

Relationship of Patients' Perception of Malocclusion Related Quality of Life and Orthodontic Treatment Need in Adults

Papon Chongthanavanit¹, Suwannee Luppanapornlarp¹, Siripen Arunpraphan², Irin Sirisoontorn^{1*}

1. Department of Clinical Dentistry, Walailak University International College of Dentistry, Bangkok, Thailand.

2. Department of Oral Health Science, Walailak University International College of Dentistry, Bangkok, Thailand.

Abstract

The objective of the study was to find the relationship among patients' perception of malocclusion, quality of life, and orthodontic treatment need. A total of 128 orthodontic patients participated in this study. Patients were interviewed by using Index of Orthodontic Treatment Need Aesthetic Component (IOTN_AC) and Oral Impacts on Daily Performance (OIDP) in order to determine their perspectives. For orthodontists' examination, a dental model was analyzed and measured by Dental Aesthetic Index (DAI). ANOVA and Pearson correlation were used to find the relationship of patients' perception of malocclusion, quality of life, and malocclusion measure by dentist. The result shows there was a relationship between the degree of orthodontic treatment need with DAI. In terms of malocclusion related quality of life, malocclusion affected participants the most by getting embarrassed when they smile, followed by difficulty in cleaning their teeth, and avoiding social interaction, respectively. In conclusion, the study shows the relationship between the degree of orthodontic treatment need from patients' perception on malocclusion (IOTN_AC) and DAI. This finding emphasizes that IOTN_AC and DAI are alternative tools for evaluating the severity of malocclusion and reflect the degree of orthodontic treatment need.

Clinical article (J Int Dent Med Res 2022; 15(1): 223-229)

Keywords: Malocclusion, Oral Impacts on Daily Performance (OIDP), Dental Aesthetic Index (DAI), Index of Orthodontic Treatment Need (IOTN), Quality of Life, Patients' Perception.

Received date: 04 November 2021

Accept date: 21 January 2022

Introduction

Malocclusion is a public health concern with high prevalence in different populations, causing physical and psychological implications, influencing oral health-related quality of life. The impact of malocclusion on both individuals and populations has been explored extensively. Malocclusion could be one of the factors influencing many dental diseases such as an increase in caries and periodontal disease.^{1,2} Further attributes of oral health are (1) It is a fundamental component of health, physical, and mental well-being. It exists along a continuum influenced by the values and attitudes of people and communities. (2) It reflects the physiological, social, and psychological attributes that are essential to the quality of life. (3) It is influenced

by the person's changing experiences, perceptions, expectations, and ability to adapt to circumstances.^{3, 4} The definition acknowledges the multifaceted nature and attributes of oral health that are beyond the oral cavity.

Orthodontists have developed a number of measures or indices to assess the severity of a malocclusion, the need for treatment, the perceived complexity of treatment, and the quality of the result. These are usually based on assessing relevant occlusal features as defined by the profession either clinically or from a set of study models. A major limitation of this approach is that it fails to take into account the way people really feel and therefore does not correspond to broader concepts of health and needs.⁵ In overcoming this shortcoming, research has focused on finding the relationship by using previous measures which are Oral Impacts on Daily Performances (OIDP), and Index of Orthodontic Treatment Need Aesthetic Component (IOTN_AC) compared with Dental Aesthetic Index (DAI) in order to find out the relationship of malocclusion impact on oral health-related quality of life (OHRQoL).

*Corresponding author:

Dr. Irin Sirisoontorn,
Department of Clinical Dentistry,
Walailak University International College of Dentistry,
Bangkok, Thailand.
E-mail: irin.sirisoontorn@gmail.com

Oral Health and Quality of Life Measures

Condition-specific measures have advantages over generic measures such as being clinically sensible, more responsive, and more acceptable to patients as they cover only relevant areas, the research tool usually shorter than generic measures. Specific measures are designed for use in clinical situations. A narrow focus potentially allows researchers to determine significant relationships between symptoms and changes in health.¹

Sheiham developed Oral Impacts on Daily Performance (OIDP) as a condition-specific measure of OHRQoL.⁶ Eight questions were used to measure the impact of the oral cavity on daily life: three reflecting the physical dimensions (eating, speaking, cleaning teeth); three reflecting the psychological dimensions (resting plus to sleep, to maintain a normal mood, to smile without embarrassment to others who saw teeth), and two are social dimensions (work, hanging out with people).

Malocclusion Measures in Orthodontics

Malocclusion is a disorder from multiple factors such as skeletal and dental growth disturbances, genetic influence, etc. Major benefits of orthodontic treatment are improvement in physical function, prevention of tissue damage, improved aesthetics, and psychosocial well-being.⁷



Figure 1. The Aesthetic Component (AC) of IOTN.

According to orthodontic treatment, most research tools were developed to help orthodontists evaluate conditions of the patients and develop treatment plans (e.g., IOTN_AC, Index of Orthodontic Treatment Need Dental Health Component (IOTN_DHC). Several indexes are used by dentists or dental hygienists for malocclusion registration to evaluate severity levels and orthodontic treatment needs. IOTN_AC is an orthodontic index based on socially defined aesthetic standards which patients can self-evaluate.⁸ This approach can reflect people's perception of the attractiveness of their teeth by showing ten photos of teeth (Figure 1).

Index of orthodontic treatment need aesthetic component can be interpreted into three degrees of orthodontic treatment need which are "no need", "borderline", and "definite need".

The Dental Aesthetic Index (DAI) is an orthodontic index based on socially defined aesthetic standards. It is useful in both epidemiological surveys to identify unmet needs for orthodontic treatment and as a screening device to determine priority for subsidized orthodontic treatment. DAI components consist of common malocclusion characteristics such as missing teeth, crowding (incisal segment), spacing (incisal segment), midline diastema, anterior maxillary irregularity, anterior mandibular irregularity, maxillary overjet, mandibular overjet (reverse overjet), open bite, and molar relation. Then, the dentist can calculate the severity of malocclusion into a DAI score and interpret the results into three degrees of orthodontic treatment need which are "no need", "borderline", and "definite need".

Relationship of Malocclusion Measures by Patients' Perception and Dentists' Analysis and Quality of Life

Systematic review by Dimberg, Arrrup, Bondemark found that there is high-quality evidence that severe malocclusions in the aesthetic zone have an impact on OHRQoL in children and adolescents, predominantly in the dimensions of emotional and social well-being.⁹ Two studies stated that increased orthodontic treatment need had a negative impact on OHRQoL.^{10, 11}

In addition, six studies revealed that malocclusions predominantly affected the dimensions of self-esteem, social disability, and

psychological discomfort.^{10, 12-16} Two studies indicated that dental aesthetics have a significant effect on perceived OHRQoL.^{16, 17} According to previous studies, the severity of malocclusion was analyzed by dentists using an orthodontic index such as DAI which may not reflect patients' perception of their malocclusion on their quality of life. In this study, research has focused on finding the relationship by using previous measures which are ODP, IOTN_AC and DAI in order to find out the relationship of malocclusion impact on OHRQoL.

H1: There is a relationship of the degree of orthodontic treatment need from patients' perception (IOTN_AC) on malocclusion and quality of life (ODP)

H2: There is a relationship of the degree of orthodontic treatment need from patients' perception (IOTN_AC) on malocclusion and dental aesthetic index (DAI)

H3: There is a relationship of quality of life (ODP) and dental aesthetic index (DAI)

Materials and methods

Survey research design was conducted to answer the research question. A questionnaire was generated by questions from IOTN_AC and ODP. The content would reflect the perception of patients' malocclusion and individual's quality of life. Items were derived following a literature review. Then, research tool evaluation was performed by quantitative approach: reliability and validity test.

Sample plan

The sample included patients receiving dental services from Advanced Oral Health Center at Walailak University International College of Dentistry between 2020 and 2021. Exclusion criteria of this study were (1) Patients did not pass the screening or refused to get orthodontic treatment, (2) Patients had missing data or no dental model, (3) Primary or Mix-dentition, (4) All samples who met the criteria will be included in this study to avoid selection bias.

A 95 percent level of confidence implies that 95 out of 100 samples will have the true population value within the margin of error (E) specified. The value was calculated and presented in Table 1.¹⁶

Population Size	Variance of the population P = 50%		
	Confidence level = 95%		
	Margin of error		
	5	3	1
50	44	48	50
75	63	70	74
100	79	91	99
150	108	132	148
200	132	168	196
250	151	203	244
300	168	234	291
400	196	291	384
500	217	340	475

Table 1. Sample Size based on Desired Accuracy with Confidence Level of 95%.¹⁹

Sample Size based on Desired Accuracy with Confidence Level of 95%.¹⁹ The population from the clinic is 150, the sample size will be a minimum of 108 samples; 128 respondents participated in this study, 22 patients were lost.

Collection of Data

Respondents were selected from the list of patients with malocclusion at age 18+. Before an interview, respondents finished a survey form to reduce bias answer from the interview.

For patients' perspectives, structured interview was used; participants were randomized from the list of patients. The interview of respondents used structured questions following IOTN_AC, ODP.

For orthodontists' examination, the dentist analyzed DAI by model analysis. Before collection of data in DAI part, intra examination calibrations were performed. Thirteen dental models were analyzed twice: first time the dentist analyzed the models at the first visit of consultation. Then, the same models were analyzed again after 2 weeks later in order to compare the results of the first and second time and calculate Kappa. Typically Kappa should be more than 80%.²⁰

Results

Prior to testing the research hypotheses, the reliability and validity of the tools were tested. Cronbach's alpha was 0.947, which indicates a high level of internal consistency for the scale with this specific sample. For validity tests, the index of item objective congruence (IOC) from three experts was used. All the questions scored higher than 0.5 meaning that every question was valid. The results confirmed that the research tool was ready to use for collecting and analyzing

data. A total of 128 respondents participated in the study. The characteristics of the participants are shown in Table 2.

		Frequency	Valid Percent
Age	18-23	23	18.0
	24-30	45	35.2
	31-40	55	43.0
	41+	5	3.9
	Total	128	100.0
Gender	Male	51	39.8
	Female	77	60.2
	Total	128	100.0
History of previous orthodontic treatment	Used to	32	25.0
	Never	96	75.0
	Total	128	100.0
Chief complaint	Spacing	31	24.2
	Crowding	54	42.2
	Proclination	42	32.8
	Crossbite	1	0.8
	Total	128	100.0

Table 2. Demographic Characteristics of the Participants.

According to the chief complaint of participants, results show that most patients chose proclination of the front teeth as the reason to see the orthodontist (n = 42, or 32.8%), followed by crowding (n = 54, or 42.2%), and spacing (n = 31, or 24.2%).

Patients' Perception on Malocclusion

Descriptive statistics were performed to quantitatively describe overall patients' perception on malocclusion by IOTN_AC (Table 3).

	Photo	Frequency	Valid Percent
IOTN_AC	1	39	30.5
	2	30	23.4
	3	23	18.0
	4	19	14.8
	5	0	0
	6	10	7.8
	7	5	3.9
	8	1	0.8
	9	0	0
	10	0	0
	Unknown	1	0.8
	Total	128	100.0

Table 3. Patients' Perception on Malocclusion by IOTN_AC.

Regarding the patients' perception on malocclusion, results demonstrate that the perception of photo number one was chosen by most patients (n = 39, or 30.5%), followed by photo number two (n = 30, or 23.4%), and photo number three (n = 23, or 18%). Then, IOTN_AC were analyzed to interpret the orthodontic treatment need (Table 4).

		Frequency	Valid Percent
IOTN_AC Interpretation	No need	111	86.7
	Broader line	15	11.7
	Definite need	2	1.6
	Total	128	100.0

Table 4. Interpretation IOTN_AC to Orthodontic Treatment Need.

According to the interpretation of orthodontic treatment need by IOTN_AC, results demonstrate that in terms of participants' perception about malocclusion, most may not need orthodontic treatment (n = 111, or 86.7%), followed by broader line treatment need (n = 15, or 11.7%), and very few may require definite orthodontic treatment (n = 2, or 1.6%).

Patients' Perception on Quality of Life

Descriptive statistics were performed to quantitatively describe overall patients' perception on quality of life by OIDP (Table 5).

Quality of life	Minimum	Maximum	Mean	Std. Deviation
Eat	0	25	2.21	4.57
Speak	0	12	1.10	3.23
Clean	0	25	5.58	7.39
Sleep	0	15	1.34	3.90
Emotion	0	10	0.34	1.48
Smile	0	25	7.29	7.32
Work	0	20	2.10	5.75
Social	0	25	3.42	5.99
Overall Quality of Life	0	70	23.38	20.48

Table 5. Minimum, Maximum, Means and Standard Deviations of Attributes in Quality of Life.

Regarding the patients' perception on quality of life, the results demonstrate that for malocclusion effect most chose smile (M = 7.29, SD = 7.53), followed by cleaning (M = 5.58, SD = 7.39), and social (M = 3.42, SD = 5.99), respectively.

Dental Aesthetic Index (DAI)

Dentists analyzed DAI by model analysis. Descriptive statistics were performed to

quantitatively describe DAI of the samples. The mean and standard deviation of DAI samples were determined (M = 32.41, SD = 7.32). Then, DAI was interpreted to orthodontic treatment need (Table 6).

		Frequency	Valid Percent
DAI Interpretation	No need	20	15.6
	Borderline	35	27.3
	Definite need	73	57.0
	Total	128	100.0

Table 6. IOTN_AC Interpretation of Orthodontic Treatment Need.

According to the interpretation of orthodontic treatment need by DAI, results demonstrate that the majority of participants' DAI shows complication of malocclusion which needs orthodontic treatment (n = 73, or 57%), followed by broader line treatment need (n = 35, or 27.3%), and only a few participants' DAI suggests minor malocclusion which may not require definite orthodontic treatment (n = 20, or 15.6%).

Relationship of Orthodontic Treatment Need from Patients' Perception on Malocclusion and Quality of Life

One-way analysis of variance was performed to find out differences in orthodontic treatment need from patients' perception on malocclusion and quality of life (Table 7).

	Sum of squares	df	Mean Square	F	Sig.
Between Groups	1212.41	2	606.21	1.46	0.237
Within Groups	52061.83	125	416.50		
Total	53274.24	127			

Table 7. One-way Analysis of Variance of Orthodontic Treatment Need from Patients' Perception on Malocclusion and Quality of Life.

One-way ANOVA was conducted to compare the differences in three levels of orthodontic treatment need from patients' perception on malocclusion to quality of life. There were no significant differences in orthodontic treatment need from patients' perception on malocclusion and quality of life, $F(2,125) = 1.46$, $p = 0.237$ (Table 7). This finding shows that the interaction between the degree of orthodontic treatment need from patients' perception on malocclusion and the quality of life is not consistent.

Relationship of Orthodontic Treatment Need from Patients' Perception on Malocclusion and Dental Aesthetic Index (DAI)

One-way analysis of variance was performed to find out differences in orthodontic treatment need from patients' perception and DAI (Table 8).

	Sum of squares	df	Mean Square	F	Sig.
Between Groups	556.88	2	278.442	5.580	0.005
Within Groups	6237.99	125	49.904		
Total	6794.88	127			

Table 8. One-way Analysis of Variance of Orthodontic Treatment Need from Patients' Perception and DAI.

One-way ANOVA was conducted to compare the differences in three levels of orthodontic treatment need from patients' perception and DAI. There were significant differences in degree of orthodontic treatment need from patients' perception and DAI, $F(2,125) = 5.58$, $p = 0.005$ (Table 8). Post hoc analyses using the Scheffe post hoc criterion for significance indicated that the average of DAI was significantly higher in definite need (M = 40.50, SD = 7.32) than were those in borderline (M = 37.27, SD = 2.49) and in no need orthodontic treatment (M = 31.60, SD = 7.45). There were significant differences between DAI and degree of orthodontic treatment need from patients' perception which were "no need" and "borderline" group ($p = 0.004$) (Table 9).

Dependent Variable	(I) Orthodontic Treatment Need	(J) Orthodontic Treatment Need	Mean Difference (I-J)	Std. Error	Sig.
DAI	No need	Borderline	-5.66*	1.94	0.004
		Definite need	-8.90	5.04	0.080
	Borderline	No need	5.66*	1.94	0.004
		Definite need	-3.23	5.32	0.544
	Definite need	No need	8.90	5.04	0.080
		Borderline	3.23	5.32	0.544

Table 9. Multiple Comparisons (Post-hoc) of Orthodontic Treatment Need from Patients' Perception on Malocclusion and DAI.

Relationship of Quality of Life and Dental Aesthetic Index (DAI)

Pearson correlation was performed to find out the relationship in quality of life and DAI (Table 10).

		Quality of Life	DAI
Quality Of Life	Pearson Correlation	1	-0.088
	Sig. (2-tailed)		0.324
	N	128	128
DAI	Pearson Correlation	-0.088	1
	Sig. (2-tailed)	0.324	
	N	128	128

Table 10. Pearson Correlation of Quality of Life and Dental Aesthetic Index (DAI).

Pearson correlation was conducted to find out the relationship in quality of life and DAI. There was no relationship between quality of life and DAI ($p = 0.324$).

Discussion

According to the objective of this research, tests of the three hypotheses were performed using one-way ANOVA and Pearson correlation. This part will be discussed following the hypotheses.

H1: The study showed that there was no relationship between the degree of orthodontic treatment need from patients' perception on malocclusion and quality of life. Participants with negative self-perceptions of their smile tend to undergo orthodontic treatment. Most respondents were still concerned about the appearance of their teeth even though they thought that no treatment was needed (low IOTN_AC), leading to a desire of orthodontic treatment. This result supports the finding of Kok, et. al in 2004 which revealed that children with a definite need for orthodontic treatment did not have a worse oral health-related quality of life.²¹

H2: The result indicated that there is a relationship between the degree of orthodontic treatment need from patients' perception on malocclusion and DAI. IOTN_AC increased or decreased in line with the severity of the malocclusion according to the DAI. This finding emphasizes that IOTN_AC and DAI are alternative tools for evaluating the severity of malocclusion and reflects the degree of orthodontic treatment need.

H3: Another finding is that there is no relationship between quality of life and DAI. DAI from orthodontists' analysis of the dental model showed the severity of malocclusion which indicated the degree of orthodontic treatment

need. In 2016, from the study of Ashari and Mohamed support this finding that the DAI did not predict the effect of malocclusion on quality of life.²² For example, after the model analysis of one patient, the index indicated that no treatment was needed in this patient; the patient felt dissatisfied with her smile. She still requested to fix that tiny problem.

Most of the samples in this study were adult (18-41+). The oral health related quality of life measured by OHIDP evaluated quality of life in three dimensions: (1) physical dimensions (eating, speaking, cleaning teeth); (2) psychological dimensions (resting plus to sleep, to maintain a normal mood, to smile without embarrassment to others who saw teeth), and (3) social dimensions (work, hanging out with people). Regarding the patients' perception on quality of life, the results demonstrate that respondents chose that malocclusion affects the psychological dimension the most followed by the physical dimension and the social dimension, respectively. Another finding shows that the proclination of the front teeth was the reason most patients see the orthodontists, followed by crowding, and spacing, respectively. Another study found that dissatisfaction with dental appearance causes loss of confidence and leads to the desire for orthodontic treatment.²³⁻²⁵ Psychological dimensions of quality of life influences seeking orthodontic treatment the most.

Conclusions

In adult orthodontic patients, the psychological dimension had the most impact followed by the physical dimension and social dimension. The top three chief complaints of patients seeking orthodontic treatment were proclination, crowding, and spacing, respectively. There was no relationship between the degree of orthodontic treatment need from patients' perception on malocclusion and quality of life. In addition, DAI and quality of life did not have a relationship as well. There was a relationship between the degree of orthodontic treatment need from patients' perception on malocclusion and DAI.

Acknowledgements

The author(s) gratefully acknowledge the funding received towards my master's degree from Walailak University International College of Dentistry.

Declaration of Interest

The authors report no conflict of interest.

References

1. Cunningham SJ, Hunt NP. Quality of life and its importance in orthodontics. *Journal of orthodontics* 2001;28(2):152-58.
2. Sayuti E, Latif DS, Aziz M, Sasmita IS. Prevalence of Malocclusion and Orthodontic Treatment Need in Children with Autism. *Journal of International Dental and Medical Research* 2021;14(2):686-90.
3. Glick M, Monteiro da Silva O, Seeberger GK, et al. FDI Vision 2020: shaping the future of oral health. *International Dental Journal* 2012;62(6):278-91.
4. Glick M, Williams DM, Kleinman DV, et al. A new definition for oral health developed by the FDI World Dental Federation opens the door to a universal definition of oral health. *British dental journal* 2016;221(12):792-93.
5. Isiekwe GI, Sofola OO, Onigbogi OO, Utomi IL, Sanu OO. Dental esthetics and oral health-related quality of life in young adults. *American Journal of Orthodontics and Dentofacial Orthopedics* 2016;150(4):627-36.
6. Gherunpong S, Tsakos G, Sheiham A. Developing and evaluating an oral health-related quality of life index for children; the CHILD-OIDP. *Community dental health* 2004;21(2):161-69.
7. Goyal S, Goyal S, Muhigana A. Assessment of malocclusion severity levels and orthodontic treatment needs using the Dental Aesthetic Index (DAI): A retrospective study. *Rwanda Medical Journal* 2013;70(3):20-27.
8. Nugroho MJ, Ismah N, Purbianti M. Orthodontic Treatment Need Assessed by Malocclusion Severity using the Dental Health Component of IOTN. *Journal of International Dental and Medical Research* 2019;12(3):1042-46.
9. Dimberg L, Arnrup K, Bondemark L. The impact of malocclusion on the quality of life among children and adolescents: a systematic review of quantitative studies. *European Journal of Orthodontics* 2015;37(3):238-47.
10. Mu C, Zhi-Cai F, Xue L, et al. Impact of malocclusion on oral health-related quality of life in young adults. *Angle Orthodontist* 2015;85(6):986-91.
11. Dalaie K, Behnaz M, Khodabakhshi Z, Hosseinpour S. Impact of malocclusion severity on oral health-related quality of life in an Iranian young adult population. *European journal of dentistry* 2018;12(1):129.
12. Ekuni D, Furuta M, Irie K, et al. Relationship between impacts attributed to malocclusion and psychological stress in young Japanese adults. *Eur J Orthod* 2011;33(5):558-63.
13. Frejman MW, Vargas IA, Rösing CK, Closs LQ. Dentofacial deformities are associated with lower degrees of self-esteem and higher impact on oral health-related quality of life: results from an observational study involving adults. *J Oral Maxillofac Surg* 2013;71(4):763-7.
14. Choi SH, Kim BI, Cha JY, Hwang CJ. Impact of malocclusion and common oral diseases on oral health-related quality of life in young adults. *Am J Orthod Dentofacial Orthop* 2015;147(5):587-95.
15. Clijmans M, Lemiere J, Fieuws S, Willems G. Impact of self-esteem and personality traits on the association between orthodontic treatment need and oral health-related quality of life in adults seeking orthodontic treatment. *Eur J Orthod* 2015;37(6):643-50.
16. Masood M, Suominen AL, Pietila T, Lahti S. Malocclusion traits and oral health-related quality of life in Finnish adults. *Community Dentistry & Oral Epidemiology* 2017;45(2):178-88.
17. Klages U, Bruckner A, Zentner A. Dental aesthetics, self-awareness, and oral health-related quality of life in young adults. *Eur J Orthod* 2004;26(5):507-14.
18. Kotliik J, Higgins C. Organizational research: Determining appropriate sample size in survey research appropriate sample size in survey research. *Information technology, learning, and performance journal* 2001;19(1):43-50.
19. Taherdoost H. Determining sample size; how to calculate survey sample size. *International Journal of Economics and Management Systems* 2017;2:237-39.
20. Sim J, Wright CC. The Kappa Statistic in Reliability Studies: Use, Interpretation, and Sample Size Requirements. *Physical Therapy* 2005;85(3):257-68.
21. Kok YV, Mageson P, Harradine NW, Sprod AJ. Comparing a quality of life measure and the Aesthetic Component of the Index of Orthodontic Treatment Need (IOTN) in assessing orthodontic treatment need and concern. *Journal of Orthodontics* 2004;31(4):312-8.
22. Ashari A, Mohamed AM. Relationship of the Dental Aesthetic Index to the oral health-related quality of life. *The Angle Orthodontist* 2016;86(2):337-42.
23. Insee K, Rieopisittangkit N, Borikul N, Sukjariangporn R. Self-perceived Orthodontic Treatment Needs and Self-perceptions on Dental Aesthetic in Early Adolescence. *Khon Kaen University Dental Journal* 2020;23(3):44-51.
24. Koruyucu M, Elif T, Munevveroglu AP, Gozde A, Seymen F. Orthodontic Treatment Needs of Children: Comparison of Three Index-Çocuklarda Ortodontik Tedavi ihtiyacı: Üç indeksin Karşılaştırılması. *Journal of Istanbul University Faculty of Dentistry* 2014;48(2):1-12.
25. Reshitaj A, Bujupi R, Reshitaj K, Bytyqi B. Oral Health Related Quality of Life and Dental Anxiety in Children with Malocclusion between 11-14 years Old. *Journal of International Dental and Medical Research* 2019;12(3):1047-9.