Recent Developments in Optical coherence Tomography for Imaging of the Retina and Optic Nerve Head

Essay

Submitted in Partial fulfilment of master degree

In Ophthalmology

By

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توطئة للحصول على درجة الماجستير
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Summary

Optical coherence tomography (OCT) is a new, noninvasive, noncontact, transpupillary imaging technique that produces high resolution, cross sectional images of the retina.

It was developed in the early 1990s.

It is based on the principle of low-coherence interferometry and the information concerning various ocular structures is extracted from time delays of the reflected signals.

Different scanning protocols can be used according to the retinal pathology studied; and the image presented is either a cross sectional image or a topographic map.

It provides *quantitative data* about the thicknesses of the retinal layers; and *qualitative data* about morphology of the retina and optic nerve head and reflectivity defects. It also provides topographic parameters of the retina and optic nerve head.

OCT diagnoses many pathologies e.g retinal edema, serous retinal detachment, RPE detachment, macular holes, and macular pseudo-holes, drusen, choroidal neovascularization, diabetic retinopathy, cystoid macular edema, epiretinal membranes, optic disc pits and pathological optic disc and nerve fiber layer changes in glaucoma. It can diagnose early cases before any visual complaints appear. This helps out in better management of glaucoma and minimizing disability.

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☒ **Summary**

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List of abbreviations

3-D	3-Dimensional
ANSI	American national standards institute
AMD	Age related Macular Degeneration
AO	Adaptive Optics
BM	Bruch's Membrane
BS	Beam Splitter
CARS	Coherent anti-stokes raman scattering
CC	Choriocapillaries
CCD	Charge-Coupled Device
CME	Cystoid Macular Edema
CMOS	Complimentary Metal-Oxide Semiconductor
CNV	Choroidal Neovascularization
CRL	Conventional Retinal Laser
DL	Double-Layer
DME	Diabetic Macular Edema
ELM	External Limiting membrane
ERM	Epiretinal Membrane
FA	Fluorescein Angiography
FDA	Food & drug association
FD-OCT	Fourier Domain Optical Coherence Tomography
FTMH	Full thickness macular hole
GA	Geographical atrophy
GCC	Ganglion Cell Complex
GCL	Ganglion Cell Layer
HD	High-Definition
HRT	Heidelberg retinal tomogram
IA	Indocyanin Angiography
ICSC	Idiopathic Central Serous Chorioretinopathy
IFT	Improper Central Foveal Thickness
ILM	Internal Limiting Membrane
INL	Inner Nuclear Layer
IPL	Inner Plexiform Layer
ISL	Inner Segment Layer

IS/OS D Inner Segment/Outer Segment photoreceptor layer Defect
IS/OS PR Inner Segment/Outer Segment photoreceptor
LMH Lamellar Macular Hole
MDB Median Distance Band
ME Macular Edema
MH Macular Hole
MP Macular Pucker
MTM Myopic traction maculopathy
NFL Nerve Fiber Layer
OCT Optical Coherence Tomography
OCT/SLO OCT and Scanning Laser Ophthalmoscopy
ODT Optical Doppler tomograpgy
OLM Outer Limiting Membrane
ONH Optic Nerve Head
ONHD Optic Nerve Head Drusen
ONL Outer Nuclear Layer
OPD Optical Path Difference
OPL Outer Plexiform Layer
OS Outer Segment
OSL Outer Segment Layer
PCV Polypoidal Choroidal Vasculopathy
PD Pattern Deviation
PED Pigment Epithelial Detachment
PPC Photoreceptor Pigment epithelium Complex
PRL Photoreceptor layer
PS Posterior Segment
PS-OCT Polarization sensitive OCT
PVD Polypoidal Choroidal Vasculopathy
RAP Retinal Angiomatous Proliferation
RNFL Retinal Nerve Fiber Layer
RNFLT Retinal Nerve Fiber Layer Thickness
ROP Retinopathy of Prematurity
RP Retinitis Pigmentosa
RPE Retinal Pigment Epithelium
RPE/BM Retinal Pigment Epithelium/Bruch's membrane
RT Retinal Thickness

RTA Retinal thickness analyzer
SBS Shaken Baby Syndrome
SD-OCT Spectral Domain OCT
SH-OCT Second harmonic OCT
SLD Superluminescent Diode
SLO Scanning Laser Ophthalmoscopy
SNR Signal-to-Noise Ratio
SRF Subretinal Fluid
SRT Selective Retina Treatment
SS Swept Source
TD Time Domain
Ti:Al2O3 Titanium Aluminum Oxide
UHR Ultrahigh Resolution
VF Visual Field
VM Verhoeff membrane
VMIA Vitreomacular interface abnormality
VMT Vitreamacular traction
VMTS Vitreomacular Traction Syndrome

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