REVIEW ARTICLE

Pain and Discomfort Associated with Fixed Orthodontic Appliances and Clear Aligner Therapy: A Narrative Review

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Abstract

Background: Pain and discomfort often occur during orthodontic treatment. Understanding and addressing them can improve patient care and outcomes. **Objectives:** This review provides a comprehensive analysis of the profiles of pain and discomfort associated with fixed orthodontic (FA) appliances and clear aligners (CA), along with their management protocols. **Methods:** A literature search on orthodontic pain and discomfort used PubMed, Google Scholar, and the Saudi Digital Library. The study assessed articles published from 2015 to 2025. This review summarizes research from randomized controlled trials, prospective clinical studies, systematic reviews, and meta-analyses on orthodontic pain and discomfort, with a focus on pain management strategies associated with CA and FA treatments. **Results:** FA patients experienced pain and discomfort more frequently than CA patients. After activation of the orthodontic appliance, the pain intensity became severe between 24 and 48 h and gradually decreased over the next week. Patients undergoing treatment with CA showed lower pain prevalence and intensity than the FA patients. Similarly, fewer functional difficulties were noted among CA patients compared to FA patients. Drugs such as ibuprofen, naproxen, and acetaminophen effectively reduced pain at 2, 6, and 24 h after appliance activation. Etoricoxib demonstrated prolonged pain relief for up to 96 h. Non-pharmacological methods such as low-level laser therapy, topical analgesics, and behavioral interventions were able to reduce orthodontic treatment pain. **Conclusion:** Both CA and FA orthodontic treatments caused temporary pain and discomfort. However, pain caused by CA therapy is less severe than that caused by FA orthodontic treatment. Orthodontic pain management using pharmacological and non-pharmacological strategies is effective in improving patient comfort and treatment acceptance.

Key words: Clear aligners, fixed appliances, non-steroidal anti-inflammatory drugs, orthodontic pain, pain management, photobiomodulation, quality of life

INTRODUCTION

Orthodontic treatment has progressed remarkably in the past 10 years. Orthodontic treatment with fixed appliances (FA) remains the gold standard for tooth movement. Clear aligner (CA) therapy is evolving as an alternative to FA, especially among young adults concerned with esthetics and treatment comfort. Despite advances in orthodontic treatment, pain and discomfort remain major concern for patients undergoing orthodontic treatment. It has been reported that nearly 90% of orthodontic patients complain of treatment-related pain. Almost 30% of orthodontic patients discontinue treatment due to discomfort.[1]

Orthodontic pain results from inflammation due to mechanical forces, soft-tissue trauma from appliances, and functional limitations during eating and speaking. The intensity and character of pain vary between fixed and removable orthodontic appliances. Fixed orthodontic appliances cause more severe and persistent pain and discomfort than removable appliances.[2] CA therapy was introduced as a comfortable and esthetically pleasing alternative for orthodontic treatment with a high acceptance rate among adults. However, the pain profiles of patients

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undergoing CA and FA therapies remain different. In addition, orthodontic pain and discomfort adversely affect oral health-related quality of life (OHRQoL).[3]

A thorough understanding of pain mechanisms associated with orthodontic appliances and their management techniques is crucial for practitioners. Non-steroidal anti-inflammatory drugs (NSAIDs) have been widely studied for orthodontic pain management.[4] Other non-pharmacological adjunctive therapies, such as low-level laser therapy (LLLT), topical anesthetics, vibratory stimulation, and behavioral interventions, have also been applied in orthodontic pain management.

Severe orthodontic pain may lead to non-compliance with appliance wear and neglect of oral hygiene. This may eventually result in treatment failure. Patients with high pain sensitivity may reject orthodontic treatment. In-depth knowledge of pain profiles during orthodontic treatment is essential for proper pain management. Hence, this narrative review was undertaken to synthesize evidence on pain and discomfort related to FA and CA therapies. This narrative review aims to summarize the findings on: (1) The prevalence and intensity of pain between FA and CA treatments; (2) time-dependent pain patterns; (3) impacts on quality of life; and (4) pharmacological and non-pharmacological methods of management.

METHODS

Narrative review scope

This review synthesizes evidence from literature searches conducted in May 2026 using PubMed, Medline, Google Scholar, and Scopus electronic databases, covering publications from 2015 to 2025. The searches targeted: (1) Pain and discomfort related to FA; (2) pain and discomfort associated with CA; and (3) orthodontic pain management strategies. All studies were open access, in English, and involved humans receiving orthodontic treatment.

Study selection and data synthesis

Studies were selected based on relevance, prioritizing randomized controlled trials (RCTs), systematic reviews, meta-analyses, and prospective comparative studies. Cross-sectional and observational studies provided pain prevalence and patient-reported outcomes. Data were extracted on pain prevalence, Visual Analog Scale (VAS)-based pain intensity, timeline patterns, OHRQoL impacts, and the efficacy of management interventions.

A formal quality assessment was not performed for this narrative review. Studies employing robust methods, such as RCTs with sufficient sample sizes, feasible blinding, validated pain measurement tools, and suitable statistical analyses were prioritized. Cochrane systematic reviews and meta-analyses were prioritized to synthesize evidence on management interventions. Findings are structured thematically, covering pain characteristics such as prevalence, intensity, and timing. The impact on OHRQoL and management strategies was also included.

RESULTS

Pain prevalence and intensity

Fixed orthodontic appliances

Pain and discomfort were the most frequent symptoms in patients undergoing FA treatment. A study of 200 FA patients found that 92% experienced discomfort; this affected eating (68%), teeth cleaning (64%), speaking (37%), sleeping (21%), and smiling (21%).[5] Nearly 95% of patients felt pain during FA treatment, with 80% describing it as moderate-to-severe initially. This highlights the significant pain burden caused by FA therapy.

Inauen *et al*. found that orthodontic pain peaked on day 1, with a VAS score of 42.4 mm, which decreased to 9.0 mm by day 7.[6] Similar pain trends were observed in cross-sectional studies, with most patients reporting moderate pain (mean VAS 5.05–5.76) during the 1st week of treatment.[7,8] Moreover, pain levels are significantly affected by procedures such as ring cementation, which is especially painful across all ages.[8]

Gender differences in pain perception have demonstrated mixed findings across studies. Higher mean VAS scores were reported among males on days 1 and 2 than among females, with a significant difference between groups.[8,9] Conversely, some studies reported no significant gender differences in orthodontic pain,[6,10] indicating that individual differences could have a greater impact than gender.

CA therapy

CA therapy consistently shows lower pain intensity than FA in several comparative studies.

Many studies have shown consistently lower pain intensity among patients undergoing CA therapy than among those receiving FA treatment. White *et al*. found that patients with traditional FA experienced more discomfort than those with CA during the 1st week, peaking between days 1 and 3.[11] Similarly, Almasoud found that patients receiving CA experienced significantly less pain prevalence and intensity – measured by mean VAS scores – compared to those treated with passive self-ligating FA. Pain peaked at 24 h with a mean VAS of 3.87 and decreased to 1.62 by day 7.[12] A systematic review reported that CA therapy caused less pain in the 1st week and reduced the need for analgesics compared with FA.[13] In addition, a cross-sectional study reported an

average VAS pain score of 3 for aligners compared with 6 for brackets.[14]

Pain quality differs between CA and FA treatments. The CA therapy caused milder pain during the initial passive wear phase than active therapy. In addition, there was some mild tenderness in the jaw muscles.[15] Alajmi *et al*. found that all patients experienced pain in both the CA and FA groups. CA patients reported more pressure-like pain, whereas FA patients experienced more throbbing and dull sensations. Despite these differences, the average pain scores on the VAS scale for both treatments were similar.[16]

Comparative summary

Table 1 demonstrates the prevalence and intensity of pain in CA and FA. Treatment with CA was related to less pain in the 1st week. Data suggest that CA therapy is less painful. The short-term discomfort from the CA and FA treatments is predictable, peaking within the first 24–48 h and then dropping sharply.

Timing of orthodontic pain symptoms

Onset and peak

Orthodontic pain has a predictable pattern: Rapid onset, early peak, and then gradual decline. Pain begins hours after placement or activation, generally within 4–12 h.[2,18] Peak intensity usually occurs within 24 h of activation, but some studies have report earlier peaks at 2–6 h, especially with procedures such as separator placement.[19] A study conducted by Inauen *et al*. provides a detailed temporal profile showing pain peaks on day 1 (42.4 mm on the VAS) and a subsequent decline over the following week.[6] Similarly, Antonio-Zancajo *et al*. observed peak pain between 24 and 48 h with conventional lingual brackets. CA appliances caused the lowest pain across all time points.[17] Figure 1 shows the pain timeline comparing CA and FA.

Duration and resolution

Pain lasts 3–7 days, with most patients feeling better by the end of the 1st week. Marković *et al*. noted that pain lasts 3–4 days and diminishes naturally without self-medication.[18] Bartolucci *et al*. reported that more than half of the study participants experienced complete pain cessation within 7 days; however, 18% still felt pain beyond 15 days.[20] Inauen *et al.* observed a decrease in pain from 42.4 mm on day 1 to 9.0 mm on day 7, representing a 79% reduction.[6]

CAs showed temporal patterns similar to FA, but with lower peak intensity and shorter duration. Almasoud observed that pain was highest at 24 h and lowest on day 7 for both FA and aligners. However, CA patients consistently reported significantly less pain at all-time points.[12] Tran *et al*. noted the initial passive aligner caused more short-term tooth pain than later active aligners, indicating an adaptation effect during treatment.[15]

Subsequent activations

Pain patterns during later activations differ from initial appliance placement. Patients receiving CA and FA felt less

Table 1: Summary of pain prevalence and intensity by CA and FA therapies

Appliance type	Pain prevalence (%)	Mean peak VAS score	Peak timing	Key references
Fixed appliances (Conventional)	72–95	42.4–60 mm	24–48 h	Inauen *et al*. (2023),[6] Banerjee *et al*. (2018)[3]
Fixed appliances (Self-ligating)	70–90	38–55 mm	24 h	Almasoud (2018)[12] Rahman *et al*. (2016)[10]
Fixed appliances (Lingual)	65–85	30–45 mm	24–48 h	Antonio-Zancajo *et al*. (2020)[17]
Clear aligners (Invisalign)	60–80	20–39 mm (VAS 3–4)	24–48 h	White *et al*. (2017)[11], Almasoud (2018)[12], Pereira *et al*. (2020)[13]

VAS scores measured on a 0–100 mm scale unless specified. VAS: Visual Analog Scale, CA: Clear aligners, FA: Fixed orthodontic

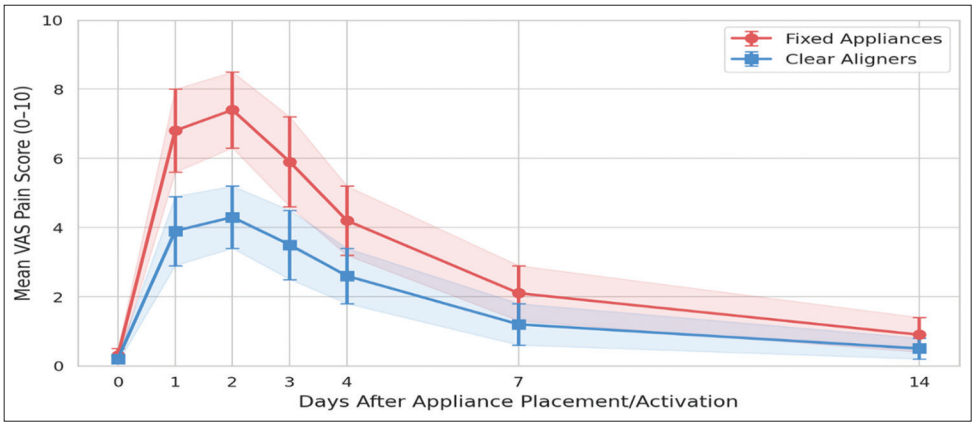

Figure 1: Pain intensity over time: Fixed orthodontic versus clear aligners

discomfort during the subsequent appliance adjustments than at the initial activation.[11]

Rahman *et al*. found that discomfort peaked after insertion of the initial 0.014-inch nickel-titanium archwire. It was most intense on day 1, eased by day 3, and significantly decreased by day 5 following each archwire change.[10] This indicates that although pain returns with each activation, its severity might decrease as patients become accustomed to treatment. Table 2 presents the temporal pattern of orthodontic pain.

Impact on quality of life

Functional domains

Orthodontic pain impacts daily activities such as eating, maintaining oral hygiene, speaking, sleeping, and socializing. A study of 200 patients with FA found that 68% had trouble eating, 64% had difficulty cleaning their teeth, 37% had speech issues, 21% had sleep problems, and 21% felt embarrassed about smiling or laughing.[21] Similarly, Gupta *et al*. discovered that in the 1st month of FA treatment, 88.5% of patients reported mouth pain, whereas 82.8% experienced difficulty eating.[22] For most orthodontic patients, experiencing mild-to-severe pain on a given day affected OHRQoL. While 9% of patients reported having very severe pain. Motivation and counseling significantly reduced pain, emphasizing the role of psychological factors in pain perception.[3] Figure 2 and Table 3 illustrate the relative prevalence of pain impacts across functional domains, showing that eating and oral hygiene are the most commonly affected activities during orthodontic treatment.

Table 2: Temporal pattern of orthodontic pain reported by different studies[6,11,12,17]

Time point	Fixed appliances mean VAS (mm)	Clear aligners mean VAS (mm)	Clinical significance
Baseline (Pre-treatment)	0–5	0–5	Minimal to no pain
2–6 h	25–35	15–25	Early onset, rising pain
24 h (Day 1)	42–60	20–39	Peak pain intensity
48 h (Day 2)	35–50	18–32	Sustained moderate pain
72 h (Day 3)	25–40	12–25	Declining pain
Day 7	9–15	5–10	Substantial resolution

VAS: Visual analogue scale

OHRQoL

A formal assessment of OHRQoL using validated tools reveals significant impacts early in orthodontic treatment. Antonio-Zancajo *et al*. compared OHRQoL in 120 patients using lingual FA and CA. Findings indicated that lingual FA had the smallest effect on quality of life (13 ± 12), whereas aligners had a slightly higher impact (17 ± 19). In contrast, conventional and low-friction brackets had more pronounced effects.[17] The findings support the conclusion that the choice of orthodontic technique affects patient pain levels and quality of life at the outset of treatment.

Curto *et al*. studied the impact of bracket slot size on pain and OHRQoL during the 1st month of treatment. They observed significant differences in pain at 4 h and 2 days post-treatment. Notably, 0.022" low-friction brackets yielded less pain.[24] The design of orthodontic appliances can influence pain levels and OHRQoL. Figure 3 provides a comprehensive visualization of OHRQoL impacts of CA and FA and time points, showing the domains most affected during the initial treatment phase.

Comparative impacts: FA versus CAs

CAs offer advantages in specific aspects of OHRQoL related to soft-tissue trauma and functional problems. Alajmi *et al*. observed that CA patients had more comfortable chewing, fewer food restrictions, and fewer mucosal ulcerations than

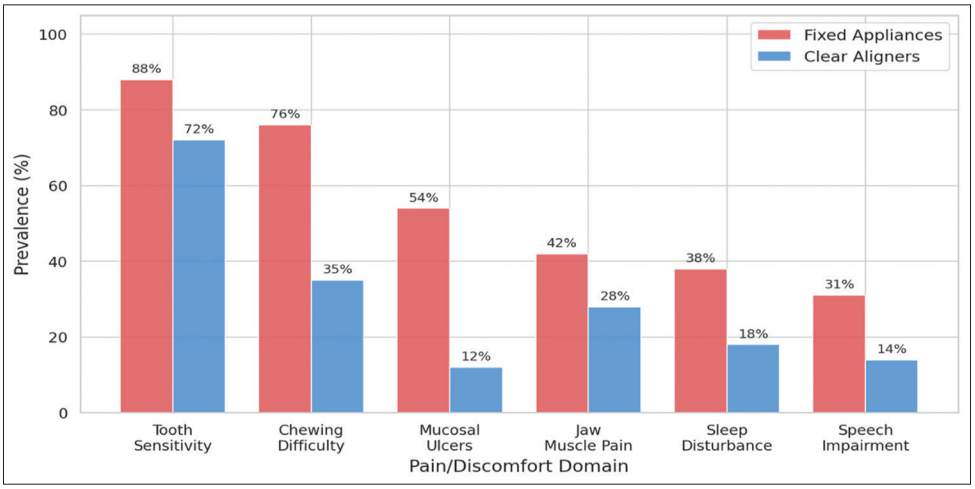

Figure 2: Prevalence of pain/discomfort domains based on appliance type

Table 3: Quality of life impacts by functional domain reported in different studies[16,21-23]

Functional domain	Prevalence of impact (Fixed appliances) (%)	Prevalence of impact (Clear aligners) (%)	Duration of impact	Management strategies
Eating/Mastication	68–83	30–50	3–7 days (peak), 1 month (residual)	Soft diet, analgesics, chewing gum
Oral hygiene	64–75	20–40	Throughout treatment (reduced after adaptation)	Modified techniques, interdental aids, motivation
Speech	37–55	25–45	3–14 days (adaptation period)	Practice exercises, reassurance
Sleep	21–35	10–20	1–3 days (peak pain period)	Analgesics before bedtime, sleep positioning
Social interactions	21–40	10–25	Variable (psychological adaptation)	Counseling, peer support, esthetic options
Mucosal trauma	50–70	5–15	Throughout treatment (episodic)	Wax, silicone covers, appliance adjustments

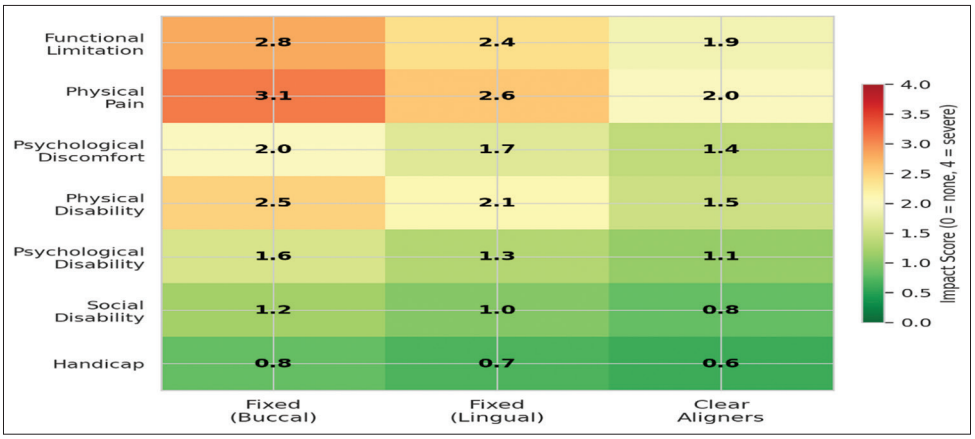

Figure 3: Oral health-related quality of life impact by appliance type

FA patients. However, average pain levels were comparable across groups, and analgesic use was insignificant.[16]

Kaklamanos *et al*. reviewed three studies that compared OHRQoL between CA and traditional FA. They observed that CA resulted in fewer adverse effects, including reduced pain, sleep disturbances, food impaction, and oral irritation, during the 1st week. Although not consistently more comfortable, CAs are generally well tolerated.[23] The quality-of-life benefits of CA are most evident during the early treatment phase, in soft-tissue comfort and functional activities. However, the overall pain experience might be more comparable than initially speculated, mainly differing in type and distribution of discomfort, not in its intensity.

Pain management strategies

Pharmacological interventions: Systemic analgesics

Systemic analgesics are widely studied and commonly used to manage orthodontic pain. According to the Cochrane systematic review by Monk *et al*., analgesics significantly reduce orthodontic pain compared with no treatment or placebo at 2, 6, and 24 h.[25] The review found no evidence of a difference in efficacy between NSAIDs and paracetamol, though evidence quality was moderate-to-very low. Cheng *et al*. found that ibuprofen and naproxen exhibit stable analgesic effects that peak at 6 h, with naproxen stronger at 2 or 6 h and lasting up to 24 h. Acetaminophen's effect increased from 2 to 24 h. They recommend ibuprofen (400 mg) and acetaminophen (600 mg) before and after treatment for optimal pain control.[26]

Sandhu *et al*. compared the analgesic effects of 11 pharmacological formulations. The study revealed that etoricoxib was an effective pain reliever when given pre- and postoperatively. Ibuprofen, acetaminophen, naproxen, and aspirin were effective at specific time points (6, 12, and 24 h).[27] The study shows that drug timing is crucial, as combining pre- and post-operative doses boosts effectiveness for drugs with shorter half-lives. Another study compared the analgesic effects of placebo, acetaminophen 500 mg, ibuprofen 400 mg, and etoricoxib 60 mg administered for

3 days.[28] All three analgesics were effective in controlling pain during the first two orthodontic treatment visits, with etoricoxib 60 mg/day being the most effective. Importantly, all three drugs at their lowest recommended doses did not influence the rate of tooth movement, addressing a longstanding concern regarding NSAID use in orthodontics Table 4.

Figure 4 illustrates the comparative efficacy of different analgesics at 2, 24, and 72 h post-activation, demonstrating the sustained superiority of etoricoxib and the time-dependent efficacy profiles of other agents.

Pharmacological interventions: Topical agents

Topical analgesics and anesthetics offer localized pain relief with potentially fewer systemic effects. Eslamian *et al*. conducted a randomized, double-blind, crossover trial comparing topical benzocaine (5%), ketoprofen (1.60 mg/mL), and placebo gel in 20 participants undergoing fixed orthodontic treatment. Ketoprofen gel significantly reduced pain compared with the control group, with the lowest pain scores observed in the ketoprofen group. Benzocaine showed an intermediate effect, limited to 6 h.[29]

Eslamian *et al*. conducted a study on 5% naproxen gel for orthodontic separator pain. They observed that the gel significantly reduced pain at all measured time points compared with placebo, with peak pain at 2 h and minimal pain at 7 days after placement.[19] Lidocaine/prilocaine topical anesthetic significantly reduced pain and discomfort during the insertion of orthodontic separators.[30] These results support the use of topical NSAIDs and local anesthetics as effective alternatives for systemic pain relief during separator placement or band cementation.

Non-pharmacological interventions: Photobiomodulation (PBM) and LLLT

LLLT and PBM are effective non-drug methods for managing orthodontic pain. Nicotra *et al*. observed that subjects receiving LLLT reported significantly less pain immediately, 6 h, 24 h, and 2–5days, with lower peak pain scores than control and placebo groups.[31]

Caccianiga *et al*. reviewed PBM to alleviate pain during FA treatment. Most studies have demonstrated differences in pain perception between irradiated and non-irradiated arches, whereas one study reported a 12.1% reduction in pain with PBM. A few studies found no significant reductions in pain, suggesting differences in protocols and parameters.[32]

Eslamipour *et al*. reported that ibuprofen significantly reduced pain in 6–24 h after archwire activation. LLLT reduced pain, but this effect was significant only at 2 h and between 3 and 7 days post-treatment. The effectiveness of LLLT was limited, and results differed across studies,

Table 4: Analgesic efficacy for orthodontic pain management[26]

Analgesic	Optimal dose	Peak efficacy window	Duration of effect	Effect on tooth movement
Ibuprofen	400 mg	6–24 h	6–8 h	No effect at recommended doses
Naproxen	500 mg	2–24 h	8–12 h	No effect at recommended doses
Acetaminophen	500–600 mg	2–24 h (increasing)	4–6 h	No effect
Etoricoxib	60 mg	6–96 h (sustained)	24+h	No effect at recommended doses
Aspirin	650 mg	6–24 h	4–6 h	Potential effect (limited data)

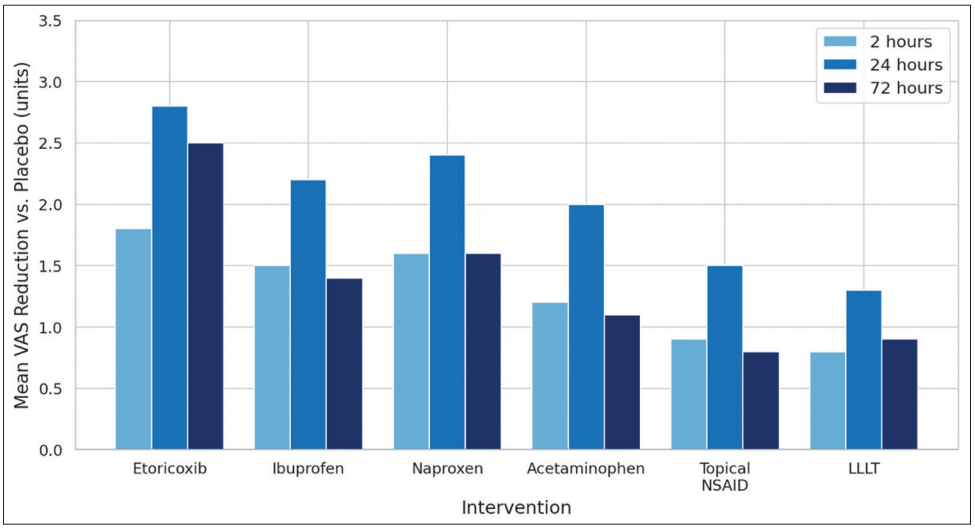

Figure 4: Illustrates the comparative efficacy of different analgesics at 2, 24, and 72 h post-activation

indicating heterogeneity.[33] Peševska *et al*. observed that laser therapy produced an immediate benefit, with 20% of patients experiencing complete pain relief by day 1 and all laser-treated patients relieved by day 4. Meanwhile, the control group receiving analgesics had severe pain on day 1, but only achieved complete relief by day 5.[34]

Non-pharmacological interventions: Behavioral and mechanical approaches

Various behavioral and mechanical strategies have been assessed for managing orthodontic pain. Shedam *et al*. compared chewing gum with no intervention. Results indicated that chewing gum significantly alleviated pain from FA appliances. The average pain scores at 24 h and after 7 days were considerably higher in the group that did not chew gum.[35]

Gomaa and Ellaithy compared orthodontic pain in patients who received 500 mg of acetaminophen and bite wafers. Their results indicated that pre-operative analgesia and bite wafers significantly reduced post-operative pain within 24 h of orthodontic treatment.[36]

Woodhouse *et al*. studied the effect of supplemental vibrational force from an AcceleDent device on orthodontic pain. They found no significant change in pain levels or analgesic use during initial alignment with FA. The maximum pain occurred at 24 h and returned to baseline by 7 days.[37]

Topolski *et al*. analyzed 19 drug options, 16 LLLT treatments, and 21 additional methods for managing orthodontic pain. Findings showed that non-pharmacological methods – such as chewing gum, bite wafers, topical benzocaine or ketoprofen, cognitive behavioral therapy, music therapy, muscle relaxation, and vibratory devices – may be effective. However, a clear protocol needs to be determined.[38] Table 5 shows the non-pharmacological and topical agents used in pain management strategies.

Timing of analgesic administration

The timing of analgesic administration greatly affects their effectiveness. Monk *et al*. found that pre-emptive ibuprofen provided better pain relief at 2 h than post-treatment ibuprofen, which showed no significant difference at 6 or 24 h.[25] Sandhu *et al*. demonstrated that combined pre- and post-operative dosing enhanced efficacy for drugs with shorter half-lives, with the timing of administration materially affecting analgesic effectiveness.[27]

Cheng *et al*. recommended administering ibuprofen (400 mg) and acetaminophen (600 mg) 1 h before and 6 h after treatment for optimal pain management.[26] Gomaa and Ellaithy discovered that pre-operative analgesia, with 500 mg of acetaminophen taken orally 30 min prior, effectively reduced post-operative pain, resulting in significantly lower pain levels compared to taking analgesics only when pain was present.[36] These findings support proactive pain management with analgesics before or immediately after appliance placement or activation, rather than waiting for pain to develop. Table 6 outlines the clinical pain management protocol recommendations.

DISCUSSION

Pain affects 72–95% of patients undergoing orthodontic treatment for FA, whereas fewer CA patients experience it. This, therefore, underscores the need for proactive pain management and very thorough patient counseling in orthodontic treatment. Patients experience less pain with CA compared to FA. This is probably because there is less soft-tissue injury, there are no sharp parts, and aligners are easily removed for eating and cleaning.

Table 5: Non-pharmacological pain management strategies

Intervention	Mechanism	Evidence level	Efficacy	Clinical recommendations
Low-level laser therapy	Anti-inflammatory, neural modulation	Moderate	Pain reduction at 2 h and 3–7 days; heterogeneous results	Consider adjunct; optimize protocols
Topical ketoprofen gel	Local NSAID effect	Moderate	Significant pain reduction versus placebo	Apply to affected areas after activation
Topical naproxen gel (5%)	Local NSAID effect	Moderate	Significant pain reduction for separator placement	Apply before/after separator placement
Topical lidocaine/ Prilocaine	Local anesthetic	Moderate	Reduces separator placement pain	Apply before separator placement
Chewing gum	Increased blood flow, distraction	Low–Moderate	Significant pain reduction at 24 h and 7 days	Recommend sugar-free gum after activation
Bite wafer	Functional stimulation	Low–Moderate	Comparable to pre-operative analgesia	Provide after appliance placement
Vibrational devices	Gate control theory	Low	No significant effect in RCT	Not recommended based on current evidence

NSAID: Non-steroidal anti-inflammatory drugs

Table 6: Clinical pain management protocol recommendations

Treatment phase	Recommended interventions	Timing	Rationale
Pre-treatment counseling	Realistic expectations, pain timeline, management options	Initial consultation	Reduces anxiety, improves preparedness
Appliance placement/ Activation	Ibuprofen 400 mg OR acetaminophen 600mg	1 h before procedure	Pre-emptive analgesia more effective
Immediate post-activation	Repeat analgesic dose	6 h after procedure	Maintains therapeutic levels during pain onset
First 24–48 h	Analgesics every 6–8 h as needed; soft diet; chewing gum	As needed during peak pain	Addresses peak pain period
Days 3–7	Analgesics as needed; gradual return to normal diet	As needed during declining pain	Supports resolution phase
Adjunctive measures	Low-level laser therapy (if available), topical analgesics for localized pain, bite wafer	Immediately after activation	Enhances multimodal analgesia
Follow-up assessment	Pain intensity, functional impacts, analgesic consumption	Next appointment	Identifies patients needing protocol adjustment

Orthodontic pain begins within hours, peaks at 24–48 h, and is gone by 7 days. This pattern has been observed in many studies with different appliances. This helps clinicians schedule interventions during times of peak pain.

Orthodontic pain impacts the quality of life in all its domains. Most pronounced effects are seen early in FA treatment, but noticeable changes were also observed during CA. Since these effects last only a week, it is easy for the patients to accept the treatment, as it has been explained to them that it is of a temporary nature.

Orthodontic pain can be controlled using NSAIDs and acetaminophen proactively. Etoricoxib gives longer relief. Ibuprofen, naproxen, and acetaminophen are effective only at certain times.

Non-pharmacological methods include LLLT/PBM and topical analgesics. They are considered alternative options due to the absence of standardized protocols and the low volume of high-quality research.

Clinical implications

Patients should be informed of the expected pain associated with orthodontic treatment during the initial consultations. Proactive pain management relates to the administration of analgesics before or immediately after placement of the appliance. Topical analgesics such as ketoprofen or naproxen gel will help in pain control for localized procedures. LLLT/PBM may be preferable for patients who would like non-drug options or have systemic analgesics unresponsive. Simple acts such as chewing gum or bite wafers bring benefits at low costs. Monitoring should be done on eating and oral hygiene, and for patients whose pain persists over 7 days, they should be re-evaluated for trauma, forces, or other causes.

Future research

- Develop and validate models that can identify high-risk individuals and recommend personalized interventions for pain management
- Conduct longitudinal research to assess the impact of different treatments on quality of life
- Undertake comparative effectiveness studies on different pain management strategies
- Develop clinical guidelines for LLLT and PBM, topical analgesic formulations, and behavioral interventions
- Integrate patient preferences, values, and priorities into pain management research.

Strengths and limitations

This review presents evidence from recent literature (2015 to 2025) in a narrative form, including RCTs, reviews, and prospective studies, and deals with pain, its management, and quality of life. The limitations of this review are that it uses a narrative approach without formal quality assessment or bias evaluation and without meta-analysis of data. The fact that only open-access English-language studies were examined without considering research published in other languages was not captured.

CONCLUSION

Pain and discomfort are frequent complaints during orthodontic treatment. Pain associated with orthodontic treatment usually peaks 24–48 h after appliance placement and then subsides within approximately a week. CAs cause about 50% less pain than FA. NSAIDs and acetaminophen are effective when taken before or immediately after placement. Non-drug methods such as LLLT/PBM, topical analgesics, and behavioral techniques are promising for

pain management in orthodontic patients but need further confirmation through additional research.

AUTHORS' CONTRIBUTIONS

The single author, AAB, is responsible for the entire conceptualization, data collection, formal analysis, and preparation of this manuscript.

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