X-ray-free caries diagnostics in the everyday dental practice routine

By KAVO

Alternative, X-ray-free caries diagnostics in instruments, such as the DIAGNOdent, VistaCam, Supravette – to name but a few - have been finding their way into dental practices for some years now. Up to now, however, I have not been personally convinced by any of these instruments. One reason was that integration in our existing practice systems seemed to be time consuming and expensive. However, the restricted diagnostic spectrum (simultaneous detection of occlusal and proximal lesions) also counted for something. With the desire to re-equip my practice for a more extensive prophylactic care concept in caries diagnostics, I had an opportunity to test a new diagnostic procedure (DIAGNOcam, KaVo, Biberach/Riss) more extensively.

The following article briefly examines the underlying technology and, on the basis of specific facts, presents the diagnostic potential of DIAGNOcam, including possible applications in relation to prophylaxis.

Technologically advanced

The DIAGNOcam basically relies on a tried & tested technology that is used today in many practices: transillumination. In contrast to conventional technology with an interden- tal light source, DIAGNOcam uses a light that is generated by the DIAGNOcam, X-ray image), a diagnostic procedure that is used today in many practices: transillumination. As mentioned above, our practice is undergoing expansion and reorientation to a prophylactic concept even if this process is not yet complete, I would like to discuss my experience to date.

Integration in dental prophylaxis

As mentioned above, our practice is undergoing expansion and reorientation to a prophylactic concept. However, there are extensive editing options available for the automatically saved images.

First step toward X-ray-free caries diagnostics

The computer and KaVo's KdD program are started and the rubber arms of the DIAGNOcam slide over the proximal zone of the teeth. After adjustment of the camera position, above all in the vertical axis and in its inclination to the tooth axis, a crisp image is obtained. It should be noted that a learning phase is required for proper handling of the PS screen. Especially in the proximal zone, caries lesions are revealed by the DIAGNOcam, which probably would not have been possible to identify clearly by sight or which would not have showed up at all. By the same token, this means that I can offer my patients earlier and more effective treatment. It should be noted, however, that the DIAGNOcam cannot distinguish between active and inactive caries. Consequently, active caries can only be differentiated from inactive caries by means of a time progression (screening) and corresponding progression.

With a little practice, it soon becomes a genuine pleasure to work with DIAGNOcam, which offers an additional diagnostic tool for use in dental examinations. The enclosed guide makes it easy to learn how to interpret the images. At present, however, the diagnosis with X-ray images, is apparent. Another major advantage is that the camera can be used as an auxiliary diagnostic instrument. Not withstanding this, I have not yet tended the test phase identified any incorrect diagnoses compared with the DIAGNOcam, however. Especially in the diagnostic of proximal caries, an improved correlation of the DIAGNOcam image with the clinical extent is apparent. Another major advantage is that proximal over- laps which frequently hinder diagnosis with X-ray images, do not occur with the DIAGNOcam due to the nature of the system. In a workflow in accordance with manufacturer recommendations (visual inspection, DIAGNOcam, X-ray image), a fil- ing can be verified by the DIAGNOcam, avoiding an unnecessary X-ray session.

Fig. 1: Initial situation

There is an extensive filing in the occlusal fissure.

Fig. 2: Use of the DIAGNOcam by dental hygienist

After performing dental cleaning, the caries radiologist often reported a floss or unclear hop. This situation is more extensively in further X-ray investigations with waiting times, at the expense of my time spent treating the patient. This situation has now changed: the problem is discussed beforehand with the patient and the dental hygienist and visually presented with the DIAGNO- cam. This significantly raises the hygienist's status in the patient's eyes. At the same time, I can see a trust-building effect from the patient's perspective, so that not only the dentist, but also the general practitioner (GP) contributes to the patient's dental health with state-of-the-art diagnostic procedures. I am currently in the process of utilizing the next phase of the workflow and I decide on the basis of the initial images recorded by the assistant, whether I can clinically confirm the situation or take another look with the DIAGNOcam or get an X-ray taken. All my patients benefit from X-ray-free diagnostics. Especially children, pregnant women and patients who are fearful of X-rays. Especially with regard to child prophylaxis is, simple screening makes an enormous and very welcome contribution to keep the teeth of young children healthy.

Cost-effectiveness presentation of this diagnostic tool.

With the introduction of the DIAGNOcam as integral part of the treatment, I have raised the original price for professional dental hygiene treatment by €12 (comparable to BDA). A short, conservative calculation makes it clear that the investment in the device pays off in a very short time. The additional time expenditure in prophylaxis is low and acceptable. A flat-rate allowance for running costs of the DIAGNOcam of €1,000/year is integrated in the below calculation.

Calculation of DIAGNOcam in prophylaxis

The procurement costs of the DIAGNOcam are around €9,900 plus sales tax. According to the above estimate, the investment pays off in the course of the first year, without taking into account depreciation. The acceptance for an additional charge of €12 for the use DIAGNOcam (especially when included in the dental hygiene session) is very high. In addition, it can be seen that the proportion of cases demanding treatment in adhesive filling therapy (with average time outlay) increases. This is least costly for patients that a little previous research with more extensive and expensive treatments. At the same time, the profitability for the dentist remains the same or may, depending on the practice structure, be increased, as fewer, but expensive laboratory made prosthesis are needed, for example, and patients are treated more professionally.

The X-ray image (Fig. 5) only reveals a extremely faint lightness of this area. After opening a carious process was revealed (Fig. 6), which was treated after excavation and sterilization with the SONIClise system (Fig. 7).

General conclusion

We Swabians have a reputation for being a rather under- stated lot. It is therefore not easy to say what to this enormous gain has been for my practice. No more than I can claim the opposite. First and foremost, the increase in the quality of caries diagnostics should be mentioned. I identify more and can therefore treat my patients at an early stage. This gives me, as a practitioner, a good feeling but also the patient who feels well taken care of. X-ray images are certainly (still) considered to be the gold standard. However, now and again it is difficult to convince especially critical patients (such as the parents of very young patients about X-rays. Our dental hygienists are very happy to be able to integrate the DIAGNOcam in their treatment. Summing up, in my opinion the introduction of the DIAGNOcam has significantly enhanced our practice, both financially and in terms of intangibles.

Clinical case study

Case 1: proximal caries in an upper molar

Fig. 3: X-ray image

Fig. 4: Cavities prepared

Fig. 5: filling with SONIClise system

**Case 2: deep caries lesion in an incisor**

Fig. 6: Initial situation

Fig. 7: DIAGNOcam image

**Case 3: proximal caries in a premolar**

Fig. 8: DIAGNOcam image

**Case 4: occlusal caries in a molar**

Fig. 9: DIAGNOcam image

**Case 5: caries in a child's tooth**

Fig. 10: DIAGNOcam image

**Case 6: caries in an adult's tooth**

Fig. 11: DIAGNOcam image

**Case 7: caries in a child's tooth**

Fig. 12: DIAGNOcam image

**Case 8: caries in an adult's tooth**

Fig. 13: DIAGNOcam image

For more information, visit www.kavo.com/MEA

Kavo Dental GmbH
Ateksa Vakia
8th Floor Rotana Arjaan Tower
Dubai Media City, UAE
Tel.: +971 4 2222296
Mob.: +971 50 1757141
E-Mail: ateksa.vakia@kavo.com
www.kavo.com MEA