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RESEARCH ARTICLE

VIBRATION ORTHODONTICS: A SIMPLE METHOD TO PAINLESS ORTHODONTIC TREATMENT

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Abstract

Pain is an all too common experience of patients undergoing any form of dental treatment, to the extent that 77% of a patient population reported some degree of pain from a visit to the dentist. In orthodontics, a mechanical stimulus is introduced by placing fixed appliances on the teeth resulting in tooth movement. To achieve this movement, forces are applied to the dentoalveolar complex resulting in inflammation or ischemia to the periodontal ligament (PDL) with subsequent release of histamine, bradykinin, prostaglandins, substance P, and serotonin. These mediators stimulate local nerve endings and send pain signals to the brain. Many methods have been used to alleviate pain arising from orthodontic origins. Nonsteroidal anti-inflammatory drugs (NSAIDS) are the most common method employed for pain relief. Other methods include low-level laser therapy, acupuncture,transcutaneous electrical nerve stimulation, vibratory stimulation of the PDL,viscoelastic bite wafers, and even chewing gum. This paper highlights use of vibratory stimulation for reduction in perception of pain.

Introduction:-

Pain, which includes varied sensations evoked by, and reactions to, noxious stimuli, is a complex experience and often accompanies orthodontic appointments[3]. Many patients have avoided orthodontic treatment because of the fear of pain. It is one of the most important reasons why patients are discouraged from seeking orthodontic treatment. Until now, the nonsteroidal anti‑inflammatory drugs (NSAIDs) are one of the most commonly used modality in orthodontic pain reduction; however, the side effects of NSAIDs have been always an issues of concern particularly in young patients[1]. Consequently as an alternative, many nondrug methods of pain control have evolved. Various methods which have been suggested for pain control in orthodontic patients includes NSAIDs, low level laser therapy, transcutaneous electrical nerve stimulation, magneticfield, chewing–gum, plastic wafer, and vibratory stimulation.[4]

Appliance Design:

1. High frequency vibration received from device that is a Colgate pro C (150) battery sonic toothbrush. Colgate pro C (150) battery sonic toothbrush functions at 20,000 strokes /min that converts to 150 Hz of vibrational frequency.(Figure 3)
2. An acrylic mouthpiece was modified and retrofitted to the metal shank within the brush head portion of the toothbrush handle. (Figure 1)

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3. A small hole was created by tunneling various sized high-speed burs into the mouthpiece where the metal shank of the toothbrush slid into the rubber and fit tightly. (Figure 4)
4. When activated, the metal shank transmits vibration into the mouthpiece which isthen applied to the teeth as the patient bites gently against it.

Appliance Images:

Figure 1

Figure 2

Figure 3

Figure 4

Discussion:-

Short durations of extremely small magnitude, high-frequency mechanical stimuli can promote anabolic activity in the adult skeleton[1].Certain exercises can induce osteogenesis and improve bone strength. Experimental protocols that insert "rest" periods to reduce the effects of desensitization can double anabolic responses to mechanical loading.[2]Recovery periods restore mechanosensitivity to dynamically loaded bone .Here, it is determined

thatwhether such signals can influence trabecular and cortical formative and resorptive activity in the growing skeleton; is the newly formed bone of high quality and would the insertion of rest periods during the loading phase enhance the efficacy of the mechanical regimen[4]. Site specifically attenuate the declining levels of bone formation and maintain a high level of matrix quality. If WBV prove to be efficacious in the growing human skeleton, they may be able to provide the basis for a non-pharmacological and safe means to increase peak bone mass and ultimately reduce the incidence of osteoporosis or stress fractures later in life. Most patients reported not being able to tolerate the vibratory stimulation after discomfort was present. This confirms the earlier observationsthat the vibratory effect must be induced prior to the onset of pain. If used in this manner, the device may be a useful tool in preventing the dental pain commonly associated with orthodontic treatment.

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