

CONTEXT

Dental sealants and composite filling materials containing bisphenol A (BPA) derivatives are increasingly used in childhood dentistry. Evidence is accumulating that BPA and some BPA derivatives can pose health risks attributable to their endocrine-disrupting, estrogenic properties.

1. Harvard Medical- School of Public Health

Exposure to BPA, chemical used to make plastics, before birth linked to behavioral, emotional difficulties in young girls

Boston, MA – Exposure in the womb to bisphenol A (BPA) – a chemical used to make plastic containers and other consumer goods – is associated with behavior and emotional problems in young girls, according to a study led by researchers at Harvard School of Public Health (HSPH), Cincinnati Children's Hospital and Medical Center, and Simon Fraser University in Vancouver, British Columbia.

In this study, published October 24, 2011, in an advance online edition of Pediatrics, lead author [[Joseph Braun]], research fellow in environmental health at HSPH, and his colleagues found that gestational BPA exposure was associated with more behavioral problems at age 3, especially in girls.

<https://www.hsph.harvard.edu/news/press-releases/bpa-exposure-behavioral-difficulties/>

2. The American Academy of Pediatrics (AAP)- *Dental Composite Restorations and Psychosocial Function in Children: Pediatrics August 2012, VOLUME 130 / ISSUE 2*

Nancy N. Maserejian, Felicia L. Trachtenberg, Russ Hauser, Sonja McKinlay, Peter Shrader, Mary Tavares, David C. Bellinger

BACKGROUND AND OBJECTIVE: Resin-based dental materials may intraorally release their chemical components and bisphenol A. The New England Children's Amalgam Trial found that children randomized to amalgam had better psychosocial outcomes than those assigned to composites for posterior tooth restorations. The objective of this study was to examine whether greater exposure to dental composites is associated with psychosocial problems in children.

3. Bisphenol A and Related Compounds in Dental Materials: Abby F. Fleisch, MD,^a Perry E. Sheffield, MD,^b Courtney Chinn, DDS, MPH,^c Burton L. Edelstein, DDS, MPH,^c, Philip J. Landrigan, MD, MS^c

Dental sealants and composite filling materials containing bisphenol A (BPA) derivatives are increasingly used in childhood dentistry. Evidence is accumulating that BPA and some BPA derivatives can pose health risks attributable to their endocrine-disrupting, estrogenic properties.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4139922/>

4. Bisphenol A release from an orthodontic resin composite: A GC/MS and LC/MS study

Article in Dental Materials 34(2) · November 2017. Jürgen Durner Ludwig-Maximilians-University of Munich, Lachaise Isabelle-French National Centre for Scientific Research, Christof Högg -Ludwig-Maximilians-University of Munich

Objectives: First, to analyse the in vitro release of BPA and Bis-GMA from an orthodontic resin composite (Transbond XT, 3M Unitek), stored in various conditions, by gas chromatography/mass spectrometry (GC/MS) and liquid chromatography/mass spectrometry (LC/MS); then to extrapolate the data to the clinical situation. Secondly, to explore the thermal stability of Bis-GMA. Methods: Cylinders of resin composite were prepared and stored according to 3 different protocols:

5. Bisphenol A in dental sealants and its estrogen like effect: Manu Rathee, Poonam Malik,¹ and Jyotirmay Singh²

A dental resin sealant serves as a protective coating or barrier that effectively isolates pits and fissures to help prevent caries in children and adults.[9–11] When sealants are applied to tooth structures, they are polymerized in situ.[12] As there may be incomplete conversion to polymer, chemicals such as Bis-DMA and Bis-GMA might leach into the salivary fluid of the oral cavity.[6,13] Leaching of these monomers from resins can occur during the initial setting period and in conjunction with fluid sorption and desorption over time.[14–16] Thus, this chemical leach from dental sealants may be bioactive.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3354837/>

6. Bisphenol A - A Possible Health Issue Arising from Dental Restoratives. A Review

Article (PDF Available) · May 2018. Dmitrii Todirica¹, Ario Santini², Augustin Curticapean³, Cristina Molnar Varlam¹, Székely Melinda¹ and Mohammed S. Aldossary⁴

Dental resin-based materials are increasingly used in the contemporary dentistry. The elution of Bisphenol A from such materials is still gaining attention because of the potential biological effects on human. This review will discuss the possible health issue and the adverse effects on living organisms. Comprehensively, this review will discuss Bisphenol A elusion and release from different dental resin-based materials including composites, fissure sealants and orthodontic adhesives. Furthermore, the factors affecting the elution of Bisphenol A from dental materials will be explored, with an overview of its release into saliva and urine, and the methods of detection.

https://www.researchgate.net/profile/Mohammed_Aldossary2/publication/325391473_Bisphenol_A_-_A_Possible_Health_Issue_Arising_from_Dental_Restoratives_A_Review/links/5b0aa1d10f7e9b1ed7f8606f/Bisphenol-A-A-Possible-Health-Issue-Arising-from-Dental-Restoratives-A-Review.pdf

7. Would You Like Some BPA With That Dental Sealant, Dear? By Bonnie Rochman @brochman Sept. 13, 2010

<http://healthland.time.com/2010/09/13/would-you-like-some-bpa-with-that-dental-sealant-dear/>

8. Too often when a sealant fails, the decay has already reached the pulp resulting in extensive, costly restorative work. By Staci Violante, RDH, BSDH, MSDH Hygiene Department News-The failures of dental sealants: Weigh the pros and cons with dental patients. June 5, 2018 dental sealants.

'Too often when a sealant fails, the decay has already reached the pulp resulting in extensive, costly restorative work. In hindsight, a patient who had a healthy, virgin tooth, now has a diseased one.'

<https://www.dentistryiq.com/articles/2018/06/the-failures-of-dental-sealants-weigh-the-pros-and-cons-with-dental-patients.html>

9. Dental Composite Restorations and Psychosocial Function in Children- Nancy N. Maserejian, ScD, corresponding author a Felicia L. Trachtenberg, PhD,a Russ Hauser, MD, ScD, MPH,b,c,d Sonja McKinlay, PhD,a Peter Shrader, MA,a Mary Tavares, DMD, MPH,e and David C. Bellinger, PhD, MScb,f,g

Resin-based dental materials may intraorally release their chemical components and bisphenol A. The New England Children's Amalgam Trial found that children randomized to amalgam had better psychosocial outcomes than those assigned to composites for posterior tooth restorations. The objective of this study was to examine whether greater exposure to dental composites is associated with psychosocial problems in children.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3408688/>

CONCLUSIONS:

Greater exposure to bisGMA-based dental composite restorations was associated with impaired psychosocial function in children, whereas no adverse psychosocial outcomes were observed with greater urethane dimethacrylate-based compomer or amalgam treatment levels.

10. Published 2018 May 27: Presence and leaching of bisphenol a (BPA) from dental materials

BPA has been reported to leach from some resin based dental restorative materials and materials used for orthodontic treatment. To confirm and update previous findings, especially in light of the new temporary lower threshold value for tolerable daily BPA intake, we have investigated the leaching of BPA from 4 composite filling materials, 3 sealants and 2 orthodontic bonding materials.

A study from 2012 found that children who had received composite fillings had more behavioral problems than the control group [17]. The authors suggested this to be due to a possible BPA content in the materials

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5974758/>

11. What You Need to Know About Dental Fillings and Sealants:

Could Your Child's Dental Fillings Be Causing Behavioral Changes? Janet Raloff of Science News writes:

The new report, posted online July 16 in *Pediatrics*, is "very important," says Philip Landrigan, director of the Children's Environmental Health Center at Mount Sinai School of Medicine in New York City. These data linking bis-GMA and behavioral changes in kids "make a strong case that in the short term, use of BPA-containing dental materials should be minimized," he says. Over the longer term, he argues, manufacturers should look to discontinue the materials' use in children as soon as acceptable substitutes are readily available.

A study published in the Journal of the American Academy of Pediatrics, July 2012 has raised concern about the release of Bisphenol A (BPA) from composite filling materials and dental sealants that are routinely being used and applied to children's teeth. <https://safebabyhealthychild.com/need-know-dental-fillings-sealants/>

12. A new study finds that children who have their cavities filled with a white composite resin known as bis-GMA appear to develop small but quantifiable drops in psychosocial function. To put it simply: Treated kids can become more moody, aggressive and generally less well adjusted.

<https://www.sciencenews.org/blog/science-public/putting-bpa-based-dental-fillings-perspective>

13. Medical News Today: How does bisphenol A affect health? 25 May 2017

By Christian Nordqvist : Reviewed by Suzanne Falck, MD, FACP

BPA is an endocrine disruptor. It can imitate the body's hormones, and it can interfere with the production, secretion, transport, action, function, and elimination of natural hormones.

BPA can behave in a similar way to estrogen and other hormones in the human body.

Infants and young children are said to be especially sensitive to the effects of BPA.

Research suggests it can impact human health in various ways.

How to avoid BPA

Bisphenol A (BPA), a chemical found in plastics used to package food, may be linked to birth defects, reproductive problems, heart disease.

Potentially harmful

- Mimics the hormone estrogen
- Found in the urine of 93 percent of the population over age 6; suggests constant exposure to BPA
- BPA can leach into food or beverage if plastic container is heated

Products, purpose of BPA

Baby bottles

Makes bottle transparent



Safer alternatives

- Use glass bottles or plastic bag inserts
- BPA-free bottles available

Nondisposable water bottles

Makes bottle shatterproof



- Do not wash in dishwasher
- Use stainless steel or BPA-free plastic bottles

Canned food lining

Prevents corrosion
food contamination



- Choose food packaged in cardboard cartons
- Eat fresh produce

Dental sealant, composite

Resin contains BPA-based materials



- BPA also found in plastic eyeglass lenses, coatings on cash register receipts, CDs, paints, medical equipment, toys

What to look for



- Container bottoms marked with 7* or 3 may contain PBA

*New bio-based or combination plastics also marked with numeral 7

Silverfil contains ZERO
free mercury

Source: AP, Green Guide, BPA Global Group, U.S. Centers for Disease Control and Prevention, American Dental Association © 2012 MCT Graphic: Melina Yingling