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What's new for the clinician – summaries of recently published papers (March 2025)

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1. EFFECTS OF ORTHODONTIC WAX VERSUS ORA-AID ON PAIN AND DISCOMFORT AT THE BEGINNING OF ORTHODONTIC TREATMENT

Pain and discomfort are some of the common complications in orthodontic treatment. They are caused by irritation of the oral mucosa resulting from trauma and increased friction between tissues and brackets, wires and tubes. It has been recognised that there is a need for barrier materials to protect wounds from being irritated by these stimuli, to prevent secondary infection and to reduce the patient's discomfort. Many types of barrier materials used to prevent irritation caused by fixed orthodontic treatment are commercially available. The most commonly used conventional orthodontic wound barrier material is orthodontic wax made from thermoplastic resin silicone. This product is a water-insoluble solid material that has no odour and taste. A more recently developed material is the adhesive periodontal wound dressing Ora-Aid. This product is a self-adhesive oral dressing material to protect mouth sores. It acts as a buffer between orthodontic appliances and wound, protecting the wound from secondary infections. It supports wound healing by isolating the wound. It is a disposable material and it can stay in the mouth for a long time due to its adhesive feature. Bozkurt & Buyukbasaran (2024)[1] reported on a study that sought to examine the effects of orthodontic wax and Ora-Aid material on wound healing, duration in the mouth and pain relief and to evaluate the effect on the patient's quality of life.

Materials and methods

A total of 250 patients, 125 males and 125 females, aged 11-14 years old, attending the Department of Orthodontics at a Turkish university comprised the population under consideration.

After placing the orthodontic brackets in each patient, orthodontic wax or Ora-Aid was randomly given to all patients. Paired randomisation using the toss of a coin was used to allocate patients to study groups. Patients who did not develop wounds and did not use these materials were considered the control group. No orthodontic wires were inserted so that pain assessment was not affected by orthodontic tooth movement pain. Since the most crucial period where pain, irritation or wounds can develop is usually the first week, the evaluation period was determined as the first week of treatment. The patients were asked to put the materials on the bracket when there was a wound. The patients were asked to fill out a questionnaire five times in total (T0 – when the wound occurs, T1 – after 24hr, T2 – after 48hr, T3 – after 96hr, T4 – after 168hr). This form included questions for the Visual Analogue Scale (VAS), mouth retention, wound assessment and examination of the effect on quality of life. To quantify the discomfort/pain, patients were instructed to use VAS. Based on their perception, participants were required to note their self-perception of the pain intensity on a scale of 0 to 100, with 0 indicating no pain or discomfort and 100 indicating unbearable pain. Following the placement of the brackets, participants who developed wounds and used these materials were considered the trial group. OHIP-14T and OHRQoL questionnaires were done to search about functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability and handicap to determine the impact on quality of life.

Results

This study included 250 patients; 240 returned their questionnaires and data for analysis. Ten patients were excluded as they did not meet the inclusion criteria. At the end of one week, 65 patients did not have mucosal ulcerations or soreness. Patients with no wound were determined as the control group: G1 (n:65). The remaining patients were divided into two groups by paying attention to the number of female and male. A total of 86 patients used the orthodontic wax determined as G2 (n:86). A total of 89 patients used Ora-Aid material determined as G3 (n:89). The mean ages of the groups were statistically similar. The three groups in this study did not differ by age or gender composition. There was a significant difference between G2 (orthodontic wax) and G3 (Ora-Aid) in the staying duration of the material in the mouth where Ora-Aid was found to be retained for a significantly longer period of time than orthodontic wax ($p < 0.05$). There were no significant differences in the level of pain reported between males and females. For all post-baseline time points, the Ora-Aid group had a lower VAS for pain when compared with the orthodontic wax group ($p < 0.01$). In terms of the oral health impact on quality of life, for the overall scores functional limitation, physical pain and physical disability scores were significantly worse at T1 than at T0. No significant differences were found between T0 and T1 for the psychological discomfort, psychological disability, social disability and handicap four subscales of the OHIP- 14T. A significant difference was observed from baseline to 1 week in the overall scores for the quality of life data, the functional limitation scale, the physical pain scale, the psychological discomfort scale and the physical disability scale. ($p < 0.01$).

Conclusion

This trial found that Ora-Aid significantly reduced mucosal discomfort associated with orthodontic appliances and improved quality of life compared to orthodontic wax. Additionally, Ora-Aid remained in the mouth significantly longer than standard wax.

Implications for practice

Ora-Aid has been shown to be a suitable alternative to traditional orthodontic wax material for dealing with oral mucosal injuries during orthodontic treatment.

REFERENCE

1. Bozkurt P, Buyukbasaran A. Effects oforthodontic wax and Ora-Aid on pain and discomfort at the beginning of orthodontic treatment. *Clin Oral Invest 28*, 636 (2024). https://0-doi-org.innopac.wits.ac.za/10.1007/s00784-024-06020-7

2. EFFECT OF PHOTOBIOMODULATION ON DENTIN HYPERSENSITIVITY: A RANDOMISED CONTROLLED DOUBLE-BLIND CLINICAL TRIAL

The management of chronic periodontitis often requires nonsurgical or surgical interventions to restore periodontal health.[1] However, these treatments may result in undesirable outcomes, such as gingival recession and dentinal tubular exposure, causing dentin hypersensitivity (DH). Despite frequent complaints of pain from exposed root surfaces after periodontal therapy, clinical research on effective treatments remains limited.1 DH is transient pain triggered by external stimuli – thermal, evaporative, osmotic or tactile – without underlying dental pathology. This condition disrupts daily activities such as eating, drinking, speaking and brushing and, in severe cases, may lead to psychological and emotional distress.1The hydrodynamic theory, proposed by Brännström,1 is the most widely accepted explanation for DH pain. It suggests external stimuli disturb fluid movement within dentinal tubules, triggering pulp nerve fibres. DH occurs when exposed dentin with open dentinal tubules communicates with the pulp, often as a result of contributing factors such as gingival recession caused by improper oral hygiene or periodontal disease.

Treatment options for DH include at-home methods, such as fluoride or oxalate toothpaste, and in-office interventions, such as varnishes, resin-based materials and laser therapy. Laser therapy addresses DH using either high-power or low-power approaches. High-power lasers (eg Er: YAG, Nd: YAG and Er, Cr: YSGG) reduce or seal dentinal tubules by generating superficial heat, creating a melting effect on the cementum surface. Low-power lasers, particularly photobiomodulation (PBM), promote cellular metabolic activity in odontoblasts, stimulating tertiary dentin production and sealing exposed tubules.

A standardised protocol for laser therapy in DH is yet to be established due to significant methodological variations.1 Given the variability in laser parameters and the lack of research on post-periodontal treatment DH, Olazabal G, Moya MV, Cirisola LEP *et al* undertook a randomised clinical trial that sought to investigate if photobiomodulation (PBM) can reduce DH.

Materials and methods

This randomised, controlled, double-blind superiority clinical trial adhered to the SPIRIT Statement for protocol design and the CONSORT Statement for reporting. The study comprised patients aged 18 or older, diagnosed with periodontitis, and experiencing dentin hypersensitivity in areas with gingival recession greater than 30 on the VAS scale caused by a UNC-15 periodontal probe after scaling and root planning. Both male and female patients were included, provided they were without comorbidities.

Patients taking medications that affect gingival metabolism (eg cyclosporine, phenytoin, nifedipine), inflammation (eg corticosteroids, anti-inflammatories) or pain (analgesics/ NSAIDs), as well as those with a history of photosensitivity or allergies to any medications used in the study, were excluded. Patients who experienced any complications during the study, such as allergic reactions to materials used or to paracetamol, or who took any medication not provided in the study, were also excluded. Participants received assistance from researchers for any issues arising during the study.

Participants requiring periodontal treatment (scaling and root planning) and presenting with periodontitis stages 1, 2, 3 or 4, grades a, b or c were recruited. After one week, participants returned for a post-scaling dentin sensitivity assessment. All patients received initial therapy, providing preventive and health promotion tools to ensure cooperation in the planned treatment and achieve optimal results.

The periodontal treatment involved hand instruments, specifically Hu-Friedy Gracey curettes (5/6, 7/8, 11/12 and 13/14). These high-strength stainless steel instruments are designed with specific angulations to provide efficient access to root surfaces in different areas of the dentition. The procedure consisted of manual scaling and root planing, employing controlled and precise movements to remove both supragingival and subgingival calculus. Additionally, the root surfaces were carefully smoothed to minimise bacterial recolonisation.

It is important to note that ultrasonic scaling and prophylaxis were not performed in this study to standardise the treatment approach and focus exclusively on manual instrumentation. Undergraduate students performed treatments under the supervision of the principal investigator. After one week, participants returned for a post-scaling dentin sensitivity assessment.

Before any intervention, the researcher responsible for PBM opened an envelope and performed the indicated procedure according to the assigned group. The 112 participants were allocated to either the Control or Experimental Group as follows:

- Experimental Group – Conventional SRP treatment + PBM (n = 56): Participants received identical periodontal treatment followed by PBM. The laser therapy was performed using the portable therapy laser device which emits an infrared wavelength (808nm) with a power output of 100mW. Six points were treated for each tooth: three on the buccal side (apical, middle and cervical) and three on the palatal/lingual side.
- Control Group – Conventional SRP treatment + PBM simulation (n = 56): Participants received identical periodontal treatment. The PBM simulation was performed identically to the Experimental Group, with devices positioned in the same locations but turned off. Activation sounds were recorded and played during the procedure to prevent group identification.

The primary outcome was pain and this was assessed using the Visual Analog Scale (VAS), a 100mm ruler with “0” indicating “no pain” and “100” indicating “unbearable pain.” Patients marked their pain level, which was measured in millimetres and recorded. The same operator consistently

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provided instructions. Outcome assessments occurred seven days and one month post-application.

Secondary outcomes included:

- Rescue medication – Paracetamol was provided, and usage was recorded as a pain measurement parameter. Participants brought their medication blister packs to appointments to monitor adherence. Outcome assessments occurred seven days and one month post-application.
- Oral health impact – The oral health impact was assessed using the OHIP-14 questionnaire that measured the impact of oral health on quality of life. Responses were scored from 0 (never) to 4 (always), with scores ranging from 0 to 56, with higher scores indicating greater impact. Outcome assessments occurred seven days and one month post-application.

The study was conducted by a research team including:

- Periodontist – supervised all procedures and was unaware of the PBM group allocation.
- Examiner – remained blinded to the interventions.
- Researcher – applied (or simulated) PBM, knowing all interventions and revealing group identification only after statistical analysis.
- Statistician – blinded to the treatment groups, receiving data labelled as G1 and G2.
- Patient – blinded to interventions, with simulation including protective occlusive glasses in the control group.

Results

A total of 206 participants were assessed for eligibility; 94 were excluded due to not meeting inclusion criteria (no pain/mild pain) or declining to participate. The remaining 112 participants were randomised equally into the control group ($n=56$) and the intervention group ($n=56$). All participants completed the allocated interventions without loss to follow-up. In the analysis phase, two participants from the control group were excluded for taking ibuprofen instead of the prescribed medication (paracetamol).

The groups were similar in sex distribution ($p=0.341$) and age ($p=0.760$) at baseline.

Regarding the primary outcome, the groups were homogeneous regarding pain in baseline ($p=0.178$). At both seven and 30 days, pain levels were higher in the control group compared to the PBM group ($p=0.001$ and <0.001, respectively), indicating that the control group experienced more pain than the PBM group. In the final analysis, 56 patients in the PBM group completed the study, with 16 reporting no sensitivity after treatment, resulting in a success rate of 28.57%. In the placebo control group, 54 patients were analysed, and eight reported no sensitivity (14.81%). In the control group, there was no significant pain reduction at seven days after the simulated PBM treatment ($p=0.066$). In contrast, after PBM treatment the PBM group showed a significant reduction in pain at seven days ($p=0.001$). By 30 days, both groups showed significant pain improvement ($p<0.001$). A total of 56 patients were included in the PBM group, 40 of whom experienced sensitivity after treatment, corresponding to a failure rate of 71.42%. The control group consisted of 54 patients, 46 of whom reported sensitivity by the end of the study (85.18%).

There were no differences between the groups regarding medication use at baseline, seven and 30 days ($p=0.679$, 0.359 and 0.618, respectively).

Repeated measures analysis showed no interaction between group and time ($p=0.146$), indicating that both groups exhibited similar trends over time. There was a significant effect of time ($p<0.001$), and the PBM group had lower OHIP scores compared to the control group at all time points ($p=0.008$). For all groups, the mean score at time 0 was higher than at seven and 30 days ($p<0.001$ and <0.001, respectively), and the mean score at seven days was higher than at 30 days ($p<0.001$).

Conclusion

The researchers reported that photobiomodulation(PBM) significantly reduced pain at seven and 30 days following scaling and root planing. Additionally, it was associated with improvements in the oral health-related quality of life in patients with dentin hypersensitivity.

Implications for practice

This trial demonstrated the efficacy of PBM for reducing DH after scaling and root planing.

REFERENCE

1. Olazabal G, Moya MV, Cirisola LEP, *et al*. Effect of photobiomodulation on dentin hypersensitivity: a randomized controlled double-blind clinical trial. *Clin Oral Invest* **29**, 84 (2025). https://0-doi-org.innopac.wits.ac.za/10.1007/s00784-025-06149-z

CPD questionnaire on page 118

The Continuing Professional Development (CPD) section provides for twenty general questions and five ethics questions. The section provides members with a valuable source of CPD points whilst also achieving the objective of CPD, to assure continuing education. The importance of continuing professional development should not be underestimated, it is a career-long obligation for practicing professionals.