

RESEARCH ARTICLE

Effect of NSAIDs in the Tooth Movement in Orthodontic Treatment

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ABSTRACT

Background: Patients undergoing tooth movement in orthodontics often utilize non-steroidal anti-inflammatory medications (NSAIDs) to alleviate inflammation and discomfort. On the other hand, the orthodontic profession is still debating whether or not NSAIDs slow down or hinder tooth mobility.

Materials and Methods: About 60 mouths that needed their teeth moved participated in a randomized controlled experiment. There were two groups of patients: Group A received NSAIDs (ibuprofen, 400 mg), while group B received a placebo. Tooth movement was measured using digital calipers at baseline and then at intervals of 4 weeks over a period of 12 weeks.

Results: The mean rate of tooth movement in group A was 1.5 ± 0.3 mm per month, whereas in group B it was 1.8 ± 0.4 mm per month. Analysis of variance (ANOVA) showed a statistically significant difference ($p < 0.05$) in the rate of tooth movement between the two groups, with group B demonstrating faster tooth movement compared to group A.

Conclusion: The administration of NSAIDs during orthodontic treatment appears to have a modest but statistically significant inhibitory effect on the rate of tooth movement. Clinicians should consider the potential impact of NSAIDs on treatment outcomes when managing pain and inflammation in orthodontic patients.

Keywords: Orthodontics, Tooth movement, Non-steroidal anti-inflammatory drugs, Ibuprofen, Pain management.

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INTRODUCTION

Orthodontic tooth movement, a fundamental aspect of orthodontic treatment, involves the controlled application of mechanical forces to induce desired changes in tooth position and alignment.¹ Pain and inflammation are common occurrences during orthodontic treatment due to activating inflammatory pathways and remodeling bone and periodontal tissues.² The analgesic and anti-inflammatory effects of non-steroidal anti-inflammatory medications (NSAIDs) make them a go-to medication for symptom management.³

Despite their widespread use, the effects of NSAIDs on orthodontic tooth movement remain a topic of debate. While some studies suggest that NSAIDs may inhibit tooth movement by interfering with the inflammatory response necessary for bone remodeling,⁴ others propose that NSAIDs have minimal impact on the rate and efficacy of tooth movement.⁵

To maximize treatment success and patient comfort, it is essential to understand how NSAIDs affect the movement of orthodontic teeth. So, this research aims to find out how non-steroidal anti-inflammatory drugs (NSAIDs) affect the orthodontic treatment moving tooth rate.

MATERIAL AND METHODS

This research used a randomized controlled trial design to find out how NSAIDs affect the pace of tooth movement in orthodontic treatment. The Institutional Review Board gave their blessing to the experiment, and its conduct followed the guidelines laid forth in the Declaration of Helsinki. 60 orthodontic patients aged 12 to 25 years, requiring tooth movement as part of their orthodontic treatment plan, were recruited from the orthodontic department. Informed consent was obtained from all participants or their legal guardians.

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Table 1: Baseline characteristics of study participants

Group	Age (years)	Gender (M/F)	Initial tooth position (mm)
A	16.4 ± 2.1	15/15	5.2 ± 0.8
B	16.7 ± 1.8	14/16	5.1 ± 0.7

Table 2: Rate of tooth movement over 12 weeks

Time point (weeks)	Group A (mm/month)	Group B (mm/month)
0	-	-
4	1.2 ± 0.3	1.6 ± 0.4
8	1.4 ± 0.2	1.7 ± 0.3
12	1.5 ± 0.3	1.9 ± 0.5

Values are expressed as mean ± standard deviation.

Participants were randomly assigned to one of two groups using computer-generated randomization: Group A received NSAIDs (ibuprofen, 400 mg) while group B received a placebo. The medications were administered orally three times daily for the duration of the study.

Digital calipers were used to measure tooth movement at baseline and every four weeks for a total of twelve weeks. For the sake of precision and uniformity, just one calibrated examiner took the measurements.

A statistical program called SPSS 23 was used to analyze the data. As the location of the teeth moved over time, we were able to determine the pace of tooth movement. Descriptive statistics were used to describe the data, including standard deviation and mean. In order to compare the two groups' tooth movement rates, suitable non-parametric tests or analysis of variance (ANOVA) were used.

RESULT AND DISCUSSION

Table 1 provides a summary of the research participants' baseline characteristics. Regarding the distribution of ages and genders, "there were no statistically significant differences between the placebo group and group A, which received NSAIDs, or initial tooth position.

Table 2 presents the rate of tooth movement over the 12-week study period. At baseline (time point 0), no tooth movement was observed in either group. However, by the end of the study period, both groups demonstrated significant tooth movement.

Group B (placebo) exhibited a consistently higher rate of tooth movement compared to group A (NSAID) at each time point. For instance, at week 12, the mean rate of tooth movement in group B was 1.9 ± 0.5 mm/month, whereas in group A, it was 1.5 ± 0.3 mm/month.

Overall, based on these findings, it seems that using NSAIDs during orthodontic treatment could slow down tooth movement a little.

DISCUSSION

This research adds to the continuing discussion on how NSAIDs affect the mobility of teeth in orthodontic treatment. Our results demonstrate that the administration of NSAIDs,

specifically ibuprofen, was associated with a slightly slower rate of tooth movement compared to placebo. This suggests that NSAIDs may have a modest inhibitory effect on the orthodontic tooth movement process.

Prior research has shown comparable consequences therefore, our results are in line with that. A specific cyclooxygenase-2 inhibitor, a kind of non-steroidal anti-inflammatory drug, dramatically slowed the orthodontic tooth movement rate, as shown in a rat model by Rody *et al.*¹ Similarly, Verna *et al.*² discovered that using NSAIDs reduced bone turnover, which might be a factor in the delayed movement of teeth.

The mechanism by which NSAIDs inhibit tooth movement is thought to involve the suppression of inflammatory mediators and cytokines that play a crucial role in bone remodeling.³ By reducing the inflammatory response, NSAIDs may interfere with the process of osteoclastogenesis and osteoblastogenesis, thereby slowing the rate of bone turnover and subsequent tooth movement.

However, keep in mind that the NSAIDs' inhibitory impact on tooth movement was not very strong in this research. Other factors, such as individual patient response to NSAIDs, treatment compliance, and variations in treatment protocols, may also influence the rate of tooth movement during orthodontic treatment.

Furthermore, the clinical significance of the observed differences in tooth movement between NSAID and placebo groups remains to be determined. While the difference in tooth movement rates was statistically significant, it is unclear whether this difference is clinically meaningful in terms of treatment outcomes or duration.

Future study should clarify the ideal time, dose, and duration of NSAID administration in orthodontic patients to better manage inflammation and discomfort while minimizing any deleterious effects on tooth movement. It is necessary to conduct research with long-term follow-ups in order to determine how NSAIDs affect the stability of therapy and the overall results of orthodontic treatment.

CONCLUSION

Finally, our results imply that NSAIDs like ibuprofen could slow down the pace of tooth movement in orthodontic treatment. When prescribing NSAIDs to orthodontic patients for pain management, clinicians should consider the risks to treatment results as well as the benefits.

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