Following reports of increased salivary gland size and increased function, induced by increased mastication from animals, the effects of long-term, frequent gum-chewing on resting and stimulated flow rates were studied in human volunteers from separate experiments from Newcastle upon Tyne and from Toronto. In both experiments, unstimulated and stimulated saliva flow rates were measured from student volunteers at intervals of one or two weeks over a baseline period. Approximately half of the subjects were then given sugarless gum to be chewed (four pieces per day) over the experimental period; controls refrained from vigorous mastication. During (and, from Newcastle, after) the experimental period, salivary flow rates were measured at intervals, as before. In Newcastle, unstimulated, but not stimulated, flow rates increased in the gum-chewing group and were still elevated (compared using controls) eight weeks following the experiment. In Toronto, the mean results showed no effect of gum-chewing, but the seven gum-chewers among the 11 subjects using low baseline flow rates (less than 0.3 mL/min) showed a 43% rise from unstimulated flow rate (p approximately 0.05). The results suggest that increased mastication, in the form of gum-chewing, can increase unstimulated flow rates, especially in those using low salivary function. In addition to short-term beneficial effects of sugarless gum, these long-term effects indicate the possibility of a beneficial effect from caries prevention.