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Inflammation and Orthodontic Tooth Movement

Understanding the Impact on Plaque Control and Compliance

Tissue inflammation is a familiar companion to orthodontic tooth movement and typically arises from adjustments to orthodontic appliances that stretch and distort tissue in the periodontium. The mechanical force of the adjustments triggers a pain reaction sometimes severe enough to compromise a patient's oral hygiene practices designed to effectively remove plaque. The effect of inflammation-related pain can, in fact, drive some patients to end orthodontic treatment entirely.¹

Inflammation and Tooth Movement

Though inflammation in the periodontium and dental pulp will likely be a cause of discomfort to a patient throughout orthodontic tooth movement, the occurrence of an inflammatory process is a necessary pre-condition for the remodeling functions that take place in the periodontal ligament and alveolar bone.

In the wake of the inflammatory reaction that follows the application of orthodontic force a patient's sensitivity to pain is heightened. An abnormally high sensitivity to pain is generally triggered in patients by the release of chemical mediators in the blood flow but can also occur as a response made by peripheral nerve fibers.

The effect of inflammation-based pain can impair a patient's ability to bite and chew. It can also influence the degree of compliance a patient observes in practicing his or her oral hygiene and conducting activities of daily living.

Control Inflammation, Control Pain

A variety of anti-inflammatory drugs are available to address inflammation-related pain for orthodontic patients. Studies have investigated numerous drugs including aspirin, acetaminophen,

misoprotol and others. One study determined ibuprofen the most effective analgesic for managing orthodontic pain. A common thread among the study of these drugs is an agreement they all reduce the inflammatory response caused by orthodontic force.

Non-steroidal anti-inflammatory drugs (NSAIDs) are supported for pain control yet concern remains over how NSAIDs interfere with inflammation associated with tooth movement process. Research has shown low doses for 1 day to 2 days in initial stages of tooth movement is acceptable.²

Dental lasers have also been reported effective in reducing inflammation caused by orthodontic tooth movement. Low energy laser devices such as CO2 lasers provide highly localized irradiation that may inhibit inflammation without side effects. Study results published in 2010 conclude laser therapy is beneficial to orthodontic movement and call for deeper research into the mechanisms of low-power lasers.³

When Inflammation is a Barrier to Oral Hygiene

Orthodontic patients who neglect adequate oral hygiene as a result of inflammation-based pain heighten their risk of decalcification and caries. Bacteria such as *Actinobacillus actinomycetemcomitans*⁴ and *S. mutans*⁵ appear in higher levels when orthodontic appliances are present. While inflammation symptoms may keep patients from practicing good oral hygiene bacterial plaque can lie undisturbed for extended periods on enamel surfaces, and over time cause white spot lesions—the early stage of carious lesions.

The best option for orthodontic patients to remove plaque is the daily practice of brushing. An orthodontic toothbrush with soft bristles can promote more effective cleaning around problem areas associated with brackets, arch wires, buttons and ligatures.

Risk of inflammation in the periodontium can also be reduced with the use of interdental cleaners and flossers designed to work with orthodontic appliances.

Fluoride treatment is also recommended for all orthodontic cases, with regularly applied fluoride varnish shown to work effectively at reducing decay rates.

If regular flossing becomes difficult for orthodontic patients an interdental brush may be used to provide cleaning characteristics comparable to traditional floss.

Successfully completed orthodontic treatment improves plaque and biofilm control over time by correcting crowded teeth and allowing for better oral care access.

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