

Proceeding Paper

In Vitro Evaluation of Dental Composites on Human Dental Pulp Stem Cells Differentiation [†]

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[†] Presented at the 3rd International Electronic Conference on Applied Sciences; Available online: <https://asec2022.sciforum.net/>.

Citation: Spagnuolo, G.; Del Giudice, C.; Maglitto, M.; Simeone, M.; Menale, C.; Rengo, S. In Vitro Evaluation of Dental Composites on Human Dental Pulp Stem Cells Differentiation. *Eng. Proc.* **2022**, *4*, x. <https://doi.org/10.3390/xxxxx>

Academic Editor(s):

Published: 1 December 2022

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Dental composite materials can exert different effects. Particularly, monomers could influence the odontogenic differentiation in human dental pulp stem cells (hDPSCs). The aim of this preliminary study was to evaluate cytotoxicity of two novel composite and whether they can affect mineralization of hDPSCs. Ceram.x Spectra™, a nanohybrid composite with pre-polymerized Sphere-Tec particles, and Admira Fusion, a nanohybrid restorative material with the innovative technology ORMOCER were tested. The samples and the eluates were prepared according to ISO 10993-12:2012. We treated hDPSCs in undifferentiated state with eluates for 4 days and performed MTT assay to evaluate cytotoxicity. The effect of the eluates on the hDPSCs mineralization capacity was evaluated after osteogenic differentiation by alizarin red staining and alkaline phosphatase (ALP) activity test. We assessed different dilutions of both eluates and observed that undiluted Ceram.x eluates were significantly cytotoxic over time, reducing cell viability of about 51,7% as compared untreated cells. Further, the eluates obtained from ORMOCER technology composite did not display any adverse effect on hDPSCs viability. Moreover, we assessed that Ceram.x limited osteogenic activity of hDPSCs, while Admira Fusion did not appear to show any adverse effect. Our results show that composite with conventional dental monomer might exert cytotoxicity on hDPSCs as compared to ORMOCER technology. Indeed, the limited cell differentiation caused by Ceram.x could be explained by its the cytotoxic effect. In this regard, the study is continuing to define cellular changes induced by the composites, and to further identify the optimal dental composite resin for clinical use

Author Contributions:

Funding:

Institutional Review Board Statement:

Informed Consent Statement:

Data Availability Statement:

Conflicts of Interest: .