Effect of aqueous ozone on the NF-kappaB system.

Abstract:
Ozone has been proposed as an alternative oral antiseptic in dentistry, due to its antimicrobial power reported for gaseous and aqueous forms, the latter showing a high biocompatibility with mammalian cells. New therapeutic strategies for the treatment of periodontal disease and apical periodontitis should consider not only antibacterial effects, but also their influence on the host immune response. Therefore, our aim was to investigate the effect of aqueous ozone on the NF-kappaB system, a paradigm for inflammation-associated signaling/transcription. We showed that NF-kappaB activity in oral cells stimulated with TNF, and in periodontal ligament tissue from root surfaces of periodontally damaged teeth, was inhibited following incubation with ozonized medium. Under this treatment, IkappaBalpha proteolysis, cytokine expression, and kappaB-dependent transcription were prevented. Specific ozonized amino acids were shown to represent major inhibitory components of ozonized medium. In summary, our study establishes a condition under which aqueous ozone exerts inhibitory effects on the NF-kappaB system, suggesting that it has an anti-inflammatory capacity.