

# Radical Retinoscopy In The Low Vision Examination: A Case Report

J. Graham Strong\*

## Abstract

*The case of a 31 year old low vision patient is reported. A review of her ocular status is made in this presentation. Although conventional retinoscopy is impossible, radical retinoscopy provides a reasonably accurate refraction. Spectacle correction of this hitherto undetected refraction provides the basis for successful low vision therapy.*

## Abrégé

*Ce travail traite du statut oculaire d'une handicapée visuelle de 31 ans. La skiascopie conventionnelle étant impossible on a eu recours à la skiascopie radicale pour obtenir la réfraction. Une correction par lunettes de cet état de refraction jusqu'alors en-soupçonné a permis une thérapie satisfaisante de basse vision.*

Radical retinoscopy is an often overlooked adjunct to routine static retinoscopy. Conventional retinoscopic observations are made along the primary line of sight from a standard working distance of 66 cm and compensated for by a retinoscopy lens of +1.50 D. By definition, radical retinoscopy is a technique where the "working distance is reduced until a recognizable reflex is seen"<sup>1</sup> This reduced working distance which may be closer than 10 cm, is compensated for by a corresponding increase in the magnitude of the retinoscopy lens.

Maier<sup>2</sup> has suggested that this technique be attempted in those cases where "routine retinoscopy is not possible due to the following:

- a) Keratonconus
- b) Large central opacities of the cornea

- c) Highly irregular corneal curvatures resulting from scar tissue formation after disease, trauma, pterygia, or foreign bodies
- d) Cataract of sufficient density to prevent observation of the reflex from usual working distances
- e) Other anomalous conditions of the media"

Although this technique causes a shortening of the range of neutrality with an increased likelihood of miscalculation,<sup>3</sup> it does provide a reasonable objective measurement of refraction in those low vision cases where conventional retinoscopy is impossible.

The following case report illustrates the potential merit of 'radical retinoscopy' as a procedure in low vision work.

**HISTORY:** Mrs. E.M. is a 31 year old physiotherapist. Registered with the CNIB since she was 3 months old, her ocular problems have been attributed to an embryopathic 'viral' infection in the very early days or weeks of her prenatal period. There is no family history of blindness. There is no history of surgical intervention in her case. Her primary and secondary school education was received at a school for the blind after the third grade. Until that time she had functioned in a normal classroom situation. She is presently employed in a hospital where she is somewhat disadvantaged by her inability to read typewritten patient files and records. She had heard of our clinic through the CNIB and wanted to know if any aids were available to help her with this reading problem.

She demonstrates a high degree of mobility, having independently travelled to and from our low vision

clinic by bus.

**CLINICAL FINDINGS:** Visual acuities were found to be 5/350 for the right eye and 3/300 for the left eye. At 40 cm, acuities of 20M and 32M respectively were recorded. Microphthalmia was evident with marked nystagmus and a constant left esotropia.

There is, in the right eye, hypoplasia of the iris, with lens and iris remnants being adherent to the posterior temporal surface of the cornea. A leukoma has formed in this broad anterior synechia three mm from the centre of the cornea. The cornea itself is small, measuring 8 mm in diameter and there are several areas of scleralization (Fig 1)

The limited degree of vision is afforded by a vertical opening in the nasal iris measuring 1.5 mm in width and 4 mm in height (Fig 2) Ophthalmoscopy through this 'pupil' revealed normal peripheral fundus. No central fundus details could be visualized even with monocular indirect ophthalmoscopy.

The left eye demonstrates severe malformation with much of the cornea obscured by scarring and scleralization particularly in the inferotemporal quadrant. No retinal reflex was visible and the eye exhibits signs of incomplete development.

Applanation pressures were not possible because of the rapid nystagmus. Intraocular tension was felt to be normal to palpation and no corneal edema was recognized in the right eye. The left cornea is edematous but this may be related to endothelial decompensation rather than an elevated intraocular pressure.

These clinical findings were consistent with a diagnosis of em-

\*O.D., Clinical Supervisor  
School of Optometry  
University of Waterloo,



bryopathy resulting from prenatal rubella infection. 4,5,6

Because of the nystagmoid movements and the eccentricity of fixation, keratometry was somewhat unreliable. Averaging several successful readings for the right eye gave the following: OD 45.12 @ 180 46.37 @ 90. No reliable readings could be made for the left eye. Radical retinoscopy (10 cm working distance) obliquely through the tear in the iris gave a gross value of +22.00 -1.50 axis 180, which yielded a net Rx of +12.00 -1.50 axis 180. Subjective testing using a 10 foot target distance refined this to a best subjective prescription of +10.00 -1.00 axis 180.

This was found to improve the acuity to 10/350 and was prescribed in lenticular form. Because of the optical asymmetry of the viewing situation, a monocular PD was determined by widening and narrowing the centration of the trial lenses to first perceptible blur points and then selecting the midpoint. No subjective advantage was found with similar correction to the left eye.

On delivery of the spectacles near-point capabilities were assessed. It was interesting to note that no subjective distance improvement could be elicited with telescopic aids fitted over the distance Rx. This non-response to telescopic correction may be attributable to the gross eccentricity and deformity of the anatomical pupil. Nystagmus and probable field defects further compromise successful telescopic correction for this patient.

At near, a 10 times power loupe was found to improve the nearpoint discrimination to 2M. A 15 times power loupe with a built-in light source further increased the acuity to 1M. This acuity was repeated with a 15 times power focusable loupe. Although the patient found this loupe to be optically superior, proper illumination was critical for it to be maximally effective. The 20 times power loupe was found to give no further acuity improvement.

The patient was next presented with normal sized typewritten pages

to simulate her intended use of the aid. She was able to read these with reasonable facility considering her unfamiliarity with reading tasks and the mechanical and optical constrictions of the reading aids. On the basis of this demonstrated proficiency, both 15 times power loupes were prescribed. It was pointed out to her that the focusable loupe would be useful at home where she could arrange appropriate

illumination.

**FOLLOWUP:** One month after the dispensing of these various aids, Mrs. E.M. was contacted by telephone. She is wearing her correction constantly except when she works in the kitchen where she prefers to leave her glasses off. She uses her focusable loupe successfully at home for scrutinizing her bills and for periodic reading tasks.

She plans to use her illuminated

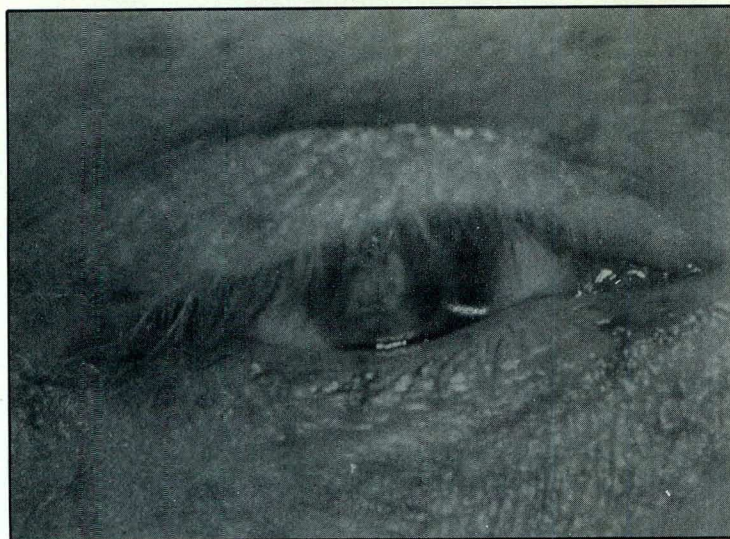


Figure 1:  
Microphthalmia with areas of scleralization evident in the right eye. Conventional retinoscopy is impossible for this eye with no pupil visible.



Figure 2:  
Biomicroscopic view of pupil which is just visible to the right of the corneal section. Off axis radical retinoscopy was performed through this pupil.



magnifier when she goes back to work at the hospital.

Subsequent conversations with the patient confirm that she is now able to better perform her duties as physiotherapist with her newfound reading ability using her illuminated loupe.

**DISCUSSION:** This case illustrates the success that can be achieved with an intelligent and motivated patient in spite of an insurmountable loss of acuity. It also demonstrates the importance of radical retinoscopy in low vision work.

Virtually no fundus reflex could be observed with conventional static retinoscopy. Radical retinoscopy proved to be the only method for detecting the pupil and for objectively measuring the refraction. Previous assessments by other practitioners since the age of six months seem to have overlooked this possibility for determining her refractive condition. Ultimately this refraction provided the basis for resolving her visual acuity goals using conventional low vision aids.

**COMMENT:** In conversation with other low vision practitioners, my experience coincides with theirs in that radical retinoscopy is an invaluable technique prior to many low vision workups.

#### **Acknowledgement**

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