

**PATIENT'S DISCOMFORT ASSOCIATED WITH
FIXED ORTHODONTIC APPLIANCES TREATMENT
(RASA TIDAK NYAMAN PADA PASIEN YANG
BERHUBUNGAN DENGAN ALAT PERAWATAN
ORTODONTIK CEKAT)**

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ABSTRACT

To determine the prevalence and factors causing discomfort during fixed orthodontic treatment. Two hundred patients of fixed orthodontic patients in UiTM clinics who were willing to participate and could consent to the research were selected. The participants were randomly selected for this research in the odd number sequence from the population size of 740 individuals. Data was collected employing an Oral Impact on Daily Performance questionnaire to assess discomfort intensity and bio-psychosocial variables. Statistical analysis used was descriptive statistics and chi-squared statistics. The prevalence of discomfort in patients with fixed orthodontic appliances was 92% (mean: 0.92, standard deviation: 0.27), which covers 184 of the samples. Eating food (68%), speaking clearly (37%), cleaning teeth (64%), sleeping (21%), smiling and laughing, and showing teeth without embarrassment (21%) remained independently associated with a greater prevalence of discomfort ($P \leq 0.05$). The patient wearing fixed orthodontics appliances has a high prevalence of discomfort. The factors

associated with the discomfort included eating food, speaking, cleaning teeth, sleeping, and smiling and laughing, showing teeth without embarrassment.

Keywords: appliances; discomfort; fixed orthodontic

ABSTRAK

Untuk mengetahui prevalensi ketidaknyamanan dan faktor penyebab ketidaknyamanan selama perawatan ortodontik cekat. Dipilih 200 pasien ortodontik cekat di klinik UiTM yang bersedia berpartisipasi dan mampu memberikan persetujuan dalam penelitian. Para peserta dipilih secara acak untuk penelitian ini dalam urutan angka ganjil dari ukuran populasi 740 individu. Data dikumpulkan melalui kuesioner Oral Impact on Daily Performance untuk menilai intensitas ketidaknyamanan dan variabel bio-psikososial. Analisis statistik yang digunakan adalah statistik deskriptif dan statistik chi-square. Prevalensi ketidaknyamanan pada pasien dengan alat ortodontik cekat adalah 92% (rata-rata: 0,92, standar deviasi: 0,27) yang mencakup 184 sampel. Makan makanan (68%), berbicara dengan jelas (37%), membersihkan gigi (64%), tidur (21%), dan tersenyum dan tertawa memperlihatkan gigi tanpa rasa malu (21%) tetap terkait secara independen dengan prevalensi ketidaknyamanan yang lebih besar ($P \leq 0,05$). Pasien yang memakai alat ortodontik cekat memiliki prevalensi ketidaknyamanan yang tinggi. Faktor yang berhubungan dengan ketidaknyamanan antara lain makan, berbicara dengan jelas, membersihkan gigi, tidur, dan tersenyum dan tertawa memperlihatkan gigi tanpa rasa malu.

Kata kunci: alat; ortodontik cekat; rasa tidak nyaman

INTRODUCTION

Aiste Kavaliauskiene et al.

described discomfort as unpleasant perceptions, feeling of restrictions in the

oral cavity, pressure on the mucosa, stretching of the soft tissues, displacement of the tongue, soreness of teeth, and pain. Orthodontic treatment can cause both physical and psychological discomfort. These types of discomfort would negatively influence the patient's intention to undergo orthodontic treatments, their compliance, and the quality of treatment itself. According to Serg et al., orthodontic patients frequently undergo functional complaints and social discomfort throughout the treatment, and they are usually anxious about their appearance. During fixed orthodontic treatment, patients' self-confidence might be affected by the visibility of the appliances, and speech impairment, especially during social interactions in which attention is focused on the face, eyes, and mouth.^{1,2}

All orthodontic procedures, including fixed or removable appliances, would exert pain and discomfort in patients. However, this feeling of pain and discomfort is subjective and varies in every patient. Dalili described pain from orthodontic treatment as mild and short lasting. However, some patients might experience severe pain to the extent of impaired mastication and tooth brushing. The initial stage of orthodontic treatment is crucial as it is the time for patients to adjust and adapt to the treatment. Most patients

withdraw from the treatment because of the unbearable pain they perceive during this time.^{3,4}

Several main factors contribute to the discomfort experienced by orthodontic patients, as reported by Leandro Silva Marques et al., including types of appliances, amount of forces applied during the initial stage of treatment, previous pain and emotional experiences, and cognitive and environmental factors such as age, sex, and culture. Moreover, certain activities would also increase discomfort perceived by patients during orthodontic treatment. Variations in individual responses toward certain types of activity would be beneficial in determining which factors that would exert more pain and discomfort on the patients. According to Rocket al., discomfort may be influenced by several factors, including force generated by the archwire, the ligation technique, soft tissue ulceration, or even difficulties in mastication.^{5,6}

Orthodontic treatment, including fixed appliances, is completed within 15 to 24 months. During treatment, the movement of teeth depends on the gradual bone turnover and periodontal adaptation in response to the applied force. Various factors influenced treatment time, including patient compliance, occlusal features, and treatment protocol. Extraction-based

treatment and treatment involving molar relationship correction would prolong the treatment time.⁷

Notably, orthodontic treatment has a significant influence due to some treatment-related side effects, especially in fixed orthodontics treatment. An early study by Jing Wang et al. reported that many patients, especially adolescents, have difficulty adjusting to the treatment because of pain, anxiety, and distress. They also feel embarrassed about the aesthetic changes in appearance with fixed orthodontic appliances. However, with the popularity of orthodontic treatment in recent years, the aesthetic factors that influence the quality of life are decreasing because patients and their peers gradually accept this temporary change in appearance.⁸

A recent study by Chen et al. indicates that as the treatment progress, patients may adapt to continuous pain as the sensation cease or at least disappear from their focus of attention. A clinician must precisely know and explain to the patient the time needed for the adaptation. Insufficient knowledge about orthodontic treatment and lack of communication between the clinician and patients could lead to patients' withdrawal from the treatment.^{9,10}

Therefore, this study aimed to determine the prevalence of discomfort in

fixed orthodontic patients and the factors causing discomfort during fixed orthodontic treatment.

METHOD

Subjects

The study group comprised 200 patients - 47 males (23.5%) and 153 females (76.5%). The sample was obtained by approaching consecutive patients who agreed to participate in the study, attending orthodontic treatment at the Orthodontic Clinic, Faculty of Dentistry UiTM Sungai Buloh Campus from December 2016 till March 2017. Approval for the study was obtained from UiTM Research Ethics Committee (600-IRMI (5/1/6)).

The main criteria for including patients in the study group were 18 years old and above, patients who were cognitively capable of giving consent in the research, and completing the questionnaire alone. The study sample consisted of patients with fixed orthodontic appliances using conventional brackets with 0.022-inch slots. Patients selected were medically fit and healthy, had normal dentofacial morphology, and presented with good teeth and healthy periodontium. At the same time, patients with the systemic condition, extra/intraoral anchorage, and dentofacial abnormalities were excluded from the study group.

Study variables

Patients were asked to complete a questionnaire and answer questions about pain and discomfort they had experienced at least three months after the appliance insertion. The Oral Impacts on Daily Performance questionnaire (Fig 1) consisted of 11 items that focused on the impact of oral health on daily activities performance such as eating, speaking, cleaning teeth, undertaking light physical activities, going out, sleeping, relaxing, smiling, enjoying contact with other people and emotional stability. The frequency and severity of each reported oral health impact were further assessed. Patients were asked to indicate the frequency and severity scores by choosing a scale of 0 to 5, in which 0 indicates no discomfort, and 5 is the maximum discomfort felt by the patients.

Statistical analysis

The statistical significance of differences between the prevalence of discomfort and factors that caused discomfort during fixed orthodontics treatment were evaluated using descriptive and chi-squared statistics. If the patient had discomfort for at least one of the factors listed, the patient was considered to have overall discomfort. A p-value ≤ 0.05 was considered statistically significant. All statistical analyses were performed with SPSS for Windows version 24.0 (SPSS Inc.,

Chicago, IL, USA) statistical software package.

RESULT

The response rate to participation in the study was 100%. The prevalence of discomfort in fixed orthodontic patients was 92%. Data shows 184 individuals from samples consisting of 200 orthodontic patients were having general discomfort while wearing fixed orthodontic appliances. On the other hand, only 16 individuals, equal to 8% of total samples, had no discomfort. (Table 1) The result is also represented in the pie chart in Figure 1.

Table 1. General discomfort status

		Frequency (n)	Percentage (%)
General Discomfort	Yes	184	92
	No	16	8

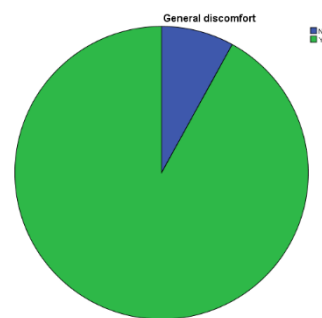


Figure 1. General discomfort

Table 2. Association between gender and activities towards discomfort status

		Discomfort status		P value
		Yes	No	
Gender	Male	44 (93.6%)	3 (6.4%)	0.640
	Female	140 (91.5%)	13 (8.5%)	
Activities	Eating	136 (68.0%)	64 (32.0%)	0.000
	Speak clearly	74 (37.0%)	126 (63.0%)	0.001
	Cleaning teeth	127 (63.5%)	73 (36.5%)	0.000
	Doing light physical activities	5 (2.5%)	195 (94.5%)	0.504
	Going out	11 (5.5%)	189 (94.5%)	0.314
	Sleeping	42 (21.0%)	158 (79.0%)	0.032
	Relaxing	9 (4.5%)	191 (95.5%)	0.365
	Smiling, laughing and showing teeth without embarrassment	41 (20.5%)	159 (79.5%)	0.034
	Emotional state	15 (17.5%)	185 (92.5%)	0.235
	Carrying out major work	12 (6.0%)	188 (94.0%)	0.292
	Enjoying contact of other people	19 (9.5%)	181 (90.5%)	0.177

Data in Table 2 shows only several factors are associated with the general discomfort of patients wearing fixed orthodontic appliances. Perceived discomfort is closely related to eating ($p=0.000$), speaking clearly ($p=0.001$), cleaning teeth ($p=0.0000$), sleeping ($p=0.032$), and smiling and laughing, showing teeth without embarrassment ($p=0.034$). Data recorded for other factors were not associated with the general discomfort perceived by the patients.

These findings indicate that patients who are having discomfort in eating, speaking, cleaning teeth, sleeping, and smiling and laughing, showing teeth without embarrassment, would have a high

prevalence of having a general discomfort during fixed orthodontic treatment.

DISCUSSION

This study was performed on 200 patients who were asked to complete a questionnaire concerning discomfort they perceived with fixed orthodontic appliances. The results of the present study demonstrate that approximately 92% (mean: 0.92, standard deviation: 0.27) of participants experienced discomfort due to the use of a fixed orthodontic appliance which may negatively influence their quality of life. This percentage is equivalent to 184 of the samples—another 16 patients from the samples claimed to have no discomfort at all.

The possible reason for these patients not having discomfort at all might be because of the high pain threshold level compared to others. According to a study by Marques et al., the degree of crowding that the patients have also contributes to the pain and discomfort perceived by patients. Severe crowding would influence in the higher magnitude of force applied during orthodontic treatment. Hence, patients who claimed to have no discomfort during treatment might be because of less severity of crowding during the initial treatment. Moreover, the patients had been wearing the fixed appliances for more than three

months, and some of them to the extent of more than six months. Thus, the patient can adapt to pain and discomfort as the treatment progress.⁵

Because gender differences were not statistically significant in the perception of discomfort, the findings were evaluated without sex discrimination. Since the questionnaires were not distributed equally between males and females, it might contribute to the insignificant findings of the data. No gender discrimination was found to be significant for the perception of pain in fixed orthodontic patients. However, girls reported more discomfort/pain during fixed appliance treatment than boys.

This study reported that eating food was statistically significant to the general discomfort perceived by patients with fixed orthodontic appliances. This finding was supported by a previous study by Rakhshan et al.; patients experienced pain or discomfort while chewing food especially fibrous, sticky, or firm foods, but the pain and discomfort were reduced when consuming soft foods. The result also shows that 70 participants experienced discomfort during eating regularly, whereas another 63 participants only reported the discomfort in part of the period. Among the participants, four individuals score 0 for discomfort during eating, eight individuals score 1, 27 individuals score 2, 62 individuals score 3,

22 individuals score four and another 13 individuals score 5. Since the majority of patients scored 3, it indicates that discomfort during eating was said to be moderate.¹¹

Stewart et al. reported that removing appliances made swallowing and speech more difficult. In our study, 37% of patients (n: 74), had discomfort in speaking clearly, with the majority of patients having discomfort only for part of the period (n: 47). The finding for discomfort in speaking is said to be significant as the p-value is ≤ 0.05 . Our results were consistent with the previous literature. Fujita (1979) studied 20 orthodontic patients and observed tongue soreness and difficulty with speech within the first months of treatment. Moreover, in our study, six patients score 0 for the discomfort to speak, 22 patients scored 1, 20 patients scored 2, 19 patients score 3, 6 patients score four, and only one patient scored 5. It indicates that discomfort to speak clearly during fixed orthodontic treatment is said to be mild to moderate.¹²

A study by Rakhshan et al. showed that brushing teeth would cause pain and discomfort. The pain was experienced in a large population of the sample, although it was only described as mild pain. This discomfort might result in an impaired oral hygiene status of patients. Patients might neglect their oral hygiene care because of

pain and discomfort perceived during brushing. It is supported by another study by Krukemeyer et al., which suggested that orthodontic pain might negatively affect the patients' oral hygiene efforts. The majority of patients (n: 52) give a score of 3 for these factors, indicating moderate discomfort during teeth cleaning.^{1,13}

Only 2.5% (n: 5) of patients reported discomfort in doing light physical activities, while the others were not. A possible explanation might be that patients involved in this study had undergone orthodontic treatment for more than three months. They might have adapted to certain activities, especially in doing only light physical activities, Marques et al., Among these five patients, three patients were having discomfort regularly while the other two patients were having discomfort only for parts of the period. Moreover, four of the patients gave a score of 1, meaning that the discomfort perceived was only mild.⁵

Serg et al. suggested that psychosocial factors may influence patients' adaptation to pain and discomfort during orthodontic treatment. However, social factors were reported to be statistically not significant in our study. Patients who have these problems may have a lack their self-esteem and self-confidence. It is supported by Marques et al., stating that perception and intensity of discomfort are directly

associated with the individual characteristics of each patient, including their self-esteem, self-confidence, patients' compliance, and expectations.^{2,5}

Impaired sleeping is statistically significant in causing discomfort during fixed orthodontics treatment. 21.0% of patients (n: 42) reported sleep disturbances throughout the fixed appliance treatment, with the majority of them experiencing moderate discomfort, scaled 2 (n: 13) and 3 (n: 16). Kavaliauskiene et al. reported that over half of the patients in the study, which equals to 53.8% indicated sleep disturbance during fixed orthodontic treatment. Unfortunately, our result contradicts Rawji's et al., findings that reported no difference in sleep quality for patients who who underwent orthodontics treatment after they had been worn for a minimum of three months. A previous study by Kvam et al. also stated 78% of patients' sleeping habits were not impaired during undergoing fixed orthodontics treatment.^{1,14,15}

Only nine (4.5%) participants claimed discomfort during relaxing, while 15 (17.5%) others experienced emotional state discomfort during fixed orthodontics treatment. Both emotional state and relaxing discomfort are statistically insignificant in determining general discomfort experienced by fixed appliance patients. These findings are consistent with

a previous study by Bernabe et al., reported that emotional stability or relaxation of patients wearing orthodontics appliances were not usually affected. Only two of three hundred fifty-seven participants from their study reported impacts on relaxing.¹⁶

Rivera et al. stated that orthodontics requires patients to wear appliances throughout treatment. Patients may perceive the appliances as unattractive. This statement is related to our study because 41 (20.5%) of patients complained of discomfort during smiling, laughing, and showing teeth without embarrassment. This study reported that smiling, laughing, and showing teeth without embarrassment was statistically significant to the general discomfort perceived by patients with fixed orthodontic appliances. The majority of patients had mild discomfort between a scale of 1 (n: 10) and 2 (n: 14). According to a previous study by Twigge et al., there was a significant difference ($P = 0.015$) found in the relation between smiling, laughing, and showing teeth without embarrassment of the orthodontics patients which correlate with our findings.^{17,18}

Discomfort during carrying major work was reported to be statistically not significant in this study. 94.0% of patients (n: 188) from the study experienced no discomfort while major work. This result corresponded to Twigge et al. findings;

none of one hundred and five participants from their study were considered to have discomfort and problem while carrying out major work.¹⁸

CONCLUSION

The patient who is undergoing fixed orthodontic appliances has a high prevalence of discomfort. The factors that contributed to the discomfort included eating food, speaking, cleaning teeth, sleeping, smiling and laughing, showing teeth without embarrassment. These findings could favor orthodontists' clinical conduct, as future patients should be informed on how and to what extent orthodontic treatment can affect their physical and psychological well-being.

CONFLICT OF INTEREST

We declare no potential conflict of interest in the scientific articles we write.

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