



## Optic Disc Optical Coherence Tomography Imaging through a Black Intraocular Lens

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**Optic Disc Optical Coherence Tomography Imaging  
through a Black Intraocular Lens**

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**Keywords:** Black intraocular lens; occlusive intraocular lens; optical coherence tomography;  
optic disc imaging; glaucoma; papilledema

**Running Title:** Optic disc imaging through a Black IOL

## Case Report

A 49-year-old female presented to ophthalmology with intractable diplopia, secondary to decompensated esotropia. Her diplopia was controlled for several years with spectacle prisms, and thereafter with an occlusive contact lens until she became contact lens intolerant.

On examination, visual acuity was 6/9 OD and 6/60 OS. The intraocular pressure was 13 mmHg OU. The crystalline lenses were clear, the macula and optic disc appeared normal. She had a family history of glaucoma and was screened by optometrists annually.

She underwent primary phacoemulsification and implantation of the 85F Black PMMA IOL (Morcher GmbH, Stuttgart, Germany) in her left eye. One week following surgery, her diplopia had resolved. Vision was recorded as perception of light in her left eye. The left cornea was clear. The Black IOL implant was well centred (**Figure 1**). The posterior segment could not be visualised.

Optical coherence tomography (OCT) images (Spectralis, Heidelberg Engineering) of the left optic disc were successfully acquired through the Morcher 85F Black IOL. Image quality was, comparable to those attained in the healthy right eye (**Figure 2**). OCT optic disc images revealed borderline retinal nerve fibre layer thinning in both eyes.

OCT images of the optic discs were used as baseline measurements to monitor for structural changes of glaucoma at follow-up. No further treatment was recommended. The patient was kept under regular outpatient review with intraocular pressure measurements and optic disc OCT imaging.

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**Discussion**

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52 Black intraocular lenses (IOLs) are implanted for intractable diplopia, leucocoria, visual  
53 confusion, and a variety of neuro-ophthalmic indications<sup>1</sup>. Two categories exist: Black IOLs  
54 that transmit near-infrared light (NIR), and Black IOLs that block NIR light<sup>2-4</sup>. Black IOLs which  
55 transmit NIR light support macular imaging with optical coherence tomography (OCT) and  
56 ultra-widefield retinal imaging with confocal scanning laser ophthalmoscopy<sup>5</sup>. An imaging  
57 modality capable of examining the optic disc in this patient group has not been described.  
58  
59 The novel discovery of optic disc imaging using OCT described in this report has a number of  
60 useful clinical applications:  
61 (1) Diagnosis of glaucoma: the utility of optic disc OCT in the diagnosis of glaucoma has  
62 been demonstrated<sup>6</sup>. Visual field assessment and other forms of structural imaging of  
63 the optic disc (scanning laser polarimetry) are impossible in this patient group<sup>2</sup>.  
64 (2) Follow-up of glaucoma patients: structural change of the optic disc and peripapillary  
65 retinal nerve fibre layer may be detected<sup>7</sup>.  
66 (3) Papilledema: Optic disc OCT imaging may contribute to a diagnosis of papilledema<sup>8</sup>,  
67 detect subtle changes in CSF pressure following lumbar puncture<sup>9</sup>, and may  
68 differentiate optic disc edema and drusen<sup>10</sup>.  
69 (4) Other optic nerve disorders: optic disc pits<sup>11</sup> and optic disc melanocytoma<sup>12</sup> are  
70 detectable on optic disc OCT imaging.

74 This clinical observation impacts on pre-operative Black IOL selection. Patients with known  
75 glaucoma or disorders that may require optic nerve surveillance (such as those at risk of  
76 raised intracranial pressure) who are candidates for Black IOL implantation may benefit from  
77 implantation of a NIR-transmitting Black IOL (Morcher GmbH). This will support a diagnosis of  
78 associated ocular and systemic disease where necessary.

For Review

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149   **Figures**

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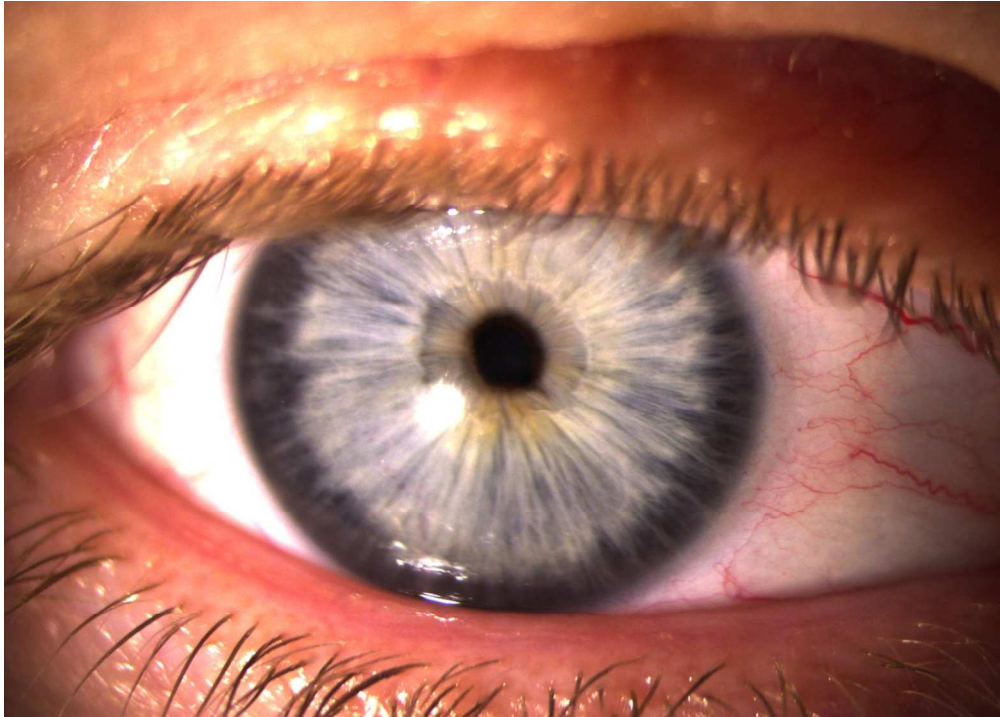
151   **Figure 1.** Anterior segment images. **(a)** Anterior segment image of right eye demonstrating  
152   miotic pupil (Holmes-Adie) and clear crystalline lens **(b)** The left eye demonstrates a  
153   pharmacologically dilated pupil with Black IOL implant (Morcher 85F PMMA) and post-  
154   operative subconjunctival haemorrhage. There is no red reflex visible in the left eye.

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156   **Figure 2.** Optic disc Optical Coherence Tomography (OCT) images. **(a)** Right eye and **(b)** left  
157   eye through the Morcher 85F Black PMMA IOL demonstrating clear infra-red images (top left),  
158   automated retinal nerve fibre layer analysis (top right), and nerve fibre layer classification  
159   compared to normative database for both eyes. Right optic disc OCT imaging suggests  
160   borderline superior and inferior retinal nerve fibre layer thinning **(a)**, and the left optic disc,  
161   borderline inferior thinning **(b)**.

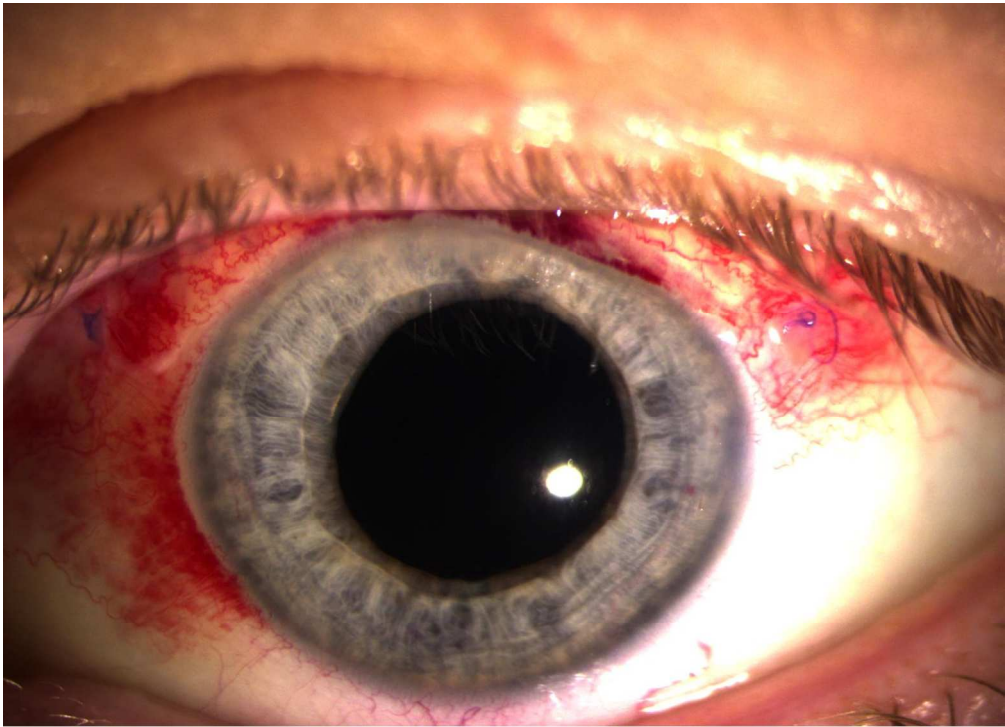
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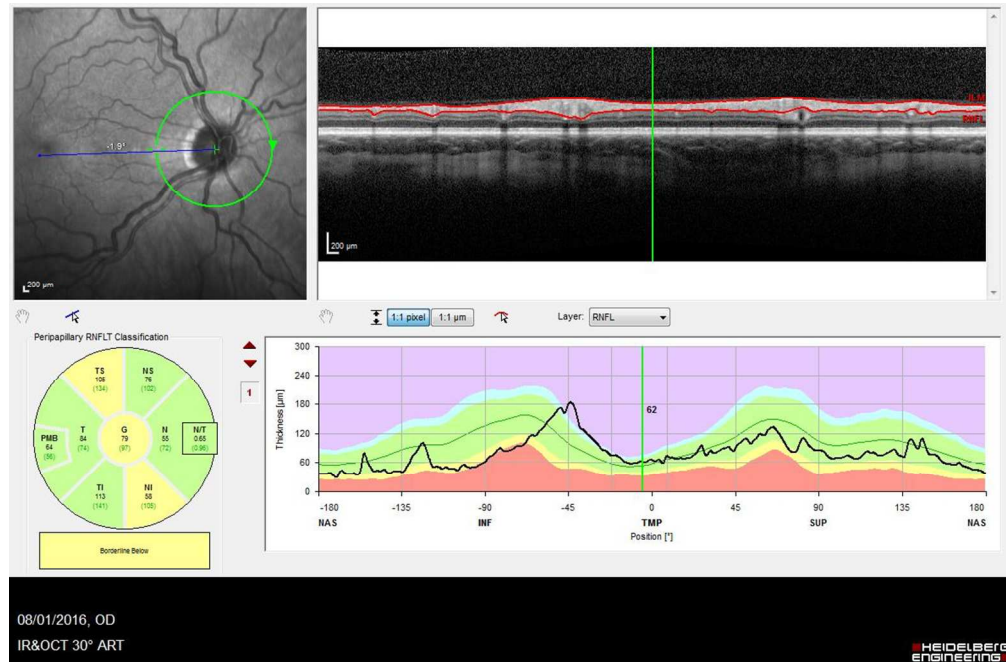


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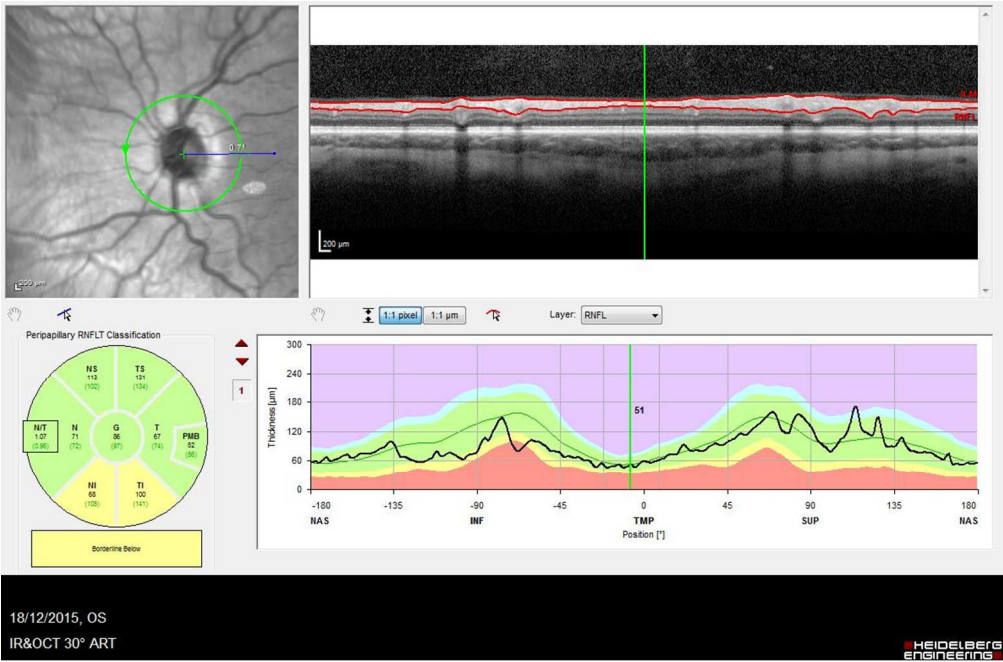
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