

KaVo DIAGNOdent® pen

# KaVo DIAGNOdent® pen

Find hidden caries anywhere



# KaVo DIAGNOdent<sup>®</sup> pen

## Fissure caries

- Kids and young adults have in 80% fissure caries
- Fissure caries is very often below intact enamel – **Hidden Karies**



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## Fissure caries

- For fissure caries  
DIAGNOdent® is in the  
meantime scientifically  
considered as the GOLD  
STANDARD for diagnosis



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## Approximal caries

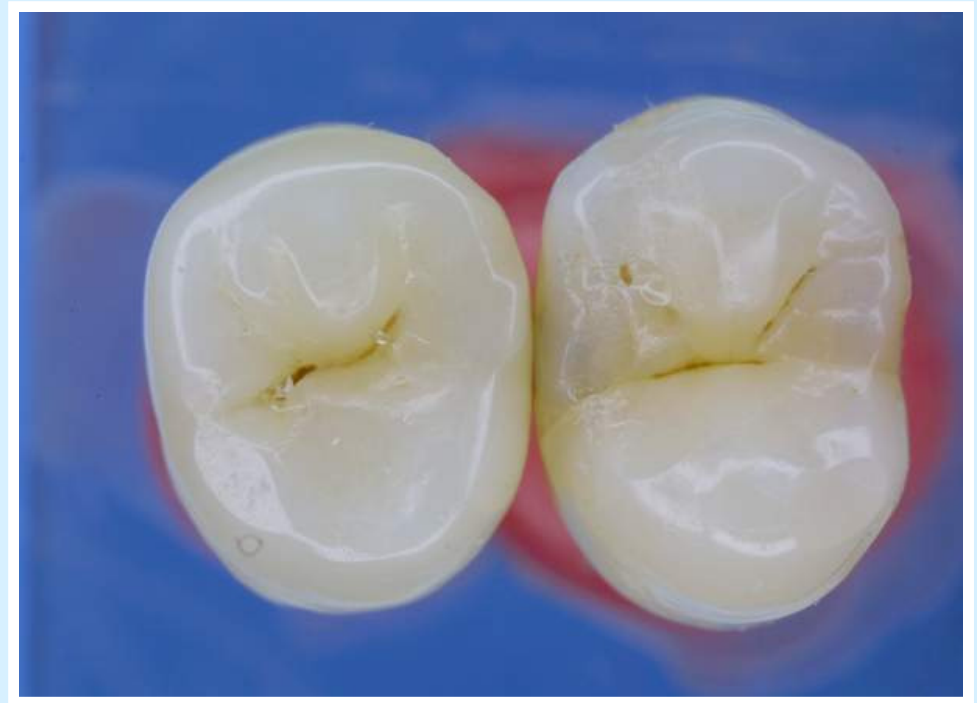
- Caries in adults is mainly approximal and secondary caries



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## Approximal caries

- The visual diagnosis of approximal caries is very difficult
  - In this case only a slight colouration is visible.
- The conventional probe is not helpful in this cases



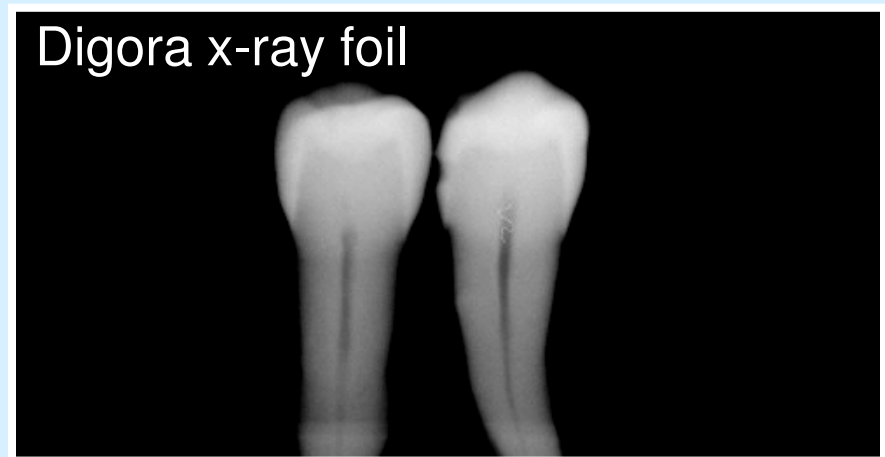
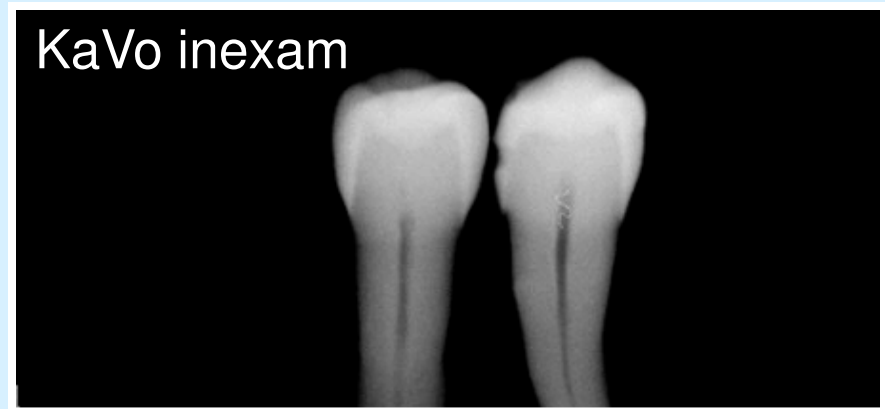
Pictures and findings:  
Prof. Stachniss, Marburg

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## Approximal caries

- The x-ray diagnosis is still considered as gold standard for approximal caries
- X-ray findings:
  - KaVo inExam
    - Diagnosis: C3 caries
  - Digora x-ray foil
    - Diagnosis: C2 caries

Pictures and findings:  
Prof. Stachniss, Marburg



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Approximal caries

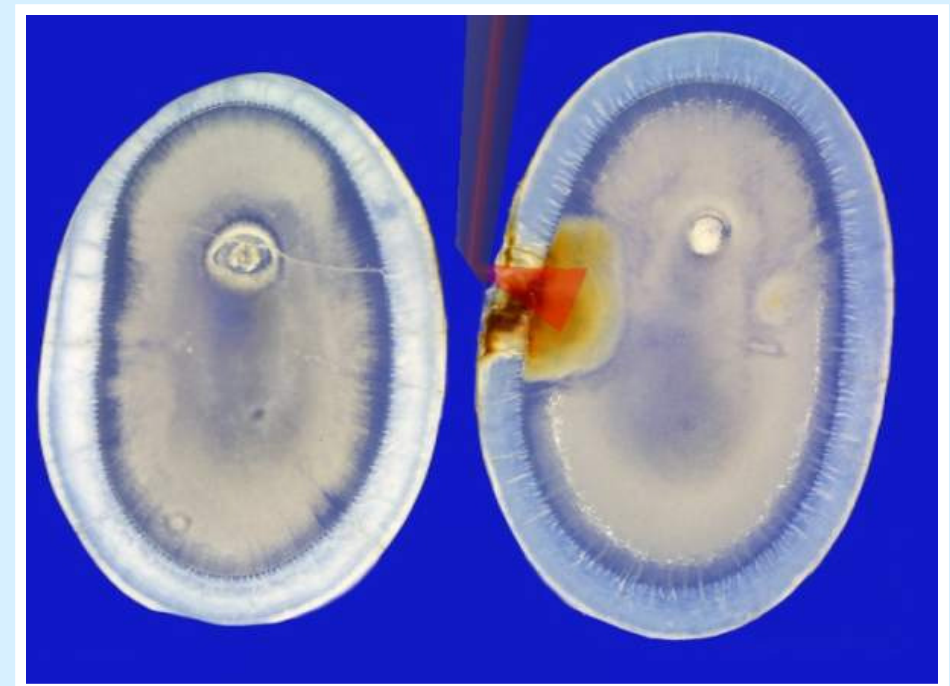
- The finding of the DIAGNOdent scan is a C4 – caries

**DIAGNOdent value 60:**

Deep dentin caries



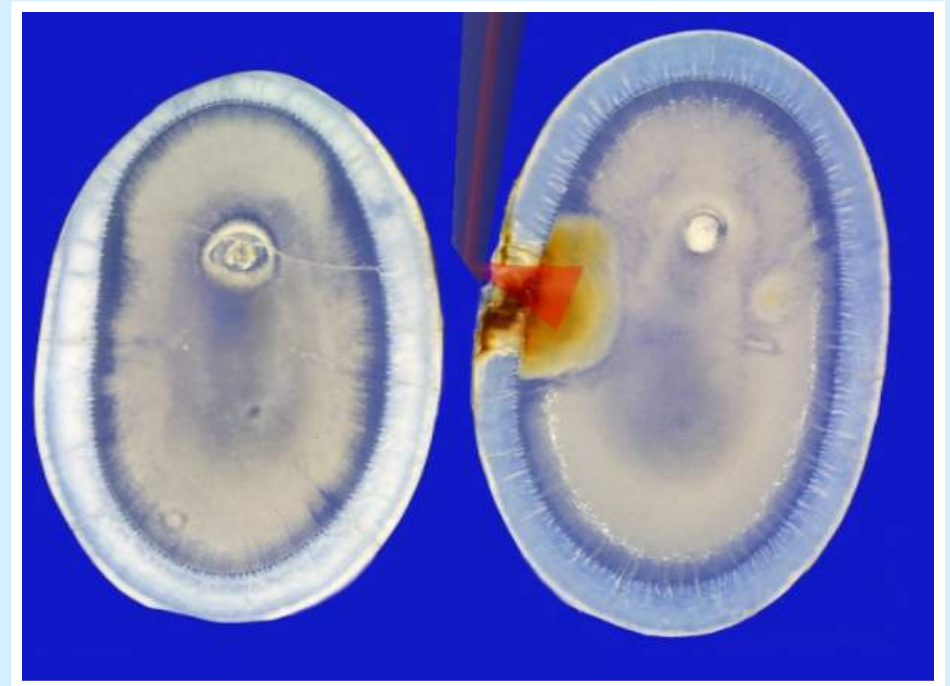
Pictures and findings:  
Prof. Stachniss, Marburg



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## Approximal caries

- The histological diagnosis confirms the findings of DIAGNOdent® pen
  - C4 – deep caries in dentin

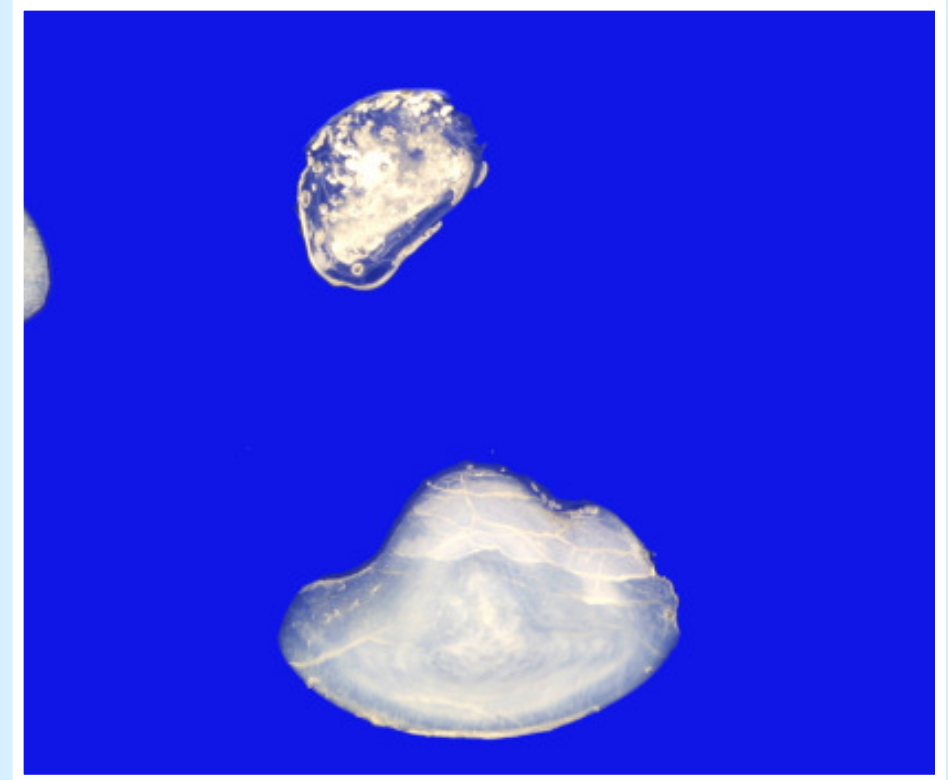
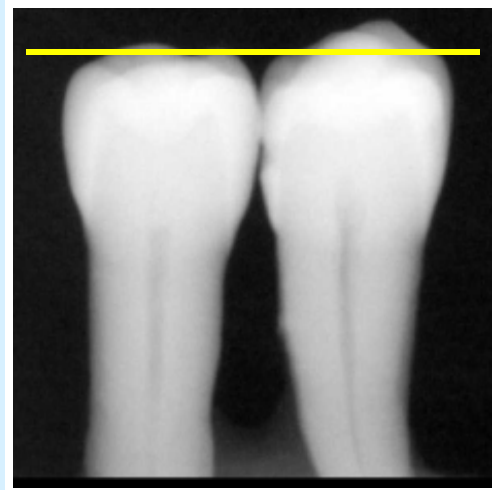


Pictures and findings:  
Prof. Stachniss, Marburg

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How does  
approximal caries  
look like ?

- DIAGNOdent<sup>®</sup> pen value:



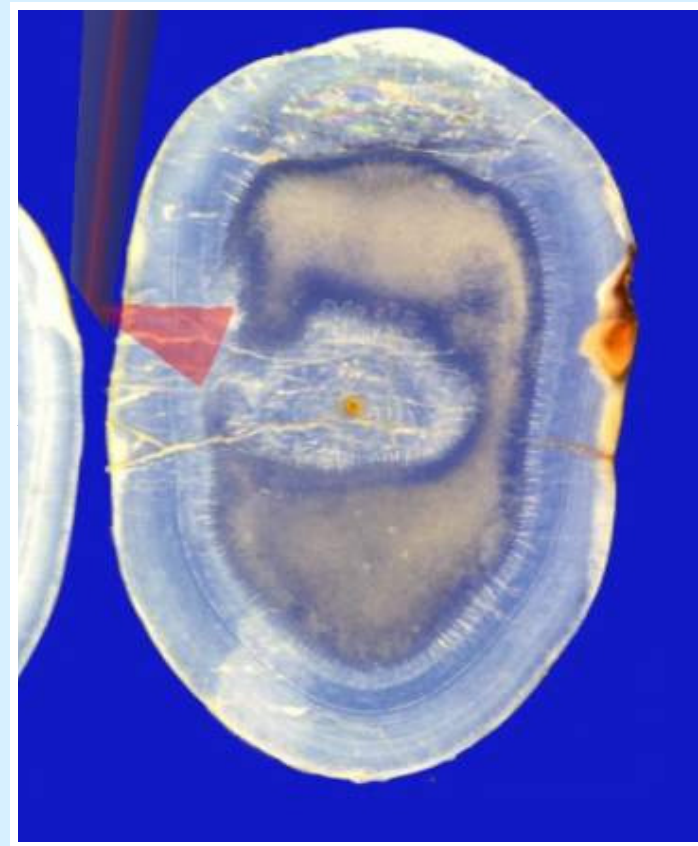
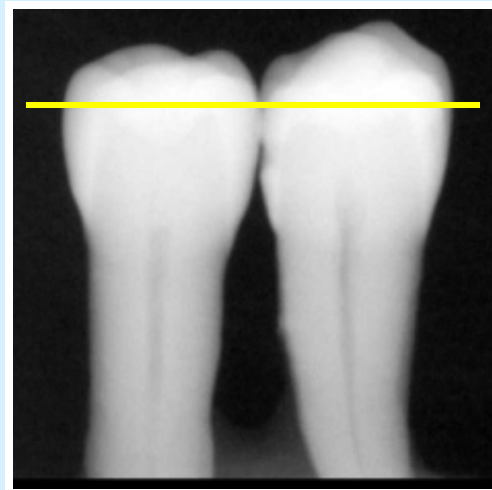
Pictures:  
Prof. Stachniss, Marburg

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Appearance of approximal caries

- DIAGNOdent<sup>®</sup> pen value: 8

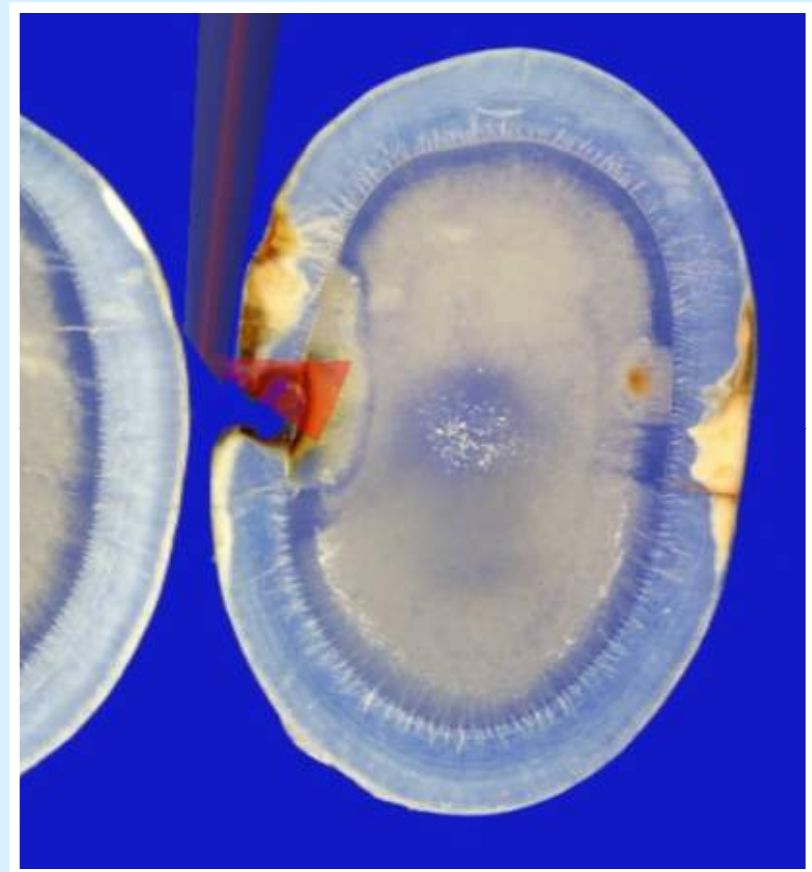
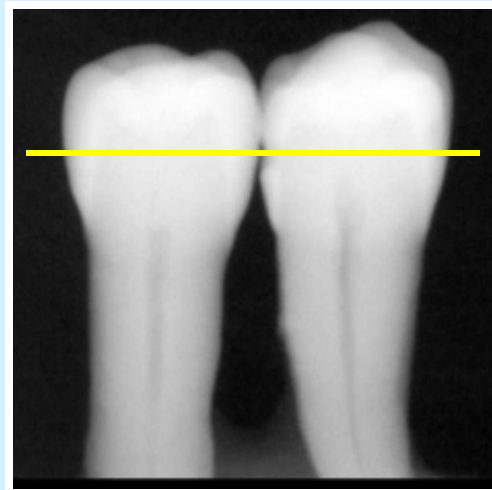


Pictures:  
Prof. Stachniss, Marburg

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# KaVo DIAGNOdent<sup>®</sup> pen

Appearance of approximal caries  
DIAGNOdent<sup>®</sup> pen value: 50

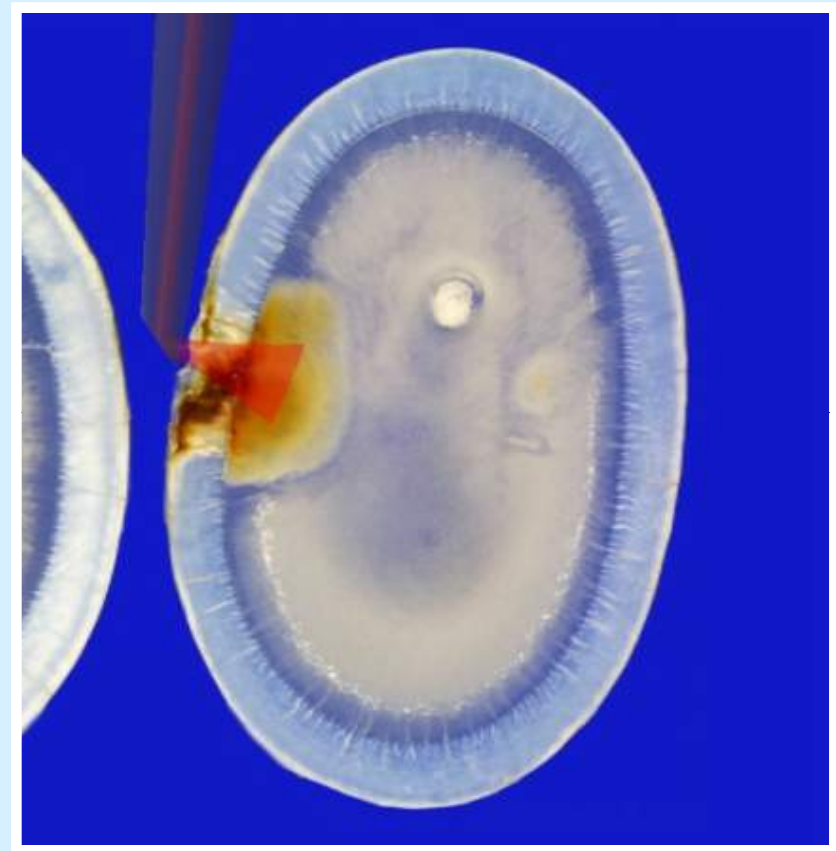
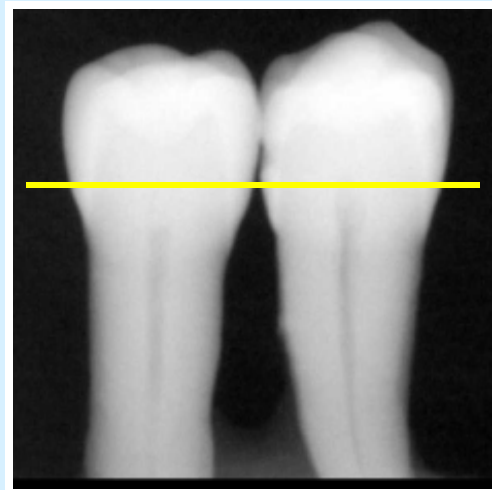


Pictures:  
Prof. Stachniss, Marburg

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# KaVo DIAGNOdent<sup>®</sup> pen

Appearance of approximal caries  
DIAGNOdent<sup>®</sup> pen value: 60

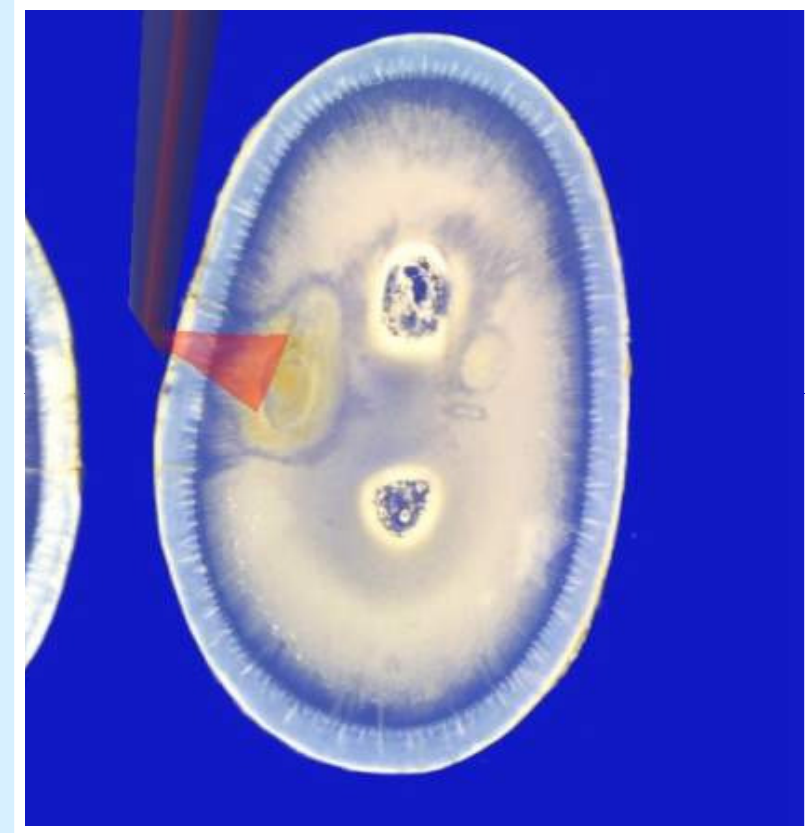
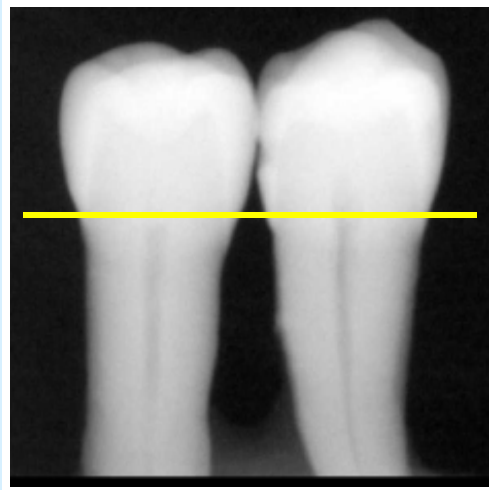


Pictures:  
Prof. Stachniss, Marburg

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# KaVo DIAGNOdent<sup>®</sup> pen

Appearance of approximal caries  
DIAGNOdent<sup>®</sup> pen value: 45

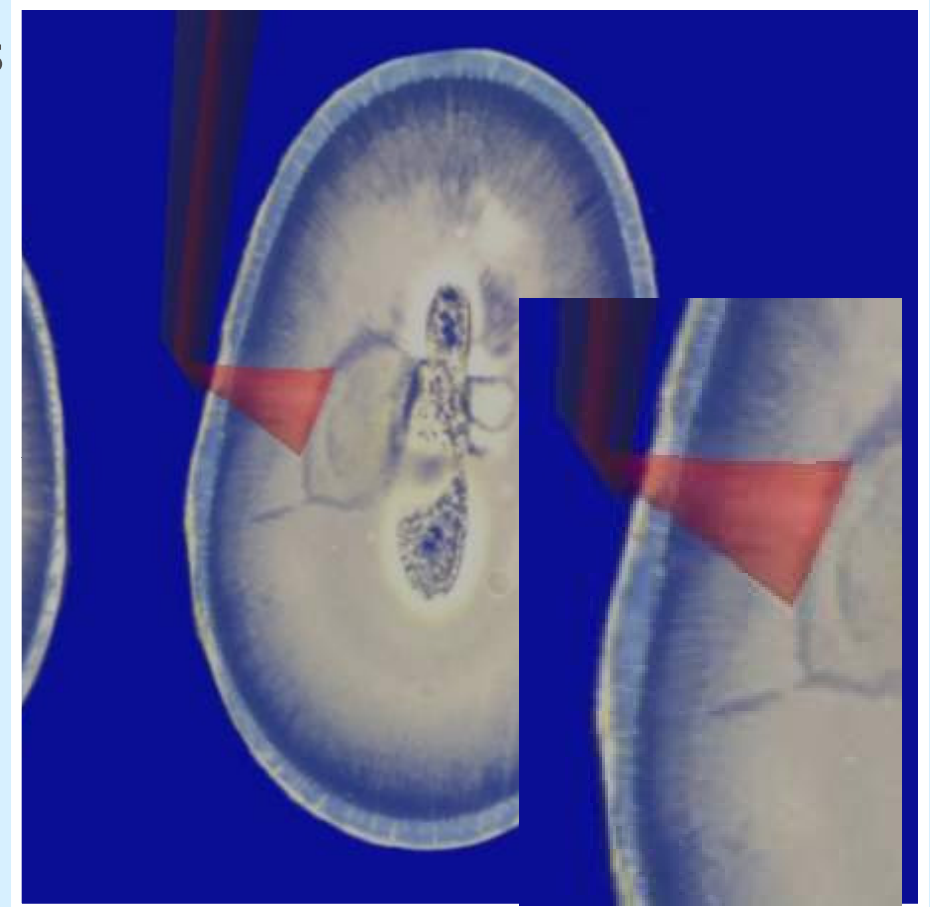
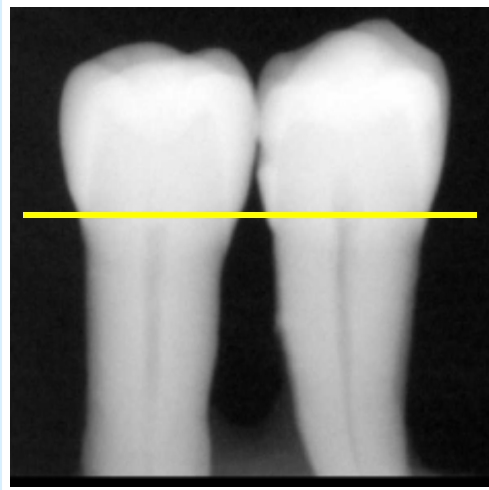


Pictures:  
Prof. Stachniss, Marburg

KaVo DIAGNOdent<sup>®</sup> pen

# KaVo DIAGNOdent<sup>®</sup> pen

Appearance of approximal caries  
DIAGNOdent<sup>®</sup> pen value: 99  
due to plaque on surface



Pictures:  
Prof. Stachniss, Marburg



## KaVo DIAGNOdent® pen

- Why a dentist would like to detect hidden caries?
  - Hidden caries destroys the tooth internally
  - When caries is visible very often only big treatments, i.e. endodontics can solve the case
  - Patients with regular professional tooth cleaning will be unsatisfied
    - why you did not see it ?



## KaVo DIAGNOdent® pen

- Why a dentist would like to find hidden caries?
  - The population is getting older
  - There are less young patients
  - Each invasive treatment is a kind of amputation
  - A dental treatment has a life time of Ø 12-15 years
  - Economically a edentulous patient is not interesting
  - Therefore a dentist should be interested to maintain the economic basis of his practice – **the tooth**



## KaVo DIAGNOdent® pen

- **Classical treatment**
  - 12 J.: Amalgam filling
  - 25 J.: big amalgam filling
  - 40 J.: Root canal treatment and inlay / onlay
  - 55 J.: Root post
  - 70 J.: Tooth extraction
- **Preventive treatment**
  - 15 J.: small composite filling
  - 30 J.: bigger composite filling
  - 45 J.: even bigger composite filling
  - 60 J.: Root canal treatment and inlay / onlay
  - 75 J.: Root post
  - 90 J.: Tooth extraction
- The average German patient is with 63 years edentulous  
Source: KZV-Jahrbuch 2003



## KaVo DIAGNOdent® pen

- Why a dentist would like to find hidden caries?
  - Longterm patient binding
    - Small painless or almost painless treatments
    - Critical teeth can be treated non-invasively and observed in recall over months
    - Fear and negative image of dentists is reduced or is not raised



## KaVo DIAGNOdent® pen

- Why a dentist should use DIAGNOdent®?
  - He earns more money
  - Observed changes after introduction of DIAGNOdent in some practices:
    - Almost no amalgam fillings
    - Increase of 1-face composite fillings by 100 to 200 % – normally without anesthesia
    - Increase of the multi-face composite fillings by more than 50 %
    - Reduction of the big time consuming restorations
    - Increase of the total practice turn over 20% bis 40%



# KaVo DIAGNOdent<sup>®</sup> pen

## **Why a dentist should use DIAGNOdent<sup>®</sup>?**

- Return on invest
  - DIAGNOdent<sup>®</sup> pays off with app. 100 additional 1 face composite restorations
- In Germany: more private payment of the patients
- More patients can be treated, due to change in practice profile
- He is doing something good to the patient



## KaVo DIAGNOdent® pen

- What are the advantages of the patient?
  - Longer maintenance of the teeth
  - Less big treatments like root canal, bridges etc.
  - Less pain in treatment
  - Less anaesthesia
  - Less x-ray



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# KaVo DIAGNOdent® pen

- wireless
- small
- handy
- easy to use
- everywhere to use  
(battery driven)



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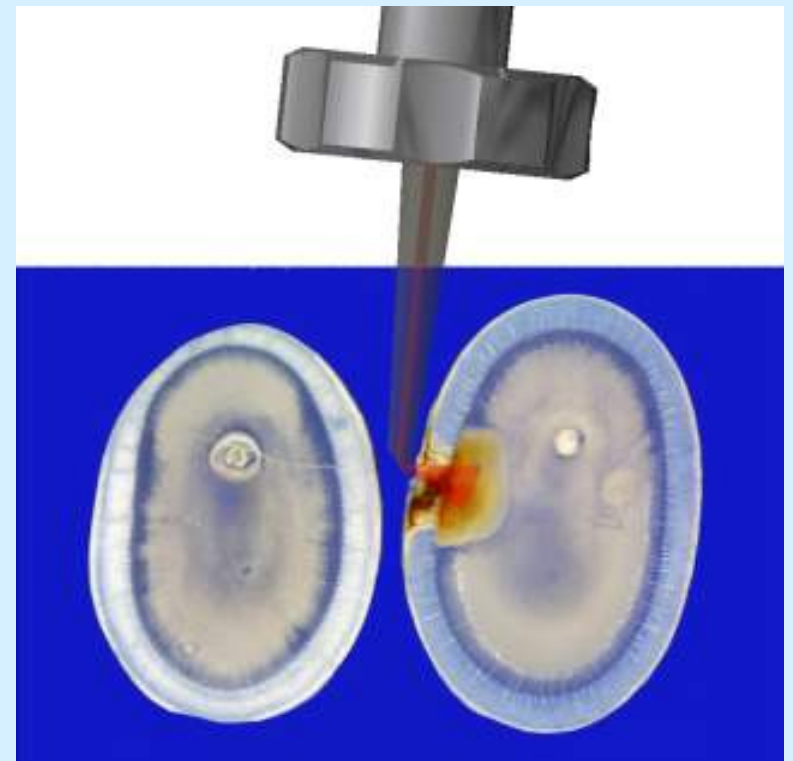
- Technical features:
  - Acoustic signal
  - Digital display
    - Peak value
    - Actual value (small)



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## Probes:

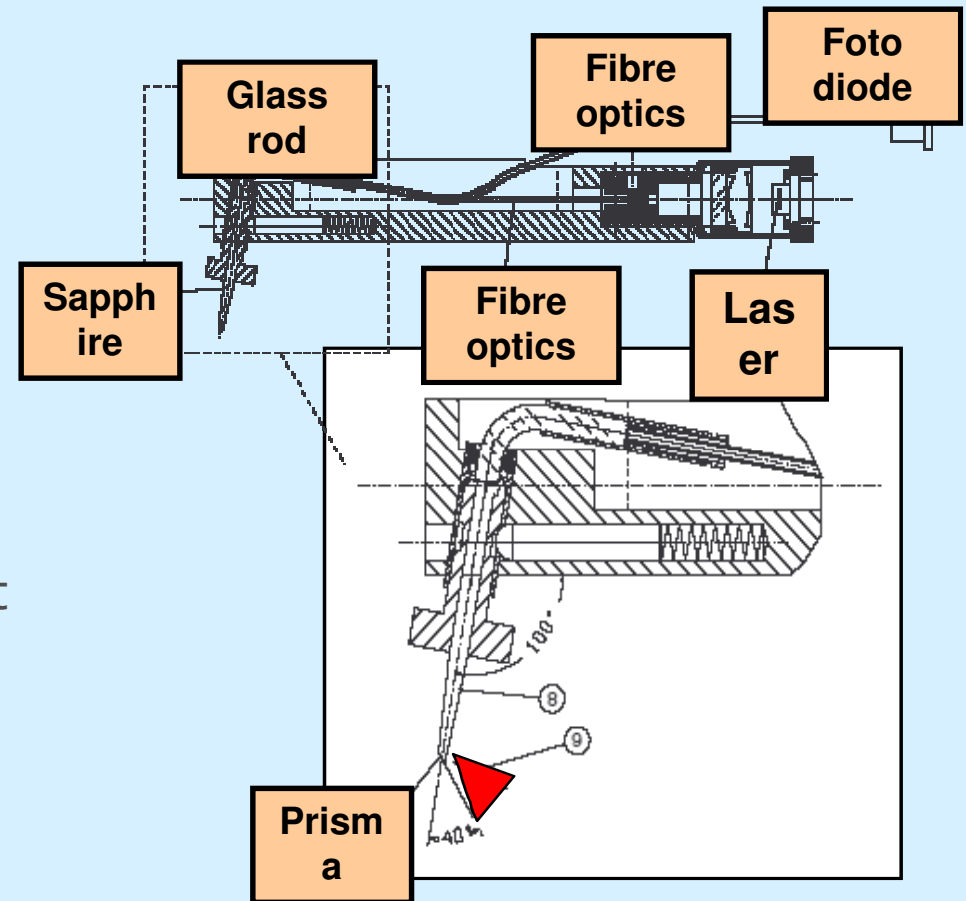
- Caries detection:
  - Fissure – probe
  - Approx – probe
    - 100° deviation of laser beam with prism
    - Laser direction marked with red dot
  - Probes made of sapphire
    - extremely strong
    - Sapphire is the second hardest material after diamond



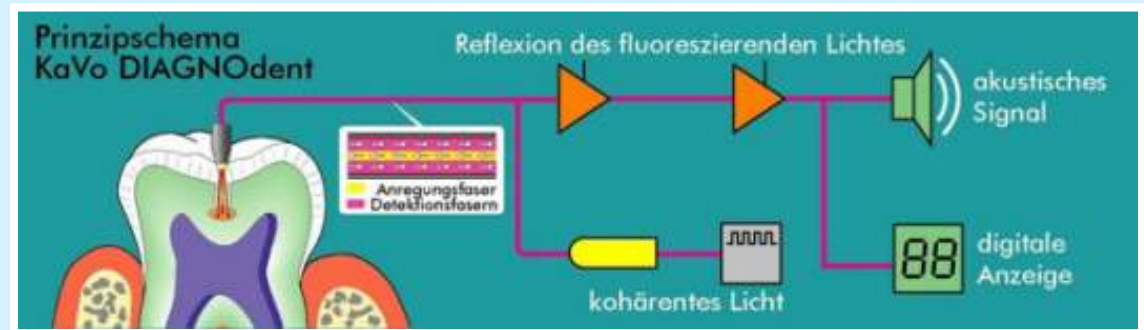
# KaVo DIAGNOdent<sup>®</sup> pen

## Working principle

- Laser light is focussed in lens and directed in fibre optics
- Fibre optics are bundled with the fibre optics of the fluorescence light
- Glass rod alternates laser beam and fluorescence light
- Sapphire with prism to alternate laser beam 100°
- Fluorescence detection

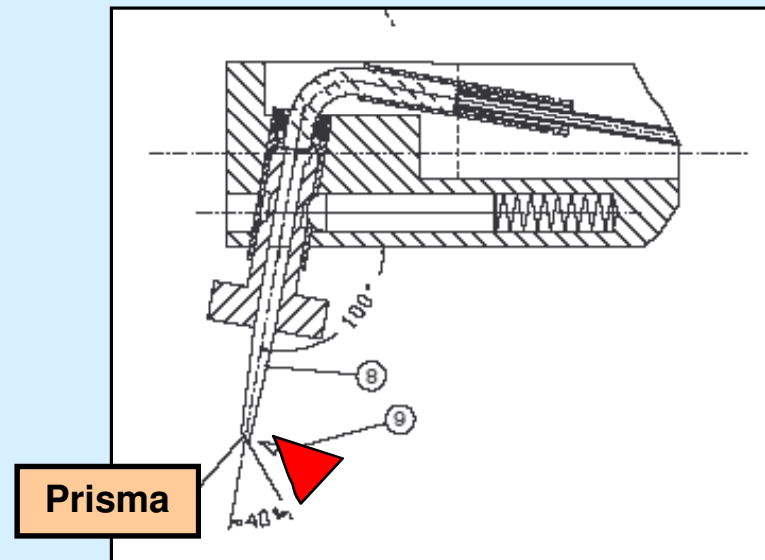


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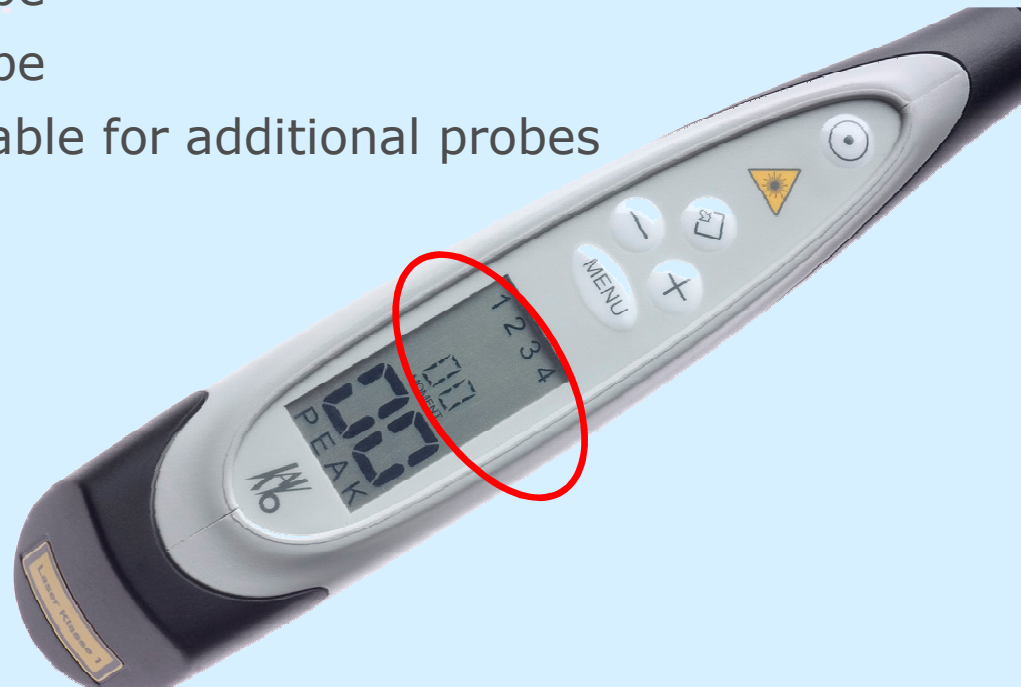
## Working principle

- **DIAGNOdent 1:**
  - Fibre optics go direct to the tip
  - With the bundle of fibre optics no prism is possible



# KaVo DIAGNOdent<sup>®</sup> pen

- Technical features:
  - Memory for 4 probe (i.e.):
    - 1 – Fissure probe
    - 2 – Approx probe
    - 3 + 4 are available for additional probes



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- Adjustment of DIAGNOdent<sup>®</sup> pen
  - necessary if value differs more +/- 3 to reference
  - similar to DIAGNOdent
    - approx: additional cover on reference necessary



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## DIAGNOdent values

- A study of Prof. Lussi, showed that:
  - **DIAGNOdent<sup>®</sup> pen** has similar values than **DIAGNOdent<sup>®</sup>**
  - Values are the similar for approximal and fissure
  - Existing publication are also valid for DIAGNOdent<sup>®</sup> pen

(Publication of the study ORCA 2005)

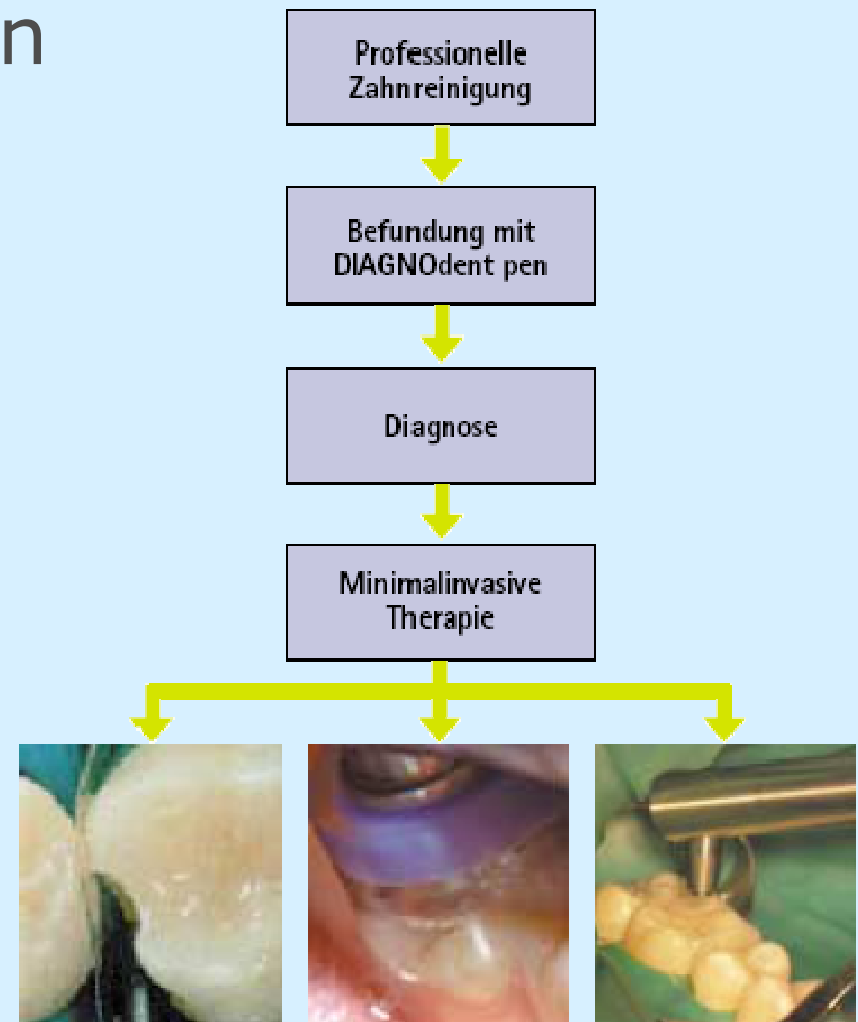
<b>DIAGNOdent values</b>	<b>Diagnosis - Therapy</b>
0 to ~13	Sound tooth - professional tooth cleaning PTC
~14 to ~20	Intensive PTC and fluoridation or HealOzone etc.
~21 to ~29	Intensive PZC with Fluoridation / HealOzone and monitoring - minimal invasive Restorations - Look at other caries risk factors
>~30	Minimal invasive restorations and intensive PTC



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## Clinical use

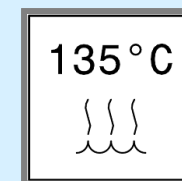
- DIAGNOdent<sup>®</sup> scan during PTC (before fluoridation)
- Dry teeth before scan (Water can change deviation of Laser beam)
- Diagnosis by dentist
- Minimal invasive treatment
  - SONICflex micro
  - HealOzone
  - RONDOflex



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## Hygiene

- **Cover can be sterilized by 135°C**
- **Probes can be sterilized 135°C**
- **Use of appropriate camera sleeves possible (Adjustment has to be done through sleeve)**



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## Perio probe

- **Perio probe DIAGNOdent<sup>®</sup> pen**
- Concrement detection in perio pockets up to 9 mm
- Similarly depth measuring
- Ideal combination with SONICflex paro
- Introduction: Autumn 2006

