

Use of the index of orthodontic treatment need in a school population of Zahedan

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Abstract: IOTN Index has been used in different countries for assessment of orthodontic treatment need in recent years. This index has 2 components, an Aesthetic Component (AC) and Dental Health Component (DHC). **Objective:** The aim of this study is determining orthodontic treatment need based on IOTN in 11-14 years old students in zahedan (2010-2011). **Materials and Methods:** This study was an analytical descriptive study. It was undertaken among 11-14 years old zahedanian schoolchildren. The method of sampling was cluster sampling. In total, 395 students (198 boys and 197 girls) randomly selected from schools in zahedan. The examination were done with disposable dentistry mirrors and measurements were done with disposable rulers, and photographs were taken with digital camera statistical analysis For comparison result between girls and boys we used chi-square test. **Result:** The results for DHC of IOTN were: 46/6% of population showed little or no need for treatment, 17% were in borderline category and 36/5% had a severe or very severe need for treatment. In evaluating AC, 77/2% of children was in no need or little need, 16/2% in moderate need and 6/6% in severe or very severe need to treatment group. The results for ACE were: 63/9% no need and little need, 27/8% moderate need and 8/3% severe or very severe need. There was no significant statistical difference between girls and boys. But there was significant statistical difference between AC and ACE (p=0.0001), AC and DHC (p=0.016), ACE and DHC (p=0.0002). **Conclusion:** Evaluation of this index in zahedan show that most of people are in no need or little need group of orthodontic treatment.

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Key word: AC, ACE, DHC

Introduction

The assessment of malocclusion and treatment need for public health purposes is necessary to plan for orthodontic treatment and training programs for specialists. Such data are not available for the Zahedani population. Many methods (Draker, 1960; Grainger, 1967; Saltzmann, 1968; Summers, 1971; Linder-Aronson, 1974) have been designed for assessing malocclusion. However, a universally accepted index does not exist. The Index of Orthodontic Treatment Need (IOTN; Brook and Shaw, 1989) was developed to rank malocclusion on the basis of the significance of various occlusal traits for dental health and aesthetic impairment. The index incorporates a dental health component (DHC) based on the recommendation of the Swedish Medical Board (Linder-Aronson, 1974) and an aesthetic component (AC) developed by Evans and Shaw (1987). The IOTN has been shown to be valid and reproducible (Shaw *et al.*, 1991). The underlying intention of the IOTN is to identify those individuals who would be most likely to benefit from orthodontic treatment. The aim of this investigation was to estimate the orthodontic treatment need in a sample of schoolchildren.

Subjects and methods

Permission to undertake the survey was obtained from the Department of Health and Education. A letter was sent to the parents of the children to seek consent for their cooperation in the study. This letter also served to inform the parents about the examination procedures and to reassure them of the confidentiality of any information collected. Only positive consent was accepted. After the examination, the parents received a letter indicating whether orthodontic treatment was necessary. Twenty schools from five different geographic administrative divisions were selected. Children aged 11–14 were selected because at this age, treatment of dental and skeletal malocclusion is possible. All the 11–14-year-old children present on the day of screening (395 subjects: 197 girls and 198 boys) in the 20 schools selected were examined. Children who had undergone or were undergoing orthodontic treatment were excluded. An examiner who had been previously trained in the use of the occlusal indices undertook the screening. The clinical examination was performed using a conventional chair under natural light. No radiographs, study casts, or previous written records of the children were used. The IOTN was calculated through direct examination. The DHC of IOTN has five grades. Grades 1 and 2

represent no/little need for treatment; grade 3 denotes borderline need for treatment; and grades 4 and 5 signify high priority for treatment. Practically, 10 features or traits of malocclusion were considered: overjet, anterior crossbite, overbite, open bite, lateral crossbite, displacement of teeth, impeded eruption of teeth, clefts of lip and/or palate, Class II and Class III buccal occlusion, and hypodontia. The results were recorded in data sheets. Photograph of each subject was taken by a digital camera and saved in the computer. Then the photographs were used to assign grade of AC from 1 to 10 and the results were recorded in data sheets. The examiner also determined the grade of AC for each subject and the data was recorded as an ACE component.

Statistical analyses

Data was analyzed using the Statistical Package for Social Sciences for Windows SPSS. Qualitative data was analyzed using the chi-squared test to determine differences in treatment need between subgroups of participants. The significance level was set at 0.05. Kappa (κ) statistic (Landis and Koch, 1977), which is a chance-corrected measure of agreement, was used to analyze the results. A correlation coefficient test was used to compare the professional assessments.

Results

The results are presented in Tables 1 to 6.

Most of the schoolchildren were in the no-need or little-need grade based on IOTN components. Based on AC and ACE components most of the schoolchildren were in the no-need or little-need categories, with less children in the great-need grade compared to those in the moderate-need and no-need grades; however, based on DHC component most of the schoolchildren were in the little-need grade.

In comparison of Zahedan schoolchildren with other populations, these schoolchildren were found to have better dental esthetics and consequently lower (77.2%) orthodontic treatment need. Our results showed that most of the schoolchildren were in no-need or little-need grades for orthodontic treatment based on DHC component; however, in other studies (2,9,12,14,16,19) most of the population were in the great-need grade for orthodontic treatment.

1. Age and gender distribution of the samples

Age (years)	11–12	1–13	13–14
Number	109	142	144
Percent	2706 %	3509 %	3605%

Table 2. Frequency of dental health component (DHC) and grades of the index of orthodontic treatment need by gender

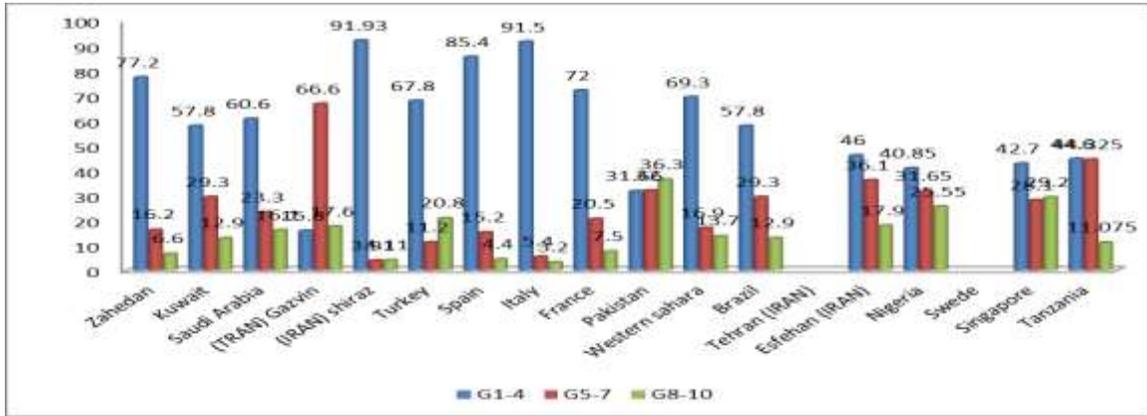
DHC \ Gender	Grades 1 and 2		Grade 3		Grades 4 and 5		Total	
	n	%	n	%	n	%	n	%
Males	98	49050	34	17017	66	33033	198	100
Females	86	43065	33	16075	78	39060	197	100
Males and females	184	4606	67	17	144	3605	395	100

There were no statistically significant differences between girls and boys in DHC component by use of chi-squared test (chi-squared=1.80, df=2, p=0.41).

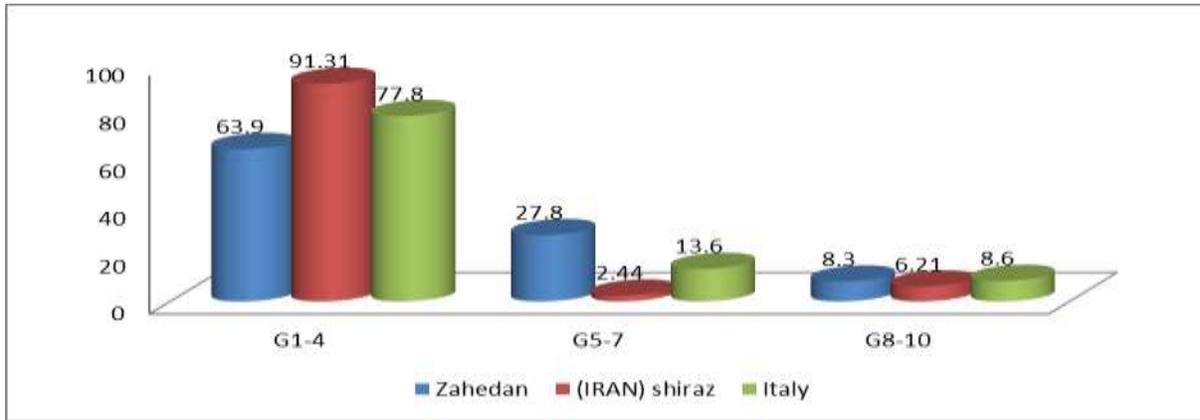
Table 3. Frequency of the aesthetic component of the Index of Orthodontic Treatment Need by gender

AC \ Gender	Little need		Moderate need		Great need		Total	
	n	%	n	%	n	%	n	%
Males	146	73.73	36	18.18	16	8.08	198	100
Females	159	80.71	28	14.21	10	5.07	197	100
Males and females	305	77.2	64	16.2	26	6.6	395	100

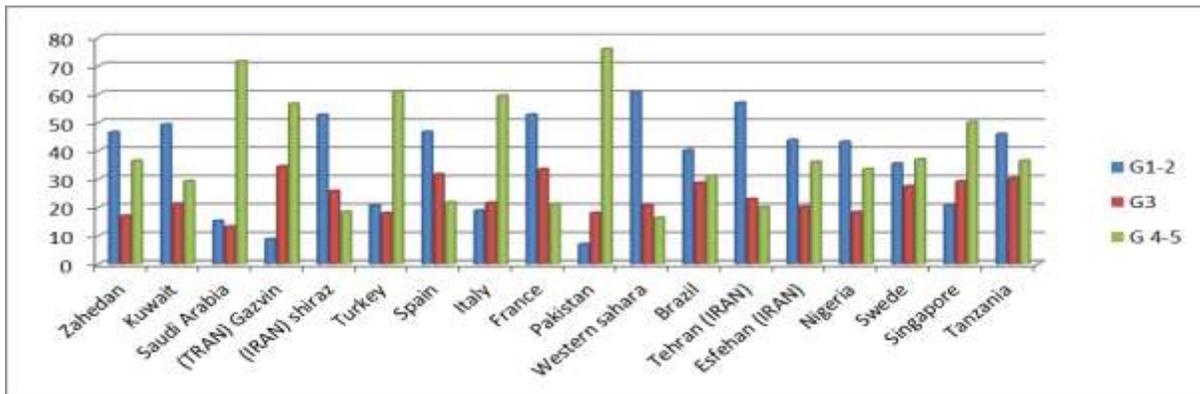
The comparison of AC component by use of chi-squared test showed no statistically significant differences between girls and boys (chi-squared=2.94, df=2, p=0.23)



Graph 1. The descriptive comparison of orthodontic treatment need between Zahedan, other cities of Iran and other countries based on AC component.



Graph 2. The descriptive comparison of orthodontic treatment need between Zahedan, other cities of Iran and other countries based on ACE component.



Graph 3. The descriptive comparison of orthodontic treatment need between Zahedan, other cities of Iran and other countries based on DHC component.

Table 4. Frequency of the aesthetic component of the Index of Orthodontic Treatment Need by gender

IOTN component	Little need		Moderate need		Great need		Total	
	n	%	n	%	n	%	n	%
Males	128	64.64	55	27.77	15	7.57	198	100
Females	124	62.94	55	27.91	18	9.13	197	100
Males and females	252	63.9	110	27.8	33	8.3	395	100

The comparison of ACE components by use of chi-squared test did not show statistically significant differences between genders (chi-squared=0.33, df=2, p=0.85).

Table 5. Distribution of AC, DHC and ACE components of the Index of Orthodontic Treatment Need

ACE	Little need		Moderate need		Great need		Total	
	n	%	n	%	n	%	n	%
DHC	184	46.6	67	17	144	36.5	395	100
AC	305	77.2	64	16.3	26	6.6	395	100
ACE	252	63.9	110	27.8	33	8.3	395	100

Correlation between AC and DHC was statistically significant (chi-squared=12.152, df=4, p=0.016)

Correlation between ACE and DHC was statistically significant (chi-squared=45.769, df=4, p=0.0002)

Correlation between ACE and AC was statistically significant (chi-squared=32.116, df=4, p=0.0001)

Discussion

The present investigation is the first Zahedan survey of orthodontic treatment need using the IOTN. Increasing international use of this index allows comparison of orthodontic treatment need in Zahedan with other population groups; it also allows comparison of our results with other cities of Iran. In this study a group of 395 schoolchildren was evaluated. The results of AC (77.2% in grades 1–4) and ACE (63.9% in grades 1–4) components indicate that most of the subjects were categorized in the little-need or no-need grade for orthodontic treatment. In comparison, females showed less orthodontic treatment need compared to males but the difference was not statistically significant. The results of AC component in the present study was very similar to other cities in Iran and other countries (2,4,5,8,10,11,13–16,18). In relation to the AC component the results of the present study were very similar to those of Spanish schoolchildren (Manzanera and et al., 2009), which might be attributed to the age range of the subjects. The results of the present study were different from those of populations in Ghazvin (Iran) (mean age of 18.1) and Pakistan (mean age of 18), which might be attributed to differences in the age range of the subjects. The results of the present study based on ACE (63.9%) are similar to those in Italy (77.8%, Nobile 2007) and Shiraz (91.3%, Hedayati 2007), which were categorized as having a little or no orthodontic treatment need; these groups were in a similar age range. The results of the present study based on DHC component were similar to those in other cities of Iran (Tehran and Shiraz) and other countries such as Spain, France, Pakistan, Kuwait, Nigeria and Tanzania. The results of DHC component

in the present study (11–14 years of age) showed little or no need for orthodontic treatment but it was different from those in Ghazvin (mean age of 18.1), Saudi Arabia (17–24 years of age) and Singapore (17–22 years of age), which exhibited severe need for orthodontic treatment. In spite of age differences the subjects of current studies were populations who referred to treatment centers but the subjects in the present study were schoolchildren who were selected randomly. In an investigation in Sweden on immigrating adolescents (Josefsson et al., 2007) there were no significant differences the three grades of orthodontic treatment need but the subjects who had severe need (37%, DHC grades of 4 and 5) were more numerous than others. In the present study there were no differences between males and females, similar to other cities in Iran and in other countries.

Conclusion

Widespread use of IOTN in epidemiological studies could be useful for comparing the treatment needs in different populations and is suitable for planning community dental health resources. According to AC component (77.2%), ACE (63.9%) and DHC (46.6%) Zahedani schoolchildren were found to have better dental aesthetics and consequently a lower orthodontic treatment need. There were no significant differences between males and females.

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