

ORIGINAL ARTICLE / ОРИГИНАЛНИ РАД

Perception of pain, social, and functional discomfort during orthodontic treatment

Sava Matić, Predrag Nikolić

University of Belgrade, Faculty of Dental Medicine, Department of Orthodontics, Belgrade, Serbia

SUMMARY

Introduction/Objective Pain and social discomfort are common experiences after the insertion of a fixed orthodontic appliance.

The aim of the study was to determine the intensity of pain during the first seven days after the placement of a fixed orthodontic appliance, the impact of orthodontic treatment on psychosocial component of the patient and daily life activities in the first month of therapy.

Methods The study included 60 randomly selected patients from the Department of Orthodontics, Faculty of Dental Medicine, Belgrade, Serbia, aged 15 to 20 years. After the insertion of a fixed orthodontic appliance, the patients were given a questionnaire form comprising questions related to the intensity of pain in the first seven days, function of speech and chewing, oral hygiene, injury of the oral mucosa, and social contacts. For the processing of results obtained from the questionnaire χ^2 test was used.

Results The largest percentage of respondents (21.7%) rated pain with grade 1, while less than 10% of respondents gave grades 4, 6, 7, 9, and 10. Most of the participants (95%) answered that they had no difficulties with daily life activities caused by the fixed orthodontic appliance. Most respondents (91.7%) did not have any social discomfort, while a small percentage (8.3%) said they had these problems.

Conclusion General intensity of pain that respondents felt during the first seven days after the placement of a fixed orthodontic appliance was low to moderate. For most of the respondents there was no change in social behavior related to the psychosocial component. Except for changes in dietary habits and sores on the oral mucosa of the cheek in the first month of therapy, examines had no major problems with daily life activities.

Keywords: orthodontic treatment; pain; discomfort

**INTRODUCTION**

Pain and discomfort are common experiences during orthodontic treatment. Discomfort manifests itself as a slight tactile pressure on the teeth, soft tissue stretching, pressure on oral mucosa, tooth sensitivity, and pain [1–4]. After the insertion of fixed orthodontic appliances, patients go through a period of adjustment and social discomfort, and they are often concerned about their appearance. The pain which occurs during orthodontic treatment is usually moderate and short-term, but because of individual reactions to pain, some patients experience severe pain which presents a problem during chewing and conducting proper oral hygiene [5]. The pain that occurs during orthodontic treatment is one of the main reasons that discourages patients from seeking orthodontic treatment, and may adversely affect the cooperation of patients [6, 7]. The experience of pain is subjective, shows great individual variation, and depends on factors such as sex, age, individual pain threshold, the strength of the applied orthodontic force, current emotional state and stress, previous experience with painful conditions, etc. [8, 9].

Orthodontists must encourage patients and answer their questions related to these symptoms. It is very difficult to measure the subjective experience of pain, because there is a

very wide range of individual reactions to pain even when the same force is used on different patients [10]. Numerous studies describe the reaction of patients to fixed orthodontic appliances and common conclusion is that the pain begins five hours after the application of orthodontic force and average duration is five days [2, 11, 12]. Most research focuses on the level of cooperation and on adaptation to the orthodontic treatment from the point of view of orthodontists [3, 6, 12–17], and little attention is paid to the perception of patients concerning the discomfort during orthodontic treatment [18]. Most papers in the literature are about the discomfort of patients during orthodontic treatment related to pain, while a large number of variables associated with psychological and psychosocial components are not studied [19].

The aim of this study was to determine the intensity of pain during the first seven days after the placement of a fixed orthodontic appliance, the impact of orthodontic treatment on psychosocial component of the patient and daily life activities in the first month of the therapy.

METHODS

The study included 60 randomly selected patients from the Department of Orthodontics, faculty of Dental Medicine, Belgrade, Serbia,

Примљено • Received:

December 22, 2015

Прихваћено • Accepted:

October 11, 2016

Online first: February 8, 2017

Correspondence to:

Sava MATIĆ
 Prespanska 11, 11050 Beograd
 Srbija
 sava.matic@gmail.com

aged 15 to 20 years. The average age was 17.53 years, with the sex structure almost equal – 46.7% of the respondents were male and 53.3% were female. The criterion for participation in the study was that respondents have permanent dentition and that they accept treatment with a fixed orthodontic appliance. Research was approved by the Ethics Committee of the Faculty of Dental Medicine and conducted under the principles of good clinical practice, which means that research involved only those patients who were previously fully informed, both orally and in writing form, about the objectives and methods of research, and juvenile patients had written parental consent. Respondents were similar in regard to their socioeconomic status.

After the insertion of the fixed orthodontic appliance, the patients were given a questionnaire form consisting of questions related to pain intensity in the first seven days after the placement of the orthodontic appliances on a scale of one to ten, issues related to the function of speech and chewing, oral hygiene, injury of the oral mucosa, and social contacts. The patients received oral and written explanation of how to fill out the questionnaire they brought back one month later. For the processing of the results obtained from the questionnaire χ^2 test was used.

RESULTS

The largest percentage of respondents (21.7%) gave grade 1 as they did not feel any pain during the first seven days, while mutually comparable percentage of respondents rated pain with grade 2 (11.7%) and grade 8 (10%), as well as grade 5 (15%) and grade 3 (13.3%), while less than 10% of the respondents gave grades 4, 6, 7, 9, and 10 (Table 1). Medication for pain relief was used by 35% of the respondents, while 65% did not take pain relief medications (Table 2).

Approximately half of the respondents (53.3%) did not have speech problems, and as much as 73.3% of the respondents had no problems with swallowing. Speech and swallowing difficulties were rare and occurred in 21.7% and 25%, respectively. A significant difference was observed in patients who have had occasional difficulties with speech (20%) and in swallowing (1.7%) (Table 2).

As much as 65% of the respondents said that there was a type of food they cannot eat after setting fixed orthodontic

Table 1. Intensity of pain during the first seven days of therapy; percentage of respondents' answers to the survey question, "Rate the strongest pain that you feel in the course of 7 days at a scale of 1 to 10 (1 – not at all, 10 – very much)."

Intensity of pain	%
1	21.7
2	11.7
3	13.3
4	8.3
5	15
6	8.3
7	6.7
8	10
9	3.3
10	1.7

Table 2. Percentage of respondents' answers to the survey questions

Survey question	Answers	%
1. Are you taking any medications to relieve the pain?	Yes	65
	No	35
2. Do you have problems with speech?	Rarely	21.7
	Sometimes	20
	Often	3.3
	Sometimes	1.7
3. Do you have problems with swallowing?	None	53.3
	Rarely	25
	Sometimes	1.7
4. Is there a type of food you cannot eat with fixed orthodontic appliance?	None	73.3
	Yes	65
5. Do you have scratches on the oral mucosa of the cheek?	No	35
	Yes	63.3
6. Do you have scratches on the inside of the lips?	No	36.7
	Yes	23.3
7. Do you have problems brushing teeth?	Yes	23.3
	No	76.7
	Never	60
	Rarely	21.7
8. Are you able to brush your teeth completely?	Sometimes	16.7
	Often	1.7
	Very often	1.7
9. Do you have difficulties with speech or with pronunciation of words?	Yes	60
	No	3.3
	Mostly	36.7
10. Are you unable to sleep because of pain, or due to some other problems caused by fixed orthodontic appliance?	No	73.3
	Rarely	15
	Sometimes	8.3
	Often	1.7
	Very often	1.7
11. Do you have difficulties in carrying out your daily life activities because of fixed orthodontic appliance?	None	70
	Rarely	15
	Sometimes	6.7
	Often	5
	Very often	1.7
12. Do you avoid laughing or do you feel embarrassed because you think others are watching your braces?	Always	1.7
	No	95
	Sometimes	5
	Often	1.7
13. Have you had any social discomfort, or has anyone mocked you because of fixed orthodontic appliance at work or school?	No	76.6
	Rarely	10
	Sometimes	11.7
	Often	1.7
13. Have you had any social discomfort, or has anyone mocked you because of fixed orthodontic appliance at work or school?	No	91.7
	Yes	8.3

appliance, such as solid food, meat, nuts, walnuts, almonds, peanuts, candies and chewing gum, whose consumption orthodontists usually don't recommend during orthodontic treatment. A small percentage of the respondents (35%) had no problems with nutrition (Table 2).

A total of 63.3% of the respondents had scratches of the oral mucosa of the cheek, and 23.3% had scratches on the inside of the lips.

The majority of the respondents (60%) said that there was never a problem while brushing teeth and that they can brush teeth completely. Rare problems with brushing were reported by 21.7%, and occasional problems by 16.7% of the respondents. As little as 1.7% of the respon-

dents reported frequent problems with brushing. A very small percentage of the respondents (3.3%) said that they could not brush their teeth completely. Impaired speech was rarely a problem for 15% of the respondents; it was occasionally a problem for 8.3% of the respondents, while 1.7% of the respondents had frequent and very frequent problems with pronunciation of some words.

The majority of respondents (70%) did not have sleeping problems caused by pain or by other issues stemming from the fixed appliance, 15% had rare problems with sleeping, 6.7% had occasional problems, and 5% of the respondents had frequent problems of this nature. Very frequent or continuous problems with sleeping caused by fixed orthodontic appliance were reported by 1.7% of the respondents, be it due to pain or some other issue.

Most of the participants (95%) answered that they had no difficulties with daily life activities because of the fixed orthodontic appliance, while only 5% said that they experienced occasional problems in this regard.

A total of 76% of the respondents said they did not avoid laughing or felt embarrassed because they thought others were watching their fixed appliances; 10% rarely avoided laughing or felt uncomfortable; 11.7% of the respondents occasionally avoided laughing or felt uncomfortable. Only 1.7% of the respondents often avoided laughing or felt embarrassed because they thought others were watching their fixed orthodontic appliance.

Most examinees (91.7%) did not experience any social discomfort – in other words, no one teased them because of the fixed orthodontic appliance, while a small percentage of the respondents (8.3%) said they had these problems (Table 2).

DISCUSSION

For the success of orthodontic treatment it is essential to emphasize aspects of treatment that are important to patients, such as the incidence of pain, discomfort, impaired function of chewing and speech. Pain that occurs after the application of fixed orthodontic appliances gradually increase during an interval of 4–24 hours after inserting the braces, but returns to normal after seven days [2, 12, 13, 20]. These findings may be important for orthodontists so that they can give information to future patients how fixed orthodontic therapy will affect their quality of life [19]. According to the literature, 70–95% of orthodontic patients will feel pain during the treatment [1, 7]. Approximately 11% of patients report that they constantly feel pain during therapy [1].

According to a research conducted by Krukemeyer et al. [21], 59% of patients had painful sensations the first few days after setting a fixed appliance. In a study conducted by Kavaliauskiene et al. [9], 72% of respondents reported the highest grades for pain after one day of using the appliance, and 61.3% of respondents did not complain of pain after one month. These results are in accordance with results of previously conducted studies in which examinees stated that initial pain begins two to four hours after the

placement of fixed orthodontic appliances; the peak occurs in the first 24 hours, and decreases by the third day [13, 22]. According to Chen et al. [23], the quality of life one month after the placement of a fixed orthodontic appliance was similar to that before the treatment. Our results show that the intensity of pain in the first seven days after the placement was low to moderate for the majority of the respondents (78.3%). This finding is similar to some of the previous studies, which also point out that the intensity of pain, discomfort, and impaired oral functions are subjective [14, 24, 25]. In a study conducted by Scheurer et al. [14], 23.3% of subjects were taking analgesics in the first 24 hours after the placement of fixed orthodontic appliances. They concluded that if patients are well informed of what they can expect after the insertion of orthodontic appliances, this reduces patients' anxiety, which in turn affects the perception of pain intensity and consumption of analgesics. Ngan et al. [26] stated that after one initial dose of painkillers after the insertion of a fixed orthodontic appliance, there is no need for an additional dose of analgesics. In their study, approximately 20% of patients were taking analgesics, and probably many of them on a preventive basis. In our study, 35% of the respondents stated that they were taking analgesics to alleviate pain.

The most common food that patients were not able to consume after setting the braces in our research was solid food – meat, nuts, walnuts, almonds, peanuts, candies, and chewing gum, which is in line with the results of surveys carried out [24, 27], in which it was found that patients report the same or similar problems in their diet. In our research, 63.3% of the respondents had scratches on the inside of the cheek; most of the respondents (76.7%) did not have sores on the inside of the lips, and a smaller percentage of examinees (23.3%) reported this problem.

According to the findings of the research conducted by Kvam et al. [1], 75.8% of patients had sores on the oral mucosa, and 2.5% had severe ulcerations caused by fixed orthodontic appliances. In a study conducted by Kavaliauskiene et al. [9], one third of respondents had a wound on the oral mucosa that occurred in the first seven days of treatment (32.3% after one year). Also, respondents in this survey did not notice the following changes in their behavior: avoiding communication (10.8%), avoiding smiling (32.3%), feeling uncomfortable in public (30.1%), or feeling uncomfortable due to problems caused by impaired speech (26.8%). Some patients did experience teasing (12.9%), and some of the respondents (9.7%) noted interest for their fixed orthodontic appliance.

Contrary to their results, in our study, 76% of the respondents said that they did not avoid laughing or felt embarrassed because they thought others were watching their fixed appliance, 10% rarely avoided laughing or felt uncomfortable, 11.7% of the respondents occasionally avoided laughing or felt uncomfortable. Only 1.7% of the respondents often avoided laughing or felt embarrassed because they thought others were watching their fixed prosthesis. Mocking due to fixed orthodontic appliances was reported by 8.3% of the respondents. In our research, 15.0% of the respondents had rare problems with pronun-

ciation of some words, 8.3% had occasional problems of this kind, while 1.7% of the respondents had frequent and very frequent problems with the pronunciation of some words.

CONCLUSION

General intensity of pain that respondents felt during the first seven days after the placement of a fixed orthodontic

appliance was low to moderate. For most of the respondents there was no change in social behavior related to the psychosocial component, and a very small percentage of respondents (1.7%) stated that they avoided laughing or that they felt embarrassed because they thought others were watching their fixed orthodontic appliance. Except for changes in dietary habits and sores on the oral mucosa of the cheek in the first month of therapy, examinees had no major problems with the maintenance of oral hygiene, speech, sleep, and other daily activities.

REFERENCES

1. Kvam E, Gjerdet NR, Bondevik O. Traumatic ulcers and pain during orthodontic treatment. *Community Dent Oral Epidemiol.* 1987; 15(2):104–7.
2. Ngan P, Bradford K, Wilson S. Perception of discomfort by patients undergoing orthodontic treatment. *Am J Orthod Dentofacial Orthop.* 1989; 96(1):47–53.
3. Sergl HG, Klages U, Zentner A. Pain and discomfort during orthodontic treatment: causative factors and effects on compliance. *Am J Orthod Dentofacial Orthop.* 1998; 114(6):684–91.
4. Har-Zion G, Brin I, Steiner J. Psychophysical testing of taste and flavour reactivity in young patients undergoing treatment with removable orthodontic appliances. *Eur J Orthod.* 2004; 26(1):73–8.
5. Dalili F. Pain perception at different stages of orthodontic treatment [doctoral dissertation]. Kuopio, Finland: Faculty of Medicine of the University of Kuopio; 2009.
6. Sergl HG, Klages U, Zentner A. Functional and social discomfort during orthodontic treatment – effects on compliance and prediction of patients' adaptation by personality variables. *Eur J Orthod.* 2000; 22(3):307–15.
7. Oliver RG, Knapman YM. Attitudes to orthodontic treatment. *Br J Orthod.* 1985; 12(4):179–88.
8. Ogura M, Kamimura H, Al-Kalaly A, Nagayama K, Taira K, Nagata J, et al. Pain intensity during the first 7 days following the application of light and heavy continuous forces. *Eur J Orthod.* 2009; 31(3):314–9.
9. Kavaliauskiene A, Smailiene D, Buskiene I, Keriene D. Pain and discomfort perception among patients undergoing orthodontic treatment: results from one month follow-up study. *Stomatologija.* 2012; 14(4):118–25.
10. Burstone CJ. Biomechanics of tooth movement. In: Krause BS, Riedel RA, editors. *Vistas in Orthodontics.* Philadelphia, PA: Lea and Febiger; 1962. p. 197–213.
11. Jones M, Chan C. The pain and discomfort experienced during orthodontic treatment. A randomized controlled clinical trial of two initial aligning arch wires. *Am J Orthod Dentofacial Orthop.* 1992; 102(4):373–81.
12. Wilson S, Ngan P, Kess B. Time course of the discomfort in young patients undergoing orthodontic treatment. *Pediatr Dent.* 1989; 11(2):107–10.
13. Scott P, Sherriff M, Dibiasse AT, Cobourne MT. Perception of discomfort during initial orthodontic tooth alignment using a self-ligating or conventional bracket system: a randomized clinical trial. *Eur J Orthod.* 2008; 30(3):227–32.
14. Scheurer PA, Firestone AR, Bürgin WB. Perception of pain as a result of orthodontic treatment with fixed appliances. *Eur J Orthod.* 1996; 18(1):349–57.
15. Bergius M, Kiliaridis S, Berggren U. Pain in orthodontics. A review and discussion of the literature. *J Orofac Orthop.* 2000; 61(2):125–37.
16. Feldmann I, List T, John MT, Bondemark L. Reliability of a questionnaire assessing experiences of adolescents in orthodontic treatment. *Angle Orthod.* 2007; 77(2):311–7.
17. Jones ML, Richmond S. Initial tooth movement: force application and pain: a relationship? *Am J Orthod.* 1985; 88(2):111–6.
18. Wiechmann D, Gerst J, Stamm T, Hohoff A. Prediction of oral discomfort and dysfunction in lingual orthodontics: a preliminary report. *Am J Orthod Dentofacial Orthop.* 2008; 133(3):359–64.
19. Marques LS, Paiva SM, Vieira-Andrade RG, Pereira LJ, Ramos-Jorge MR. Discomfort associated with fixed orthodontic appliances: determinant factors and influence on quality of life. *Dental Press J Orthod.* 2014; 19(3):102–7.
20. Polat O, Karaman AI. Pain control during fixed orthodontic appliance therapy. *Angle Orthod.* 2005; 75(2):214–9.
21. Krukemeyer AM, Arruda AO, Inglehart MR. Pain and orthodontic treatment. *Angle Orthod.* 2009; 79(6):1175–81.
22. Firestone AR, Scheurer PA, Bürgin WB. Patients' anticipation of pain and pain-related side effects, and their perception of pain as a result of orthodontic treatment with fixed appliances. *Eur J Orthod.* 1999; 21(4):387–96.
23. Chen M, Wang DW, Wu LP. Fixed orthodontic appliance therapy and its impact on oral health-related quality of life in Chinese patients. *Angle Orthod.* 2010; 80(1):49–53.
24. Wiedel AP, Bondemark L. A randomized controlled trial of self-perceived pain, discomfort, and impairment of jaw function in children undergoing orthodontic treatment with fixed or removable appliances. *Angle Orthod.* 2015; in press.
25. Miller KB, McGorray SP, Womack R, Quintero JC, Perelmuter M, Gibson J, et al. A comparison of treatment impacts between Invisalign and fixed appliance therapy during the first week of treatment. *Am J Orthod Dentofacial Orthop.* 2007; 131(3):302.e1–9.
26. Ngan P, Wilson S, Shanfeld J, Amini H. The effect of ibuprofen on the level of discomfort in patients undergoing orthodontic treatment. *Am J Orthod Dentofacial Orthop.* 1994; 106(1):88–95.
27. Jawad F, Cunningham S, Croft N, Johal A. A qualitative study of the early effects of fixed orthodontic treatment on dietary intake and behaviour in adolescent patients. *Eur J Orthod.* 2012; 34(4):432–6.

Перцепција бола, социјална и функционална нелагодност током ортодонтошке терапије

Сава Матић, Предраг Николић

Универзитет у Београду, Клиника за ортопедију вилица, Београд, Србија

САЖЕТАК

Увод/Циљ Бол и нелагодност су уобичајена искуства након постављања фиксног ортодонтошког апарата.

Циљ овог рада је одредити интензитет бола током првих седам дана након постављања фиксног ортодонтошког апарата, утицај ортодонтошке терапије на психосоцијалну компоненту личности и свакодневне животне активности у првом месецу терапије.

Метод У истраживању је учествовало 60 насумично изабраних пацијената Клинике за ортопедију вилица Стоматолошког факултета у Београду, узраста од 15 до 20 година. По постављању фиксног ортодонтошког апарата пацијенти су добили да попуне упитник и одговоре на питања која су се односила на појаву бола у првих седам дана по постављању апарата на скали од један до десет, питања везана за функцију говора и жвакања, одржавање оралне хигијене, повреде оралне слузокоже и социјалне контакте. За обраду

резултата добијених из анкетног упитника користио се χ^2 тест.

Резултати Највећи проценат испитаника (21,7%) оценили су бол са оценом 1 (нису осећали бол током првих седам дана), док је мање од 10% дало оцене 4, 6, 7, 9 и 10. Већина учесника (95%) одговорила је да нису имали проблема са обављањем свакодневних животних активности због фиксног ортодонтошког апарата. Већина испитаника (91,7%) нису осећали социјалну нелагодност, а 8,3% јесте.

Закључак Генерални интензитет бола који су оценили испитаници првих седам дана по постављању фиксног ортодонтошког апарата је био низак до умерен. Код већине испитаника није било промена у психосоцијалном понашању. Осим промена навика у исхрани и појаве раница на унутрашњој страни образа у првих месец дана терапије, испитаници нису имали проблема са обављањем свакодневних активности.

Кључне речи: ортодонтошки третман; бол; нелагодност