Polished *vs* glazed surface properties of lithium disilicate ceramic (IPS e.max®, Ivoclar Vivadent): a physico-chemical and biological study

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Objectives: Lithium disilicate ceramics are widely used materials in aesthetic dentistry and fixed prosthesis(1). Moreover, IPS e.max® Press or CAD was recently reported as the most robust and durable all-ceramic system tested to date(2). Despite multiple biomedical applications, little is known about ceramic surface modifications and the resulting cell behaviour at its contact. The aim of this study was to analyze surface properties and biological response of two different surfaces: glazed *vs* manual polished surface treatment.

Methods: Our study was realized with lithium disilicate ceramic samples (IPS e-max® Press, Ivoclar Vivadent, France) with 3 different surface treatments: raw, hand polished, and glazed surface treatment (control samples were Thermanox®). Surface characterizations were analysed by water-drop method, interferometry, and scanning electron microscopy. Moreover, we compared cell response between polished and glazed surfaces using an organotypic culture model of chicken epithelium(3).

Results: Results demonstrated that the surface roughness is not modified as shown by equivalent Ra measurements. On the contrary, the contact angle θ in water is very different between polished (82°) and glazed (32°) samples. The culture of epithelial tissues allowed a very precise assessment of histocompatibility of these interfaces and showed that polished samples increased cell adhesion and proliferation as compared to glazed samples. Finally, we demonstrated that lithium disilicate dental ceramic is not cytotoxic *in vitro*(4).

Conclusion: Lithium disilicate polished ceramic provided better adhesion and proliferation than lithium disilicate glazed ceramic(5). Taken together, our results demonstrated for the first time, how it is possible to use simple surface modifications to finely modulate the adhesion of tissues. Our results will help dental surgeon to choose the most appropriate surface treatment for a specific clinical application, in particular for the CFAO CAD/CAM skills(6) or for aesthetic ceramic implant collar. We conclude therefore that polished lithium disilicate ceramic is promising to be used to improve aesthetic collar implant and to tight the perio-implant junction without decreasing physical properties of oral rehabilitation.

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