

Novel mouthrinse with prolonged chlorhexidine release

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Objective: To develop a novel approach to sustained antimicrobial activity in the mouth between orthodontic appointments, by using chlorhexidine hexametaphosphate .

Design and Setting: lab based experiment (*in vitro*).

Materials and Methods: Hydroxyapatite discs (HA) (n=20 for each group) were immersed in 2.2, 5 or 10mM chlorhexidine hexametaphosphate nanoparticle suspensions (CHX-HMP-NPs) or chlorhexidine digluconate (CHXdg) suspensions for 30 seconds and immersed for a further hour in deionised water to remove any residual unbound material. The discs were placed in UV-transparent cuvettes containing 3 mL deionised water, sealed and stored at 37°C. Chlorhexidine release was measured using UV absorption over 7 weeks. Surface characteristics of the functionalised discs were examined using SEM.

Results: A higher concentration and more prolonged release of chlorhexidine was observed for HA discs treated with CHX-HMP NPs. Chlorhexidine release from HA discs treated with 10mM CHX-HMP NPs showed sustained CHX release up to 7 weeks compared with less than 1 week observed with the CHXdg group. SEM analysis showed clear signs of residual CHX-HMP-NP precipitate on HA discs at the end of the experiment

Conclusions: This novel mouthrinse is able to produce a sustained chlorhexidine rich environment up to 7 weeks and could potentially be used as an “in office” antimicrobial application, reducing reliance on patient compliance.

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