ORIGINAL RESEARCH PAPER
Volume-9 | Issue-4 | April-2020 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

PAIN MANAGEMENT IN ORTHODONTICS

Dental Science

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ABSTRACT

Pain is among the most frequently mentioned negative effects of orthodontic treatment and one of the most common concerns for patients. It is necessary for the orthodontist to identify and manage the pain experienced by their patients. This article provides an overview of current management strategies employed for alleviating orthodontic pain.

KEYWORDS

Pain, orthodontic treatment,management

INTRODUCTION

Pain, which is a subjective feeling that shows large individual variations, is one of the major reasons for the withdrawal from the treatment among orthodontic patients.[1]A study which was done in India revealed that 8 per cent of a study population discontinued the orthodontic treatment because of pain.[2]

Almost all orthodontic procedures such as separator placement, archwire placement and activations, application of orthopaedic forces and debonding produce pain in patients.[2]As therapists, it is our responsibility to manage the unpleasant sensations that appliances cause as effectively as possible, always bearing in mind the subjective, complex, and multi-dimensional nature of pain.

MANAGEMENT OF ORTHODONTIC PAIN:

PHARMACOLOGICAL APPROACH:

Analgesics:

Nonsteroidal anti-inflammatory drugs (NSAIDs) have been used for the relief of orthodontic pain for decades. Various types of NASIDs are available for orthodontic patients, for example, acetaminophen, ibuprofen and celecoxib. Their individual superiority in pain control and efficacy in avoiding impeding tooth movement vary among different studies.[3-6]Paracetamol, explicitly indicated by most authors as the safest NSAID, seems to be the drug of choice in view of no influence on the range of tooth movement, the risk of root resorption or other adverse effects within oral cavity. According to Shetty et al. acetaminophen showed no significant effect on prostaglandin synthesis and may be a safe choice compared to ibuprofen for relieving pain associated with orthodontic tooth movement[4]

Prostaglandin is a pro-inflammatory mediator that causes painful sensations by binding to sensory endings and promotes tooth movement by stimulating bone remodelling.[3,7] The synthesis of prostaglandin is mediated by COX enzymes and NSAIDs inhibit the activity of COX enzymes.Therefore, NSAIDs could relieve orthodontic pain by inhibiting the release of prostaglandin. Decreased levels of prostaglandin following NSAID intake could inhibit osteoclasts and reduce the rate of tooth movement. Moreover, a second mechanism by which NSAIDs impede orthodontic tooth movement has been proposed in which NSAIDs interfere with collagenase activity and procollagen synthesis, which results in impeded periodontal remodelling.[8]

Anaesthetic Gels:

Anaesthetic gels are safer alternatives to analgesics in reducing the pain which results from orthodontic procedures. Keim[9] described an anaesthetic gel “oraqix” containing a combination of lidocaine and prilocaine in 1:1 ratio by weight. Such gels can be used when performing routine orthodontic procedures such as band placement and cementation, archwire ligation, and band/bracket removal to relieve the patient's discomfort. The advantage of this system is its delivery method, which simply introduces the gel into the gingival crevice and makes it entirely painless.

Medicated wax:

Kluemper et al. conducted a comparative study on subjects using wax to relieve the discomfort caused by fixed orthodontic appliances with those using wax containing slow releasing benzocaine. The patients using medicated wax reported of less pain as compared to the other group showing the analgesic properties of benzocaine containing wax.[10]

MECHANICAL APPROACH:

Mechanical approaches have been proposed to relieve orthodontic pain, including vibration, chewing gums, biting wafers and acupuncture. The proposed mechanism for vibration, chewing gum and biting wafers lies in the fact that mechanical stimuli activate mechanoreceptors that transmit tactile signals while suppressing the transmission of painful signals.[8]

Vibratory stimulation:

Vibration is applied to patients' teeth through a vibrating device that is placed in their mouths. The use of vibratory stimulation to reduce orthodontic pain was first reported by Marie et al., but on detailed analysis, it was found that most of the patients were not able to tolerate the vibrations, once the discomfort sets in. Thus, if used, it is recommended that it should be used prior to the onset of pain.[11]

Chewing gums and biting wafers:

Chewing gum or a plastic wafer during first few hours of appliance activation in order to reduce pain has been suggested (Proffit, 2000).[12] This will temporarily displace the teeth sufficiently to allow blood to flow through compressed areas preventing a build up of metabolic products. White (1984)[13]found that approximately 63 percent of patients reported less discomfort after chewing Aspergum— a weak analgesic chewing gum with aspirin, after orthodontic mechanotherapy. Hwang et al. (1994)[14] evaluated the effect of therabite wafers in reducing pain. They observed relief of pain in the majority of patients (56 percent) but the rest of the subjects reported increased discomfort after chewing wafers.

Acupuncture:

Acupuncture is performed through inserting systemic needles at Hegu (LI4), which is located at the dorsum of the hand between the first and second metacarpal bones. Although acupuncture has been revealed to be effective for orthodontic pain relief, the mechanisms by which acupuncture relieves orthodontic pain remain largely unknown.[8]

LOW LEVEL LASER THERPY:

Low-level laser therapy has been extensively applied for pain relief in both medical and dental practice.[15,16] Its applications has also been extended for the relief of orthodontic pain.[17] Low-level laser therapy is accomplished through applying laser irradiation to the whole dental arch. A large body of evidence has confirmed the effectiveness of low level laser therapy in alleviating orthodontic pain.[18-20] However, its effectiveness has been refuted in several other studies.[21,22]Moreover,

several systematic reviews and meta-analyses have produced controversial results.[23,24] These inconsistencies may be attributed to different irradiation durations and dosages. Thus, irradiation protocols need clarification, and their effectiveness necessitates further verification.

BEHAVIOURAL APPROACH:

Behavioural approaches that are applied to relieve orthodontic pain include CBT(cognitive behavioural therapy),[25] physical activity[26] and music therapy.[27] These behavioural modalities share a common feature: reassurance and attention distraction. CBT, a form of psychotherapy, uses several treatment sessions to correct patients' negative altitudes and decrease their anxiety. Elevated anxiety increases patients' pain sensations through limbicsystem-mediated neural pathways. CBT, through reducing patients' anxiety, has been revealed to be effective in relieving orthodontic pain in clinical practice.[25,28] Furthermore, music therapy and physical activity, through distracting patients' attention via the insular cortex mediated neural pathways, have been revealed to alleviate orthodontic pain in clinical practice.[26,27]

TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION:

Roth and Thrash (1986)[29] evaluated the effect of TENS in reducing periodontal pain after separator placement. Although it was effective in reducing pain within 6 seconds of electrode placement, and the technique was used by others, no additional reports have been published.

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