

Pain in the Separation of Molars among the Orthodontic Patients

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ABSTRACT:

Introduction: Pain has been the most common and foremost reason for discontinuing the orthodontic treatment. The patients usually experience the pain in Orthodontic treatment during separator placement, wire placement, headgear wear, and rapid palatal expansion. Placement of orthodontic separators (brass wire, elastomeric, spring type steel separators, and latex elastics) results in a painful experience. Therefore the purpose of the study is to assess the pain perception among the patients seeking orthodontic treatment.

Methods: This study was carried out amongst 120 (53 male and 67 female) patient seeking orthodontic treatment. Elastomeric separators was placed mesially and distally to the first molars and the participants was given self-administrated Universal pain assessment Tool to document perceived pain and pain upon chewing, using a visual analog scale for seven days. Total scores were calculated and a descriptive statistics in the form of number (mean) and percentage were calculated.

Results: This study showed a mean score for perceived pain of each day to be 7.16, 7.1, 6.05, 4.67, 3.69, 2.88, and 2.27 respectively with mean of 4.831 +/- 1.273. Similarly the mean score for pain on chewing were 8.21, 7.53, 6.62, 5.19, 4.38, 3.65, and 3 with mean of 5.5119 +/- 1.269.

Conclusions: There was significant difference on pain perception among the male and female participants, female having higher pain perception. There was significant difference in pain perception between the Adolescent and Adult in both normal life and during eating.

Keywords: Pain, Separators, Universal Pain Assessment Tool

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INTRODUCTION

International Association for The Study of Pain (IASP) has defined Pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage. Pain has been the most common and foremost reason for discontinuing the orthodontic treatment. The patients usually experience the pain in Orthodontic treatment during separator placement, wire placement, headgear wear, and rapid palatal expansion.¹⁻⁴

The cause for the sensation of pain is mainly due to release of various biochemical mediators which are stimulated by inflammatory reactions in periodontium and dental pulp during the orthodontic tooth movement. The pain is due to changes in blood flow caused by the appliances which is correlated with the release and presence of various substances, such as Substance-P, Histamine, enkephalin, dopamine, serotonin, cytokines, etc. Many literatures regarding the increase in the levels of these mediators, which elicit hyperalgesia response following force application, has been published in Orthodontics.^{5,6}

Placement of orthodontic separators (brass wire, elastomeric, spring type steel separators, and latex elastics) results in a painful experience. Two controlled clinical trials^{7,8} performed by Ngan et al. concluded that there was discomfort associated with separator placement, which usually starts within 4 hours of insertion. The level of discomfort increases over the next 24 hours and decreases to pre-placement level within 7 days. Bondemark et al.⁹ has evaluated and compared the separation effect and patient perception of pain and discomfort to two types of orthodontic separators (elastomeric and spring type) but found no statistically significant difference between the discomfort caused by the two types of separators. They reported that the worst pain was experienced at day 2 and subsided almost completely by day 5. An electromyographic (EMG) study by Michelotti et al.¹⁰, performed to evaluate the motor and sensory changes associated with separator placement, showed a decrease in motor output as well as pressure pain threshold in muscles of mastication.

Thus the pain assessment during the placement of separators in orthodontic procedure amongst

the Nepalese patient would be necessary for the management of the pain.

MATERIALS AND METHODS

The total number of 120 (53 male and 67 female) patients, (convenient sampling) who visited different hospitals and clinics in Kathmandu, Nepal seeking for orthodontic treatment during 4 months of period, were informed about their participation in the research and the written informed consent was obtained after getting ethical clearance from Institutional Review Committee, Maharajgunj, Nepal.

Gender	Frequency	Percent
Female	67	55.8
Male	53	44.2
Total	120	100
Age	Frequency	Percent
Teenager	68	56.7
Adult	52	43.3
Total	120	100

Table 1: Frequency distribution by age and gender

On the first visit of the orthodontic treatment of the patient, the elastomeric separators were placed on the mesial and distal of the first molars. Then the patients were given a self-administered Universal pain assessment Tool (fig. 1), with 1 to 10 markings to take home. Then the participants were asked to mark the intensity of the pain they perceived every day for next 7 days, 1 being no pain and 10 being the upmost pain. They were also asked to mark the Universal pain assessment tool for perceived pain on chewing.

The data thus obtained were analyzed at the significance level of 0.05. The data were compared between male and female and between the different age groups too.

Universal Pain Assessment Tool

This pain assessment tool is intended to help patient care providers assess pain according to individual patient needs. Explain and use 0-10 Scale for patient self-assessment. Use the faces or behavioral observations to interpret expressed pain when patient cannot communicate his/her pain intensity.

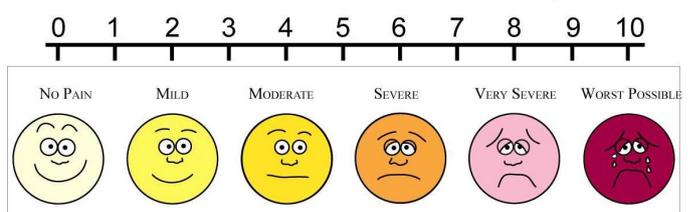


Fig. 1. Universal pain Assessment tool 22

RESULTS

The entire self-administered Universal Assessment tool were collected from 120 participants. The results of mean score for perceived pain of each day were 7.16, 7.1, 6.05, 4.67, 3.69, 2.88, and 2.27 respectively with mean of 4.831 +/- 1.273. Similarly the mean score for pain on chewing were 8.21, 7.53, 6.62, 5.19, 4.38, 3.65, and 3 with mean of 5.5119 +/- 1.269.

Days	Frequency	Mini. Pain Grade	Max. Pain Grade	Mean	S.D.
Day1	120	5	9	7.16	1.264
Day2	120	3	9	7.1	1.959
Day3	120	2	9	6.05	1.699
Day4	120	2	8	4.67	1.712
Day5	120	1	8	3.69	1.608
Day6	120	1	7	2.88	1.278
Day7	120	0	7	2.27	1.179

Table 2: Descriptive analysis of regular life dental pain

Days	Frequency	Mini. Pain Grade	Max. Pain Grade	Mean	S.D.
Day1	120	6	9	8.21	0.829
Day2	120	3	9	7.53	1.782
Day3	120	2	9	6.62	1.745
Day4	120	2	9	5.19	1.755
Day5	120	2	9	4.38	1.583
Day6	120	1	8	3.65	1.436
Day7	120	0	22	3	2.177

Table 3: Descriptive analysis of during eating daily dental pain

This shows there is increased pain during eating with the separator in the teeth. The pain perception pattern showed that the participant had the upmost pain for the first 3 days and it gradually decreased after that.

The independent T-test showed that there was significant difference on pain perception among the male and female participants, female having higher pain perception.

Characteristics	Gender	Frequency	Mean	S.D.	t	Sig(2-tailed)
During Eating Mean	Male	53	5.0108	1.3485	-3.978	0.000
	Female	67	5.9083	1.0541		
Regular Mean	Male	53	4.3127	1.3924	-4.086	0.000
	Female	67	5.2409	1.0038		

Table 4: Analysis of gender with regular and during eating dental pain

The participants were divided into two groups according to the age, 12-16 years (adolescent) and 16 -24years (adult). The mean pain perception of Adolescent was 5.1087 and that of adults was 4.3736. Similarly, the mean pain perception of Adolescent during eating was 5.7794 and for Adult during eating were 5.1621.

Characteristics	Age	Frequency (n)	Mean	Std. Deviation	t-Test	Sig(2-tailed)
During Eating Mean	Adolescent	68	5.7794	1.0142	2.581	0.012
	Adult	52	5.1621	1.4792		
Regular Mean	Adolescent	68	5.1807	1.0094	3.45	0.001
	Adult	52	4.3736	1.4373		

Table 5: Analysis of age with regular and during eating dental pain

This showed there is significant difference between the Adolescent and Adult in both normal life and during eating.

DISCUSSION

The results obtained from the research using Universal Pain Assessment Tool for pain perception suggest the patient experiences pain during separator placement. The management of the pain can be done by the use of NSAIDS, anesthetic gel¹¹, application of continuous wave low-level laser therapy¹², and the use of vibratory stimulation.¹³

The current study showed there is increased pain during eating with the separator in the teeth. Bondmark et al.⁹, and Scheurer et al.¹⁴ also showed that eating is most affected activity during separator placement.

The pain perception pattern showed that the participant had the upmost pain for the first 3 days, Day 1 being the most and it gradually decreased after that. This result showed the agreement with the studies done by Ngan et al.^{7,8}, Giannopoulou et al.¹⁵, and Wilson et al.¹⁶ In contrary to that Bondmark et al.⁹ and Cureton et al.¹⁷ showed the highest pain perception on Day 1 and Day 3 respectively.

From the statistics of the study, it can be said that there is significant difference in pain perception among the genders. It shows female experiences pain more than male. This result goes in accordance with the results of research done by Abu Alhajja et al.¹⁸, Krishnan et al.¹⁹, and Berguis et al.²⁰ However, the study conducted by Abdullah showed no significant difference between male and female.²¹

It was also shown that there was significant difference between adults and Adolescent. Adults were shown more tolerant to pain by the separators than the adults which is obvious. But the study done by Ngan et al.^{7,8} disagrees with this result claiming the pain perception levels were same for adults and adolescences.

CONCLUSION

Thus it can be concluded that there is a pain due to separator placement during orthodontic treatment with maximum pain on the first day which declines after Day 3 gradually. The Adolescents and female has less tolerance to the pain than the adults and male.

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