



Orthodontic Pain and Patients' Quality of Life: Patient Experiences and Provider Assessments

**Sanam Tauheed¹, Erum Behroz Khan², Zafar Islam³, Shoaib Khan^{4*},
Saima Akram Butt⁴, Attiya Shaikh⁵ and Mubassar Fida⁶**

¹Department of Orthodontics, Jinnah Medical and Dental College, Karachi, Pakistan.

²Department of Orthodontics, Jinnah Sindh Medical University, Karachi, Pakistan.

³Department of Orthodontics, Peshawar Dental College, Peshawar, Pakistan.

⁴Ziauddin University, 4/8 Shahra e Galib, Clifton Block 6, Karachi, Pakistan.

⁵Department of Orthodontics, Liaquat College of Medicine and Dentistry, Karachi, Pakistan.

⁶Department of Orthodontics, Aga Khan University Hospital, Karachi, Pakistan.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JAMMR/2020/v32i630432

Editor(s):

(1) Kate S. Collison, King Faisal Specialist Hospital and Research Centre, Saudi Arabia.

Reviewers:

(1) Umarevathi Gopalakrishnan, Sri Venkateswara Dental College and Hospital, India.

(2) David Pagollang Motloba, Sefako Makgatho Health Sciences University, South Africa.

(3) Gianluigi Caccianiga, University of Milano Bicocca, Italy.

Complete Peer review History: <http://www.sdiarticle4.com/review-history/55805>

Original Research Article

Received 20 February 2020

Accepted 25 April 2020

Published 06 May 2020

ABSTRACT

Objectives: To compare orthodontic pain and its influence on quality of patient's life as perceived by them with that assessed by their orthodontic care providers.

Materials and Methods: It was a cross-sectional study involving 75 patients attending the orthodontic clinic and 14 orthodontic care providers from September to October 2010. Patients aged 16 and older, receiving fixed orthodontic treatments were included. Patients and orthodontists scored pain during different orthodontic procedures using a qualitative pain intensity scale which graded pain for different orthodontic procedures. Oral health related quality of life (OHRQoL) was assessed by means of a 4-point Likert scale to measure the influence of orthodontic treatment related pain on different aspects of life.

Results: For change of consistency of diet ($p=0.02$) statistically significant difference was observed between mean ranks of patients and orthodontists. For pain during record taking, higher

*Corresponding author: E-mail: shoaib.khan@zu.edu.pk;

mean ranks were reported for patients aged between 20-30 years ($p = 0.01$) whereas for pain after separator placement, patients aged above 30 had higher mean ranks ($p = 0.05$).

Conclusions: Orthodontists can accurately estimate the degree of pain their patients' experience. Significant proportions of patients experience substantial degrees pain during the visits, subsequent to orthodontic visits and pain due to fixed orthodontic appliance therapy transiently affects patients' OHRQoL.

Keywords: Quality of life; orthodontic pain; pain perception.

1. INTRODUCTION

During orthodontic treatment, pain and discomfort are commonly encountered [1]. Substantial number of patients report pain of varying severity that may range from moderate to severe intensity, particularly in the early stages of therapy. In actual fact, orthodontic pain is reported to be one of the utmost factor disliked by the patients. In severe cases the anticipation of pain induces major fear in patients discouraging them from seeking treatment [2]. Fear of pain may also result in patients to interrupt or discontinue treatment, which affects compliance and causes unnecessary delay in treatment times [3-7] Communication with the patients pertaining to pain and pain management must consequently be part of routine patient-orthodontist interactions.

The placement of separators and archwire and their activation in fixed orthodontic therapy, is associated with the incidence of pain [8-11]. Yet, few studies have explored the impact of discomfort and pain on physical, social, or psychological aspects of life.

Although improvement of quality of life is often perceived as the prime goal of orthodontic care, it is universally accepted that, to obtain a higher quality of life, patients must experience some treatment-related side effects of wearing orthodontic appliances [12].

Orthodontic treatment is reported to affect patients' appearance, speech, nutrition intake, as well as public interactions [13,14]. Pain experienced by orthodontic patients for the duration of the entire course of treatment is considered as an aspect of oral health-related quality of life (OHRQoL) [15].

Researchers have reported improvements in OHRQoL at the conclusion of treatment, owing to improvement in appearance, function and psychological wellbeing [16-19]. However, research on the impact of pain on orthodontic

patients' OHRQoL during their treatment is scarce [14,15].

Zhang et al reported a significant deterioration in patients' OHRQoL during treatment compared with their pretreatment status [20].

Pertaining to the fact that pain affects patients' quality of life (QoL) as well as treatment cooperation, it is thus recommended that discussion regarding management of pain should be part of the communication among patients and their care-givers. Patients' expectations are greatly influenced by information from their oral-care providers. Prior information about the threshold of pain possibly experienced during the course of treatment may provide a sense of control resulting in improved compliance of the patients. However, literature suggests that pain management in the field of orthodontics has largely been overlooked leading to minimal or no education of patients concerning pain management training [21].

Majority of orthodontists underestimate patients' pain responses to treatment [7,22,23] and hence a definitive pain management regime is not prescribed routinely.

Hence, it was hypothesized that orthodontists cannot accurately predict the actual pain experienced by their patients and its impact on their QoL. The aim of the study was to compare orthodontic pain and its impact on QoL as perceived by patients with that assessed by their orthodontic care providers. The findings obtained from the study could be employed in counseling patients and clinicians concerning what to expect during fixed appliance therapy and may help patients provide 'informed consent' for pursuing treatment.

2. MATERIALS AND METHODS

A descriptive cross sectional study was undertaken from September to October 2019, involving 75 patients undergoing fixed appliance treatment at an Orthodontic clinic of a private dental hospital and their 14 orthodontic care-

providers. It was approved by the institutional review board of The Aga Khan University Hospital. Non-probability sampling technique was used to collect the sample.

Inclusion criteria were patients older than 16 years who had given written consent to participate in the study. Patients were excluded from the study if they had (i) cognitive or medical disorders (ii) previous orthodontic treatment (iii) orthodontic treatment with non-conventional fixed labial appliances (iv) conditions that could result in pain like (a) untreated dental caries (b) periodontal diseases. To avoid any recruitment bias, equal number of patients were enrolled in the study from each of the orthodontist's clinic. The data collection instrument was a perception questionnaire consisting of 12 items covering 2 domains: pain experiences and impact of pain on OHQoL. To avoid any bias, it was ensured that both provider and patient would not view each other's responses. The patients completed the survey in the dental clinic at the end of their appointment. After the patients had left, their provider completed the provider survey. Patients' names were recorded on both forms to facilitate future merging of data. Pain during different orthodontic procedures was recorded using a 5-point Verbal Pain Rating Scale (VRS) ranging from 1=no pain at all to 5=severe pain. Participants were requested to grade the pain they experienced during pre-treatment record taking, after separators, bands and bracket placement and after wire activation. The providers estimated the patients' pain levels for the same 5 procedures using the same VRS.

OHQoL was assessed using a 4-point Likert scale where patients were questioned about the impact of pain on different aspects of their daily life. Responses ranged from 'strongly disagree' to 'strongly agree'. Questions included impact on daily routine, oral hygiene maintenance, diet intake, social gatherings and self-confidence and requirement of pain medication. Providers responded to a similar survey estimating the impact of treatment on different aspects of their patients' lives.

2.1 Data Analysis Procedure

Statistical analysis for the study was carried out using Statistical Package for Social Science version 21 (SPSS Inc. Chicago). Descriptive statistics were calculated for the data collected from the perception questionnaire. Since the data followed a Poisson distribution, nonparametric statistics were computed to test significance between groups. Gender dimorphism for pain during orthodontic procedures and mean ranks of patients and orthodontists for different orthodontic procedures along with impact of pain on OHQoL were compared using Mann Whitney-U test. Association between pain and age was assessed by Kruskal-Wallis Test. Statistical significance level was set at a value of $p \leq 0.05$.

3. RESULTS

The total sample consisted of 75 orthodontic patients (mean age 17 years and 7 months) and 14 orthodontists (mean age 31 years and 5 months).

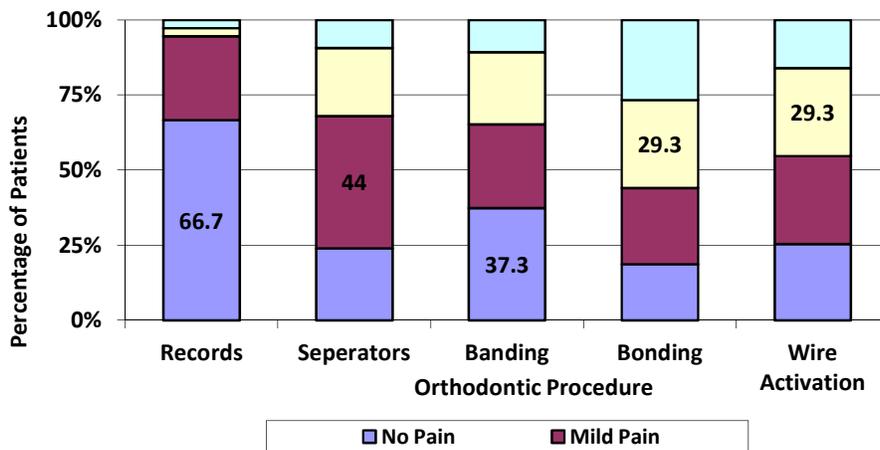


Fig. 1. Pain intensities for different orthodontic procedures as reported by patients

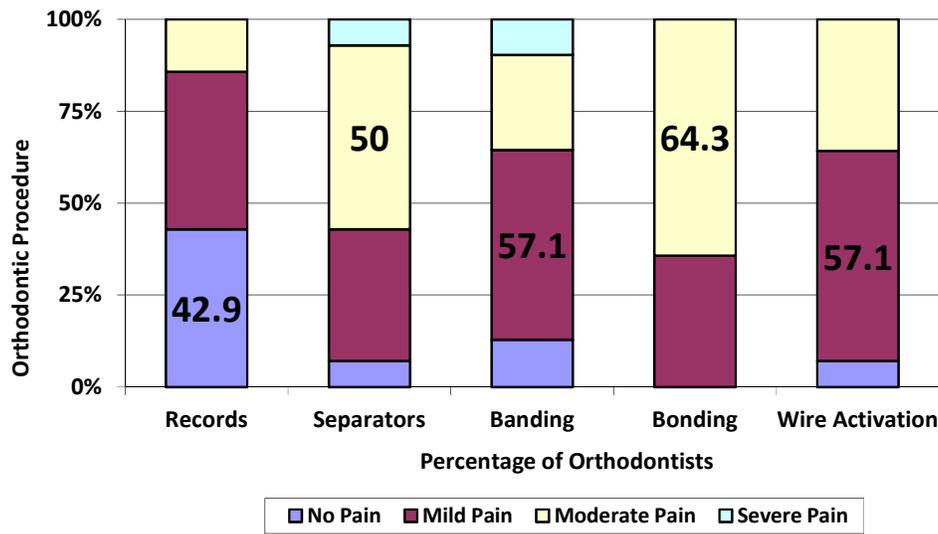


Fig. 2. Pain intensities for different orthodontic porcedures as estimated by orthodontists

Table 1 summarizes the comparative analysis of the mean ranks of patients and orthodontists for pain during orthodontic procedures. No statistically significant results were observed between the two groups.

was obtained for change in diet ($p=0.02$) where patients reported less impact or change in their diet than that perceived from the orthodontist.

Table 2 shows a comparison between the mean ranks of patients and orthodontists for the impact of pain on OHQoL. Statistically significant result

Table 3 describes gender dimorphism for pain. No statistically significant differences were observed between the mean ranks of males and females.

Table 1. Comparison of the mean ranks of patients and orthodontists for pain during orthodontic procedures

Procedure	Orthodontist (n=14) mean rank	Patient(n=75) mean rank	p value
Records	53.43	43.27	0.080
Separators	55.32	43.07	0.085
Banding	48.07	44.43	0.612
Bonding	44.18	45.15	0.893
Wire Adjustments	43.89	45.21	0.856
Total	14	75	

*N=89, Mann Whitney U Test * $p \leq 0.05$*

Table 2. Comparison of mean ranks of patients and orthodontists for impact on quality of life

Quality of Life	Orthodontist (n=14) mean rank	Patient (n=75) mean rank	p value
Daily Life	44.14	45.16	0.89
Pain Medication	44.46	45.10	0.93
Oral hygiene	36.82	46.53	0.18
Pain on Chewing	47.07	44.61	0.73
Conscious of Appearance	53.11	43.49	0.18
Eating in Social Gatherings	39.43	43.11	0.58
Change in Diet	54.82	39.40	0.02*
Total	14	75	

*N=89, Mann Whitney U Test, * $p \leq 0.05$*

Table 3. Gender dimorphism for pain

Procedure mean rank	Gender (N= 75)		p value
	Males (n=28)	Females(n=47)	
Records	44.46	45.22	0.89
Separators	37.92	47.92	0.08
Banding	39.38	47.32	0.17
Bonding	45.48	44.80	0.91
Wire Adjustment	41.98	46.25	0.46

N=75, Mann Whitney U Test, *p ≤ 0.05

Table 4. Association of pain with age

Procedure	Age groups mean rank (N=75)			p value
	10-20 years (n=44)	20-30 years (n=22)	30< years (n=9)	
Records	38.77	55.69	49.67	0.01*
Separators	39.00	50.21	57.39	0.05*
Banding	42.34	50.27	42.33	0.40
Bonding	47.51	39.77	38.72	0.33
Wire Adjustment	43.28	46.04	47.83	0.82

N=75, Kruskal Wallis Test, *p ≤ 0.05

Table 4 depicts association of pain with age. Statistically significant differences were observed between the 3 age groups for 2 procedures. For pain during record taking, higher mean ranks were reported for patients aged between 20-30 years whereas for pain after separator placement, patients aged above 30 years had higher mean ranks for procedures, the youngest group, aged 10-20 years had the lowest reported pain.

4. DISCUSSION

The evaluation of pain and OHRQoL has a vital role to play in clinical practice [24]. Discomfort caused by wearing orthodontic appliances may drastically influence patients' compliance towards treatment. Pain, functional impairment, esthetic issues and related complaints are the principal reasons for poor patient co-operation and a desire to discontinue treatment resulting in early termination of the latter by the patient.

As stated by previous studies, 75 - 95% of patients label orthodontic therapy as painful whereas 30% might discontinue treatment due to pain [19, 22]. This seems to have immense clinical importance as treatment outcomes and patient cooperation has shown to improve drastically with increase in patient awareness and education imparted by their providers. However, orthodontists seem unequipped with appropriate knowledge to foresee when their patients would require pain management [22]. Hence, our study aimed to assess how well the

primary care providers for orthodontic patients could estimate the intensity of pain and its impact on the quality of their lives.

A high percentage of our patients reported different treatment procedures to be painful. Pre-treatment record taking procedure was considered as the least painful procedure (66.7%), whereas, severe pain was most commonly reported after bracket placement (26.7%).

Although orthodontic treatment is labeled as painful by many, results reported by different studies vary widely. Bergius et.al, reported 87% of their orthodontic sample experienced moderate amounts of pain after placement of separators [25]. In contrast, less than half of our sample (44%) reported mild pain after this procedure.

In the present study, the experience of pain varied substantially among patients after bracket placement and wire adjustments. Mild to severe degrees of pain were reported subsequent to bracket placement (81.3%) and wire adjustment visits (74.6%). Majority of the patients reported to experience moderate degrees of pain after the two procedures (29.3%).

Mean pain intensity ranks for the procedures were 45.15 and 45.21, respectively. In conformity to the present study, Scheurer et.al, reported 94% of their patients to experience varying degrees of discomfort within the first 24 hours

after bracket placement with a mean pain intensity score of 42 [26].

Krukemeyar et.al, in their study on pain during orthodontic treatment concluded that orthodontic pain negatively affects patients' lives [22]. Thirteen percent of their study sample reported a disturbance in daily life due to orthodontic pain. Similarly, Oliver and Knapman, reported that 25% of their study sample believed that pain due to orthodontic appliances interfered with their schoolwork and daily activity [3]. In the current study, 40% of patients reported a negative impact of pain on their everyday routine, which was in approximate agreement with the findings of Erdnic and Dincer (50.5%) [27].

When the effect of pain on chewing and oral hygiene maintenance was assessed, it was found that 54.6% of the patients reported varying degrees of discomfort during mastication and 54.7% reported a difficulty in maintaining oral hygiene. This was in contrast to the findings of Krukemeyar et.al [22] who reported much lower percentages (10% and 42%, respectively) for both routine activities.

Scheurer et.al, reported moderate to severe difficulty in chewing and biting foods of hard consistency, as in 44.7% of their study sample [27]. The present study findings are in agreement to that showing almost 50.7% of the current study sample agreed that pain due to orthodontic appliances compelled them to change the consistency of their daily diet.

The present study found no gender dimorphism for pain perception as the mean ranks were similar. This was in contrast to various studies who found females to perceive higher amounts of pain than males [26,27,28].

Within the field of medicine, it is widely accepted that a clinician plays a major role in patient education and awareness. A recent research concludes that patients who were well informed by their orthodontists about pain expectations during therapy reported better treatment motivation as well as lesser reports of acute pain. However, an inconsistency between patient experiences and provider assessments was highlighted by Krukemeyar et.al who investigated whether orthodontists could accurately predict patients' pain [22]. It was concluded that on an average, orthodontists under estimated the intensity of pain experienced by their patients.

This was explored in the present study and the results showed comparable mean ranks between

orthodontists and patients while assessing pain intensities for different procedures. Both groups of participants also unanimously agreed that pain due to orthodontic treatment transiently affects patients' OHRQoL.

The results of present study indicate that with evolving researches, clinicians are becoming better trained and equipped to provide patients with realistic expectations towards treatment experiences. This in turn aids in the psychological training of patients which can improve tolerance of pain and decrease in pain perception. Thus, appropriate clinician-patient communication can positively impact patient compliance and result in better treatment outcomes. It also highlights the extent to which orthodontic treatment procedures impact OHRQoL and can aid practitioners in developing a standard regime for analgesic prescription to known painful procedures, as well as introducing newer techniques and armamentarium for making orthodontics an added pain-free experience for patients.

The study was limited due to the subjective measurement of pain which is dependent on many aspects such as type of malocclusion, duration and modality of treatment, body response, age and gender. Nonetheless, the frequency of reported pain was consistent with that reported in literature [29].

5. CONCLUSION

- No gender related discrimination was found for perception of pain.
- Significant proportions of patients experience pain of varying degrees during and following their orthodontic visits.
- Pain due to fixed orthodontic appliance therapy transiently affects patients' OHRQoL.
- Orthodontists can accurately estimate the degree of pain their patients' experience.

CONSENT

The findings obtained from the study could be employed in counseling patients and clinicians concerning what to expect during fixed appliance therapy and may help patients provide 'informed and written consent' for pursuing treatment.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:

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