



Comparative evaluation of Analgesic Effect of Piroxicam and Transcutaneous Electrical Nerve Stimulation Therapy on Pain associated with Orthodontic Separator: a Clinical Trail

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Abstract

Aim: To determine whether piroxicam and transcutaneous electric nerve stimulation are effective at reducing pain during or after separator placement.

Methodology: The goal of the predetermined clinical trial was to determine how well piroxicam and transcutaneous electric nerve stimulation reduced pain after separator installation. The study comprised 50 individuals who were assigned to get fixed orthodontic treatment and were between the ages of 20 and 30. They were divided into two groups of 30 subjects each at random. Group I: One hour before to the implantation of the separator, the subjects received 20 mg of piroxicam. Group II: Following separator insertion, subjects received TENS therapy. Using a visual analogue scale (VAS), the discomfort felt by patients following separator installation was evaluated at 2, 12, and 24 hours.

Result: 50 people in total were enrolled in the study. Out of these, 26 (14 in Group I and 12 in Group II) were men and 24 were women and no significant difference were observed between them.

Conclusion: Following separator implantation, pain management using piroxicam and TENS was equally successful. TENS therapy has various benefits that make it superior to NSAIDs from both the patient's and the clinician's perspectives.

Keywords: Pain, Orthodontic separator, VAS

DOI Number: 10.14704/nq.2022.20.10.NQ55867

NeuroQuantology 2022; 20(10): 8845-8850

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Introduction: Orthodontic patients worry about their discomfort and suffering during the course of therapy. It is a major limiting factor for fixed-appliance therapy and can have a negative impact on patient compliance. [1] Soon after the first arch wire is put in place, the periodontal ligament (PDL) undergoes biological changes that result in the release of prostaglandins, bradykinin, and other inflammatory mediators, which are the source of orthodontic pain. [2-4] The pain during fixed orthodontic therapy could also be brought on by gingival irritation. Following the application of orthodontic force, the discomfort usually worsens after two hours, peaks after 24 hours, and then gradually subsides by the seventh day. [5,6]

The initial clinical procedure is to insert elastic separators between teeth to allow space for band sitting. By applying pressure to the periodontal ligament using elastic separators, space is swiftly produced within 24 hours. [7] Orthodontic patients experience pain during the replacement of the arch wire and the activation of the appliance, two therapeutic procedures. [8] However, the pain that comes with the initial separator insertion surgery is a major factor in noncompliance and debilitates the patient's will. [9, 10]

Orthodontic discomfort has previously been treated with NSAIDs, chewing wafers, anaesthetic gels, low-level laser therapy, vibratory stimulation of periodontal ligament, chewing gums, and TENS. [11] There are no specific guidelines or requirements for managing discomfort during orthodontic treatment. Research and agreement are still difficult to come by in this field. Pharmacological meaning that the simplest and least complicated method is to use over-the-counter medications. Ibuprofen or acetaminophen dosages before surgery can reduce discomfort and enhance quality of life. Each analgesic also has disadvantages of its own. [12] NSAID pre-treatment doses may reduce pain and inflammation by preventing the production of prostaglandins. Longer treatment times may result from this, which may have a

eISSN1303-5150

negative impact on the rate of tooth movement. 10 NSAID side effects might also include digestive issues. [13, 14]

Only aspirin, ibuprofen, and naproxen sodium have had their effectiveness as preoperative analgesics for pain management in fixed orthodontic therapy investigated to date. [15] Inhibitors of COX that are not selective include piroxicam. Given that it has a mean half-life of 50–60 hours, once-daily dosing is possible. 20–30 mg of piroxicam should be taken once daily. Piroxicam has the advantage of causing substantially less gastrointestinal irritation than aspirin, ibuprofen, or naproxen sodium.

Transcutaneous electric nerve stimulation (TENS), a non-pharmacological approach, is often used by medical and paramedical professionals to treat both acute and chronic pain in a variety of conditions. [16] Similar to how it can be used to control pain brought on by various conditions that affect the maxillofacial region, it can also be used to manage pain brought on by various dental treatments. TENS closes the gate for pain impulses by producing an electrical shock that travels faster than a pain impulse and reaches the substantia gelatinosa in the dorsal horn. This reduces the intensity of the pain. TENS also activates peptides that resemble opiates, like endorphins. [17]

Therefore, the purpose of the current clinical trial is to evaluate the efficacy of piroxicam and transcutaneous electric nerve stimulation in reducing pain following separator implantation.

Material and Method: The goal was to determine how well piroxicam and transcutaneous electric nerve stimulation worked to lessen discomfort after separator placement. The study included 50 participants having fixed orthodontic treatment due to begin between the ages of 20 and 30.

For inclusion, subjects must meet the following requirements: they must be of both sexes, between the ages of 20 and 30, have given their agreement, have never had any dental work done, require fixed orthodontic therapy, and require the placement of an orthodontic

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separator. Patients with piroxicam allergies, expectant mothers, sick persons, people with spaces in the posterior segment, and people who have had their posterior teeth pulled are all excluded from treatment.

The subjects who complied with the inclusion criteria were divided into two groups. Group I received piroxicam (20 mg) an hour before the separator was inserted. Immediately following the placement of the separating placemat, Group II also underwent TENS therapy. Separators were put in place in group I an hour after piroxicam was given, while group II employed TENS for 20 minutes after separator insertion. After conductive gel was applied to the placement site, the electrodes were placed over the painful area of the cheek that corresponds to the molar region on the left and right sides, in the upper and lower arches. 50 Hz, 0.5 m/sec pulse width, and 0 to 60 mA were the used parameters. It was gradually becoming more intense as the volume was turned up. By

adjusting the matching knob, the intensity was gradually increased until the patient experienced a tingling feeling brought on by the pulse. The amount was then gradually raised until the patient was completely comfortable. At this time, the intensity was kept constant, and the pulse rate was raised to 2 and eventually to 5.

The patients were instructed to use a visual analogue scale (VAS) (Fig. 1) to score the intensity of their discomfort or pain on a scale from 0 to 10, where 0 represented "no pain or discomfort" and 10 represented "unbearable suffering." This assessment was completed after the separator was installed at the following intervals: 2 hours, 12 hours, and 24 hours. The VAS marking on the subject was measured and noted in millimeters (10 mm). The data were loaded into a spreadsheet, and statistical analysis was performed using SPSS software version ^[17].

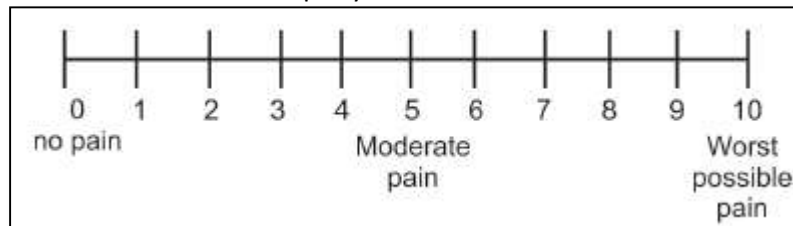


Fig no 1: Visual Analog Scale

Result: Total 50 subjects were enrolled, in which 26 (Group I = 14, Group II= 12) were male and 24 were female (Group I= 12, Group II= 12). The incidence of post-obturation pain, in both groups was gradually increased after placement of separator. No significant difference was observed between two groups.

(Table no. 1)

Assessment of mean pain perception in both group		
	Group I	Group II
After 2 hours	2.81 ± 0.35	2.53 ± 0.56
After 12 hours	3.02 ± 0.45	3.11 ± 0.44
After 24 hours	4.17 ± 0.95	4.22 ± 0.74

Discussion: Orthodontic appointments typically include some degree of discomfort, which includes feelings brought on by and reactions to unpleasant stimuli. One of the adverse effects of orthodontic treatment that is most frequently cited and that both patients and

professionals find to be very concerning. ^[18] Each person's subjective perception of pain is very different. Age, gender, the amount of force used, one's current emotional state, level of stress, cultural differences, and past painful experiences are all factors that affect it. ^[19]



Every orthodontic procedure, including the use of separators, activation and placement of archwires, application of orthopedic forces, and debonding, causes pain in the patients, as is amply demonstrated by the literature currently in existence. Creating space between teeth that will be banded is the first step in fixed orthodontic mechanotherapy. It is well known that almost all orthodontic separators, including latex elastics, spring-type steel separators, brass wire, and elastomerics, cause pain when they are implanted in patients. [20, 21]

Orthodontic pressures cause a disruption in the blood supply to the fibres attaching the tooth to the alveolar bone, which results in the release of prostaglandins and other inflammatory mediators into the surrounding tissue. In the present study, we investigated the efficacy of transcutaneous electrical nerve stimulation (TENS) therapy and preoperative piroxicam administration in reducing the severity of discomfort following the implantation of orthodontic separators. The cyclo-oxygenase (COX) enzyme is non-selectively blocked by oxicam derivatives, including piroxicam, an NSAID. As a result, prostaglandins, the main mediator of pain, are suppressed. It is an oral formulation with a significant half-life of roughly 50 hours.

TENS therapy is a non-invasive, inexpensive method of treating both acute and recurring pain. Since it is non-pharmacologic, there is no possibility of side effects like allergic reaction to medication or blocking orthodontic tooth movement. By "closing the gate" for pain impulses, which inhibits pain signals, TENS is supposed to lessen discomfort. The substantia gelatinosa of the dorsal horn of the spinal cord and higher levels of the central nervous system allow electrical stimulation, pressure, and touch impulses to move more quickly than pain impulses. The TENS also activates endogenous analgesic systems that produce opiate-like peptides, such as endorphins, which raises their plasma levels. [22]

To gauge pain, a visual analogue scale was employed. The VAS is a direct pain intensity

scaling method that asks users to indicate on a continuous line where they experience the most pain. The line is marked with no pain at one end and the worst pain at the other. The VAS is preferable to observational, self-report, behavioral, physiological, or verbal rating scales because it has greater sensitivity, repeatability, and reliability of the direct scaling methodologies. [23] Additionally, parametric statistical tests are permitted. On the other hand, VAS has the drawback that most of the reported values are related to the pain's intensity component. [24]

Two hours, twelve hours, and twenty-four hours after separator implantation, pain was evaluated in the current investigation. The reported levels of pain in the two groups of patients did not differ statistically significantly. This finding is extremely important because it supports the notion that TENS can take the place of the conventionally prescribed NSAIDs as a means of pain management during orthodontic therapy. Patients who currently have nephropathy, erosive or ulcerative conditions of the gastrointestinal mucosa, anticoagulant medication, hemorrhagic disorders, or intolerance or allergy to any NSAID are forbidden from taking NSAIDs. [25] Prostaglandins, which are produced throughout fetal development, keep the ductus arteriosus open, therefore they should also be avoided during pregnancy. [26]

NSAIDs, which are typically provided as a pain reliever during orthodontic therapy, can be replaced by TENS. It won't have any of the many side effects that are a common result of using NSAIDs, which will be quite helpful for both patients and medical professionals. TENS therapy has various contraindications, and those with cardiac pacemakers, cerebrovascular conditions, epilepsy, or pregnancy should avoid using it. [27]

Conclusion: The study was performed to assess efficacy of piroxicam and Transcutaneous electric nerve stimulation in reduction of pain after separator placement. The following conclusions were made.



- Both were equally effective in managing pain after placement of separator.
- The use of TENS has an added advantage over NSAIDs due to its several advantages, both from the patient's and the clinician's perspective.

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