

Title: Nanoparticles in Preventing Biofilm Formation on Orthodontic Brackets: Clinical Study

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Abstract: This study investigates the effectiveness of nanoparticles in preventing the formation of biofilms on orthodontic brackets. Biofilm formation is a common concern during orthodontic treatment, as it can lead to oral health issues. The study utilized a randomized controlled trial design. The participants were divided into two groups: the experimental group and the control group. The experimental group received orthodontic brackets coated with nanoparticles, while the control group received regular brackets. The patients' oral hygiene was monitored, and plaque index scores were recorded at specific intervals. The results of this study demonstrated a significant difference in biofilm formation between the two groups. The experimental group, which had orthodontic brackets with nanoparticle coatings, exhibited a lower plaque index compared to the control group. The mean plaque index score difference was statistically significant ($P < 0.05$), indicating that the nanoparticles effectively reduced biofilm formation on orthodontic brackets. In conclusion, the findings of this clinical study suggest that the utilization of nanoparticles as coatings for orthodontic brackets can be an effective approach to prevent biofilm formation.

Keywords: Antimicrobial properties; Biofilm formation; Clinical study, Orthodontic, Oral health.

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