

Clinical Significance

Young patients with cariously involved pulp tissues may be treated with full pulpotomy using materials such as Biodentine. This conserves the vitality of the pulp tissues and appears to offer a less painful alternative to RCT. The procedure is relatively short in duration and was able to relieve patients' preoperative pain completely within 2 days. This option is also likely to be associated with good patient cooperation and lower cost. Full pulpotomy should be considered as an option in selected cases for young permanent teeth with carious pulp exposure.

their preoperative periapical rarefaction completely healed, and in 2 cases the lesion size was reduced to localized widening of the periodontal ligament (Figure 3). After 1 year, 1 patient had evidence of internal resorption despite complete healing

of the periapical rarefaction and was considered a failure. Although RCT was advised, the patient's parent chose to continue follow up. One tooth had narrowing of a canal. All restorations but 1 remained functional. The exception was a stainless steel crown that required replacement with a smaller restoration.

DISCUSSION

These young permanent teeth had success with full Biodentine pulpotomy. No RCT was required.

Taha NA, Abdulkhader SZ: Full pulpotomy with Biodentine in symptomatic young permanent teeth with carious exposure. *J Endod* 44:932-937, 2018

Reprints available from NA Taha, Dept of Conservative Dentistry, Faculty of Dentistry, Jordan Univ of Science and Technology, PO Box 3864, Irbid 22110, Jordan; e-mail: n.taha@just.edu.jo

FLUORIDE

Re-thinking fluoride intake guidelines



BACKGROUND

The use of fluoride to reduce dental caries began back in the 1930s and included the consideration of how to balance the positive effects of fluoride against the negative effects, specifically, fluorosis. Originally the main source of fluoride was fluoridated drinking water, but today fluoride can also be ingested from toothpastes, varnishes, tablets, gels, milk, and salt that have been fortified with fluoride. The appropriateness of the current guidelines for fluoride intake in populations, whether changes in guidelines are needed, and what research is needed to guide future decisions in this area were investigated.

CURRENT GUIDELINES

The current guidelines for fluoride intake are designed to achieve balance between preventing caries and minimizing the risk of fluorosis. These guidelines are designed for populations, not individuals, and recognize that there will be individual variations that cannot be controlled. The focus is on young children (Table 2), although adult values have also been set.

Children

The optimal intake of fluoride for children up to age 6 years is 0.12 mg/kg body weight/day based on the observation that fluoride intakes up to this level are detected in areas with fluoridated

water and such intakes are not associated with esthetically significant fluorosis. Some set the value for fluoride at 0.5 mg/kg body weight/day.

Adults

Adult values consider adequate mean fluoride intake (AI) as well as dietary reference values (DRVs). AI analysis indicates that the maximal reduction in caries in a population that does not cause adverse effects occurs at a fluoride intake level of 0.05 mg/kg body weight/day for all ages over 6 months.

Monitoring Risk

The ongoing evaluation of fluoride exposure relies on urine analysis. Renal fluoride excretion can be used to survey fluoride exposure when community prevention programs are using fluoride. Fluoride intakes between 0.05 and 0.06 mg/kg body weight/day are accepted as optimal. Those over 0.1 mg/kg body weight/day are associated with an increased risk for enamel fluorosis. However, these assessments are complicated by within-subject variation, lack of correlation between urinary fluoride excretion and fluoride intake, and uncertainty about what levels provide protection against caries. In addition, few studies have used standardized means for evaluating how much fluoride children ingest from toothpaste. Children age 1.5 to 2.5 years are estimated to ingest an average of 64% to 84% of the toothpaste that is dispensed. Thus the current estimates of fluoride intake

Table 2. Estimates of Daily Fluoride Intake from Diet, Fluoride Supplements, Fluoride Toothpastes, and Total Intake Among 2-year-old Children

	Fluoride Intake, Mean (Range), mg F/kg bodyweight/d	
	Assuming 1 ppm F in Drinking Water	Assuming 0 ppm F in Drinking Water
Diet (including water and beverages)	0.046 (0.038-0.046)	0.023 (0.015-0.023)
Fluoride supplements		0.038*
Fluoride toothpaste 1,000 ppm	0.023 (0-0.154)	0.023 (0-0.154)
Total intake	0.069 (0.038-0.20)	0.084 (0.054-0.215)

*Range not given. Adapted from data by Pendrys and Stamm (1990). It is assumed that a 2-year-old weighs 13 kg. (Courtesy of Mejáre I: Current guidance for fluoride intake: Is it appropriate? *Adv Dent Res* 29:167-176, 2018.)

range from 0.01 to 0.04 mg/kg body weight/day, although the use of lower-fluoride-content or “children’s” toothpastes can complicate this finding.

The risk for fluorosis is estimated on the basis of the amount of fluoride consumed per kilogram of body weight per day, with exposure to fluoride from toothpastes estimated indirectly. The clinical relevance of these estimates is difficult to calculate. It is particularly challenging because the intake of fluoride is not followed immediately by the development of fluorosis or caries prevention. Instead, the passage of time tends to hide the true relationship between fluoride intake and fluorosis development.

NEED FOR CHANGES

The complexity of fluoride exposure and ingestion values along with the reality that individual variations can be considerable combine to make it difficult to make completely supported changes in fluoride recommendations. Early use of 1000-ppm fluoride toothpaste has been shown to rarely result in esthetically significant fluorosis. The recommendation that guidelines be age specific have been shown to be appropriate.

FUTURE RESEARCH

Future research to clarify the relationship between fluoride exposure at a young age and the development of fluorosis will require prospective cohort studies with representative and sufficiently large samples. Specific goals of this research include the measurement and/or estimation of total fluoride intake in children from birth to age 3 to 4 years who grew up with fluoridated versus non-fluoridated water. The effect of using low-fluoride versus high-fluoride content toothpaste must be estimated in children before age 24 to 30 months in relation to the risk of developing fluorosis and caries. In addition, the degree of tolerance the society has toward mild to moderate fluorosis must be ascertained, as well as the social opinion on the subject of fluorosis compared to the gains in dental health. The urinary fluoride levels should be monitored in randomly selected samples to determine if fluoride ingestion remains within limits, how fluorosis relates to measured urinary fluoride levels, and if urinary fluoride levels are linked to the severity of dental fluorosis that develops.

Clinical Significance

Current evidence is insufficient to support changing the current guidelines regarding fluoride exposure, which stand at 0.05 to 0.07 mg/kg body weight/day. Guidelines should take into account the age of the subject, with a lower upper limit considered for children age up to 2 years compared to those age 3 to 6 years. Esthetic issues regarding fluorosis are significant. Both the dental profession and the public should be involved in deciding whether the risk of fluorosis is worth the gain in dental caries prevention. This determination may vary depending on the specific population making the assessment.

Mejáre I: Current guidance for fluoride intake: Is it appropriate? *Adv Dent Res* 29:167-176, 2018

Reprints available from I Mejáre, Malmö Univ, Klara Östra Kyrkogata 8B, 111 52 Stockholm, Sweden; e-mail: ingegerd.mejare@gmail.com

OPIOIDS

Prescribing opioids and risk mitigation implementation



BACKGROUND

Opioids are not only responsible for thousands of deaths but also for tens of thousands of opioid-use disorders and unintentional overdoses. Many people who go on to develop opioid use disorders report that their early exposure to opioids was

through a legitimate prescription or one shared by family or friends. Adolescents and young adults, who are particularly at risk, also experience opioids first for a true medical need. Adolescents also engage in a combination of medical and nonmedical uses of opioids, which carries an increased risk of developing