

## Comparison Between the Efficacy of Acetaminophen and Ibuprofen for Relieving Orthodontic Pain

Mohit Chaturvedi<sup>1</sup>, Neha Chaturvedi<sup>2\*</sup>

<sup>1</sup>M.D.S. (Orthodontics and Dentofacial Orthopaedic), <sup>2</sup>M.D.S. (Endodontics and Conservative Dentistry),  
Abha Tooth World, A Comprehensive Dental Care Centre, Near Chandra Medicos, Janta Colony, Vaishali  
Nagar, Ajmer, Rajasthan, India.

### ABSTRACT

**Background:** Postoperative pain is most common complication after orthodontic therapy. Non-steroidal anti-inflammatory drugs are among most widely prescribed analgesics for management of postoperative pain. The aim of the present study was to compare the efficacy of acetaminophen and ibuprofen for relieving orthodontic pain.

**Materials and Methods:** A sample of 40 patients who needed fixed orthodontic therapy was selected for this study. Before the commencement of the study informed consent was taken from all patients. Patients who were scheduled for fixed orthodontic treatment with age more than 16 years were selected for the study. Patients with presence of any systemic disease, patients contraindicated to use of NSAID, patients using any antibiotics or analgesics were excluded from study.

The three drugs i.e., Acetaminophen, Ibuprofen, Placebo were randomly administered among patients in each age category. Mclaughlin, Bennett, Trevisi (MBT) 0.022" slot and 0.016" NiTi initial aligning wire were used for patients with mild - to - moderate crowding. Each patient was thereafter asked to note the degree of pain perceived at specific intervals of time (1 hour, 1day; and 7th day), during chewing and biting. Statistical analysis was done by using SPSS, version 22 (SPSS, Inc., Chicago, IL) and  $p < 0.05$  was considered statistically significant.

**Results:** A total of 40 patients were included in the study in which 16 were male whereas 24 were females. Analgesic drugs were distributed among groups; to group I Ibuprofen was given which include 7 males 11 females, to group II

Acetaminophen was given which include 5 males and 8 females, to group III Placebo were given which include 4 males and 5 females. For both chewing and biting there is no significant difference between Group I and group II, but there is significant difference between group I and II with respect to Group III until 7<sup>th</sup> day.

**Conclusion:** Our study concluded that preoperative administration of acetaminophen and ibuprofens were effective to control the postoperative pain. However, acetaminophen can be considered as the treatment of choice due to the fact that it does not cause gastrointestinal (GI) ulcers.


**Keywords:** Postoperative Pain, Acetaminophen, Ibuprofen, Placebo.

### \*Correspondence to:

**Dr. Neha Chaturvedi,**  
M.D.S. (Endodontics and Conservative Dentistry),  
Abha Tooth World,  
A Comprehensive Dental Care Centre,  
Near Chandra Medicos,  
Janta Colony, Vaishali Nagar, Ajmer, Rajasthan, India.

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### INTRODUCTION

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage.<sup>1</sup> Pain has two components, the first component is the awareness of a painful stimulus and the second is emotional effect evoked by this experience.<sup>2</sup> About 95 % of the patients undergoing orthodontic therapy may have varying degrees of pain and discomfort during some stages of treatment such as separator or arch wire placement.<sup>3,4</sup> It has also been reported that pain is the most common reason for patient aversion

and discontinuing treatment.<sup>5,6</sup> Most commonly used method for the management of pain caused due to orthodontic treatment still remains to be the use of nonsteroidal anti-inflammatory drugs (NSAIDs), in spite of developing various techniques such as low level laser therapy to periodontal tissue,<sup>7</sup> transcutaneous electrical nerve stimulation,<sup>8,9</sup> and vibratory stimulation of periodontal ligament.<sup>10,11</sup> Ibuprofen is a 2-propionic acid derivate discovered in the 1960s. Ibuprofen is a peripherally acting analgesic with a potent anti-inflammatory action.<sup>12</sup> It is non-selective inhibitor of

cyclooxygenase (COX-1 and COX-2).<sup>13</sup>Acetaminophen is an over-the-counter medication with antipyretic and analgesic effects via central inhibition of the third isoform of cyclooxygenase enzyme (COX3), which is mostly found in the cerebral cortex and heart.<sup>14,15</sup> The aim of the present study was to compare the efficacy of acetaminophen and ibuprofen for relieving orthodontic pain.

**MATERIALS AND METHODS**

A sample of 40 patients who needed fixed orthodontic therapy was selected for this study. Before the commencement of the study informed consent was taken from all patients. Patients who were scheduled for fixed orthodontic treatment with age more than 16 years were selected for the study. Patients with presence of any systemic disease, patients contraindicated to use of NSAID, patients using any antibiotics or analgesics were

The three drugs i.e., Acetaminophen, Ibuprofen, Placebo were randomly administered among patients in each age category. Double blinding was done in which both the patient and the person who randomly distributed drugs were unaware about which drug was consumed and distributed. The bracket slot size and archwire combination were standardized. Mclaughlin, Bennett, Trevisi (MBT) 0.022" slot and 0.016" NiTi initial aligning wire were used for patients with mild-to-moderate crowding. All patients were prescribed with a single preoperative dose, 1 hour before the initial archwire placement. Each patient was thereafter asked to note the degree of pain perceived at specific intervals of time (1 hour, 1 day; and 7th day), during chewing and biting. Statistical analysis was done by using SPSS, version 22 (SPSS, Inc., Chicago, IL) and p<0.05 was considered statistically significant.

**RESULTS**

A total of 40 patients were included in the study in which 16 were male whereas 24 were females. Analgesic drugs were distributed among groups; to group I Ibuprofen was given which include 7 males 11 females, to group II Acetaminophen was given which include 5 males and 8 females, to group III Placebo was given which include 4 males and 5 females. Table 3 shows the mean pain score for chewing, biting for each of the three groups. For both chewing and biting there is no significant difference between Group I and group II, but there is significant difference between group I and II with respect to Group III until 7<sup>th</sup> day.

**Table 1: Distribution of gender**

Gender	N(%)	p-value
Male	16(40%)	<0.05
Female	24(60%)	
Total	40 (100%)	

**Table 2: Distribution of analgesic drugs**

Group	Analgesic drugs	Gender	
		Male	Female
Group I	Ibuprofen	7	11
Group II	Acetaminophen	5	8
Group III	Placebo	4	5

**Table 3: Mean pain score**

Variable	1 hour	1 day	7 day
<b>Chewing</b>			
Group I	15.00±3.76	46.17±6.58	5.76±6.49
Group II	23.19±9.57	50.37±7.96	7.19±3.46
Group III	29.54±10.00	52.49±8.34	8.45±5.39
<b>Biting</b>			
Group I	19.36±5.46	53.63±8.71	11.24±5.36
Group II	25.53±11.56	54.71±10.34	10.37±6.99
Group III	36.00±15.39	56.71±11.36	12.55±5.67

**DISCUSSION**

The aim of the present study was to compare the efficacy of acetaminophen and ibuprofen for relieving orthodontic pain. In our study a total of 40 patients were included in which 16 were male whereas 24 were females. Analgesic drugs were distributed among groups; to group I Ibuprofen was given which include 7 males 11 females, to group II Acetaminophen was given which include 5 males and 8 females, to group III Placebo was given which include 4 males and 5 females. Table 3 shows the mean pain score for chewing, biting for each of the three groups. For both chewing and biting there is no significant difference between Group I and group II, but there is significant difference between group I and II with respect to Group III until 7<sup>th</sup> day. Patel et al. and Bradley et al. reported that ibuprofen was more effective than acetaminophen in post-separator pain control.<sup>16,17</sup>

Najafi HZ et al conducted a study and results showed that there was no significant difference between acetaminophen, ibuprofen, and meloxicam in post-separator placement pain control when administered 1 h before the procedure. In all the groups, at rest, pain level elevated after separator placement and reached its peak at 24 h and then subsided until 48 h. But during chewing and fitting of the posterior teeth, some of the groups reached a peak in pain at 48 h. No significant difference was found in pain experience between males and females.<sup>18</sup>

Wajekar NA et al concluded that, when compared with the placebo group, the use of (nonsteroidal anti-inflammatory drugs) ketorolac, ibuprofen, and acetaminophen preoperatively reduced the pain perceived at 2 hours and 6 hours after archwire placement. However, the results were much significant for the ketorolac group as compared with the ibuprofen and acetaminophen groups.<sup>19</sup>

**CONCLUSION**

Our study concluded that preoperative administration of acetaminophen and ibuprofen was effective to control the postoperative pain. However, acetaminophen can be considered as the treatment of choice due to the fact that it does not cause gastrointestinal (GI) ulcers.

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