

Spontaneous resolution of myopic retinoschisis

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Abstract: Spontaneous resolution of myopic retinoschisis is an unusual event due to the fact that most eyes of patients with this condition have already undergone certain morphological changes and vision will progressively worsen over time. We present a case of spontaneous anatomic and visual improvement in a myopic eye with a macular retinoschisis. The patient was monocular oculus dextrus (OD) with a history of left eye enucleation for recurrent retinal detachment and glaucoma for 30 years prior. Recent optical coherence tomography (OCT) depicted features characteristic of myopic retinoschisis. At the same time, the patient sought chiropractic treatment for neck pain and numbness in upper limbs. The patient had received 12 sessions of cervical adjustment which helped attain symptomatic relief of her neck and upper limb complaints at which time the patient also reported substantial recovery in her vision. Restoration of the normal retinal morphological appearance was illustrated upon re-evaluation of OCT. Spontaneous resolution of myopic retinoschisis may be a multifactorial cause. Further studies elucidating the exact mechanism resulting in visual improvement after chiropractic adjustment are needed before any claims regarding its efficacy for the treatment of myopic retinoschisis can be made.

Keywords: Chiropractic; ischaemic tolerance; myopic retinoschisis; retinal haemodynamics; visual improvement

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Introduction

Myopic retinoschisis is the splitting of the posterior retinal layers in highly myopic patients that can lead to vision loss. The mechanisms underlying myopic retinoschisis remain unclear. It is generally believed that progressive axial elongation in high myopic eyes can lead to chorioretinal stretching and deprives retinal nutrients. In this context, the retina becomes oxygen starved and increases retinal vascular endothelial growth factor (VEGF) expression, contributing to ocular angiogenesis. The pathological neovascularity can leak fluid under or into the retina, causing macular oedema, retinal detachment and visual impairment (1). Because most of these eyes have already undergone structural changes, spontaneous resolution of myopic retinoschisis is a highly unusual event (2). Only a few dozen cases of non-surgical resolution of retinoschisis have been reported in the literature (2).

Case presentation

A 50-year-old highly myopic woman presented to our chiropractic clinic complaining of exacerbated neck pain and upper extremity numbness for a duration of 2 weeks. The patient was monocular OD, with a history of head contusion complicated by recurrent retinal detachment, chronic pain and glaucoma. The left eye had thus been enucleated 30 years prior. The right eye had long-standing myopic maculopathy, and undergone prophylactic laser therapy, cataract extraction and yttrium-aluminum-garnet (YAG) capsulotomy in the past few decades. Her vision impairment was depicted in ophthalmic studies, including visual field defects and features characteristic of myopic retinoschisis (*Figures 1,2*).

At presentation to our clinic, the patient had a guarded neck posture. The neck pain, rated to be 7/10 on verbal Numeric Pain Scale (NPS), was exacerbated with positions of flexion, extension and lateral bending. X-ray findings

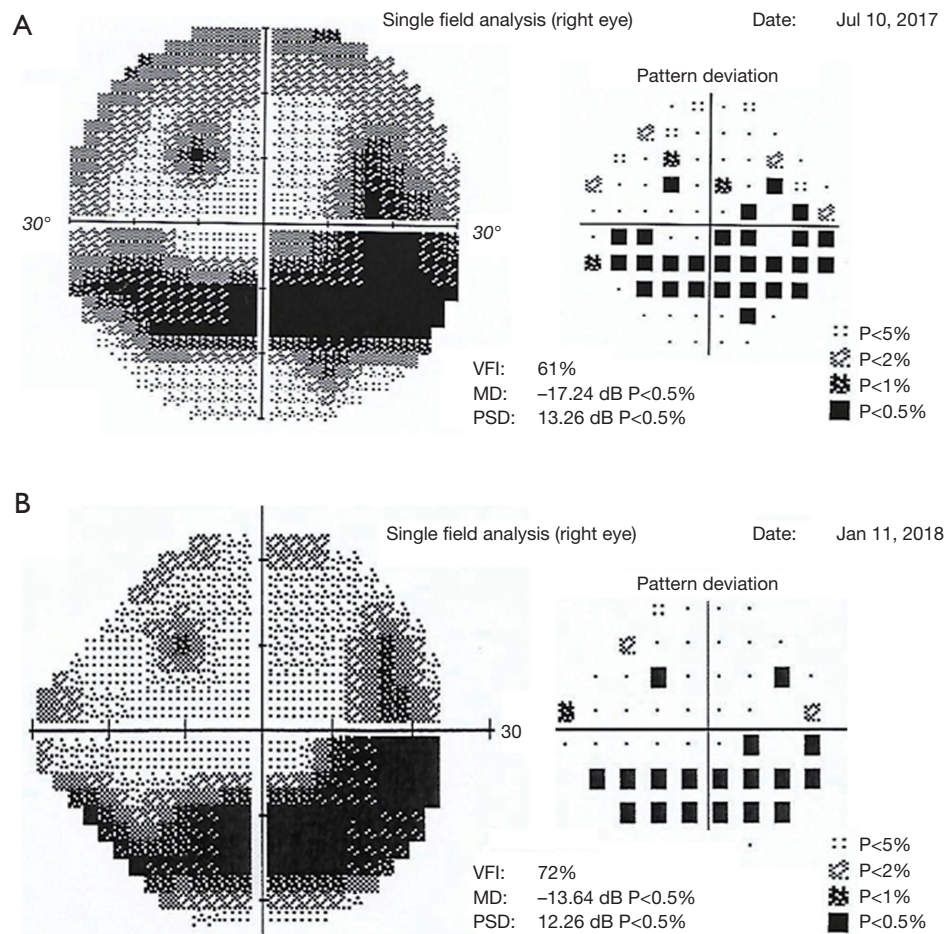


Figure 1 Humphrey visual field, OD. (A) Single field analysis performed prior to chiropractic treatment demonstrates a MD of -17.24 dB and a PSD of 13.26 dB with visual field index (VFI) of 61%; (B) follow-up examination about one month after treatment reveals MD of -13.64 dB, PSD of 12.26 dB and VFI of 72%. OD, oculus dextrus; MD, mean deviation; PSD, pattern standard deviation.

were consistent with degenerative cervical spondylolisthesis. Chiropractic approach was focused on correcting cervical instability and releasing nerve compression. The patient was treated with 3 sessions of cervical adjustment per week. As expected, the pain and numbness were reduced, and cervical range of motion (ROM) was increased 1 week after starting the manipulation. Throughout the 12 treatment sessions, the patient reported experiencing subjectively clearer and brighter vision in her right eye and the improvement had been ongoing during the 12 treatment sessions. Follow-up examinations confirmed an improvement in visual field status and almost complete resolution of her macular retinoschisis (*Figures 1,2*).

Discussion

The high-oxygen demand of the retina and the relatively sparse nature of the retinal vasculature make the retina vulnerable to ischaemia and hypoxia. Nevertheless, there are some survival factors in retinal ischaemia. In the normal eye, the choroidal circulation nurtures the outer retina, whereas the central retinal artery and its end branches feed the inner retina and mid-retina. Due to the connection between these two systems (3,4), the bipartite vascularization ensures minimum supply for retinal hemodynamics (5). Animal models have shown that the choroid supply of oxygen to the inner retina may be sufficient to maintain ganglion cell viability even when the retinal vessels have been completely

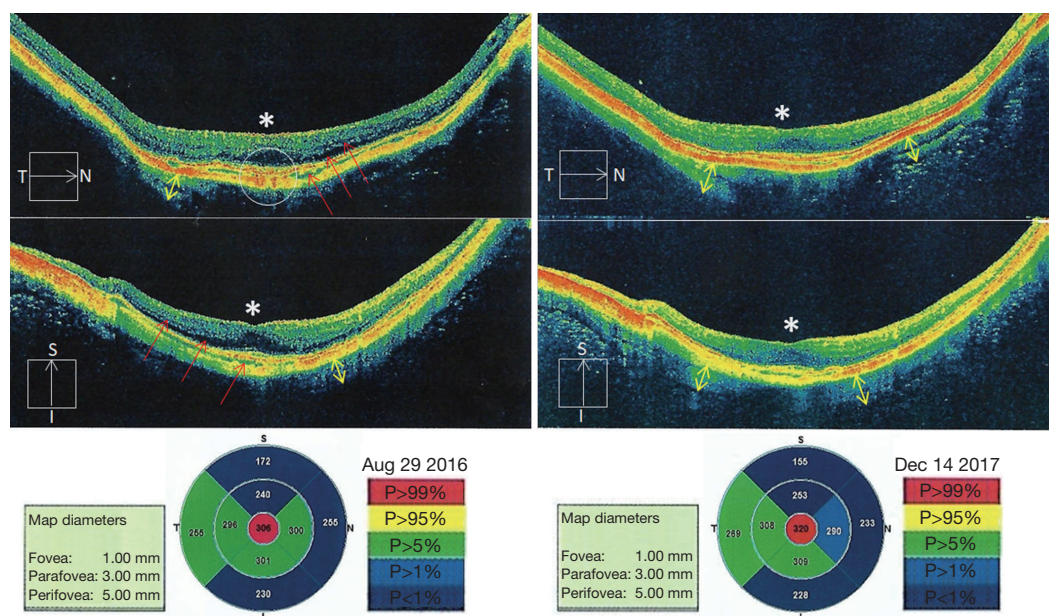


Figure 2 Myopic macular retinoschisis. OCT image taken 15 months earlier (left) depicts a shallow foveal pit (white asterisks), multiple levels of retinal splitting (red arrows), and hyperreflective exudate in the subfoveal region (encircled). Central macular thickening (red area), and peripheral thinning (blue areas) are indicated in the overall thickness map. Follow-up scan after treatment completion (right) shows a significant reduction in macular retinoschisis and subfoveal lesion. Note the difference in choroidal thickness estimated visually (yellow double-headed arrows). There are no significant changes in the posterior scleral curvature over time. OCT, optical coherent tomography.

obliterated (4).

Experimental data has suggested that preconditioning events (prior episodes of ischaemia) may induce “ischaemic tolerance” in the retina and result in reduced anatomical and functional damage (6,7). In this context, some retinal cells survive at an ischaemic level subthreshold for causing overt cell death, and hibernate in a poorly functioning mode. Upon improvement in blood supply and oxygenation of the surviving tissue, certain visual functions can be reactivated and restored (8-10). It is observed that if there is even minimal retinal circulation (8) or are islands of surviving tissue (9) after retinal damage, it is possible to obtain a considerable recovery of vision in these eyes. Spontaneous resolution of myopic retinoschisis may be a multifactorial cause, with changes in the scleral shape potentially playing a role (2). From a pathophysiologic point of view, restoration of retinal hemodynamics is a possible explanation for claims of visual improvement from many advocated therapies (11), including the possible efficacy of chiropractic adjustment (10).

Vision recovery has occasionally been reported after chiropractic manipulation in patients with various visual

problems (12-14), however, none of the published reports has explained the reasons for the recovery in detail. In regard to our case, there was nearly full resolution of macular schisis, recovery of the retinal pigment epithelium, and altered choroidal thickness (*Figure 2*). Given that choroidal thickness is associated with ocular perfusion pressure (15), age (16) and myopic macular degeneration (17), it is possible that the morphological changes in OCT appearance reflect an improved choroidal circulation. The choroid is innervated by both divisions (the sympathetic and the parasympathetic vasodilators) of the autonomic nervous system (18). We speculate that cervical manipulation may have induced a shift in the sympathetic and parasympathetic interaction (19,20), and might further adjust the choroidal haemodynamics. Even a minimal improvement of blood supply may be of great importance for vulnerable end-organs.

The present study is limited by its retrospective nature and by its single-patient observation. The items of observation lack prospective designs. There is no vascular imaging to be confirm that neck manipulation alone can predictably lead to improvement in ocular blood flow.

Overtimes, in repeat visual field examination, the second exam shows better results due to the learning effect. The change of the central scotoma of our patient (*Figure 1*) was considered as near full recovery of the macular schisis. Furthermore, the notable changes shown on OCT are supportive, reflecting a spontaneous resolution of myopic retinoschisis. This study could contribute to further understanding of the connection between retinal morphology and alteration of visual function.

Conclusions

We report a spontaneous anatomic and visual improvement, in a myopic eye with macular retinoschisis, following 12 cervical spinal adjustments. The exact mechanism of recovery remains unclear. Limited reports and obscure references make it not possible to generalize the efficacy of chiropractic manipulation for patients suffering from macular retinoschisis.

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None.

Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

Informed Consent: Written informed consent was obtained from the patient for publication of this manuscript and any accompanying images.

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