

IMPACT OF MALOCCLUSION ON THE DAILY PERFORMANCE OF LIBYAN DENTAL STUDENTS.

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ABSTRACT:

Objective: To assess the prevalence, intensity, and extent of socio-dental impacts attributed to malocclusions by normative orthodontic treatment need level.

Materials and methods: Among 600 of internship and 4th year dental students from the faculty of Dentistry Benghazi University, 326 students volunteered to participate in this study. A modified version of the Index of Orthodontic Treatment Need (IOTN) was used for each student. The Oral Impact on Daily Performance index (OIDP) was used to assess the level in which oral conditions may affect the individuals daily activities. Data were analyzed using SPSS (version 21). Non-parametric statistics were the primary choice because the OIDP frequency scores were not normally distributed.

Results: The oral conditions causing impacts on the eight activities showed different frequencies, bad position of teeth had the highest prevalence 19.8%, followed by spacing between the teeth 4.3%, while abnormalities of the face and mouth had the least prevalence 1.9%. There was a highly statistically significant difference in the prevalence of OIDP between the OITN groups at level 5% ($p=0.00$), but not between gender groups ($p=0.3$). There was no statistical significant difference between the prevalence of OIDP and classes of malocclusion (Angle) ($p=0.1$).

Conclusion: Untreated malocclusions have physical, psychological, and social consequences on quality of life of Libyan adolescents. These results raise the issue of whether all these adolescents should be considered for orthodontic attention since most had on perceived impacts on performing their daily life activities.

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المخلص العربي

تأثير سوء اطباق الاسنان على الأداء اليومي لطلاب طب الاسنان الليبيين

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الهدف: لتقييم مدى انتشار سوء اطباق الاسنان، ومدى الآثار الاجتماعية و تأثير وظائف الاسنان بهذه الاضطرابات و ذلك بواسطة قياس مستوى الحاجة المعياري لعلاج تقويم الاسنان.

المواد و الطرق: من بين 600 من طلاب طب الاسنان و المتدربين في كلية طب الاسنان، جامعة بنغازي، تطوع 326 طالباً للمشاركة في هذه الدراسة. تم استخدام نسخة معدلة من مؤشر الحاجة لتقويم الاسنان (IOTN) ودراسة تأثير صحة الفم على مؤشر الأداء اليومي للأفراد (OIDP). وقد تم تحليل البيانات باستخدام SPSS (الإصدار 21).

النتائج: أظهرت الدراسة بأن حالة الفم قد سببت تأثيرات على ثمانية أنشطة بدرجات متفاوتة، وكان التمرکز السيء للأسنان الأعلى انتشاراً بنسبة 19.8 %، يليه التباعد بين الاسنان 4.3 %، في حين كانت تشوهات الفم و الوجه الأقل انتشاراً بمعدل 1.9 % . كان هناك فروق ذات دلالة إحصائية عالية في انتشار OIDP بين مجموعات IOTN ($P=0.00$)، ولكن ليس بين الجنسين ($P=0.3$). كما لم يكن هناك فرق ذات دلالة إحصائية بين مدى انتشار OIDP وفئات من سوء الاطباق (تصنيف أنجل) ($P=0.1$).

الاستنتاج: سوء إطباق الاسنان له عواقب جسدية ونفسية واجتماعية على حياة المراهقين الليبية. هذه النتائج تثير مسألة ما إذا كانت جميع هؤلاء المراهقين ينبغي النظر للاهتمام بتقويم الاسنان منذ أكثر كان على التأثيرات المتصورة على أداء أنشطتها الحياة اليومية.

INTRODUCTION:

It is not surprising that the concept of Quality of Life (QOL) and its relationship to treatment needs and outcomes is currently a “hot topic” in dentistry^{1,2}. Oral Health related Quality of Life (OH-QoL) instruments provide a valid method to evaluate needs and outcomes which are important to both the clinician and the patient. In fact, some even argue that OH-QoL should be integrated in the overall patient assessment, as well as in gauging the efficacy of the treatment from the patient’s perspective^{1, 2}. This is particularly applicable to orthodontics, where clinicians treat malocclusions that often carry a large psychosocial component.

Nonetheless, several studies focused on impact of malocclusion on the daily performance^{3,7} and since the physical, social, and psychological aspects of malocclusion are key reasons why orthodontic care is sought^{10,13}, several OH-QOL measures were used which provide an insight into how an individual’s oral health status affects life quality and how oral health care brings about improvements to QOL^{13,14}. The Oral Impacts on Daily Performance (OIDP) scale assesses impacts that affect individuals’ daily life. Considering respondent burden, this instrument is advantageous for use in population surveys, not only in terms of being easier while measuring behaviors rather than feeling states, but also in being short. Perception questionnaire is a generic oral-health-related quality of life instrument designed to assess the adverse impacts of oral conditions^{10, 13}. Condition-Specific instruments (CSI) are the most commonly used specific OH-QOL measures to assess quality of life. They emphasize the assessment of quality of life for a specific condition, such as malocclusion, rather than assessing quality of life in relation to overall oral health¹⁵.

Another advantage is linking the specific oral problems to the impact it causes, which has enabled CS-OIDP to be used in the assessment of dental health needs in the prioritization of dental health care services, as well as using it to assess the intensity or the extent (number of affected daily activities) of such impacts^{10, 16}. The reason for application of this quality of life measurement tool (OIDP) on dental students

was to comprehend the impact of their oral conditions on their quality of life.

1) The prevalence of OIDP, 2. Correlation between OIDP and IOTN, 3. Prevalence and intensity of OIDP between Angle classes; among dental students of East of Libya.

MATERIALS AND METHODS:

This study was conducted at the department of orthodontics, faculty of dentistry of Benghazi University in Benghazi which is the largest in the east of Libya. A total number of 161 subjects (36 males, 125 females) fulfilled the inclusion criteria, with the age ranging from 24 to 28 (mean age 24, SD=1.16). The exclusion Criteria were: history of orthodontic treatment, any underlying systemic illness, history of smoking and failure to fill the questionnaires correctly. After verbal consent was obtained from the participants during the oral examination, the subjects completed questionnaires regarding their personal health.

ORAL EXAMINATION:

The oral screening was performed in the orthodontic department by four dentists who were calibrated to carry out the clinical examination, and confirmed by one specialist orthodontist. The examination included evaluation of the oral health status using DMF index, the decayed missed and filled teeth were assessed and reported on each subjects’ examination sheet. A modified version of the index of orthodontic treatment need (IOTN), Table 1, was used for each student¹⁷. The index consisted of two dental health components, grade 0: no definite need for orthodontic treatment, and grade 1: definite need for treatment Table 1.

Table 1: Modified dental health components of Index of Orthodontic Treatment Need [reproduced with kind permission from Burden et al. (2001)].

The need of prosthesis. Impede eruption of teeth, presence of supernumerary teeth, and retained deciduous teeth.
Over jet Increased over jet greater than 6 mm.
Reverse over jet greater than 3.5mm with no masticatory or speech problems. Reverse over jet greater than 1mm but less than 3.5mm with recorded masticatory and speech difficulties.
Crossbites anterior or posterior crossbites with greater than 2mm discrepancy between retruded contact position and intercuspal position.
Displacement of contact Contact point displacements greater than 4 mm.
Points (crowding)
Overbite Lateral or anterior open bites greater than 4 mm.
Deep overbite with gingival or palatal trauma.

Therefore, this research was designed to investigate The (Oral Impact on Daily Performance) OIDP index was used to assess the level in which oral conditions may affect the individual's daily activities. The OIDP index was first presented and validated in the First International Conference on Measuring Oral Health and Quality of Life, which was held at North Carolina University in 1997¹⁴.

The index assesses oral impacts on daily life in relation to eight activities; eating, speaking, cleaning mouth, relaxing, smiling, studying and emotional and social contact. The questions were in English and came with an explanation to help the students answer without an assistant. In order to evaluate the cause of the oral problem, the subjects were asked subsequently to determine the reason from his/her point of view. Four causative choices were presented in the questionnaire, 1 bad position of teeth, 2 spacing between the teeth, 3 deformity of the face or mouth, and 4 other reasons. The index is specifically designed to link the oral impacts experienced with self-reported specific oral problems, Table 2. If there is no impact on any of the eight activities score zero was reported. Scores higher than zero were found to allocate a negative impact on the quality of life. The severity and frequency of the oral condition were assessed from a scale (0 to 3); the score for the impact on each activity was calculated by multiplying the severity and frequency, so the final score of one activity (impact intensity) may have a value between 0 to 9. The general average of the oral impacts for each subject was calculated as a percentage, the sum of the 8 activities is divided by 72 and multiplied by 100[25]. Furthermore, among those adolescents reporting a CSI, the intensity of the impact on each performance (ranging from 1 to 9) was classified into five levels: very little (1), little (2), moderate (3–4), severe (6), and very severe (9). The overall intensity of CSI was then estimated as the most severe impact on any of the eight performances. Higher total scores indicate more severe effect of the oral impact on daily life.

STATISTICAL ANALYSIS:

The inter-item correlation coefficients among the 8 OIDP items were calculated. Non-parametric statistics were the primary choice because the OIDP frequency scores were not normally distributed. Chi-square test was

used for categorical data analysis. The inter-item correlation coefficients among the 8 OIDP items were calculated, whereas the extent of CSI was compared according to gender and to level of normative orthodontic treatment need through the Mann-Whitney test and according to Angle's malocclusion by means of the Kruskal-Wallis test.

RESULTS:

A total number of 161 participated in this study. 38 (23.6%) males and 123 (76.4%) females. About 117 (72.7%) had no need for Orthodontic treatment, while 44 (27.3%) had definite need for orthodontic treatment. Out of the 44 subjects, 11 were males and 33 females. The total prevalence of OIDP is 48 (29.7%), 40 females and 8 males. The prevalence and intensity of daily performance impact is shown in (table 3). No statistically significant difference was found regarding OIIF, IOTN, DMF as well as Angle's classification between the genders ($p > 0.05$), table 4. The total frequency of one activity was calculated by the sum of the prevalence of each score obtained. Smiling was the most prevalent daily activity effected by oral conditions 26 (16%), followed by eating and cleaning both had prevalence of 13 (8%). In comparison to studying which was the least affected activity. Only one subject had a negative impact on studying by (0.6%). Feeling ill and sleeping showed less prevalence about 7 (4.3%) and 5 (3%) respectively. Speaking on the other hand showed only 1.8% (3 subjects) prevalence. There was a highly statistically significant difference in the prevalence of OIDP between OITN groups at level 5% ($p = 0.00$) but not between gender groups ($p = 0.3$). Mann Whitney U test was used. A high significance association at level 1% between OIDP and IOTN ($p = 0.00$). There was no statistical significant difference between the prevalence of OIDP and Angle's classes of malocclusion ($p = 0.1$), Table 5. Eating and cleaning were the only severely impacted daily activities by (2.5% and 0.6% of severe and very severe respectively). While the other six performances showed no severe intensity. Most activities had a very little intensity, smiling had 13% of very little intensity followed by 2.2% of moderate intensity,

speaking showed 1.2% of moderate and 0.6% of very little intensity, sleeping had 2.5 % intensity and 3.7% for feeling ill, while studying and social contact had 0.6% of very little intensity. The oral conditions causing impacts on the eight activities showed different frequencies with bad position of teeth at the highest prevalence 19.8%, followed by spacing between the teeth 4.3%, while deformity of the face and mouth had the least prevalence 1.9%.

There was a highly significant correlation between OIDP and bad position of teeth and spacing but no correlation was found with deformity of the face and mouth, table 6. The frequency of different intensity of oral condition specific measure among both genders are illustrated in, table 7. where a total of 32 male and 123 female expressed at least one oral impact.

Percentage distribution of different intensity of OIDP among the dental students in relation to orthodontic treatment need is shown in ,table 8. 2.3% and 0.9%of subjects expressed severe intensity whereas the majority (35 and 106) had very little of OIDP by definite need and no definite need respectively.

DISCUSSION:

This cross-sectional study was conducted in dental student to investigate the oral impact on daily performance caused by malocclusion. A recent review concluded that there is a need for a more comprehensive and rigorous evaluation of the socio-dental impacts of untreated malocclusion on quality of life³.

Since this study was designed to focus exclusively on the socio-dental impacts of malocclusions, it is interesting to note that the reported pattern of affected daily performances was different from previous most studies^{18, 19}. Whereas effects on eating were the common performance impact in other studies^{18, 20, 21}, it was not the most affected performance by malocclusions among the Libyan adolescents. Smiling was the most prevalent daily activity affected by oral conditions(16%) which is in agreement with the Brazilian study 22, followed by eating and cleaning both had prevalence of 1(8%). This study assesses not only the

prevalence but also the intensity and extent of the oral impacts attributed to malocclusions or conditions related to orthodontics. Among the Libyan adolescents, 29% reported condition specific instrument for malocclusions on at least one daily performance during the past 3 months. A figureless to that was reported in Malaysian dental student 54.3% 23. This issue was further highlighted when information about intensity and extent of the CSI was analyzed, Tables 7. These findings raise doubts about current methods of assessing orthodontic treatment and how to prioritize who should be treated first.

The validity and reliability of the modified IOTN have not been fully confirmed and is suggested that the modified IOTN overcomes the reliability problems that often accompany the use of orthodontic indices by non-specialists in oral health surveys¹⁷. Therefore, the present study used the modified IOTN in combination with Angle's classification for defining malocclusion.

The main finding of this study was that about (72.7%) had no need for Orthodontic treatment, while (27.3%) had definite need for orthodontic treatment obtained. Our results showed that the prevalence, intensity, and extent of CSI differed by orthodontic treatment need level. They were highly statistically significant among adolescents with definite normative need than in those with no need for orthodontic treatment. Although, these results reinforce the idea that untreated severe malocclusions have physical, psychological, and social consequences on quality of life, it should be noted that not all adolescents perceived a negative impact of their malocclusions.

The present study had several limitations. Firstly, although self-esteeming measures were used as an analytical tool, the study design limited interpretation concerning temporal relationships. Intervention studies may provide additional information. Secondly, the number of subjects was small. Finally, other factors (e.g. genetic components, nutrition) that have been shown to affect psychological stress were not considered as was performed by some other studies²⁴.

Table 2: Oral Impact on Daily Performance registration form

Please answer the following questions, How often, during the past 3months, have you encountered these difficulties? Circle one number regarding the severity and frequency(None at all - 0 Very little - 1 Pretty much - 2 Quite a lot - 3) and one or more regarding the cause (1. Bad position of the teeth 2. Space between teeth 3. Deformity of themouth and face, 4. Other causes).				
	DAILY PERFORMANCES	SEVERITY	FREQUENCY	What do you think is causing thes difficulties?
1)	Are you having difficulties eating (biting, chewing)?			1 2 3
2)	Are you having difficulties with speech or word pronunciation			1 2 3
3)	Are you having problems washing your mouth due to mouth related issues?			1 2 3
4)	Have you had sleepless nights due to toothaches of other mouth related issues?			1 2 3
5)	Did you feel ill because of problems in mouth?			1 2 3
6)	Do you avoid smiling or showing your teeth because of problems inside your mouth?			1 2 3
7)	Have toothaches or other mouth related problems ever prevented you from attending classes or going to school?			1 2 3
8)	Have your problems with your teeth prevented you from meeting with your friends or from other social activities?			1 2 3

Table 3: prevalence and intensity of daily performance impact:

Indicator	Eating	speaking	cleaning mouth	sleeping	feeling ill	studying	smiling	social contact
Prevalnce of Impacts (n=48)								
n	13	3	13	5	7	1	26	1
%	8.2	1.8	8	3.1	4.3	0.6	16	0.6
Intensity of impacts in 44 students								
very little	4.3	0.6	5.6	2.5	3.7	0.6	13	0.6
little	1.9	0.0	1.2	0.6	0.6	0.0	0.6	0.0
moderate	0.0	1.2	0.6	0.0	0.0	0.0	2.2	0.0
Severe	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Very severe	0.6	0.0	0.6	0.0	0.0	0.0	0.0	0.0

Table 4: Comparison of mean scores of variables between males and females

Variables	Male mean (SD)	Female mean (SD)	p-value
OITN 0.29 (0.4)	0.27 (0.4)	0.798	
DMF	2.97 (3.0)	3.73 (3.1)	0.194
Angle	12.9 (48.6)	3.6 (19.4)	0.08
OIDP 0.9 (2.3)	1.0 (2.1)	0.93	

*. Correlation is significant at the 0.05 level.

Table 5: Comparison of mean values of the prevalence of impact on daily performance between IOTN, gender and Angle groups.

Variable	n	SD	Range	Mean	P-value
IOTN					
No need	117	1.42	9.7	0.6	
Definite need	44	3.2	13.9	2.0	0.00*
Gender					
Female	123	2.1	13.9	1.0	
Male	38	2.3	9.7	0.9	0.3
Angle					
Normal	31	1.2	4	0.5	
CI I	220	4.9	19.4	3.2	
CI II div1	2	0	0	0	
CI II div2	1	0	0	9.7	0.3
CI III	5	1.2	2.8	0.8	

*. Correlation is significant at the 0.05 level.

Table 6: Frequency and P value of the oral conditions causing impacts on the eight activities.

Cause of difficulty	N	%	Pearson Correlation	Sig. (2-tailed)
Bad position of teeth	32	19.8%	.679**	.000*
Spacing between the teeth	7	4.3%	.426**	.000*
Deformity of the mouth and face	3	1.9%	.135	.087

*. Correlation is significant at the 0.05 level.

Table 7: Intensity of oral impact between genders.

Gender		Frequency	Percent
Male	Valid	Very Little	32
		Little	2
		Moderate	2
		Severe	2
		Total	38
Female	Valid	Very Little	109
		Little	7
		Moderate	5
		Severe	1
		Very severe	1
		Total	123
			100.0

Table 8: Percentage distribution of different intensity of OIDP among the dental students in relation to orthodontic treatment need.

OITN		Frequency		Percent
no definite need for orthodontic treatment	Valid	Very Little	106	90.6
		Little	8	6.8
		Moderate	2	1.7
		Severe	1	.9
		Total	117	100.0
definite need for orthodontic treatment	Valid	Very Little	35	79.5
		Little	1	2.3
		Moderate	5	11.4
		Severe	2	4.5
		Very severe	1	2.3
		Total	44	100.0

CONCLUSION:

OIDP was statistically significant among adolescents with definite orthodontic need than in those with no need for orthodontic treatment. However there was no statistical significant difference between the prevalence of OIDP and Angle's classes of malocclusion ($p= 0.1$). Therefore, prevention of malocclusion problems in Libya seems vital. The authorities are suggested to use the results of this study and similar research and promote prevention in the community. Further research on larger sample size will also be definitely beneficial.

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