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Endodontics

Apical Periodontitis Progression is Impaired by Celecoxib and Indomethacin Treatment

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Background: The aim of this study was to evaluate in vivo the efficacy of selective and non-selective inhibitors of cyclooxygenase-2 enzymes in the treatment of experimental apical periodontitis induced by bacterial lipopolysaccharide (LPS).

Methods: Thirty-six C57BL / 6 mice were used in which a solution containing E. coli LPS (1.0µg / µl) was inoculated into the root canals of the first molars. After 30 days apical periodontitis was established.The animals were treated with Celecoxib - a selective COX-2 inhibitor (15 mg / kg) or Indomethacin - a non-selective COX-2 inhibitor (5 mg / kg) for 7 and 14 days. Evaluation of gene expression was performed using qRT-PCR, bone resorption using histological sections stained with hematoxylin and eosin.Osteoclastogenesis was evaluated using tartrate resistant acid phophatase histo-enzymology. Data were analyzed using the two-way ANOVA test followed by the Tukey-test ($\alpha = 0.05$).

Results: Administration of Celecoxib and Indomethacin prevented osteoclastogenesis signaling, osteoclast formation and periapical bone resorption, yet the effect of Celecoxib was sustained and more robust (p 0.05). Administration of selective and non-selective inhibitors of cyclooxygenase-2 enzyme differentially modulated expression of genes involved in bone metabolism. Celecoxib inhibited expression of mRNA for MMP-9 and calcitonin receptor and cathepsin K (p 0.05) while Indomethacin exerted no effect on MMP-9 and calcitonin receptor (p 0.05) or augmented cathepsin gene expression (p 0.05).

Conclusions: We found that selective COX-2 inhibitor Celecoxib reduced osteoclastogenic signaling and activity that dampened bone resorption in LPS-induced apical periodontitis with higher efficacy than the non-selective inhibitor Indomethacin.