

## ARTICLE TITLE AND BIBLIOGRAPHIC INFORMATION

**Exposure to Bisphenol A from Bis-glycidyl Dimethacrylate-based Dental Sealants.**

Joskow, R., D. B. Barr, et al. (2006).  
*J Am Dent Assoc* 137(3): 353-62.

## LEVEL OF EVIDENCE

2b

## PURPOSE/QUESTION

The purpose was to determine whether Bisphenol A (BPA) exposure from dental sealants occurred, and to measure the concentrations in urine and saliva at several time points following initial exposure.

## SOURCE OF FUNDING

Government

## TYPE OF STUDY/DESIGN

Cohort study

# Exposure to Bisphenol A (BPA) from Dental Sealants is Detectable in Saliva and Urine, and Varies Significantly Between Sealant Formulations

## SUMMARY

### Subjects

The subjects were 15 healthy adults. One withdrew immediately following baseline sample collection, leaving 13 males and one female. Subjects ages ranged from 19 to 42 years, with a mean of 30.

### Exposure

Five of the subjects were exposed to Helioseal F<sup>®</sup> dental sealants, and 9 to Delton Light Cure<sup>®</sup> dental sealant (Delton LC). The mean number of sealants placed was six (range two-12), and the mean total weight of sealant placed was 40.35 mg, with no difference for these parameters between the two sealants.

### Main Outcome Measure

The main outcome measures included the concentrations of Bisphenol A (BPA) in both urine (at baseline, one hour post-treatment and 24 hours post-treatment) and saliva (at baseline, immediately post-treatment, and one hour post-treatment).

### Main Results

For salivary samples, the BPA concentrations were approximately 80 times higher in the subjects exposed to Delton LC than those exposed to Helioseal F (42.8 ng/mL, SD=28.9 vs. 0.54 ng/mL, SD=0.45; P=.0022). At one hour post-treatment, the salivary concentrations were still higher in the Delton LC group (7.86 ng/mL, SD=12.73 vs. 0.21 ng/mL, SD=0.03; P=.017). Creatinine-adjusted urinary concentrations of BPA were somewhat higher in subjects exposed to Delton LC at one hour post-treatment (12.0 ug/gm, SD=15.1 vs. 2.88 ug/gm, SD=4.83; P=.080), and significantly higher 24 hours post-treatment (2.58 ug/gm, SD=1.53 vs. 0.43 ug/gm, SD=0.16; P<.0001).

### Conclusions

BPA exposure from dental sealants is detectable and measurable in both saliva and urine of exposed individuals following initial exposure. The increase in concentration is notably above "background" level, and can vary significantly between different sealant formulations.

## COMMENTARY AND ANALYSIS

Because Bisphenol A (BPA) has become ubiquitous in terms of environmental exposures, such as from water and food packaging made from plastics, and because it is a known endocrine disruptor with estrogenic activity,<sup>1-5</sup> the question of additional exposure from dental sources is important. BPA is a component of most dental sealants and dental composite materials. Until recently very little was known about whether or not BPA

could be detected in human tissue or fluids from dental exposures.<sup>6-7</sup> This study significantly contributes through further development of sophisticated detection techniques for examining concentrations of BPA in saliva and urine, and by directly comparing two commonly used dental sealants.

The differences found in BPA exposure between the two sealants are significant, and indicate that further assessments of all dental sealant and composite materials may reveal that such differences are common. The study authors point out that acute BPA doses from materials which leach amounts similar to those from some sealants may result in exposure at levels that have been shown to produce estrogen-mediated effects in rodents.

A prior study of BPA from dental exposures in children showed that there were detectable increased concentrations above background levels in urine as long as 14 days following placement of sealants and composites.<sup>7</sup> Whether exposure continues beyond the peri-treatment period via leaching or release of BPA from the material remains to be seen. Although dental sealants and composites are essential for both prevention and treatment of dental caries, further research is important to both characterize the amounts of BPA and similar chemicals which produce human exposures, and to identify potential health effects from those exposures.

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