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Optical Coherence Tomography

A New Era in Dental Imaging

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Introduction

Optical coherence tomography (OCT) is a non invasive optical signal acquisition and processing method. It captures micrometer resolution cross sectional, 3 dimensional images, up to 1-2mm depth from within optical scattering media (biological tissue).

Conclusions

Principle:
OCT is a low coherence interferometric technique, typically employing near infrared light.

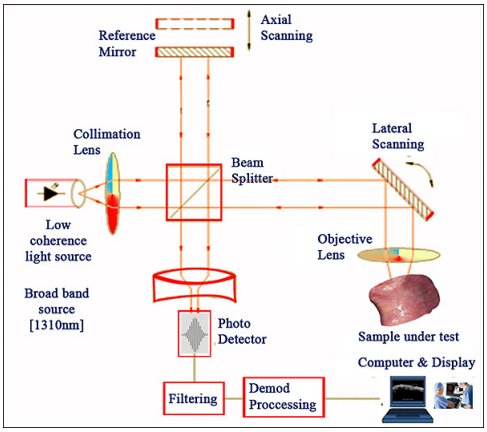


Fig. 1: OCT is a low coherence interferometric technique, typically employing near infrared light

History:

Fig. 2: First applied by Dr. David Haung et al in ophthalmology in 1991

Fig. 3: OCT SCANNER (VIVOSIGHT)

Fig. 4: OCT Hand Held probe

Fig. 5: Screening oral mucosa

Fig. 6: Instant chair side monitoring

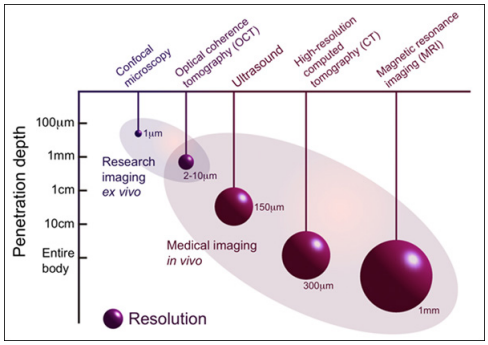


Fig. 7: Penetrating 1-2mm depth

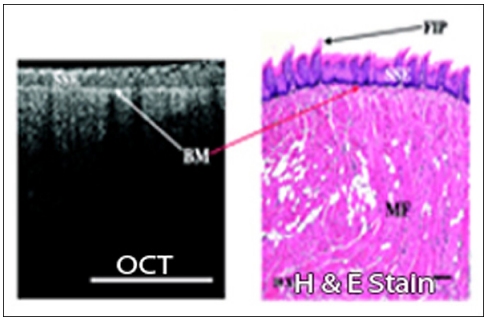
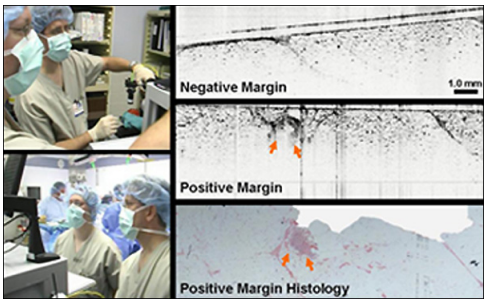


Fig. 8

Fig. 9: Treatment planning



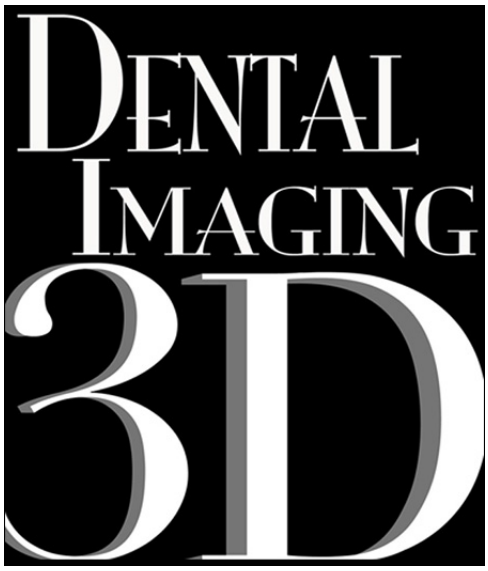


Fig. 10: Guiding surgical procedure

Fig. 11

Applications in Medicine
- Ophthalmology
- Gastroenterology
- Cardiology

Applications in Oral Medicine
- Early screening for precancerous lesions & oral cancer
- Imaging of tissue pathology

Applications in Conservative Dentistry & Endodontics
- Early detection of caries
- Evaluation of root canal anatomy
- Evaluation of fracture in restoration & tooth

Applications in Periodontics
- Assess periodontal disease

Advantages
- Instant, direct imaging of tissues morphology
- Live subsurface images at near microscopic resolution
- No ionizing radiation used

Disadvantages
- OCT scan quality is dependent on operator skill
- Tend to have a fairly shallow imaging penetration depth
- Expensive

Applications
Dentist viewing an OCT image for fractures & voids in composite restoration
Oct image showing early decalcification of tooth
Oct image showing root canal anatomy
Screening for oral cancer
OCT image showing moderate dysplasia of buccal mucosa
OCT SCANNER (VIVOSIGHT)
OCT Hand Held probe
Screening oral mucosa
Instant chair side monitoring
Penetrating 1-2mm depth
Treatment planning
Guiding surgical procedure

Fig. 12: Dentist viewing an OCT image for fractures & voids in composite restoration

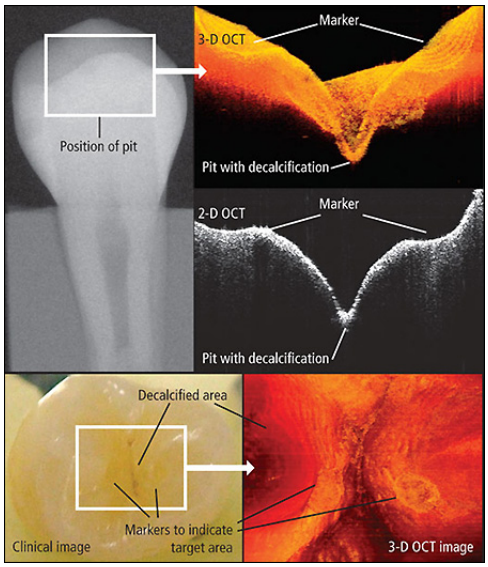


Fig. 13: Oct image showing early decalcification of tooth

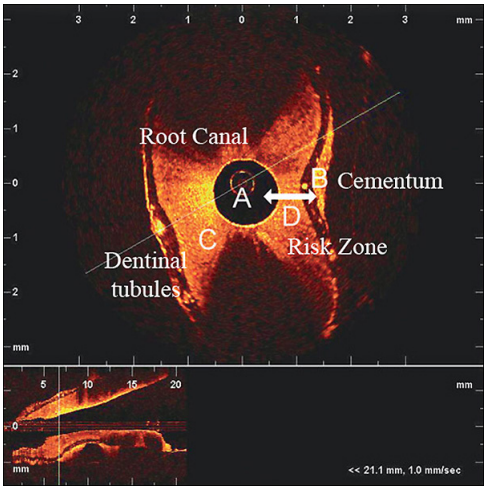


Fig. 14: Oct image showing root canal anatomy

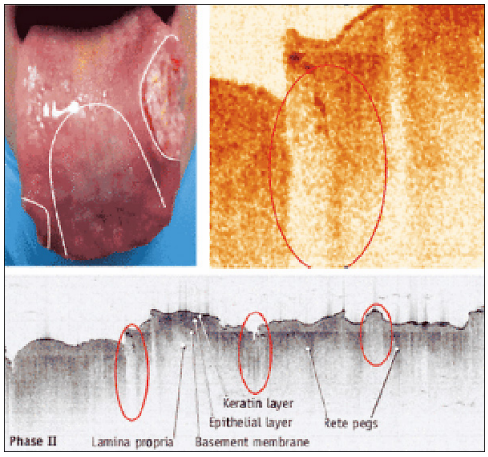


Fig. 15: Screening for oral cancer

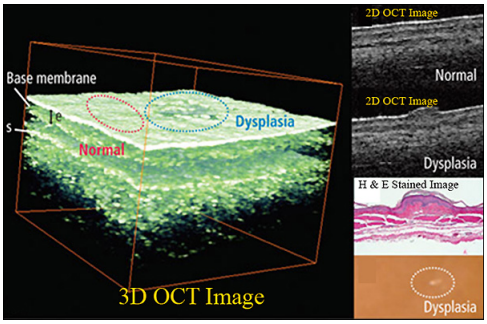


Fig. 16: OCT image showing moderate dysplasia of buccal mucosa

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