

Enhancing Root Canal Therapy with MTA and Tetracycline-Loaded Nanochitosan: An Approach for Infected Root Canal Treatment in Dogs (in-vivo Animal Study)

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Abstract : Background: A recent study has explored the potential of an approach to treating infected root canals using a combination of Mineral Trioxide Aggregate (MTA) and Tetracycline-loaded Nanochitosan. Material and methods: Forty dogs were included in the study, with infected periapical areas induced by leaving access openings in their teeth for four months. Bacteriological samples from the infected root canals were collected and managed anaerobically to identify and count the different microorganisms present. The most common microorganisms detected were *Prevotella oris*, *Fusobacterium nucleatum*, *Streptococcus viridans*, *Enterococcus faecalis*, *Clostridium subterminale*, *Porphyromonas gingivalis*, and *Peptostreptococcus anaerobius*. The dogs were divided into four groups based on the sealant used to treat the infected periapical areas: Group I: Negative control (no treatment) Group II: Positive control (MTA only) Group III: MTA + tetracycline Group IV: MTA + tetracycline loaded on nanochitosan Results: Periapical areas in Group IV showed significantly more bone healing than those in Groups I, II, and III. The newly formed bone was evaluated radiographically, histologically, and immunohistochemically using Osteopontin (OSP) antibodies. Data collected was statistically analysed using SPSS software at a 0.05 significance level. Conclusion: The study concluded that the combined use of Tetracycline-loaded Nanochitosan and MTA presents a promising approach for the treatment of infected root canals. The potent antimicrobial activity of Tetracycline-loaded Nanochitosan, along with the biocompatibility and desirable properties of MTA, may synergistically contribute to improved clinical outcomes in endodontic therapy. This study has important implications for the clinical management of infected root canals. The combination of Tetracycline-loaded Nanochitosan and MTA could provide a more effective and efficient means of treating these challenging cases. Further research is needed to confirm these findings in humans and to optimize the treatment protocol.

Keywords : mineral trioxide aggregate, tetracycline-loaded nanochitosan, periapical infection, osteopontine

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