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Relationship between fluoride and Bone Metabolism: Focusing on Serum Ionic Fluoride Concentrations

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Abstract:

Fluoride is ubiquitous in the environment. Fluoride are contained in air, soil, water, plants and animals. Human, therefore, intakes fluoride from air, drinking water and foods throughout the life. The fluoride absorption from gastrointestinal tract is rapid and complete in the absence of calcium, magnesium and aluminum. About 40 to 50% of absorbed fluoride is excreted to urine and residual fluoride is accumulated in bone. Fluoride has beneficial and adverse effects on tooth and bone. The adequate fluoride intakes decrease the prevalence of dental caries during the development of enamel minerals and stimulate migration of osteoblast of bone. On the other hand, excess intakes of fluoride cause dental fluorosis and skeletal fluorosis. Both fluoride concentrations in serum and bone were positively associated with age. The capacity of fluoride accumulation in bone is larger in younger than in older persons. Bone formation is predominant in younger persons, and bone resorption is predominant in elderly persons. It is expected that bone metabolism affects serum fluoride concentrations. The accumulated fluoride in bone thought to be released to serum by bone resorption in elderly persons. Previous studies showed a large inter-observer variation in the serum fluoride concentrations. Serum fluoride concentrations are affected by the analytical method, amounts of fluoride intake, the timing of collecting blood, kidney function and age. In the future study for serum fluoride concentrations, it is important to evaluate after adjusting confounding factors, especially age.

Key words: Fluoride, Skeletal fluorosis, Osteoporosis, Serum ionic fluoride concentration, Fluoride intake

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