Observations on the Durability of Mottled Teeth

MARGARET CAMMACK SMITH AND H. V. SMITH

University of Arizona, Tucson, Ariz.

FLUORINE ingestion as the cause of mottled enamel which is endemic in many parts of this country and the rest of the world has been well established.[1, 2, 3]

The observation made by Black [4] in 1916 that mottled teeth appeared to have less caries than so-called normal teeth, has recently received much attention. Dean, *et al.*,[5] have reported that the incidence of caries was appreciably less in the mottled teeth of the 12, 13, and 14 year old children in Galesburg and Monmouth, Ill., schools than in the same age group of the nearby communities of Macomb and Quincy, where mottled enamel was not endemic. Dean and his coworkers, although apparently convinced that the higher fluorine content of the waters of the former cities accounted for the lower incidence of dental caries, were somewhat hesitant to conclude that the fluorine content of the water was the only factor involved because of other differences in the mineral composition of the water supplies, primarily in the amount of calcium and magnesium.

Miller reported experiments with rats in which caries development was inhibited by the inclusion of 250 p.p.m. of sodium fluoride in the caries producing ration. Cox [6] has more recently produced mottled enamel in rat molars, and reports that such teeth are more resistant to caries produced by a corn meal ration, than were the molars formed without the addition of sodium fluoride to the ration. Cox [6] makes rather sweeping conclusions and very broad recommendations for the application of his findings made on rats to the dental ills of the human race. He goes so far as to state that addition of fluorides to community water supplies provides an " attractive means of mass reduction of dental caries; that prophylactic measures through other media such as bottled water, milk supply, and fluorine containing medicinals are feasible; and that means of control of fluorine in the whole dietary of children should be undertaken."

To one who is familiar with the disfiguring dental defect known as mottled enamel which affects the teeth of every person who drinks water containing as little as 1 p.p.m. of fluorine during the years of tooth formation, this recommendation seems, to put it mildly, unsafe. There is ample evidence that mottled teeth, though they be somewhat more resistant to the onset of decay, are structurally weak, and that unfortunately when decay does set in, the result is often disastrous. The chart graphically presents the result of a survey of the situation in St. David, Ariz., a community where water supplies range from 1.6 to 4.0 p.p.m. of fluorine. This survey included the

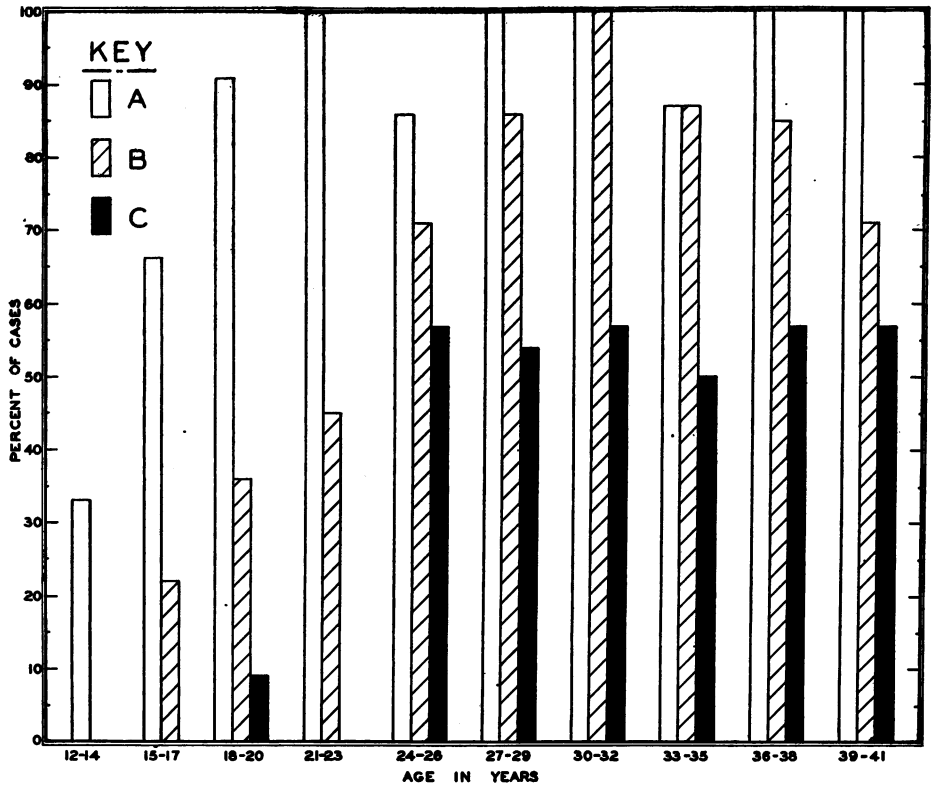

CHART 1—DENTAL SURVEY OF THE MOTTLED TEETH OF THE INHABITANTS OF ST. DAVID, ARIZONA

A. Per cent of age group in which caries was observed
B. Per cent of age group in which some teeth had decayed and been extracted after unsuccessful attempts to repair them
C. Per cent of age group in which all teeth had been extracted and replaced by false teeth

adult group so that a truer picture of the durability of mottled teeth could be obtained.

It may be seen that although only 33 per cent of the children in the age group from 12 to 14 years showed any carious lesions, the percentage of persons with carious teeth increased with age as was to be expected. Beyond the age of 21 years, there were relatively few individuals in which caries had not developed. That the result of the onset of caries was especially severe is reflected in the high percentage of all age groups with extracted teeth. Caries once started evidently spreads rapidly. Steps taken to repair the cavities in many cases were unsuccessful, the tooth breaking away when attempts were made to anchor the fillings, so that extraction was the only course. That decay was widespread and repair was highly unsuccessful among the young adults is shown by an incidence of more than 50 per cent of false teeth in the age group 24 to 26 years. This high incidence of false teeth appeared in all subsequent age groups. Very rarely, adults were found whose teeth, though mottled, were free from caries. It was the exception rather than the rule to find dentitions from which there had been no extractions because of inability to repair carious teeth successfully.

It would appear therefore, that even though fluorine ingestion during the

period of tooth formation may produce teeth which offer more resistance to bacterial invasion, the disadvantage of the resulting poorly constructed, internally weak, mottled teeth may far more than offset the advantage of a greater resistance to external invasion by bacteria.

A word of warning is thus offered to any plan to build caries resistance into teeth by addition of fluorides to public water supplies as a public health procedure so attractively suggested by Cox, *et al.* The range between toxic and non-toxic levels of fluorine ingestion is very small. Any procedure for increasing fluorine consumption to the so-called upper limit of non-toxicity would be hazardous. This would be especially true in the case of addition of fluorine to public food or water supplies where uncontrollable individual fluctuations in intake would be encountered.

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