

# Orthodontic Pain: Causes And Management

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## ABSTRACT

Orthodontic pain, the most cited negative effect arising as a result of orthodontic force application, is a major matter of distress for clinicians and patients/parents. The people who experience orthodontic pain are likely to self-medicate with nonprescription pain relievers before visiting the clinician. It becomes duty of an orthodontist to satisfy the questions arising in the mind of patients, parents and clinicians. The purpose of this review article is to throw a light on the various possible causes of orthodontic pain and to discuss the various management options for the orthodontic pain

**KEYWORDS:** Cause Orthodontic Pain, Management

## INTRODUCTION

Pain, which is a subjective feeling that shows large individual fluctuations, is one of the major deterrents for patient compliance for orthodontic treatment.<sup>1,2</sup> Surveys of orthodontic patients have revealed that pain is among the most cited negative effect of orthodontic therapy and even when compared with the pain of invasive procedures such as extractions, patients perceived orthodontic pain to be greater in both incidence and severity.<sup>3</sup> One survey rated pain as the greatest dislike during treatment and fourth among major fears and apprehensions prior to orthodontic treatment.<sup>4</sup>

The percentage of the adolescents who reported pain during the Fixed Orthodontic Treatment has been reported to be on a higher side.<sup>5</sup> It is dependent upon various factors including sex, age, pain threshold, magnitude of force, and emotional status. The forces which are applied on teeth trigger an inflammatory response which involve factors which form the basis of tooth movement i.e. pain and quantum of bone resorption.<sup>2,5</sup> A study which was done in India revealed that 8 per cent of a study population discontinued the orthodontic treatment because of pain.<sup>2,6</sup>

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Pain is a subjective response, which shows large individual variations.<sup>7</sup> The methods which are used for controlling pain during the orthodontic treatment include pain relieving medications, use of low-level laser therapy, Transcutaneous Electrical Nerve Stimulation (TENS), and vibratory stimulation of the periodontal ligament. All these methods have been successful to a certain degree, however, Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) has emerged as the most preferred method.<sup>2,7</sup>

The purpose of this review article is to throw a light on the various possible causes of orthodontic pain and to discuss the various management options for the orthodontic pain.

## CAUSES OF ORTHODONTIC PAIN

Orthodontic pain is the result of compression of the periodontal ligament by the tooth resulting in an inflammatory response mediated by cytokines and prostaglandin. Thus, anti-inflammatory medication such as ibuprofen, have been suggested as the gold standard in decreasing post-operative orthodontic pain.<sup>3,7</sup>

The first step in fixed orthodontic mechanotherapy is creating space mesially and distally to teeth, which are to be banded. Orthodontic separator's placement results in a painful experience for almost all patients.<sup>7</sup> Pain associated with initial arch wire placement has been previously researched. Jones reported that pain is experienced by the majority of patients 4 hours after arch wire placement, which will peak at 24 hours and then decline.<sup>8</sup> Jones and Chan stated that pain from arch wire placement can be worse in some patients and could even be more than that experienced after tooth extraction.<sup>9</sup> Comparing various arch wires to determine differences in pain perception

showed statistically non-significant results.<sup>7,10,11</sup>

The concept of light forces producing more physiological and less painful tooth movement is a matter of debate.<sup>7,11</sup> Hixon et al., who favoured application of heavier forces for retraction of canine, concluded that higher forces per unit area tend to increase the rate of biological response.<sup>12</sup> Gianelly and Goldman argued that large forces caused greater periodontal compression and hence resulting in increased pain. Further, they said that some amount of pain is experienced with every orthodontic appointment.<sup>7,12</sup> Williams and Bishara evaluated the threshold level for patient discomfort at debonding and concluded that tooth mobility and force application were the two important influencing factors. They found intrusive forces to produce less pain at debonding in comparison with other types of forces applied. They suggested applying finger pressure or asking the patient to bite on a piece of cotton roll to minimize pain while debonding.<sup>13</sup>

## MANAGEMENT OF ORTHODONTIC PAIN

### *Analgesics*

Analgesics have been largely prescribed for the alleviation of the symptoms which are felt by the patients who undergo orthodontic treatment. The drugs which are available for pain management belong to two major groups: the non-narcotic analgesics (e.g. NSAIDs) and the opioids (or narcotics).<sup>2,13</sup>

Prostaglandins (PGs) are typical inflammatory and pain mediators which result from the degradation of arachidonic acid. COX isoenzymes (COX-1 and COX-2) mediate the formation of PGs. The expression of COX-2 is under the regulatory effect of environmental

conditions whereas the constitutive COX-1 does not exhibit a dynamic regulation. Based on the hypothesis that a selective COX-2 inhibition would induce the desired anti-inflammatory effects without the undesirable side effects (particularly at the gastric level) which are associated with the COX-1 inhibition, drugs which are known as “coxibs” or selective COX-2 inhibitors have been developed. Coxibs play a role in preservation of the COX-1 pathway as a consequence of their anti-inflammatory properties and thus allow the natural production of some useful PGs.<sup>2,13</sup>

### **Chewing Gums**

Proffit et al., suggested chewing gums or plastic wafers during the first few hours of the appliance activation, in order to reduce the pain.<sup>14</sup> Aspergum, a weak analgesic chewing gum containing aspirin, proved to be of great help in relieving pain, after an orthodontic mechanotherapy.<sup>15</sup>

### **Low laser therapy**

Turhani et al., treated seventy-six patients in a single-blind study in which the control group received placebo laser therapy without active laser irradiation and the other group received low level laser irradiation therapy for 30 seconds per banded tooth. All patients were treated with fixed edgewise metal brackets. In both groups, patients underwent irradiation of either the maxilla or the mandible or both, in accordance with the location of the orthodontically treated teeth. The difference in the location of treatment had no bearing on the outcome for treatment. The group with low-laser irradiation therapy experienced a significant reduction in pain ( $P < 0.05$ ) in post treatment pain levels at 6 and 30 hours but not at 54 hours. Some patients took analgesic drugs during the course of the treatment but the

authors found that this was statistically non-significant.<sup>3,16</sup>

### **Anaesthetic Gels**

Anaesthetic gels are safer alternatives to analgesics in reducing the pain which results from orthodontic procedures. Keim et al., in their study, stated that they may be of use when orthodontic procedures are performed. The advantage offered by this system is its simple method of delivery which includes the introduction of gel into the gingival crevice and making it entirely painless.<sup>2,17</sup>

### **Vibratory stimulation**

The use of vibratory stimulation to reduce orthodontic pain was first reported by Marie et al., but on detailed analysis, it was found that most of the patients were not able to tolerate the vibrations, once the discomfort sets in. Thus, if used, it is recommended that it should be used prior to the onset of pain.<sup>18</sup>

### **Transcutaneous electrical nerve stimulation (TENS)**

Roth and Thrash evaluated the effect of TENS in reducing periodontal pain after separator placement. Although it was able to reduce pain within a relatively short span of time of electrode placement, there is dearth of literature published on its use.<sup>7,19</sup>

## **CONCLUSION**

In terms of the orthodontic treatment, there is an increased perplexity amongst the patients and their parents regarding the orthodontic pain. Research investigating alternative therapies should employ stronger study designs to enable any sort of discussion on their effectiveness at reducing orthodontic pain.<sup>2,3,19</sup>

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