



# Excellent Visual Outcomes in Children with Myelinated Nerve Fibers and Without Myopia

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## Abstract

**Introduction:** Myelinated Retinal Nerve Fibers (MRNF) is typically unilateral and associated with high axial myopia, intractable amblyopia, and poor visual outcomes. Cases without myopia have not yet been reported. We report three cases, one bilateral, without myopia, with excellent visual outcomes.

**Methods:** Retrospective, observational case-control study.

**Case Reports:** I) A 2-year-old boy with pseudostrabismus had MRNF OU. Uncorrected visual acuity (VA) was 20/30 OD and 20/60 OS at age 4. OD patching was instituted, at first 5 hours weekly but increased to half-time at age 5. At last follow-up, his VA measured 20/25 OD and 20/30+ OS.

II) A 5-year-old girl with Down syndrome had MRNF for 360 degrees OS, extending in an arcuate fashion around the vascular arcades. Hyperopic correction was prescribed with homatropine 5% twice daily OD. After 4 months, the VA measured 20/50 OU and the homatropine was discontinued. At age 8 10/12, VA was 20/30 OD and 20/40 OS.

III) A 9-year-old girl had "intraocular abnormality" OD discovered by her optometrist, who prescribed reading glasses. Examination showed uncorrected VA of 20/20 at distance and near. MRNF were noted for 4 clock hours in the OS. Glasses were discontinued. Eighteen months later, her VA measured 20/20 OU.

**Discussion:** Maculae were normal in all cases. We recommend a trial of refractive correction, patching or penalization, where indicated, in children with MRNF.

**Conclusion:** MRNF without myopia are consistent with excellent visual outcomes.

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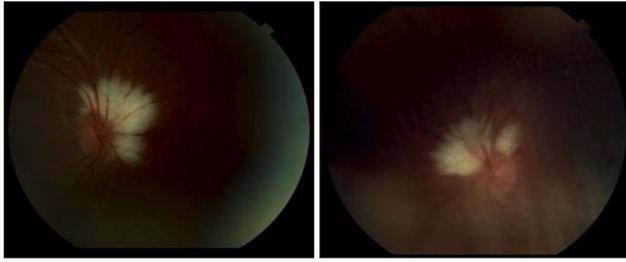
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## Introduction

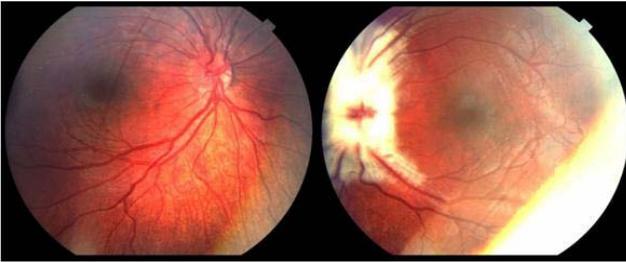
Myelinated Retinal Nerve Fibers (MRNF) may be associated with high axial myopia and intractable amblyopia. These cases, usually unilateral, generally have visual outcomes of 20/200 [1-3]. A few cases have been reported with better outcomes [4-6]. Such cases, which have all been unilateral, have had limited retinal involvement, normal maculae, and as little as -1.5 D of myopia. Only one case report of MRNF without ipsilateral myopia has been reported to date. After therapeutic patching, corrected final visual acuity was 20/25 in the right eye and 20/30 in the left eye [7]. We discuss three additional cases, one bilateral, who had no myopia and yet achieved visual outcomes of 20/40 or better.

## Patients and Methods

Data for this study were collected with approval by the Institutional Review Board of the Albany Medical College in accordance with the Declaration of Helsinki and the United States Health Insurance Portability and Privacy Act. No informed consent was necessary for this retrospective, observational case-control study. Patient records were anonymized and de-identified prior to analysis. The medical records of 41 children diagnosed with an unspecified retinal disorder from 2012-2015 at Albany Medical College were reviewed. We included children younger than 15 years who had myelinated retinal nerve fibers and underwent spectacle correction, patching, or penalization therapy and achieved visual acuity outcomes of 20/40 or better. All patients underwent a complete ocular examination, including the measurement of visual acuity, cycloplegic refraction, strabismus evaluation, funduscopy, and bilateral fundus photography to document the extent of myelinated retinal nerve fibers present and the condition of the maculae.



**Figure 1:** Fundus photos of a 2-year-old boy demonstrating myelinated retinal nerve fibers superiorly for 4 clock hours in the left eye. A similar nerve fiber configuration of 5 clock hours is seen in his right eye. The maculae are normal.



**Figure 2:** Fundus photos of a 5-year-old girl with hyperopia reveal 12 clock hours of myelinated retinal nerve fibers in the left eye, extending in an arcuate fashion around the vascular arcades. The maculae are normal.

## Results

### Case 1

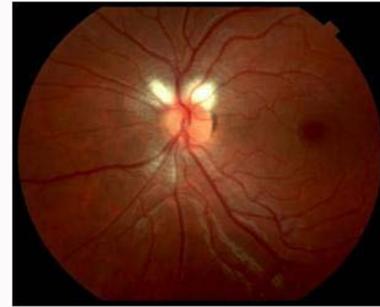
A 2-year-old boy presented for evaluation of a right head tilt and an intermittent left esotropia. Examination showed pseudostrabismus and a cycloplegic refraction of +0.25 in each eye. There were myelinated nerve fibers superiorly for 4 clock hours in the left eye and 5 clock hours in the right eye (Figure 1). Both maculae were normal. The child was followed conservatively. His right face turn was inconsistent, but there were developmental delays. At age 4, his visual acuity was measured at 20/30 in the right eye and 20/60 in the left eye. Patching of the right eye was instituted, at first 5 hours weekly but increased to half-time at age 5. When he was last seen, his visual acuity measured 20/25 in the right eye and 20/30+ in the left eye.

### Case 2

A 5-year-old girl with Down syndrome had been noticed to hold objects close to her face. Examination showed a cycloplegic refraction of +5.00 in the right eye and +5.50 in the left eye. There were myelinated nerve fibers for 360 degrees in the left eye, extending in an arcuate fashion around the vascular arcades (Figure 2). The macula was normal. The child was given glasses containing 1 diopter less than the cycloplegic refraction, and homatropine 5% was prescribed twice daily in the right eye. After 4 months, the visual acuity measured 20/50 in each eye and the homatropine was discontinued. The child was last seen at age 8 10/12 with visual acuities of 20/30 in the right eye and 20/40 in the left eye.

### Case 3

A 9-year-old girl presented for a second opinion after her optometrist noted an "intraocular abnormality" in the right eye



**Figure 3:** Fundus photo of a 9-year-old girl with mild hyperopia showing normal macula and 4 clock hours of myelinated retinal nerve fibers superiorly in the left eye.

and prescribed reading glasses containing +0.25 OU. Examination showed uncorrected visual acuities of 20/20 at distance and near with cycloplegic refractions of +1.25 in each eye. Myelinated nerve fibers were noted for 4 clock hours superiorly in the left eye (Figure 3). The macula was normal. The family was advised that there was no need for glasses. Eighteen months later, her visual acuity measured 20/20 in each eye.

## Discussion

In two of our three cases, amblyopia was diagnosed and treatment was successful. The third case, despite unilateral involvement, had no identifiable amblyopia. We recommend a trial of refractive correction, where indicated, and patching or penalization in all cases with myelinated retinal nerve fibers. Our experience, along with a single case report in the literature [7], suggests that myelinated nerve fibers without myopia are consistent with excellent visual outcomes.

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