

Comparative Assessment of Pain Control in Fixed Orthodontic Therapy by Using Rubber Based Teethers vs Ibuprofen

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ABSTRACT

Background: Although the demand and awareness for improving smile aesthetics and occlusal corrections increased, still patients decline or discontinue orthodontic treatment due to related pain and discomfort. Hence, the present study was conducted to compare the pain control in fixed orthodontic therapy by using rubber based teethers vs ibuprofen.

Material and methods: This clinical study was conducted over a period of 6 months. 100 patients with an age range of 18 to 22 years, irrespective of gender, were selected for the study. Sample was divided into two groups randomly and assigned ibuprofen and rubber based teethers (50 in each group). To record pain level, the subjects were asked to complete a Visual Analog Scale (VAS) score. The amount of pain they experienced 5 minutes after arch wire insertion (Base line); then at 24 hours, and 7th day after prescribing ibuprofen and rubber based teethers for pain control were recorded. Statistical Analysis Data was analysed using SPSS software (version 22.0). The level of significance was set at $P \leq 0.05$.

Results: In the present study the mean age of patients was 20.4 yrs. Males and Females in the group were 53% and 47% respectively. In ibuprofen group, baseline pain score was 6.87 ± 1.54 which was significantly reduced to 5.34 ± 1.23 after 24 hours and further reduced to 4.33 ± 1.23 at 7th day. In rubber based teethers group, baseline pain score was 7.45 ± 1.65 which was significantly decreased to 4.64 ± 1.62 after 24 hours and further reduced to 1.92 ± 1.26 at 7th day.

Conclusion: The present study concludes that using rubber-based teethers can effectively reduce the pain during initial arch wire placement as compared to ibuprofen.

Keywords: Rubber based teethers, orthodontic pain, initial arch wire, ibuprofen.

INTRODUCTION

During fixed orthodontic treatment, many patients complain of pain, which is a concern for the patients as well as the orthodontists.^{1,2} The pain associated with orthodontic treatment is a result of

compression forces leading to ischemia, inflammation, and edema in the periodontal tissues.³⁻⁵ To obtain pain relief pharmacological agents (nonsteroidal anti-inflammatory drugs and

Received: Oct. 8, 2020; Accepted: Dec. 11, 2020

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topical anesthetic formulations) have been generally recommended by orthodontists.⁵⁻⁷ Pain relatively starts within four hours, increases over the next 24 hours, and decreases within seven days after initial bonding and placement of separators. The most common method of measuring the intensity of pain is the numerical rating scale (NRS) and visual analogue scale (VAS). Pharmacological and non-pharmacological methods can be relatively used in orthodontic pain management.⁸ Traditionally prescription of non-steroidal anti-inflammatory drugs (NSAIDs) has been considered as the most effective strategy for controlling pain resulted from orthodontic forces. NSAIDs inhibit the synthesis of prostaglandins which are important mediators in the process of pain induction.⁹ The use of these drugs, however, may be associated with reduction in tooth movement and some systemic side effects such as gastrointestinal problems, thrombocytopenia, skin rashes, renal insufficiency, hypertension, and headache, and has raised health concerns especially for use in children and adolescents.¹⁰ For this reason, employing non-pharmacological approaches such as bite wafers or low level laser therapy (LLLT) has been recommended for pain control during orthodontic therapy.^{9,11,12} Chewing of gum or plastic wafers has been suggested as a method to alleviate pain induced after placement of orthodontic appliances.^{9,13,14} It is believed that chewing allows blood flow in compressed areas of the periodontal ligament and prevents the formation of pain-inducing metabolites, thus attenuating pain perception.¹⁴ Some studies demonstrated the effectiveness of bite wafers in controlling pain associated with initial arch wire placement and suggested this approach as a suitable alternative for NSAIDs in pain management.^{9,13} Hence, in the present study rubber based teethers are used as a alternative to chewing gum or bite wafers to achieve similar result. These teethers are made up of elastic material and they can be cleaned and reusable. Teethers are economical and do not create bracket debonding issues when compared to chewing gums or wafers. Present study was conducted to compare the pain control in fixed orthodontic therapy by using rubber based teethers vs ibuprofen.

MATERIAL AND METHODS

This clinical study was conducted over a period of 6 months to compare pain control in fixed orthodontic therapy by using rubber based teethers vs ibuprofen. Before commencement of the study ethical approval was taken from the ethical committee of the institute. 100 patients with an age range 18 to 22 years, irrespective of gender, were selected for the study. Sample was divided in two groups randomly and assigned ibuprofen and rubber based teethers (50 in each group). A written informed consent was obtained from all patients for inclusion in study. Patients of age 18 to 22 years (both sex), patients with Severe/ moderate crowding requiring first premolar extractions, cases in which extractions scheduled at least two weeks before bonding were included in the study. Patients who were medically compromised, patients who were receiving Analgesic Therapy, patients who were contraindicated to the use of Ibuprofen, cases in which Oral surgery was performed in the previous four weeks were excluded from the study. Maxillary arch was bonded using straight wire edgewise appliance system and 0.014" cu nickel-titanium (Cu-Ni-Ti) arch wire (3M Unitek) was placed with ligation. All patients in both groups were called after 24 hours from wire placement and requested to mark Visual Analog Scale (VAS) score according to their level of pain feeling. This was considered as base line pain score. The patients of ibuprofen group were prescribed to take 400 mg ibuprofen tablet immediately after first visit and repeated 08-hourly for one week. In the rubber based teethers group, the patients were prescribed to chew a teether for 5 minutes immediately after this visit and repeated 8-hourly for one week. To record pain level, the subjects were asked to complete a Visual Analog Scale (VAS) score. The format of scoring was a 10 cm line, weighted at both ends by descriptive terminology with a happy face and a sad face. Patients were requested to mark a location on the line corresponding to the amount of pain they experienced at 5 minutes after arch wire insertion (Base line); then at 24 hours, and 7th day after prescribing ibuprofen and rubber based teethers for pain control. All this information was collected on a predesigned Performa attached. The patients were instructed not to use any additional analgesics. Statistical Analysis Data was analysed

using SPSS software (version 22.0). The level of significance was set at $P \leq 0.05$.

RESULTS

In the present study total patients included were 100 and were divided into two groups i.e. ibuprofen and rubber based teethers (50 in each group). The mean age of patients was 20.4 yrs. Males in the study were 53% and females were 47%. In ibuprofen group, baseline pain score was 6.87 ± 1.54 which was significantly reduced to 5.34 ± 1.23 after 24 hours and further reduced to 4.33 ± 1.23 at 7th day. In rubber based teethers group, baseline pain score was 7.45 ± 1.65 which was significantly decreased to 4.64 ± 1.62 after 24 hours and further reduced to 1.92 ± 1.26 at 7th day.

Table 1: Demographic data.

Variables	N(%)
Gender	
Male	53(53%)
Female	47(47%)
Mean age(yrs)	20.4

Table 2: Comparison of mean decrease in pain score in both groups

Group	Baseline pain	After 24 yrs	After 7 days	P value
Ibuprofen	6.87 ± 1.54	5.34 ± 1.23	4.33 ± 1.23	≤ 0.05
Rubber based teethers	7.45 ± 1.65	4.64 ± 1.62	1.92 ± 1.26	

DISCUSSION

In the present study total patients included were 100 and were divided into two groups i.e. ibuprofen and rubber based teethers (50 in each group). The mean age of patients was 20.4 yrs. Males and Females in the group were 53% and 47% respectively. In ibuprofen group, baseline pain score was 6.87 ± 1.54 which was significantly reduced to 5.34 ± 1.23 after 24 hours and further reduced to 4.33 ± 1.23 at 7th day. In rubber based teethers group, baseline pain score was 7.45 ± 1.65 which was significantly decreased to 4.64 ± 1.62 after 24 hours and further reduced to 1.92 ± 1.26 at 7th day.

The results of other investigators who found that pain severity is greatest at 24 hours after insertion of arch wire and returns to the normal level over the first week after appliance placement were similar to the results obtained in the present study. In most studies, the maximum pain was somewhat greater during biting compared to other oral functions.^{9,16-18}

In contrast, Polat et al reported that at some time points, the highest pain level was observed while aligning front teeth together.¹⁹

Ngan et al concluded that ibuprofen was the preferred analgesic to decrease pain associated with orthodontic treatment.²⁰ According to Davidovitch and Shanfield, 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.²¹

It is believed that any factor that can temporarily displace the teeth under orthodontic force can be useful in relieving the pressure and hinders the further formation of ischemic spots, and cures the pain. Based on this theory, Proffit recommended chewing gum for pain control in orthodontic patients following appliance placement.²² Rubber based teethers can create similar affects and plays significant role in pain reduction.

In contrast to the present study Otasevic et al concluded that avoiding hard food in the first week after initial arch wire placement was more effective in pain reduction than chewing on bite wafers.²³

Limitation of the present study is that patients were not advised with any dietary changes during the test period of the study, which is one week. So, the future scope of the study can be correlation of the pain perception by the patient and dietary prescription during the entire test period of the study.

CONCLUSION

The present study concludes that using rubber based teethers can effectively reduce the pain during initial arch wire placement as compared to ibuprofen.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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