

Bulk-Fill Resin-Based Composites



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Abstract

Bulk-fill resin composite is a restorative material of great promise for restorative dentistry, presenting success in vitro evaluations. This material was proposed thinking to overlap the problems found in conventional composite resins, which have the negative point the polymerization contraction stress. This new material presents changes in its chemical composition, such as monomeric modification and the initiator system, in order to generate less polymerization contraction. However, longitudinal in vivo studies are of utmost importance for the consolidation of this material as a clinical success.

Keywords: Composite resins; Polymerization; Dental restoration, Permanent

Introduction

Composite resin is the material with the broadest application in restorative dentistry due to its optic and physic properties being very similar to the natural dental tissue, in order to re-establish dental function, form and aesthetic [1,2]. The material presents as its principal characteristic adhesion to the dental structure, avoiding further damage to the dental tissue, however, it presents as disadvantages a strong polymerization contraction stress, with risk of causing marginal gap and staining, microinfiltration, post-procedure sensibility, secondary caries and cusp fracture, characterising a bad prognostic [3-6]. With that in mind, the technology industry developed bulk-fill low-polymerization contraction resins, which permit the insertion of larger quantities of resins and a shorter photopolymerization time. There is an expressive growth on the number of studies regarding this issue in the last five years.

Discussion

The composite resin polymerization process occur by the creation of polymers from monomers, promoting molecular agglutination, and thus, a contraction derived from the polymerization process, as well as residual tension [7].

The new generation of composite resins, the bulk-fill resins, are the big hit in restorative dentistry, for their superior qualities such as: lower polymerization contraction; a simpler, faster restorative technique, with the insertion of a single increment 4-5 mm thick and photopolymerization time as reduced as 20 seconds in a high potency photopolymerizator [8]. Commercially, we can find bulk-fill resins from two categories: flowable, used as filling or

base; restorative, indicated for complete cavity filling, also being malleable.

The chemical modification that this class of composite resins present still demands more studies, due to many important information being legally protected, although it is known that they present modifications on their particle content, being more translucent and permitting better light penetration into deeper layers, being indicated for more voluminous filling [9]; modification of the monomers towards higher molecular mass, denominated "tension modulators", which present bigger chains that can polymerize, and compensate the distance between the polymers [10,11]; and an association between traditional photoindicator systems, such as camphorquinone, and new patented systems [12].

Studies report satisfactory results with the use of bulk-fill composite resins, specifically on adhesion [13] and polymerization [12,14,15], nonetheless, future studies must be directed to clinical research for it to be considered effectively a good option of restorative material.

Conclusion

Bulk-fill composite resins are being largely studied in in vitro assays, presenting very satisfactory results. Notwithstanding, the preoccupation with its clinical effectivity makes future in vivo studies, specially longitudinal studies.

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