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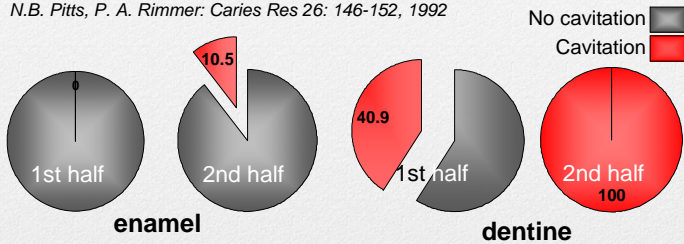
## Background



Loss of integrity of the approximal tooth surface is one of the main criteria in the decision whether to surgically treat such carious lesions. But presence or absence of cavitation is hard to detect either clinically or radiographically.

## Radiographic penetration vs. cavitation

N.B. Pitts, P. A. Rimmer: Caries Res 26: 146-152, 1992



## Cone-beam computed tomography



## Objective

The purpose of this study was to evaluate the validity and reproducibility of detecting cavities of approximal carious lesions judged from cone beam computed tomographs.

## Materials and Methods

- Teeth/Observer**
- 56 extracted human premolars and molars
    - 40x sound surface, 39x carious lesion without cavitation, 33x cavitation
  - 4 observers (3x ♂, 1x ♀; age: Ø 36.5 years)
    - experienced in caries diagnosis

- Cone-Beam CT**
- GALILEOS® (Sirona, Germany)
    - 90 kV, 56mAs, 15s (pulsed)
    - rotation: ~200° (~1 picture each 1°)
    - Standard volume: 15 x 15 x 15 cm;
  - High 3D-resolution: 3.7 x 3.7 x 3.7 cm  
Voxel: 0.15 mm edge length (256 x 256 x 256)
  - Control group: SIDEXIS® (Sirona) digital radiographs (0.10s; Heliodont DS)

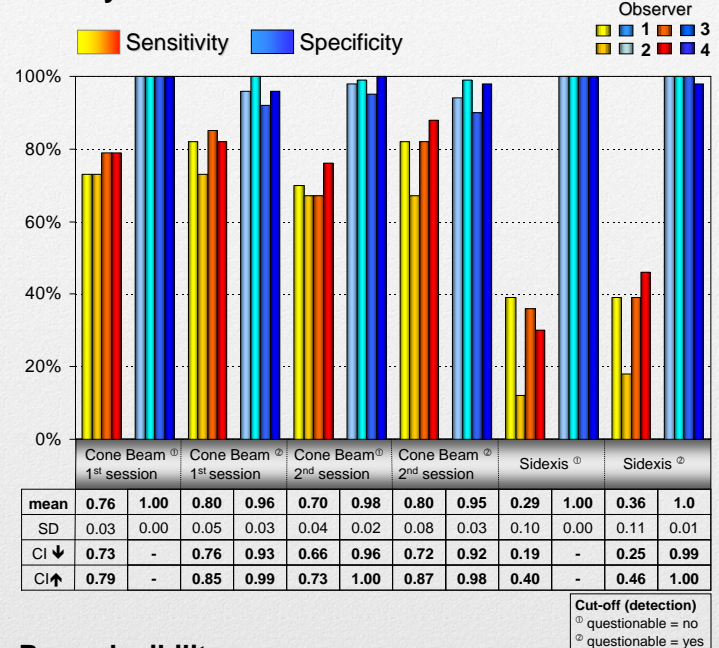
## Diagnostic sessions

- Minimum 1 week break between sessions
- Randomised sequence (pictures, system)
- Rating: cavitation (yes, questionable, no)
- Validity
  - criterion: direct visual inspection (2 observers, forced consensus)
  - Outcome measure: Sensitivity, Specificity
  - ANOVA (p<0.05)
- Inter-/intrapersonal reliability
  - Outcome measure: Cohen's Kappa

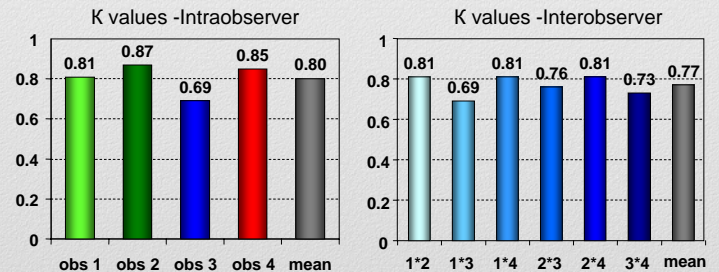


## Results

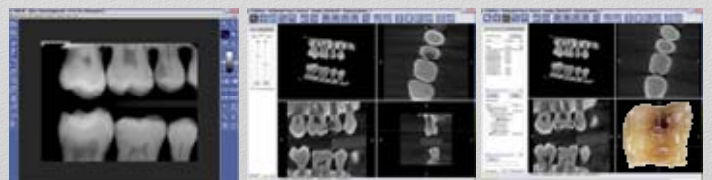
### Validity



### Reproducibility

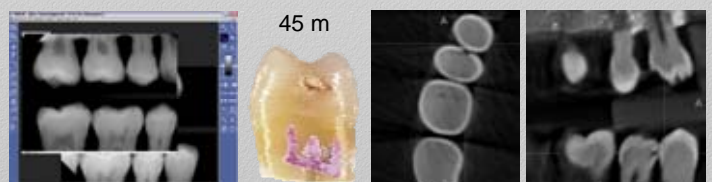


## Examples



Bitewing radiography

Cone-beam tomography



## Conclusions

- The detection of approximal carious cavities based on SIDEXIS or GALILEOS radiographs is almost completely accurate for sound approximal surfaces and non-cavitated carious lesions.
- Cone beam tomography strongly improves the reproducible detection of cavitated approximal carious lesions compared to intraoral radiography.