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# Comparison of Preliminary Orientation of Patients Receiving Orthodontic Fixed Device Therapy with A Self-Ligating Approach and A Traditional Preadjusted Edgewise Bracket Technique to See If Any Discernible Differences in Suffering and Discomfort Could be Discovered

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## ABSTRACT

**Aim**: To compare the preliminary orientation of patients receiving orthodontic fixed device therapy with a self-ligating approach and a traditional preadjusted edgewise bracket technique to see if any discernible differences in suffering and discomfort could be discovered.

**Methods and Materials**: Patients who met the criteria repeatedly were rotated between the two groups. 0.022 inch MBT preadjusted edgewise orthodontic brackets were used to bond the members of group I. Individuals in group II were joined with 0.022 inch. 60 people (34 females and 26 men) made up the final sample; their ages ranged from 16 to 27 years, with an average of 21.54 years (standard deviation: 5.37). Thirty people made up each group. Between groups, the bonding process was standardised. The patients were handed printed sheets to record their VAS scores at the conclusion of the initial appointment. To determine whether the teeth were sore and whether the brackets felt more or less comfortable on the lips, the patients were called back within the first few days of bracket insertion.

**Results**: In the current study, 60 participants were divided into two separate groups of 30 each, and data sheets were filled out with the VAS scores, pain attributes, and pain medications utilised as stated by the participants. The mean age of the patients in both groups at the beginning of treatment was similar. In Group I, the VAS score was recorded at a minimum of 0, and that in Group II, it was recorded at a maximum of 5. Most people experienced pain "while

biting," but no one ever experienced shooting pain. For the timeframe of the first archwire, two patients in Group I and four patients in Group II disclosed no pain

**Conclusion**: In general, pain levels were higher during the first five days after initial archwire implantation, independent of the type of appliance utilised (conventional or self ligating). In both groups, women showed more discomfort than men did. In the current investigation, patients in both groups reported that the disengagement of the archwire was not unpleasant. Both traditional and self-ligating pain experienced in the current investigation are statistically insignificant.

**Keywords:** Pain; Orthodontic treatment

## INTRODUCTION

The largest dislike for orthodontic treatment has been assessed as pain, which is also ranked fourth among the main fears and anxieties before orthodontic treatment.[1] Orthodontic therapy begins at the initial evaluation stage and lasts until the date of debonding, and it involves significant procedures including the excision of a few teeth, the placement of separators, banding and bonding, the placement and activation of archwires, as well as debonding. As a result, during the course of their orthodontic treatment, patients are subjected to pain stimuli. Nowadays most orthodontic patients report experiencing pain when eating and biting food, which leads them to alter their diet. Pain from orthodontic therapy has been found to have detrimental impacts on oral health efforts and to be a main reason for missing visits.[2]

Finally, the patient's level of satisfaction with the results of their orthodontic treatment is impacted by pain and suffering during treatment. The most accurate way to evaluate pain perception is with the visual analogue scale (VAS), which is used to measure pain experience indirectly. There have been nonlinear correlations found between pain felt well after arch wire component and its preliminary positioning, as well as with age, socioeconomic class, the amount of force used, dental arch connections, and dentition crowding. Damon asserts that the conjunction of a low coefficient of friction orthodontic bracket and a small force produced by super elastic nickel titanium based arch wires, which lead to more effectively moving teeth and less discomfort, makes his permanent appliance system superior to competing systems.[3-5]

Orthodontic mechano therapy methods have long been affected by technological advancements. Alignment, levelling, and tooth displacement are 3 phases of orthodontic therapy that were formerly done individually. The advent of super elastic, heat triggered arch wires to orthodontics is intended to allow the practitioner to combine these stages to shorten treatment time. It is unknown to what extent such an approach may influence the degree and type of tooth movement, how painful and uncomfortable it feels, and how the tooth reacts.[6-8] The orthodontic community need crucial clinical information on the relative efficacy of various biomechanical tooth-moving techniques. Orthodontic therapy should be carried out as soon as possible without endangering the afflicted tissues from a financial standpoint. Which method causes the least amount of discomfort and the fastest orthodontics tooth displacement with the least amount of harm to the teeth and supporting tissues is a crucial concern.

The study's objective was to compare the preliminary orientation of patients receiving orthodontic fixed device therapy with a self-ligating approach and a traditional preadjusted edgewise bracket technique to see if any discernible differences in suffering and discomfort could be discovered.

## MATERIALS AND METHODS

This study was conducted under the direction of the institution's formal ethics committee and in accordance with the standards of protecting human subjects. Participants in this study came from the outpatient department of a tertiary level orthodontic facility. According to calculations for sample size, 108 prospectively enrolled individuals were initially enrolled in the study prior to the start of their individual orthodontic therapy.

48 patients were not eligible to take part in this study because they did not fulfill the specified selection criteria: 6 patients had preferred to only use cosmetic lower brackets rather than metal, (ii) 18 patients had irregular extractions or tooth loss, and (iii) twelve patients chose to only treat their maxillary arches, iv) four had their maxillary lateral incisor orthodontic brackets turned around to regulate the torque of their palatally positioned lateral incisors, and ( v) eight could not be followed that up at this facility because they had to move to a different city because their fathers were transferred.

All patients were made aware of the study's objectives, but they were not told which bracket had a more modern design. No one objected to taking part. Patients who met the criteria repeatedly were rotated between the two groups. 0.022 inch MBT preadjusted edgewise orthodontic brackets were used to bond the members of group I. Individuals in group II were joined with 0.022 inch. 60 people (34 females and 26 men) made up the final sample; their ages ranged from 16 to 27 years, with an average of 21.54 years (standard deviation: 5.37). Thirty people made up each group. Between groups, the bonding process was standardised.

The patients were handed printed sheets to record their VAS scores at the conclusion of the initial appointment. To determine whether the teeth were sore and whether the brackets felt more or less comfortable on the lips, the patients were called back within the first few days of bracket insertion. When the first wire was changed, discomfort was once again measured to determine which side was more or less comfortable when the old wire was untied and when the new wire was ligated.

In accordance with the McGill Pain Questionnaire, the features of the pain were expressed by utilising yes/no replies for four descriptions.[4] As before, "continuous," "shooting," "dull," and "pain when chewing or biting."[5] The VAS was selected to gauge the intensity of the discomfort or pain. A 2 page questionnaire and a 10 cm straight VAS scale were given to each patient. A worst pain (10 cm) possible and no discomfort at all (0 cm) were used as anchors while designing the VAS questionnaire. Participants were prompted to assess their anticipated level of pain as a result of the initial alignment archwire implantation using this VAS scale.

Patients kept track of them at the following intervals: four hours after treatment, at bedtime the day of the session, after 24 hours, and two, three, four, five, six, and seven days after the first aligning archwire was tied. The patient

then took recordings after the first archwire was taken out, the second archwire was put in, and the second archwire was taken out.

## RESULTS

In the current study, 60 participants were divided into two separate groups of 30 each, and data sheets were filled out with the VAS scores, pain attributes, and pain medications utilised as stated by the participants. The mean age of the patients in both groups at the beginning of treatment was similar. In Group I, the VAS score was recorded at a minimum of 0, and that in Group II, it was recorded at a maximum of 5. Most people experienced pain "while biting," but no one ever experienced shooting pain. For the timeframe of the first arch wire, two patients in Group I and four patients in Group II disclosed no pain

At the time of the initial archwire's removal, only two patients complained of pain. After the second arch wire was placed, eight patients in Group I and twelve patients in Group II reported feeling no pain. After the second arch wire was taken out, none of the patients complained of any pain. A statistical method for comparing the VAS of the two groups was area under the curve (AUC). AUC is a quick and efficient way to extract a summary metric from plotted data. Although more patients in Group II reported no pain, the difference between the two groups was statistically insignificant despite the fact that Group II's mean AUC for the first archwire was higher than Group I's. The mean AUC was greater in Group I compared to Group II, but the variation was statistically irrelevant. More study participants in Group II revealed no pain after the arrangement of the second archwire.

Male participants in Group II conceived more pain than Group I did, and females in Group I conceived more pain than Group II did. The least painful people were the men in Group I, while the most painful people were the women in Group II. The level of pain in the current study did not exhibit any clear peaks.

The first six days after the first archwire was implanted, all patients reported experiencing pain; however, none did so on the seventh day. Both Group I as well as Group II each had three patients who needed to take painkillers. All patients used the analgesic pill Combiflam (ibuprofen 400 mg, paracetamol 325 mg), which is the usual analgesic given out from this institution. (Table 1) (Table 2)

**Table 1:** Group statistics

| Group | n | Mean AUC | SD | SEM |
|---|---|---|---|---|
| 1 | 30 | 85.11 | 135.07 | 33.38 |
| 2 | 30 | 99.31 | 134.1 | 32 |

**Table 2:** Mann–Whitney test ranks

| AUC (VAS) | Category | n | Mean rank | P | Mann–Whitney U test |
|---|---|---|---|---|---|
| First arch wire | 1 | 30 | 17.24 | 0.71 (NS) | 224.1 |
| | 2 | 30 | 16.01 | | |
| Second arch wire | 1 | 30 | 19.28 | 0.080 (NS) | 113.6 |
| | 2 | 30 | 13.94 | | |

## DISCUSSION

Orthodontics in particular, and dentistry in general, are both very concerned with pain. The common occurrence of pain throughout orthodontic therapy has an effect on patients' apprehension, quality of life, adherence to therapy, and even decision to stop treatment.[7-9] But occasionally people neglect palliative pain care and prevention. Orthodontists should consider the duration and intensity of pain when treating patients.[10-12] At prescribed intervals, study participants in both factions were required to recall their level of pain or unpleasantness in a VAS interview booklet. The VAS scale has been shown to be a reliable, efficient instrument with good reproducibility. It is one of the most widely used methods for assessing perceived pain or discomfort.[13-15]

Although this scale evaluates the patients' subjective feelings, it only provides a general measure of suffering or discomfort and it does not assist the patient in differentiating between the various sources of pain or discomfort.[16-18]

The patients' usage of a self-prescribed analgesic record provided another independent method of gauging the severity of the subjects' pain. Patients with the self-ligating brackets experienced more pain from archwire engagement than those with traditional ligating brackets. This was comparable to research by[11,12,13] but not [14] who found reduced discomfort with SLB

For the Damon 3 system to engage, the archwire must be pressed. So, this might be the reason why the SLB group is experiencing more pain. The force required to close the engagement mechanism is what causes the chair side pain; manipulation of rigid and full-size archwires can result in increased discomfort in self-ligating brackets. On traditional brackets, full engagement is not always accomplished when using elastic ligatures. The level of engagement in both systems was maximised and then matched in the current experiment using SS ligatures. However, in cases of badly misaligned teeth, complete slot engagement of the archwire was not attempted using the traditional ligating brackets; instead, they were weakly ligated with SS.[19-21]

The results of this study tend to suggest that discomfort is generally worse during the first five days after initial archwire implantation, independent of the type of appliance utilised (conventional or self ligating). This is in line with findings from numerous studies that assessed the discomfort brought on by orthodontic treatment[18].

In the current investigation, no patients had any pain on the seventh day following the first installation of the archwire. This is often supported by a number of studies that demonstrate pain levels after archwire installation revert to a low baseline level within 7 days.According to the information on the types of pain experienced during the current investigation, both groups most frequently reported experiencing "during biting" pain; neither group experienced shooting pain.

This cannot be compared to earlier studies by [14]In their investigation, they found that while patients treated with Victory Series brackets reported more persistent pain, those treated with the Damon SL II showed a higher frequency of chewing/biting pain. They explained it by pointing out that the bracket-archwire interface was the main mechanical difference between the two appliances employed in this experiment. This could account for the various types of discomfort that the patients felt. It is expected that lower frictional forces result in less compression of the periodontal ligament and blood vessels, which will change the type of pain experienced, as orthodontic treatment-

related pain is mostly related to the degree of periodontal ligament compression. Therefore, it may be assumed based on the foregoing that mild force levels were employed in both study groups in the current study.

In general, pain levels were higher during the first five days after initial archwire implantation, independent of the type of appliance utilised (conventional or self ligating). In both groups, women showed more discomfort than men did. In the current investigation, patients in both groups reported that the disengagement of the archwire was not unpleasant. Both traditional and self-ligating pain experienced in the current investigation are statistically insignificant.

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