Intensity of pain after separator placement, banding and bonding in fixed Orthodontic patients

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Abstract
The most common question that appears to be first in almost everyone's mind as they pursue orthodontic treatment is: "Is it going to hurt? The cause of pain with fixed orthodontic treatment is still not completely understood, but has been associated with the changes in blood flow when pressure is applied to the teeth. It is basically the body's response to an injury that is an inflammatory response. Some patients experience pain whereas others do not. This study aims to evaluate the intensity of pain after separator placement, banding and bonding among orthodontic patients.

Materials and Methods: *A cross-sectional study was carried out among 176 patients who needed comprehensive orthodontic treatment in the Department of Orthodontics at KIST Medical College and Teaching Hospital. Patients recorded their pain perception during different time intervals 2, 6, 24, and 48 hrs after separator placement, 24 hrs after banding and 24hrs after bonding using visual analog scale. Statistical analysis was done by SPSS version 20 by paired t test and the level of significance was set at p<0.05.*

Result: *Out of 176 patients mean age obtained was 19.43 ± 4.589. Comparison of VAS showed that pain reaches its peak level at 24 hrs of separator placement (mean VAS score of 2.84) and then decreases. VAS score is highest for pain after 24 hrs of bonding (mean VAS score of 3.14) and least pain is experienced after 24 hrs of banding (mean VAS score of 2.16) but is not statistically significant.*

When comparing the pain after different hours of separator placement, changes in pain between 24 hrs and 48 hrs was found to be statistically significant. (p value 0.000).Comparing the pain between separator placement, banding and bonding, pain after banding versus pain after bonding was found to be statistically significant. (p value 0.000).

No statistically significant difference was found between the response of male and female.

Conclusion: *Changes in pain between 24 hrs and 48 hrs after separator placement was found to be statistically significant. (p value 0.000)and pain after banding versus pain after bonding was found to be statistically significant. (p value 0.000).There is no significant difference in level of pain between male and female patients.*

Keywords: *Orthodontic pain, , seperators, banding,bonding*

Introduction

When people think about having orthodontic treatment, the first thing they imagine is the immense pain associated with it. That's why most patients are afraid to do orthodontic treatment because they think it is very painful. But, this is not so. Each person will tend to have an individual response. It has been reported that between 87% and 95% of patients experience pain during fixed orthodontic treatment.[1,2,3,4,5] .It has also been

reported by patients that they had pain after placement of seperators, archwires, headgear and rapid palatal expansion.[4,6,7] Those patients who had previous knowledge of orthodontic treatment showed a more positive attitude towards orthodontic treatment.[8]

Nevertheless the degree of pain experienced by patient varies based on age, gender, patients apprehensiveness and emotional state. [5,9,10,11.] There are different ways to reduce the pain after orthodontic treatment. Among them NSAIDS have been shown to reduce the pain associated with orthodontic treatment.[12] Orthodontic pain is caused by the release of chemical mediators like prostaglandins as a result of compression of periodontal ligaments.[5,13] This study was designed to evaluate the intensity of pain during different orthodontic procedures like separator placement, banding and bonding.

Materials and Methods

This is a cross-sectional study which was carried out among 176 patients excluding 20 patients not meeting the inclusion criteria; assuming effect size of 0.3 at 5% level of significance and 80% power. The study protocol was approved by the institutional review committee of KIST Medical College and Teaching Hospital.

After taking informed consent, a questionnaire was delivered among the patients coming to the Department of Orthodontics at KIST Medical College who are undergoing fixed orthodontic treatment. Both male/female patients were included. To assess level of pain, questionnaire was given to the patients and was returned back to the investigator after filling the form.

Inclusion criteria

- Patient undergoing fixed orthodontic treatment
- Patient suitable for separator placement mesial and distal to first molar
- No history of syndromes or clefts
- Patient not taking any analgesics for pain
- Patient with no serious medical conditions

Questionnaire was given with VAS visual analog scale, easily understandable and brief in manner. Using visual analog scale, patients recorded their pain perception 2, 6, 24, and 48 hrs after separator placement, 24 hrs after banding and 24hrs after bonding.

The pain VAS is a continuous scale comprised of a horizontal (HVAS) or vertical (VVAS) line, usually 10 centimeters (100 mm) in length. For pain intensity, the scale is most commonly denoted by "no pain" (score of 0) and "pain as bad as it could be" or "worst imaginable pain"(score of 10). Participants were encouraged to approach investigator for any clarification. All answers will be collected and recorded.

All recorded data were statistically analyzed using SPSS version 20 data analyser.

Result

The study population included 176 patients under fixed orthodontic treatment who agreed to fill the questionnaire. Descriptive analysis was performed regarding the patient response to questionnaire. Paired t test was used to evaluate relationship between variables. Level of significance was set at P<0.05.

Table 1: Variables

Age group	Frequency	Percentage
10-15	33	18.8
15-20	56	31.8
20-25	69	39.2
25-30	14	8.0
30+	4	2.3
Maximum Age	36	
Minimum Age	10	
Mean Age ±S.D	19.43±4.589	
Gender	Frequency	Percentage
Male	53	30.1
Female	123	69.9

Out of 176 samples studied 53 (30.1%) were males and 123(69.9%) were female. Result showed that majority of patients undergoing orthodontic treatment i.e 39.2% belonged to age group 25 to 30 and minority of patient i.e 2.3% were above 30 years. Out of 176 patients minimum age was 10 and maximum age was 36. Mean age obtained was 19.43 ± 4.589

Table 2: VAS score of Pain after separator placement, Banding & Bonding.

	mean score of VAS
Pain after seperator 2 hrs	2.31
Pain after seperator 6 hrs	2.65
Pain after seperator 24 hrs	2.84
Pain after seperator 48 hrs	2.35
Pain after 24 hrs after banding	2.16
Pain after 24 hrs after bonding	3.14

Comparison of VAS showed that pain reaches its peak level at 24 hrs of separator placement (mean VAS score of 2.84) and then decreases. VAS score is highest for pain after 24 hrs of bonding (mean VAS score of 3.14) and least pain is experienced after 24 hrs of banding (mean VAS score of 2.16)
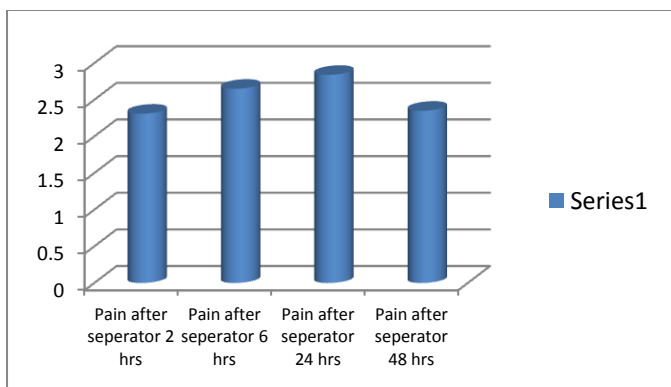
Bar diagram showing comparison of mean VAS score for 2 hrs,6 hrs, 24 hrs and 48 hrs after placement of separator, banding and bonding
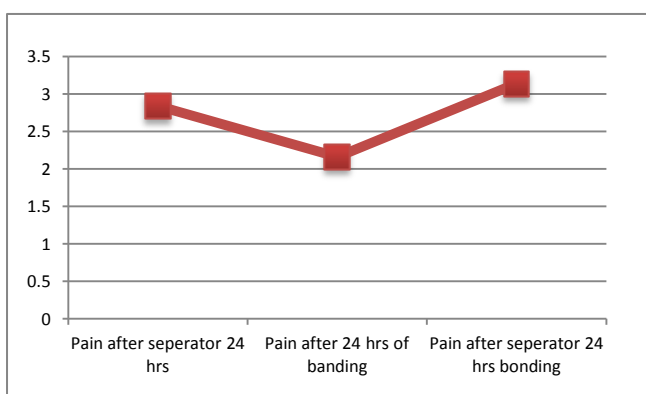

Chart showing comparison of mean VAS score for 24 hrs after placement of separator, banding and bonding

Table 3: Pain Comparison between different hours of separator placement

	Mean	T value	P value
Pain after separator 2hrs vs 6hrs	0.341 ±1.918	-2.358	0.019
Pain after separator 6hrs vs 24hrs	0.188 ± 2.004	-1.241	0.216
Pain after separator 24hrs vs 48hrs	0.494 ± 1.519	4.316	0.000*

When comparing the pain after different hours of separator placement, changes in pain between 24 hrs and 48 hrs was found to be statistically significant. (p value 0.000)

Table 4: Pain Comparison between 24 hrs after separator placement, 24 hrs after banding and 24hrs after bonding.

Pain after separator, banding and bonding	Mean	T value	P value
Pain after 24 hrs of Separator Vs pain after banding	0.676	2.776	0.009
Pain after 24 hrs of Separator Vs pain after bonding	-0.295	3.525	0.573
Pain after Banding Vs pain after Bonding	-0.972	2.911	0.000*

When comparing the pain between separator placement, banding and bonding, pain after banding versus pain after bonding was found to be statistically significant. (p value 0.000)

Discussion

Comprehensive orthodontic treatment procedure includes separator placement, banding, bonding and debonding.[14] Kvam et al suggested that 95% of the patients undergoing orthodontic treatment experienced pain.[15] The main reason for discontinuing orthodontic treatment is pain.[1,3, 16,17] The study done by Ngan et al suggested that there is pain within 4hrs of separator placement that increases over the next 24hrs and then decreases within 7 days.[10, 18,19] It has also been reported that patients experienced pain on day 2 and pain decreases by day 5 after separator placement.[20] In this study also when mean value is compared during different hours of separator placement,

there was increased level of pain during 6 hrs, reaches its peak after 24hrs and decreases after 48 hrs. There are many studies done which reported that there was pain in first 24h and decreases after that.[21] There is increased level of pain at 24 hrs of orthodontic treatment and decreases after 48hrs and 72 hrs.[22] But pain level in different hours of separator placement is not statistically significant in our study. Intensity and duration are the two major aspects of pain in orthodontic treatment.[5] Krukemeyer et al suggested that 90% of patients reported that orthodontic treatment is a painful procedure and 30% of patients discontinue treatment before time.[23] Pain depends upon patients perception which includes different factors like age, sex, pain threshold level etc. The role of the orthodontist is to explain the treatment procedures and do the proper counseling and give assurance that at the end of the treatment patient will have a beautiful smile which affects their esthetics, self esteem and confidence.

Comparison of VAS showed that pain reaches its peak level at 24 hrs of separator placement (mean VAS score of 2.84) and then decreases. VAS score is highest for pain after 24 hrs of bonding (mean VAS score of 3.14) and least pain is experienced after 24 hrs of banding (mean VAS score of 2.16). When comparing the pain after different hours of separator placement, changes in pain between 24 hrs and 48 hrs was found to be statistically significant. (p value 0.000). Comparing the pain between separator placement, banding and bonding, pain after banding versus pain after bonding was found to be statistically significant. (p value 0.000). There were several studies done which reported females experienced greater degree of pain than males.[24,2] There is no difference in level of pain between genders.[10,20,3] However pain can vary by several factors like age, sex, cultural background and psychology of the patients.[11] In our study also there is no statistical significant difference in level of pain between males and females.

Conclusion

The findings of our study suggests that pain is experienced by patients after separator placement and bonding and there is less or no pain after banding but it is not statistically significant. There is also no significant difference in perception of pain among genders.

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