

ABSTRACT

Effect of nanofibers as reinforcement on resin-based dental materials: an *in vitro* systematic review

This systematic review (PROSPERO CRD42020190191) evaluated the effect of nanofibers as reinforcement on resin-based dental materials. *In vitro* studies that evaluated and compared the mechanical properties of nanofibers resin-based composite materials, including basic chemical groups of methacrylates were eligible. A bibliographic search was conducted in MEDLINE-PubMed, Embase, Web of Science, Scopus, BVS (LILACS, BBO e IBECs), Cochrane, LIVIVO and grey literature (BDTD) published up to 2020. No publication year or language restriction was applied and methodological quality was assessed using two methods. The first one was assessed by samples obtained through a standardized process, single operator of the machine, sample size calculation, blinding and standard specification and, the second by background and objectives, intervention, outcomes, sample size, randomization, allocation concealment mechanism, implementation, blinding, statistical methods, outcomes and estimation, limitations, funding and outcomes. In a total of 5524 potentially eligible studies, 66 were selected for full-text analysis and 29 were included for qualitative analysis. High-heterogeneity was observed among the included studies and a quantitative statistical meta-analysis was not conducted. The results were separated by each mechanical test performed and the included studies that showed an improvement in the results were, modulus of elasticity (22/23), work of fracture (11/11), flexural strength (26/26), compressive strength (3/3), depth of cure (4/5), tensile strength (4/6), fracture toughness (6/6), microhardness (4/4), volumetric shrinkage (7/7), polymerization shrinkage stress (2/2), wear resistance (1/1), energy at break (1/1) and shear modulus (1/1), while a worsening in the results was observed only in the degree conversion (4/6). Overall, laboratory studies demonstrated that the incorporation of nanofibers on resin-based dental materials improved the mechanical properties compared to resin-based dental materials without nanofibers, suggesting better performance of resin-based composites with nanofibers in high stress bearing application

areas. However, more studies with high-evidence is still necessary to prove the effectiveness of these materials.

Keywords: Resin composite; nanofibers; dental materials.