

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

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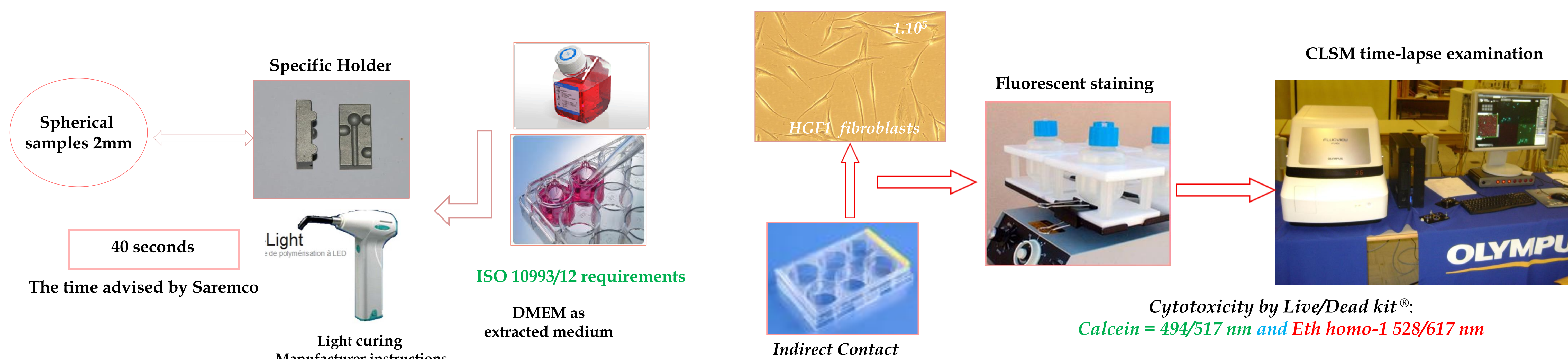
OBJECTIVES

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.

Composites preparation

MATERIALS & METHODS

CLSM time lapse imaging



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 $\pm$ 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 $\pm$ 7	91.3 $\pm$ 5*	89.5 $\pm$ 3*	87.6 $\pm$ 2*	87.7 $\pm$ 3*
Composite X	83.2 $\pm$ 5*	88.3 $\pm$ 8*	71.5 $\pm$ 2	54.7 $\pm$ 1*	37.9 $\pm$ 1*

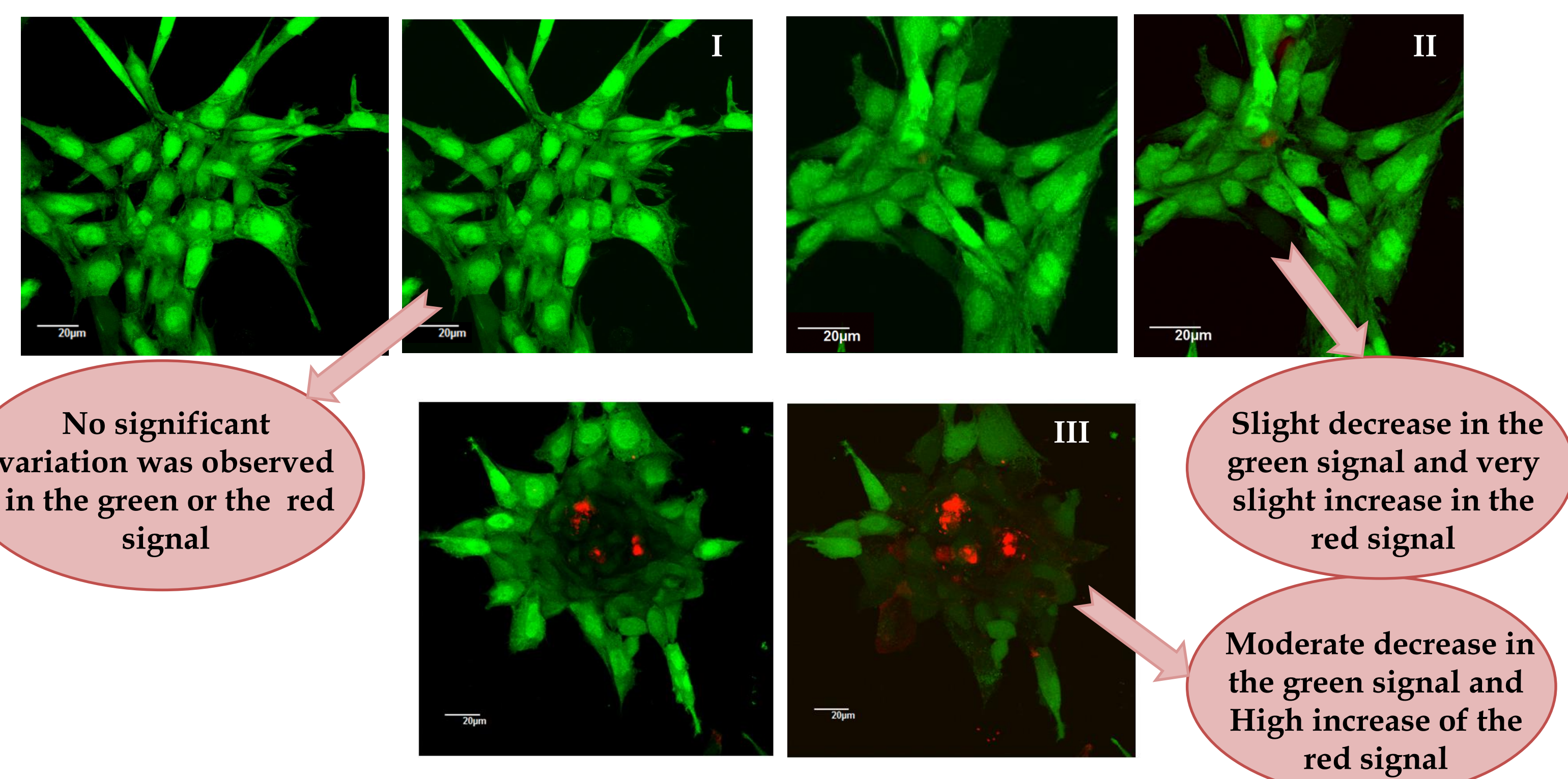


Figure 1: CLSM images of a cell population from (I) a control chamber, (II) ELS extra low shrinkage chamber and (III) composite X chamber; in the beginning and the end of the time-lapse period (15 min and 5 h, respectively). Green areas are live cells and red areas are damaged cells.

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.

Acknowledgements: Saremco Dental Switserland and Olympus Microsystems France Companies are gratefully acknowledged for their financial support. Saremco Dental company are also acknowledged for the generous donation of the tested dental composite.

References: Attik et al. (2013), *Microscopy and Microanalysis* and Attik et al. JoVe (2014)

<http://www.jove.com/video/51949>