

Tags

Staining, mouth rinse solution, black tea, tooth color

Title

***In vitro* model to evaluate the development of discoloration on human enamel caused by treatment with mouth rinses and black tea considering brushing**

Author

Sarembe S, Michler N, Ufer C, Kiesow A

Sources

<https://doi.org/10.1055/s-0043-1777047>, Sarembe S et al, J Eur Dent, 2024

Aim of the study

The aim of the study was to develop and evaluate an *in vitro* model to investigate the staining effect of mouth rinse solutions on human tooth surfaces in combination with a staining agent, while considering the impact of tooth brushing as well.

Methods

The staining potential of eight mouth rinse solutions containing octenidine dihydrochloride with and without phenoxyethanol (OCT, OCTP), chlorhexidine digluconate (CHG), benzydamine hydrochloride (BNZ), hexetidine gluconate (HEX) and polyhexamethylene biguanide hydrochloride (PHMB) was investigated.

For each mouth rinse solution, six human teeth were mechanically cleaned, pre-treated with artificial saliva and tested in a ten-step cycle, repeated 30 times (Figure 1). This mimicked a consumer behavior over 15 days, assuming two applications per day. During one cycle the six halved human molar crowns were exposed to artificial saliva, black tea and mouth rinse, along with tooth brushing. After each step, the teeth were rinsed with distilled water. The color of the teeth was assessed by color measurements (VITA-Easychade) and expressed as total color difference (ΔE). Also, photographic assessment was performed before and after 10, 20 and 30 cycles.

Results

In the first 10 cycles, increasing staining of the teeth was observed for each mouth rinse solution. However, mechanic tooth brushing almost completely reversed the staining effect of the OCT and HEX solutions. This was not observed for the BNZ, PHMB and CHG mouth rinses. Between cycles 10 and 30, the staining effect reached a ΔE plateau with mouth rinse solutions containing OCT and HEX. In contrast, during that period ΔE for the other rinses continued to increase (Figure 2). After 30 cycles, significantly less tooth staining was observed for the OCT containing solutions as compared to the solutions containing CHG, BNZ, PHMB (for all compared solutions p-values were <0.05).

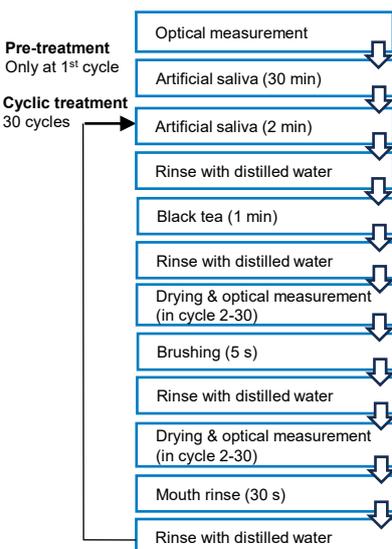


Figure 1, adapted according to Sarembe S. et al., J Eur Dent, 2024 : Test procedure

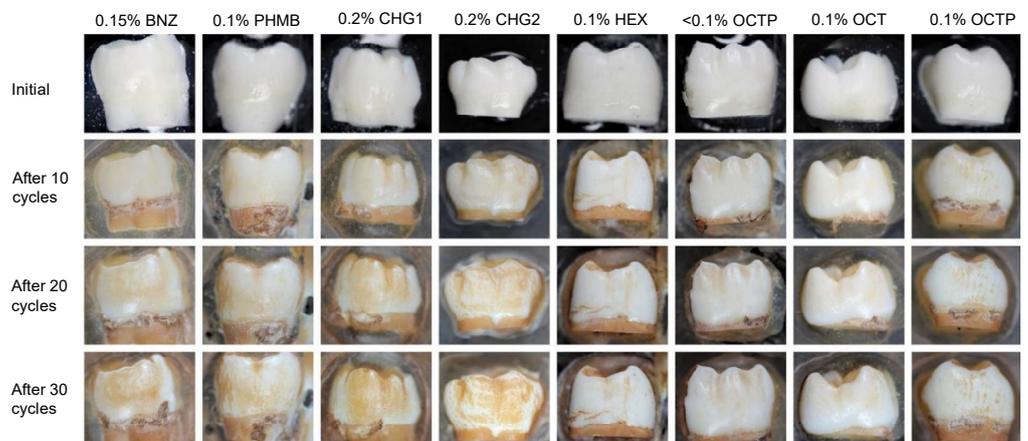


Figure 2, adapted according to Sarembe S. et al., J Eur Dent, 2024: Development of discoloration within 30 cycles

Conclusion

Overall, solutions containing octenidine dihydrochloride caused significantly less tooth discoloration as compared to BNZ, PHMB, and CHG solutions. Moreover, the study showed that the staining effect of OCT containing mouth rinses can be removed more efficiently by mechanic tooth brushing in comparison to the other mouth rinse solutions.