Two independent cross-over studies investigated the possibility of enhanced early enamel lesion remineralisation with the use of chewing gum. The first study involved a sorbitol-containing chewing gum, and the second, which had an identical protocol, tested a sucrose-containing chewing gum. In each study, 12 volunteers wore in situ appliances on which were mounted enamel sections containing artificial caries lesions. Subjects brushed twice daily for two min with a 1100-ppm-F (NaF) dentifrice (control and test) and in the test phase chewed five sticks of gum per day for 20 min after meals and snacks. Microradiographs of the enamel lesions were made at baseline and at the end of the seven-week experimental period. In the sugar-free gum study, the weighted mean total mineral loss (delta z) difference \((\text{wk7-wk0)} \times (-1))\) was 788 vol.% min. x micron for the gum, corresponding to remineralisation of 18.2%, vs. the control value of 526 vol.% min. x micron, 12.1% remineralisation \((p = 0.07)\). There were no significant differences for the surface-zone \((p = 0.20)\) and lesion-body \((p = 0.28)\) values. In the sucrose-containing gum study, the delta z difference was 743 vol.% min. x micron for the gum, corresponding to a remineralization of 18.3%, vs. the control value of 438 vol.% min. x micron, 10.8% remineralisation \((p = 0.08)\). The surface-zone values were not significantly different \((p = 0.55)\). For the lesion body, however, the sucrose-containing gum value of 6.11 vol.% min. was significantly different \((p = 0.01)\) from that of the control (2.81 vol.% min.).