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## Denti di Chiaie (*Chiaie teeth*)

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**S**ir: I have the honor to submit the following report: On the examination of certain Italian emigrants embarking at this point, one is struck with the frequency of a dental peculiarity common among the inhabitant of the Italian littoral and known as "denti di Chiaie," or Chiaie teeth. This defect was first described by Prof. Stefano Chiaie, a celebrated Neapolitan, and bears his name.

The impairment of the teeth, often not amounting to more than a mere imperfection, is of particular interest, owing to the fact that Italians who are subjects of the defect frequently present themselves before the medical practitioner in the United States. The deterioration, however, is an acquired one, due to local geological conditions and so, because of altered hygienic surroundings, will not pass beyond the present generation of Italians in America. Strong well-formed teeth not particularly prone to decay appear to be the rule among young Italians when they have not been subjected to the influence during infancy of the causes of Chiaie's disease. This etiology seems to be connected with volcanic fumes or the emanations of subterranean fires, either fouling the atmosphere or forming a solution in drinking water. In Naples, it is more often attributable to water than to the air, and since the Serino water, brought in conduits from a distant mountain height, has been in use and local wells condemned, the incidence of the disease among infants has greatly diminished. Formerly nearly all children living in the section known as Santa Lucia, along the Riviera, and at Posillipo were affected.

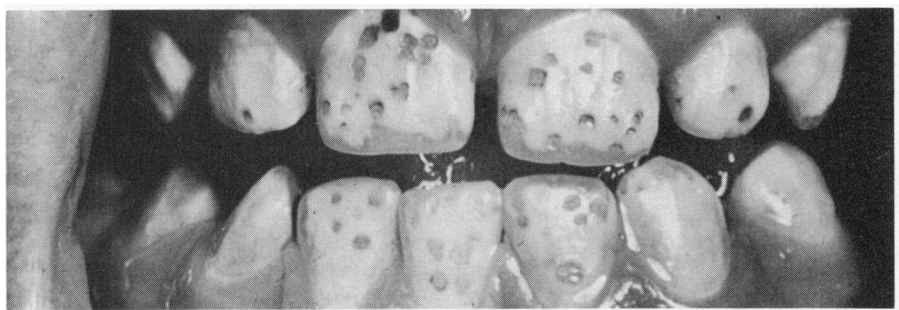
The people of Pozzuoli, a town of 16,000 inhabitants, situated 5 miles from Naples, are marked off from the people of neighboring places by their distinguishing characteristic of black teeth (*denti neri*), apparently strong and serviceable, but devoid of enamel and hideously dark. The environs of Pozzuoli are everywhere volcanic. Close at hand is the Solfatara, a half-extinct crater full of cracks from which gases are constantly issuing. Some of the inhabitants of Pozzuoli drink the water of springs, a water necessarily charged under pressure with volcanic fumes; all of them are constantly living in an atmosphere filled with noisome gases.



The theory most generally received in Italy is that these gases have a selectively harmful effect on enamel formation in early childhood, but that the growth of the other dental tissues is not interfered with. When the cause is active during the entire period of second dentation, the whole tooth is bereft of enamel and becomes perfectly black. If the growing teeth are exposed for but a short time at the commencement of their formation, only the cutting edges of the upper incisors may be affected and the appearance, when the teeth are matured, is as if they had been browned by tobacco smoke in the same way that a meerschaum pipe is colored by smoking. Sometimes the teeth have the repulsive look of fever patients' teeth when smeared with sordes, except where covered by the half-parted lips.

Among the better class of Italians living inland, it is the custom to go to the seashore in summer. Naples has always been a popular resort, and as a result of the temporary exposure of children brought with their parents to Naples at the time when Serino water was not used, it is frequent to see among well-to-do people an otherwise handsome face marred by a line of fine, black markings crossing the incisor teeth in a horizontal direction. This fault of development is known among Neapolitans as "denti scritti" or writing on the teeth. The marking, when present on finely formed, white teeth, resembles the diminutive lettering which is sometimes done on seashells for purposes of ornamentation.

The different forms of deterioration which are grouped under the name of "denti di Chiaie" are thus seen to be quite unlike any other dental disease and not all likely to be confounded with Hutchinson's teeth, mercurial teeth, caries, or other maladies of the teeth.



**COMMENT**

*When reading Dr. Eager's letter today, one is tempted to search between the lines of his careful description of "denti di Chiaie" for a hint that there is little decay in the blemished teeth. But we have the advantage of hindsight and of the knowledge gained after years of epidemiologic research.*

*Fluoride had to be recognized as the cause of the discoloration before its heroic side could become apparent. In 1930, Dr. Grover A. Kempf and Dr. Frederick S. McKay associated the water supply with mottled teeth, as "denti di Chiaie" came to be called.*

*In 1931, as reported independently in three publications, endemic mottled enamel was associated with drinking waters containing remarkably small quantities of fluoride.*

*The discovery that mottled teeth had strong resistance to decay was followed by the realization that as little as one part per million of fluoride in drinking water produced this resistance without causing mottling.*

*In 1945, as a direct result of these studies and others establishing safety, three communities artificially fluoridated their water supplies. Afterwards caries incidence dropped by 60 percent in children born and raised in those communities. Since that time, many municipalities have followed suit. Dr. Eager's careful observations were the quiet beginnings of this simple, safe, inexpensive, and efficacious public health measure.*