

PAIN ANTICIPATED & PAIN EXPERIENCED DURING ORTHODONTIC PROCEDURES

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ABSTRACT

Orthodontic patients experience pain and discomfort to a varying degree during the course of treatment. Majority of the orthodontic procedures like separator placement, banding, bonding, wire change & even debonding are associated with pain and discomfort that varies from patient to patient. The purpose of this study is to compare the pain anticipated before various orthodontic procedures & pain experienced after different stages of orthodontic treatment. All subjects included in the study were of age ranging from 14 to 25 years. Every subject was explained about the orthodontic procedure that was going to be performed on them in detail and then before any procedure was carried out, they were asked to anticipate level of pain from Visual Analogue Scale. At next appointment, every subject was shown Visual Analogue Scale and was asked about the level of pain they actually experienced. Procedures that were evaluated; 1). Separator placement, 2). Banding on molars, 3). Full Arch bracket bonding with 0.012 Ni-Ti wire placement. Results showed that at the time of start of any new orthodontic procedure, the anticipated pain is slightly more than actual pain experienced. Orthodontist should inform the patient about the pain and other common side-effects of treatment, especially before inserting an appliance that can cause discomfort. Providing sufficient information to the patient can not only help in reducing anxiety, but can also indirectly reduce the perceived intensity of pain.

Key Words: Anticipated Pain, Orthodontic, Visual Analogue Scale.

INTRODUCTION

Pain & pain related side effects are by far the most common reasons people avoid dental treatment.¹ Recently an increasing trend towards seeking orthodontic treatment has been seen. Esthetic awareness is playing a vital role to boost up one's confidence and social well being more than ever before. The drive that brings people, young or old, towards orthodontic treatment also scares them away as it is considered to be a painful procedure, which to some extent is true.² Pain resulting from orthodontic treatment is of periodontal origin. Patient experience pain as a result of pressure on the PDL, that causes ischemia, inflammation and edema which leads to pain.³ Majority of the orthodontic procedures like separator placement, banding, bonding, wire change & even debonding are associated with some

form of pain and discomfort, but the intensity of this pain is highly fluctuating and varies from patient to patient.^{3,4} Factors such as age, gender, ethnicity, stress level, previous dental experience, and efficiency of the operator are many variables that can affect the pain experienced by the patients.⁴ These variables have made this particular topic of research quite captivating.

According to a research conducted by Sinclair P, Cannito M, Goates L, Solomos L & Alexander C 5, 20% of patients undergoing orthodontic treatment had such severe pain that they had to stay awake all night. In another research conducted by Sinclair, it was seen that almost all patients undergoing orthodontic treatment reported with difficulty in eating as a result of pain.⁶ Tauheed S & Shaikh A⁷ conducted a study, that compared the effect of orthodontic pain on patient motivation, reported that higher motivation to seek orthodontic treatment does not affect perception of pain. The purpose of this study was to compare the pain anticipated before various procedures & pain experienced after different stages of orthodontic treatment.

METHODOLOGY

This descriptive cross-sectional study was conducted, in Orthodontic Department of Tertiary Care Hospital

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from June 2015 to August 2016, on subjects who were getting their orthodontic treatment started. All subjects included in the study ranged from 14 to 25 years. Any subject with previous orthodontic treatment, history of toothache, neuralgia, migraine, TMJ disorders and of non-Pakistani descent was excluded from this study. Non Probability convenience sampling was used to collect data. Informed consent was obtained from each subject included in the study. A Visual Analog Scale (VAS) was used to evaluate and interpret different levels of pain. To record the findings, a data entry sheet was formulated, which also recorded the demographic details along with detailed medical, dental and family histories from every subject. Every orthodontic procedure that was going to be performed was explained in detail to the subjects. Before any procedure was carried out, subjects were asked to anticipate the level of pain that they might suffer from by picking the number/picture that best suits their anticipated level of pain from VAS. Answer from every subject was recorded by single operator in data entry sheet, which was then kept in subject's record file. At the time of next appointment every subject was shown the same VAS and was asked to pick the number/picture that best suits level of pain that they actually experienced. To avoid any errors or biasness, data entry sheet was not shown to the subject at any point of time during the study. The procedures

that were evaluated in the study by the above mentioned method were; 1). Separator placement, 2). Banding on molars, 3). Full Arch bracket bonding with 0.012 Ni-Ti wire placement. Data tabulation and analysis was completed using SPSS software version 22.

RESULTS

Out of 150 patients who willingly participated in this study 34 (22.7%) were males and 116 (77.3%) females with mean age of 20 ± 5 years.

Separator Placement

Before separators were placed, 85.3% patients anticipated pain. On the day of separator placement and even one day after separator placement approximately 83% of the patient experienced pain. One week after separator placement 52.7% patients experienced pain (Table 1). 54% patients did not take analgesics to relieve pain (Table 2).

First Molar Banding

For both upper and lower banding, the results were quite similar. Before upper and lower band placement, approximately 70% patient anticipated pain. On the day of molar band cementation approximately 70% of the patient experienced pain. One week after banding, only 30% patients experienced pain (Table 3). 20.7% patients took analgesics after cementation of upper molar bands while 15.3% patient's relieved pain after lower band placement with analgesics (Table 2).

TABLE 1: ANTICIPATED PAIN AND PAIN EXPERIENCED DURING SEPARATOR PLACEMENT

VAS Number	Level Of Pain	Anticipated	On Day of Placement	One Day After Placement	One Week After Placement
0.	No pain	22 (14.7%)	25 (16.7%)	24 (16%)	71 (47.3%)
	Pain	128 (85.3%)	125 (83.3%)	126 (84%)	79 (52.7%)
1.	Mild Pain	2 (1.3%)	—	1 (0.7%)	2 (1.3%)
2.	Annoying Pain	43 (28.7%)	27 (18%)	30 (20%)	29 (19.3%)
3.	Nagging Pain	2 (1.3%)	2 (1.3%)	4 (2.7%)	1 (0.7%)
4.	Uncomfortable Pain	44 (29.3%)	23 (15.3%)	25 (16.7%)	19 (12.7%)
5.	Troublesome Pain	4 (2.7%)	3 (2%)	4 (2.7%)	2 (1.3%)
6.	Distressing Pain	28 (18.7%)	26 (17.3%)	20 (13.3%)	10 (6.7%)
7.	Miserable Pain	—	3 (2%)	4 (2.7%)	—
8.	Intense Pain	4 (2.7%)	27 (18%)	22 (14.7%)	6 (4%)
9.	Horrible Pain	—	—	1 (0.7%)	—
10.	Unbearable Pain	1 (0.7%)	14 (9.3%)	15 (10%)	10 (6.7%)
	Total		150 (100%)		

TABLE 2: USE OF PAIN KILLERS DURING DIFFERENT ORTHODONTIC PROCEDURES

Used	Separator placement	Banding		Bonding	
		Upper	Lower	Upper	Lower
Yes	69 (46.0%)	31 (20.7%)	23 (15.3%)	34 (22.7%)	26 (17.3%)
No	81 (54.0%)	119 (79.3%)	127 (84.7%)	116 (77.3%)	124 (82.7%)

TABLE 3: ANTICIPATED PAIN AND PAIN EXPERIENCED DURING MOLAR BANDING

VAS Number	Level of Pain	Anticipated pain		On Day of Placement		One Day after Placement		One Week after Placement	
		Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower
0.	No pain	36 (24%)	40 (26.7%)	44 (29.3%)	50 (33.3%)	60 (40%)	61 (40.7%)	101 (67.3%)	103 (68.7%)
	Pain	114 (76%)	110 (73.3%)	106 (70.7%)	100 (66.7%)	90 (60%)	89 (59.3%)	49 (32.7%)	47 (31.3%)
1.	Mild Pain	8 (5.3%)	6 (4%)	—	—	3 (2%)	2 (1.3%)	2 (1.3%)	3 (2%)
2.	Annoying Pain	52 (34.7%)	53 (35.3%)	27 (18%)	27 (18%)	30 (20%)	39 (26%)	29 (19.3%)	24 (16%)
3.	Nagging Pain	2 (1.3%)	1 (0.7%)	4 (2.7%)	3 (2%)	5 (3.3%)	2 (1.3%)	2 (1.3%)	2 (1.3%)
4.	Uncomfortable Pain	31 (20.7%)	30 (20%)	24 (16%)	26 (17.3%)	16 (10.7%)	18 (12%)	5 (3.3%)	7 (4.7%)
5.	Troublesome Pain	1 (0.7%)	—	4 (2.7%)	4 (2.7%)	2 (1.3%)	4 (2.7%)	—	—
6.	Distressing Pain	14 (9.3%)	15 (10%)	26 (17.3%)	21 (14%)	18 (12%)	11 (7.3%)	7 (4.7%)	6 (4%)
7.	Miserable Pain	—	—	—	3 (2%)	2 (1.3%)	3 (2%)	1 (0.7%)	—
8.	Intense Pain	4 (2.7%)	2 (1.3%)	12 (8%)	9 (6%)	7 (4.7%)	8 (5.3%)	2 (1.3%)	3 (2%)
9.	Horrible Pain	1 (0.7%)	1 (0.7%)	1 (0.7%)	1 (0.7%)	—	—	—	1 (0.7%)
10.	Unbearable Pain	1 (0.7%)	2 (1.3%)	8 (5.3%)	6 (4%)	7 (4.7%)	2 (1.3%)	1 (0.7%)	1 (0.7%)
Total				150 (100%)					

Bracket Placement with 0.012 Wire Engagement

Before upper and lower bracket placement, more than 60% patient anticipated pain, while on the day of bonding and even one day after bonding, approximately 60% of the patient experienced pain. One week after bonding, only 30% patients experienced pain in their teeth (Table 4). 22.7% patients took analgesics after upper bracket bonding while 17.3% patients relieved pain after lower bonding with analgesics (Table 2).

DISCUSSION

Pain is one of the most frequent adverse effects which is related to orthodontic therapy.^{8,9} 70-95% of the patients undergoing orthodontic therapy endures pain.^{10,11} VAS scale is found to be very easy and effective tool for measuring intensity of pain, even young children can readily comprehend it.¹² Factors considered to influence the intensity of pain are gender, age, stress, past dental experiences, present emotional state and cultural differences.⁸ Pain after start of fixed orthodontic treatment increases gradually from 4 to 24

hours, intensity of which decreases gradually and by 1 week the pain subsides completely.¹³ The mechanisms whereby the application of orthodontic forces cause pain are not yet fully understood, but there are indications that it can be due to changes in blood flow in the periodontal ligament and correlated with the presence of prostaglandins, substance P and other substances.^{12,14-17} Fixed appliances seem to have only a minor effect on patient's daily life. Biting and chewing seem to be the most painful activities and eating presents with the greatest problem in daily life.³

Separator placement, which is the initial step in fixed orthodontic treatment, is used to create space mesial and distal to the molar. Results of this study showed that 85.3% patient anticipated pain, while on the day of separator placement and even one day after separator placement approximately 80% of the patient experienced pain.

For both upper and lower arch banding, the results were quite similar. In the upper and lower band place-

TABLE 4: ANTICIPATED PAIN AND PAIN EXPERIENCED DURING BRACKET PLACEMENT WITH 0.012 NI-TI

VAS Number	Level of Pain	Anticipated pain		On Day of Placement		One Day after Placement		One Week after Placement	
		Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower
0.	No pain	51 (34.0%)	58 (38.7%)	46 (30.7%)	50 (33.3%)	58 (38.7%)	65 (43.3%)	101 (67.3%)	105 (70.0%)
	Pain	99 (66%)	92 (61.3%)	104 (69.3%)	100 (66.7%)	92 (61.3%)	85 (56.7%)	49 (32.7%)	45 (30%)
1.	Mild Pain	15 (10.0%)	15 (10.0%)	—	1 (0.7%)	1 (0.7%)	2 (1.3%)	3 (2.0%)	4 (2.7%)
2.	Annoying Pain	39 (26.0%)	34 (22.7%)	36 (24.0%)	34 (22.7%)	31 (20.7%)	32 (21.3%)	24 (16.0%)	25 (16.7%)
3.	Nagging Pain	8 (5.3%)	6 (4.0%)	1 (0.7%)	2 (1.3%)	2 (1.3%)	3 (2.0%)	3 (2.0%)	2 (1.3%)
4.	Uncomfortable Pain	20 (13.3%)	17 (11.3%)	18 (12.0%)	19 (12.7%)	20 (13.3%)	16 (10.7%)	6 (4.0%)	5 (3.3%)
5.	Troublesome Pain	3 (2.0%)	3 (2.0%)	2 (1.3%)	2 (1.3%)	4 (2.7%)	5 (3.3%)	2 (1.3%)	1 (0.7%)
6.	Distressing Pain	11 (7.3%)	11 (7.3%)	18 (12.0%)	17 (11.3%)	17 (11.3%)	13 (8.7%)	4 (2.7%)	2 (1.3%)
7.	Miserable Pain	—	1 (0.7%)	4 (2.7%)	3 (2.0%)	6 (4.0%)	3 (2.0%)	—	—
8.	Intense Pain	3 (2.0%)	4 (2.7%)	13 (8.7%)	13 (8.7%)	7 (4.7%)	6 (4.0%)	3 (2.0%)	3 (2.0%)
9.	Horrible Pain	—	—	2 (1.3%)	1 (0.7%)	—	—	—	1 (0.7%)
10.	Unbearable Pain	—	1 (0.7%)	10 (6.7%)	8 (5.3%)	4 (2.7%)	5 (3.3%)	4(2.7%)	2(1.3%)
Total								150 (100%)	

ment, approximately 70% patient anticipated pain, while on the day of molar band placement and even one day after band cementation more than 60% of the patient experienced pain.

After the placement of orthodontic bands, gingival inflammation and hyperplasia may occur. It might be due to the fact that these bands mechanically irritate the gingival tissues and the cement which is used to retain the band is in close association with the gingiva, causing chemical irritation.¹⁷

In the upper and lower bracket placement, more than 60% patient anticipated pain, while on the day of bonding and even one day after bonding approximately 60% of the patient experienced pain. One week after bonding, only 30% patients had pain in their teeth.

Increased pain intensity in the first 24 hours have been reported after the placement of straight wire appliance.¹⁸ Pain endured from the placement of an

arch wire can cause such excruciating pain that can be greater than that suffered after a tooth extraction.¹⁹ Various authors have agreed with these results & have conducted similar researches on racial and ethnic groups as well.^{3,13,19-21}

Orthodontists have not reached an agreement on the role of gender in the intensity of pain felt by the patient.^{13,22} But few studies have reported girls experience higher degrees of pain than boys.^{3,23} Similarly another study conducted in Pakistan reports no gender dimorphism for pain during different orthodontic procedures.⁷

Results of present studies showed that during the period in which the separators were in place, 46% patients took pain killer. After upper banding, 20.7% patient took analgesics while after lower banding 15.3% took pain killers. After upper bracket placement, 22.7% patient took pain killers while for the lower bracket placement 17.3% took analgesics to relieve pain.

Analgesic reduces the pain threshold and blocks the pain pathway by inhibition of prostaglandin synthesis. Different methods like application of low-level laser therapy,²⁴ transcutaneous electrical nerve stimulation,²⁵ and vibratory stimulation of the periodontal ligament²⁶ have been tried for pain control. Blocking the transmission of impulses to nerve receptors by biting on a plastic wafer or a chewing gum, to increase the blood flow in a compressed ligament area, is also one of the recommendations.²⁷ But currently use of NSAIDs is the preferred method to control pain related to fixed orthodontic appliances.¹² Feinmann et al²⁸ found a correlation between the use of analgesics and anxiety. Furthermore, various studies reported a decrease in trend in the intensity of pain as the adaptation of the orthodontic appliance progressed. Studies have shown that pain intensity plunged drastically and continuously decreased only 72 hours after orthodontic force application. This may have been due to the patients not focusing on pain any more.^{13,18,19}

CONCLUSION

At the time of start of any new orthodontic procedure, the anticipated pain is slightly more than actual pain experienced. Orthodontist should inform the patient about the pain and other common side-effects of treatment, especially before inserting any appliance that can cause discomfort. Level of pre-treatment explanations generally seems to be satisfactory, but many patients complaint of not being informed about the pain before the start of treatment. Both general and individual factors can influence the perceived intensity of pain by the patient. By providing sufficient information to the patient can not only help in reducing anxiety but can also indirectly reduce the intensity of anticipated pain.

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