

Table 3 Author	Population	Intervention	Control	Outcome	Results	Critical Appraisal
Polat et al. (2005) Turkey	60 orthodontic patients (23 girls & 37 boys)	Group B: 400 mg of ibuprofen 1 hr before archwire placement. Group C: patients received 550 mg of naproxen sodium 1 hr before archwire placement	Group A: 1 lactose tablet 1 hr before archwire placement.	Pain – 100 mm horizontal Visual Analogue Scale (VAS) (Assessed pain when chewing, biting, fitting back teeth, and fitting front teeth @ 2 hrs, 6 hrs, bedtime on day of appointment, 2 days, 3 days, & 7 days after bonding)	-Naproxen sodium group experienced significantly less pain at 2 hrs, 6 hrs, and except for ‘pain to biting’, 24 hrs when compared to the preoperative ibuprofen and placebo groups (p < .05)	Research Design Rating: I Recommendation Grade for Action: A Checklist Score: 14/16 Major Strengths: double-blind randomized control trial (RCT), VAS to assess pain, 1-week duration Major Weaknesses: did not report on other clinically important outcomes such as adverse effects or delayed rate of tooth movement, if any.
Bernhardt et al. (2001) USA	41 orthodontic patients (ages 9 - 16 years)	Group A: 400mg of ibuprofen taken 1 hr prior to separator placement & 400 mg ibuprofen taken 6 hrs after initial dose.	Group B: 400 mg ibuprofen taken 1 hr before separator placement & lactose capsule taken 6 hrs after initial dose. Group C: lactose capsule taken 1 hr before separator placement & 400 mg ibuprofen taken 6 hrs after initial dose.	Pain – 10 cm horizontal VAS (Assessed pain when chewing, biting, fitting back teeth, and fitting front teeth @ 2 hrs, 6 hrs, bedtime on day of appointment, 2 days, 3 days, & 7 days after separator placement)	-Pre-emptive ibuprofen alone or pre- and post-operative ibuprofen significantly decreased perceived pain 2 hrs after treatment better than post-operative ibuprofen alone (p < 0.05). - Pre-emptive ibuprofen significantly decreased pain perceived at bedtime vs. post-operative dose	Research Design Rating: I Recommendation Grade for Action: A Checklist Score: 12/16 Major Strengths: triple-blind RCT, VAS, 1-week duration Major Weaknesses: loss to follow up greater than 20%, lack of equal distribution of genders between groups, did not report on other clinically important outcomes such as adverse effects or delayed rate of tooth movement, if any.
Polat & Karaman (2005) Turkey	120 orthodontic patients (ages 14-16 years)	5 groups: ibuprofen; flurbiprofen; acetaminophen; naproxen sodium and aspirin One tablet taken 1 hr before appointment and another tablet 6 hrs after bonding.	Placebo group: one lactose capsule taken 1 hr before appointment and another lactose capsule taken 6 hrs after bonding.	Pain – 100 mm horizontal VAS (Assessed pain when chewing, biting, fitting back teeth, and fitting front teeth @ 2 hrs, 6 hrs, bedtime on day of appointment, 2 days, 3 days, & 7 days after bonding)	-Preoperative administration of all the analgesics significantly reduced pain at two hours (p < 0.05). - Significantly greater levels of pain upon chewing, biting were observed in the placebo groups compared to all analgesic groups at bedtime (p < 0.05).	Research Design Rating: I Recommendation Grade for Action: A Checklist Score: 15/16 Major Strengths: double-blind RCT, VAS, 1-week duration Major weaknesses: Other clinically important outcomes were not considered
Bird et al. (2007) USA	33 orthodontic patients (ages 9-19 years)	Group A: 400mg ibuprofen 1 hour before separator placement Group B – 650mg acetaminophen 1	No Placebo	Pain – 100 mm horizontal VAS (Assessed pain when teeth not touching, chewing, biting back teeth together @ immediately before,	- No difference in pain levels between acetaminophen and ibuprofen when given 1 hour before separator placement. - The most commonly used words to describe pain was	Research Design Rating: I Recommendation Grade for Action: B Checklist Score: 12.5/16 Major Strengths: double-blind

		hour before separator placement		immediately after, 2-3 hrs, bedtime, & the morning after separator placement) - Also McGill Pain Questionnaire (MPQ)	“annoying” and “sore”.	RCT, VAS, equal distribution of males and females Major weaknesses: no placebo, short duration of study, other clinically important outcomes were not considered.
Bradley et al. (2007) UK	159 orthodontic patient (ages 12-16 years; 57 boys & 102 girls)	Group A: 1g paracetamol 1 hr prior to separator placement and 6 hrs after	Group B: 400mg ibuprofen given 1 hr prior to separator placement and 6 hr after	Pain – 10 cm horizontal VAS (Assessed pain when biting, chewing @ 2 hrs, 6 hrs, bedtime on day of appointment, next morning, 2 days, 3 days, & 7 after separator placement)	- Ibuprofen significantly more effective than paracetamol from 2 hrs to bedtime on first day (p= 0.004) -From days 1-3, there was no statistically significant difference between pain scores with paracetamol and ibuprofen.	Research Design Rating: I Recommendation Grade for Action: B Checklist Score: 14/16 Major Strengths: double-blind RCT, VAS, 1-week duration Major weaknesses: no placebo group, 18 patients included in an intention-to-treat analysis, other clinically important outcomes were not considered
Ngan et al. (1994) USA	77 orthodontic patients (34 females & 43 males; mean age 16.6 ± 6.8 years)	Group A: 400 mg ibuprofen immediately after treatment Group B: 650mg aspirin immediately after treatment	Group C: beta lactose capsule immediately after treatment	Pain – 10 cm horizontal VAS (Assessed pain when chewing, biting, fitting back teeth, and fitting front teeth @ 0 hr, 2 hrs, 6 hrs, 24 hrs, 2 days, 3 days, & 7 days after separator or wire insertion)	-Ibuprofen produced significantly less pain than placebo & aspirin at 6 & 24 hrs and 2 & 7 days after separator placement (p < 0.001). -Ibuprofen and aspirin produced significantly less discomfort than placebo after archwire placement. -Ibuprofen produced significantly less discomfort than aspirin at 2, 6 hrs and 2, 3, 7 days after archwire placement	Research Design Rating: I Recommendation Grade for Action: A Checklist Score: 15/16 Major Strengths: double-blind RCT, VAS, 1-week duration Major weaknesses: other clinically important outcomes were not considered
Steen Law et al. (2000) USA	63 orthodontic patients (38 females & 25 males; mean age 13.3 ± 1.7 years)	Group 1: 400mg ibuprofen 1hr prior to separator placement and placebo immediately after appointment Group 2: placebo 1hr prior to separator placement and 400mg ibuprofen immediately after appointment	Group 3: placebo 1hr prior to separator placement and another placebo immediately after appointment	Pain – 10 cm horizontal VAS (Assessed pain when chewing, biting, fitting back teeth, and fitting front teeth @ 2 hrs, 6 hrs, 24 hrs, 2 days, 3 days, & 7 days after separator placement)	- Preoperative ibuprofen group experienced significantly less pain compared to postoperative ibuprofen group and placebo group with respect to pain when chewing at 2 hrs after separator placement (p < 0.05). - No significant difference in pain levels between groups at any other times	Research Design Rating: I Recommendation Grade for Action: A Checklist score: 14/16 Major Strengths: double-blind RCT, VAS, 1-week duration Major weaknesses: loss to follow up >20%, other clinically important outcomes were not considered

Alternative Therapy						
Youssef et al. (2008) UK	15 patients (age 14-23 years)	Lased group: right side of the upper and lower jaw received irradiation with low level diode laser for 40 seconds total at 0-, 3-, 7-, & 14-day intervals after every activation.	Control: Left side of upper and lower jaw received no irradiation	Pain – questionnaire with visual pain scale & rank, assessed at every reactivation appointment. Tooth movement – canine retraction measured (mm) using a digital caliper on model casts at each reactivation interval. Velocity then determined by distance over time. Tissue damage - radiographs	- Velocity of tooth movement was greater in lased groups than in the control group ($p < 0.05$) - The degree of pain is greater in the control side during the different treatment stages than in lased side. - No evidence of damage to dental and periodontal tissues by LLLT	Research Design Rating: II-1 Recommendation Grade for Action: I Checklist score: 12/16 Major strengths: analyzed pain, tooth movement, and tissue damage; sufficient duration Major weaknesses: single-blind, no placebo, questionnaire used instead of VAS
Turhani, et al. (2006) Austria	76 orthodontic patients (46 females & 30 males; mean age of 23.1)	Group 1: received single course of low level laser therapy (LLLT) for 30 sec per bonded & banded tooth	Group 2: received placebo laser therapy 30 sec per bonded & banded tooth	Pain - standardized questionnaire (Assessed the prevalence, quality, intensity, localization & time course of pain @ 6 hrs, 30 hrs, and 54 hrs after treatment)	- Significantly fewer patients reported pain in group 1 than in group 2 at 6 hrs and 30 hrs ($p < 0.05$)	Research Design Rating: I Recommendation Grade for Action: B Checklist score: 13/16 Major strengths: RCT Major weaknesses: single-blind, questionnaire used instead of VAS, short duration of observation, other clinically important outcomes were not considered