

### **Prenatal Fluoride and Autism**

#### **Developmental Defects Increase with Fluoride Levels in Water**

The IOM did not consider fluoride's adverse effects on the developing fetal GI tract or brain, despite the fact that defects in tooth enamel have been correlated with impaired brain development.

All enamel defects are indications of severe stress, because they result from systemic cellular disruption during prenatal and early postnatal life that can affect other ectodermally derived structures, including the brain. Chronologically distributed enamel defects are a valuable aid in neurological diagnosis, since they occur commonly in brain-damaged children.<sup>72</sup> Developmental enamel defects in primary teeth have been found at least twice as frequently in children with mental retardation as in children in a control group.<sup>72b</sup>

Some enamel defects are essentially birth defects resulting from a pregnant woman's consumption of fluoride. Similarly, a thin upper lip and flattened philtrum (the groove in the middle of the upper lip) are birth defects resulting from consumption of alcohol during pregnancy. They certainly signify more than a cosmetic effect, as does the grey-blue line on the gums of people with lead poisoning.

Dental studies show that the prevalence and severity of developmental defects of enamel in children increase significantly as fluoride levels in drinking water increase from less than 0.2 mg/l to more than 0.7 mg/l.<sup>73-76</sup> Fluoride supplements (0.25 to 0.75 mg/day) are also associated with developmental defects of enamel.<sup>77</sup> Fluoride levels in amniotic fluid have been positively correlated in a dose-response relationship with fluoride content and pathology of fetal bones – with significantly greater fluoride levels in fetuses born to mothers with dental fluorosis.<sup>78</sup>

As discussed in Chapter 1, prenatal fluoride is a risk factor for preterm birth, and infants born preterm are more frequently affected by tooth enamel defects, compared with infants born at term.<sup>79</sup>

Choi et al. (2015) found that developmental neurotoxicity was associated with dental fluorosis. Children with fluoride-induced mottling of their teeth – even the mildest form that appears as whitish specks on the enamel – showed lower performance on some neuropsychological tests.<sup>80,81</sup>

## References

72. Aminabadi NA, Oskouei SG, Pouralibaba F, et al. [Enamel defects of human primary dentition as virtual memory of early developmental events.](#) *J Dent Res Dent Clin Dent Prospects.* 2009 Autumn;3(4):110–116.
- 72b. Bhat M, Nelson KB. Developmental enamel defects in primary teeth in children with cerebral palsy, mental retardation, or hearing defects: a review. *Adv Dent Res.* 1989 Sep;3(2):132–142.
73. Ekanayake L, van der Hoek W. [Dental caries and developmental defects of enamel in relation to fluoride levels in drinking water in an arid area of Sri Lanka.](#) *Caries Res.* 2002 Nov-Dec;36(6):398–404.
74. Nunn JH, Rugg-Gunn AJ, Ekanayake L, Saparamadu KD. [Prevalence of developmental defects of enamel in areas with differing water fluoride levels and socio-economic groups in Sri Lanka and England.](#) *Int Dent J.* 1994 Apr; 44(2):165–173.
75. Weeks KJ, Milsom KM, Lennon MA. [Enamel defects in 4- to 5-year-old children in fluoridated and nonfluoridated parts of Cheshire, UK.](#) *Caries Res.* 1993;27(4):317–320.
76. Wong HM, McGrath C, Lo EC, King NM. [Association between developmental defects of enamel and different concentrations of fluoride in the public water supply.](#) *Caries Res.* 2006;40(6):481–486.
77. Hiller KA, Wilfart G, Schmalz G. [Developmental enamel defects in children with different fluoride supplementation – a follow-up study.](#) *Caries Res.* 1998;32(6):405–411.
78. Shi J, Dai G, Zhang Z. [Relationship between bone fluoride content, pathological change in bone of aborted fetuses and maternal fluoride level.](#) *Zhonghua Yu Fang Yi Xue Za Zhi.* 1995 Mar;29(2):103–105.
79. Hall RK. [Prevalence of developmental defects of tooth enamel \(DDE\) in a pediatric hospital department of dentistry population \(1\).](#) *Adv Dent Res.* 1989 Sep;3(2):114–119.
80. Choi AL, Zhang Y, Sun G, et al. [Association of lifetime exposure to fluoride and cognitive functions in Chinese children: a pilot study.](#) *Neurotoxicol Teratol.* 2015 Jan-Feb;47:96–101.
81. Grandjean P. [Mottled fluoride debate.](#) *Chemical Brain Drain.* December 17, 2014.