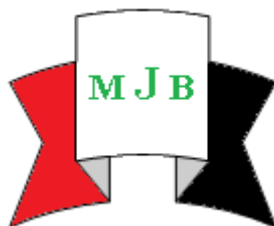


Prevalence of Bad Oral Habits and Relationship with Prevalence of Malocclusion in Sammawa City Students Aged (6-18) Years Old

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Received 22 September 2013

Accepted 26 November 2013

Abstract

Background : These oral habits maybe seen in children, adolescents and adults causing serious effect on their facial growth and dentition that is to say they may be related to malocclusion which is a condition where there is departure from the normal relation of the teeth in the same dental arch or to the teeth in the opposing arch.

Materials and methods: This study was conducted from 10 April 2011 to 29 May 2013 on (3300) students and (300) students as control group aged (6-18) years old attending primary ,intermediate and secondary schools in Sammawa city which lies 280km to the south of Baghdad, itself part of middle furat of Iraq were studied with respect to bad oral habits ,sagittal occlusion according to Angle's classification, overjet, overbite, posterior crossbite and spacing and crowding.

Results: The sample consisted of 3300 students. 786 students of all the age groups were found to have bad oral habits, which represented 23.8% of the total sample examined in this study (411,52.3%) of the 786 were males and (375,47.7%) were females. Some of the students had a single habit (481,61.2%) and others were found to have multiple habits (305,38.8%). The most prevalent habit was nail biting (184,23.4%), followed by tongue thrust (169,21.5%), digit sucking (147, 18.7%), mouth breathing (129,16.4%), lip habit (111,14.1%), and the least was other habits (46,5.9%).

Conclusion: The Prevalence of malocclusion in digit sucking group had very highly significant difference when compared with control group followed by tongue thrust group, mouth breathing group while other groups had low significant difference.

Key Words: Prevalence of bad oral habits; Prevalence of malocclusion;Sammawa city.

سعة انتشار عادات الفم السيئة وعلاقتها بسعة انتشار سوء الاطباق في طلاب مدينة السماوة
بعمر (٦-١٨) سنة

الخلاصة

الخلفية العلمية:- عادات الفم السيئة يمكن مشاهدتها في الاطفال ,المراهقين والبالغين وتسبب تأثير خطير على نمو الوجه والاسنان بطريقه ترتبط بسوء الاطباق وهو حالة الابتعاد عن العلاقة الطبيعية بين الاسنان في نفس الفك السني او بين الاسنان في الفك المقابل.

المواد والطرائق:- هذه الدراسة اجريت من العاشر من شهر نيسان عام ٢٠١١ ولغاية التاسع والعشرين من شهر ايار لعام ٢٠١٣ على عينه متكونه من (٣٣٠٠) طالب و(٣٠٠) طالب كمجموعه تحكم بعمر (٦-١٨) سنة يحضرون في المدارس الابتدائية ,المتوسطة والثانوية في مدينة السماوة التي تقع على بعد ٢٨٠ كم الى الجنوب من بغداد وهي نفسها جزء من الفرات الاوسط في العراق وتم تطبيق المقاييس من ناحية عادات الفم السيئة, الاطباق في المستوى السهمي حسب تصنيف انكل ,فرط البروز , فرط العضة, الاطباق المعكوس الخلفي ,الفراغات والازدحام.

النتائج:- العينة تتألف من ٣٣٠٠ طالب. ٧٨٦ طالب فقط من كل مجاميع الاعمار يمتلكون عادات فم سيئة وهي تمثل نسبة ٢٣,٨ % من العينة الكلية المفحوصة في هذه الدراسة (٥٢,٣,٤١١ %) منهم ذكور و (٤٧,٧,٣٥٧ %) منهم اناث . بعض الطلاب يمتلكون عاده سيئة واحده فقط (٦١,٢,٤٨١ %) والآخرين يمتلكون عادات سيئة متعددة (٣٨,٨,٣٠٥ %). العادة السيئة الاوسع انتشارا هي قضم الاظافر (٢٣,٤,١٨٤ %) تليها عاده دفع اللسان (٢١,٥,١٦٩ %), مص الاصابع (١٨,٧,١٤٧ %), التنفيس من الفم (١٦,٤,١٢٩ %), عادات الشفه (١٤,١,١١١ %) وكانت الاقل انتشارا العادات الاخرى (٥,٩,٤٦ %).

الخلاصة:- سعه انتشار سوء الاطباق في مجموعه مص الاصابع عالية جدا عند مقارنتها بمجموعه التحكم تليها مجموعه دفع اللسان بمجموعه التنفس من الفم اما بقيه المجاميع فلم يظهروا اختلافات كثيرة عند مقارنتها بمجموعه التحكم.
الكلمات الدلالية:- سعه انتشار عادات الفم السيئة ,سعه انتشار سوء الاطباق ,مدينة السماوة.

Introduction

A habit it was defined as the action or condition which by repetition has become spontaneous [1] and in order to place things in proper prospective, we should point out the nervous habits which are finger and nose-picking, hair twisting, scratching, eye rubbing, ear pulling and then the broad category labeled "oral habits" [2]. Oral habits were defined as the stereotypic repetitive functions of the masticator system, often subconscious differing qualitatively and quantitatively from its physiological function [3].

Abnormal oral habits operate so quietly and unconsciously that even the patient is frequently unaware of their existence. All such simple habits at first are performed by conscious effort. With each repetition it becomes less and less conscious effort and strictly applicable only to motor responses. Until finally it is pre-formed entirely unconsciously, becoming a part of the routine of the mind from which the consciousness is removed [4]. Parents are frequently concerned about their children's behavior patterns, especially if they are repetitive or stereotyped. These patterns are important, they are common in children with normal psychological status but they may also occur in children with developmental problems or emotional difficulties, or may be secondary to physical disorders [5].

Oral habits should be of primary clinical concern to orthodontists because they may cause malocclusion and interfere with the treatment progress [6].

Nail Biting (Onychophagia)(NB)

Nail biting is defined as the habit of biting one's nails and is a common oral habit in children and young adults [7]. They also reported that most nail biters bite all 10 fingers equally rather than selectively.

Tongue Thrust (TT)

The forward movement of the tongue tip between the teeth to meet the lower lip in deglutition and in sounds of speech so that the tongue becomes interdental [8]. While Hanson et al [9] defined tongue thrust as a condition in which the tongue makes contact with teeth anterior to the molars during swallowing. it is positioning of the tongue between the anterior teeth during swallowing, speaking or at rest. During the act of swallowing the teeth may not be in occlusion [10].

Digit Sucking (DS)

The term digit sucking refers to placing the thumb or fingers into the mouth many times every day and night, exerting definite sucking pressure [11]. While Gellin [10] defined digit sucking as the placements of the thumb or one or more fingers into varying depths into the mouth.

Mouth Breathing (MB)

Normal respiration is believed to involve adequate utilization of the nasal and the nasopharyngeal tracts^[12]. There was no certain definition of mouth breathing could be stated due to many difficulties which are involved, such as difficulties involved in the differential diagnosis of nose and mouth breathers, due to the fact that mouth breathers usually have some capacity for nasal ventilation. It is only when a total blockage or stenosis of the

nasal airway has occurred where isolated mouth breathing can be found [13]. Or difficulty to distinguish if mouth breathing primarily is an adaptation to respiratory need, or can it be a habit persisting after clearance of the nasal airway or existing in spite of a clean nasal airway [14].

Lip Habits (LH)

Lip biting and sucking habits can often be seen in patients with excessive overjet and are often associated with copped, dry or inflamed lips or perioral musculature. Therefore, lip habits do not cause malocclusion but rather they may result from it [15]. Ghafari [14] confirmed Josell' s statement but he did not know whether the interposition of the lip causes, contributes to, or maintains maxillary anterior protrusion and possibly retroclination of mandibular incisors, but he also reported that the habit is usually eliminated with reduction of the overjet.

Other habits (O)

Such as object chewing and pencil biting. 61% of individuals of either sexes were reported to be object chewers [16]. Object chewing was found to be related to stress and anxiety [16].

Materials and Methods

The Sample

The sample consists of 6-18year-old students attending primary ,intermediate and secondary schools. Age was considered according to the last birthday giving an age range from 6 years 0 months to 18 years 11 months [17]. The total number of samples were examined (3300) from primary schools (1100), from intermediate schools (1100) and from secondary schools (1100) in Sammawa city which lies 280km to the south of Baghdad, itself part of middle furat of Iraq. It is bounded on the North by Diwaneya, on the west by Saudi

Arabia, on the south by Nasiriya and on the east by Meesan, and control group (C) was chosen randomly from these schools, they were all clinically healthy individuals, of normal intelligence, and none of them had received any type of orthodontic treatment. It consisted from (300) from primary schools (100), from intermediate schools (100) and from secondary schools (100) students similar to the sample as regards of age and place of residence. Permission was obtained from the Almuthanna directorate of education. The schools` authorities were contacted and the purpose of the study was explained to them to assure full cooperation.

Methods of Examination

The examinations were carried out in rooms that were available in host school The subjects were seated on ordinary chairs . The subject's head supported in an upright position and the examiner standing in front of the chair [18]. The following instruments were used: Plane mouth mirrors (No.4) Dentaurem (042-751), Kidney dish, Millimeter graded vernier (Inox, Zurcher Modell, Soft stainless steel wire (0.5mm), Tweezers, Indelible pencil, Concentrated sterilization solution (Ethyl Alcohol 95%), Portable light.

Questionnaire:-

Each student of the sample was given a paper containing a simple questionnaire to answer with his or her parents. Does your son or daughter have any of these habits now or in the past? And if in the past, at what age the habit stopped?

1.*Digit Sucking:* This habit was examined first by asking the students about which finger was sucked and the manner in which it was sucked. The second step was to examine he index finger to find if there is a

callus formation, cleaner fingernail or reddish color [10] or acquired rotation which is the most frequent deformation [19].

2.Object Biting: This type of habit was examined by a simple questionnaire about what was the object and the manner in which it was used inside the mouth [16].

3.Nail biting: This habit was examined according to Odenrick and Brattstrom [20] by a questionnaire to ask whether the students bite their nail often or in frequently. They were also asked whether it was possible to see from their nails that they were nail biters.

Those who were considered as nail biter bite most of their finger nails often in a sever manner.

4. Mouth breathing: This habit was investigated according to Melsen et al [21] by a questionnaire about the cause of their mouth breathing and to observe the habit after asking the student to sit in rest position. There was also an extra oral examination to diagnose if there was any increase in lower facial height, incompetent lip [22,23,15]. Those who were not chronic mouth breathers such as seasonal mouth breathers were not considered as a habitual mouth breathers.

5. Lip habits: These habits were investigated by examining the lips whether they were inflamed, dry and capped or not those with sound lips, which means that they did not use the habit frequently were not considered as having the habits [15].

6. Tongue thrust: This habit was investigated by a simple examination. The head was left unsupported and the students were asked to swallow and during their swallowing their lips was pulled apart to observe his tongue position whether it protruded forward against the anterior teeth or not, and whether

the teeth are at centric occlusion during swallowing or not [24,25,21].

Orthodontic Methods

Sagittal Occlusion:

Depending on Angle's classification [26], the criteria described by Lavelle [27] and described by Houston [28] This variable was divided as follows (Figure,1a,b,c) :-

(a) Normal molar occlusion (Class I). It is registered when the mesiobuccal cusp of the upper first permanent molar occludes with the anterior buccal groove of the lower first permanent molar.

(b) Distal molar occlusion (Class II). It is observed when the relative position of mandibular molar has shifted distally by half cusp width or more.

(c) Mesial molar occlusion (class III). It is observed when the relative position of the mandibular molar had shifted mesially by :-

half a cusp width or more. In addition to that cusp to cusp relationship of molars.

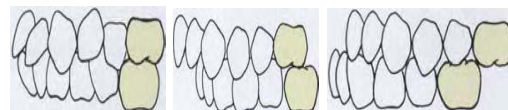


Fig (1a): CL I **Fig (1b): CL II**
Fig (1c): CL III [26]

Overjet (O.J)

Measurement of the horizontal relation of the incisors is made with the aid of millimeter graded vernier while the subject is in centric occlusion and measured the distance from the most prominent surface of labial surface of upper central incisor and labial surface of lower central incisor (Figure, 2a).The measurement of overjet is recorded to the nearest millimeter. Increased overjet was considered as > 4mm and decreased overjet was considered as <1 mm. An increased, decreased, or reversed overjet value was considered as a single occlusal anomaly [18].

Overbite (O.B)

The overbite was measured according to Draker [29] while the subject is in centric occlusion with his occlusal plane horizontal. The amount of vertical overlap of the upper incisor on the lower incisor is marked with the pencil on the labial surface of the lower incisor using the incisal edge of the upper incisor to guide the pencil with the conical plane of the sharpened point of the pencil itself parallel to the subject's occlusal plane (Figure,2b). If there is lack of vertical overlap between any of the opposing pairs of incisors (openbite), the amount of openbite is measured directly and recorded to the nearest whole millimeter. Increased overbite was considered as $>4\text{mm}$ and decreased overbite as $<1\text{mm}$. An increased or decreased overbite including anterior openbite was considered as a single occlusal anomaly.



Fig (2a) : Overjet [18] **Fig (2b):** Overbite [29]

Posterior crossbite

The measurement of the transverse lateral segment relation was made by direct inspection of the lateral segments on each side. One of three separate relations was recorded for the transverse interdigitation of the lateral segments [18]:

Posterior crossbite: a buccal cusp of a mandibular tooth lied buccal to the maximum height of a buccal cusp of an opposing maxillary tooth (Figure, 3).



posterior crossbite normal

Fig 3 Posterior crossbite and scissorsite (B=buccal, L=lingual, P=palatal) [18].

Spacing and Crowding:

It was assessed separately for the maxillary and mandibular dentitions, spacing or crowding was registered when a deviation of at least 2 mm per segment was diagnosed [30,31] (Figure, 4a,b).

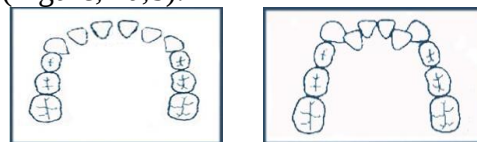


Fig (4a): Spacing (30) **(4b):** Crowding [30]

Statistical Analysis

The data were processed and analyzed by using (SPSS Inc., version 17 for windows 7and excel 2010).The usual statistical methods were used in order to analyze and assess results include:-Descriptive Statistics, Inferential Statistics, Z-test for comparison significant difference between two proportions. The following levels of significance are used: $P > 0.05$ (NS).

$0.05 \geq P > 0.01$ (* Significant).
 $0.01 \geq P > 0.001$ (**highly significant).
 $P \leq 0.001$ (***)very highly significant).

Results

The sample consisted of 3300 students. 786 students of all the age groups were found to have bad oral habits, which represented 23.8% of the total sample examined in this study (411,52.3%) of the 786 were males and (375,47.7%) were females. Some of the students had a single habit (481,61.2%) and others were found to have multiple habits (305,38.8%).

The most prevalent habit was nail biting (184,23.4%), followed by tongue thrust (169,21.5%), digit sucking (147, 18.7%), mouth breathing (129,16.4%), lip habit (111,14.1%), and the least was other habits (46,5.9%).Age and gender distribution of bad habits shown in (Table,1).

Table 1 distribution of bad habits according to age and gender.

A	6-12 years				13-18 years			
	M		F		M		F	
	No	%	no	%	No	%	no	%
NB	35	19	40	21.8	52	28.3	57	30.9
TT	43	25.4	38	22.4	46	27.3	42	24.9
DS	46	31.3	51	34.7	22	14.9	28	19.1
MB	27	20.9	24	18.7	40	31	38	29.4
LH	15	13.5	20	18	39	35.2	37	33.3
O	9	19.6	11	23.9	12	26	14	30.5

Sagittal occlusion:

The distribution of sagittal occlusion within the six groups of bad habits and control group are shown in (Table, 2 and Figure, 5).

-Nail biting (NB):-

- Class I (71.4%) showed no significant differences when compared with control group (74.1%) $P > 0.05$.
- Class II (21.3%) showed no significant differences when compared with control group (22.3%) $P > 0.05$.
- Class III (7.3%) showed a significant differences when compared with control group (3.6%) $P \leq 0.05$.

-Tongue thrust (TT) :-

- Class I (65.1%) showed a significant differences when compared with control group (74.1%) $P \leq 0.05$.
- Class II (31.8%) showed a significant differences when compared with control group (22.3%) $P \leq 0.05$.
- Class III (3.1%) showed no significant differences when compared with control group (3.6%) $P > 0.05$.

- Digit sucking (DS) :-

- Class I (48.6%) showed a significant differences when compared with control group (74.1%) $P \leq 0.05$.
- Class II (49.2%) showed a significant differences when compared with control group (22.3%) $P \leq 0.05$.

Class III (2.2%) showed no significant differences when compared with control group (3.6%) $P > 0.05$.

- Mouth breathing (MB):-

- Class I (58.6%) showed a significant differences when compared with control group (74.1%) $P \leq 0.05$.
- Class II (33.5%) showed a significant differences when compared with control group (22.3%) $P \leq 0.05$.
- Class III (7.9%) showed a significant differences when compared with control group (3.6%) $P \leq 0.05$.

- Lip habit (LH):-

- Class I (73.4%) showed no significant differences when compared with control group (74.1%) $P > 0.05$.
- Class II (22.7%) showed no significant differences when compared with control group (22.3%) $P > 0.05$.
- Class III (3.9%) showed no significant differences when compared with control group (3.6%) $P > 0.05$.

- Others(O):-

- Class I (72.9%) showed no significant differences when compared with control group (74.1%) $P > 0.05$.
- Class II (23.8%) showed no significant differences when compared with control group (22.3%) $P > 0.05$.
- Class III (3.3%) showed no significant differences when compared with control group (3.6%) $P > 0.05$.

Table 2 Sagittal occlusion among the six groups of bad habits and control group and statistical significance for differences from control.

G	CL I		CL II		CL III	
	%	P sig	%	P sig	%	P sig
C	74.1	---	22.3	---	3.6	---
NB	71.4	0.264 NS	21.3	0.387 NS	7.3	0.032 *
TT	65.1	0.018 *	31.8	0.011 *	3.1	0.389 NS
DS	48.6	0.00002 ***	49.2	0.00003 ***	2.2	0.21 NS
MB	58.6	0.00069 ***	33.5	0.0071 **	7.9	0.031 *
LH	73.4	0.444 NS	22.7	0.465 NS	3.9	0.44 NS
O	72.9	0.432 NS	23.8	0.41 NS	3.3	0.46 NS

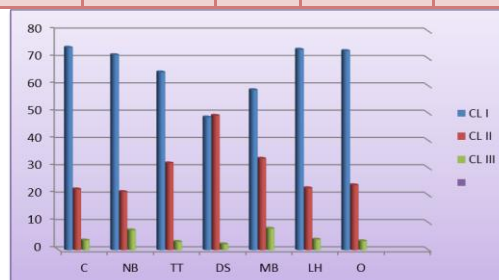


Fig 5 Sagittal occlusion (in %) within bad habits and control group.

Overjet

The distribution of overjet within the six groups of bad habits and control group are shown in (Table,3 and Figure, 6). This also demonstrates the statistical significance for differences from the control group.

-Nail biting (NB):-

- Increased overjet (18.3%) showed no significant differences when compared with control group (17.4%) $P > 0.05$.
- Decreased overjet (9.2%) showed a significant differences when compared with control group (4.5%) $P \leq 0.05$.

-Tongue thrust (TT) :-

- .- Increased overjet (29.6%) showed a significant differences when compared with control group (17.4%) $P \leq 0.05$.
- Decreased overjet (3.9%) showed no significant differences when compared with control group (4.5%) $P > 0.05$.

- Digit sucking (DS) :-

- Increased overjet (52.6%) showed a significant differences when compared with control group (17.4%) $P \leq 0.05$.
- Decreased overjet (3.5%) showed no significant differences when compared with control group (4.5%) $P > 0.05$.

- Mouth breathing (MB):-

- Increased overjet (31.1%) showed a significant differences when compared with control group (17.4%) $P \leq 0.05$.
- Decreased overjet (4.1%) showed no significant differences when compared with control group (4.5%) $P > 0.05$.

- Lip habit (LH):-

- Increased overjet (18.1%) showed no significant differences when compared with control group (17.4%) $P > 0.05$.
- Decreased overjet (4.3%) showed no significant differences when compared with control group (4.5%) $P > 0.05$.

- Others(O):-

- Increased overjet (16.4%) showed no significant differences when compared with control group (17.4%) $P > 0.05$.

- Decreased overjet (4.7%) showed no significant differences when compared with control group (4.5%) $P > 0.05$.

Table 3 Overjet among the six groups of bad habits and control group and statistical significance for differences from control.

G	Normal		Increased		Decreased	
	%	P(sig)	%	P(sig)	%	P(sig)
C	78.1	--	17.4	--	4.5	--
NB	72.5	0.08 NS	18.3	0.382 NS	9.2	0.018 *
TT	66.5	0.003 **	29.6	0.001 ***	3.9	0.30 NS
DS	43.9	0.00001 ***	52.6	0.00003 ***	3.5	0.3 NS
MB	64.8	0.0019 **	31.1	0.0007 ***	4.1	0.428 NS
LH	77.3	0.43 NS	18.4	0.4 NS	4.3	0.465 NS
O	78.9	0.452 NS	16.4	0.44 NS	4.7	0.476 NS

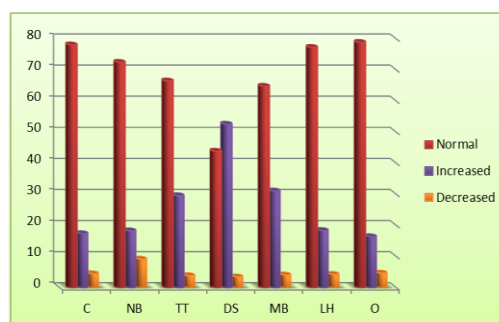


Fig 6 Overjet (in %) within bad habits and control group

Overbite

The distribution of overbite within the six groups of bad habits and control group are shown in (Table,4 and Figure, 7). This also demonstrates the statistical significance for differences from the control group.

-Nail biting (NB):-

- Increased overbite (10.8%) showed no significant differences when compared with control group (11.6%) $P > 0.05$.

- Decreased overbite (10.6%) showed a significant differences when compared with control group (5.2%) $P \leq 0.05$.

-Tongue thrust (TT) :-

- Increased overbite (11.1%) showed no significant differences when compared with control group (11.6%) $P > 0.05$.

- Decreased overbite (13.8%) showed a significant differences when compared with control group (5.2%) $P \leq 0.05$.

- Digit sucking (DS) :-

- Increased overbite (8.5%) showed no significant differences when compared with control group (11.6%) $P > 0.05$.
- Decreased overbite (53.4%) showed a significant differences when compared with control group (5.2%) $P \leq 0.05$.
- **Mouth breathing (MB):-**
- Increased overbite (9.2%) showed no significant differences when compared with control group (11.6%) $P > 0.05$.
- Decreased overbite (16.6%) showed a significant differences when compared with control group (5.2%) $P \leq 0.05$.
- **Lip habit (LH):-**

- Increased overbite (10.7%) showed no significant differences when compared with control group (11.6%) $P > 0.05$.
- Decreased overbite (7.4%) showed no significant differences when compared with control group (5.2%) $P > 0.05$.
- **Others(O):-**
- Increased overbite (9.9%) showed no significant differences when compared with control group (11.6%) $P > 0.05$.
- Decreased overbite (5.6%) showed no significant differences when compared with control group (5.2%) $P > 0.05$.

Table 4 Overbite among the six groups of bad habits and control group and statistical significance for differences from control.

G	Normal		Increased		Decreased	
	%	P(sig)	%	P(sig)	%	P(sig)
C	83.2	--	11.6	--	5.2	--
NB	78.6	0.11 NS	10.8	0.4 NS	10.6	0.012 *
TT	75.1	0.017 *	11.1	0.436 NS	13.8	0.0004 ***
DS	38.1	0.00003 ***	8.5	0.15 NS	53.4	0.00003 ***
MB	74.2	0.016 *	9.2	0.233 NS	16.6	0.00005 ***
LH	81.9	0.378 NS	10.7	0.4 NS	7.4	0.189 NS
O	84.5	0.412 NS	9.9	0.366 NS	5.6	0.45 NS



Fig 7 Overbite (in%) within bad habits and control group

Posterior crossbite, spacing and crowding:-

The distribution of posterior crossbite, spacing and crowding within the six groups of bad habits and control

group are shown in (Table,5 and Figure,8). This also demonstrates the statistical significance for differences from the control group.

-Nail biting (NB):-

- Posterior crossbite (3.2%) showed no significant differences when compared with control group (2.6%) $P > 0.05$.
- Spacing (16.8%) showed no significant differences when compared with control group (14.3%) $P > 0.05$.
- Crowding (25.6%) showed no significant differences when compared with control group (22.7%) $P > 0.05$.

-Tongue thrust (TT):-

- Posterior crossbite (9.8%) showed a significant differences when compared with control group (2.6%) $P \leq 0.05$.
- Spacing (26.5%) mainly lower segment showed a significant differences when compared with control (14.3%) $P \leq 0.05$.
- Crowding (24.9%) showed no significant differences when compared with control group (22.7%) $P > 0.05$.

- Digit sucking (DS) :-

- Posterior crossbite (13.4%) showed a significant differences when compared with control group (2.6%) $P \leq 0.05$.
- Spacing (28.9%) mainly upper segment showed a significant differences when compared with control (14.3%) $P \leq 0.05$.
- Crowding (32.4%) mainly lower segment showed a significant differences when compared with control (22.7%) $P \leq 0.05$.

- Mouth breathing (MB):-

- Posterior crossbite (27.6%) showed a significant differences when compared with control group (2.6%) $P \leq 0.05$.
- Spacing (15.2%) showed no significant differences when compared with control group (14.3%) $P > 0.05$.
- Crowding (38.7%) upper and lower segment showed a significant differences when compared with control (22.7%) $P \leq 0.05$.

- Lip habit (LH):-

- Posterior crossbite (4.3%) showed no significant differences when compared with control group (2.6%) $P > 0.05$.
- Spacing (16.6%) showed no significant differences when compared with control group (14.3%) $P > 0.05$.
- Crowding (35.2%) mainly upper segment showed a significant differences when compared with control (22.7%) $P \leq 0.05$.

- Others(O):-

- Posterior crossbite (3.6%) showed no significant differences when compared with control group (2.6%) $P > 0.05$.
- Spacing (17.2%) showed no significant differences when compared with control group (14.3%) $P > 0.05$.
- Crowding (26.4%) showed no significant differences when compared with control group (22.7%) $P > 0.05$.

Table 5 Posterior crossbite, spacing, crowding among the six groups of bad habits and control group and statistical significance for differences from control.

G	P.crossbite		Spacing		Crowding	
	%	P(sig)	%	P(sig)	%	P(sig)
C	2.6	--	14.3	--	22.7	--
NB	3.2	0.348 NS	16.8	0.226 NS	25.6	0.229 NS
TT	9.8	0.00039 ***	26.5	0.00054 ***	24.9	0.29 NS
DS	13.4	0.00003 ***	28.9	0.00009 ***	32.4	0.013 *
MB	27.6	0.00003 ***	15.2	0.432 NS	38.7	0.00032 ***
LH	4.3	0.184 NS	16.6	0.277 NS	35.2	0.0046 **
O	3.6	0.351 NS	17.2	0.3 NS	26.4	0.287 NS

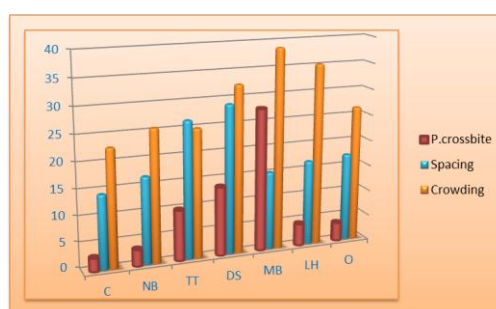


Fig 8 Posterior crossbite, spacing, crowding (in%) within bad habits and control group

Discussion

The sample

The prevalence of bad oral habits (23.8%), it was near to what was found by Tewari [4] and Nanda et al [32] which were 19.49% and 17%, and less than what was found by Al-Gouthany[33], this difference due to difference in total number of the sample, age range, types of habits studied and socioeconomic factors, there was no gender differences similar to Al-Gouthany [33].

-Nail biting (NB):-

High frequency of class III sagittal occlusion and decreased overbite were noted in this group and when

compared with control these findings agree with those of many investigators [20,34], These two malocclusion variables may be due to the effect of other habits used by the subject in addition to nail biting.

-Tongue thrust (TT)

High frequency of class II sagittal occlusion ,increased overjet , decreased overbite ,posterior crossbite and spacing (mainly lower segment) were noted in this group and when compared with control these findings agree with those of many investigators [10,11,13,35], it may be due to lower position of the tongue causing widening in the lower arch and

narrowing of upper arch leading to the development of buccal crossbite, in agreement with Larsson [36], lower spacing due to protrusion of lower incisors by the pressure of the tongue, in agreement with Hertzberg et al [37].

- Digit sucking (DS) :-

High frequency of class II sagittal occlusion, increased overjet, decreased overbite, posterior crossbite, spacing (mainly upper segment) and crowding (mainly upper segment) were noted in this group and when compared with control these findings agree with those of many investigators [10, 11, 21, 32, 34, 38]. This may be due to the proclination of the upper incisors with subsequent mesial drift of the buccal segment by the pressure of the digit [11, 32, 36], while open bite may be due to the reduced vertical growth of the frontal part of the alveolar process by the effect of the digit, which lies between the upper and lower anterior teeth Larsson [36], increased overjet, posterior crossbite, spacing and crowding may be due to the continuous pressure of the digit on the maxillary anterior teeth causing their tipping or bodily movement or the pressure subjected by the digit on the mandible anterior teeth causing their retroclination [32, 21, 36].

- Mouth breathing (MB):-

High frequency of class II, CL III sagittal occlusion, increased overjet, decreased overbite, posterior crossbite and crowding (upper and lower segment) were noted in this group and when compared with control these findings agree with those of many investigators [13, 32]. This may be due to lack of tongue support to the maxillary arch causing its narrowing [21, 39, 40, 41], while crowding due to the retroclination of the upper and lower incisors by the effect of lower position of the mandible causing their crowding in agreement with [13, 39].

- Lip habit (LH):-

High frequency of crowding (mainly upper segment) were noted in this group and when compared with control these findings agree with those of many investigators in agreement with Al-Huwaizi [34]. While other habits there was no frequency when compared with control

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