High biocompatibility of the ELS extra low shrinkage® composite: Time-Lapse imaging using 3D Confocal Laser Scanning Microscopy

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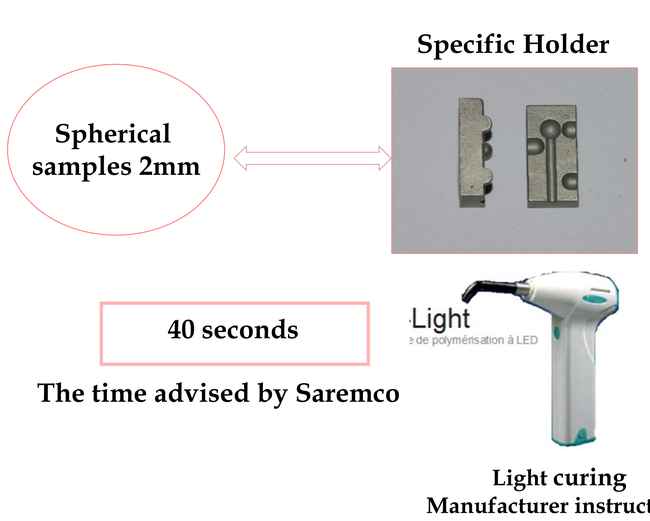
OBJECTIVES

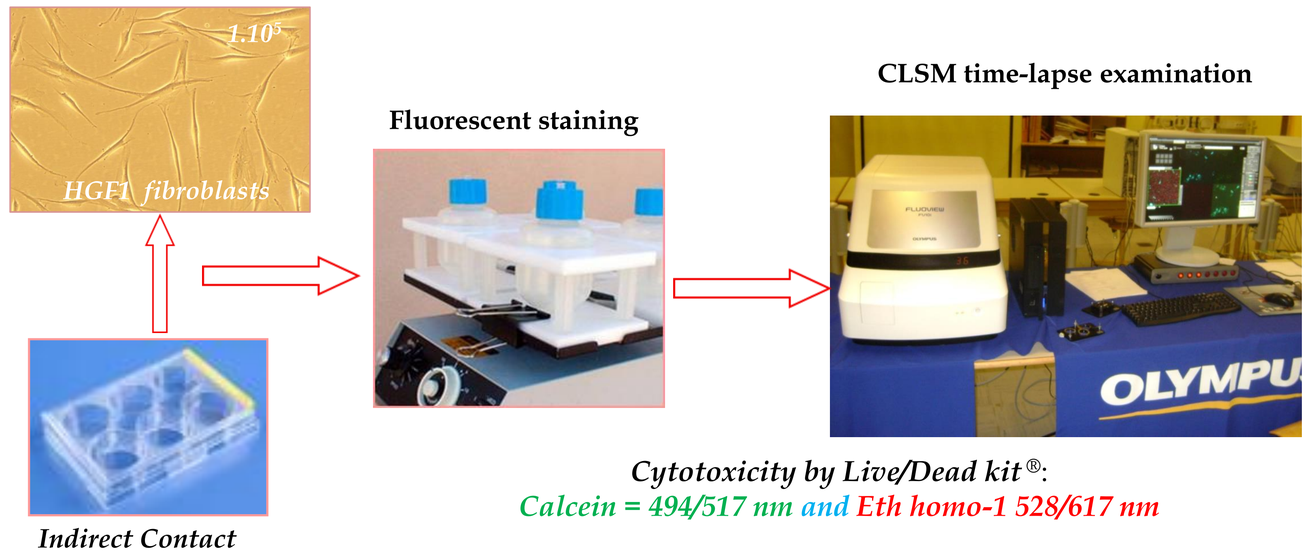
The purpose of this study was to investigate the *in vitro* biocompatibility of two dental composites (ELS extra low shrinkage® compared to a composite X used for direct restoration) by 3D confocal laser scanning microscopy combined to time-lapse imaging.

MATERIALS & METHODS

Composites preparation



CLSM time lapse imaging



Cytotoxicity by Live/Dead kit®:
Calcein = 494/517 nm and Eth homo-1 528/617 nm

RESULTS

Cytocompatibility Assessment

Table 1. Rate of live HGF cells evolution after 1, 2, 3, 4 and 5 h of contact with composites extracts. *Data show mean values ± SD of nine images stacks analysis. Values are significantly different from control cells at p<0.05.*

Contact time (hour)	Cell Viability (%)				
	1	2	3	4	5
Control cells	100	100	100	100	100
ELS extra low shrinkage®	93.9 ±7	91.3±5*	89.5±3*	87.6±2*	87.7±3*
Composite X	83.2±5*	88.3±8*	71.5±2	54.7±1*	37.9±1*

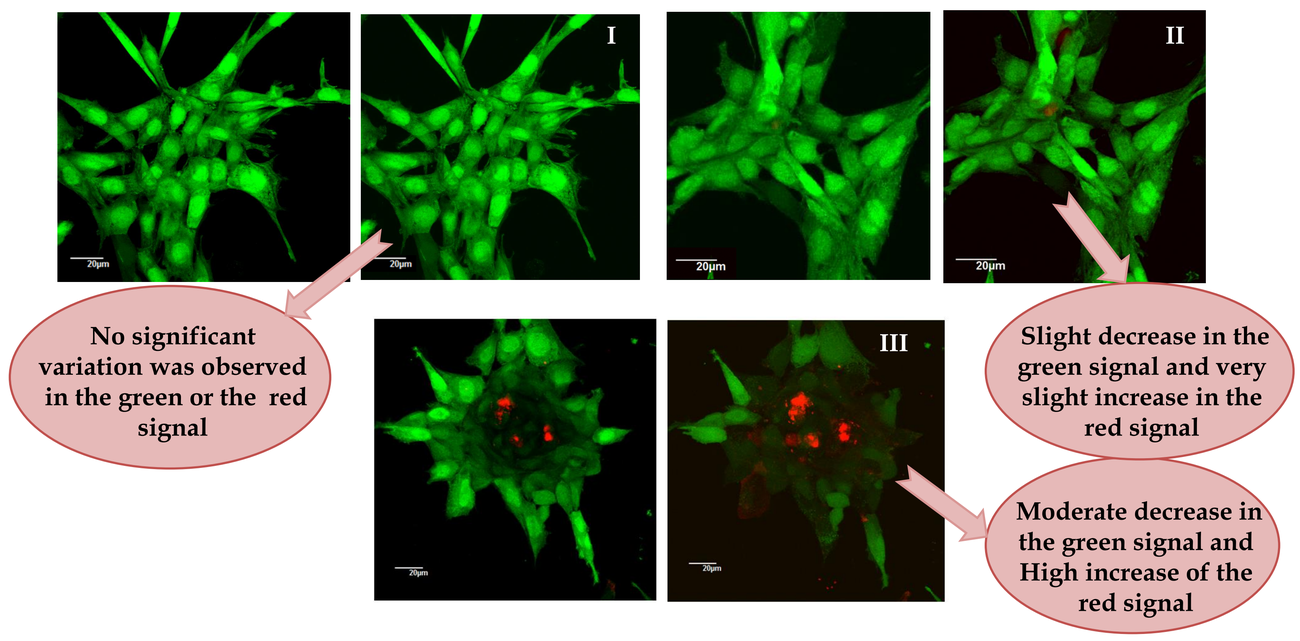


Figure 1: CLSM images of a cell population from (I) a control chamber, (II) ELS extra low shrinkage chamber and (III) composite X chamber; in the beginning and the end of the time-lapse period (15 min and 5 h, respectively). Green areas are live cells and red areas are damaged cells.

DISCUSSION

The *ELS extra low shrinkage®* is significantly better tolerated by human gingival fibroblasts than the tested composite X. The ELS composite showed comparable behavior to control cells during the entire time-lapse period. These effects were shown by reduction of cell viability, and significant change in cell morphology. Then, **ELS extra low shrinkage® composite demonstrated superior biocompatibility** compared to the other tested composite (X) used for direct restoration.

CONCLUSIONS

The present study highlighted the use of 3D CLSM time-lapse confocal imaging as an innovative and a sensitive method to demonstrate qualitatively and quantitatively **the high biocompatibility behavior of the ELS extra low shrinkage® composite.**

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References: *Attik et al. (2013), Microscopy and Microanalysis and Attik et al. JoVe (2014)*
http://www.jove.com/video/51949