Journal of
Oral Health and Oral Epidemiology

https://johoe.kmu.ac.ir
10.34172/johoe.2210.1509
Vol. 13, No. 1, 2024, 19-24

Original Article

Comparison of the effectiveness of two different pain assessment methods in different orthodontic procedures

Saadet Cinarsoy Cigerim[1*], Turkan Sezen Erhamza[2], Jamil Bayzed[1]

[1]Department of Orthodontics, Faculty of Dentistry, Van Yuzuncu Yil University, Van, Turkey
[2]Department of Orthodontics, Faculty of Dentistry, Kırıkkale University, Kırıkkale, Turkey

***Corresponding Author:** Saadet Cinarsoy Cigerim, Email: saadetcinarsoy@live.com

Abstract

Background: This study compares two pain ratings that patients use to indicate how uncomfortable they are during bonding and the collection of orthodontic registration material.

Methods: Two hundred people, ages eleven to twenty, participated in the study; 125 were female and 75 were male. The participants' discomfort levels were assessed during bonding operations and the initial registration material collection using the visual analog scale (VAS) and the facial pain scale (FPS). During the first registration material collection in oral photography, dental impressions, X-rays, bonding operations, lip retractor insertion, polishing, acid and sealing, and bracket application, pain levels were recorded. The Mann-Whitney U test was used to compare the data between groups, while the Wilcoxon and Friedman tests were used to analyze the data within groups. The gathered data were statistically analyzed with a significance threshold of 5%.

Results: There was a statistically significant positive correlation between the VAS and FPS scales when evaluating pain during intraoral photography, the dental impression procedure, X-rays, lip retractor insertion, polishing, acid and sealing, and bracket bonding ($0.537<r<0.734$; $P=0.001$). A statistically significant positive connection was also discovered when the gender difference was included ($0.261<r<0.42$; $P=0.001$).

Conclusion: Similar information was obtained during the orthodontic initial registration and bonding procedures using two different pain assessment instruments. It is also believed to make it possible to compare research using different pain scales.

Keywords: VAS, FPS, Pain

Citation: Cigerim SC, Erhamza TS, Bayzed J. Comparison of the effectiveness of two different pain assessment methods in different orthodontic procedures. *J Oral Health Oral Epidemiol*. 2024;13(1):19–24. doi: 10.34172/johoe.2210.1509

Received: October 4, 2022, **Accepted:** August 17, 2023, **ePublished:** March 27, 2024

Introduction

Anxiety, attention, cultural values, suggestion, pain, and prior experiences are some of the variables that might affect pain, which is linked to actual or potential tissue damage or is characterized as an uncomfortable sensory and emotional experience if such damage exists.[1] Since pain is a subjective sensation and a complex fact, it can be assessed subjectively.[2] Thus, a variety of techniques have been devised to assess pain.[2] Numerous scales, including the color analog scale (CAS), facial pain scale (FPS), and visual analog scale (VAS) have been shown to be employed in the investigations. The FPS scale's face expression, the CAS scale's color darkness, and the VAS scale's values between 0 and 10 all indicate how much pain the person is experiencing. The patient's conduct is evaluated and measured using these scales in relation to their suffering.[2-5]

Most patients receiving orthodontic treatment dislike pain, which can occasionally be so bad that it even makes patients decide to stop their treatment.[6] Patients may experience worry and anxiety in response to orthodontic treatment because they believe that pain is a possibility.[7] Despite reports that between 70 and 95 percent of orthodontic patients suffer pain during treatment, many individuals do not view discomfort as a significant issue.[5,8] Despite this, it has been reported that approximately 8% of patients who experienced pain during the initial period of orthodontic treatment give up the treatment. Moreover, some patients with painful experiences are moving away from orthodontic treatment despite their functional needs. For this reason, the prerequisite for effective pain management is the assessment of pain with a valid and reliable taking dental impression tool.[9]

During orthodontic treatment, the pain was frequently evaluated during separation and arch brace placement, the application of fixed and mobile plates, the evaluation of different forces applied, rapid maxillary expansion, headgear treatments, and debonding procedures were applied.[7] Çinarsoy Ciğerim and Karaman evaluated the pain, felt by patients during bonding and registration material collection procedures in orthodontics, with VAS.[10] While there are few studies evaluating the

relationship between different pain assessment methods related to dentistry,[11-13] no study was found that evaluated the effectiveness of different pain assessment scales during bonding and registration material collection procedures in orthodontics. This study compares the usefulness of the VAS and FPS scales for gathering orthodontic registration material and measuring pain during bonding treatments.

Materials and Methods

A cross-sectional observational study was conducted here. In this study, 200 randomly selected patients between the ages of 11 and 20 who were accepted for treatment at the Van Yüzüncü Yıl University, Faculty of Dentistry Orthodontic Clinic, between 2018 and 2020 and had not previously received orthodontic treatment, were included. The power of the study was determined to 197 people with an impact size of 0.25 at a 95% confidence interval (G Power-3.1.9.2). At the start of the study, 210 patients were included. 10 patients had to give up treatment due to some health and financial problems and dropped out of the study. Therefore, the study group consisted of 200 people in total.

Our study did not include patients with any systemic disease, drug use, or who had previously received orthodontic treatment. The study's duration and objective, along with the method and scales to be utilized, were thoroughly explained to the patients. Patients' pain levels were measured using the VAS and FPS during the registration material collection session and the bonding session prior to orthodontic treatment. While orthodontic registration material collection processes is including intraoral photographing, taking dental impression, and X-ray procedures; bonding procedures is containing lip retractor insertion, polishing, acid and sealing, and bracket bonding. While registrations were collected, Hager & Werken brand lip retractors, Orto Technology brand mouth mirrors, and Canon 450D brand digital camera were used. All radiographs were taken with Sirona X-ray equipment.

The vertical lines on the VAS range from 0 to 10. The 'no pain' point and the 'severe pain' point were the names given to the two ends of these lines. The patient chooses a point between these two ends to represent their level of agony.

Six different facial expressions were employed on the FPS scale. It has a rating system of 0 for no pain, 1 for mild discomfort, 2 for disturbing pain, 3 for moderate pain, 4 for severe pain, and 5 for not-endurable anguish.

Statistical analysis

Statistical analysis was conducted using the NCSS (Number Cruncher Statistical System) 2007 application, located in Kaysville, Utah, USA. The study's data were assessed using descriptive statistical methods (mean, standard deviation, median, frequency, percentage, minimum, maximum). Using the Shapiro-Wilk test and graphical analysis, it was determined whether the quantitative data met the normal distribution. The Mann-Whitney U test was used to compare two sets of quantitative variables that dispersed differently. By employing Spearman correlation analysis, the correlations between the quantitative variables were assessed. For statistical significance, a p-value of less than 0.05 was used. We assessed the gathered data using a 95% confidence interval.

Results

200 cases in all, with 37.5% (n = 75) male and 62.5% (n = 125) female, were employed in the study. The age range of the participants in the study was 11–20 years old, with an average age of 14.95 ± 2.22.

There was found to be a statistically significant correlation between the VAS and FPS pain assessment methods, which we used to evaluate the pain of individuals during intraoral photographing, taking dental impression process, X-ray, lip retractor insertion, polishing, acid and sealing, and bracket bonding ($0.537 < r < 0.734$; $P = 0.001$) (Table 1, Figure 1).

A statistically significant correlation was discovered between the VAS and FPS pain evaluation methods in the comparison conducted with the gender difference ($0.261 < r < 0.742$; $P = 0.001$) (Table 2, Figure 2).

Discussion

It has been seen that various scales such as VAS, FPS, and

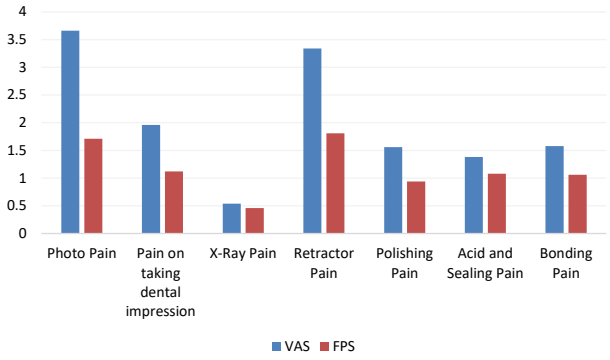

Figure 1. Evaluation of the relationship between VAS and FPS pain assesment methods

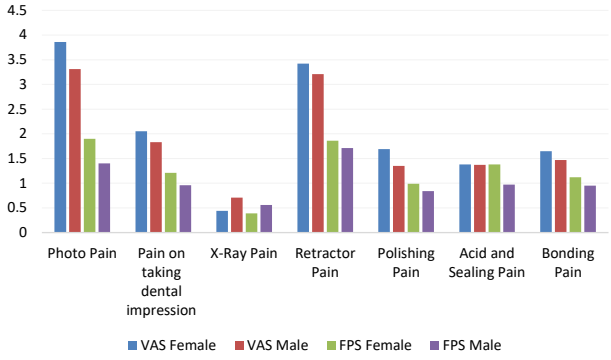

Figure 2. Evaluation of VAS and FPS pain assesment methods by gender

Table 1. Evaluation of the Relationship between VAS and FPS Pain Assessment Methods

		VAS	FPS	*r*	*P*
Photo Pain	Min-Max (Median)	0-10 (3)	0-5 (1)	0.654	0.001**
	Mean ± SD	3.66 ± 3.27	1.71 ± 1.57		
Pain on taking dental impression	Min-Max (Median)	0-10 (1)	0-5 (1)	0.537	0.001**
	Mean ± SD	1.96 ± 2.64	1.12 ± 1.36		
X-ray pain	Min- Max (Median)	0-10 (0)	0-4 (0)	0.383	0.001**
	Mean ± SD	0.54 ± 1.32	0.46 ± 0.83		
Retractor pain	Min- Max (Median)	0-10 (3)	0-5 (2)	0.734	0.001**
	Mean ± SD	3.34 ± 2.78	1.81 ± 1.40		
Polishing pain	Min- Max (Median)	0-9 (1)	0-5 (1)	0.646	0.001**
	Mean ± SD	1.56 ± 1.99	0.94 ± 1.06		
Acid and sealing pain	Min-Max (Median)	0-10 (0)	0-5 (1)	0.496	0.001**
	Mean ± SD	1.38 ± 2.12	1.08 ± 1.18		
Bonding pain	Min-Max (Median)	0-10 (1)	0-5 (1)	0.684	0.001**
	Mean ± SD	1.58 ± 2.12	1.06 ± 1.24		

r = Spearman's Correlation Coefficient; $^{**}P < 0.01$.

CAS are often used in dentistry-related pain research.[2-5] While there are few studies evaluating the relationship between these pain assessment methods,[11-13] there are no studies evaluating the effectiveness of different pain assessment scales during the bonding and registration material collection process in orthodontics. Our study's findings demonstrated that two distinct pain evaluation scales offered comparable data throughout bonding procedures and orthodontic first registrations, enabling comparisons between research that employ these pain scales to gauge discomfort. Since the amount of discomfort during orthodontic first registrations is similar among scales, other factors may impact the choice of scale in clinical practice or research. It is claimed that categorical scales such as the FPS should be preferred by newborns and elderly individuals who have less abstract abilities.[2,14] The utmost advantage of VAS is that it is simple, and it can be used easily by all individuals with motor functions from the age of 7. As it does not contain any words, it is also language-independent.[6] The only issue with using VAS is that it requires visual and motor coordination during application.[15,16] The advantage of FPS is that facial expressions can be easily selected without explanation. Without the need for any education level, it can be applied to patients of all ages, languages, and geographies.[17] In our study, VAS and FPS scales were also preferred.

Variables such as cognitive functions and education levels of individuals whose pain levels are determined to affect the quality of responses obtained from pain scales.[18,19]

The fact that our study did not assess factors like education level can be viewed as a limitation, but the strong positive correlation between the scales suggests that the patients understood the instructions before applying the scales and were consistent in their responses. It was observed in our study, that intraoral photographing and lip retractor insertion constitute higher pain values in the VAS and FPS scales compared to the others. After these procedures, the most pain score was determined as taking dental impression and the least score was determined as X-rays, however, it was observed that VAS and FPS scales showed a correlation in all procedures. Consistent with the results of our study, it was seen that different scales provided similar information about cervical dentin hypersensitivity,[12] pulpal originated pain, and periodontal pain.[11] Hjermstad et al[20] also noted in their systematic review that there is a substantial link between various scales. Although some research indicates that VAS is more sensitive than FPS,[21-23] most patients would rather verbally describe their pain than use a numerical score.[24] In our study, participants were not asked to select between scales. Selecting orthodontic registration techniques and the pain scale to be used during bonding may be appropriate to be held in the new investigations.

Research has indicated that there is minimal or nonexistent correlation between the objective intensity of a pain stimuli and the individual's experience and reaction to pain. Because of this, the feeling of pain is influenced by environmental factors including culture, gender, and age in addition to emotional and cognitive aspects.[8] According to clinical pain research, women experience pain for longer periods of time and are more intolerant of it.[5,25] There was no gender difference observed in several investigations.[8,26] The VAS and FPS scales showed a strong positive association in both men and women, according to our research. Although Svensson,[27] Holdgate et al,[22] and Lund et al[28] suggest that scales cannot be used interchangeably some studies[3] remark that the scales have high validity and therefore can be used securely for clinical use. On the other hand, Clark et al[23] emphasize that the

Table 2. Evaluation of VAS and FPS pain assessment methods by gender

			Gender		Test value
			Male	**Female**	***P***
Photo pain	VAS	Min-Max (Median)	0-10 (3)	0-10 (4)	Z: -1.187
		Mean ± SD	3.31 ± 3.27	3.86 ± 3.27	0.235 [a]
	FPS	Min-Max (Median)	0-5 (1)	0-5 (2)	Z: -2.000
		Mean ± SD	1.4 ± 1.39	1.9 ± 1.65	0.045* [a]
		r	0.600	0.676	
		P	0.001**	0.001**	
Pain on taking dental impression	VAS	Min-Max (Median)	0-10 (0)	0-10 (1)	Z: -0.903
		Mean ± SD	1.83 ± 2.69	2.05 ± 2.61	0.367 [a]
	FPS	Min-Max (Median)	0-5 (0)	0-5 (1)	Z: -1.514
		Mean ± SD	0.96 ± 1.33	1.21 ± 1.38	0.130 [a]
		r	0.508	0.545	
		P	0.001**	0.001**	
X-ray pain	VAS	Min-Max (Median)	0-10 (0)	0-7 (0)	Z: -0.528
		Mean ± SD	0.71 ± 1.65	0.44 ± 1.07	0.598 [a]
	FPS	Min-Max (Median)	0-4 (0)	0-4 (0)	Z: -1.008
		Mean ± SD	0.56 ± 0.96	0.39 ± 0.74	0.313 [a]
		r	0.539	0.261	
		P	0.001**	0.003**	
Retractor pain	VAS	Min-Max (Median)	0-10 (3)	0-10 (3)	Z: -0.510
		Mean ± SD	3.21 ± 2.77	3.42 ± 2.8	0.610 [a]
	FPS	Min-Max (Median)	0-5 (2)	0-5 (2)	Z: -0.757
		Mean ± SD	1.71 ± 1.39	1.86 ± 1.4	0.449 [a]
		r	0.712	0.742	
		P	0.001**	0.001**	
Polishing pain	VAS	Min-Max (Median)	0-5 (1)	0-9 (1)	Z: -0.642
		Mean ± SD	1.35 ± 1.64	1.69 ± 2.16	0.521 [a]
	FPS	Min-Max (Median)	0-4 (1)	0-5 (1)	Z: -0.857
		Mean ± SD	0.84 ± 0.97	0.99 ± 1.11	0.391 [a]
		r	0.660	0.641	
		P	0.001**	0.001**	
Acid and sealing pain	VAS	Min-Max (Median)	0-9 (0)	0-10 (1)	Z: -0.740
		Mean ± SD	1.37 ± 2.25	1.38 ± 2.05	0.459 [a]
	FPS	Min-Max (Median)	0-5 (1)	0-5 (1)	Z: -0.746
		Mean ± SD	0.97 ± 1.09	1.14 ± 1.23	0.456 [a]
		r	0.498	0.492	
		P	0.001**	0.001**	
Bonding pain	VAS	Min-Max (Median)	0-8 (1)	0-10 (1)	Z: -0.144
		Mean ± SD	1.47 ± 1.88	1.65 ± 2.25	0.886 [a]
	FPS	Min-Max (Median)	0-4 (1)	0-5 (1)	Z: -0.514
		Mean ± SD	0.95 ± 1.08	1.12 ± 1.33	0.607 [a]
		r	0.714	0.670	
		P	0.001**	0.001**	

r = Spearman's Correlation Coefficient; [a] Mann-Whitney U test; *$P<0.05$; **$P<0.01$

selection of the scale should be made by considering the characteristics of the patient. Age, gender, and pain perception variances should all be taken into account, as numerous studies[8] have noted. It was indicated that the quality-of-life scale should not be disregarded in the evaluations, even though Calderon et al. claimed that the VAS, VRS, NS, and FPS-R scales show a high correlation. Additionally, they stated that there is no ideal pain scale and that toothache (pulpal or periodontal) directly affects quality of life.

Conclusion

When evaluating pain during orthodontic registration material collection (intraoral photography, collecting tooth impressions, and X-rays) and bonding procedures (lip retractor insertion, polishing, acid and sealing, and bracket bonding), VAS and FPS pain measures performed similarly well.

Authors' Contribution

Conceptualization: Saadet Çınarsoy Ciğerim, Türkan Sezen Erhamza, Jamil Bayzed.
Data curation: Saadet Çınarsoy Ciğerim, Türkan Sezen Erhamza, Jamil Bayzed.
Formal analysis: Saadet Çınarsoy Ciğerim, Türkan Sezen Erhamza, Jamil Bayzed.
Funding acquisition: Saadet Çınarsoy Ciğerim, Türkan Sezen Erhamza, Jamil Bayzed.
Investigation: Saadet Çınarsoy Ciğerim, Türkan Sezen Erhamza, Jamil Bayzed.
Methodology: Saadet Çınarsoy Ciğerim, Türkan Sezen Erhamza, Jamil Bayzed.
Project administration: Saadet Çınarsoy Ciğerim, Türkan Sezen Erhamza, Jamil Bayzed.
Resources: Saadet Çınarsoy Ciğerim, Türkan Sezen Erhamza, Jamil Bayzed.
Software: Saadet Çınarsoy Ciğerim, Türkan Sezen Erhamza, Jamil Bayzed.
Supervision: Saadet Çınarsoy Ciğerim, Türkan Sezen Erhamza, Jamil Bayzed.
Validation: Saadet Çınarsoy Ciğerim, Türkan Sezen Erhamza, Jamil Bayzed.
Visualization: Saadet Çınarsoy Ciğerim, Türkan Sezen Erhamza, Jamil Bayzed.
Writing–original draft: Saadet Çınarsoy Ciğerim, Türkan Sezen Erhamza, Jamil Bayzed.
Writing–review & editing: Saadet Çınarsoy Ciğerim, Türkan Sezen Erhamza, Jamil Bayzed.

Competing Interests

There is no conflict of interest to declare.

Ethics Approval

Ethics committee approval (Decision no: 2020.11.10) was obtained from Van Yüzüncü Yıl University Non-Interventional Research Ethics Committee.

Funding

None.

References

1. Treede RD. The International Association for the Study of Pain definition of pain: as valid in 2018 as in 1979, but in need of regularly updated footnotes. Pain Rep. 2018;3(2):e643. doi: 10.1097/pr9.0000000000000643.
2. Haefeli M, Elfering A. Pain assessment. Eur Spine J. 2006;15(Suppl 1):S17-24. doi: 10.1007/s00586-005-1044-x .
3. Le May S, Ballard A, Khadra C, Gouin S, Plint AC, Villeneuve E, et al. Comparison of the psychometric properties of 3 pain scales used in the pediatric emergency department: Visual Analogue Scale, Faces Pain Scale-Revised, and Colour Analogue Scale. Pain. 2018;159(8):1508-17. doi: 10.1097/j.pain.0000000000001236.
4. Polat O, Karaman AI. Pain control during fixed orthodontic appliance therapy. Angle Orthod. 2005;75(2):214-9. doi: 10.1043/0003-3219(2005)075<0210:pcdfoa>2.0.co;2.
5. Scheurer PA, Firestone AR, Bürgin WB. Perception of pain as a result of orthodontic treatment with fixed appliances. Eur J Orthod. 1996;18(4):349-57. doi: 10.1093/ejo/18.4.349.
6. Ertan Erdinç AM, Dinçer B. Perception of pain during orthodontic treatment with fixed appliances. Eur J Orthod. 2004;26(1):79-85. doi: 10.1093/ejo/26.1.79.
7. Çağlayan S, Balos Tuncer B. Ortodonti'de ağrının önemi. Eur Ann Dent Sci. 2011;38(2):95-101.
8. Bergius M, Berggren U, Kiliaridis S. Experience of pain during an orthodontic procedure. Eur J Oral Sci. 2002;110(2):92-8. doi: 10.1034/j.1600-0722.2002.11193.x.
9. Gürkan A, Aldemir K, Işik Andsoy I, Asiye GÜ. Ameliyat sonrası akut ağrı yoğunluğunun değerlendirilmesinde dört farklı ağrı ölçeğinin karşılaştırılması. Cukurova Med J. 2020;45(4):1562-71. doi: 10.17826/cumj.741465.
10. Çinarsoy Ciğerim S, Karaman A. Evaluation of pain felt by patients during orthodontic diagnostic material collection and direct bonding procedures. Atatürk Univ Dis¸ Hekim Fak Derg. 2022;32(1):58-62. doi: 10.17567/ataunidfd.982035.
11. dos Santos Calderon P, Peixoto RF, Gomes VM, da Mota Corrêa AS, de Alencar EN, Rossetti LM, et al. Concordance among different pain scales in patients with dental pain. J Orofac Pain. 2012;26(2):126-31.
12. Freitas BL, de Souza Pinto M, de Oliveira ES, Douglas-de-Oliveira DW, Galvão EL, Gonçalves PF, et al. Scales for pain assessment in cervical dentin hypersensitivity: a comparative study. Cad Saude Colet. 2020;28(2):271-7. doi: 10.1590/1414-462x202000020372.
13. Rosas S, Paço M, Lemos C, Pinho T. Comparison between the Visual Analog Scale and the Numerical Rating Scale in the perception of esthetics and pain. Int Orthod. 2017;15(4):543-60. doi: 10.1016/j.ortho.2017.09.027.
14. Miró J, Huguet A, Nieto R, Paredes S, Baos J. Evaluation of reliability, validity, and preference for a pain intensity scale for use with the elderly. J Pain. 2005;6(11):727-35. doi: 10.1016/j.jpain.2005.06.005.
15. Bradley RL, Ellis PE, Thomas P, Bellis H, Ireland AJ, Sandy JR. A randomized clinical trial comparing the efficacy of ibuprofen and paracetamol in the control of orthodontic pain. Am J Orthod Dentofacial Orthop. 2007;132(4):511-7. doi: 10.1016/j.ajodo.2006.12.009.
16. Krishnan V. Orthodontic pain: from causes to management--a review. Eur J Orthod. 2007;29(2):170-9. doi: 10.1093/ejo/cjl081.
17. Alakus Sabuncuoglu F, Ersahan S, Erturk E. A comparison of two pain scales in the assessment of dental pain during initial phase of orthodontic treatment. J Int Dent Med Res. 2015;8(2):61-7.
18. Peters ML, Patijn J, Lamé I. Pain assessment in younger and older pain patients: psychometric properties and patient preference of five commonly used measures of pain intensity. Pain Med. 2007;8(7):601-10. doi: 10.1111/j.1526-

4637.2007.00311.x.
19. Herr K, Spratt KF, Garand L, Li L. Evaluation of the Iowa pain thermometer and other selected pain intensity scales in younger and older adult cohorts using controlled clinical pain: a preliminary study. Pain Med. 2007;8(7):585-600. doi: 10.1111/j.1526-4637.2007.00316.x.
20. Hjermstad MJ, Fayers PM, Haugen DF, Caraceni A, Hanks GW, Loge JH, et al. Studies comparing Numerical Rating Scales, Verbal Rating Scales, and Visual Analogue Scales for assessment of pain intensity in adults: a systematic literature review. J Pain Symptom Manage. 2011;41(6):1073-93. doi: 10.1016/j.jpainsymman.2010.08.016.
21. Bird SB, Dickson EW. Clinically significant changes in pain along the visual analog scale. Ann Emerg Med. 2001;38(6):639-643. doi:10.1067/mem.2001.118012.
22. Holdgate A, Asha S, Craig J, Thompson J. Comparison of a verbal numeric rating scale with the visual analogue scale for the measurement of acute pain. Emerg Med (Fremantle). 2003;15(5-6):441-6. doi: 10.1046/j.1442-2026.2003.00499.x.
23. Clark P, Lavielle P, Martínez H. Learning from pain scales: patient perspective. J Rheumatol. 2003;30(7):1584-8.
24. Williamson A, Hoggart B. Pain: a review of three commonly used pain rating scales. J Clin Nurs. 2005;14(7):798-804. doi: 10.1111/j.1365-2702.2005.01121.x.
25. Bartley EJ, Fillingim RB. Sex differences in pain: a brief review of clinical and experimental findings. Br J Anaesth. 2013;111(1):52-8. doi: 10.1093/bja/aet127.
26. Fleming PS, Dibiase AT, Sarri G, Lee RT. Pain experience during initial alignment with a self-ligating and a conventional fixed orthodontic appliance system. A randomized controlled clinical trial. Angle Orthod. 2009;79(1):46-50. doi: 10.2319/121007-579.1.
27. Svensson E. Concordance between ratings using different scales for the same variable. Stat Med. 2000;19(24):3483-96. doi: 10.1002/1097-0258(20001230)19:24<3483::aid-sim786>3.0.co;2-a.
28. Lund I, Lundeberg T, Sandberg L, Budh CN, Kowalski J, Svensson E. Lack of interchangeability between visual analogue and verbal rating pain scales: a cross sectional description of pain etiology groups. BMC Med Res Methodol. 2005;5:31. doi: 10.1186/1471-2288-5-31.