

Bisphenol A

ADA Statement on Bisphenol A and Dental Materials

Bisphenol A (BPA) has been present in many consumer plastic products and food packaging since the 1960s.¹ Some studies have suggested that BPA may have adverse health effects, which has raised concerns about its widespread use.

The food industry uses BPA in the manufacture of hard plastic bottles and the lining that coats metal cans used to hold foods and beverages. Bisphenol A also is found in many other hard plastic products (like toys and plastic tableware). In 2012 in response to a petition from the American Chemistry Council, the FDA removed regulatory authorization for BPA as an additive in baby bottles and spill-proof cups. The FDA stated that this action was not based on safety concerns but rather on the manufacturers' representation that the industry no longer used BPA in those items.² BPA is also present in the environment from the release of industrial and household wastes. To a lesser extent, dental materials used to treat and prevent caries can contribute to very low-level BPA exposure for a few hours after placement.^{3,4,5}

BPA might be found in dental composites and sealants for two reasons: 1) it's a by-product of other ingredients in dental composites and sealants that have degraded, and; 2) it's a trace material left-over from the manufacture of other ingredients used in dental composites and sealants. ADA research, confirmed by direct communications from dental material manufacturers, indicates that BPA is not used as a formula ingredient in dental materials.

As a product of the degradation of the material in the oral cavity: Composite resins are formulated from a mixture of monomers that are commonly based on bisphenol A diglycidyl ether methacrylate (bis-GMA). Some composite resins may contain other monomers, in addition to bis-GMA, that are added to modify the properties of the resin. An example is bisphenol A dimethacrylate (bis-DMA). Bis-DMA-containing materials can release very small quantities of BPA, because bis-DMA is broken down by salivary enzymes.

As a trace material: BPA is used in the production of other ingredients found in many dental composites and sealants. Bis-DMA and bis-GMA are both produced using BPA as a starting ingredient, so residual BPA, which was not chemically converted into bis-DMA or bis-GMA, is likely present in trace amounts in any dental material containing these ingredients.

The U.S. Department of Health and Human Services (HHS) provides scientific guidance on issues that affect the health of Americans, and the U.S. Food and Drug Administration (FDA) provides advice and recommendations on dental product safety. A 2008 report prepared by the National Toxicology Program (NTP) of the HHS states that, "Dental sealant exposure to bisphenol A occurs primarily with use of dental sealants [containing] bisphenol A dimethacrylate. This exposure is considered an acute and infrequent event with little relevance to estimating general population exposures."⁶ The NTP reported that bisphenol A in food and beverages accounts for the majority of daily human exposure.⁶ In 2012, the FDA reiterated that "recent studies provide reason for some concern about the potential effects of BPA on the brain, behavior, and prostate gland of fetuses, infants and children." However, the FDA "recognizes substantial uncertainties with respect to the overall interpretation of these studies and their potential implications for human health effects of BPA exposure. These uncertainties relate to issues such as the routes of exposure employed, the lack of consistency among some of the measured endpoints or results between studies, the relevance of some animal models to human health, differences in the metabolism (and detoxification) of and responses to BPA both at different ages and in different species, and limited or absent dose response information for some studies."⁷ Based on this conclusion, the FDA continues to provide for the use of BPA in dental materials, medical devices and food packaging.

According to the CDC, dental caries remains the most common chronic disease of children 6 to 19 years of age—4 times more common than asthma among adolescents aged 14 to 17 years.⁷ Untreated cavities can cause pain, dysfunction, absence from school, poor appearance and can lead to the spread of infection—problems that greatly affect a child’s quality of life. The utility of composite resin materials for both restoring dental health and preventing caries is well established, while any health risks from their use are not. The ADA fully supports continued research into the safety of BPA; but, based on current evidence, the ADA does not believe there is a basis for health concerns relative to BPA exposure from any dental material.

The ADA is a professional association of dentists committed to the public’s oral health. As such, the ADA supports ongoing research on the safety of existing dental materials and in the development of new materials. Based on current research, the Association agrees with the authoritative government agencies that the low-level of BPA exposure that may result from dental sealants and composites poses no known health threat.

References

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