

# Easy detection of caries, safe finding of calculus.

## Your safe method of caries diagnosis.

Three competent procedures complement each other to provide a perfect caries diagnosis – your good and experienced vision, the radiograph, and the DIAGNOdent pen. Early, initial caries and hidden caries, may be safely detected using the LASER fluorescence technology of the DIAGNOdent pen. This enables minimally-invasive procedures to be performed, the patient is subjected to less stress and more, healthy tooth tissue is retained.

## Simplified periodontal prophylaxis.

Furthermore, the DIAGNOdent pen is also useful in the detection of calculus. This permits the early detection of periodontitis and you may take corrective measures immediately.

## Your three steps to safe diagnosis.

No stress and highly informative – The combination of a classic probe and radiographs, usually provides adequate information for diagnoses. However, mechanical identification can damage healthy tooth tissue, inevitably leading to a restoration, which triggers pain and stress in patients. When X-rays are taken, the patient is exposed to avoidable radiation and X-rays are not reliable

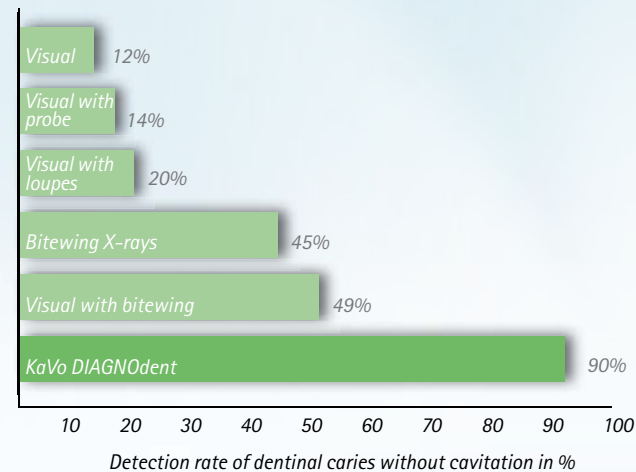
for the early detection of caries. Contrastingly, the LASER fluorescence method of the DIAGNOdent pen, is suitable for diagnosis of both caries and early detection of periodontitis, without X-rays and mechanical damage.



## 10 years in practice – 45,000 patients.

Supremacy of LASER fluorescence technology, has been proven countless times over. Its reliability has been proven in numerous scientific studies. The DIAGNOdent pen will easily complement and enhance, proven diagnostic procedures.

## Scientifically proven reliability.



Source: Lussi et al, Quintesenz 54, 10 (2003), Lussi et al (2001)

## Many advantages for you, every day.

- Perfect support for simple and safe diagnosis
- Easy handling, thanks to acoustic signals and easy-to-read display
- Pleasant and safe detection method for patient
- Perfect integration into your workflow
- High-quality, low-maintenance KaVo solution, with multiple benefits

# Caries prophylaxis can be so easy and gentle.

## Highest quality of diagnosis and perfect, longitudinal monitoring.

The LASER fluorescence technology of the DIAGNOdent pen, affords reliable results and supports safe and reproducible diagnoses. The examination values can be read at any time, via the wireless display. This allows for early detection of fissure and proximal caries. Thanks to the proven reproducibility, the DIAGNOdent pen can also be used for longitudinal monitoring of caries development.

## Highest comfort for all involved.

Thanks to the various probes of the DIAGNOdent pen, caries is detected without any pain to the patient and measurement results are shown on the easy-to-read display. A very special advantage: In particular, children and pregnant women can avoid unnecessary ionising radiation, by using the DIAGNOdent pen.

## Optimum patient satisfaction thanks to safe results.

The DIAGNOdent pen provides clear, fast and reliable support, for your caries diagnoses. Thanks to the early detection of caries, you can preserve healthy dental tissue and prevent subsequent interventions – this is real prophylaxis, which increases your patients' loyalty.

## Diagnosis with the DIAGNOdent pen – main features and advantages for you:

- **Easy detection:** In particular, children and adolescents present with fissure caries in 80% of cases; here, DIAGNOdent pen allows for easier detection
- **Easy detection of „iceberg“ syndrome:** 90% of caries is within the proximal area – here, DIAGNOdent allows easier detection
- **Easy, early detection:** Fissure caries, proximal caries and calculus, are detected in a more timely fashion; this results in fewer subsequent interventions
- **Just more surety:** Optimum support for the dentist's eye and for X-ray images – the DIAGNOdent pen detects infected and affected tissue, in almost every case
- **Improved patients' loyalty:** Thanks to the gentle and safe support of your diagnosis, your patients enjoy returning for treatment and further, recommend your practice to others.



# Your perfect assistant – essential in professional tooth cleaning.

## Practical example:

<b>1 Professional teeth cleaning</b>		
<b>Removal of all hard and soft accumulations:</b> Calculus removal with the SONICflex, manual instruments, PROPHYflex powder jet device with PROPHYpearls, DURAtec 2933 polishing contra-angle handpiece		
<b>2 Examination with the DIAGNOdent pen</b>		
<b>Fissure</b> Measured value: 0 – 12	<b>Fissure</b> Measured value: 13 – 24	<b>Fissure</b> Measured value: >25
<b>Healthy Tooth Tissue</b> Measured value: 0 – 7 <b>Proximal</b>	<b>Early Demineralisation</b> Measured value: 8 – 15 <b>Proximal</b>	<b>Strong demineralisation</b> Measured value: >16 <b>Proximal</b>
<b>3 Initial diagnosis</b>		
No findings	Early carious lesion	Carious lesion
<b>4 Measures</b>		
<b>Standard prophylaxis measures</b> Low risk Fluoride toothpaste, etc.	<b>Monitoring, intensive prophylaxis measures, local antibacterial measures</b> e.g. fluoridation, remineralisation, chlorhexidine	<b>Minimally-invasive treatment, X-rays, caries bacteria test, saliva test</b> High-risk Remineralisation, RONDOflex, SONICflex micro, composite filling materials and intensive prophylaxis

Source: Prof. Dr. Lussi, University of Bern, Switzerland

# Easy handling and easy-to-read results.

## Easy examination.

The DIAGNOdent pen lies comfortably in the hand. It also continuously sends its data to the display, by radio transmission. The results are presented on a large and highly visible display screen.

## Easy-to-read results.

Nothing blocks or obstructs one's view of the measurement result: The optionally available radio display, affords perfect view of the readings of your DIAGNOdent pen – both for you and your patient.

## Just pleasant to the patient.

Show the examination results also to your patient, using the wireless radio display. You may jointly discuss the measurement results and show the patient where caries treatment or removal of calculus is required.

## Treatment with the DIAGNOdent pen – main features and advantages for you:

- Easy to use and service
- Cable-free, can be set up anywhere, no computer installation necessary
- Fast, easy calibration
- Sterilisable grip sleeve
- Improved service with professional tooth cleaning, thanks to additional safety check



# Reliable detection of fissure caries.

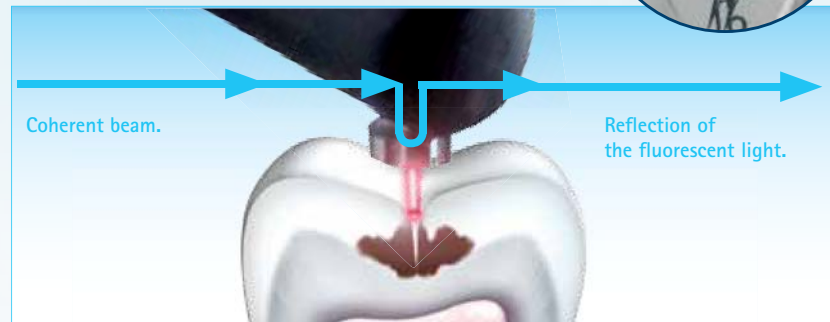


## Easy and reliable caries detection with the DIAGNOdent pen.

KaVo DIAGNOdent pen detects the different levels of fluorescence between healthy and diseased tooth substance. Even very small lesions can be detected reliably without exposure to ionising radiation. Healthy tooth substance remains unaffected: No probe, scratches or damage.



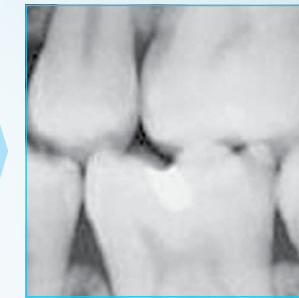
Generally, conventional hand instruments may not be used to probe within drop-shaped fissures.



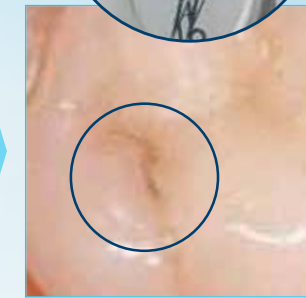
The DIAGNOdent pen offers the advantage of measuring fluorescence deep within the fissure pattern, since LASER light easily penetrates the enamel and is reflected by even the smallest lesion. Measurement is indicated with an acoustic signal and numerical value.



Visually, only a slight discoloration is perceptible.



The radiograph does not reveal any caries lesions.



Only the DIAGNOdent pen finds dentine caries.



The DIAGNOdent pen discovers cavities.

## Recommend therapy: fissure caries and smooth surface caries\*

Reading: **Normal prophylaxis**  
0 – 12 (such as fluoride toothpaste)

Reading: **Intensive prophylaxis**  
13 – 24 (e.g. fluoridation, remineralisation)

Reading: **Minimally invasive restorative procedures**  
**Composite filling materials and intensive prophylaxis**  
(e.g. remineralisation, Air Abrasion, SONICflex micro)  
conventional restoration with large lesions, depending on risk assessment and findings.

\* Source: Prof. Dr. Lussi, University of Bern, Switzerland

This study and further studies can be found on the Internet at:  
[www.kavo.com/diagnodent-studies](http://www.kavo.com/diagnodent-studies)  
[www.ncbi.nlm.nih.gov/pubmed](http://www.ncbi.nlm.nih.gov/pubmed)



The sapphire fissure probe even detects the smallest of lesions – without scratching or impairing healthy tooth tissue.



## Excerpt from a clinical study\*: "New and conventional methods for diagnosis of fissure caries."

Occlusal caries is often diagnosed in children and adolescents. Diagnoses of fissure caries is complicated, mainly by an (apparently) intact surface. Previous examinations showed that conventional clinical methods, under practice conditions, only detect caries with max. 20% of teeth with dentinal caries and intact surfaces. Thus for many years, the search has been going on for other technologies, that would improve the accuracy of diagnosis. Recently, a LASER device based on fluorescence (DIAGNOdent), has been introduced for such purpose. Clinical inspection after drying and use of bitewing X-ray images, showed very good specificity values ( $\leq 95\%$ ), but poor sensitivity values ( $< 50\%$ ) compared to use of the

DIAGNOdent device. The LASER device showed a specificity of  $\geq 78\%$ , i.e. healthy teeth are detected as being healthy, in almost 80% of the cases. Sensitivity, i.e. the ability to detect a diseased tooth (with dentinal caries) as being diseased, is significantly higher with the LASER device, compared to other, more conventional methods. In cases of doubt after clinical examination, it is recommended to use the LASER device as a „second opinion“, when making the decision regarding occlusal caries diagnosis.

\* Source: Prof. Dr. Lussi, University of Bern, Switzerland

This study and further studies can be found on the Internet at:  
[www.kavo.com/diagnodent-studies](http://www.kavo.com/diagnodent-studies)  
[www.ncbi.nlm.nih.gov/pubmed](http://www.ncbi.nlm.nih.gov/pubmed)

# Complete detection of proximal caries.

## Real added-value: detect hidden caries.

Conventional methods of identification, are not sufficiently reliable to detect hidden caries. Adults in particular, suffer from proximal and secondary caries, assuming that these are detected, since visual diagnosis is highly difficult.

Hidden caries remains hidden, in two-thirds of all instances of conventional examination methods. Only with the KaVo DIAGNOdent pen, can you reliably detect hidden caries in the proximal region.

The LASER beam of the approx probe of the DIAGNOdent pen, makes it possible: An integrated prism reflects the incident LASER beam by 100°, so that nothing is hidden around the tooth's contact points.



100% deflection of the laser beam by the prism.

Recommend therapy:  
Proximal caries\*

Reading: **Normal prophylaxis**  
0 - 7 (such as fluoride toothpaste)

Reading: **Intensive prophylaxis**  
8 - 15 (e.g. fluoridation, remineralisation)

Reading: **Minimally-invasive restorative procedures**  
> 16 Composite filling materials and intensive prophylaxis (e.g. remineralisation, Air Abrasion, SONICflex micro)

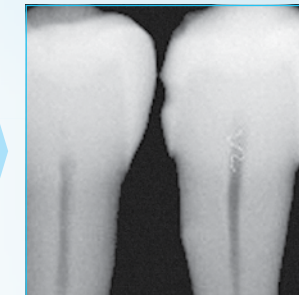
Source: Prof. Dr. Lussi, University of Bern, Switzerland

Picture by: Prof. Stachniss, University of Marburg



Visual diagnosis or diagnosis with a probe is problematic.

Findings: D2



In the previous gold standard has been x-ray diagnosis.

Findings: D2/D3



The high DIAGNOdent pen value indicates deep caries in the dentine that it is not identifiable in the dental film in this instance.



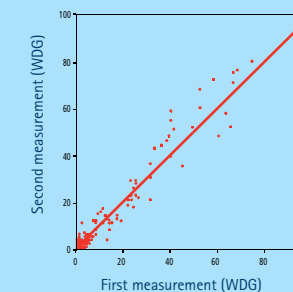
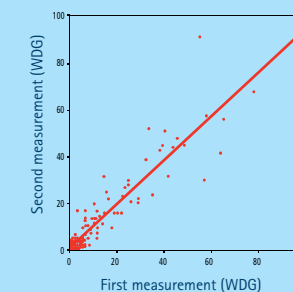
The histological sections confirm findings with the proximal DIAGNOdent pen probe: Deep dentine caries (D4).



## Excerpt from a clinical study\*:

### „Detection of proximal caries using a new LASER fluorescence device.“

Reproducibility of examination results of individual researchers for both tips of the new LASER fluorescence device for detection of proximal caries. (WDG: wedged tip; TWGD: sharp wedged tip)



Specificities and sensitivities of detection of proximal caries.

	Specificity			Sensitivity		
	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>
Bitewing Radiograph	0,67	0,81	0,89	0,68	0,46	0,46
Diagnodent pen (WDG)	0,92	0,89	0,82	0,88	0,87	0,89
Diagnodent pen (TWGD)	0,93	0,89	0,81	0,87	0,84	0,92

D<sub>1</sub>; D<sub>0</sub> = healthy, D<sub>1</sub>-D<sub>3</sub> = decay  
D<sub>2</sub>; D<sub>0</sub>; D<sub>1</sub> = healthy, D<sub>2</sub>-D<sub>3</sub> = decay  
D<sub>3</sub>; D<sub>0</sub> - D<sub>2</sub> = healthy, D<sub>3</sub> = decay

\* Source: S. Lussi, A. Hack, I. Hug, B. Megert, H. Stich; Clinic for Tooth Conservation, Children's and Preventive Medicine, Tooth-Medical Department, University of Bern and KaVo GmbH, Biberach

This study and further studies can be found on the Internet at:  
[www.kavo.com/diagnodent-studies](http://www.kavo.com/diagnodent-studies)  
[www.ncbi.nlm.nih.gov/pubmed](http://www.ncbi.nlm.nih.gov/pubmed)

# Real periodontal prophylaxis – easy, safe and gentle.

## The DIAGNOdent pen makes it possible.

The DIAGNOdent pen precisely identifies calculus and visually indicates the findings by a displayed number, for the dentist, assistant and patient to see. The perio probe of the DIAGNOdent pen, detects calculus more thoroughly than conventional probes. Cleaning becomes less invasive, because only those regions are cleaned, where calculus actually exists. This saves valuable time.

Now, periodontal prophylaxis will become easy, safe and gentle. With the DIAGNOdent pen and its special perio probe, you only clean where calculus is actually located. This is very gentle for your patients.

Similar to caries, calculus contains fluorescent substances that are detected by the DIAGNOdent pen. This LASER fluorescence technology has been used for years, amongst others, within the feed-back system of the KaVo KEY Laser 3+ and allows for selective removal of calculus.



### Attained readings:

Reading: **clean gingival pockets**  
< 5

Reading: **little residual calculus remains, or calculus is located at the extremity of, or just beyond the probe tip's effective scanning range**  
4 – 40

Reading: **calculus in gingival pockets**  
> 40



Efficient detection of calculus using the perio probe.

## Removal of calculus with KEY-Laser 3+:

- Gentle LASER beam removes calculus without any impact power
- Globally unique „autopilot“ (feed-back system), protects the root surface from over-instrumentation – better than with mechanical scaling (e.g. J Clin Periodontol 30(6)2003; p.511-518; J Clin Periodontol 33(3)2006; p.200-208)
- Simultaneously with removal of calculus, the LASER beam may also enable significantly improved re-attachment levels

Source: Journal of Periodontology 78(7)2007, p.1195–1200.



Gentle removal of calculus using the perio handpiece of the Key LASER

**UNIQUE**  
LASER with  
detection and  
removal of  
calculus



### Residual calculus detection.

More calculus is found with DIAGNOdent than with a traditional periodontal probe (n = 3,174 detection surfaces\*).

The findings of various practitioners with the DIAGNOdent pen were more consistent.

### Probing the pocket depth before and 3 months after root cleaning.

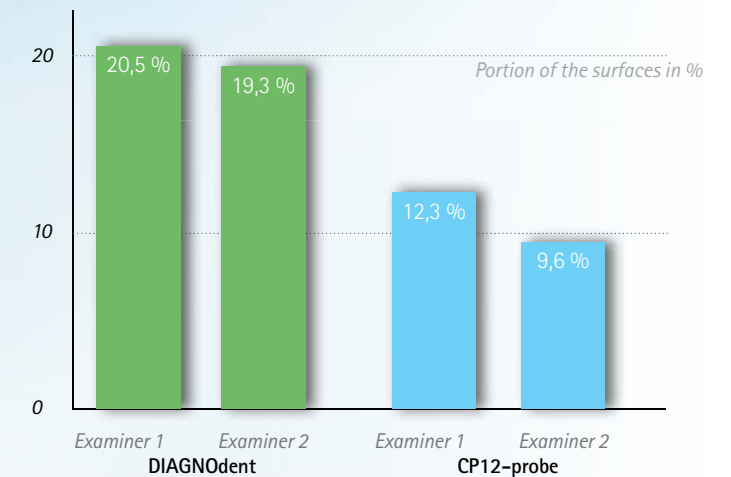
Patients examined with the DIAGNOdent pen showed a greater drop in the number of deep pockets (> 4 mm) (n = 3,174 detection surfaces\*).

### Bleeding in the periodontal pocket before and 3 months after root cleaning.

Patients examined with DIAGNOdent pen had a greater reduction in bleeding index (BOPSee above „POB“) (n = 3,174 detection surfaces\*). The postoperative bleeding index improves and the pocket depth is noticeably reduced. Results of the clinical study by Prof. Frentzen of Bonn University have proven this. Liquids such as saliva or blood cannot influence the measurements.

\*Source: Prof. Dr. Frentzen, University of, Germany

This study and further studies can be found on the Internet at:  
[www.kavo.com/diagnodent-studies](http://www.kavo.com/diagnodent-studies)  
[www.ncbi.nlm.nih.gov/pubmed](http://www.ncbi.nlm.nih.gov/pubmed)



### Periodontitis detection with the DIAGNOdent pen – main features and advantages for you:

- Patient motivation from clearly perceptible and reliable treatment.
- Saves time because unnecessary excess treatment is eliminated
- Positioning as trendsetter, thanks to use of innovative LASER fluorescence technology
- Increased income from regular recalls

# Sustainable success of practice due to patient loyalty.

## Gentle detection for satisfied patients.

Thanks to its perfect diagnostic support, the DIAGNOdent pen contributes highly to patient satisfaction. Patients will be pleased with more gentle treatment with the DIAGNOdent pen and the significantly reduced use of manual probes – this will also prevent unnecessary damage to the enamel.

The following always applies: Earlier detection affords more gentle treatment. Gentle measurement with the DIAGNOdent pen, enables minimally-invasive treatment, in many cases with minimal removal of intact enamel. Furthermore, DIAGNOdent pen minimises X-ray exposure, thanks to reduction of bitewing radiographs, in particular with respect to children and pregnant women.

## Visible success that pays dividends.

In follow-up examinations, changes can be precisely understood and the success of preventative measures such as fluoridation or remineralisation treatment, is visually documented. In addition, the number of returning patients increases and you will enjoy the benefit of more chargeable follow-up services.

The DIAGNOdent pen will result in increased patient loyalty, as satisfied patients like to come back. Patients that are gently and successfully treated, will recommend your practice. This way, you will sustainably optimise the success of your practice – thanks to the DIAGNOdent pen.

# Extraordinary service for your patients.

## Inform your patients – with the KaVo Prophylaxis Practice Package.

Do you want to keep your patients up-to-date with dental health matters and prevention concepts? KaVo supports you with a comprehensive communication concept for your waiting room and with patient information on the Internet. Present your practice as innovative and „cutting-edge“ – your patients will feel comfortable.

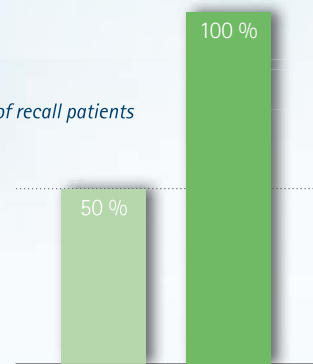


A webpage that will lead interested parties directly to you: [www.der-gesunde-zahn.net](http://www.der-gesunde-zahn.net)

## Successful treatment, successful practice – overview of your advantages:

- Improved patient loyalty from greater comfort and successful prevention confirmable by numbers.
- Reduced use of the manual probe, decreased abrasion of the enamel.
- In many cases, the gentle measurement enables micro-invasive treatment, without the unnecessary removal of healthy enamel
- Chargeable follow-up services
- High patient loyalty and improved service increases the bottom line of your practice

Increase of patient turnover, by a 100% increase in the share of recall patients



Patient brochure: „Healthy teeth“:  
Order number: 1.004.6340



Poster „Professional Tooth Cleaning“ for the waiting room:  
Order number: 1.008.6352



# Impressive proof of impressive results.

Study	summary
<p>„The intra/inter-examiner reproducibility of the new DIAGNOdent pen on occlusal sites.“ Kühnisch J, Bücher K, Hickel R. <i>Ludwig-Maximilians-University of Munich, Department of Conservative Dentistry and Periodontology, Munich, Germany. jkuehn@dent.med.uni-muenchen.de</i></p>	<p>Based on the documented reproducibility, the DIAGNOdent pen should be used in addition to visual inspection and x-rays.</p>
<p>„Clinical evaluation of DIAGNOdent pen in detection of occlusal caries in children.“ Olmez A, Tuna D, Oznurhan F. <i>Department of Pediatric Dentistry, School of Dentistry, University of Gazi, Turkey. aysegul@gazi.edu.tr PMID: 16937852 [PubMed - indexed for MEDLINE]</i></p>	<p>The DIAGNOdent pen with its great sensitivity is a helpful addition to visual inspection in the discovery of occlusal caries.</p>
<p>„Clinical study of the use of the laser fluorescence device DIAGNOdent pen for detection of occlusal caries in children.“ Anttonen V, Seppä L, Hausen H. <i>Oulu Municipal Health Center, Finland. voukko.anttonen@ouka.fi PMID: 12566634 [PubMed - indexed for MEDLINE]</i></p>	<p>The DIAGNOdent pen it is an appropriate tool for routine examinations in children.</p>
<p>„Detection of approximal caries with a new laser fluorescence device.“ Lussi A, Hack A, Hug I, Heckenberger H, Megert B, Stich H. <i>Department of Operative, Preventive and Paediatric Dentistry, School of Dental Medicine, University of Bern, Bern, Switzerland. adrian.lussi@zmk.unibe.ch PMID: 16508265 [PubMed - indexed for MEDLINE]</i></p>	<p>The new laser fluorescence system is a helpful additional instrument for the detection of proximal caries. Given the favourable reproducibility, the DIAGNOdent can be used to monitor the development of caries.</p>
<p>„Performance of conventional and new methods for the detection of occlusal caries in deciduous teeth.“ Lussi A, Francescut P. <i>Department of Operative, Preventive and Paediatric Dentistry, School of Dental Medicine University of Bern, Bern, Switzerland. adrian.lussizmknibe.ch</i></p>	<p>The DIAGNOdent pen can be used as an additional instrument for detecting occlusal caries. Given the favourable reproducibility, the device can be used to monitor the development of caries.</p>

## „An outstanding instrument“

The DIAGNOdent pen, along with a clinical evaluation and the consideration of the individual caries risk factors, enhance early identification of caries and diagnosis.

Based on the favourable reproducibility of its values, the DIAGNOdent pen is an outstanding instrument for detecting the development of lesions in regular examinations.

Prof. Dr. Adrian Lussi,  
University of Bern

## „High reliability“

„... with greater than 90% reliability, DIAGNOdent pen technology measures carious lesions that were not detectable with x-rays or a probe. Reservations are overcome by the combined use of an intra-oral camera, x-rays and the DIAGNOdent.“

Mark E. Hyman DDS,  
Greensboro, NC, USA

You can find these and additional studies on the Internet at:

[www.kavo.com/diagnodent-studies](http://www.kavo.com/diagnodent-studies)  
[www.ncbi.nlm.nih.gov/pubmed](http://www.ncbi.nlm.nih.gov/pubmed)

# KaVo supplies the perfect solution for each and every step during prophylaxis:



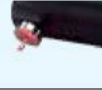


So easy for you.

So gentle for your patients.

	<p><b>1. Workflow Integration (e.g. with KaVo Primus® 1058 TM)</b></p> <ul style="list-style-type: none"> <li>Professional prophylaxis system and reliable treatment centre in one</li> <li>Highest reliability for first-rate prophylaxis and treatment results</li> <li>Bracket table, swing-arm and cart version, with flexible equipment versions for all requirements</li> </ul>	<p><b>So gentle for your patients.</b></p> <ul style="list-style-type: none"> <li>Comfortable patient positioning with soft upholstery</li> <li>Create a feel-good ambience for your patients with attractive designs</li> <li>Effective patient marketing with optional multimedia solution</li> </ul> 
	<p><b>2. Scaling (e.g. with KaVo SONICflex quick 2008 L)</b></p> <ul style="list-style-type: none"> <li>Easy and fast tip change with just one turn</li> <li>One handpiece for an extremely large number of indications</li> <li>Also compatible with Sirona couplings</li> </ul>	<ul style="list-style-type: none"> <li>Soft oscillating action, especially suitable for sensitive patients</li> <li>High patient confidence level due to gentle treatment</li> <li>Low noise air-scaler with light</li> </ul> 
	<p><b>3. Tooth cleaning (e.g. with KaVo PROPHYflex 3 - 2018)</b></p> <ul style="list-style-type: none"> <li>360° rotating tip for ideal work conditions without tiring</li> <li>Entirely sterilisable and therefore easy to integrate into the hygiene workflow</li> <li>Also compatible with Sirona couplings</li> </ul>	<ul style="list-style-type: none"> <li>Perfect tooth cleaning for visibly better results</li> <li>Gentle and pleasant treatment with PROPHYpearls</li> <li>4 individual tastes (berry, cherry, mint and orange)</li> </ul> 
	<p><b>4. Polishing (e.g. with KaVo DURAtec 2933)</b></p> <ul style="list-style-type: none"> <li>Adaptable for both snap-on or screw-in instruments</li> <li>Special sealing, perfect for prophylaxis</li> <li>Best polishing results due to ideal paste distribution with 90° rotation</li> </ul>	<ul style="list-style-type: none"> <li>Soft polishing with mild vibrations</li> <li>Noticeably gentle</li> <li>Cleaner teeth you can both see and feel</li> </ul> 
	<p><b>5. Caries detection (e.g. with KaVo DIAGNOdent)</b></p> <ul style="list-style-type: none"> <li>Perfect findings in every field of application</li> <li>Reliable detection of occlusal and proximal caries, plus calculus detection in perio-pockets</li> <li>Early detection of hidden caries via Quantitative LASER Fluorescence technology</li> <li>Wireless</li> </ul>	<ul style="list-style-type: none"> <li>Preservation and protection of healthy tooth tissue</li> <li>Pain-free detection</li> <li>Higher patient confidence levels due to reliable diagnoses</li> </ul> 



# At a glance – KaVo DIAGNOdent® pen and accessories.

Product	Order number	
DIAGNOdent pen 2190	1.002.7000	
DIAGNOdent pen Display 2191	1.004.8400	
DIAGNOdent pen sapphire fissure probe	1.002.6967	
DIAGNOdent pen sapphire proximal probe	1.006.9928	
DIAGNOdent pen sapphire perio probe	1.002.6970	
Sterile cassette for DIAGNOdent pen probes 2190	1.002.7011	