Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 10, Issue, 01, pp.64631-64634, January, 2018

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

RESEARCH ARTICLE

PAIN ASSESSMENT AFTER PLACING SEPARATORS AS WELL AS INITIAL ARCHWIRE IN ORTHODONTIC PATIENTS: A RANDOMIZED CLINICAL TRIAL

[1]Dr. Manish Goyal, [*2]Dr. Dheeraj Khetwal, [3]Dr. Akshita, [4]Dr. Syed Amaan Ali and [5]Dr. Ridhi Chawla

[1]Professor, Kothiwal Dental College, Rohilkhand University Bareilly
[2,3,4]Post Graduate student, Kothiwal Dental College, Rohilkhand University Bareilly
[5] Assistant Professor, Kothiwal Dental College, Rohilkhand University Bareilly

ARTICLE INFO

Article History:
Received 20th October, 2017
Received in revised form
26th November, 2017
Accepted 02nd December, 2017
Published online 31st January, 2018

Key words:

Pain, Separators,
Ibuprofen, Archwire,
Chewing Gum.

ABSTRACT

Pain is a common experience in orthodontic patients,and fear of pain and discomfort is a concernfor many. Orthodontic pain usually beginsat 2 hours after force application and reaches its maximumintensity at bedtime or at 24 hours, and lastsapproximately 5 to 7 days.The aim of this study was to investigate the intensity of pain experienced by orthodontic patients following the insertion of separators and to compare the efficacy of ibuprofen and chewing gum in pain reduction during the placement of initial archwire. A total number of 60 patients seeking orthodontic treatment were included in this study between age group of 12- 24 years. The subjects were divided into three groups: placebo group (G1), ibuprofen group (G2), chewing-gum group (G3). They were asked to answer the questions based on visual analogue scale and to quantify the level of pain.Pain during placement of separator as per VAS scale- Majority of the participants (59.3%) reported mild pain with mode value of 2. Pain after placement of separator as per VAS scale- Overall 50 % of participants reported moderate pain with mode value of 3 and 4. 73% of participants reported pain on chewing food while 82.5% modified their dietary pattern.30% of participants reported intake of analgesics due to pain from elastomeric separator.Ibuprofen is most effective in reducing the pain. Chewing gum can also be recommended for orthodontic patients to reduce pain at chewing function.

Citation: Dr. Manish Goyal, Dr. Dheeraj Khetwal, Dr. Akshita, Dr. Syed Amaan Ali and Dr. Ridhi Chawla. 2018. "Pain assessment after placing separators as well as initial archwire in orthodontic patients: A randomized clinical trial", *International Journal of Current Research*, 10, (01), 64631-64634.

INTRODUCTION

Pain is a common experience in orthodontic patients and fear of pain and discomfort is a concernfor many. Orthodontic pain arises from ischemia, inflammation and edema in the compressed periodontalligament (Furstman *et al*., 1972). In an inflamed and ischemic periodontal ligament, mediators such as histamine, brady kinin, prostaglandins, serotonin, and substance P are released. These mediators irritate the nerve endings of the pain receptors, thus causing pain. Orthodontic pain usually beginsat 2 hours after force application and reaches its maximumintensity at bedtime or at 24 hours, and lastsapproximately 5 to 7 days (Farzanegan *et al*., 2012). The placement of elastomeric separators is a part of routine fixed appliance therapy to create space for molarbands. This process causes displacement of teeth and theimmediate release of biochemicals in the gingival fluid, followed by an increase in the level of prostaglandins E2 and interleukin-1 the next day. Therefore, the intensityof pain is at its highest after 24 hours, remains bothersomefor the next 3 days, and diminishes over the next6 to 8 days. Most patients report pain upon chewingfor which they have to change their dietary patternduring the separation period (Aldress, 2015). Since this pain is inflammatory, nonsteroidal anti-inflammatory drugsare the gold standard in reducing the discomfort.

However, the systemic effects of these drugs, including their deceleration effect on the rate of tooth movementand the necessity for the patient's compliance in taking the medications should be considered. Other methodssuch as bite wafers, vibratory stimulation, transcutaneous electrical nerve stimulation, and chewing gums have achieved pain reduction to some degree, but the effectsare highly variable. This study was designed because of the scarcity of researchevaluating the efficacy of nondrug methods in orthodonticpain control (Scheurer *et al*., 1996).

Aim and Objectives

The aim of this study was to investigate the intensity of pain experienced by orthodontic patients following the insertion of separators and to compare the efficacy of ibuprofen and

Corresponding author: **Dr. Dheeraj Khetwal,**
Post Graduate student, Kothiwal Dental College, Rohilkhand University Bareilly

chewing gum in pain reduction during the placement of initial archwire.

MATERIALS AND METHODS

A total number of 60 patients seeking orthodontic treatment were included in this study between age group of 12- 24 years. The subjects were divided into three groups:

- In the placebo group (G1), the patients were asked to take a B6 vitamin tablet as a placebo immediately after archwire placement and at 8-hour intervals for a week if pain persisted.
- In the ibuprofen group (G2), the subjects took a 400-mg ibuprofen tablet immediately after archwire placement and at 8-hour intervals for a week if pain persisted.
- — The subjects in these 2 groups were blinded about the drug that they took.
- In the chewing-gum group (G3), the patients chewed a sugar-free gum for 5 minutes immediately after archwire placement and at 8-hour intervals for 1 week if they experienced pain.

Table 1. Questionnaire given to the patient after placing elastomeric separators

Type Of Separator Used (To Be Filled By Treating Doctor)

Elastometic	Kesling	Brass Wire

S No.	Question	Yes	No
1.	pain during placement of separators		
2. (day 0)	pain 6h after placement of separators		
3. (day 1) (day 2) (day 3)	(a) pain 1d after placement of separator (b) Pain 2d after placement of separator (c) pain 3rd after placement of separator		
4. (day 4)	Next appointment		
5.	Pain during chewing of food		
6.	Whether had to modify dietary pattern		
7.	Whether had to take analgesics		
8. quality of sensation	Pain		
	Discomfort		
	Feeling of pressure		
	Tenderness		
	localized		
	Generalized		
	Radiating		
	Restricted to jaw		
9. (day 4)	Alleviation of pain on removal of separators		
10. Visual Analogue Scale			

Example : Pt Would Encircle The Digit 7 And Write Day 1 Below It; Encircle Digit 9 Writing Day 2 Below, Encircle Digit 4 On Day 3 And So On

0 1 2 3 4 5 6 7 8 9 10

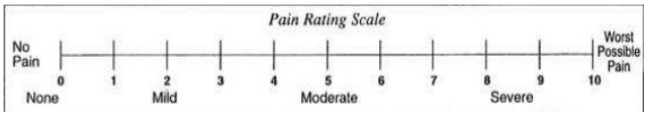
Signature of Patient / Parent / Gaurdian

Elastomeric separators were placed mesial and distal to all the four first molars. All the subjects were given a questionnaire (Table - 1). They were asked to answer the questions based on visual analogue scale and to quantify the level of pain.After a week the upper arch was banded and bonded and initial archwire (.012 NITI) was inserted in the patient. All the patients were given another questionnaire (Table - 2). The subjects were asked to complete a visual analogscale questionnaire at 2 hours, 6 hours, and bedtime onthe day of separator as well as archwire placement, and at 24 hours, 2 days, 3days, and 7 days after the first appointment. The formatof the questionnaire was a 10-cm line (visual analogue scale), and the patientswere expected to mark a location on the linecorresponding to the amount of pain they experienced, with 0 indicating no pain and 10 indicating unbearablepain (Table - 3). The severity of pain was recorded during 4 oralfunctions including chewing, biting, fitting back teeth, and fitting front teeth. For fitting the front and backteeth, the patients did not eat anything and were instructedto bring the front teeth edge to edge with lightforce and to fit the back teeth with light force, and thenscore their pain in each function. For the biting andchewing functions, the subjects used a slice of an apple; they bit and chewed the slice and scored their experiencedpain. The patients were instructed not to use any additionalanalgesics. All patients returned their questionnaires after one week. The data thus obtained was subjected to statistical analysis.

Table 2. Questionnaire given to the patient after placing initial archwire

When did you perceive the initial pain?	1st hour	2nd hour	3rd hour	4th hour	5th hour	6th hour		
	6th hour	1st day	2nd day	3rd day	4th day	5th day	6th day	7th day
Have you got pain?								
Yes								
No								
VAS INDEX VALUE								
In which part(s) do you feel the pain?								
Anterior teeth								
VAS INDEX VALUE								
Posterior teeth								
VAS INDEX VALUE								
Have you consumed any pain relief?								
Yes								
No								
Has your daily life been affected?								
Yes								
No								

Table 3. Visual Analogue Scale to quantify the level of pain



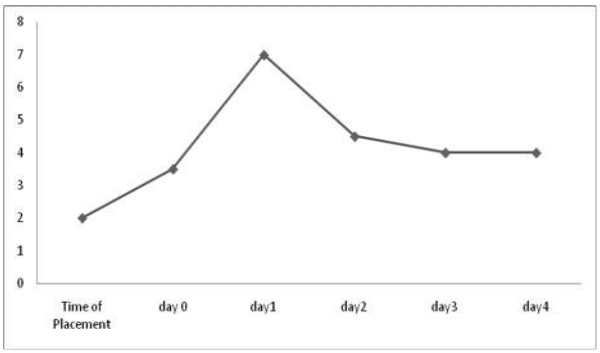
RESULTS

A total number of 63(23 males and 40 females) patients seeking orthodontic treatment were included in this study between age group of 12- 24 years.

- Pain during placement of separator as per VAS scale- Majority of the participants (59.3%) reported mild pain with mode value of 2.
- Pain after placement of separator as per VAS scale- Overall 50 % of participants reported moderate pain with mode value of 3 and 4.
- Pain after 24 hrs of placement of separator- Majority of participants 67.1% reported severe pain with mode value of 7.
- Pain after 48 hrs of placement of separator- Majority of the participants (66.6%) reported moderate pain with mode value of 4 and 5.
- Pain after 72 hrs of placement of separator- Majority of participants (74.6%) reported moderate pain with mode value of 4.
- Pain after 96 hrs of placement of separator- Majority of participants (53.9%) reported moderate pain with mode value of 4.

Pain perceived at different time interval after placement of elastomeric separator

- 73% of participants reported pain on chewing food while 82.5% modified their dietary pattern.
- 30% of participants reported intake of analgesics due to pain from elastomeric separator.
- Participants described the quality of sensation as



- Pain 82.5%
- Discomfort 90.4%
- Feeling of pressure 71.4%
- Tenderness 73.0%
- Localized 87.3%
- Generalised 26.9%
- Radiating 33.3%
- Restricted to jaw 76.1%

80.9% of participants reported alleviation of pain on removal of stimulus

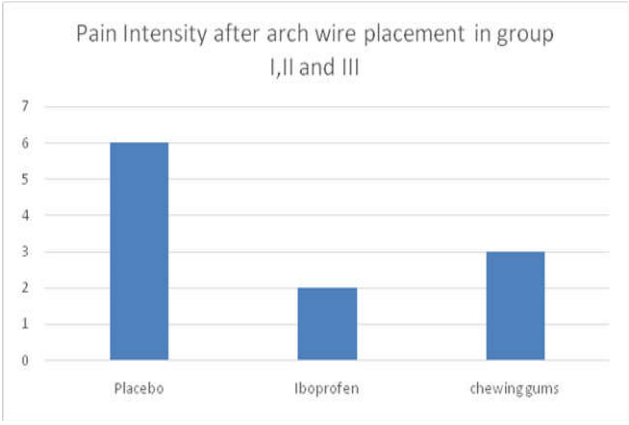
QUESTIONAIRE -II RESULTS

After a week the upper arch was banded and bonded and initial archwire (.012 NITI) was inserted and then subjects were randomly divided in three different groups.

- GROUP I – Placebo (21)
- GROUP II- ibuprofen (21)
- GROUP III- chewing gum (21)

Table 4.

Readings on VAS scale	Group I	Group II	Group III
Initial pain (mode value)	6 hrs	24 hrs	24 hrs
Pain experience (mode value)	6	2	3
Area of pain			
Anterior (mode value)	17% (5)	6% (3)	12% (4)
Posterior (mode value)	8% (3)	2% (2)	6% (2)
Daily life affected	4%	3%	4%



DISCUSSION

Pain resulting from orthodontic procedures has been previously documented and methods to manage it were suggested. In addition to the use of NSAIDs, other methods were reported, including the application of anesthetic gel(Keim, 2004), the use of vibratory stimulation(Marie, 2003), and the application of continuous wave low‐level laser therapy(Eslamian*et al*., 2004).According to Davidovitch and Shanfield(Davidovitch, 1986),pain during orthodontic treatment is due to an inflammatory response in the periodontal ligament, and NSAIDs have been called the gold standard for orthodontic pain control.The current study utilizes the VAS for documentation of pain perception. As a subjective method of measuring pain, the VAS has been used extensively in many studies and has beendescribed as an easy and reliable way to demonstrate small variations in pain intensity(Ngan*et al*., 1989).The validity of the VAS for reporting pain has been demonstrated in young children and it was previously utilized to record pain intensity induced by orthodontic separators in child and adolescent samples.

This studied perceived the most severe pain within the 1st day of separators placement Ngan*et al.,*(1989)Wilson *et al.* (1989) and Giannopoulou*et al*.(2006) reported the same findings.However, different samples of adults reported experiencing the peak of separator pain on day 2or day 3. The decline in the perceived pain was evident in the current study after the 2nd day, and the decline continued with a few patients after the 4th day. This tendency toward a reduction in the average pain intensity and the number of patients experiencing pain was in agreement with many studies that investigated pain experiences associated with orthodontic treatment.The individual variations in the pain perception observed in this study confirm the previously published responses to orthodontic procedures such as separator placement and insertion of initial archwires. Chewing was the most painful experience among the three studies' parameters. This was in agreement with the results of Bondemark*et al.,*(2004)who found that eating was the most affected activity during the separation study period. Scheurer*et al.*(1996)also reported that the influence of fixed orthodontic appliances on eating/chewing was significantly higher than the influence on daily life. Bondemark*et al.* showed that the effect of separator placement on leisure activities was small.Patients were asked to complete a questionnaire concerning pain perceived after insertion of fixed orthodontic appliances. The form was given to the patients at the first appointment afterinsertion of the archwires and returned at the next appointment. The system of measuring discomfort by VAS was found to be appropriate, with even young children able to understand the concept and respond to the questions.Following ligation of the archwires, the patientsstarted to feel uncomfortable and perceived pain.

As can be seen from Tables 4, although not statistically significant, the data show higher pain scores for the anterior than for the posterior teeth, in agreement with the results of other investigators (Ngan*et al.*, 1989; Scheurer*et al.*, 1996). This may be explained by the factthat during the levelling phase the anterior teeth are often more involved and incisors have smaller root surfaces than molars. In addition to this, biting while eating might be the reason for the higher pain perceived in the anterior teeth.Chewing gum was also effective in reducing pain in the chewing function at 24 hours and 7 days compared with the placebo group(Aldress, 2015).

Conclusion

Pain due to orthodontic separator placement varies among adolescent patients, but it decreases significantly after the first 2 days. The consumption of pain relief was highest at 6 hours after archwire insertion and gradually decreased on the following days. Thus, Ibuprofenis most effective in reducing pain though chewing gum can also be recommended for orthodontic patients to reduce pain during chewing.

REFERENCES

Aldress AM. 2015. Intensity of pain due to separators in adolescent orthodontic patients. *J Orthodont Sci.,* 4:118-22.

Davidovitch Z, Shanfield J. Biochemical aspects of orthodontictooth movement: cyclic nucleotide and prostaglandin concentrationsin tissues surrounding orthodontically treated teeth in vivo. Am J OrthodDentofacialOrthop 1986;90:139-48.

Eslamian L, Borzabadi‐Farahani A, Hassanzadeh‐Azhiri A, Badiee MR,Fekrazad R. The effect of 810‐nm low‐level laser therapy on pain caused by orthodontic elastomeric separators. Lasers Med Sci2014;29:559‐64.

Farzanegan F, Zebarjad SM, Alizadeh S, Ahrari F. 2012. Pain reduction after initial archwire placement in orthodontic patients: A randomized clinical trial. *Am J Orthod Dentofacial Orthop*., 141: 169-73.

Furstman L, Bernik S. 1972. Clinical considerations of the periodontium. *Am J Orthod.,* 61:138-55.

Giannopoulou C, Dudic A, Kiliaridis S. 2006. Pain discomfort and crevicularfluid changes induced by orthodontic elastic separators in children. *J Pain.,* 7:367‐76.

Keim RG. 2004. Managing orthodontic pain. *J Clin Orthod.,* 38:641‐2.

Marie SS, Powers M, Sheridan JJ. 2003. Vibratory stimulation as a method ofreducing pain after orthodontic appliance adjustment. *J Clin Orthod.,*7:205‐8.

Ngan P, Kess B, Wilson S. Perception of discomfort by patientsundergoing orthodontic treatment. Am J OrthodDentofacialOrthop 1989;96:47‐53.

Scheurer PA, Firestone AR, Burgin WB. 1996. Perception of pain as a result of orthodontic treatment with fixed appliances. *E J Orthod.,* 349-357.

Wilson S, Ngan P, Kess B. 1989. Time course of the discomfort inyoung patients undergoing orthodontic treatment. *Pediatr Dent.,* 11:107‐10.

Bondemark L, Fredriksson K, Ilros S. 2004. Separation effect and perception of pain and discomfort from two types of orthodontic separators. *World J Orthod.,* 5:172‐6.

Scheurer PA, Firestone AR, Bürgin WB. 1996. Perception of pain as a result of orthodontic treatment with fixed appliances. *Eur J Orthod.,*18:349‐57.

****