

From the publishers of
"das dental labor", Germany

68087

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June 2008

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Study documents the healing power of Denseo Fairy

Healing cracks in ceramics veneers?

We have heard claims that cracks in ceramic crowns – the ultimate annoyance, the source of plenty of overtime – can now be downright healed.

At least, that is what the manufacture of Denseo Fairy promises. Whether this is true and what happens during the so-called “healer firing” is something that the Charité University Hospital in Berlin became interested in. Scientists subjected the miracle healer to comprehensive testing – and obtained astonishing results.

The deadline looms large over the dental technician. Everything has to be done in a hurry. Oh well, this is going to work somehow, never mind the long-term cooling, the patient is already on her way, just get the crown out of the furnace and ... CRACK. There it is – every ceramist’s nightmare. A ... crack. Right across the entire bridge. No time to redo it. OK, just add some glaze, back into the furnace, ten nervous minutes – followed by a sigh of relief if the crack is no longer visible. But a measure of uncertainty remains: What happens during those ten minutes in the furnace? Where does the crack go? Maybe some microcracks are left behind in the ceramic veneer, only waiting to turn back into a macrocrack the first time the bridge hits a stray cherry pit?

Denseo is now marketing a substance said to “heal” cracks – in the true sense of the word. It met with a sceptical reception. Just brush the material onto the crack, fire it, and that is it? And the bridge is supposed to be stronger than before at that?



Applying Denseo Fairy.

Advertising claims are easy enough to make. But how exactly does the Fairy work? We set out to wrench the secret from Denseo Fairy.

The Fairy’s secret

There we go again. A crack. Is the crown ready to throw out? Time for Denseo Fairy. Slightly sand the ceramic veneer, steam-clean it, turn the Denseo pin and brush the material onto the crown, in a thin and even layer.

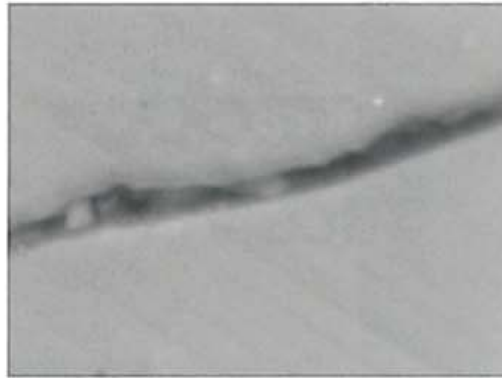
By contrast with an ordinary glaze firing, the healer firing is performed under vacuum. You will use either Denseo Fairy 830° or Denseo Fairy 730°, depending whether the veneer was made of a high-fusing or low-fusing ceramic material. The product name indicates the final temperature.

After the healer firing, the crown will look like new. But why? What has happened in the furnace? What does the Fairy do inside the veneer? The special ceramic compound penetrates deeply into the finest microcracks and reconnects the disrupted molecular structure. Denseo Fairy is much more granular than conventional ceramics. The material is chemically rejoined, as if the crack had never happened. The

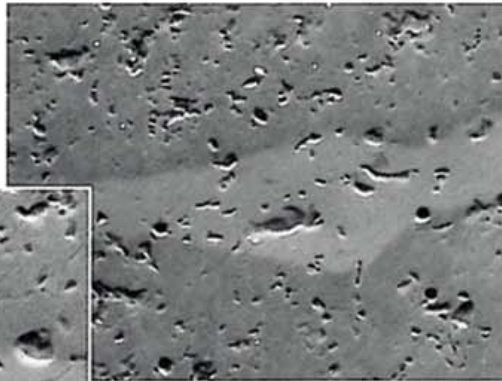
Repairing or healing – what is the difference between healing and glazing?

	Healing	Glazing
Temperature	730 °C low-fusing ceramic; 830 °C for high-fusing ceramics	According to the manufacturer’s instructions
Firing	Under vacuum	Generally without vacuum
Materially added	Denseo Fairy 730° or Denseo Fairy 830°	With or without glaze
Results	In-depth healing of the crack	Superficially “repaired” crack

Crack in the ceramic veneer (SEM image).



SEM image showing a cross-section of a crack in the ceramic specimen healed with Denseo Fairy.

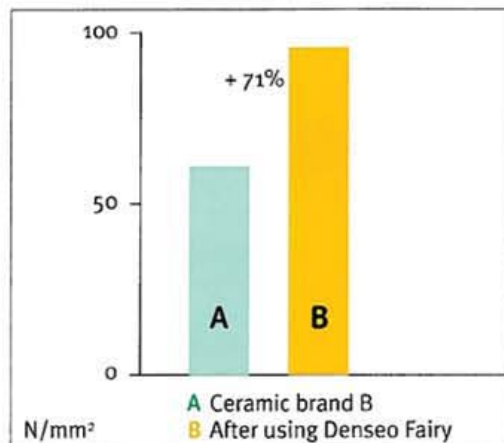


scanner electron microscope delivers proof of that. The crack is not just repaired with healed. After healer firing, the crown will not just be as resistant as before, but even more so. Says the manufacturer. But is that the truth?

A case for science

The Charité University Hospital in Berlin got interested in the topic. CC3, the Centre for Dentistry, undertook a scientific study of the efficacy of Denseo Fairy. The scientists examined ceramic samples by three different manufacturers on metallic carriers. They then studied the fractured parts of the specimens: first untreated, then treated with Denseo Fairy. Various

Flexural strength of Denseo Fairy compared to the ceramic material by manufacturer B.



parameters were examined before and after the Denseo Fairy treatment: flexural strength (three-point bending test) and Vickers hardness (Leitz Durimet tester). After the healer firing, the critical tension intensity factor was additionally measured. This parameter indicates to what extent the material of the crown is capable to resist crack propagation. The results were intriguing: The flexural strength and the critical tension intensity factor were markedly higher than previously after the Denseo Fairy treatment:

The scanner electron microscope showed that the veneer and the repair material were truly fused. This would mean that cracks can really be healed with this material. And not only that: The veneer is stronger after that was before. If Denseo Fairy is used instead of the conventional glaze firing, the same effects are obtained: The structure of the material will be more resistant, and the formation of cracks is prevented right from the start. This is particularly interesting in the case of multi-unit bridges, where the cracking risk is high. A true alternative, that is, to glaze and repair firings. The flexural strength of the specimens was increased by glaze firing, by 25 percent for the material of manufacturer A. When Denseo Fairy was used, flexural strength was increased by 71 percent, as the diagram shows.

What do the fractured surfaces look like?

The healed ceramic samples were segmented longitudinally and examined under the scanner electron microscope. The two ceramic materials fuse, forming a solid unit.

Conclusions

Cracks in ceramics veneers are an everyday occurrence, no matter how experienced the dental technician. Now, however, cracks in the veneer are no longer a reason to throw out a crown or bridge. Not only can they be saved, but the healer firing will even make them better than before. The scientific results have confirmed this. As a dental technician, you can sell a healed crown with a clear conscience – it will certainly not fail. You saved plenty of time and plenty of work, to say nothing of the cost for redoing the entire restorations. ■