



## Original Research Article

## To evaluate the effectiveness of biting on chewie as pain management during debonding: A cross-sectional study

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## ABSTRACT

**Introduction:** During orthodontic treatment, pain and discomfort are frequently felt by patients during procedures like separator placement, archwire placement, orthodontic force application, miniscrew placement and debonding. The purpose of this study is to look into the effects of biting on Chewie for pain management during debonding procedure.

**Materials and Methods :** Out of sample size of 128 sites, 64 sites (right or left) was assigned as Chewie and 64 sites as control group and debonding was carried out. Pain was evaluated on VAS scale from 1 to 10.

**Result:** Chewie group has a mean value of 1.76, with a 95% confidence interval ranging from 1.59 (Lower) to 1.93 (Upper). Conventional group has a mean value of 2.00, with a 95% confidence interval ranging from 1.79 (Lower) to 2.20 (Upper).

**Conclusion:** Debonding performed with gently squeezing action and biting on the chewie will be sufficient to keep pain to a minimum level and no other additional pain-relief method will be required.

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### 1. Introduction

During orthodontic treatment, pain and discomfort are frequently felt by patients during procedures like separator placement, archwire placement, orthodontic force application, miniscrew placement and debonding.<sup>1-3</sup> Furthermore, 8% of the patients preferred to discontinue their treatment due to the pain.<sup>4</sup> Even if the pain does not cause the patient to discontinue treatment, it has a negative impact on the quality of life by limiting the patient's daily activities.

Pain caused by separator placement and archwire activation, in particular, has been extensively researched in the literature.<sup>1-4</sup> Researchers became interested in debonding pain relatively late, with studies published only after the early 1990s.<sup>5</sup>

The debonding procedure should be painless, safe, and quick.<sup>6</sup> The use of different orthodontic instruments, laser application, analgesics, ultrasound, adjunctive procedures, thermal heating the orthodontic adhesives, or biting occlusal bite wafers at debonding can all help to reduce pain during debonding.<sup>7-9</sup>

According to Williams and Bishara, two factors influence the patient's pain perception during debonding: 1. Tooth mobility and 2. Force application direction. They claim that applying an intrusive force to the teeth relieves pain by stabilizing them and compensating for the shear/peel and torsional debonding forces applied to the periodontal ligament.<sup>5</sup>

In the era of aligners, the use of Chewie for seating aligners has increased. They are made from soft plastic (styrene copolymer) which is resilient and non-absorbent. The purpose of this study is to look into the effects of biting on Chewie for pain management during debonding

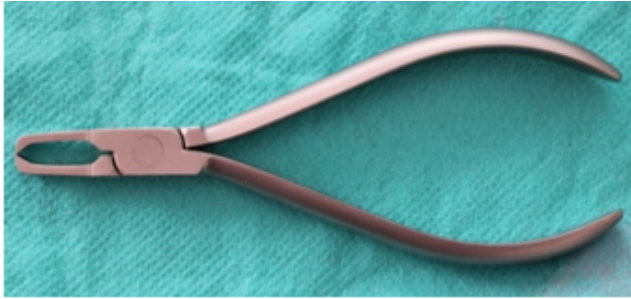
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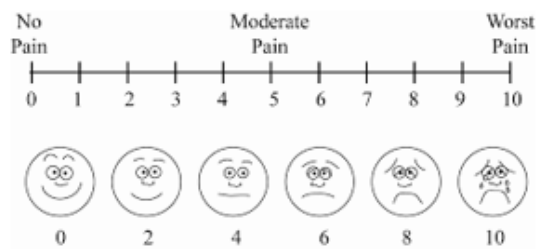
procedure.

## 2. Materials and Methods

1. Debonding plier GDC (Figure 1)
2. VAS scale with range 0-10 (Figure 2)
3. Chewie KISEER (Figure 3)



**Figure 1:** Debonding plier

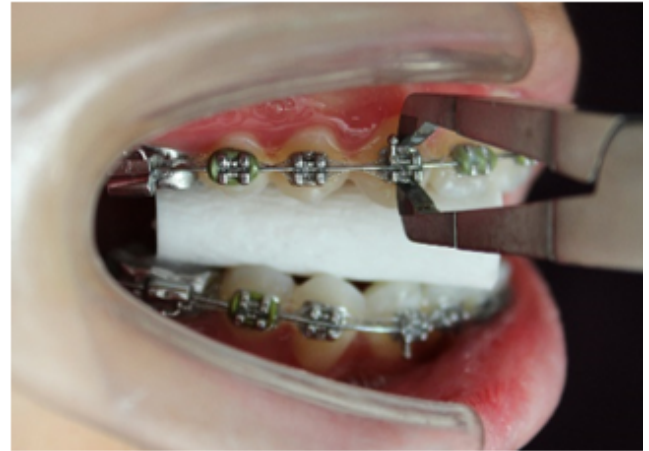


**Figure 2:** VAS scale

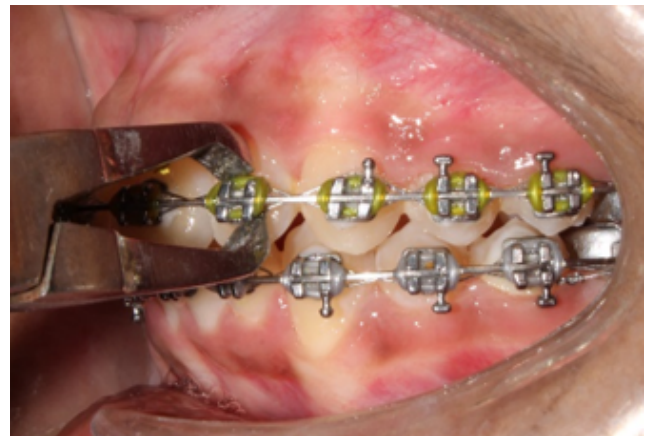


**Figure 3:** Chewie

1. Patients with fixed orthodontic treatment at the stage of debonding, who fill out the consent form were enrolled in the study.
2. Patients were allocated numbers randomly



**Figure 4:** Chewie placement



**Figure 5:** Conventional debonding

3. For the bracket debonding procedure, each patient's mouth was divided into two parts
4. For the patients having odd numbers, the right side - including the upper and lower quadrants - were used as the Chewie-biting side (Figure 4); the other side - including the upper and lower quadrants - were used as the control side (Figure 5).
5. For the patients having even numbers, the reverse procedure was implemented
6. Just prior to debonding, a Chewie was placed on the study side. The patients were instructed to bite the Chewie firmly but not excessively.
7. The debonding procedures was performed by the same clinician, and the clinician was right-handed
8. While debonding the bracket's, a gentle squeezing action was performed and the clinician avoided torsional forces as much as possible.
9. Removal of the brackets was carried out from posterior to anterior (sequence of the bracket debonding was as follows: 15, 35, 45, 25; 14, 34, 44, 24; 13, 33, 43, 23;

12, 32, 42, 22; 11, 31, 41, 21.) and the clinician waited for a while after the debonding of each bracket; the next bracket was then removed.

10. During the waiting, pain measurement of the tooth whose bracket was removed was carried out.
11. Pain perception was measured by using a Visual Analog Scale (VAS) from 0 to 10 points indicating no pain to intolerable pain.

The pain perceptions in the teeth with highest and lowest score of the study and control sides was compared in all subjects.

### 2.1. Statistical plan

Descriptive statistics:

- Mean, SD and Confidence Interval (CI) was used.
- Independent t-test to compare mean VAS between two groups.

### 2.2. Inclusion criteria

1. Patients undergoing fixed ortho treatment with 0.022 x 0.028-inch MBT metal bracket who were on the stage of debonding.
2. Patients who did not use analgesic medicine periodically or in the last 48 hours
3. Patients who did not have restoration at the bracket/tube placed area
4. Patients who did not have acute or chronic dental pain caused by periodontal/periapical lesions or caries
5. Patients who did not have any craniofacial syndromes

### 2.3. Exclusion criteria

1. Patients who had undergone orthodontic treatment using Ceramic Brackets.
2. Debonded brackets at the time of debonding.
3. Patients with history of orthodontic retreatment.
4. Missing teeth except extracted premolars
5. Active periodontal problems (recession and mobility greater than Grade I).
6. Heavily restored or root canal treated tooth.
7. Craniofacial deformities that would affect the dentoalveolar bone quality (e.g. cleft lip and palate).
8. Surgical treatment (including impacted tooth removal).
9. Presence of miniscrews.

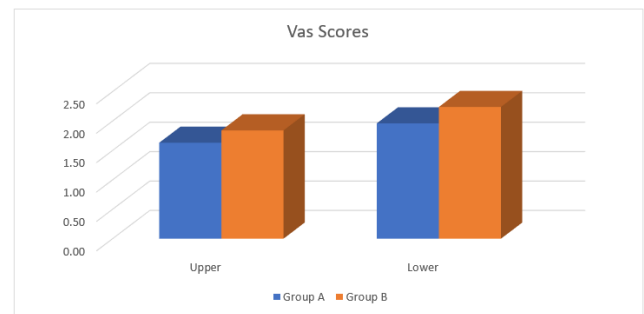
## 3. Results

Findings from Table 1 suggests that, Group A (Chewie group) has a mean value of 1.76, with a 95% confidence interval ranging from 1.59 (Lower) to 1.93 (Upper). Group B (Conventional group) has a mean value of 2.00, with a 95% confidence interval ranging from 1.79 (Lower) to 2.20 (Upper). The p-values are provided for comparisons within

each group. Group A has a p-value of 0.033 (significant), while Group B has a p-value of 0.042 (significant), indicating differences within each group. There is also a p-value of <0.001 (highly significant) for the overall comparison of both groups.

Table 2 depicts the comparison of mean Vas scores between two groups. The t-statistic is -1.734, and the corresponding p-value is 0.044, which is less than the significance level of 0.05. This indicates a statistically significant difference in mean VAS scores between Group A and Group B. The mean difference between the two groups is -0.23692, which means that, on average, Group A has a lower VAS score compared to Group B. The 95% confidence interval for the mean difference ranges from -0.50601 (Lower) to 0.32216 (Upper). Since this confidence interval includes both positive and negative values, it suggests that the true mean difference could be either lower or higher, but it still confirms the statistically significant difference.

In summary, the findings suggest that there are statistically significant differences in VAS scores between Group A (Chewie group) and Group B (Conventional group). Group A tends to have lower VAS scores on average compared to Group B.



**Figure 6:** Mean vas scores between Group A (Chewie) and Group B (Conventional)

Figure 6 depicts that the mean vas scores are higher for group B, for both upper and lower.

## 4. Discussion

The use of Chewie as pain management during debonding has not been investigated till now. Thus, this study aimed to evaluate the effectiveness of biting on Chewie as pain management during debonding.

As suggested by Williams and Bishara, providing an intrusive force on the teeth (biting force) during debonding can alleviate pain.<sup>5</sup> In our study, the mean VAS score for the Chewie group was 1.76 and for the control group was 2.00. Contradictory to the present findings, Kilinc and Dara reported that neither soft wax biting nor soft acrylic wafer biting was superior to conventional debonding in terms of pain.<sup>10</sup>

**Table 1:** Descriptive statistics and comparison within the groups

Statistics/Region	Group A			Group B		
	Upper	Lower	Overall	Upper	Lower	Overall
Mean	1.59	1.93	1.76	1.79	2.20	2.00
Median	1.00	2.00	1.00	1.00	2.00	2.00
SD	1.070	1.241	1.170	1.326	1.379	1.367
P value	0.033	0.042	<.001	0.017	ns	ns

**Table 2:** Comparison of mean VAS between two groups (Group A vs Group B)

VAS Scores	T	p-value	Mean Difference	95% Confidence Interval of the Difference	
				Lower	Upper
	-1.734	.044	-.23692	0.50601	3.2216

Mangnall et al. claim that operating on the right side of the mouth requires a more rotated hand position causing a grip that has a greater chance of applying more painful torsional forces when debonding.<sup>11</sup> Therefore, the study and control sides were changed in each successive patient in this study.

While assessing the results of previously conducted studies, it should be kept in mind that none of them had a split-mouth design. Therefore, it is inevitable that individual factors - such as gender, age, and emotional status - affected the results of these studies; Mangnall et al. state that this condition was a weakness of their study.<sup>11</sup> Therefore this study was designed as a split-mouth study.

The overall difference between female and male subjects was not evaluated in this study. If it had been shown, the study could have presented more findings to the scientific community. This can be expressed as a limitation of the present study.

## 5. Conclusion

In summary, chewie biting did relieve debonding pain. If there is a conventional twin bracket and the manufacturer does not recommend a special debonding instrument or technique, debonding performed with gently squeezing action and biting on the chewie will be sufficient to keep pain to a minimum level and no other additional pain-relief method will be required.

## 6. Source of Funding

None.

## 7. Conflict of Interest


None.

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