

## The Impact of Fixed Appliances (Braces) on Quality of Life

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### Abstract

Patient own quality of life is an important aspect in providing holistic and well-balance treatment to patient. Any dental treatment done should not be detrimental to patient's daily life and normal routine. Orthodontic therapy has been known to influence patient's mental and psychical health during treatment.

This study explored the relationship between quality of life and fixed appliances (braces) by adopting a set of questionnaires. A total of 102 (83% females and 17% males) patients were randomly invited and consented to this study. They were asked to answer questions regarding diet changes, pain perception, physical changes and psychological effect.

The results showed that 76.5% have difficulties in eating, 74.5% experience pain in the mouth, 45% could not pronounce words correctly and 41% complaint that their meal routine were interrupted.

In conclusion, this study shows that fixed appliances (braces) have some detrimental effect to patient's quality of life and will influence their oral health impact profile.

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### Introduction

Patient with dental malocclusion have become more concern regarding their appearance and request fixed appliances to treat the condition. Nowadays, it has become a burden to the government to fund the expensive treatment and a lucrative income for the private sector. Thousands of dollars were spent per patient to have straight teeth and a nice smile. In recent study, more than 74.57% of the population suffered from dental malocclusion and it give a big impact on individual's physical, social and psychological well-being<sup>1</sup>. Dental malocclusion such as crowding and spacing could reduce patient's self-esteem and could hinder them from their normal social life. Thus, it is important to get an early orthodontic treatment in order to treat the dental condition. There are many challenges that will be face by orthodontic patient such as

pain, difficulty in eating, diet changing, problem pronouncing words and ulcers. These challenges could affect their quality of life. Moreover, this condition might become worse if periodontal problem occur in adolescent patient. Reduced periodontal support could cause tooth drifting, rotation and mobility<sup>2</sup>. As high as 90.1% of adolescent with orthodontic appliances (both fixed and removable appliances) claim the treatment affect their eating and speaking<sup>3</sup>. This unfortunate event has directly resulted in a negative social impact on their daily life. Food contained sticky sugar and carbonated drinks should also be avoided when wearing fixed appliances because it could make cleaning difficult and could damage tooth surface (enamel decalcification). However, white spot lesion before the start of treatment should not be confused with decalcification after fixed appliances treatment<sup>4</sup>.

Apart from that, orthodontic treatment could cause feeling of discomfort and pain that usually experience by the patient<sup>5</sup>. Fixed appliances specifically have more impact on the daily routine rather than removable appliances<sup>3</sup>. Thus, it is crucial to do a study on the effect of this treatment to oral health and the quality of life. Fixed appliances were known to affect speech in

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early stages of the treatment. Few studies found that, it was common to have some difficulties or changes in pronouncing certain words especially with letter S, I and Z<sup>6,7</sup>. This alteration of pronunciation may persist for a few days and few weeks for some. In another study, patients who had labial fixed appliances will experience more speech difficulties approximately up to 7 days compared to lingual appliances<sup>6</sup>. Moreover, some malocclusion such as Class III occlusion, diastema, increased in overjet, open bite, deep bite and asymmetry if not properly treated could lead to higher risk of speech disorder like dyslalias<sup>8</sup>. When speech is affected, it directly affects their daily work especially those who work in the front-line services area such as sales, teachers, lawyer, health personal and other profession which needs direct communication. Apart from that, Muslim patients would also have difficulty in reciting the holy Quran properly when speech is affected. Orthodontic fixed appliances also affect dietary habits. Patient usually need to make changes to their diet especially on what they eat and how they prepare the food. They tend to have smaller pieces of food to help them bite and chew<sup>9</sup>. However, drastic changes in diet could result in weight loss for some patients. This is a classic example whereby fixed appliances treatment could directly affect and reduce patient's quality of life.

The pain experience during treatment was among the most frequent complaint from patients. As high as 39% of patients, complaint of discomfort and mild pain during the placement of arch wire into bracket slot<sup>10</sup>. Patient with fixed appliances suffered the highest pain intensity between one to five days after activation compared to removable appliances. These might give an adverse effect on school and leisure activities<sup>11</sup>. Intolerance to pain could also jeopardized the whole treatment plan where patient might request to stop and terminate the treatment completely. Nevertheless, Hans et al stated that, patient will slowly adapt to the pain after few days of treatment and those who have a positive mind set and attitude will able to adapt faster and have lesser pain<sup>5</sup>. Therefore, it is recommended to take NSAIDs medications to reduce the pain at the early stage of treatment and every time after each visit. However, allergic reaction and adverse effect should be deeply considered before taking the medication<sup>12</sup>. In summary, this study is aimed at oral health

impact on patient undergoing orthodontic treatment and to study the effect of fixed appliances on the quality of life.

## Materials and methods

This cross-sectional study was conducted at the Orthodontic Specialist Clinic, Islamic Sciences University of Malaysia (USIM), located in Kuala Lumpur, Malaysia. A total of 120 patients who were undergoing orthodontic treatment with fixed appliances (braces) were randomly selected. Whereas patients who had a history of using removable or functional appliances were excluded. They were excluded because these appliances could increase the treatment time of orthodontic treatment to more than one year. Hence, this could affect the motivation and their perception towards the treatment. All of the subjects were given a self-administered fourteen-item questionnaire. Consent were acquired prior to the study. The questionnaire was modified from the oral health impact profile by Slade and Spencer<sup>13</sup> and were constructed in bilanguage (English and Malay language). Prior to the study, a pre-test of few questionnaire was conducted for content validity. Reliability was computed using Cronbach's alpha. Then, minor correction was done to the questions to make it simple and easily understood.

A total of 14 questions related to the effect of fixed appliances on patient's oral health impact profile were included using a 6-point Likert scale from 0=very often to 5=don't know. Negative statements were included to reduce response set bias. They were divided into 4 segments which were related to diets changes, pain perception, physical changes and psychological effect. The total score of the questionnaire will be calculated by rounding the overall score from each domain. A higher score indicates a good oral health impact profile and reflex a better quality of life.

## Results

From 120 patients, 16 patients declined to participate, and 2 questionnaires were discarded due to incomplete data. Final respondents were 102 where 83% were females and 17% were males. Demographically, 88% of patients were from Malay ethnicity, 11% were Chinese and 1%

was Indian. However, this study does not resemble Malaysia's population as a whole because Malays only comprised of 45% of the population. Majority of the patients were Malay because the clinic is situated in Malay housing area and community. Table 1 presents the socio-demographic characteristics of the study population. The respondents mean age was 21 years old  $\pm$  5.33 years with a median of 17 years old. The youngest patient was 13 years old and the oldest was 36 years old. Teenagers (10 to 19 years old) make up the largest group at 49% followed by 42% young adults (21 to 29 years old) and 9% adult patient (30 to 39 years old). Table 2 demonstrates that the highest complaint during wear of fixed appliance was difficulties in eating with 76.5% patients had difficulties to consume food. Apart from that, 41.2% patient's complaint of their meal routine being interrupted where they were forced force to change their diet. Nevertheless, 78.4% said that their diet was still satisfactory, and they still could enjoy their daily meals. In addition, only 9.8% had worsening of their taste sensation during treatment.

Variable	10 to 19 n (%)	20 to 29 n (%)	30 to 39 n (%)
Gender			
Male	12 (12%)	4 (4%)	1 (1%)
Female	38 (37%)	39 (38%)	8 (8%)
Race			
Malay	40 (39%)	41 (40%)	9 (9%)
Chinese	9 (9%)	2 (2%)	0 (0%)
Indian	1 (1%)	0 (0%)	0 (0%)

**Table 1.** Demographic characteristics in three age groups.

No.	Questions in summary	Yes n (%)	No n (%)	Unsure n (%)
1	Difficulties pronouncing words	46 (45.1)	54 (52.9)	2 (2.0)
2	Worsening taste sensation	10(9.8)	91(89.2)	1(1.0)
3	Pain in the mouth	76(74.5)	24(23.5)	2(2.0)
4	Difficulties in eating	78(76.5)	24(23.5)	0(0.0)
5	Reduce self esteem	26(25.5)	72(70.6)	4(3.9)
6	Feeling tense	18(17.6)	82(80.4)	2(2.0)
7	Unsatisfactory diet	18(17.6)	80(78.4)	4(3.9)
8	Meal routine interrupted	42(41.2)	59(57.8)	1(1.0)
9	Unable to rest	28(27.5)	72(70.6)	2(2.0)
10	Feeling embarrass	12(11.8)	87(85.3)	3(2.9)
11	Uncomfortable to others	7(6.9)	92(90.2)	3(2.9)
12	Disturbed daily work	17(16.7)	85(83.3)	0(0.0)
13	Depression with life	11(10.8)	88(86.3)	3(2.9)
14	Unable to function	8(7.8)	92(90.2)	2(2.0)

**Table 2.** List of questions and the percentage of answer.

Pain in mouth due to fixed appliance recorded as the second highest complaint at

74.5%. This usually happen during the first few days after the bond up procedure. The force use to trigger tooth movement could be the cause of pain. Apart from that, residual arch wire or long uncut arch wire also could cause traumatic ulcers. Difficulties in communication due to inability to pronounce correct words was experienced by almost half of the patients (45%). For most patients this condition was temporary and will become better after few days. As high as 25% admitted having low self-esteem due to the fixed appliances. Furthermore, more than 11% felt embarrass and 6.9% felt uncomfortable to others during the treatment duration. More than 10% of patients felt depressed and 7.8% admitted that they were unable to function normally. Apart from that, fixed appliances treatment may affect patient's physical body. More than 17% complaint of feeling tense and 27% complaint of unable to rest. Lastly, 16.7% said that the treatment affected their work and could reduce their productivity. Lastly, the total score for the questionnaire in this sample was 4447 which was considered as having a moderate oral health impact profile.

## Discussion

Study on quality of life and oral health impact is not a new science. Dental patient's quality of life has been studied since 1980s<sup>14,15,16</sup>, while oral health impact profile has been developed since 1990s<sup>13,17</sup>. This research tools have allowed researchers to correlate between the impact of dental health and sickness towards the well-being of patient both psychologically and physically. In this study, high school children and young adults comprised of more than two-third because the cost of orthodontic treatment in USIM was considered inexpensive and affordable. Apart from that, the waiting time to received treatment of more than two years might force many adult patients to seek immediate treatment in private clinic. The overall results indicate that the highest complaint during treatment with fixed appliances (braces) was eating disarray. This finding was concurrence to other research looking at eating behaviour during orthodontic treatment. In their study, they found that 51.4% and 86.5% patients' complaint of uncomfortable to consume food<sup>18,19</sup>. Most of them complaint of difficulty during biting and chewing food<sup>9</sup>. Because of this condition, patient

tend to avoid carrots, meat dishes, toffees and crisps. They also consume more soft diet such as mashed potato, cheese, banana, soup, and boiled vegetable<sup>9</sup>. Interestingly, most patient adapt more healthier diet due to the discomfort of eating hard food by consume less of pan-frying food and snack.

Having a well-balanced diet and a good meal is important to human well-being. A sudden change in normal diet could have detrimental effect on the body and weight. Patients undergoing orthodontic treatment were usually advised to take soft diet and avoid hard food to prevent any breakages of the fixed appliances. Breakage if left untreated could lead to prolong treatment time and could incur in extra cost to the patient. Although, 41.2% patients had to make changes to their diet and consume more soft diet, 78.4% feel that their meal was still satisfactory. This could be because most Malaysian consume soft boiled rice, noodle and bread as their main meal. Apart from that only 10% complaint that their taste sensation become worse during the initial period of fixed appliances treatment. This could be because of residual bonding agent; acid etch or composite still lingering in the mouth after bonding up procedure. Patients also admit that the taste alteration is just temporary event. However, there were no evidence that orthodontic appliances could affect taste and flavour between various treatment<sup>20</sup>. The second highest complaint was the occurrence of pain during the treatment whereby 74.5% patients reported of pain and discomfort. The forces used to trigger tooth movement could be the cause constant pain throughout the treatment. This result coincides with other studies where the most common pain experienced during the first two hours after activation<sup>21</sup> and could last between 3 to 5 days after placement of new arch wire<sup>5</sup>. It has been suggested that patient should take some form of pain control such as acetaminophen, ibuprofen or aspirin to relief the pain<sup>22</sup>.

Almost half of the patient's complaint of difficulties in communication due to inability to pronounce certain words in the early stage of the treatment. However, this is well known occurrence with orthodontic treatment. It has been reported that, patient with fixed appliances experience difficulties in pronouncing words which affect their speech and communication<sup>6,7</sup>. Nevertheless, this situation is usually temporary

and will improve with time and practice. In this study, 25% of the patients admitted having low self-esteem 11% felt embarrassed and 6% felt uncomfortable to others due to when wearing fixed appliances. This could be due to the metal braces sticking in front of the teeth, which can also affect their self-image. Furthermore, 10% reported of depression and 7.8% felt unable to function normally. This showed that orthodontic treatment does have negative impact on psychological of a patient. For some, oral health quality of life can temporarily worsen compared to before the start of the treatment<sup>23</sup>. It has also been reported that, adolescent age group have lower levels of psychological well-being and were more vulnerable to undesirable psychological effects of treatment compared to preadolescent and adults<sup>24</sup>. However, psychological effect changes after treatment, where it became more positive. This is in agreement with study regarding the correction of dental malocclusion and orthodontic treatment which have shown positive psychological effect on patients<sup>25</sup>. Reduction of this percentage during and after treatment was a good sign that the treatment does improve patient's self-esteem.

## Conclusions

In short, this study has shown that fixed appliances (braces) have some effect to patient's quality of life and could influence their oral health impact profile. Furthermore, pain, discomfort, diet changes and detrimental psychological effect in dental patient is real and should be advised accordingly prior to the start of the treatment. Patient selection is very important and explanation on the physical and psychological changes that might happen should be discuss with patient prior to the treatment.

## Declaration of Interest

Authors have declared that they have no conflict of interest in this study.

## References

1. Sharma R, Sharma K, Yadav D, Choudhary A, Singh S. A study to determine the prevalence of malocclusion and chief motivational factor for desire of orthodontic treatment in Jaipur, India. *World J Dent.* 2015;6(2):87-92.
2. Haslinda R and Azrul H. Esthetic consideration in conjunction with periodontic and orthodontic approaches in Class III gingival recession: A case report. *World Applied Sciences Journal.* 2014;30(1):365-369

3. Eduardo B, Aubrey S, and Cesar MO. Impacts on daily performances related to wearing orthodontic appliances. *The Angle Orthodontist*. 2008;78(3):482-486.
4. Azrul H and Muhammad H. White spot lesion among patients attending USIM orthodontic clinic. *International Dental Journal*. 2015;65(Special Issue 2):65-65.
5. Hans GS, Ulrich K, Andrej Z. Pain and discomfort during orthodontic treatment: causative factors and effects on compliance. *American Journal of Orthodontics and Dentofacial Orthopaedics*. 1998;114(6):684-691.
6. Ambesh KR, Joe ER, Sanjay VG. Comparison of speech performance in labial and lingual orthodontic patients: A prospective study. *Dent Res J*. 2014;11(6):663-675.
7. Ruscello DM, Tekieli ME, Van Sickels JE. Speech production before and after orthognathic surgery: A review. *Oral Surg Oral Med Oral Pathol*. 1985;59(1):10-14.
8. Farronato G, Giannini L, Riva R, Galbiati G, Maspero C. Correlations between malocclusions and dyslalias. *Eur J Paediatr Dent*. 2012;13(1):13-8.
9. Feras AAJ, Susan JC, Nick C, Ama J. A qualitative study of the early effects of fixed orthodontic treatment on dietary intake and behaviour in adolescent patients. *European Journal of Orthodontics*. 2012;34(1):432-436.
10. Lew KK. Attitude and perceptions of adults towards orthodontics treatment in Asian community. *Community Dent Oral Epidemiol*. 1993;21(1):31-5.
11. Anna-Paulina W, Lars B. A randomized controlled trial of self-perceived pain, discomfort, and impairment of jaw function in children undergoing orthodontic treatment with fixed or removable appliances. *The Angle Orthodontist*. 2015;86(2):324-330.
12. Nandita S, Siddarth S, Junaid A, Ashok SK. Pain management in orthodontics. *J Clin Diagn Res*. 2013;7(6):1258-1260.
13. Slade GD and Spencer AJ. Development and evaluation of the oral health impact profile. *Community Dental Health*. 1994;11(1):3-11.
14. Brown LJ, Brunelle AJ, Carlos JP. Oral health of U.S. Adults 1985: Tooth mortality, sociodemograph and other dental health characteristics. *J. Dent. Res*. 1987;66 (Special Issue):96-96.
15. Susan TR. The impact of dental conditions on social functioning and the quality of life. *Ann Rev. Public Health*. 1988;(9):1-19.
16. Reisine ST and Weber J. The effects of temporomandibular joint disorders on patients' quality of life. *Community Dent Health*. 1989;6(3):257-270.
17. Locker D and Slade G. Oral health and the quality of life among older adults: the oral health impact profile. *Journal Canadian Dental Association*. 1993;59(10):830-833.
18. Mu C, Da-Wei W, and Li-Ping W. Fixed orthodontic appliance therapy and its impact on oral health-related quality of life in Chinese patients. *The Angle Orthodontist*. 2010;80(1):49-53.
19. Vanessa de CN, Ana Cláudia de CFC, Maurício de ACa, Danilo PV, Renata Rodrigues de AP. Impact of orthodontic treatment on self-esteem and quality of life of adult patients requiring oral rehabilitation. *The Angle Orthodontist*. 2016;86(5):839-845.
20. Gilad HZ, Ilana B, Jacob S. Psychophysical testing of taste and flavour reactivity in young patients undergoing treatment with removable orthodontic appliances. *European Journal of Orthodontics*. 2004;26(1):73-78.
21. Omur P and Ali IK. Pain control during fixed orthodontic appliance therapy. *The Angle Orthodontist*. 2005;75(2):214-219.
22. Li XT, Tang Y, and Chen YX. Interventions for pain during fixed orthodontic appliance therapy. *The Angle Orthodontist*. 2010;80(5):925-932.
23. Man Z, Colman MG, Urban H. Changes in oral health-related quality of life during fixed orthodontic appliance therapy. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2008;133(1):25-29.
24. David FB, Roger GM. The pain experience and psychological adjustment to orthodontic treatment of preadolescents, adolescents and adults. *Am J Orthod Dentofacial Orthop*. 1991;100(4):349-356.
25. Asuman KH. Does orthodontic treatment affect patients' quality of life? *Journal of Dental Education*. 2008;72(8):886-894.