



CODEN [USA]: IAJPBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.1471554>Available online at: <http://www.iajps.com>

Research Article

**CHEWING GUM AND IBUPROFEN COMPARISON FOR
ORTHODONTIC PAIN CONTROL**

Muhmmad Inqalab fareed, Safoora Hashmi, Umar Farooq

¹House Officer, Nishtar Institute of Dentistry, Multan.**Abstract:**

Background: Orthodontic patients have common experience of pain which effect 2-hours after force application and achieved peak level at twenty four hours, then lasts for five to seven days.

Objective: The objective of this randomized clinical study was to evaluate the decline in pain score with chewing gum and ibuprofen in orthodontic pain control after the placement of initial arch wire during the first week.

Materials and Methods: The study was carried out at Nistar Institute of Dentistry, Multan from 1st May, 2017 to 1st April, 2018. In the present study 250 patients were selected. The age range of selected patients was 12-years to 16-years. There were 133 (53%) male and 117 (47%) were female patients. Selected patients were divided into two groups i.e. chewing gum and ibuprofen groups (each group containing 125) by random number table. In each group patients received pain control twenty four hours after insertion of initial arch wire and after that eight hours interval till seventh day. Patients were requested to finish VAS (Visual Analog Scale) questionnaire, at 24-hours after insertion of arch wire, than at 24-hours and seventh day. For determination of mean significance decrease in visual analog scale, 2-way ANOVA was utilized among two groups.

Results: Results demonstrated that lessening in pain score for group of ibuprofen; baseline to twenty four hours was 2.35 ± 1.36 which was lower significantly as compared to pain score decrease in group of chewing gum 3.34 ± 1.34 . 4.07 ± 1.43 decrease in pain score showed by the group of ibuprofen at 7th day which was low significantly as compared to 5.86 ± 1.56 decrease in pain score for group of chewing gum.

Conclusion: It was concluded that for orthodontic patients, more decrease in pain score showed by the chewing gum as compare to ibuprofen.

Key words: Initial Arch Wire, Orthodontic Pain Control, Chewing Gum, Ibuprofen.

Corresponding author:

Muhmmad Inqalab fareed,
House Officer,
Nishtar Institute of Dentistry,
Multan.

QR code



Please cite this article in press Muhmmad Inqalab fareed et al., *Chewing Gum and Ibuprofen Comparison for Orthodontic Pain control*, Indo Am. J. P. Sci, 2018; 05(10).

INTRODUCTION:

In orthodontic patients, pain is general experience. Discomfort and pain fear is a key component in preventing patients from looking for orthodontic treatment. Orthodontic undervalue the degree to which orthodontic treatment reason pain to their patients [1]. In patients found a more positive attitude who encounter less pain during treatment of orthodontic [2].

Orthodontic pain emerges from inflammation, ischemia and edema in compacted periodontal ligament[3]. After two hours of force application pain starts and reach at maximum level at twenty four hours and continues for five to seven days [4].

NSAIDs (Non-Steroidal Anti Inflammatory Drugs) has been accounted for as the best methodology for orthodontic pain control[5-6]. However, currently the side-effects and over use of non-steroidal anti-inflammatory drugs have been considered issues of concern especially they diminish movement of orthodontic tooth[7]. Different new non-pharmacological techniques, for example, bite wafers or chewing gum, low force laser therapy have been recommended for control of orthodontic pain[8,9,10]. The component behind these non-pharmacological strategies is to release the firmly assembled periodontal ligament fibers, normal blood flow restoring, in this manner keeping the development of metabolites that animates pain receptors. Currently literature proposed that chewing gum can likewise be prescribed for control of initial orthodontic pain[9].

To compare the reduction in pain score, in orthodontic pain control with ibuprofen and chewing gum, there has been no examination conducted in Pakistan. In Pakistani population, outcomes might be distinctive due to compliance of patients, hereditary reasons and nutritional reasons. However, target of this examination was to compare a non-pharmacological alternative of chewing gum with ibuprofen in orthodontic pain control. For orthodontic patients, it will be beneficial as chewing gum have less negative side-effects in physiology of tooth movement; it will likewise take out the conceivable fundamental reactions from ibuprofen and can be utilized at home easily as well as at work place or school and contraindications to ibuprofen patients.

MATERIALS AND METHODS:

Present randomized clinical investigation was carried out at orthodontic department of Nistar Institute of Dentistry, Multan from 1st May, 2017 to 1st April, 2018. After obtaining approval from hospital, total 250

patients, irrespective of gender, with the range of age twelve years to sixteen years were selected in accordance with inclusion criteria by using non probability purposive sampling method. Through random number table these samples were divided into two groups and allocated chewing gum group and ibuprofen group (in each group there were 125). From all patients, who were included in this study, a written informed consent was obtained. Patients with extraction scheduled at least 2-weeks before bonding, moderate / severe crowding requiring 1st pre-molar extraction and 12-years to sixteen years of age both gender were included in this present examination. Patients who received analgesic therapy, oral surgery during last 4-weeks, contraindication to ibuprofen use and medically compromised patients were excluded from study.

Through straight wire edge-wise appliance system maxillary arch wire was bounded and 0.016" Ni-Ti (nickel titanium) arch wire 3M-Unitek ligated. After twenty four hours, all patients were called and asked them to mark VAS (visual analog scale) score as per their pain feeling level. Base line score was considered on this. Ibuprofen group's patients were recommended to take ibuprofen tablet (400-mg) after 1st visit immediately and eight hourly repeated for one week. The patients were recommended to chew gum (sugar free) who were in the chewing gum group (Wrigley company orbit) for five minutes after visit immediately and eight hourly repeated for 1-week.

For the purpose to record the level of pain, patients were requested to finish the visual analog scale score. A 10-cm line was the scoring format, weighted at the two closures by spellbinding terminology with a cheerful face and pitiful face.

Patients were asked to check an area at stake relating to the measure of pain they encountered at twenty four hours after insertion of arch wire (baseline); at that point at twenty four hours, and seventh day in the wake of endorsing ibuprofen and chewing gum for control of pain. With a ruler measurements were made for the separation from the left edge of the line to the check and recorded as score. Through subtracting visual analog scale score at twenty four hours reduction obtained in visual analog scale score and seventh

day, from benchmark score. A pre-designed attached proforma was used to collect all this information. The patients were told not to utilize any extra analgesics.

SPSS software was used to analyze the data. Quantitative information like age & visual analog scale score at various stages was displayed by mean \pm standard deviation while qualitative information like sex (gender) was exhibited by percentage and frequency. Two way ANOVA was utilized for mean decrease significance in visual analog scale in both groups. $P \leq 0.05$ significance level was set.

RESULTS:

In this study 250 patients age range of 12-years to 16-years; mean age of 14.03 ± 1.17 years were selected in this study (table-I). Male patients were 133 (53%) and female patients were 117 (47%). The ratio of male to female was 1.1: 1 (fig-I).

7.78 ± 1.28 was the baseline pain score in group of ibuprofen which was reduced to 5.52 ± 1.29 significantly after twenty four hours and 3.80 ± 1.11 further reduced at seven days. In mean pain score there was statistically significant decrease ($p < 0.05$) from base line to twenty four hours and after seven days. 7.72 ± 1.49 was the base line pain score in chewing gum group, which was reduced to 4.38 ± 1.52 significantly after twenty four hours and further decreased to 1.86 ± 1.35 at seventh day. At base line for pain both the groups had difference insignificantly $p > 0.05$, while after twenty four hours and seven days significantly difference was found $p < 0.05$ and group of chewing gum had decrease mean pain as contrasted to group of ibuprofen (table-II). After taking the ibuprofen decrease in pain score was 2.35 ± 1.36 from base line to twenty four hours in the group of ibuprofen which was lessen significantly than decrease in mean pain score for group of chewing gum which showed 3.34 ± 1.34 at $p < 0.05$. Similarly the group of ibuprofen showing decrease in pain score from base line to seven days after procedure 4.07 ± 1.43 which was less significantly as compare to mean pain score decrease for group of chewing gum which shows 5.86 ± 1.56 pain decrease at $p < 0.05$. Keeping in view the above, it comes to know that group of chewing gum showed more decrease in mean pain as contrasted to group of ibuprofen (table-III). Both groups showing overall difference significantly at each point of follow up. In mean pain score more decrease showed by chewing gum at each level as compare to ibuprofen.

Table-I: Patients Age Descriptive Statistics

	N	250
Age Years	Mean	14.03
	Standard Deviation	1.17
	Minimum	12
	Maximum	16

Table-II: Mean Decrease in Visual Analog Scale Pain Score Comparison between Both Groups at Different Follow ups

Group	Baseline Pain	24-Hours after	7-days after
Ibuprofen	7.87 ± 1.28	5.52 ± 1.29	3.80 ± 1.11
Chewing Gum	7.72 ± 1.49	4.38 ± 1.52	1.86 ± 1.35
p Value	0.387(i)	0.000(ii)	0.000(ii)

(i) Insignificant $p > 0.05$

(ii) Significant $p < 0.05$

Table-III: Mean Decrease in Visual Analog Scale Pain Score Comparison between Both Groups at Different Follow ups

Group	Decrease from Baseline to 24-hours	Decrease from Baseline to 7-days
Ibuprofen	2.35 ± 1.36	4.07 ± 1.43
Chewing Gum	3.34 ± 1.34	5.86 ± 1.56
p Value	0.000*	0.000*

* Significant $p < 0.05$

Male = 133

Female = 117

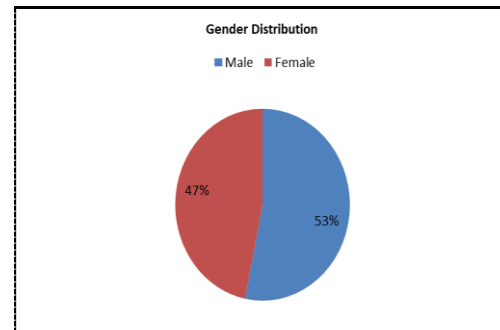


Fig-I: Distribution of Gender

This examination was intended to analyze the impacts of chewing gum and ibuprofen on orthodontic pain control by estimation of diminishing in mean visual analog scale pin score following introductory placement of arch wire. The reports because of ordered age and sexual orientation on torment of patients after orthodontic apparatus application are inconsistent [11-14]. To control these components, this investigation was constrained to group of young people of 12-years to 16-years age, and stratification in light of sex was utilized to adjust the dissemination of young men and ladies in two gatherings.

In these two groups, pain recorded score on visual analog scale was crested at twenty four hours and reduced over the remaining week after placement of initial arch wire. This finding concurs with the consequences of Ngan et al[10], Bernhardt et al, Polat et al and Law et al[15,16,17]. During function pain experience and this pattern was also similarly reflected in past investigations [11-12,14,18].

Almost equal base line pain score was observed in both groups with insignificant difference at $p > 0.05$, while after twenty four hours, observed difference significantly $p < 0.05$ and group of chewing gum had less pain as compared to group of ibuprofen. Moreover, after seven days, significant difference was observed and now again there is less pain in group of chewing gum as compared to group of ibuprofen.

In the present study, there was more decrease in pain (3.34 ± 1.34) with chewing gum as contrasted to ibuprofen 2.35 ± 1.36 from base line to twenty four hours which showed difference significantly in pain score decrease among both groups $p < 0.05$. Comparative contrast was seen following seven days of placement initial arch wire and instruction of treatment. In the group of chewing gum, diminish in agony score from placement initial arch wire to seven days after process was 5.86 ± 1.56 which was higher significantly than diminish in pain score from group of ibuprofen which indicated decrease of 4.07 ± 1.43 pain ($p < 0.05$). Now again group of chewing gum had more pain decrease as compared to group of ibuprofen.

Ngan et al presumed that ibuprofen was the favored analgesic to diminish pain related with orthodontic treatment [10]. As indicated by Davidovitch and Shanfield, during treatment of orthodontic pain is because of an incendiary reaction in the periodontal ligament, and non-steroidal anti-inflammatory drugs have been known as the best quality level for

orthodontic pain control [19]. Pain after placement of orthodontic appliances is a combination of inflammation, ischemia, pressure and edema in the periodontium as indicated by Furstman and Bernik[3]. It is trusted that any factor that can briefly uproot the teeth under orthodontic force can ease the weight and stop the further arrangement of ischemic spots, in this manner fix torment. In view of this hypothesis, chewing gum prescribed by Proffit [20] to orthodontic patients for pain control following placement of appliance. In any case, the viability of chewing gum for orthodontic patient's pain control has not been assessed in some other Pakistani investigation. Outcomes might be distinctive in Pakistan in light of social reasons, hereditary reasons, passionate status and patient consistence. Otasevic determined that maintaining a strategic distance from hard sustenance in the primary week after placement of initial arch wire was more compelling in reduction of pain than chewing on bite wafers [21]. However, it does not seem reasonable that patients recommended to avoid from hard food. Murdock et al recently looked at pain reaction amid the 1st week after beginning placement of initial arch wire in patients arbitrarily doled out one of the two pain management group[22]. They presumed that the bite wafers were at any rate as successful as non-steroidal anti-inflammatory drugs for pain control after procedures of orthodontic. Thus, in our examination, for orthodontic pain control, chewing gum was more effective as compared to ibuprofen.

The outcomes of our investigation are similar with a recent study conducted by Zebarjad and Fahimeh who concluded that in orthodontic patients both viscoelastic bite wafers and chewing gum are effective for decreasing pain and can be suggested as reasonable substitute for ibuprofen[9]. However, the fundamental distinction between two investigations was that investigation of Zearjad and Fahimeh was just led on girls, while in this examination stratification in view of sex was utilized to adjust the distribution of young men and young ladies in the two gatherings.

So it was observed in this investigation that chewing gum was not mediocre compared to ibuprofen as for any pain administration. The system of chewing gums is to relax the firmly pressed periodontal ligament filaments,

reestablishing the ordinary blood flow of periodontium, subsequently keeping the development of pain receptors fortifying metabolites lastly relieving the pain.

Another primary issue that convolutes ibuprofen utilization in orthodontic patients is their demonstrated symptoms of restraining orthodontic tooth movement.

Elective pain administration strategies, for example, the chewing gum and wafers don't have these conceivable results. So utilization of chewing gum will be useful for orthodontic patients as these need negative reactions in tooth development physiology. It will likewise wipe out conceivable fundamental symptoms of ibuprofen and can without much of a stretch be utilized at school or home and in patient with contraindications to ibuprofen.

The care suppliers will be empowered to recommend non-pharmacological alternative for orthodontic pain control by dint of this examination. The restriction of this examination was little size of sample; consequently directing another investigation with bigger size of sample is suggested.

CONCLUSION:

Chewing gum demonstrated more decrease in pain score for orthodontic agony after placement of initial arch wire when contrasted with ibuprofen. So, in orthodontic pain control, chewing gum can be better substitute for ibuprofen that wipes out the reactions possibility from ibuprofen and can undoubtedly be utilized.

REFERENCES:

- [1] Krukemeyer AM, Arruda, AO, Inglehart MR. Pain and Orthodontic Treatment. *Angle Orthod.* 2016; 79: 1175-81.
- [2] Alhaija ESA, Al Daikki A, Mahmoud K. Al-Omairi, Nadeem SAK. The relationship between personality traits, pain perception and attitude toward orthodontic treatment. *Angle Orthod.* 2014; 80: 1141-19.
- [3] Furstman L, Bernik S. Clinical considerations of the periodontium. *Am J Orthod.* 2000; 61: 138-55.
- [4] Polat O, Karaman AI. Pain control during fixed orthodontic appliance therapy. *Angle Orthod.* 2010; 75: 214-19.
- [5] Xiaoting Li, Yin T, and Yangxi C. Interventions for pain during fixed orthodontic appliance therapy. *Angle Orthod.* 2010; 80: 925-32.
- [6] Patel S, Susan P, McGorray B, Yeziarski R. Effects of analgesics on orthodontic pain. *Am J Orthod Dentofacial Orthop.* 2011; 139: e53-e58.
- [7] Bartzela T, Jens C. Türp, Motschall E. Medication effects on the rate of orthodontic tooth movement: A systematic literature review. *Am J Orthod Dentofacial Orthop.* 2009; 135: 16-26.
- [8] Doshi-Mehta G, Wasundhara A. Bhad-Patilb. Efficacy of low-intensity laser therapy in reducing treatment time and orthodontic pain: A clinical investigation. *Am J Orthod Dentofacial Orthop.* 2012; 141: 289-97.
- [9] Farzanegan F, Zebarjad. Pain reduction after initial arch wire placement in orthodontic patients: A randomized clinical trial. *Am J Orthod Dentofacial Orthop.* 2012; 141: 169-73.
- [10] Ngan P, Wilson S, Shanfeld J, Amini H. The effect of ibuprofen on the level of discomfort in patients undergoing orthodontic treatment. *Am J Orthod Dentofacial Orthop.* 1994; 106: 88-95.
- [11] Jones M, Chan C. The pain and discomfort experienced during orthodontic treatment: a randomized controlled clinical trial of two initial aligning arch wires. *Am J Orthod Dentofacial Orthop.* 1992; 102: 373-81.
- [12] Scheurer P, Firestone A, Bürgin W. Perception of pain as a result of orthodontic treatment with fixed appliances. *Eur J Orthod.* 1996; 18: 349-57.
- [13] Ngan P, Kess B, Wilson S. Perception of discomfort by patients undergoing orthodontic treatment. *Am J Orthod.* 1989; 96: 47-53.
- [14] Fernandes LM, Ogaard B, Skoglund L. Pain and discomfort experienced after placement of a conventional or a superelastic NiTi aligning archwire. A randomized clinical trial. *J Orofac Orthop.* 1998; 59: 331-39.
- [15] Polat O, Karaman AI, Durmus E. Effects of preoperative ibuprofen and naproxen sodium on orthodontic pain. *Angle Orthod.* 2005; 75: 791-96.
- [16] Bernhardt MK, Southard KA, Batterson KD, Logan HL, Baker KA, Jakobsen JR. The effect of preemptive and/or postoperative ibuprofen therapy for orthodontic pain. *Am J Orthod Dentofacial Orthop.* 2001; 120: 20-27.

- [17] Steen Law SL, Southard KA, Law AS, Logan HL, Jakobsen JR. An evaluation of preoperative ibuprofen for treatment of pain associated with orthodontic separator placement. *Am J Orthod Dentofacial Orthop.* 2000; 118: 629-35.
- [18] Lim HM, Lew KK, Tay DKL. A clinical investigation of the efficacy of low level laser therapy in reducing orthodontic post adjustment pain. *Am J Orthod Dentofacial Orthop.* 1995; 108: 614-22.
- [19] Davidovitch Z, Shanfield J. Biochemical aspects of orthodontic tooth movement: cyclic nucleotide and prostaglandin concentrations in tissues surrounding Orthodontically treated teeth in vivo. *Am J Orthod Dentofacial Orthop.* 1986; 90: 139-48.
- [20] Proffit WR. *Contemporary Orthodontics.* 3rd ed. St Louis: Mosby; 2000. p. 302-5.
- [21] Otasevic, M, Naini FB, Gill DS, Lee RT. Prospective randomized clinical trial comparing the effects of a masticatory bite wafer and avoidance of hard food on pain associated with initial orthodontic tooth movement. *Am J Orthod Dentofacial Orthop.* 2006; 130: 6.e9 - 6.e15.
- [22] Murdock S, Phillips C, Khondker Z, Hershey H. Treatment of pain after initial arch wire placement: A non-inferiority randomized clinical trial comparing over the counter analgesics and bite-wafer use. *Am J Orthod Dentofacial Orthop.* 2010; 137: 316-23.