Il bis-GMA si forma dalla reazione di Bisfenolo-A con due molecole di glicidil-metacrilato. Alcuni compositi usano UDMA(Urethan dimetacrilato) invece di bis-GMA mentre molti oggi usano una combinazione dei due materiali. Recentemente, qualche produttore ha aggiunto una dose di TEG-DMA(Triethylene glycol dimethacrylate) , una resina a bassa viscosità usata come diluente. La formulazione di un materiale che usa bis-GMA può influire sulle proprietà di modellazione e promette di ridurre la contrazione di volume.

Release of bisphenol A and its derivatives from orthodontic adhesive systems available on the European market as a potential health risk factor.

Małkiewicz K, Turło J, Marciniuk-Kluska A, Grzech-Leśniak K, Gąsior M, Kluska M.

Ann Agric Environ Med. 2015 Feb 24;22(1):172-7. doi: 10.5604/12321966.1141390.
PMID: 25780850 Free Article

Related citations

CONCLUSIONS:

1) In conditions of the current experiment it was demonstrated that most of the assessed orthodontic adhesive resins available on the European market and released into the outside environment - biologically harmful bisphenol A or its derivatives, posing a potential threat to the patients' health. 2) Release of BPA and its derivatives into aqueous solutions is the highest in the early stages of sample incubation

Synthesis of none Bisphenol A structure dimethacrylate monomer and characterization for dental composite applications.

Liang X, Liu F, He J.

Dent Mater. 2014 Aug;30(8):917-25. doi: 10.1016/j.dental.2014.05.021. Epub 2014 Jun 18.

PMID: 24950804

OBJECTIVE:In this study, new dimethacrylate monomer SiMA without Bisphenol A (BPA) structure was synthesized and used as base resin of dental composite materials with the aim of reducing human exposure to BPA derivatives.

- SIGNIFICANCE:
- SiMA had potential to replace Bis-GMA as base resin of dental composite materials. However, formulation of SiMA based resin and composite should be optimized in terms of mechanical strength to satisfy the requirements of resin based dental materials for clinical application.
-

In vitro detection of DNA damage in human leukocytes induced by combined effect of resin composites and adhesive systems.
Marovic D, Tadin A, Mladinic M, Juric-Kacunic D, Galic N.
Am J Dent. 2014 Feb;27(1):35-41.
PMID: 24902403

PURPOSE:
To simultaneously evaluate the genotoxicity of dental composites and adhesive systems in vitro using a cytogenetic assay, with respect to the influence of composite shade.

RESULTS:
For combinations of micro-hybrid composite (A3.5) with two self-etch adhesives (16.1 +/- 5.50 and 16.2 +/- 9.52) after exposure to samples eluted for 1 day, the incidence of primary DNA damage was significantly higher than for the corresponding negative control (14.7 +/- 2.85). Genotoxicity was also higher after treatment with samples eluted for 1 hour (15.3 +/- 4.70) and 1 day (15.3 +/- 9.10), comprised of nano-hybrid composite (A1) with self-etch adhesive in relation to the control (13.1 +/- 1.70). There was no clear trend of increased DNA damage in material combinations with darker shades of composites. Material composition and higher material concentrations showed greater influence on the genotoxicity.

J Formos Med Assoc. 2014 Jun;113(6):349-55. doi: 10.1016/j.jfma.2012.07.008. Epub 2012 Aug 13.

Biocompatibility and cytotoxicity of two novel low-shrinkage dental resin matrices.

Jan YD1, Lee BS2, Lin CP3, Tseng WY4

BACKGROUND/PURPOSE:
To reduce the polymerization shrinkage of dental composite resin, we used two different ratios of toluene 2,4-diisocyanate (TDI) or 1,6-hexamethylene diisocyanate (HDI) as functional side chains of bisphenol A-glycidyl methacrylate (bis-GMA) to synthesize two series of new dental resin matrices. This study evaluated the biocompatibility and cytotoxicity of these two series of new resin matrices.

RESULTS:
Resins of the T1/4 and B groups revealed significantly higher cytotoxicity than resins of other groups. However, resins of the T1 and T3/2 groups exhibited less cytotoxicity. In general, resins of the TDI-modified groups showed equal or less cytotoxicity and induced equal or lower levels of ROS than the corresponding resins of the HDI-modified and B groups.

CONCLUSION:
Our results showed that the TDI-modified resin matrices containing more functional side chains were less cytotoxic than the corresponding HDI-modified resin matrices. When the ratio of functional side chain to bis-GMA is increased, the stereo hindrance of resin structure is increased, more toxic resin monomers are trapped in the complicated resin structure, and thus the resin matrix reveals less cytotoxicity. The TDI-modified resin matrices exhibit higher stereo hindrance of resin structure and thus show less cytotoxicity than the corresponding HDI-modified resin matrices..

J Mech Behav Biomed Mater. 2014 Jul;35:1-8. doi: 10.1016/j.jmbbm.2014.03.012. Epub 2014 Mar 28.

Preparation of low shrinkage methacrylate-based resin system without Bisphenol A structure by using a synthesized dendritic macromer (G-IEMA).

Yu B1, Liu F1, He J2

Abstract

With the growing attention on estrogenic effect of Bisphenol A (BPA), the application of BPA derivatives like Bis-GMA in dental materials has also been doubted. In this research, new BPA free dental resin systems were prepared with synthesized dendritic macromer G-IEMA, UDMA, and TEGDMA. Physicochemical properties, such as double bond conversion, polymerization shrinkage, flexural strength and modulus, fracture energy, water sorption and solubility of BPA free resin formulations were investigated. Bis-GMA/TEGDMA resin system was used as a control. Results showed that the prepared BPA free resins could have higher double bond conversion, comparable or lower polymerization shrinkage and water sorption, and lower water solubility, when compared with Bis-GMA/TEGDMA resin. Though flexural strength and modulus of prepared BPA free polymers were lower than those of Bis-GMA/TEGDMA polymer, BPA free polymers had higher fracture energies and showed plastic deformation prior to fracture, all of these two phenomena showed that BPA free polymers in this research might have higher fracture toughness which would be good for the service life of dental materials..

PLoS One. 2013 Dec 23;8(12):e82942. doi: 10.1371/journal.pone.0082942. eCollection 2013.

Bisgma stimulates prostaglandin E2 production in macrophages via cyclooxygenase-2, cytosolic phospholipase A2, and mitogen-activated protein kinases family.

Kuan YH1, Huang FM2, Lee SS3, Li YC1, Chang YC4.

BACKGROUND:
Bisphenol A-glycidyl-methacrylate (BisGMA) employs as a monomer in dental resins. The leakage of BisGMA from composite resins into the peripheral environment can result in inflammation via macrophage activation. Prostaglandin E2 (PGE2) is a key regulator of immunopathology in inflammatory reactions. Little is known about the mechanisms of BisGMA-induced PGE2 expression in macrophage. The aim of this study was to evaluate the signal transduction pathways of BisGMA-induced PGE2 production in murine RAW264.7 macrophages.

CONCLUSIONS:
These results suggest that BisGMA induced-PGE2 production may be via COX-2 expression, cPLA2 phosphorylation, and the phosphorylation of MAPK family. Cytotoxicity mediated by BisGMA may be due to caspases activation through the phosphorylation of cPLA2 and MAPKs family

Reproductive toxicity evaluation of the dental resin monomer bisphenol a glycidyl methacrylate (CAS 1565-94-2) in mice.

Moilanen LH1, Dahms JK, Hoberman AM.

Abstract

The reproductive toxicity potential of the dental resin monomer bisphenol A glycidyl methacrylate (BisGMA; CASRN 1565-94-2) was investigated in male and female Crl: CD1(ICR) mice, 4 dosage groups, and 25 mice/sex/group. Formulations of BisGMA (0, 0.008, 0.08, or 0.8 mg/kg/d) in 0.8% ethanol in deionized water were intubated once daily beginning 28 days before cohabitation and continuing through mating (males) or through gestation day 17. The following parameters were evaluated: viability, clinical signs, body weights, estrous cyclicity, necropsy observations, organ weights, sperm concentration/motility/morphology, cesarean sectioning and litter observations, and histopathological evaluation of select tissues. No deaths or clinical signs related to BisGMA occurred. No significant changes in male and female body weights and body weight gains were recorded at any of the administered dosages of BisGMA. All mating and fertility parameters, and all litter and fetal data, were considered to be unaffected by dosages of BisGMA as high as 0.8 mg/kg/d. Gross or histopathologic tissue changes attributable to the test article were not observed. Reproductive and developmental no observed effect levels (NOAELs) for BisGMA were 0.8 mg/kg/d, the highest dose tested. Comparison of this NOAEL value to published probabilistic estimates of human BisGMA exposure from dental products suggests a margin of safety of at least 280- to nearly 2000-fold. Under the conditions of this study, BisGMA is not a reproductive toxicant.

J Mater Sci Mater Med. 2014 Jan;25(1):151-62.

In vitro blood and fibroblast responses to BisGMA-TEGDMA/bioactive glass composite implants.

Abdulmajeed AA, Kokkari AK, Käpylä J, Massera J, Hupa L, Vallittu PK, Närhi TO.

This in vitro study was designed to evaluate both blood and human gingival fibroblast responses to bisphenol A-glycidyl methacrylate-triethyleneglycol dimethacrylate (BisGMA-TEGDMA)/bioactive glass (BAG) composite, aimed to be used as composite implant abutment surface modifier. Three different types of substrates were investigated: (a) plain polymer (BisGMA 50 wt%-TEGDMA 50 wt%), (b) BAG-composite (50 wt% polymer + 50 wt% fraction of BAG-particles, <50 μm), and (c) plain BAG plates (100 wt% BAG). The blood response, including the blood-clotting ability and platelet adhesion morphology were evaluated. Human gingival fibroblasts were plated and cultured on the experimental substrates for up to 10 days, then the cell proliferation rate was assessed using AlamarBlue assay™. The BAG-composite and plain BAG substrates had a shorter clotting time than plain polymer substrates. Platelet activation and aggregation were most extensive, qualitatively, on BAG-composite. Analysis of the normalized cell proliferation rate on the different surfaces showed some variations throughout the experiment, however, by day 10 the BAG-composite substrate showed the highest ($P < 0.001$) cell proliferation rate. In conclusion, the presence of exposed BAG-particles enhances fibroblast and blood responses on composite surfaces in vitro.

Reprod Toxicol. 2013 Dec;42:132-55. doi: 10.1016/j.reprotox.2013.08.008. Epub 2013 Aug 30.

Bisphenol A and human health: a review of the literature.

Rochester JR1.

Abstract

There is growing evidence that bisphenol A (BPA) may adversely affect humans. BPA is an endocrine disruptor that has been shown to be harmful in laboratory animal studies. Until recently, there were relatively few epidemiological studies examining the relationship between BPA and health effects in humans. However, in the last year, the number of these studies has more than doubled. A comprehensive literature search found 91 studies linking BPA to human health; 53 published within the last year. This review outlines this body of literature, showing associations between BPA exposure and adverse perinatal, childhood, and adult health outcomes, including reproductive and developmental effects, metabolic disease, and other health effects. These studies encompass both prenatal and postnatal exposures, and include several study designs and population types. While it is difficult to make causal links with epidemiological studies, the growing human literature correlating environmental BPA exposure to adverse effects in humans, along with laboratory studies in many species including primates, provides increasing support that environmental BPA exposure can be harmful to humans, especially in regards to behavioral and other effects in children.

Rom J Morphol Embryol. 2013;54(2):261-5.

Biology and cytotoxicity of dental materials: an in vitro study.

Gociu M1, Pătroi D, Prejmerean C, Păstrăv O, Boboia S, Prodan D, Moldovan M.

Author information

OBJECTIVE:

The purpose of the experiment was to determine the degree of biocompatibility o a sealer (RO, laboratory made product) dental material in terms of cytotoxicity and animal tests.

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CONCLUSIONS:

The tests with experimental composite materials revealed that they are not cytotoxic for the living cells, in all versions of the materials used. All the samples of composite materials have maintained their integrity during the experiment, allowing the testing together with the embedded cells, which proved good viability, so they are suitable for dentistry use

Dent Mater. 2013 Jun;29(6):618-25. doi: 10.1016/j.dental.2013.03.009. Epub 2013 Apr 6.

Quantification of elutable substances from methacrylate based sealers and their cytotoxicity effect on with human gingival fibroblasts.

Furche S1, Hickel R, Reichl FX, van Landuyt K, Shehata M, Durner J.
Author information

OBJECTIVES:
Previous studies have shown that resin composites may cause persistent inflammation of oral or pulpal tissues as well as cell death through eluted substances. The aim of this study was to investigate the leaching of ingredients from commercial dental fissure sealers as well as their cytotoxic effects on human gingival fibroblast (HGF).

RESULTS:
In eluates from polymerized sealers, comonomers (triethylene glycol dimethacrylate (TEGDMA)) and additives were found (e.g. camphorquinone (CQ), butylated hydroxytoluene, triphenylstibane). 7 d after the beginning of the experiments the highest amount of TEGDMA was found in the aqueous eluate from Grandio(®) Seal (9944.31 (2250.56) μmol/l). The most cytotoxic eluate found in the XTT-test was from Fissurit(®) F (EC50 value at 27.13 (7.04)%; (mean(SD)).
SIGNIFICANCE:
Because of the use of sealers in preventative dental medicine it should be taken into account that substances like TEGDMA or CQ, that are often causing allergic reactions, are elutable. Before using the sealers patients should be asked for allergic reactions to these substances.

Gen Dent. 2012 Sep-Oct;60(5):424-32; quiz 433-4.
What every dentist should know about bisphenol A.
LaBauve JR1, Long KN, Hack GD, Bashirelahi N.

Abstract
Bisphenol A (BPA) is a common industrial chemical that has been associated with a variety of biological disorders. From the unborn to the elderly, BPA affects every demographic of the population; however, its potential long-term effects on prenatal and prepubescent development have led to concern about its use in the field of pediatrics. Because BPA is omnipresent in modern society, the use of BPA derivatives (such as Bis-GMA and Bis-DMA) in dental materials in general, and acrylic resins in particular, will be increasingly examined as research continues to implicate BPA in a number of biological disorders.
PMID: 23032231 [PubMed - indexed for MEDLINE

Food Chem Toxicol. 2012 Nov;50(11):4003-9. doi: 10.1016/j.fct.2012.08.019. Epub 2012 Aug 24.

Proinflammatory activation of macrophages by bisphenol A-glycidyl-methacrylate involved NFκB activation via PI3K/Akt pathway.

Kuan YH1, Huang FM, Li YC, Chang YC.

Abstract

AIM:

Bisphenol A-glycidyl-methacrylate (BisGMA), a dental composite resin and dentin bonding agent, might prompt inflammatory effects to adjacent tissues. Macrophages are a major cellular component of the inflammatory sites. Little is known about the mechanisms of BisGMA on macrophages activation. The aim of this study was to evaluate BisGMA on proinflammatory mediators generation of murine macrophage RAW264.7 cells.

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RESULTS:

BisGMA augmented the generation of IL-1β, IL-6, nitric oxide and the expression of iNOS in a time- and dose-dependent manner ($p<0.05$). BisGMA enhanced the generation of intracellular and extracellular ROS in a dose-dependent manner ($p<0.05$). The levels of p65 phosphorylation, IκB degradation, and Akt phosphorylation were found to be increased in a time- and dose-dependent manner ($p<0.05$).

CONCLUSIONS:

These results indicate that BisGMA could induce nitric oxide, ROS, and inflammatory cytokines in macrophages. In addition, BisGMA may active macrophage via NF-κB activation, IκB degradation, and p-Akt activation.

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PMID: 22939937 [PubMed - indexed for MEDLINE]

Indian J Endocrinol Metab. 2012 May;16(3):339-42. doi: 10.4103/2230-8210.95660.

Bisphenol A in dental sealants and its estrogen like effect.

Rathee M1, Malik P, Singh J.

Abstract

Bisphenol A or BPA-based epoxy resins are widely used in the manufacture of commercial products, including dental resins, polycarbonate plastics, and the inner coating of food cans. BPA is a precursor to the resin monomer Bis-GMA. During the manufacturing process of Bis-GMA dental sealants, Bisphenol A (BPA) might be present as an impurity or as a degradation product of Bis-DMA through esterases present in saliva. Leaching of these monomers from resins can occur during the initial setting period and in conjunction with fluid sorption and desorption over time and this chemical leach from dental sealants may be bioactive. Researchers found an estrogenic effect with BPA, Bis-DMA, and Bis-GMA because BPA lacks structural specificity as a natural ligand to the estrogen receptor. It generated considerable concern regarding the safety of dental resin materials. This review focuses on the BPA in dental sealants and its estrogen-like effect.

AbstractSend to:
Int Endod J. 2012 Jun;45(6):499-507. doi: 10.1111/j.1365-2591.2011.02001.x. Epub 2012 Jan 14.

The role of DNA damage and caspase activation in cytotoxicity and genotoxicity of macrophages induced by bisphenol-A-glycidyldimethacrylate.

Li YC1, Kuan YH, Huang FM, Chang YC.

Abstract
AIM:
To evaluate the potential toxicological implications of BisGMA on murine macrophage cell line RAW264.7.

RESULTS:
BisGMA demonstrated a cytotoxic effect on RAW264.7 cells in a dose-dependent and a time-dependent manner ($P < 0.05$). BisGMA was found to induce two modes of cell death. The mode of cell death changed from apoptosis to necrosis as the concentrations of BisGMA elevated. Caspase-3, caspase-8 and caspase-9 activities were significantly induced by BisGMA in a dose-dependent manner ($P < 0.05$). Moreover, BisGMA exhibited genotoxicity via a dose-related increase in the numbers of micronucleus and DNA strand breaks ($P < 0.05$).
CONCLUSIONS:
Cytotoxicity and genotoxicity induced by BisGMA are mediated by DNA damage and caspase activation.

J Appl Toxicol. 2013 Jun;33(6):451-7. doi: 10.1002/jat.1765. Epub 2011 Nov 26.

Cytotoxicity of dental resin composites: an in vitro evaluation.

Ausiello P1, Cassese A, Miele C, Beguinot F, Garcia-Godoy F, Di Jeso B, Ulianich L.

Abstract

Resin-based dental restorative materials release residual monomers that may affect the vitality of pulp cells. The purpose of this study was to evaluate the cytotoxic effect of two light-cured restorative materials with and without bis-GMA resin, respectively (Clearfil Majesty Posterior and Clearfil Majesty Flow) and a self-curing one (Clearfil DC Core Automix) when applied to the fibroblast cell line NIH-3T3. Samples of the materials were light-cured and placed directly in contact to cells for 24, 48, 72 and 96 h. Cytotoxicity was evaluated by measuring cell death by flow cytometry, cell proliferation by proliferation curves analysis and morphological changes by optical microscopy analysis. All the composite materials tested caused a decrease in cell proliferation, albeit at different degrees. However, only Clearfil DC Core Automix induced cell death, very likely by increasing apoptosis. Morphological alteration of treated cells was also evident, particularly in the Clearfil DC Core Automix-treated cells. The different cytotoxic effects of dental composites should be considered when selecting an appropriate resin-based dental restorative material for operative restorations

Am J Orthod Dentofacial Orthop. 2011 Dec;140(6):779-89. doi: 10.1016/j.ajodo.2011.04.022.

Release of bisphenol A from resin composite used to bond orthodontic lingual retainers.

Kang YG1, Kim JY, Kim J, Won PJ, Nam JH.

Abstract

INTRODUCTION:

In this study, we assessed the changes in bisphenol A (BPA) levels in saliva and urine after placing lingual bonded retainers.

RESULTS:

The only significant high level of BPA was observed in the saliva collected just after placement of the lingual bonded retainer. Age and sex did not affect the BPA levels. Subjects in the flowable resin group had lower BPA levels than those in the conventional hybrid resin group; pumice prophylaxis decreased the level of BPA released from the conventional hybrid resin at the immediate time point. The salivary BPA level (maximum, 20.889 ng/mL) detected in the samples collected just after placement was far lower than the reference daily intake dose.

CONCLUSIONS:

Accordingly, the potential toxicity of BPA from placing lingual bonded retainer might be negligible. On the other hand, because the health-effective amount of BPA is controversial, BPA release should be minimized.

PMID: 22133942 [PubMed - indexed for MEDLINE]

AbstractSend to:

Gen Dent. 2011 Jul-Aug;59(4):262-5.

Current status of potential bisphenol toxicity in dentistry.

Myers DE1, Hutz RJ.

Abstract

Bisphenols are chemical components found in dental composites and sealants. Similar compounds also can be found in baby bottles, food can liners, and even drinking water. Bisphenols have gained attention recently because they, like other natural and synthetic compounds, including hormone-based drugs and soybean products, have the capacity to mimic the actions of the hormone estrogen in living cells and animals. Such estrogenic activity has been linked to a variety of health problems, including breast and prostate cancer, metabolic disorders, and reproductive dysfunction. In early 2010, the FDA issued a report stating that there are some concerns about the safety of bisphenols in food products and called for more research on bisphenol toxicity. At present, no regulatory or professional organization has expressed concern about health effects of bisphenols in dental materials.

Protective effect of chitosan oligosaccharide lactate against DNA double-strand breaks induced by a model methacrylate dental adhesive.

Szczepanska J1, Pawlowska E, Synowiec E, Czarny P, Rekas M, Blasiak J, Szaflik JP.

Abstract

BACKGROUND:

Monomers of methacrylates used in restorative dentistry have been recently reported to induce DNA double-strand breaks (DSBs) in human gingival fibroblasts (HGFs) in vitro. Because such monomers may penetrate the pulp and oral cavity due to the incompleteness of polymerization and polymer degradation, they may induce a similar effect in vivo. DSBs are the most serious type of DNA damage and if misrepaired or not repaired may lead to mutation, cancer transformation and cell death. Therefore, the protection against DSBs induced by methacrylate monomers released from dental restorations is imperative.

RESULTS:

ChOL increased the viability of HGFs exposed to Bis-GMA/HEMA as assessed by flow cytometry. ChOL decreased the extent of DSBs induced by Bis-GMA/HEMA as evaluated by neutral comet assay and phosphorylation of the H2AX histone. ChOL did not change mechanical properties of the model adhesive, as checked by the shear bond test. Scanning electron microscopy revealed a better sealing of the dentinal microtubules in the presence of ChOL, which may protect pulp cells against the harmful action of the monomers.

CONCLUSIONS:

ChOL can be considered as an additive to methacrylate-based dental materials to prevent DSBs induction, but further studies are needed on its formulation with the methacrylates.

J Appl Oral Sci. 2011 May-Jun;19(3):218-22.

Apoptosis and survivability of human dental pulp cells under exposure to Bis-GMA.

Yano J1, Kitamura C, Nishihara T, Tokuda M, Washio A, Chen KK, Terashita M.

Abstract

OBJECTIVE:

In the present study, we examined whether 2, 2-bis [4-(2-hydroxy-3-methacryloxypropoxy) phenyl] propane (Bis-GMA) has effects on LSC2 cells, human dental pulp cell line.

RESULTS:

There was a concentration-dependent decrease in cell proliferation and an increase in cell number in the sub-G1 population after exposure to Bis-GMA. Furthermore, the cells showed typical characteristics of apoptotic cells after the exposure to high concentration of Bis-GMA. In contrast, cells exposed to lower concentrations of Bis-GMA recovered their viability after being cultured without Bis-GMA. We also found that Bis-GMA is capable of penetrating 1-mm-thick dentin discs, though the penetrated concentration was lower than that showing cytotoxicity.

CONCLUSION:

These results suggest that Bis-GMA has cytotoxic effects, though dental pulp exposed to lower concentrations is able to recover their viability when Bis-GMA is removed

Arch Toxicol. 2011 Nov;85(11):1453-61. doi: 10.1007/s00204-010-0593-x. Epub 2010 Sep 29.

Bisphenol A-glycidyl methacrylate induces a broad spectrum of DNA damage in human lymphocytes.

Drozdz K1, Wysokinski D, Krupa R, Wozniak K.

Abstract

Bisphenol A-glycidyl methacrylate (BisGMA) is monomer of dental filling composites, which can be released from these materials and cause adverse biologic effects in human cells. In the present work, we investigated genotoxic effect of BisGMA on human lymphocytes and human acute lymphoblastic leukemia cell line (CCRF-CEM) cells. Our results indicate that BisGMA is genotoxic for human lymphocytes. The compound induced DNA damage evaluated by the alkaline, neutral, and pH 12.1 version of the comet assay. This damage included oxidative modifications of the DNA bases, as checked by DNA repair enzymes EndoIII and Fpg, alkali-labile sites and DNA double-strand breaks. BisGMA induced DNA-strand breaks in the isolated plasmid. Lymphocytes incubated with BisGMA at 1 mM were able to remove about 50% of DNA damage during 120-min repair incubation. The monomer at 1 mM evoked a delay of the cell cycle in the S phase in CCRF-CEM cells. The experiment with spin trap-DMPO demonstrated that BisGMA induced reactive oxygen species, which were able to damage DNA. BisGMA is able to induce a broad spectrum of DNA damage including severe DNA double-strand breaks, which can be responsible for a delay of the cell cycle in the S phase9

Pediatrics. 2010 Oct;126(4):760-8. doi: 10.1542/peds.2009-2693. Epub 2010 Sep 6.

Bisphenol A and related compounds in dental materials.

Fleisch AF1, Sheffield PE, Chinn C, Edelstein BL, Landrigan PJ.

Abstract

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.

OBJECTIVES:

To systematically compile and critically evaluate the literature characterizing BPA content of dental materials; to assess BPA exposures from dental materials and potential health risks; and to develop evidence-based guidance for reducing BPA exposures while promoting oral health.

CONCLUSIONS:

On the basis of the proven benefits of resin-based dental materials and the brevity of BPA exposure, we recommend continued use with strict adherence to precautionary application techniques. Use of these materials should be minimized during pregnancy whenever possible. Manufacturers should be required to report complete information on the chemical composition of dental products and encouraged to develop materials with less estrogenic potential

J Am Dent Assoc. 1999 Feb;130(2):201-9.

BIS-GMA--based resins in dentistry: are they safe?

Söderholm KJ1, Mariotti A.

Abstract

BACKGROUND:

The authors critically surveyed research dealing with the release of resin components from dental composites and the potential of these agents to mimic or disrupt estrogenic cell responses.

TYPES OF STUDIES REVIEWED:

The studies reviewed included those on synthetic methods used to make bisphenol A glycidyl methacrylate, or BIS-GMA, and the biological effects of this resin in cell culture and animals. The estrogenic effect of bisphenol A was targeted because bisphenol A is present as an impurity in some resins (BIS-GMA) and as a degradation product from other resins (bisphenol A dimethacrylate, or BIS-DMA).

RESULTS:

The outcomes of this review revealed that short-term administration of BIS-GMA and/or bisphenol A in animals or cell cultures can induce changes in estrogen-sensitive organs or cells. However, considering the dosages and routes of administration and the modest response of estrogen-sensitive target organs, the authors conclude that the short-term risk of estrogenic effects from treatments using bisphenol A-based resins is insignificant. Long-term effects need to be investigated further.

CLINICAL IMPLICATIONS:

Commonly used dental resins should not be of concern to the general public; however, pharmacological evaluation of dental materials is needed to ensure biologically safe and therapeutically effective substances.

Am Dent Assoc. 2000 Jan;131(1):51-8.

Pharmacokinetics of bisphenol A released from a dental sealant.

Fung EY1, Ewoldsen NO, St Germain HA Jr, Marx DB, Miaw CL, Siew C, Chou HN, Gruninger SE, Meyer DM.

Abstract

BACKGROUND:

Limited information is available regarding potentially estrogenic bisphenol A, or BPA, released from dental sealants. This study determined the rate- and time-course of BPA released from a dental sealant (Delton Opaque Light-cure Pit and Fissure Sealant, Preventive Care/Dentsply) when applied at a dosage of 8 milligrams (one tooth) or 32 mg (8 mg on each of four teeth) to 40 healthy adults.

CONCLUSION:

This study showed that BPA released orally from a dental sealant may not be absorbed or may be present in nondetectable amounts in systemic circulation. The concern about potential estrogenicity of sealant may be unfounded

J Dent Hyg. 2010 Summer;84(3):145-50. Epub 2010 Jul 5.

Bisphenol A blood and saliva levels prior to and after dental sealant placement in adults.

Zimmerman-Downs JM1, Shuman D, Stull SC, Ratzlaff RE.

PURPOSE:
This study examined the effects of a widely used (Delton Pit & Fissure Sealant - Light Cure Opaque, DENTSPLY Professional, York, PA) pit and fissure sealant material on bisphenol A (BPA) levels in blood and saliva, among both low and high-dose groups over time.

CONCLUSIONS:
Exposure to BPA from sources other than dental resins contributes to salivary baseline concentration levels and indicates environmental exposure and use of products containing BPA. Use of specific molecular formulations of dental sealant material determines the release of BPA, therefore, dental sealant materials should be reviewed independently when questioning the release of BPA from dental sealants. In addition, dosage amounts of the dental sealant material used in this study do not influence the serum concentration levels of BPA. Further research is needed to examine the cumulative estrogenic effects of BPA from dental sealants

J Dent Res. 2013 Nov;92(11):989-94. doi: 10.1177/0022034513504436. Epub 2013 Sep 11.

Cariogenic bacteria degrade dental resin composites and adhesives.

Bourbia M1, Ma D, Cvitkovitch DG, Santerre JP, Finer Y.

Abstract

A major reason for dental resin composite restoration replacement is related to secondary caries promoted by acid production from bacteria including Streptococcus mutans (S. mutans). We hypothesized that S. mutans has esterase activities that degrade dental resin composites and adhesives. Standardized specimens of resin composite (Z250), total-etch (Scotchbond Multipurpose, SB), and self-etch (Easybond, EB) adhesives were incubated with S. mutans UA159 or uninoculated culture medium (control) for up to 30 days. Quantification of the BisGMA-derived biodegradation by-product, bishydroxy-propoxy-phenyl-propane (BisHPPP), was performed by high-performance liquid chromatography. Surface analysis of the specimens was performed by scanning electron microscopy (SEM). S. mutans was shown to have esterase activities in levels comparable with those found in human saliva. A trend of increasing BisHPPP release throughout the incubation period was observed for all materials and was more elevated in the presence of bacteria vs. control medium for EB and Z250, but not for SB ($p < .05$). SEM confirmed the increased degradation of all materials with S. mutans UA159 vs. control. S. mutans has esterase activities at levels that degrade resin composites and adhesives; degree of degradation was dependent on the material's chemical formulation. This finding suggests that the resin-dentin interface could be compromised by oral bacteria that contribute to the progression of secondary caries

Chemical Names: Bis-gma; Bisphenol A glycidylmethacrylate; BISPHENOL A-GLYCIDYL METHACRYLATE; Nupol 1629; 1565-94-2; Bisphenol A glycerolate dimethacrylate; More...
Molecular Formula: C29H36O8

2-Propenoic acid, 2-methyl-, (1-methylethylidene)bis(4,1-phenyleneoxy(2-hydroxy-3,1-propanediyl)) ester, homopolymer
Adaptic
Bis GMA
Bis GMA Polymer
Bis GMA Resin
Bis(Phenol A-Glycidyl Methacrylate)
Bis(Phenol A-Glycidyl Methacrylate), Homopolymer
Bis(Phenol A-Glycydyl Methacrylate)
Bis-GMA
Bis-GMA Polymer

Componenti pericolosi che ne determinano l'etichettatura:
Trifluoruro di itterbio
Bismetacrilato di 7,7,9(o 7,9,9)-trimetil-4,13-diosso-3,14-diossa-5,12-diazaesadecan-1,16-diile
(Ottaidro-4,7-metano-1H-indendiil)bis(metilene) bismetacrilato
2-(2H-benzotriazol-2-il)-p-cresolo
· **Indicazioni di pericolo**
H302 Nocivo se ingerito.
H317 Può provocare una reazione allergica cutanea.
· Consigli di prudenza
P272 Gli indumenti da lavoro contaminati non devono essere portati fuori dal luogo di lavoro.
P280 Indossare guanti di protezione / occhiali di protezione.
P301+P312 IN CASO DI INGESTIONE: contattare un CENTRO ANTIVELENI/un medico in caso di malessere.
P333+P313 In caso di irritazione o eruzione della pelle: consultare un medico.
P330 Sciacquare la bocca.
P501 Smaltire il prodotto/recipiente in conformità con le disposizioni locali / regionali / nazionali /
internazionali.
· Ulteriori dati:
La miscela contiene 12,2 % di componenti la cui tossicità non è nota.
contiene il 12,2 % di componenti di cui è ignoto il pericolo per l’ambiente acquatico

Le terre rare sono utilizzate in molti apparecchi tecnologici:

- superconduttori[4];
- magneti[4];
- catalizzatori[4];
- componenti di veicoli ibridi[4];
- applicazioni di optoelettronica (ad esempio laser Nd:YAG);
- fibre ottiche (erbio);
- risonatori a microonde (sfere di YIG, ovvero Yttrium iron garnet);
- gli ossidi delle terre rare sono mescolati al tungsteno per migliorare le sue proprietà alle alte temperature per saldature, rimpiazzando il torio che può risultare pericoloso da lavorare.

PRECAUZIONI–TOSSICITA’ Benché l'itterbio sia abbastanza stabile, è meglio conservarlo in contenitori sigillati, per proteggerlo dal contatto con l'aria e l'umidità. La polvere di itterbio metallico può incendiarsi spontaneamente all'aria. Tutti i composti dell'itterbio sono considerati tossici; sono noti per causare irritazione alla pelle e agli occhi e sono sospetti cancerogeni.

Alcuni, specialmente gli ultimi lantanidi, formano strutture sia ferro- che antiferromagnetiche a diverse temperature. Per queste, al diminuire della temperatura la sequenza di stati è sempre:

paramagnetico Þ antiferromagnetico Þ ferromagnetico

Il glicole etilenico dimetacrilato (EGDMA) è uno diestere formato dalla reazione di condensazione di due moli di acido metacrilico con uno di glicole etilenico

Sostanze pericolose:

CAS: 72869-86-4
EINECS: 276-957-5
Urethane Dimethacrylate (UDMA) Xi; R 36/37/38 15-30%
Fluoro Alumino-silicate glass 30-40%
CAS: 60842-32-2 Silica powder 10-20%
Prepolymerized filler 20-30%
Dimethacrylate Xi; R 36/37/38 0-5%
CAS: 10373-78-1 Camphorquinone < 1%
.

Da un punto di vista convenzionale

l'allergia è una malattia del sistema immunitario caratterizzata da reazioni eccessive portate da particolari anticorpi (reagine o IgE) nei confronti di sostanze abitualmente innocue come ad esempio pollini, che si 'cura'(gestisce) con:

-antistaminici

-cortisonici

-sodio cromoglicato

-salbutamolo che è un agonista selettivo dei recettori beta2-adrenergici

-antileucotrienici (es. montelukast)

L'ultima' frontiera' nel trattamento delle allergie sono gli anticorpi antiIgE (omalizumab). Si tratta di anticorpi monoclonali)

Da un punto di vista non convenzionale

un possibile modo di ragionare
é quello tradizionale della MTC : cerco, almeno in prima battuta, un campo di disturbo nell'ambito della stessa loggia

Vaso dell'allergia (Voll) appartiene alla loggia acqua e lì vale la pena di provare a cercare

Anticipando le conclusioni é altamente probabile che il paziente allergico abbia un problema renale e che l'iperreattività oggi a questo domani a quell'altro allergene non sia altro che la manifestazione di un 'vaso troppo pieno';é possibile che la gestione di quel problema renale cambi la prognosi del soggetto allergico

Ragazzo di 15 anni(costituzione fosforica con note fluoriche,introverso ma collaborante,pallido con evidenti occhiaie,lamenta scarsa energia) definito sin da almeno 10 anni un paziente allergico affetto da' rinite allergica ' con ricorrenti pesanti crisi d'asma che lo costringono ormai da anni all'uso quotidiano di cortisone e antiistaminici (preso in cura 9 mesi fa)

Prima visita accompagnato da padre e madre
Il ragazzo si lamenta di non riuscire a respirare, per un intasamento nasale costante mai risolventesi e riferisce il 'terrore' delle crisi asmatiche

Test EAV:

Glomerulonefrite bilaterale
Streptococco emolitico
Nefrite tubercolare monolaterale
Appendicite cronica da Tuberculinum Avis (punto appendicolare dolente alla palpazione)
Sinusite frontale ,etmoidale e sfenoidale cronica da aspergillus niger

Terapia

Sollecito la bonifica delle muffe presenti nell'ambiente abitativo
Drenaggio e sostegno renale (Solidago,plantago,cantharis, apis)
Belladonna,pennicillum(rimedi per Streptococco)
Rimedio di risonanza per tuberculinum Koch(ammonium carbonicum) +nosode tubercolare(ancora presente nei distributori)
Drenaggio colon(podophyllum)
Rimedio di risonanza per tuberculinum avis (kalium carbonicum)
Drenaggio seni paranasali(cinnabaris)+nosode aspergillus niger
Eliminazione di : latte e latticini per ridurre l'acidosi,insaccati di maiale per ridurre l'eccesso di istamina , glutine(reattività crociata glutine-tuberculinum avis);discussione prolungata su cibi alternativi,modalità di preparazione e cottura)
Colecalciferolo 1000 UI 2 volte al giorno ai pasti
Abbino sintomatici omeopatici a base di histaminum,berberis e apis(no ribes nigrum) da abbinare alla terapia convenzionale in corso;faccio mantenere la terapia convenzionale ancora per una settimana,nella settimana successiva inizio a ridurre per poi eliminare il cortisone e nel giro di un mese elimino anche l'antiistaminico

Seconda visita(dopo circa tre mesi)

Paziente accompagnato da padre e madre

- miglioramento dati EAV
- dalla sospensione il paziente non ha più assunto cortisone
-bonifica muffe effettuata solo parzialmente
-approfondiamo l'aspetto alimentare
-il ragazzo si mostra più affabile, si dice contento e disponibile a continuare il percorso terapeutico
-modeste correzioni dalla terapia

Terza visita(dopo circa tre mesi)

Paziente accompagnato solo dalla madre

- miglioramento dati EAV
- dalla sospensione il paziente non ha più assunto cortisone
-bonifica muffe effettuata solo parzialmente
-approfondiamo l'aspetto alimentare
-il paziente riferisce una buona energia e dimostra una riduzione del pallore cutaneo
-viene,inaspettatamente,espressa la problematica emozionale recente e si cominciano ad affrontarne gli aspetti(ancora senza floriterapia)
- correzioni dalla terapia:non risultano Glomerulonefrite e nefrite con i relativi Nosodi batterici ma 'entrano 'ancora i farmaci di drenaggio
Non risultano più appendicite e tub.avis
Inizio terapia per disbiosi
Inizio a reintrodurre il glutine solo con farine a basso contenuto di glutine