[Role of enamel organic matrix in the remineralization of initial demineralized enamel and artificial hydroxylapatite treated with Galla chinensis]

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Abstract

Objective: To observe the remineralization of initial demineralized enamel and artificial hydroxylapatite treated with Galla chinensis in vitro, and to assess the effect of enamel organic matrix on the potential of Galla chinensis to promote the remineralization of initial enamel carious lesions, further to elucidate the mechanism of Galla chinensis in promoting the remineralization of initial enamel carious lesion.

Methods: Bovine sound enamel blocks, non-organic enamel blocks and artificial hydroxylapatite blocks were demineralized and exposed to a pH-cycling. During the pH-cycling, the specimens were randomly treated with 1 g/L NaF, 4 g/L Galla chinensis extract (GCE) or double deionized water (DDW). Surface microhardness of all the samples was measured before and after the pH-cycling, and
percentage surface microhardness recovery (% SMHR) was calculated. The surface morphology was observed by scanning electron microscopy.

**Results:** A significant increase in microhardness (P < 0.05) with many irregular deposits and prominences on GCE treated regular enamel blocks were observed. No significant increase in that of the regular enamel treated with DDW, enamel disposed of its organic matrix or artificial hydroxylapatite treated with GCE were observed (P > 0.05). No obvious changes in the SEM images of regular enamel treated with DDW, enamel disposed of its organic matrix or artificial hydroxylapatite treated with GCE compared to those of them before pH-cycling.

**Conclusion:** Galla chinensis enhances the remineralization of initial enamel carious lesions in vitro. The organic matrix of enamel was shown to play a substantial role in the observed mechanism.

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