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[Heading]

Caries excavation: Decide confidently thanks to FACE

[Leader]

Caries or not caries – that is the question, not only in the initial diagnosis, but also during caries excavation. Dr. Wolfgang Buchalla, lecturer at the University of Zurich, speaks about problems related to caries detection and explains the Fluorescence Aided Caries Excavation (FACE) method he co-developed. This allows practitioners to clearly identify and selectively remove carious regions during excavation.

[Body text]

Dr. Buchalla, what are the problems of caries therapy in your opinion?

I see three areas: Firstly, caries is a disease that is not only caused by one type of bacteria, but by several hundred. Otherwise we would have an easy time: Affected patients could simply take an antibiotic. As this is not the case, it would be desirable to recognise every type of carious decalcification at an early stage. Until now, there were mainly the conventional methods – close examination or x-ray. The latter works relatively well for the approximal area and partly also for occlusal caries, i.e. areas that can only be viewed with difficulty. But both methods have their limitations. Secondly, many equate caries treatment with restorative therapy. However, it is ultimately a matter of treating a disease and not only of eliminating symptoms, i.e. only restoring the carious lesions. In my view, there is some catching up to do in preventive approaches. Thirdly, it might be the case that restorations are necessary if the tooth's carious process is advanced. This is then aimed at preventing further advancement of the process. The restorations must have the most lasting effect possible. This still presents a challenge, because until now caries had not always been identified precisely, whether in caries diagnostics or during caries excavation.

You developed the FACE method for detecting caries during excavation. How does this work?

FACE uses the fluorescent properties of teeth. If teeth are radiated with violet light of around 400 nm, healthy tooth substance fluoresces green. Red radiance on the contrary indicates caries. The reason: The red fluorescence is caused by porphyrin components

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synthesised by bacteria. In several studies we succeeded in proving that only dental hard substance infected with bacteria shows this red fluorescence.

And does FACE really identify the entire carious area?

Yes. FACE has the major advantage that dentists see exactly the bacterially infected area and can therefore specifically remove it. The fluorescence provides dentists with area information – in contrast to conventional methods. In the probe method, for instance, the user scans the hardness of the tooth point by point. If the substance is soft this indicates caries, if it is hard the tooth is healthy. Although the principle is easy, the underlying criterion of hardness nevertheless is very subjective. FACE is more objective. Users can see more accurately where the boundary to healthy tissue is located. In our studies we have demonstrated that FACE has very high selectivity.

Does this method also exclude that users remove healthy tissue?

In principle yes - with the following restriction: FACE is not a self-limiting method. The final decision on how long excavation proceeds lies with the user. But: The practitioner can see where bacterially infected tissue is and where not. And this is something he cannot do with any other method.

Please outline a specific case from clinical practice.

I'll briefly mention an extreme situation. In teeth where caries has already expanded almost to the pulp, there is the risk that the dentist may open the pulp. A root canal treatment is then usually inevitable to preserve the tooth. The classical strategy for avoiding inadvertent pulp opening is indirect capping so there is a greater safety margin to the pulp and, if necessary, a second procedure for complete caries excavation. With FACE, users can see where bacterially infected dentine is located and where not. This means the practitioner can now make an informed decision on whether he takes the risk of opening the pulp or not. Both may be correct depending on the individual case. In every case the dentist can work more precisely in the sensitive near pulp region and this is where I see the big advantage. Specifically, the dentist can remove infected tissue in peripheral regions, but in the central region close to the pulp he can decide against complete caries excavation. He obtains the information on bacterial infection in the hard dental tissue from FACE. Hardness measurement using a probe very close to the pulp is

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difficult anyway. On the one hand, the dentist no longer wishes to probe with too much pressure, as he then might break into the pulp. On the other hand, healthy dentine close to the pulp is also slightly softer. With FACE, he recognises the infected region and can therefore decide with more certainty on how to continue treatment.

How long have you been working on this method?

For around ten years now. During a two-year research stay at the Oral Health Research Institute in Indianapolis, USA, I worked intensively on the fluorescent properties of teeth. This topic was relatively unknown back then. Together with a colleague, I then had the idea that one could make use of these properties for caries excavation – and how.

[Résumé]

Prof. Dr. med. dent. Wolfgang Buchalla, studied dentistry in Berlin and Heidelberg and then received his doctorate from the University of Freiburg. During his two-year research fellowship in the USA he investigated the fluorescence properties of teeth. Since 2006 he has conducted research at the University of Zurich.

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[image material]



Prof. Dr. Wolfgang Buchalla

