female N=3480	Total N=6957
None	58.4	51.9	55.2	44.6	48.1	46.3	51.5	50.0	50.8
1 mm	29.5	35.6	32.5	35.4	35.9	35.7	32.5	35.7	34.1
2 mm	10.5	10.3	10.4	16.5	13.2	14.9	13.5	11.8	12.6
3 mm	1.4	1.9	1.7	3.0	2.4	2.7	2.2	2.2	2.2
4 mm	0.2	0.3	0.2	0.5	0.3	0.4	0.3	0.3	0.3
Mean	0.554	0.632	0.593	0.793	0.709	0.751	0.674	0.670	0.672
sem	0.018	0.018	0.013	0.021	0.019	0.014	0.014	0.013	0.010

Table 8: T-tests between both genders and residencies (urban and rural) for largest mandibular anterior irregularity.

	Gender difference			Residency difference		
	Urban	Rural	Total	Males	Females	Total
t value	3.037	3.009	0.180	8.788	2.868	8.273
d.f.	3481	3472	6955	3475	3478	6955
p level	**	**	NS	***	**	***

Discussion

Maxillary anterior irregularities were found in 59.5% of the sample, while mandibular anterior irregularities were found in 49.2% of the sample.

To the knowledge of the author there is no study that has reported detailed information on the largest anterior irregularities to compare with except for Cons et al. (1978) who reported the amount of irregularity per site and not the largest anterior irregularity that was reported in the present study.

It is remarkable that Cons et al. (1978) reported that only 8% of their sample had anterior irregularities, but this is because they included only irregularities of 2mm or more as suggested by Baume et al. (1973). Using the same criteria, in the present sample, 19.1% had maxillary anterior irregularities and 15.1% had mandibular anterior irregularities.

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Clinical Evaluation of Nasal Fractures, Management and Complication

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Abstract

This study was performed on patients with different severity of nasal trauma selected from 106 patients who sustained midfacial trauma. admitted to Al- Karkh general hospital and Al-shaheed Adnan hospital in Baghdad from January 1999 to September 2001.Both prospective and retrospective studies were done. from both studies we found that the incidence of nasal fracture higher than other fractures of midfacial bones. Nasal fractures more commonly occur at age between (20-30) years and the most common etiology was road traffic accidents. From 61 patients with nasal trauma in both studies we found that only 16 cases without associated injuries. We used intra oral dental film for diagnosis of nasal fracture in addition to other methods of diagnosis.

Introduction

The prominent position of the nose makes restoration of appearance extremely important (Dingman 1964).

Because of its prominent position and protruding, delicate skeleton, the nose is predisposed to soft tissue injuries and fracture. Nasal fractures rank third in incidence, behind fractures of the clavicle and wrist. (Bailey and Calhoun 1998).

Variable etiological factor responsible for nasal fractures including RTA, assault, F.F.H., bullet and industrial injuries. (Doerr et al, 1998)

With proper assessment and management, most nasal fractures can be restored to proper alignment and complications can be prevented (Bailey and Calhoum 1998).

Patients, materials and methods

***Patients*:** This study included 106 patients with midfacial trauma. Both prospective and retrospective studies were done.

The prospective study included 66 patients and the retrospective study included 40 patients.

***Materials*:** The whole information in the prospective study were collected from patients by direct clinical examination and radiograph. The radiographs were taken to those patients included ,true lateral soft tissue profile of the face, occipitomental views at angulation 15^{o}, 30^{o}, 45^{o}, and true lateral view of the nose with dental film (periapical) Agfa, speed E size#2, and occlusal film (Kodak, ultraspeed D) size #4 . Also computerized tomography scan used (Siemens, Somatom).Treatment and complications were recorded during follow up period about three month. In retrospective study all information were collected from patients files or any witness.

Dental film (periapical and occlusal)

Methods

Clinical examination

Clinical examination was done in the maxillofacial department on the dental chair with good lightening. Increased intercanthal distance examined by direct visual examination and by using the goniometer to see if there is unilateral or bilateral canthal spread. Cerbrospinal fluid rhinorr-hea diagnosis depend on tram-line sign.

Radiographical examination

1. **True lateral soft tissue profile:** Was taken for whole patients
2. **Occipitmental view (Water's view):** This view was taken in angulations of 30^o, 45^o and for most of the patients.
3. **True lateral nasal view with dental film:** Was taken for 16 patients, by this we used the intraoral dental (periapical) film held at the side of the nose and parallel to the sagittal plane, and exposure of the film from the other side of the nose, the exposure time was about 0.7 seconds, 10 MA. and 65KV, source film distance 30 cm.
4. **Computerized tomography scan (C.T. scan):** Was done for 11 patients.

Results

Etiology of nasal trauma (prospective and retrospective).

Etiology of trauma	Prospective		Retrospective		Total	
	Freq.	%	Freq.	%	Freq.	%
R.T.A	28	66.6	3	15.7	31	50.8
Assault	9	21.4	7	36.8	16	26.2
Bullet injury	0	0	3	15.7	3	4.9
F.F.H.	4	9.5	6	31.6	10	16.4
Industrial injury	1	2.3	0	0	1	1.6
Total	42	100.0	19	100.0	61	100.0

Incidence of mid facial fractures and associated fractures with nasal trauma (Prospective)

Type of fracture	Incidence		Fracture associated with nasal trauma	
	Frequency	Percentage	Frequency	Percentage
Fracture nose	39	29.8	---	
Orbital fracture	17	12.9	9	14.8
Zygomatic fracture	36	27.5	18	29.5
Lefort III fracture	5	3.8	5	8.2
Lefort II fracture	15	11.4	15	24.6
Lefort I fracture	10	7.6	6	9.9
Dentoalvealar fracture	9	6.8	8	13.1
Total	131 / 66	100.0	61	100.0

Associated injuries with nasal trauma (prospective and retrospective).

Associated injuries	Prospective		Retrospective		Total	
	Freq.	%	Freq.	%	Freq.	%
Soft tissue laceration	28	38.3	9	33.3	37	37
Eye injury	2	2.7	1	3.7	3	3
Mandibular fracture	9	12.3	2	7.4	11	11
Head injury	17	23.3	5	18.5	22	22
Cranial fracture	5	6.8	1	3.7	6	6
Chest injury	2	2.7	0	0	2	2
Abdominal injury	1	1.4	0	0	1	1
Upper and lower limb injury	9	12.3	9	33.3	18	18
Total	73	100.0	27	100.0	100	100.0
Note: Prospective absent cases 7 Retrospective absent cases 9						

Treatment of nasal trauma (prospective and retrospective)

Treatment	Prospective		Retrospective	
	Freq.	%	Freq.	%
None	9	21.4	4	21
Nasal pack	9	21.4	5	26.3
P.O.P.	21	50	8	42.1
Canthopexy	2	4.8	1	5.3
Open reduction and plating	1	2.4	0	0
Open reduction and wiring	0	0	1	5.3
Total	42	100.0	19	100.0

Clinical signs of nasal trauma (Prospective)

Clinical signs	Frequency			Percentage		
Epistaxis	41			97.6		
	mild	Mod.	severe	mild	Mod.	Severe
	24	12	5	58.5	29.2	12.1
Saddle nose deformity	16			38.09		
Traumatic telecanthus	11			26.1		
Nasal septal deviation	17			40.4		
C.S.F. Rhinorrhea	8			19.04		
Soft tissue Laceration	17			40.4		
Stepdeformity on bridge of nose	25			59.5		
Nasal bridge deviation	20			47.6		
	R	L		R	L	
	8	12		40	60	
Subconjectival haemorrhage	10			58.8		
Circumorbital Ecchymosis	9			52.9		
Total	42			100.0		

Note: Subconjectival haemorrhage 10 and Circumorbital Ecchymosis 9 cases were selected from 17 cases of pure nasal fracture relation.

Complication of nasal trauma (Prospective).

Complication	Frequency	Percentage
Increase intercanthal distance	6	10.7
Nasal septal deviation	10	17.8
Nasal bridge deformity	8	14.3
Nasal blockage	16	28.3
Diplopia	2	3.3
Soft tissue scar	14	25
Total	56	100.0

Discussion

In age distribution of nasal we found that the higher number of cases were seen at age group (20-) which is about (31.14%) . this is usual due to more outdoor activities during this age In gender distribution we found that male cases about (82%) and female (18%) and the male to female ratio about 5:1 this findings , because in our society the man is responsible to family and therefore he works and gives more activities than female .

During study the etiology of nasal trauma in both studies we found that RTA

(50.8%) , assault (26.2%) , F.F.H. (16.4%) , bullet injury (4.9%) industrial injury (1.6%).

The major cause of this high number RTA as an etiological factors for nasal fractures was due to the fact that whole drivers and passengers specially in the front seat don't wear safety belt and neglection of traffic rules from drivers and pedestrians and because of the nose is the most prominent feature of the face and susceptible to more trauma . we found also high number of nasal fractures at all age groups due to RTA in the prospective study.

We found high incidence of nasal fracture from both studies (29.9%) than other mid facial bones fractures followed by fracture zygoma (27.3%).

The most common associated fractures of middle third of the face with nasal fracture was zygomatic fracture (25.6%) , then Lefort II fracture (24.3%) and we found that (37.5%) of nasal fracture not associated with other mid facial fractures.

Highly associated fractures with nasal fractures was seen due to RTA, while the etiology of pure nasal fractures majority due to assault and F.F.H.

Clinical signs of nasal trauma

We found that epitasis was seen in whole patients with nasal trauma, and its management is not difficult even in severe bleeding.

Saddle nose deformity was seen in (38.09%) of patients and found in patients sustained trauma from anterior direction. traumatic telecanthus was seen in (26.1%). Nasal septal deviation was seen in (40.4%), because the septum absorb a large portion of impact and cause buckling of the septum and its neglection during treatment lead to nasal septal deviation and nasal blockage. C.S.F. rhinorrhea was seen in (19.04%). Nasalbridge deviation present in (47.6%) subconjectival hemorrhage was seen in 10 patients and circumorbital ecchymosis in 9 patients, these results out of 17 patients with pure nasal fracture.

Diagnosis

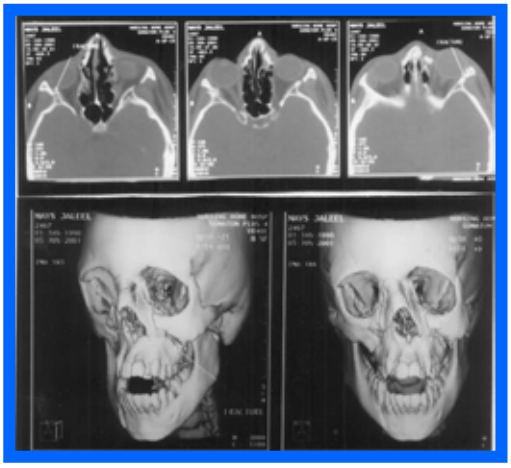
The diagnosis of nasal fracture should be depend on clinical examination but should be accompanied by radiograph. The usual use of true lateral soft tissue profile of the face for diagnosis of nasal facture should be decreased because we found that the true lateral nasal view by dental film gives better details to the fractured nasal bone due to decrease in the object film distance.

Treatment and complications

We found that 50% of patients with nasal fracture treated with closed reduction and P.O.P. splint. and this modality of treatment was done even for patients with extensive trauma and need more than this and that's explain the cause of elevation in number of complication and this agree with Bailey and Tan 1998, they were stated that incase of fracture of nasal septal complex with nasal deviation less than 1/2 the width of nasal bridge we can used closed reduction and P.O.P. splint. We found minimal use of canthopexy and rare use of open reduction and plating.

Reduction of nasal fracture should be done within first 3 hours or after 5-7 days.

From 42 patients with nasal trauma we found that 16 (38%) patients with out any complications while Mayell 1973 he found that (30%) with out complications.



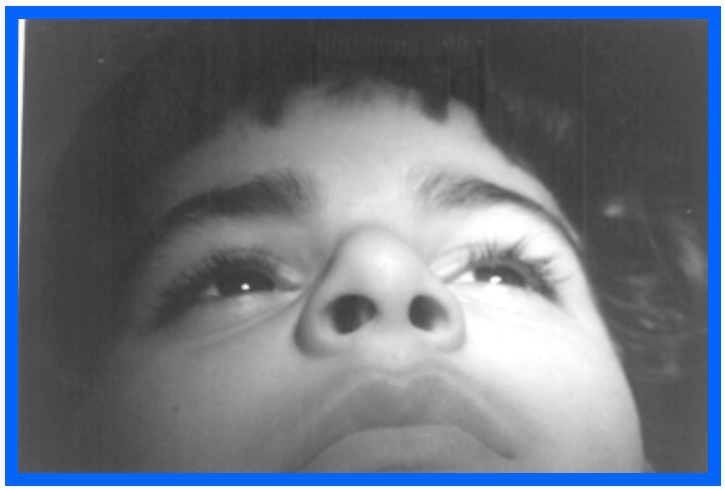
Spiral C.T. scan for patient with Lefort III and nasal fracture.

True lateral soft tissue profile for patient with nasal fracture

True lateral nasal view by dental film

Patient with nasoethmoidal fracture showing traumatic telecanthus

The same patient after three month showing increased intercathal distance and ugly scar.



Patient with nasal septal deviation after closed reduction.

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Maxillodental Responses of Banded Hyrax Expansion on Unilateral Dentoalveolar Non- functional Crossbite

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Abstract

Banded Hyrax was used for treatment of 29 patients at age range from 8-11 years for the correction of left side, unilateral, dentoalveolar, non-functional posterior crossbite. Active expansion begun with one complete turn then followed by twice 1/4 turn every day until 2-3 mm over correction within time 16-36 days. This was followed by stabilization period for 3 months. A posterioanterior radiographs were taken before and after treatment to examine the transverse changes due to Hyrax expansion on the molars inclination (both sides) to the cranial reference line and the distances from the midsagittal plane to the outermost point of the upper first permanent molar, base of maxilla and nasal cavity widths for left and right sides. It was found that the faster the expansion, the more the orthopedic and the less orthodontic effects and the asymmetrical expansion of the banded Hyrax is a rule rather than exception. Expansion magnitude was more on the cross-bite side (left) for dental, basal and nasal widths. The increase in dental distances was about twice of basal part (orthopedic). The increase in nasal cavity width was greater on crossbite side that was about twice the amount of right side. The banded molar try to move with the alveolar bone bending rather than tipping within the bone itself.

Key words: banded Hyrax, asymmetrical expansion, alveolar bending unilateral dentoalveolar, posterior crossbite.

Introduction

Expansion was one of the accepted treatments at the early development of Orthodontics as a non- extraction procedure since 1860 by Angle[1]. Then, various designs were used for expansion of the maxilla. Coffin in 1869 used the expansion loop[2] others used Jack screw[3],w appliance[4] & quadhelix appliances[2] but the Hyrax screw remain the foremost proponent for treatment of posterior crossbite as many researches were done by Haas from 1959- 1980[5]. Wertz[2] concluded that the Hyrax treatment will increase the maxillary width due to lateral rotation of each half with a center located at naso-frontal suture[6]. Timms found an increase in interhamular width with weak correlation with the increase in intermolar width[7]. Variable degrees of buccal crown tipping were found during unilateral crossbite treatment[8] with increase in intercanine and intermolar widths[6,8,9,10,11].

The treatment of unilateral posterior crossbite by Hyrax was studied by many reserchers[8,12,13,16,17,23,24,25] but none of those authors identify all the aspects of crossbite whether it was left or right, true dentoalveolar or skeletal, functional type or not and the nature of anchorage used whether it was reciprocal or differential as all of these considerations will be taken in this study. Additionally, in Iraq no similar study was performed on this subject, therefore the purpose of the present research is to quantify the amount of expansion and the effects on the anchor teeth, base of maxilla and nasal cavity widths by the use of rapid Hyrax expander for treatment of left, unilateral, nonfunctional, dentoalveolar posterior crossbite.

Definition of posterior crossbite

It is a transversal discrepancy of teeth relationship due to the narrowing of the upper dental arch compared with the lower [17]. It can be described in terms of the position of the upper molars, as bilateral maxillary crossbite that can be termed as palatal crossbite, in other word, the upper

molar are palatal to their normal origin on both sides so a differentiation can be clear from the scissor bite (mandibular buccal crossbite)[22].

The prevalence of posterior crossbite is different among population. In Izmir its about 8-16% and it appear at age 3,6,8,10,12 years, while its incidence 2-7%[17] .In Brazil its 18.2%[20].

Diagnosis of dentoalveolar crossbite

Practically all unilateral crossbite are dentoalveolar[14] but differential diagnosis between an alveolar crossbite and a crossbite with a deficient maxillary apical base is not difficult. Basal bone measurements will indicate this as shown by Dipaolo Fig (1) & silva et al [20]. Alveolar crossbites show a characteristic low or average palatal vault, good harmony between maxillary and mandibular basal bones, and the axial inclinations of buccal and lingual cusps of the posterior teeth are lingual. In maxillary apical base deficiency, there is a marked deficiency of maxillary basal bone width relative to mandible, a high palatal vault and the axial inclinations of buccal and lingual cusps of the posterior teeth are buccal[14]. If the bone of the palatal vault is wide, but the dentoalveolar processes lean inward, the crossbite is dental and caused by distortion of dental arch. In contrary, a narrow palatal vault and the maxillary teeth lean outward, the problem is skeletal as a result of narrow maxillary width fig (2)[22].

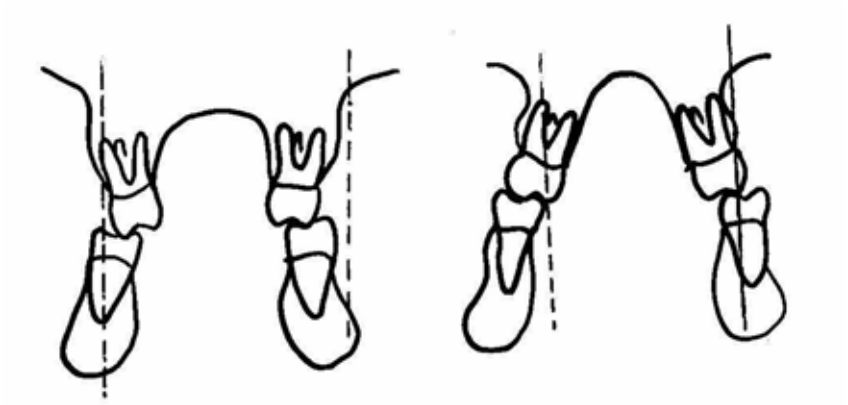

Figure 1: Dentoalveolar crossbite with good apical base width (left) and crossbite with a deficient apical base width (right) (From Dipaolo, R.: Thoughts on Palatal Expansion, JCO September 1970)[14]

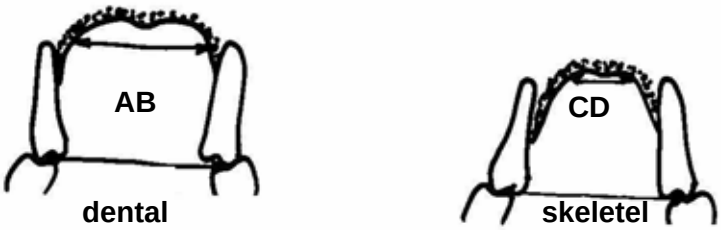

Figure 2: Posterior crossbite can be either dental, as in patient with adequate palatal width (i.e. distance AB approximately equals distance CD), or skeletal because of Inadequate palatal width (i.e. distance CD is considerably larger than distance AB). From Profitt et al 1993.[22]

Materials & Methods

Sample:

The sample was selected at the mixed dentition at age range 8-11 years when there is a transverse problem of nonfunctional dento- alveolar[6,21,31], unilateral, left side, posterior crossbite. Every patient exhibited a minimum of two molars (deciduous or Permanent) in crossbite on the left side only when the first goal of our treatment is to provide space for alignment of lateral incisor or to prevent the present one side chewing habit and the prevention of expected future T. M. J. problem. Any case of anterior crossbite, Cl III malocclusion, missing deciduous or permanent molar or cases of facial anomalies, cleft lip & palate were excluded. The total number of the treated patients was 33, from this number only 29 subjects were studied which represent the real number of the sample. Four cases were excluded, either the patient discontinue the treatment or due to quality of posterioanterior projection.

Materials:

It consisted from Hyrax screw, molars and premolar bands, solder and flux (Dentarum, Germany). Orthodontic torch & vernier (Germany). extraoral films, ceplalometric machine , acetate matte tracing paper (Germany) with refilled pencil 0.5mm and protractor.

Method:

I- Procedure:

Study model (duplicated for working) and posterioanterior x- rays were taken for every patient before treatment and after the stabilization period. The Hyrax was soldered to bands fitted on the first Permanent molars and on the 1st premolar if present or on the 1st deciduous molar ((in condition half the root length remains and the tooth are not loose, the deciduous first molar can be used for anchorage to rapid palatal expansion screw))[15]. A differential type of anchorage (simple type: small number of teeth against large number) was used by extending the Hyrax arm to reach all the right side teeth & part of the left side which are not in crossbite. After finishing procedure of the laboratory work, the Hyrax cemented on the proper teeth and the steps in palatal expansion begun that is the active expansion and stabilization.

A- Active expansion

It begun with four (1/4 turn), i.e complete turn at the 1st day after that ¼ turn twice each day (at morning & night by the patient parent)[15,17]. The patient has seen weekly interval. Every ¼ turn equal to ¼ mm[15], which deliver mechanical force system 3-5 pounds of force[14] up to 10-20 lbs[15], so correction of crossbite deemed sufficient when the posterior crossbite was overcorrected by 2-3mm[20]. Active expansion need average 16-36 days of treatment depending on the case.

B- Stabilization:

After being overcorrected, the activation stopped & the key of activation was drawn from the parents. The appliance leaved in the patient mouth for 3 months[21,26,27,28] which considered as stabilization period.

II- Posterioanterior cephalometric analysis (fig 3)

A- Linear measurement

The following landmarks were used

1- LNC- RNC: Points at the maximum curvature of the nasal cavity[17]. It's the maximum width of the left & right nasal cavity.

2- LJ- RJ: The intersection between processes zygomaticus and processes alveolaris maxillae on the left & right side[17]. It represents the width at skeletal base of maxillae.

3- L6- R6: The outermost points of the upper first permanent molars determined perpendicular to the occlusal plane[17].

4- LCRL- RCRL: It's the intersection of the greater wing of the sphenoid bone with inner cortex of the orbit. The connection of left & right side will give the cranial reference line[29].

5- LMO- RMO: Medial orbital point left & right, the most inner point situated at the medial aspect at the orbit[18]. From the mid of this distance (MOC) a perpendicular line drawn on the cranial reference line & extended down which will represent the mid sagittal plane (MSP) of the maxillae from which a perpendicular planes drawn from:-

i- LNC- RNC: Points which will give the actual expansion of the nasal cavity at

left & right side (LNC- MSP & RNC- MSP).

ii- LJ- RJ: Points which gives the actual expansion of the left & right maxillary halves. (LJ- MSP & RJ- MSP).

iii- L6- R6: Points which represents the actual dental expansion of the left & right 1st permanent molar. (L6- MSP & R6- MSP).

B- Angular measurements:

1- R6- CRL Angle: measured by intersection of cranial reference with a line tangent to the outer surface of rectangular molar band tube.

2- L6- CRL angle: measured as in no. 1.

III- Pilot study:

Training for the cephalometric tracing, landmarks identification and the errors of measurements were evaluated on four measurements (two left and two right) by using 10 radiographs. Each measurement was readed for two times by the same operator with time interval of two weeks. Table 1 shows a high level of reliability of the measurements with low total variance, so the data collection of the main research was started.

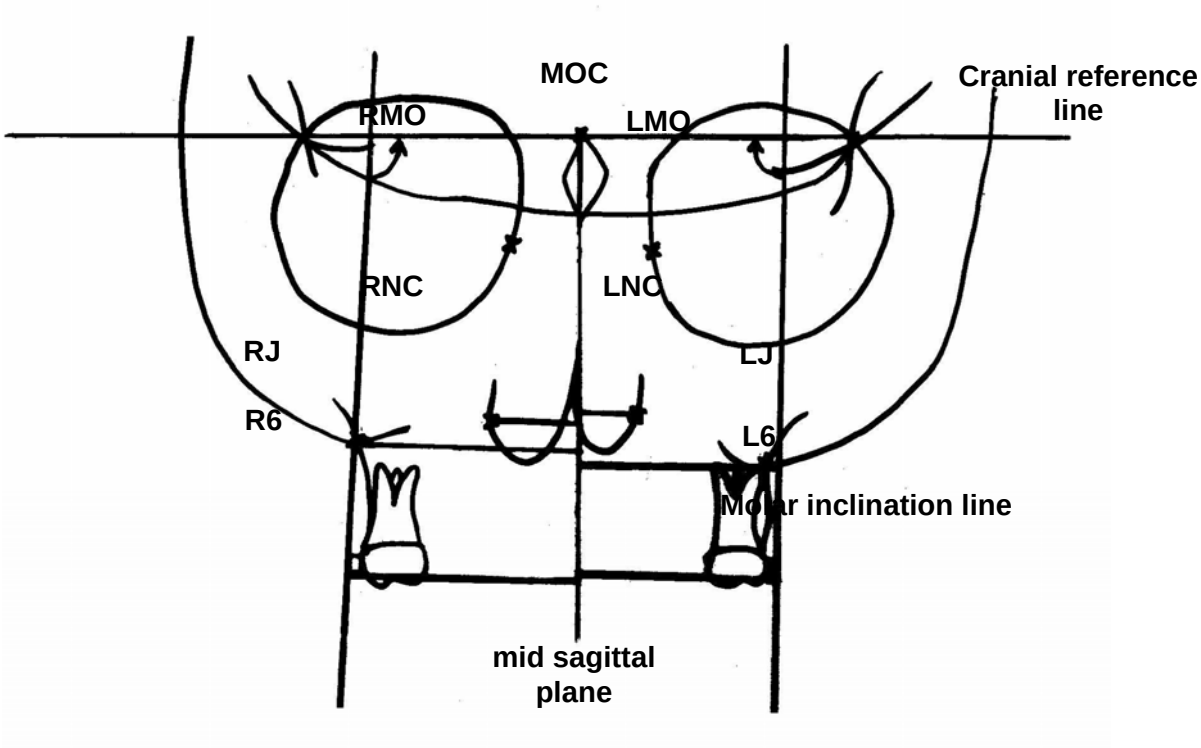

Fig 3: Posterioanterior cephalometric analysis

Table (1) pilot study for intraexaminer calibration s.d= standard deviation

Measurement	Reading	Mean	s.d.	P
6-Msp left	1st	33.5	2.1	N.S
	2nd	33.7	2.2	
J- Msp right	1st	35.4	1.9	N.S
	2nd	35.3	2.0	
NC- Msp left	1st	16.4	2.0	N.S
	2nd	16.6	2.1	
6-CRL right	1st	93.5	6.1	N.S
	2nd	94.1	6.2	

IV- Statistical analysis

Since no gender differences were found for the frontal cephalometric variables according to the researches of athanasiou et al[18],therefore, in this study, no sex separation were attempted and the following statistical analysis were done according to Triola[30].

1- Descriptive statistics.
2- Paired t- test between the 1st and 2nd readings of pilot study.
3- Paired t- test between each variable before and after treatment.
4- Pooled t- test between the right and left side before treatment and the same test repeated between left and right side after treatment

Results:

1- Sample:

The mean age of the sample was 9.8 years (at the mixed dentition period) with a range of active treatment from 16- 36 days.

2- Upper: 1st permanent molar to midsagittal plane(6-MSP):

The horizontal distance of the mesiobuccal cusp of the 1st permanent molar to the midsagittal plane was less on the left side (crossbite side) before treatment while it was more after treatment and the difference in the mean between left & right side before and after treatment was significant (P<0.05) (Table 3 fig 5). The difference in the left side between before and after treatment was very highly significant (p<0.001) while the same difference for the right side was only significant (p<0.05) (Table 2 fig 4).

3- Jugular point to midsagittal plane (J- MSP):

The amount of this distance was smaller for the left side before treatment while it become larger after treatment. The differences before treatment between the left and right sides was significant but after treatment it become non significant (Table 3 Fig 5). The left side showed a high significant differences before and after treatment (P < 0.001) with non significant differences for the right side. The influence of Hyrax before and after treatment was more profound for the left side while it was not for the right side (Table 2 Fig 4).

4- Nasal cavity width to midsagittal plane (NC- MSP):

In this study no significant difference was obtained between the left & right sides in both before and after treatment mechanics (table 3 fig 5) but the difference in the mean was very highly significant (P<0.001) for both left and right sides during the comparison of the before and after treatment (Table 2 Fig 4).

5- Inclination of 1st permanent molar to cranial reference line:

No significant difference was found between the left and right sides (Table 2 Fig 4) for after treatment while the differences was significant for the before treatment (P < 0.05) (table 3 fig 5). The difference was not significant between before and after treatment for both the left and right side (table 2 fig 4).

Discussion

Since the introduction of cephalometrics there was a major obstacle to the use of posterioanterior view due to location of anatomical landmarks[44]. In this study a specifically identified posterioanterior landmarks were used especially those located at the contour of the orbit, anterior cranial base superimposition on the orbit and the lesser and greater wings of sphenoid bone which interlace with the orbit[40]. The sphenoid bone displayed an exceptional degree of symmetry[44].

The symmetry displayed in the anterior cranial base suggests that this structure constitute reliable index to dentofacial orientation which will gives confidence that the result of study were due to the treatment by Hyrax rather than a shift in the midsagittal plane itself which depend on the anterior cranial base interlacing with the orbit in its construction.

The total sample of the present study was 29 patients which is more than the sample of Adkins et al[39] (21 patients), Asanza et al[40] (14 patients) in spite the present study sample was highly selected. The mean age of the sample was 9.8 years, which is in agreement of most authors who recommend the use of Hyrax during the mixed dentition period [31,40]. The range of time treatment was 16- 36 days

which is within the expansion time that achieved 4-8 weeks in children (in adult up to 5 months past age 19)[14].

The over correction planned to be 2-3 mm to over come the problem of relapse as once the appliance removed, the relapse tendency may increase despite 3 months of stabilization. The over correction of the transverse problem was widely recommended to allow for the subsequent uprighting of the teeth as discussed by Haas[21].

The author concentrated on the study of the transverse plane because the changes of transverse plane by Hyrax revealed higher values than in sagittal and vertical planes for the maxillary dental, maxillary basal and nasal cavity widths[17,19,20,37,38,39].

Clinically four teeth were banded for the retention of Hyrax which basically enough for parallelisms problems at insertion. Properly made appliance with four bands offer adequate support[15].

Table (2): Descriptive statistics and t- test for the differences in the mean between before and after treatments for both left and right sides.

	Measurements	Before treatment			95%Confidence inter of the difference in mean		t-test between before & after	After treatment		
		s.d	Stand. error Mean	Mean	Lower	Upper		Mean	Stand error Mean	s.d
Angular	L6-CRL	9.23	2.06	90.6	-9.818	2.718	1.185	94.1	2.98	13.34
	R6-CRL	6.53	1.46	95.2	-4.47	3.64	0.275	95.7	1.83	8.18
Linear (mm)	LNC-MSP	2.18	0.48	16.95	-2.667	-0.933	***4.346	18.75	0.51	2.31
	RNC-MSP	2.04	0.45	17.2	-1.666	-0.433	***3.566	18.25	0.38	1.74
	LJ-MSP	3.08	0.69	34.2	-3.034	-1.165	***4.702	36.3	0.62	2.81
	RJ- MSP	2.31	0.51	36	-0.633	1.133	0.592	35.75	0.51	2.29
	L6- MSP	2.76	0.61	34	-5.848	-3.451	***8.122	38.7	0.5	2.27
	R6- MSP	2.47	0.55	36.3	0.125	1.774	*2.412	37.3	0.5	2.25

s.d= standard deviation N= 29 * p<0.05 ** p<0.01 ***p<0.001
L= denote left. R= denote right.

Table (3): Descriptive statistics and t- test for the differences in the mean between the left and right side for both before and after treatment.

	Measurements	Left side			95%Confidence inter of the difference in mean		t-test between Left & Right sides	Right side		
		s.d	Stand. error Mean	Mean	lower	upper		Mean	Stand error Mean	s.d
Angular	B6-CRL	9.23	2.06	90.6	-0.37	9.57	*1.937	95.2	1.46	6.53
	A6-CRL	13.34	2.98	94.1	-5.816	9.016	0.452	95.7	1.83	8.18
Linear (mm)	BNC-MSP	2.18	0.48	16.95	-1.046	1.546	0.404	17.2	0.45	2.04
	ANC-MSP	2.31	0.51	18.75	-1.671	0.671	0.893	18.2	0.38	1.74
	BJ-MSP	3.08	0.69	34.2	0.125	3.474	*2.25	36	0.51	2.31
	AJ- MSP	2.81	0.62	36.3	-1.574	0.474	1.124	35.7	0.51	2.29
	B6- MSP	2.76	0.61	34	0.256	4.343	*2.356	36.35	0.55	2.47
	A6- MSP	2.27	0.5	38.7	-2.811	1.102	*2.07	37.3	0.5	2.25

s.d= standard deviation N= 29 * p<0.05 ** p<0.01 ***p<0.001
B= denote before. A= denote after
Note: sample mean age 9.8 years, active treatment 16-36 days.

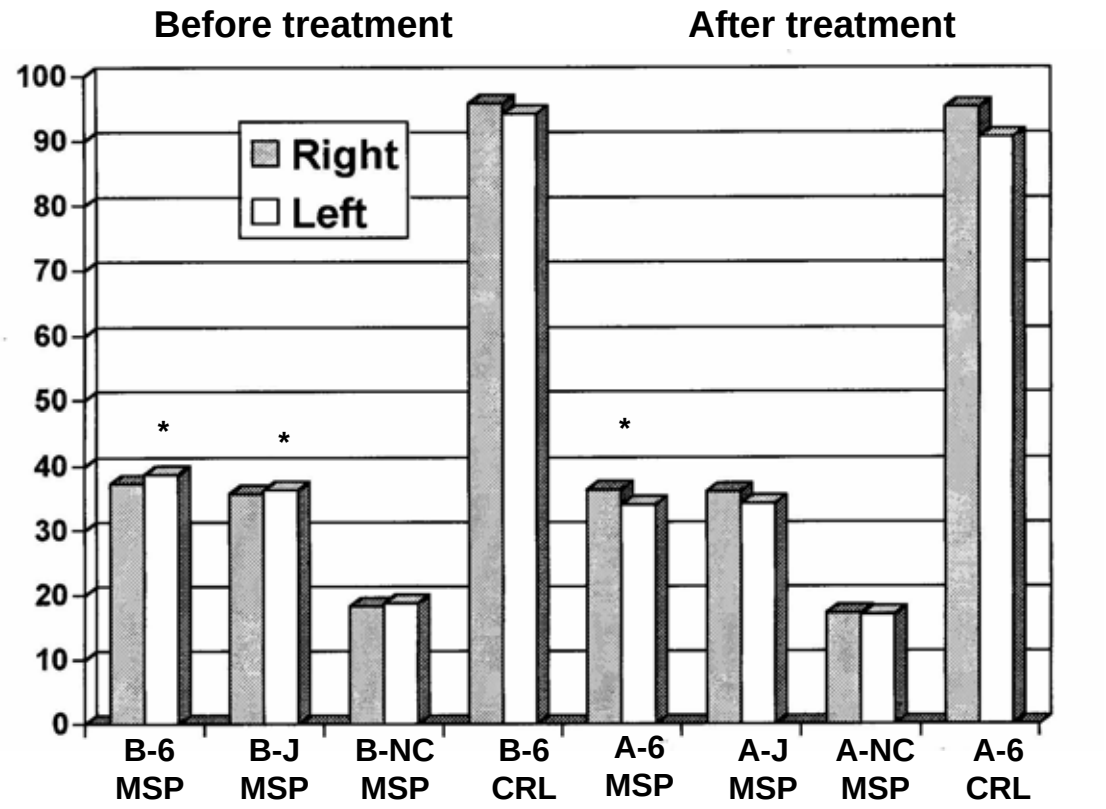

Fig (4) Bar chart for the before and after treatment measurements for left and right side

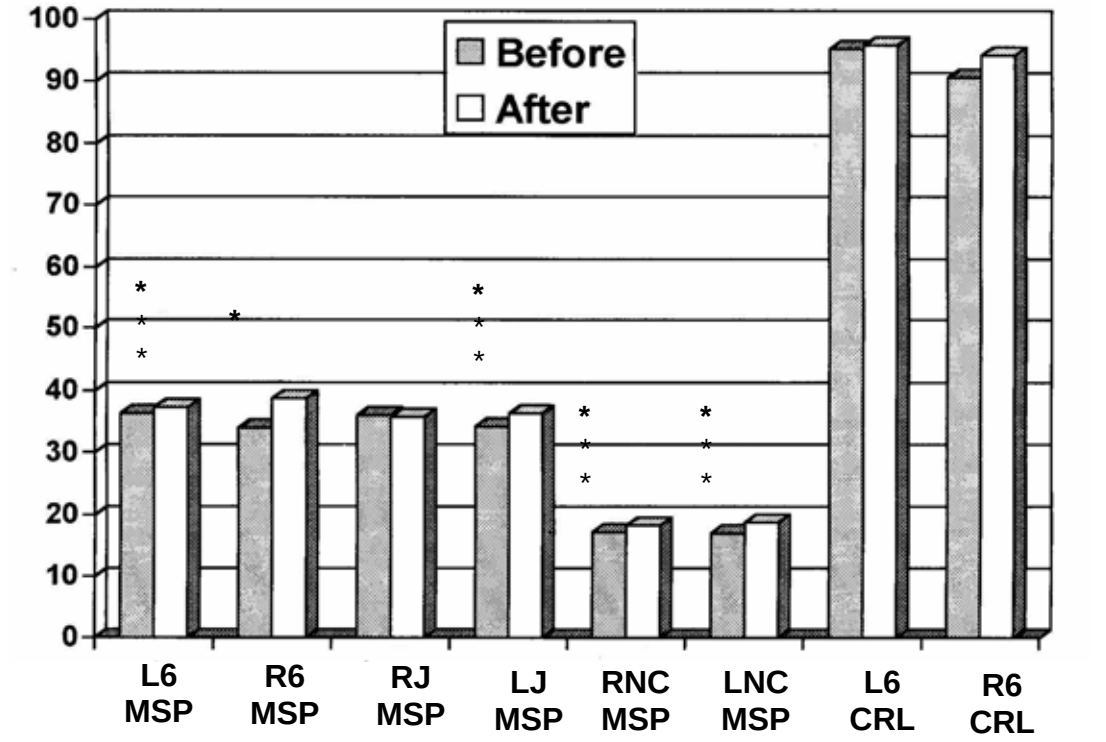

Fig (5) Bar chart for the left and right side measurements for both before and after treatment

1- Upper 1st permanent molar to midsagittal plane (6-MSP):-

This distance was originally smaller before treatment in the left side (34mm) and larger for the right side (36.3mm) and significant in mean difference which indicate the original construction of maxilla was on the left side since the sample selection were only left side crossbite. This will exclude the probability of size discrepancy crossbite of small maxilla and large mandible. The increase in this distance at the left side from 34mm before treatment to 38.7mm after treatment gives 4.7mm increase on this side within a short time of treatment (16-36 days). Such increase is not merely a tooth movement as the normal rate of teeth movement is I mm per month but it's surely due to either the opening of the suture or due to the bending effect of Hyrax appliance on the dentoalveolar structures. In addition to this bending or (flexion[32]) of the alveolar process, a pressure tension change within the periodontal ligament[14] share in the increase of this dimension. The expansion by Hyrax occur when its applied forces on the maxillary alveolar process more than the limits of the Orthodontic teeth movement which will produce opening of the suture and bending the alveolar process due to the resiliency of alveolar process which occurs earlier than mid palatal suture opening[32].

2- Jugular point to midsagittal plane (J-Msp):

This distance was less in measurement for the left side (crossbite side) and larger for the right side before treatment and this difference is statistically significant ($P<0.05$). The left side was increased from 34.2mm before treatment to 36.3mm after treatment (i.e 2.1 mm). This increase in width for the base of the maxilla approximately half that of dental increase (4.7mm) as discussed previously. This is in agreement with krebs[38] who found the gain in width of dental arch was about twice that of the basal maxillary segment. The increase in maxillary basal width for the left side before and after treatment mean difference was highly significant ($P<0.001$) but the right side mean difference was not significant because of surprising result that this dimension decreased after treatment instead of increasing (36mm before and 35.7mm after treatment with 0.3mm difference). This phenomenon attributed to variation in the rigidity of skeletal articulations between maxillary segments and other skull bones.

Additionally, the forces delivered by Hyrax activation (which could reach up to 4 kg) exceeds the sutural resistance limit and splits not only the intermaxillary suture but also all the other maxillary sutures and through this sutural splitting and the variation of articulation, the maxilla incited to displace itself downwards and forwards with a rotation in the maxillary components in both horizontal and frontal planes[6,21]. This relation could be responsible about the significant increase of the 6-MSP distance before and after treatment and about the insignificant difference at the right basal part. Its fair to said that the maxillary basal part of the non-crossbite side was not gain any increase but its alveolar part clearly gain increase in width: a judgment of alveolar bone bending and right maxilla rotation.

3- Nasal cavity width (NC-MSP):

The nasal cavity width particularly at the floor of the nose adjacent to midpalatal suture increase in width immediately following the expansion by Hyrax[6,9,33,21]. In this study the left side increases 1.8 mm while its only 1 mm for the right side. The 1.8 mm increase in width is close to that found by Gray[35] who said "the nasal cavity width gain average 1.9mm but can widen as much as 8-10 mm". The increase in width of the nose will certainly increase the nasal capacities since the air flow will proportional to fourth power of its tube[31] in other word the increase of 1.8mm will over $(1.8mm)^4$ = 10.49mm increase in nasal capacity which will aid in the general health of crossbite patient due to the increase oxygen supply to the muscles. As the maxillae separate, the outer walls of the nasal cavity move lateraly but the higher increase in width will be at the nasal floor at the level of inferior turbinate, (while the more superior areas might move medially[36]). It can be said that if the nasal problem situated at the base of the nose, the patient will posses an advantages from the expansion. From this width and the

previously mentioned variables, the left side always increases more than the right side which reflect the an asymmetrical expansion of the two maxillary halves. The asymmetrical expansions of the maxillae were reported on animals[41] and human[42] but of the (tipping type). The asymmetrical expansion will neglect the efficiency of the zygomatic arch as the main buttress against the Hyrax forces. The maxillae articulate with 10 bones of the face and cranium but the sphenoid bone form the midsagittal part of cranial base and lies posterior to the maxillae and since the expansion reach to the base of skull, its possible for the sphenoid bone to act as the main buttress against the expansion forces leaving the maxillary halves to move in non equal behavior. This phenomenon could be attributed to the banded Hyrax used in this study because Asanza et al[40] reported that the use of bonded Hyrax produce mostly symmetrical expansion of the maxillae. In this study inspite of differential anchorage used in Hyrax but the left and right sides of the maxilla and nasal cavity are expanded but in asymmetrical pattern that make the asymmetrical expansion as a rule rather than exception.

4- Inclination of 1st permanent molar to cranial reference line (6- CRL):

The total increase of this measurement on the left side was 4.5° while on the right side there was only 0.5° and the difference in the mean due to treatment was insignificant. The standard deviation was high in comparison with other measurements studied and its more variable on the left side. The wide variation of angular change from one side to other was previously reported by Asanza et al[40]. Again the change due to treatment also asymmetrical with the left side posses a higher change which come in a accordance with Hicks[10] findings. It seems to be the maxillary molars demonstrated buccal molar movement due to expansion that was highly variable. In other word, some patient's teeth demonstrate little or no movement, while others had great amount of movement. However the amount of molar movement in this study was little from that of Adkins et al[39] who described it as (molar tipping) with a value up or more than 15°. Dental tipping by the effect of expansion reported by wertz[6], Brossman et al[41] which was mostly due to outward tilting of the alveolar process as suggested by wertz[6]. Other reserchers[10,43] explain this tipping due to initial alveolar bending and compression of p.od. Ligament which produce a change in the long axis of the posterior teeth i.e tipping of the teeth in alveolar bone.

In this study the amount of tipping is little indicating that the teeth move bodily with the movement of the alveolar bone and the amount of little tipping (4.5°) considered as indicative number for the bending of the alveolar bone that carries the posterior teeth rather than a real tipping of the molar inside the alveolar bone. This seems more logical because the Hyrax were fitted exactly to the molars on the patient working model and then soldered to the bands so that there is no chance for the molars to tip since there is no play between the Hyrax & the bands and there is no possibilities of Hyrax bending since it's a very rigid appliance.

The alveolar bone bending try to relapse by the "rebound"[32] effect of any residual forces in the displaced tissue that produces stretched fibers at the attached palatal mucosa[34,43]. The relapse of dental and skeletal segments after Hyrax treatment mainly due to the accumulated forces in the circummaxillary articulations, occlusal forces and buccal musculature[43]. This will requisite the over correction of the constructed dental arches to compensate for the subsequent uprighting of buccal segment[6,33] in addition to 3 months retention of passive Hyrax as a pre-retentive procedure.

Conclusion:

1- The faster palatal widening, the less molar tipping.
2-Asymmetrical expansion by banded Hyrax for the maxillae is a rule rather than exception.
3- Expansion magnitude is greater on the crossbite side of the dento- alveolar, unilateral, non functional posterior crossbite.
4- The increase in molar distance (dentoalveolar effect) of the crossbite

side is about twice that of maxillary bone (orthopedic effect).

5- Nasal cavities width increases at the level of inferior turbinate that was greater at the crossbite side which is about twice of the right side.

6- The banded molars try to move with the alveolar bone movement rather than tipping inside the bone itself and the amount of molar tipping is the amount of alveolar bending in rapid expansion.

Suggestion:

To study the effect of Hyrax expansion on bilateral dentoalveolar, functional crossbite by the use of reciprocal anchorage.

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Facial Differences between Iraqi and European Children

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Abstract

Cephalometric comparison of Iraqi and European children with good occlusions finds a more horizontal mandible and more protrusive incisors in the Iraqi sample.

Introduction

Cephalometric norms are an important aid in orthodontic diagnosis, as has been extensively recognized in the literature since the early works of Broadbent (1931). The strict value of norms and standards in the clinical analysis of individuals has been questioned, but the utilization of ethnic norms is widely accepted. Main factors in the selection of appropriate norms are age, sex and ethnic group.

It is obvious that to apply the same norms to people of different genetic origins can be misleading, and it is important to have adequate data on each ethnic group as a starting point in any study of interracial differences. Our interest in collecting data for the study and analysis of morphological characteristics of our own population is justified by the fact that there are few studies on adolescents and young adults in Iraq.

Cephalometric radiograph is widely used in orthodontic analysis, and many population groups have been studied by means of various cephalometric methods, such as those of Downs, Tweed, Bjork, Steiner and Ricketts. Cotton et al. (1951) applied the Downs analysis to Black, Japanese and Chinese children residing in the United States, showing that the mean values of each group differed significantly and cannot readily be applied to other groups.

North American Blacks have been analyzed by Altemus (1960), Fonseca (1978) and others. Savage (1963) studied the facial pattern of Bauti children in Tanganyika, and British Caucasians have been studied by Iver and Lutz (1966).

Bjork's cephalometric method has been used by different authors on several populations. Kayukawa (1957) combined the systems of Bjork and Downs in a study of Japanese adolescents. A similar method was used by Craven (1958) in the study of the morphology of Australian aborigines, and other Australian groups were studied by Barrett et al. (1963).

On the Scandinavian population, Lysell and Filipsson (1958) studied medieval skulls in Sweden. Humerfelt (1970) applied Bjork's method to Norwegian children with normal occlusions. Recently, Thilander (1982) compared the most popular cephalometric methods in Scandinavia and applied Bjork's system to a group or 10yr-old Swedish children.

A large number of norms for different races are available in the literature. In Spain, ideal occlusion groups have been studied by Costa (1972) and M. Miana (1981), using the cephalometric systems of Steiner and Ricketts.

We considered it appropriate to apply Bjork's method to compare the morphology of our own population with the Scandinavian, in an attempt to determine facial pattern differences between Iraqi and Scandinavian children.

The purposes of the present study were to :–

1. Identify a group of Iraqi children with clinically excellent occlusion in young permanent dentition,

2. Describe craniofacial characteristics of the sample,
3. Compare, if possible, some of the data with Europeans, and
4. Propose cephalometric values which can be used for comparison of cases with the same ethnic origin.

Material and Methods

A group of 800 children of both sexes from two schools in Baghdad were examined. Of these, 40 were selected on the basis of excellent occlusion in the young permanent dentition. This represents 5 % of the total, which is quite close to the percentage found in the "Nittedal" material (Platou and Zachrisson), where 30 (5.3%) of 568 children were chosen for their clinically excellent occlusion.

Ages in the selected sample range from 12 to 18 years, with a mean decimal age of 15.2±1.3yrs; 20 were female and 20male.

In addition to the occlusal normality, the selection criteria included the balance of the facial profile, which met the following conditions:

1. Lips both functionally and morphologically competent,
2. Centric occlusion labial sealing showing no effort or muscular contraction,
3. Labial protrusion or retrusion within esthetically acceptable limits.

This was subjectively determined by two observers who independently selected the sample, with concurrence of their judgments required for a case to be accepted.

Dental occlusion criteria included:

1. Every tooth anterior to the first permanent molar fully erupted,
2. Bilateral Class I occlusal relationship both at first molars and cuspids,
3. No crossbite of the posterior teeth,
4. Incisal edges of the lower incisors occluding incisally to the cingulum of the maxillary incisors.
5. Negligible rotations or spacing (less than 1.5mm).

None of the children had previous orthodontic treatment, and the group may be considered representative of present-day social middle class in Baghdad.

Dental casts from alginate impressions and lateral cephalographs were made of each subject. Radiographs were exposed in centric occlusion with the lips in relaxed contact. The cephalographs presented a magnification calculated at about 6%.

All radiographs were traced on acetate film. A series of reference points were selected by inspection in accordance with definitions of Bjork (1947) and Krogman and Sassouni (1957) (Fig. 1).

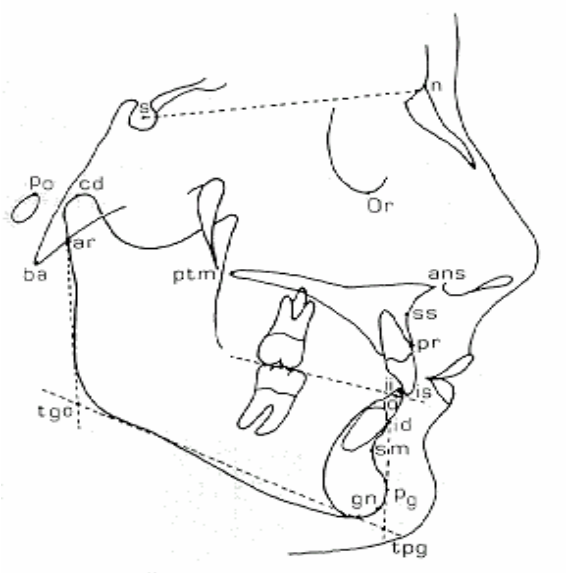

Fig. 1: Reference points used for measurement (after Bjork (1947) and Krogman and Sassouni (1957)

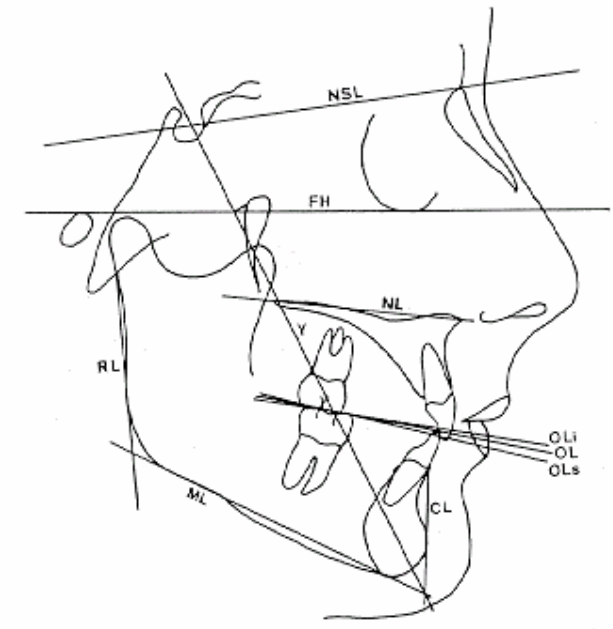

Fig. 2: Planes used in this study (after Bjork (1947) and Humerfelt (1970).

The landmarks were marked with a sharp pencil by one investigator and then checked by the other. In case of question, the final position was chosen by mutual agreement.

Planes and angles were then drawn according to Bjork (1947) and Humerfelt (1970) (Fig. 2). Measurements were made on the tracing with a ruler and protractor calibrated in increments of 0.5mm and 0.5 degrees. All measurements were repeated later to avoid reading errors.

Results and Discussion

Pertinent findings are summarized in Table 1. In studying the results and comparing them with similar works from Scandinavia, it is necessary to point out the differences in age. Our sample consisted of adolescents from 12 to 18 years (mean 15.6yr, S.D. 1.3yr), whereas the comparison groups were mostly in the 10–12yr range (Humerfelt, Thilander et.).

Because of this chronological difference and possible differences in the maturation level of children from Iraqi and European groups, no attempt has been made to test the statistical significance of the differences.

This consideration should be kept in mind when observing the differences among the values of the facial angle (S-N-Pg), which is 81.63±35° in the Iraqi sample, 79.5±3.0° for the Oslo group, 81.53 ±3.43 for the Spanish group and 79.6±3.0° for the Swedish children.

Similar findings are observed in the facial convexity angle (N-ss-Pg), where the Iraqi group presents a flatter profile than the Europeans (Fig. 3).

A noticeable mean difference is found in the mandibular plane angle NSL/ML, which is 27±5° in the Iraqi group and 33±4° in the Norwegian group. This value is not considered to be dependent on sex or age, and in these samples it shows a tendency toward a more brachiocephalic pattern in the Iraqi group.

The same tendency appears in the gonial angle (ML/RL), which averaged 117.81±6.5° in the Iraqi group versus 126±4° in the Norwegians and slightly less in the Swedish and Spanish sample. Here again, there is a tendency toward a more square mandible typical of the brachiocephalic pattern in the Iraqi group.

The interincisal angle measured 128.9±6.4° in the Iraqi sample, slightly less than for the European children. This suggests a tendency toward more anterior dental protrusion in the Iraqi group in spite of the higher age range.

Summary and Conclusions

Comparison of 40 individuals selected from 800 Iraqi school children on the basis of good occlusion and facial balance with previous studies of European children leads to the following findings and conclusions:

1. Ideal occlusions were 5. % of the total number of children examined.
2. The Iraqi children present a more horizontal and prognathic pattern, with a more square mandible.
3. The interincisal angle is slightly less in the Iraqi sample, indicating a tendency toward coronal biprotrusion.

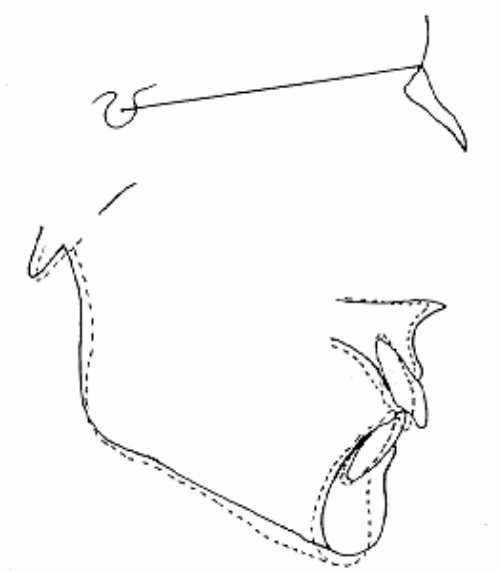

Fig. 3 Illustration based on mean figures, showing the most notable differences between European (dashed lines) and Iraqi (solid lines) samples.

Table 1: Comparison of Relevant Measurements in Spanish, Norwegian, Swedish and Iraqi Children

Measurement	Norwegian (Humerfelt)	Swedish (Thilander et al.)	Spanish (canut et al.)	Iraqi
Facial Angle	79.48 ± 3	79.59 ± 3	81.53 ± 3.43	81.63 ± 3.5
(S-N-Ph) Facial Convexity	174.14 ± 4.4	174.14 ± 4.35	178.54 ± 5.00	179.43 ± 5.00
(N-SS-Pg) Mandibular Plane	32.72 ± 4.32	31.42 ± 4.9	28.02 ± 4.97	27.00 ± 5.00
(NSL/Ml) Gonial Angle	125.81 ± 4.4	125.29 ± 5.2	118.12 ± 6.55	117.81 ± 6.5
(ML/RL) Interincisal Angle	131.17 ± 6.14	131.67 ± 7.6	129.98 ± 7.32	128.91 ± 6.4

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The Prevalence of Crossbite of Young Adult Yemenis

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Abstract

The prevalence of the anterior and posterior crossbite were recorded in a sample of 192 young adult Yemenis in Yemen, their mean age was (20.9 years) and had either normal occlusion or malocclusion, generally, the prevalence of all recorded types of crossbite were higher in females than in males however their differences were statistically not significant, the anterior crossbite was found to be (9.4%), while the posterior crossbite was found to be (5.7%) in which (3.6%) of it was of unilateral type and (2.1%) was of bilateral type, in addition to that, the prevalence of the crossbite was the highest in class lll Angle's classification and the lowest in class ll Angle's classification.

Introduction

Cross bite can be defined as an abnormal relationship of one or more teeth to one or more teeth of the opposing arch, in the buccolingual direction or labiolingual direction. Crossbite can be dental or skeletal in origin. (The appropriate type of crossbite can be specified by identifying the teeth or jaws that deviate the most from their ideal position, e.g. when a crossbite is mainly due to a narrow maxillary arch, the correct term is "maxillary posterior lingual crossbite" as opposed to "mandibular posterior buccal crossbite"), (Daskalogiann-akis, 2000).Crossbite can be divided in to:-

1-Anterior crossbite: Salzmann (1968) defined this abnormality as the lingual placement of the maxillary incisors to their opposing mandibular, when both arches are in centric occlusion, on the other hand, instanding or inverted incisors usually refers to the involvement of one, two or three incisors (Bjok et al., 1964; Baume et al., 1973).

2-Posterior crossbite: Foster (1975) defined posterior crossbite of teeth as the occlusion of buccal cusps of the lower teeth outside the arch of the upper teeth, may be:- **bilateral** (in which the mandibular path of closure from rest to occlusion usually occurs without lateral deviation and it is an acceptable and symmetrical condition) or **unilateral** (in which a central path of the mandible would bring the buccal teeth into cusp –cusp occlusal contact, and there is usually a translocated path of closure into unilateral crossbite), however both types are associated with CL lll skeletal relationship.

Bishara (2001) mentioned that posterior crossbite in the centric occlusion may have skeletal and dental components and clinically may present as unilateral or bilateral crossbite involving single or multiple teeth in the functioning occlusal position this may be associated with a mandibular shift from centric relation to centric occlusion.

3-Functional crossbite (pseudo-cross-bite): A crossbite that is due to a shift of the mandible (I.e. forced bite) in to a faulty habitual occlusion because premature occlusal interference in centric relation, the shift may occur in anterior and/ or in a lateral direction, such crossbites often seen in children, typically because of interferences caused by lack of wear of their deciduous canines. (Daskalogiannakis, 2000).

Etiology of anterior crossbite

Rani (1995) considered the possible causes for the anterior crossbite as the following:-

1-Retained deciduous tooth.
2-Trauma.
3-Arch length discrepancy.
4-Occlusal prematurities lead to forward path of closure of mandible.

5-Collaps of maxillary anterior arch leads to functional displacement.
6-Asymmetric growth of maxilla and mandible.

Etiology of posterior crossbite

1-Discrepancy between the sizes of the dental arches or basal bones (narrower upper or/and wider lower) specially seen in:-
   A- CL lll (Foster, 1975).
   B- Thumb sucking. (Thompson, 1950; Foster, 1975 and Rani, 1995)
   C- Mouth breathing (Foster, 1975 and Rani, 1995)
   D- Asymmteric growth of maxilla and mandible (Rani, 1995).
2-Instanding incisor especially in unilateral crossbite. (Foster, 1975)
3-Space deficiency (Wood, 1962 and Rani, 1995), Premature loss of primary teeth followed by a closure of space may cause the permanent successor to erupt in crossbite in relation to opposing teeth.
4-Cleft palate (Gainsforth, 1950 and profit and Field, 1993). Constriction of upper dental arch occurs mostly in case of cleft palate which leads to crossbite.
5-Prolonged retention of primary teeth which cause the permanent successor to erupt lingually to its proper position in the arch. (Wood, 1962)

However, little information was present about the prevalence of crossbite in Yemen, so the aim of this study is to provide a base data information about the crossbite in Yemen and the analysis of the data obtained.

Materials and Methods

192 subjects were selected randomly from the students of Colleges of Dentistry of Thamar and Sana`a universities in Yemen and their out patients, it included (74 females and 118 males), each one of them had the following criteria:

1-Yemeni young adults.
2-Age range from (14-27 years).
3-No previous orthodontic treatment.
4-Normal occlusion (73 subjects) or malocclusion (119subjects having either CL l; CL ll div.1; CL ll div.2 or CL lll Angle's classification derived by Angle (1899).

Clinical examination was done for each subject by objective registration of anterior and posterior crossbite using dental mirror and visual examination, according to the following criteria:-

Criteria of the crossbite:-

1-Anterior crossbite:-

One or more primary or permanent mandibular incisors are labial to their antagonists (or one or more maxillary incisors are lingual to their antagonists) in habitual occlusion. (Daskalogiannakis, 2000), It is important to mention that the anterior crossbite is recorded in this study when it confined to three incisors or less.

2-Posterior crossbite:-

A buccal cusp of a mandibular tooth lies buccal to the maximum height of a buccal cusp of an opposing maxillary tooth (Baume et.al.,1973) and according to foster(1974) it may be unilateral (affects one side) or bilateral (affects both sides).

Statistical analysis

The collected data was grouped and placed in tables and the following statistical analyses are done:-

1-Descreptive analysis to obtain means and stander deviations for the age of the sample.
2-Calculation of frequencies for non-parametric variables.
3-Cross-tabulation of the variables with the classes of Angle's classifications of malocclusion.
4-Chi-square statistical analysis to compare the non-parametric variables of both sexes and of different classes of malocclusions.

Results

The estimation of prevalence of anterior and posterior crossbite were done by direct registration using visual examination of 192 young adult Yemenis (118 males and 74 females), their average age was (20.9 years), 73 subjects of the sample had normal occlusion while the rest had different types of malocclusion, then statistical analysis of obtained data was done and the following results were found:-

Anterior crossbite:-

Table (1) shows that, (9.4%) of whole sample had anterior crossbite, and although the distribution was slightly higher in females (9.5%) than in males (9.3%), the

difference was statistically not significant (x^2=0.050, d.f =1, p>0.05), on the other hand, table (2) shows a significant higher distribution of anterior crossbite (x^2=8.842, d.f=3, p <0.05) in class lll malocclusion (0.22%) and in class l malocclusion (0.21%) than class ll malocclusion.

Posterior crossbite:-

Table (1) shows that, regarding the unilateral posterior crossbite, (3.6%) of whole sample had unilateral posterior crossbite, although the prevalence of this malocclusion in males (2.5%) was less than in females (5.4%), the difference between them was statistically not significant (x^2=0.042, d.f=1, p>0.05), while regarding the bilateral posterior crossbite, (2.1%) of the whole sample had this malocclusion and even the prevalence was higher in females (2.7%) than in males (1.7%), the difference between them was statistically insignificant (x^2=0.00, d.f=1, p>0.05),on the other hand, related to the posterior crossbite in general (unilateral + bilateral), it was found to form (5.7%) of whole sample with a higher prevalence in females (8.1%) than in males (4.2%), although the difference between them was statistically insignificant (x^2=0.647, d.f=1, p>0.05), in addition to that, table (2) shows that the distribution of the posterior crossbite was higher in class lll malocclusion (0.22%) then in class l malocclusion (0.13%) than in class ll malocclusion, although the differences among them were statistically not significant (x^2=6.051, d.f=3, p>0.05).

Table (1):-Distribution of the crossbite in Yemen for both sexes.

Gender	Sample No.	Age		Ant. C. b.		Unilateral Post. c.b.		Bilateral Post. c.b.		Unilat.+Bilat. Post. c.b.	
		Mean	St. De	No.	%	No.	%	No.	%	No.	%
Male	118	21.0	1.9	11	9.3	3	2.5	2	1.7	5	4.2
Female	74	20.7	1.7	7	9.5	4	5.4	2	2.7	6	8.1
Both	192	20.9	1.8	18	9.4	7	3.6	4	2.1	11	5.7

Table(2):-Distribution of the crossbite according to Angle's classification

Malocclusion	Ant.C.B.			Post.C.B.		
	Yes	No	Total	Yes	No	Total
CL. l	16 (0.21%)	59	75	9 (0.13%)	66	75
CL. ll div.1	0 (0%)	30	30	0 (0%)	30	30
CL. ll div.2	0 (0%)	5	5	0 (0%)	5	5
CL.lll	2 (0.22%)	7	9	2 (0.22%)	7	9
Total	18 (0.15%)	101	119	11 (0.09%)	108	119

Discussion

It is important to mention that there were no previous studies that dealt with crossbite in Yemen except that of Al-Dailami (2000) who studied this malocclusion in a sample of (10-15 years) age which is different from the age of the present study which was (14-27 years), however the idea of selection of this age group was to decrease the variation among the subjects of the sample, since the eruption of the permanent teeth is usually completed at this age (except third molars).

In general table (1) showed that all types of crossbite including anterior and posterior (unilateral and bilateral) were higher in females than males this may indicates that the etiological factors of crossbite are acting more strongly in females group.

Anterior crossbite was found to be 9.4% which is considerably higher than the findings of Kinaan (1986); Office of Population Censuses and Surveys (1994); Batayina (1997); Al-Dailami (2000) and Al-Huwaizi (2002) but lower than that of Farah (1988), and close to the finding of Al-Mulla & Al-Bashir (1989) as seen in table 3, on

the other hand posterior crossbite was found in 5.7% of the sample which is considerably lower than the findings of Ingervall et al.(1976); Al-Mulla and Al-Bashir (1989); Proffit and Fields (1993) of Blacks; Abdulla (1996) and Batayina (1997), but higher than the findings of Al-Alousi et al.(1982) and Hill (1992), and close to the findings of Proffit &Fields (1993) of Whites; Al-Dailami (2000) and Al-Huwaizi (2002) as seen in table 4, these differences may be due to difference in the age or the race of the sample or the criteria of the crossbite itself in the mentioned studies.

Regarding the distribution of the crossbite according to Angle's classification of malocclusion, it is obvious that the anterior crossbite was highly distributed in class lll Angle's classification (molar relation) while it was not found in class ll Angle's classification (table 2), this comes to be accepted universally since in class lll molar relation the lower dentition tends to be more forward in relation to upper dentition than in class l Angle's classification while in class ll Angle's classification the opposite usually occurs, on the other hand, the distribution of the posterior crossbite was the highest in class lll Angle's classification, which comes to be in agreement with Batayina (1997) and Al-Dailami (2000) and partially coincide with the finding of Foster (1975) but in class lll skeletal relation.

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Table 3:- Comparison between the prevalence of the anterior crossbite of the present study and other previous studies.

Author	Sample		Anterior crossbite
	Country	Age(y)	
Present study (2003)	Yemen	14-27	9.4%
Kinaan (1986)	Iraq England	11-12	4.3% 8%
Farah (1988)	Iraq	9-10	10.9%
Al-Mulla & Al-Bashir (1989)	Iraq	15-20	8.2%
Office of Population Censuses and Surveys (1994)	Britain	12	8%
Batayina (1997)	Jordan	17	4.5%
Al-Dailami (2000)	Yemen	13-15	4.5%
Al-Huwaizi (2002)	Iraq	13	4.4%

Table 4:- Comparison between the prevalence of posterior crossbite of the present study and other previous studies.

Author	Sample		Posterior Crossbite
	Country	Age(y)	
Present study (2003)	Yemen	14-27	5.7%(M=4.2%,F=8.1%) Unilat.=3.6%; Bilat.=2.1%
Helm (1968)	Denmark	9-18	(M)=9.4%,(F)=1.4%
Lavelle (1976)	Britain	15-20	(M)=3.6%,(F)= 20.4%
Ingervall et al. (1978)	Sweden	21-54	Unilat.=13.7%; Bilat.=5.3%
Al-Alousi et al. (1982)	Iraq	16-24	3.6%
Al- Mulla &Al-Bashir (1989)	Iraq	15-20	10.4%
Hill (1992)	Scotland	15	4.6%
Proffit & Fields (1993)	USA	12-17	White=5.9%, Black=8%
Abdulla (1996)	Iraq	13-17	9% Unilat.=7%; Bilat.=2%
Batayina (1997)	Jordan	17	Unilat.=6.5%; Bilat.=2.5%
Al-Dailami (2000)	Yemen	10-15	7.1% Unilat.=6.1%; Bilat.=1.0%
Al-Huwaizi (2002)	Iraq	13	6.1% unilat.=4.9%; Bilat.=1.2%

The Prolonged Demineralizing Effect of Acetic Acid in Root Canal Irrigation

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Abstract

The aim of the study was to evaluate the prolonged demineralizing effect of the residual 2% acetic acid left in the root canal after root canal irrigation. After incubation for 3 and 7 days, the teeth treated with 2% acetic acid were analysed for change of surface pH, and under SEM for further smear layer removal.

The results revealed that although two percent acetic acid possesses a demineralizing action that opens the dentinal orifices in the coronal and middle thirds of the inner wall of the root canal, and partial demineralization in the apical third, it doesn't have any further delayed demineralizing action after 3 and 7 days. In conclusion two percent acetic acid does not have prolonged demineralizing action.

Introduction

In endodontics, there is a controversy regarding the necessity of the removal of the smear layer. **Brannstrom in 1984** stated that if the smear layer contains bacteria, then it might provide a continuous reservoir of potential irritants to the periapical tissues. On the other hand, it was shown that the smear layer tends to occlude the orifices of the dentinal tubules thereby reducing the possibility of further penetration of dentin by irritant chemicals or bacteria **(Pashley et al., 1981)**, but at the same time it delays the diffusion of the intracanal medicament to the dentin **(Orstavik and Haapasalo, 1990).**

Two percent acetic acid possesses a demineralizing action that can remove the smear layer on the inner wall of the root canal and opens the dentinal orifices **(Alhuwaizi et al, 2000)**. This procedure is important because the irrigant is allowed to flush the debris in the dentinal tubules and as 2% acetic acid has an antibacterial action **(Alhuwaizi et al, 2002)** hence it can eradicate the bacteria dormant in the blocked dentinal tubules.

The purpose for this study is to assess the effect of the residual acetic acid left after irrigating and drying the root canal on further demineralization of the internal root canal walls during inter appointment visits.

Materials and Methods

Thirty extracted human teeth were used in this study. An access opening was made to each tooth and the root canal was instrumented by the step back technique with copious irrigation between each instrument by normal saline which was delivered by a hypodermic syringe. Another hypodermic syringe containing 2% acetic acid was used to flood the root canal with this irrigant. The acetic acid was left for 1 minute in the root canal, then it was washed with normal saline, and dried with paper points. The teeth were grouped to:-
Group I: Ten teeth tested immediately after

drying.

Group II: Ten teeth dried without washing with normal saline, and incubated for 3 days.

Group III: Ten teeth dried without washing with normal saline, and incubated for 7 days.

The teeth of groups II and III were placed in a beaker that was placed in a larger beaker containing normal saline. The two beakers were placed in an incubator at 37˚C for 3 and 7 days to keep the temperature and humidity conditions simulating the oral cavity.

1- Examining the change of pH

After the incubation period, the teeth were placed in a beaker containing 5 ml normal saline of pH = 7. The contents of the beaker were agitated, left for 1 hour, and tested for the change of the pH of the normal saline. The teeth of group I were tested for the change of pH before they were washed with normal saline and dried.

2- Examining under SEM

After incubation, the root canal of each tooth of all the groups were washed with normal saline and dried with paper points,

The crowns of the teeth were sectioned and discarded, and the roots were sectioned longitudinally. The root halves were placed in different concentrations of alcohol gradating from 10% to 100%, to remove residual water in the specimens to facilitate the examination under SEM.

The specimens were coated by a thin layer of pure gold (400A^{o}). The wall of the root canal of each specimen were examined under SEM at a magnification of $\times$ 2000. The size of the dentinal tubules' orifices of the three groups was measured in the coronal, middle, and apical thirds. A comparison was done between the groups to assess if acetic acid has a prolonged demineralizing action on the inner wall of the root canal.

Results

The results are displayed in table and figure1. The results of incubating the specimens irrigated with 2% acetic acid without washing the specimens did not have any effect on the size of the dentinal tubule's orifices. After incubating the specimens for 3 days (Group II), the size of the orifices was 2.53μm, 1.98μm, and 1.5μm for the coronal, middle, and apical thirds respectively (Figure 3). After incubating the specimens for 7 days (Group III), the size of the orifices was 2.37μm, 1.95μm, and 1.5μm for the coronal, middle, and apical thirds respectively (Figure 4). These results are very comparable with the size of the orifices after irrigation with 2% acetic acid and drying immediately (Group I) which were 2.45μm, 2.23μm, and 1.417μm for the coronal, middle, and apical thirds respectively (Figure 2).

There was no statistical significance between and within the groups for all the thirds of the root canals, using ANOVA as can be seen in table 2.

The pH of the normal saline with the teeth specimens that were irrigated with 2% acetic acid and incubated for 3 and 7 days did not change the pH of the normal saline and kept the medium at a pH of 7. This is seen in table 3.

Discussion

It is evident that the size of the dentinal orifices were wider in the coronal or middle thirds than the apical third regardless of the length of the incubation period. This result complies with the results of **Vansen et al., (1990)** who found that the apical third always has more debris than any other area in the root canal after instrumentation.

The teeth irrigated with 2% acetic acid did not undergo further demineralization and no change of the pH in the root canal was noticed after 3 and 7 days. It is possible that remnants of the acetic acid that stayed in the root canal were in small amounts that can not induce further demineralizing action.

Conclusion

There was no prolonged demineralizing action on the dentin of the root canals treated by 2% acetic acid.

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Table 1: The mean and standard deviation of the size of the dentinal tubules' orifices after the treating the root canal's with 2% Acetic Acid and incubating for different time intervals

Medicament	Coronal third	Middle third	Apical third	Medicament
Acetic acid 2%	**Mean**	2.450	2.233	1.417
	S.D.	0.345	0.294	0.194
Acetic acid 2% after 3 days	**Mean**	2.533	1.983	1.500
	S.D.	0.234	0.240	0.310
Acetic acid 2% after 7 days	**Mean**	2.367	1.950	1.500
	S.D.	0.207	0.176	0.228

Table 2: ANOVA between the different groups for the three locations in the root canals.

Location	ANOVA	Sum of Squares	df	Mean Square	F	Sig.
Coronal third	**Between Groups**	0.083	2	0.042	0.578	NS
	Within Groups	1.082	15	0.072		
	Total	1.165	17			
Middle third	**Between Groups**	0.288	2	0.144	2.462	NS
	Within Groups	0.877	15	0.058		
	Total	1.164	17			
Apical third	**Between Groups**	0.028	2	0.014	0.224	NS
	Within Groups	0.928	15	0.062		
	Total	0.956	17			

Table 3: The effect of residual acetic acid in the root canals that were incubated on the pH of normal saline.

Incubation time	PH
Immediate (no incubation)	7
3 days	7
7 days	7

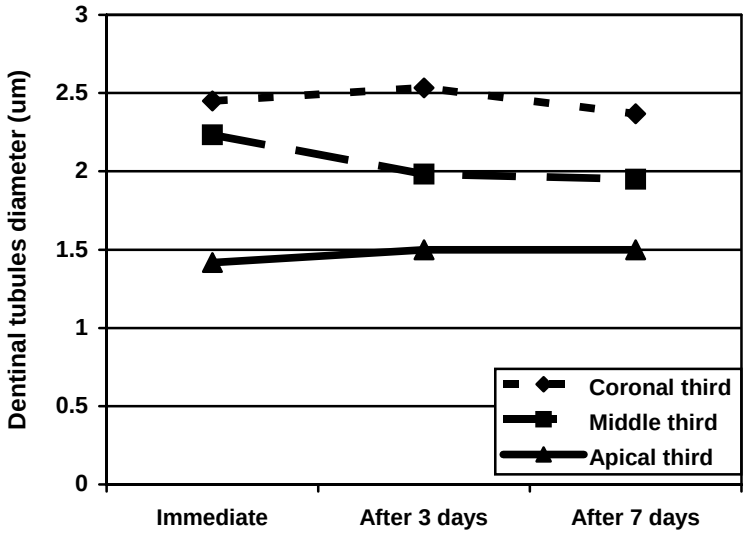
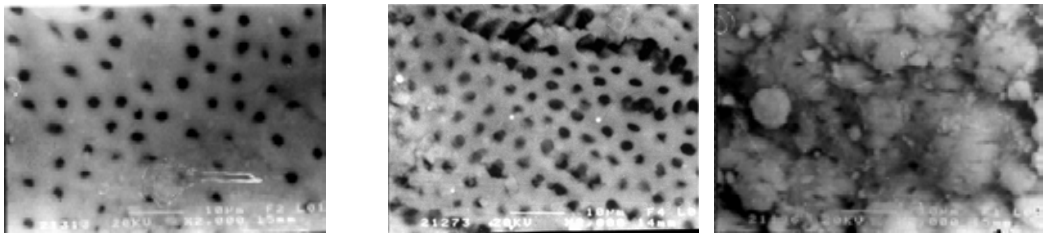
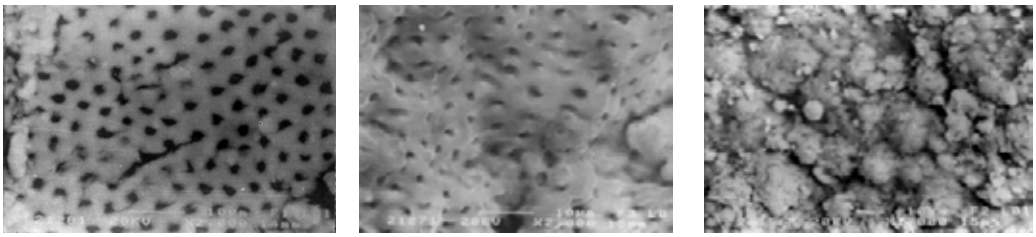


Figure 1: The mean of the size of the dentinal tubules' orifices after the treating the root canal's dentin with 2% acetic acid.



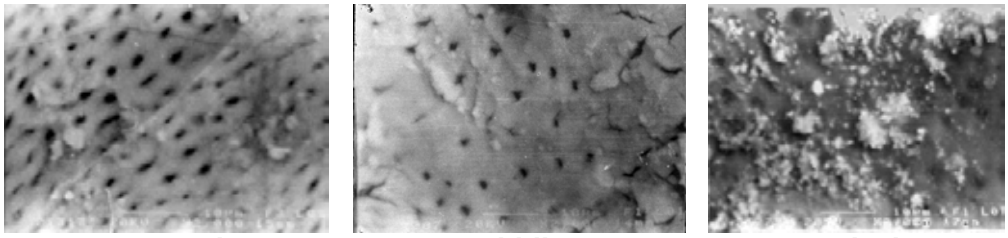
Coronal Middle Apical

Figures 2: The dentin inner wall of the root canal immediately after irrigation with 2% Acetic acid.



Coronal Middle Apical

Figure 3: The dentin inner wall of the root canal after irrigation with 2% Acetic acid and after incubation for 3 days.



Coronal Middle Apical

Figure 4: The dentin inner wall of the root canal after irrigation with 2% Acetic acid and after incubation for 7 days.

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