ceramir®

Summary of papers published on the Ceramir technology

Clinical data

There is one prospective clinical study performed, with published results up until three years post cementation. The study comprises 17 patients, with a total of 38 cemented crowns and bridges. Clinical data parameters consisted of: gingival inflammation index (GI), tooth sensitivity according both to categorical and Visual Analogue Scale (VAS) based measurements, marginal integrity, discoloration of cement margin, and retention. All scores showed perfect results, and the failure rates after 6, 12, 24 and 36 months were all 0% for both single unit and fixed partial dentures. [1-3]

Integration with tissue

The integration between tooth/bone and the bioceramic used in Ceramir have been investigated at a nano-level some years before Ceramir Crown & Bridge was released. The materials tested are hence not the exact same as Ceramir Crown & Bridge, but the bioceramic used is the same, and the integration mechanics will not differ between the materials tested and Ceramir Crown & Bridge.

There is one paper describing, in depth, the techniques used for the analysis of the material-tissue interface [4]. The paper describes the sample preparation and sample analysis. The paper also contains two images showing the integration between tooth-material (figure 3) and bone-material (figure 5) in very high resolution. The technique is utilized in [5] to analyze the interface between tooth and the bioceramic material, showing an integration at the nano-level.

Similar techniques as described above have been used to analyze the interface between a calcium aluminate based bone cement and bone-tissue in rats and sheep [6, 7]. Although the cement does not contain any glass ionomer, the calcium aluminate integration with tissue should be similar between the dental cement and the bone cement. The *in vivo* studies performed showed a neat integration between material and tissue after as short of a time as seven days [7].

Sealing of the marginal gap

In order to close the marginal gap and ensure a tight seal between tooth and restoration Ceramir's ability to induce hydroxyapatite formation/dentin remineralization has been investigated. The ability to seal the marginal gap has been attributed to the ability of Ceramir to release calcium and hydroxyl ions to form a hydroxyapatite layer/seal on the material surface when in contact with saliva [10], or PBS [10, 11]. There is one study showing that the marginal gap can be closed [8]. In the study, an artificial marginal gap

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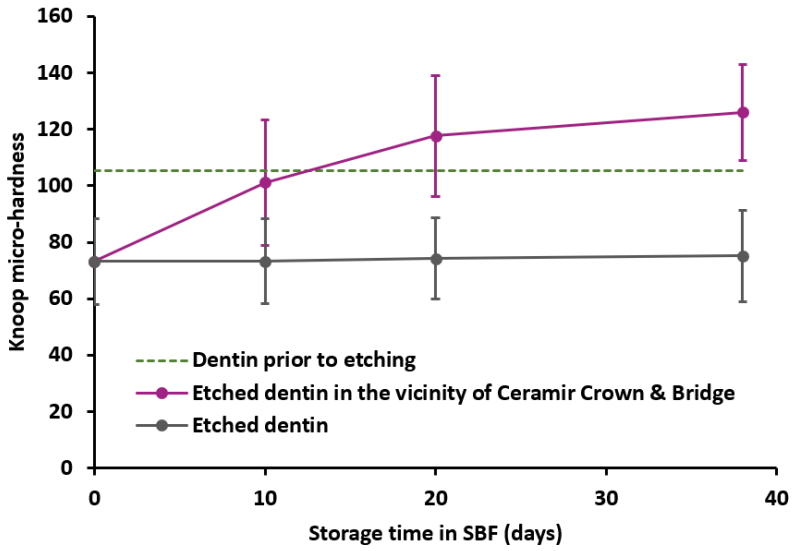
was created between Ceramir and the dentin substrate, and mineralization inside /sealing of the gap was visually observed over a period of approximately one month. Ceramir sealed the marginal gap within a week, and showed similar sealing ability to ProRoot MTA, a material known to remineralize tissue and promote secondary dentin formation when used as a pulp capping material.

There is also a thesis published on the dentin remineralization properties of Ceramir Crown & Bridge [9]. In the thesis the hardness of demineralized dentin in the vicinity of Ceramir Crown & Bridge was measured. After two weeks of storage, the dentin close to the restoration was harder than the dentin prior to etching (see image below), showing that Ceramir induce dentin remineralization.



Retention

There are a few studies on the retentive properties of Ceramir Crown & Bridge. The results from these studies show similar retentive forces between Ceramir Crown & Bridge and Rely X luting [12, 13] (a RMGI), and between Ceramir Crown & Bridge and Rely X Unicem [19] (a self-adhesive resin).

Biocompatibility

Studies on the biocompatibility of Ceramir Crown & Bridge show that Ceramir Crown & Bridge are highly biocompatible and not toxic to cells [14, 15]. In addition, a study on the antibacterial properties of Ceramir Crown & Bridge showed a slight, but significant, bactericidal effect [16].

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Additional data

There are a few clinical reports, reviews and reports on the physical properties of Ceramir Crown & Bridge, these can be found in references [17-25]. In addition, the thesis of Dr. Jesper Lööf [26] give an in-depth understanding of the reaction mechanisms involved in the setting of the calcium aluminate cement.

References

Clinical

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