

OCT ATLAS



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Foreword
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OCT ATLAS



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JAYPEE BROTHERS MEDICAL PUBLISHERS

The Health Sciences Publisher

New Delhi | London



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Abbreviations

25 G	25 Gauge	CWS	Cotton-Wool Spots	ICC	Intrachoroidal Cavitation
ACD	Anterior Chamber Depth	DALK	Deep Anterior Lamellar Keratoplasty	ICGA	Indocyanine Green Angiography
AK	Acanthamoeba Keratitis	DCP	Deep Capillary Plexus	ICL	Implantable Collamer Lens
AMD	Age-Related Macular Degeneration	DMD	Descemet's Membrane Detachment	ILM	Internal Limiting Membrane
AMG	Amniotic Membrane Graft	DME	Diabetic Macular Edema	INL	Inner Nuclear Layer
AMN	Acute Macular Neuroretinopathy	DRIL	Disorganization of Retinal Inner Layers	IOP	Intraocular Pressure
Anti-VEGF	Anti-Vascular Endothelial Growth Factor Therapy	DSEK	Descemet's Stripping Endothelial Keratoplasty	IPL	Inner Plexiform Layer
AOD	Angle Opening Distance	DSM	Dome-Shaped Macula	IRF	Intraretinal Fluid
ARMD	Age-Related Macular Degeneration	DVT	Diurnal Variation Test	IRMA	Intraretinal Microvascular Abnormalities
AS-OCT	Anterior Segment-OCT	EDI-OCT	Enhanced Depth Imaging Optical Coherence Tomography	IS/OS	Inner and Outer Segments
ASPPC	Acute Syphilitic Posterior Placoid Chorioretinitis	ELM	External Limiting Membrane	IV	Intravenous
ATT	Anti-Tuberculous Therapy	ERM	Epiretinal Membrane	IZ	Interdigitation Zone
AV	Arterio Venous	EZ	Ellipsoid Zone	KP	Keratic Precipitates
BCVA	Best Corrected Visual Acuity	FAZ	Foveal Avascular Zone	LASIK	Laser-Assisted in Situ Keratomileusis
BRAO	Branch Retinal Artery Occlusion	FFA	Fundus Fluorescein Angiography	LPI	Laser Peripheral Iridotomy
BRVO	Branch Retinal Vein Occlusion	FFM	Fundus Flavimaculatus	MF	Myopic Foveoschisis
C3R	Corneal Collagen Cross-Linking	GA	Geographical Atrophy	MLD	Minimum Linear Diameter
CC	Choriocapillary	GCC	Ganglion Cell Complex	MRI	Magnetic Resonance Imaging
CCT	Central Corneal Thickness	GCL	Ganglion Cell Layer	NPDR	Non-Proliferative Diabetic Retinopathy
CDK	Climatic Droplet Keratopathy	GDD	Glaucoma Drainage Device	NRR	Neuroretinal Rim
CDR	Cup-to-Disc Ratio	GPA	Guided Progression Analysis	NSAID	Nonsteroidal Anti-Inflammatory Drug
CME	Cystoid Macular Edema	HBA1C	Hemoglobin A1c	NVD	Neovascularization of the Disc
CMO	Cystoid Macular Edema	HCQ	Hydroxychloroquine	NVE	Neovascularization Elsewhere
CNV	Choroidal Neovascularization	HFA	Humphrey Field Analyser	NV	Neovascularization
CNVM	Choroidal Neovascular Membranes	HMD	Hereditary Macular Degeneration	OAT	Ornithine Aminotransferase
CR	Chorioretinal	HRF	Hyperreflective Foci	OCT	Optical Coherence Tomography
CRVO	Central Retinal Vein Occlusion	HVF	Humphrey Visual Field	OCTA	Optical Coherence Tomography Angiography
CSCR	Central Serous Chorioretinopathy	HVFA	Humphrey Visual Field Analyser	OD	Oculus Dextrus (Right Eye)
				ODP	Optic Disc Pit

ODP-M	Optic Disc Pit Maculopathy	PRP	Panretinal Photocoagulation	SRF	Subretinal Fluid
ONH	Optic Nerve Head	PUK	Peripheral Ulcerative Keratitis	SRMH	Subretinal Macular Hemorrhage
ONL	Outer Nuclear Layer	PVD	Posterior Vitreous Detachment	SS-OCT	Swept-Source Optical Coherence Tomography
OPL	Outer Plexiform Layer	RAP	Retinal Angiomatous Proliferation	TD-OCT	Time Domain Optical Coherence Tomography
ORCC	Outer Retina to Choriocapillaris	RAPD	Relative Afferent Pupil Defect	TIA	Trabecular - Iris Angle
ORT	Outer Retinal Tubulation	RD	Retinal Detachment	TISA	Trabecular Iris Space Area
OS	Oculus Sinister (Left Eye)	RIOFB	Retained Intraocular Foreign Body	TPA	Tissue Plasminogen Activator
OSSN	Ocular Surface Squamous Neoplasia	RNFL	Retinal Nerve Fiber Layer	TPHM	Taut Posterior Hyaloid Membrane
PAC	Primary Angle Closure	RNFLD	Retinal Nerve Fiber Layer Defect	TRD	Tractional Retinal Detachment
PAMM	Paracentral Acute Middle Maculopathy	RP	Retinitis Pigmentosa	UBM	Ultrasound Biomicroscopy
PAS	Peripheral Anterior Synechiae	RPE	Retinal Pigment Epithelium	VA	Visual Acuity
PCV	Polypoidal Choroidal Vasculopathy	BM	Bruch's Membrane	VKC	Vernal Keratoconjunctivitis
PDR	Proliferative Diabetic Retinopathy	SCP	Superficial Capillary Plexus	VKH	Vogt-Koyanagi-Harada
PED	Pigment Epithelial Detachment	SD-OCT	Spectral Domain Optical Coherence Tomography	VMT	Vitreomacular Traction
PFT	Parafoveal Telangiectasia	SLO	Scanning Laser Ophthalmoscopy	VR	Vitreoretinal
PIC	Punctate Inner Choroiditis	SMILE	Small Incision Lenticule Extraction	VRI	Vitreoretinal Interface
PPV	Pars Plana Vitrectomy				

CHAPTER 19

KERATITIS

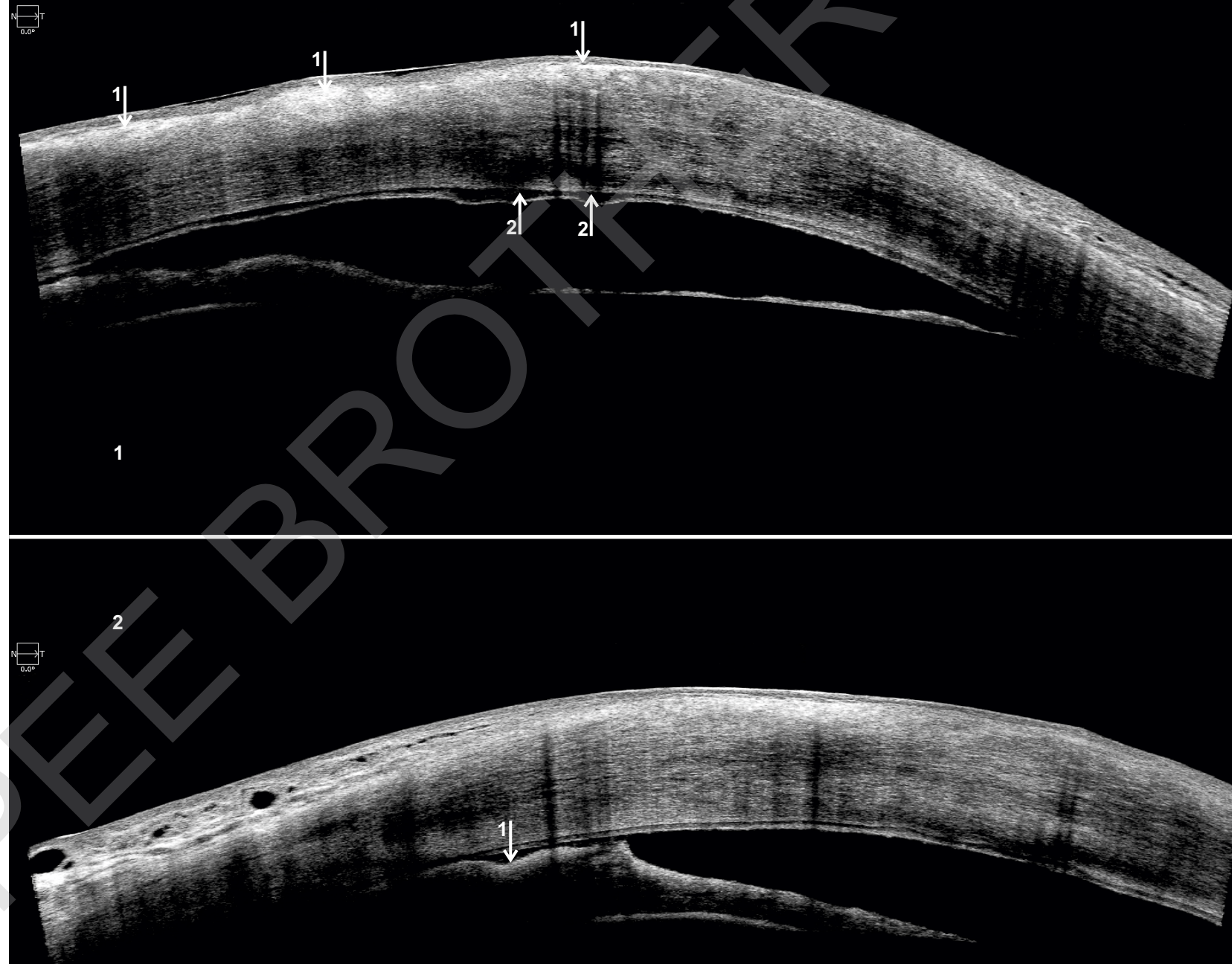
Figure 1

AS-OCT of a case of diffuse corneal melt shows diffuse stromal hyperreflectivity and thickening in the areas of dense infiltrates (1). Descemet's folds are visible (2). The anterior chamber is shallow with irregular cornea.

Figure 2

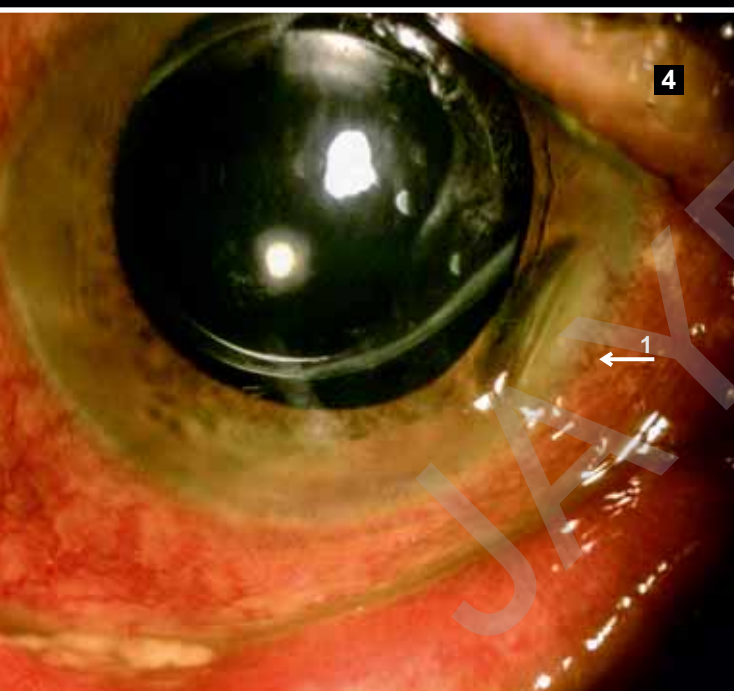
Nasal anterior segment OCT of the same eye showing iridocorneal adhesions and closed angle (1).

Corneal melt can either be sterile or infective. Tear film abnormalities are a common cause of sterile corneal melts. If timely management is not done, corneal melt can end up in perforation of cornea. AS-OCT, being a non-invasive and non-contact modality of imaging has an advantage over UBM as it provides valuable information about anterior chamber details. Amniotic membrane grafting is used in corneal melt as it provides tectonic support as well as helps in epithelization. Severe cases may need therapeutic/tectonic keratoplasty.





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Figure 3 *AS-OCT demonstrating significant corneal thinning with hyperreflectivity at the junction of normal and abnormal cornea. The base of ulcer appears most hyperreflective indicating higher density of cellular material and necrosis (1).*

Figure 4 *Photograph of right eye depicting severe conjunctival congestion with peripheral spindle-shaped thinning of cornea at 4 o'clock position (1).*

Figure 5 *Focal illumination showing thinning of cornea up to half of its thickness.*

PUK consists of spectrum of inflammatory disorders constituting of peripheral corneal thinning. Autoimmune connective tissue disorders are the most common cause of PUK. Other causes include infective and traumatic conditions. Surgical treatment in the form of tectonic graft (banana graft) is needed in severe cases. AS-OCT is advantageous in delineating the extend of thinning and underlying tissue necrosis. Response to therapy can also be gauged using this modality.

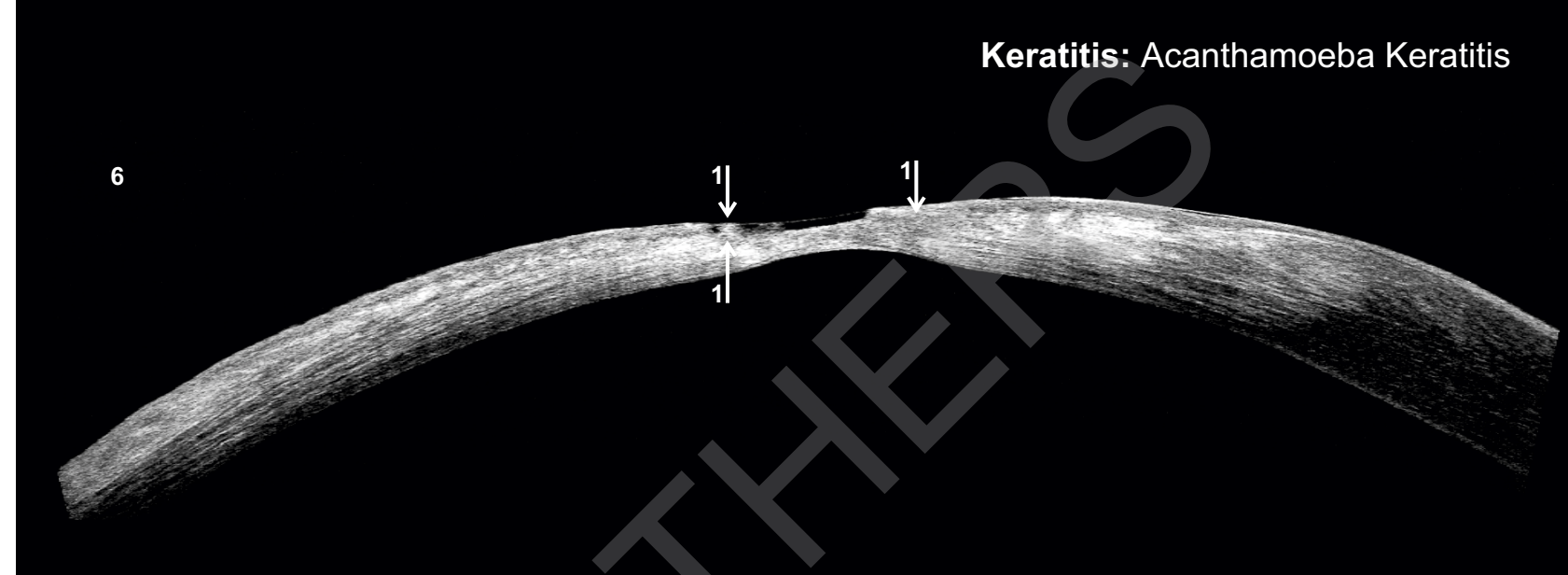


Figure 6

AS-OCT scan through center of lesion showing sloping edge of ulcer (1) with corneal thinning. Surrounding corneal tissue is hyperreflective.



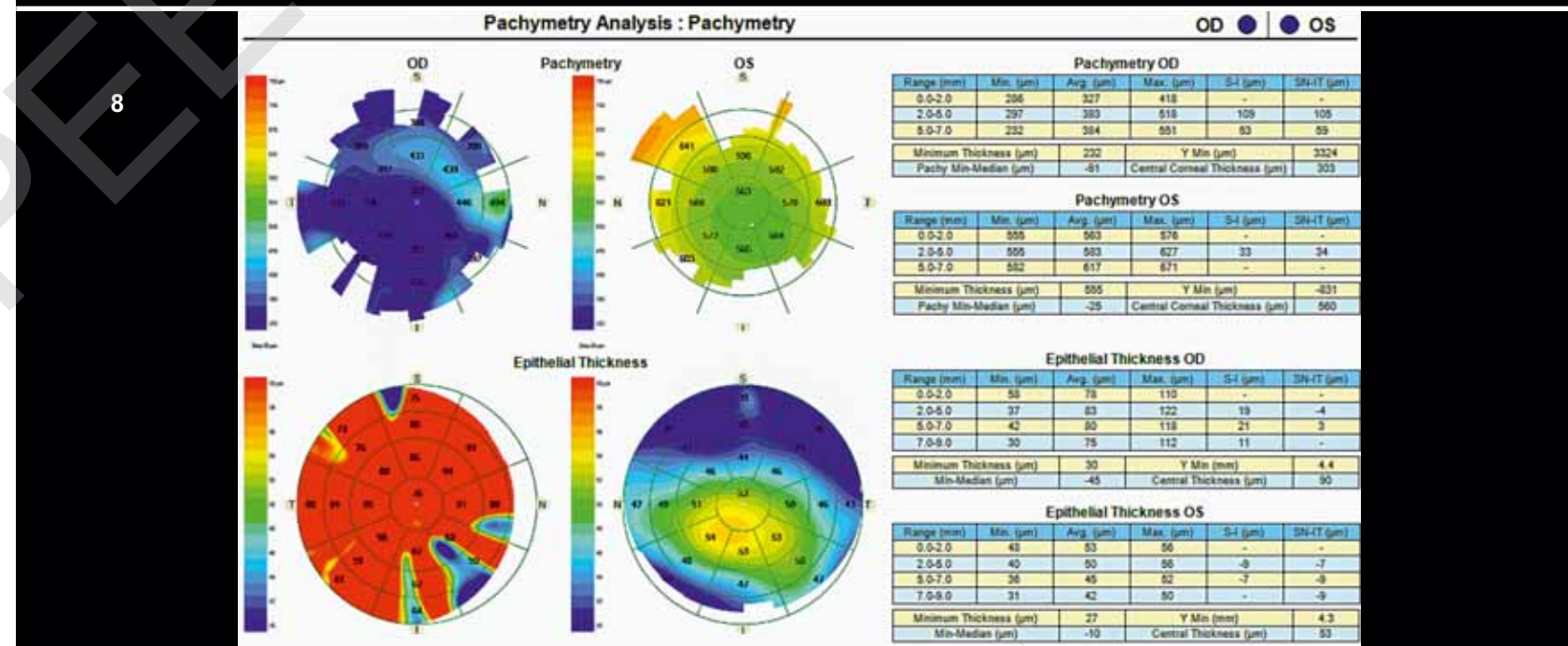
Figure 7

AS-OCT scan through superior relatively clearer cornea shows irregular epithelium with multiple hyperreflective bands suggestive of radial keratoneuritis (1).

Figure 8

Pachymetry analysis of the patient showing severe thinning in right eye with thinnest location of only 232 microns. Epithelial thickness is irregular and thickening is also noted in some areas.

Acanthamoeba keratitis (AK) is a severe sight threatening condition seen mostly in contact lens wearers but can be seen in non-contact lens wearers as well. Diagnosis is challenging and early diagnosis lead to better prognosis. Radial keratoneuritis and ring infiltrates are usually seen in Acanthamoeba keratitis. On AS-OCT, radial keratoneuritis is seen in the form of highly reflective bands or lines in the corneal stroma. In severe corneal ulceration, this finding may not be visible due to intense stromal inflammation.





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Figure 9 *AS-OCT scan of an eye with herpetic keratouveitis. Subepithelial, spindle-shaped stromal hyperreflectivity (1) suggestive of stromal infiltration and presence of endothelial protrusions in the endothelium (2) indicating keratic precipitates (KPs).*

Figure 10 *On illumination, keratic precipitates can be visualized (1).*

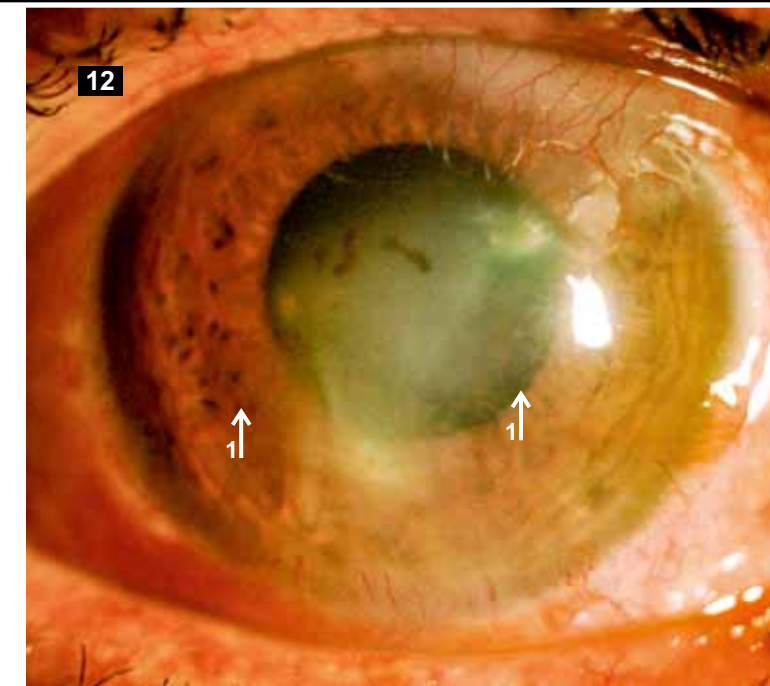


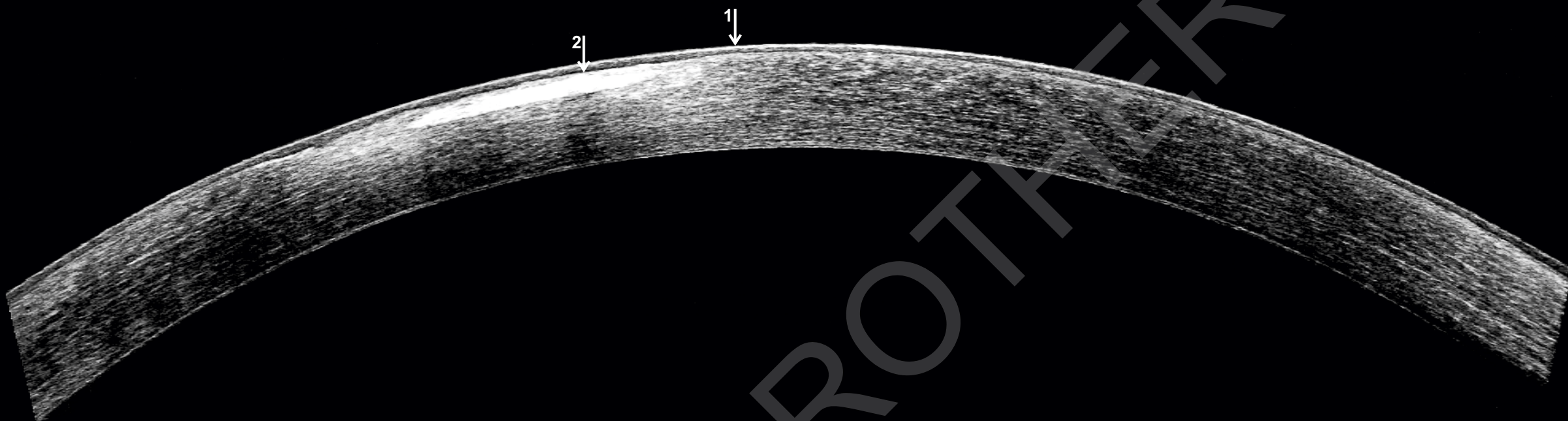
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Figure 11 Inferior scans showing irregular corneal surface with an intact epithelium and underlying stromal infiltration as a spindle-shaped hyperreflective area and presence of a large cystic space suggestive of melt/necrosis (1). There is presence of endothelial plaque adjacent to the lesion. Thinning of cornea noted at the site of stromal infiltration.

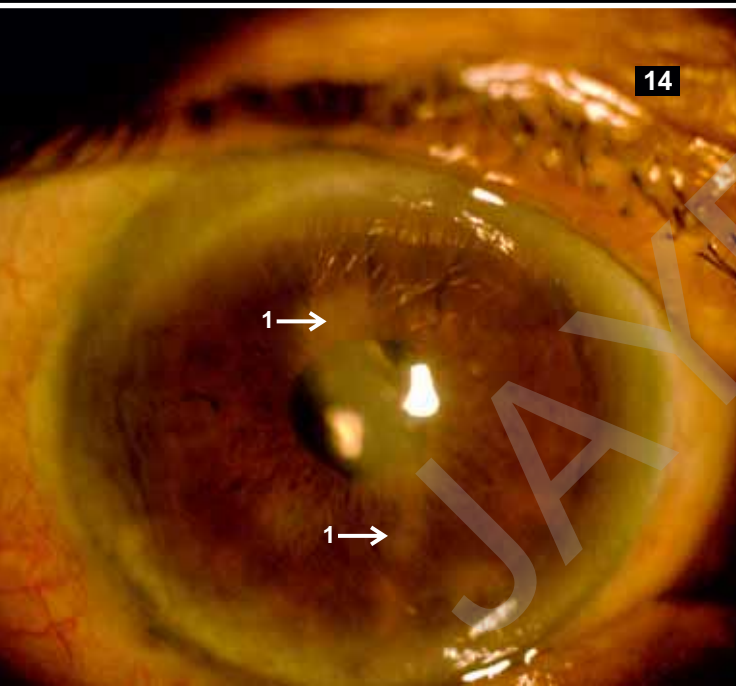
Figure 12 Anterior segment photograph showing conjunctival congestion with corneal vascularization at 1 o'clock and 6 o'clock position. There is central corneal edema with pigmentary changes (1).

Viral keratitis is responsible for severe visual impairment in both developed and developing world. Diagnosis is mainly clinical based on slit-lamp evaluation. AS-OCT can prove invaluable in microbial and viral keratitis. It helps in differentiating active lesions from scars as well as in follow-up and response to treatment. Viral keratouveitis may present with a broad spectrum of features ranging from epithelial dendritic lesion, disciform keratitis, stromal edema to endotheliitis.





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Figure 13 AS-OCT through the central cornea showing an intact epithelium (1) with a well-defined area of stromal condensation (2) in anterior corneal stroma suggestive of corneal scar.

Figure 14 Photograph of right eye of a patient of old viral keratitis. Eye appears quiet with a presence of paracentral corneal opacity (1).

Herpes simplex keratitis is a common cause of corneal blindness. It has tendency to heal with scarring. It is essential for the physician to differentiate between a scar and active lesion. AS-OCT aids in distinguishing a scar from an active lesion. Scar consists of distinct stromal condensation with an intact epithelium while an active lesion is more diffuse, spindle-shaped hyperreflective in appearance and the epithelium may be irregular.

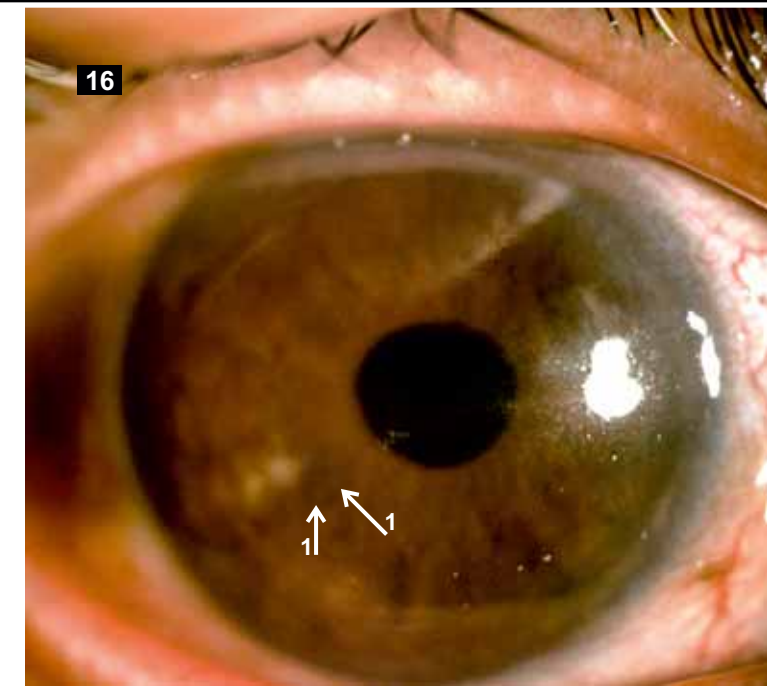


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Figure 15 AS-OCT of the same eye shows irregular, thickened epithelium (1) with underlying stromal edema visible as hyperreflective zone (2). Endothelium appears regular.

Figure 16 Slit-lamp photograph of a 54-year-old male who presented with blurring of vision and redness in right eye. There is presence of epithelial roughening with dendrite (1) with underlying stromal edema.

Herpetic epithelial keratitis has a typical dendrite pattern within the corneal epithelium with terminal bulbs. The edges of ulcer contain live virus with central ulceration through the basement membrane. Dendritic ulcers are treated with topical acyclovir 3% or ganciclovir 0.15% gel. Prophylaxis with oral acyclovir is considered in patients with frequent recurrences or in bilateral dendritic ulcers.



OCT ATLAS

We present to you an atlas of Optical Coherence Tomography (OCT) of common retinal disorders compiled using our collection of imaging on Plex Elite and Cirrus 6000. We have added fundus picture or angiography to help aid in understanding the pathology in a better way. Being an atlas, a greater space has been allocated to pictures with just little and necessary text. Enjoy the details in scans. Look at the details and the plethora of lesions visible. A picture shows much more in a shorter time than a thousand words. It is an unmatched documentation to follow the disease progression or recovery. This book is for every ophthalmologist to review the fundus pathologies and great for residents and students.

SPS Grewal MBBS MD is a graduate and a postgraduate from Government Medical College, Patiala, Punjab, India. He pursued his training in retina at PGIMER, Chandigarh, India, and completed a WHO fellowship in Moorfields Eye Hospital, London, UK. He won the Col. Rangachari Gold Medal for best research paper at 10th Annual Conference of All India Ophthalmology, Bombay 1989. He has over 150 national and international publications and instruction courses at AIOS, ESCRS and AAO. He was awarded the Sante Vision Award (Year 2008) from All India Ophthalmological Society (AIOS). He also won the "Achievement Award" and "International Scholar" award at the American Academy of Ophthalmology (AAO) in 2012 and 2014, respectively. His move from academics to private practice in 1993, was accompanied by a shift from posterior segment to anterior segment, though retina remains his true passion. Currently he is heading cataract and refractive services at Grewal Eye Institute in Chandigarh, and remains in touch with teaching residents as an Adj. Professor at the Department of Ophthalmology, Feinberg School of Medicine, Northwestern University, IL, USA.

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Mansi Sharma MBBS DNB FAICO is a young, vibrant ophthalmologist with great surgical skills is an asset to any organization across the globe. During her training she had a chance to work under great surgical

masters to hone up her skills and understand the finer nuances of vitreoretinal surgery. Her expertise in surgery is evident from the preoperative and postoperative photographs of cases operated by her. She is a person who believes in a balanced life and ambidextrous living. She plays an important role to make the vitreoretinal team a cohesive force. Currently she is a Consultant, Department of Vitreo-retinal Diseases and Surgery at Grewal Eye Institute in Chandigarh, India.

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Printed in India

Available at all medical bookstores
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Medical Publishers (P) Ltd.
EMCA House, 23/23-B, Ansari Road,
Daryaganj, New Delhi - 110 002, INDIA
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ISBN 979-93-5465-092-5

