clear effect on adhesion and growth of fibroblasts in vitro. The present data are consistent with previous literature, although, to the authors' knowledge, this is the first report dealing with gingival fibroblasts. Noteworthy is also that the flexibility of this process allows the functionalization of complex 3D shaped materials and devices, such as dental implants, in less than 1 minute. These preliminary data encourage the implementation of further clinical research.

Evaluation of degree of conversion, rate of cure, microhardness, depth of cure and contraction stress of three nanohybrid composites containing pre-polymerized spherical filler

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Aim: Manufacturers aim at improving filler technology to enhance the properties of the restorative materials, thus maximising the aesthetic and functional outcome of the restored tooth. The present study tested the degree of conversion (DC), rate of cure (RC), microhardness (VHN), depth of cure (VHR) and contraction stress (CS) of three new nanohybrid composites with pre-polymerized spherical filler.
Methods: Three commercially available composite resin were characterised in the present study, namely the Ceram.X® universal shade A3 (CXUA3), Ceram.X® duo enamel shade E2, and Ceram.X® duo dentin shade D3 (CXDE2 and CXDD3). The materials were light-cured with a LED light (SmartLite Focus, measured output 1301 mW/cm2) following the protocol recommended by the manufacturer. DC was assessed by means of Fourier-transform infrared spectroscopy, calculating RC from a second-grade polynomial fitting of the kinetic curve. A microhardness testing machine equipped with a Vickers indenter served to measure the top and bottom VHN of 2 mm-high disc-shaped specimens, using the bottom/top surface values ratio (VHR) as indirect evaluation of the depth of cure. CS vs time was evaluated by a universal testing machine provided with an extensometer as feedback system, CS was normalized for the specimen bonding area. All data sets underwent statistical analysis with dedicated software and tested for the assumptions for the use of parametric tests. Multiple analyses of variance with Scheffé post hoc test were carried out to compare the dependent variables of interest among the tested materials.
Results: All tested materials exhibited a DC lower than 50%, with CXUA3 reaching the lowest DC value after 10 s. RC of CXUA3 at 5 s was comparable to that of CXDE2, while after 10s RC of CXUA3 decreased to a value proportional to that of CXDD3. For all the tested materials, top-VHN was greater than bottom-VHN. Top-VHN of CXDE2 was lower than CXUA3 and CXDD3. CXDD3 was the only material achieving VHR>80%. The main differences in CS among the tested materials were found during the irradiation with curing-light: CXDE2 displaying the lowest CS after 10 s and CXDD3 the highest after 30 s.
Conclusion: The present study proved that the light-curing protocol suggested by the manufacturer for the three composites might be improved: 10 s of irradiation seemed insufficient to adequately cure CXUA3 and CXDE2. Longer curing times for these materials appear advisable.

Morphological and mechanical features of orthodontic composite resins: an innovative in vitro test

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Aim: In order to investigate on the morphological and mechanical features of the following orthodontic composite resins: Bisco Ortho Bracket Paste LC (Bisco, Schaumburg, Illinois, USA), Light-Cure Orthodontic Paste (Leone s.p.a., Sesto Fiorentino. FI, Italy) and Transbond XT Adhesive Resin (3M Unitek, Monrovia, CA, USA),an extensive in vitro studywas performed. Moreover, the purpose of this research was also to introduce, in the field of Dental Biomaterials, an innovative technique of polymeric characterization based on the combined use of SEM (Scanning Electron Microscope) and FIB (Focused Ion Beam) analysis, we called Ion Bean Indentation (IBI) test, that results very performing in deeply investigations of hardness and nano-morphology.
Methods: Samples preparation protocol
Four samples of each material, divided into three randomly groups, were obtained by a polyurethane stamp (10x4 mm). A transparent matrix was used to uniform specimens surface and every specimen was light-cured using a light-source (LED starlight) at light intensity of 400 mW/cm² for 40 seconds; then each sample was stored in distilled water at 37°C.
FIB and SEM analysis
The study of the inner structure and robustness of the resins were performed by a FIB milling (FEI-Helios Nanolab 600) equipment with a Ga+ion source according to a milling protocol with a fixed time of 3 min at a high voltage of 5kV and at a current of 6.5