

Original Article

DIFFERENCE BETWEEN PERCEIVED AND ACTUAL PAIN EXPERIENCED WITH ORTHODONTIC FIXED APPLIANCES; A CROSS-SECTIONAL STUDY CONDUCTED AT A PRIVATE DENTAL HOSPITAL IN LAHORE, PUNJAB.

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ABSTRACT

Background: The current study aimed to find the difference between perceived pain and actual pain experienced with orthodontic fixed appliances.

Material and Methods: This cross-sectional study was carried out from June to November 2021, on 33 patients, out of which males were 19 (57.58%) and females were 14 (42.42%) in number, with a mean age of 16.12 ± 4.18 years visiting University Hospital of Dentistry, Lahore. Pain, perceived by patients before the fixture was recorded by visual analog scale (VAS), and the onset and severity of actually experienced pain were also recorded with VAS after fixing the appliance.

Results: The onset of actual pain was after 4 hours of the procedure and paired t-test showed a statistically significant difference between perceived and actual pain.

Conclusion: The patient's perception of pain before the fixture is much greater than the intensity of actual pain experienced during the orthodontic fixed appliance treatment.

Key Words: Pain, Periodontal Ligament, Hyperalgesia

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INTRODUCTION

Pain is defined as a distressing feeling often caused by intense or damaging stimuli.¹ The routine orthodontic procedure like separator placement, banding, debonding, and activation of the fixed appliance might cause transient pain. Fixed appliance causes more pain than other orthodontic appliances.² Moreover, pain is also one of the most commonly encountered negative effects of orthodontic treatment and the main reason for discontinuation of treatment.³

The pain signals are conducted from primary sensory neurons to second-order neurons in the spinal cord and finally relayed to the cortex through the thalamus.⁴ Orthodontic pain is often due to pressure, ischemia, and inflammation.⁵ Pain is often stimulated due to immediate and delayed response of periodontal ligament (PDL) to orthodontic force due to compression and hyperalgesia during application of a fixed appliance, that is initiated by the release of inflammatory mediators as a result of blood flow changes in the PDL.⁶

The routine orthodontic procedures are related to mild pain. In certain situations, the intensity of pain has shown to be greater than the dental extraction pain after placement of orthodontic appliances.^{7,8} Dental pain is usually described in terms of soreness, ache, pressure and tension. The rigorosity of pain varies from patient to

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patient while age, gender, race, emotional state, and even the cultural background work as influential factors.^{9,10}

Various scales for the assessment of pain have been used, among which the most commonly used scale is the visual analog scale (VAS).¹¹⁻¹⁴

Patients mostly consider orthodontic treatment as a painful procedure even before the commencement of treatment. The objective of this study was therefore to find out if any difference existed between the perceived and actual pain with the orthodontic fixed appliance in both genders. This would help in counseling patients before proceeding with fixed appliance therapy regarding their perception of the pain associated with fixed appliance procedures.

MATERIAL AND METHODS

This cross-sectional study was conducted between June to November 2021, after gaining approval from the ethical committee of the University College of Dentistry, on data collected from 33 patients visiting the Department of Orthodontics for fixed Orthodontic appliance treatment at the hospital affiliated with the University College of Dentistry, Lahore. Patients in the age range of 12- 30 years with no previous history of fixed Orthodontic treatment and no active oral disease were included in this study. The sample size was calculated by a WHO calculator, with the level of significance $\alpha = 5\%$. A total of 33

participants (19 male and 14 female patients) were included in the study. Patients suffering from any syndrome, with a history of trauma to the dentofacial region or exhibiting missing teeth were excluded from this study. Informed written consent was taken and VAS (figure 1) was explained to the patients. Patients were also sensitized regarding how to denote the onset and severity of actual and perceived pain after taking consent on the provided proforma. Before the application of the fixed appliance (Roth prescription 0.022" slot), the patients were asked to score the severity of pain on VAS in the way they perceived it. After fixing 0.016-inch nickel-titanium (0.016" NiTi) patients were instructed to note the time of onset of pain and to again mark the severity of pain actually and when experienced.

The data collected were analyzed by SPSS version 23. Mean and standard deviation was calculated for descriptive variables like age and gender. Paired sample t-test was used to compare the data with a p-value of 0.05 for statistical significance.

RESULTS

The onset of pain after bonding was about 4 hours for both genders. The paired t-test showed a statistically significant difference between perceived and actual pain experienced ($p < 0.05$) (Table 1) in both genders, but the mean difference between males and females was only 0.05, which was not significant.

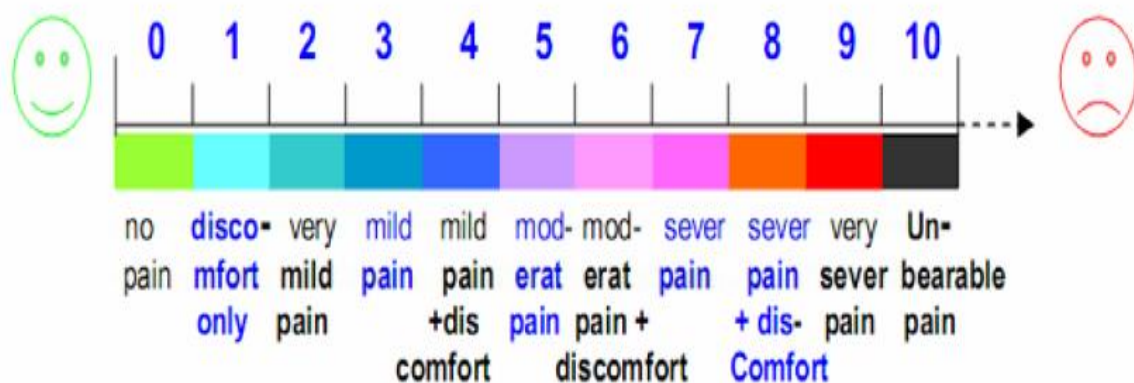


Figure 1: Visual Analogue Scoring Scale¹⁵

Table 1: Mean readings of VAS severity of perceived and actual pain in both genders

Total patients (33)	Male (19)	Female (14)
Mean of perceived pain on the VAS scale (0 - 10)	6.48	7.20
Mean of actual pain on the VAS scale (0 - 10)	4.00	4.52
Mean difference in actual and perceived pain	2.48	2.68
SD	1.14	1.19
P value	p < 0.05	p < 0.05

DISCUSSION

The orthodontic procedures are usually perceived as painful. This fear of pain discourages many patients from receiving orthodontic treatment. The VAS was used in the current study for recording the severity of pain perceived by the patient and actual pain experienced. The VAS is considered the most commonly used scale for measuring the perceived distress during orthodontic treatment because of its simple application, and reliability, and also for being user-friendly as it is readily understood by most patients.

The mean age of our study sample was 16.12 ± 4.18 which is closely related to a similar study conducted by Abdel Rahman et al in 2015 had a mean age of 18.6 ± 4.6 years.¹⁶ Pain experience shows wide variations among individuals and is affected by several factors including age. Varying results have been reported in the literature regarding the onset of pain after orthodontic fixed appliance bonding. A clinical assessment carried out by Sandhu et al in 2013 indicated that orthodontic pain usually started 1 hour after the placement of the initial archwire, then reached a peak after approximately 2 hours, and thereafter it decreased steadily.¹⁷ However, the mean VAS score did not reach zero even after 14 days. In the current study, the difference in pain between both genders was not significant ($p > 0.05$)

Poudel et al conducted a study to assess pain and oral health-related quality of life among patients undergoing orthodontic treatment.¹⁸ He concluded that most participants had

moderate pain but few patients perceived no pain at all. The participants had at least one or other oral health impacts due to fixed orthodontic treatment. In another study by Kafle and Rajbhandari in 2012, 97% of the orthodontic patients expressed some fear of pain and the approximately same percentage of patients experienced pain after orthodontic treatment.¹⁹ Among these, 11% of the patients reported a VAS score of 8-10 for anticipated pain that was indicative of severe pain. In our study, the outcome by applying paired sample t-test shows there was a significant difference in anticipated pain and experienced pain ($p < 0.05$) with fixed orthodontic treatment. Measurement of pain levels by VAS depicted a mean difference in score of 2.48 in males and 2.68 in females respectively which is significant. This difference between perceived pain and actual orthodontic pain might be linked with fear of orthodontic appliances, which is common among people the world over, regardless of gender.

CONCLUSION

The patient's perceived pain about orthodontic fixed appliances was significantly higher than the actual pain experienced in both genders. This study might help us in counseling patients regarding pain and its perception of severity, before orthodontic fixed appliance placement, so that they do not exaggerate the intensity of pain.

AUTHOR'S CONTRIBUTION

CRQ: Principal Author and Investigator/Manuscript writeup
 MK: Manuscript write up-co-helper and organizer
 HS: Data collection and result ompilation

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