

# Rehabilitation and Vision Therapy Results in Acute Disseminated Encephalomyelitis (ADEM): A Case Report

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## INTRODUCTION

Acute disseminated encephalomyelitis (ADEM) is a monophasic, inflammatory and immune-mediated disorder that affects the central nervous system (CNS).<sup>1,2,3</sup> It is characterized by white lesions on the brain as well as the spinal cord.<sup>4</sup> It is most commonly triggered by viral infection, vaccination or other pathogens.<sup>5</sup> Symptoms resemble those of Multiple Sclerosis (MS), rendering differential diagnosis difficult, while some researchers consider ADEM as part of the MS spectrum.<sup>3,6</sup> Recurrent<sup>7</sup> and multiphasic ADEM are discussed in literature as separate types of ADEM occurring months after the initial event, affecting new areas of the CNS.<sup>8</sup>



## EPIDEMIOLOGY

ADEM is most commonly encountered amongst children showing predominance in neither gender, even though two pediatric conventions have pointed toward a male predominance<sup>9</sup>. Also, with regard to seasonal distribution of the disorder, research conducted among 18 patients showed that 88% of the episodes took place in winter and spring (December to May). Finally, one third of the children facing ADEM seem to have relapses<sup>8,10</sup>.

## SYMPTOMS

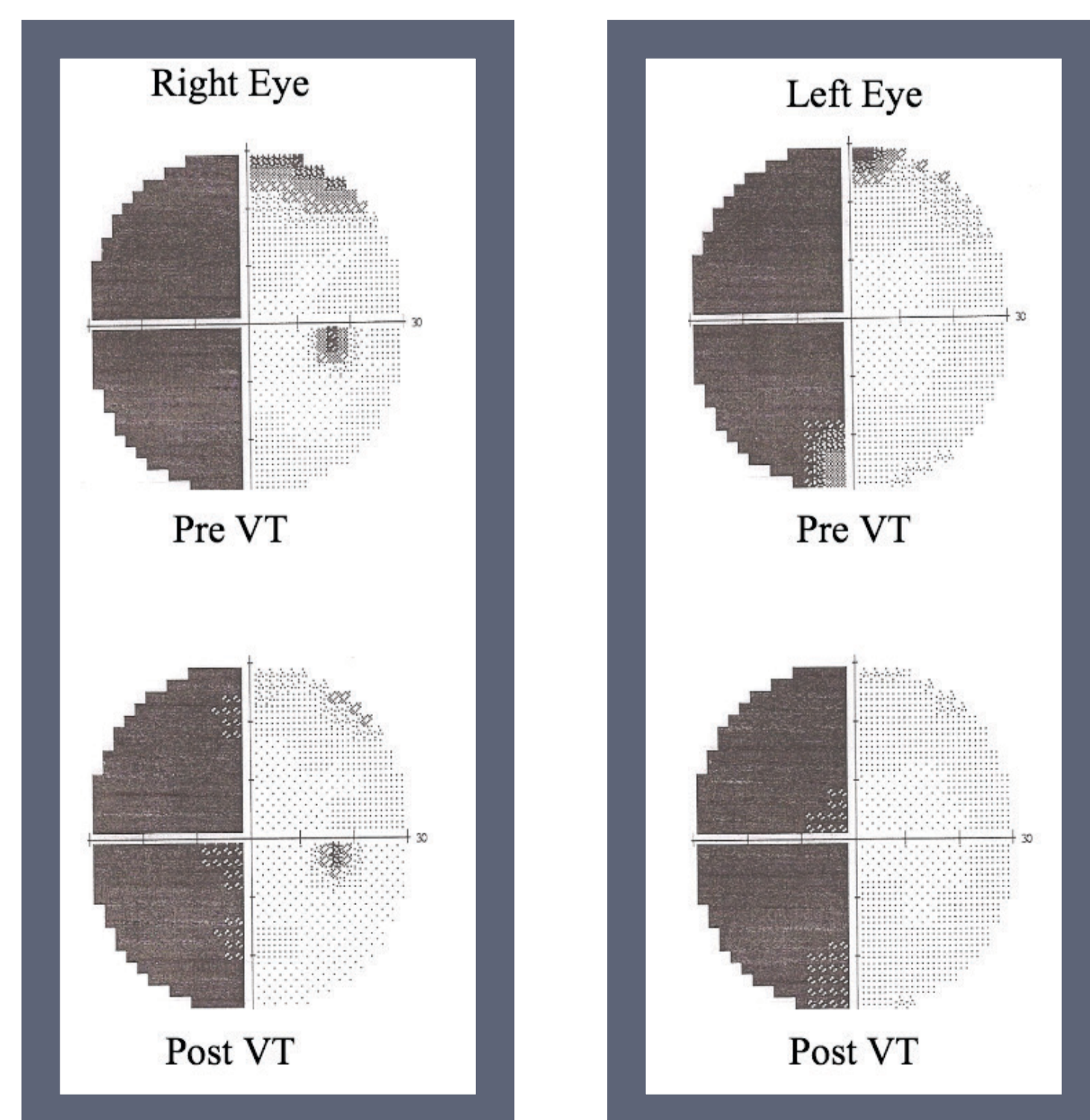
The most common signs include motor deficits (77%), acute hemiplegia (76%), altered level of consciousness (45%), seizures (13-35%), cerebellar ataxia (18-65%), spinal fluid abnormalities (70%), cranial nerve palsies (22-45%) and visual loss due to optic neuritis (7 to 23%). Other symptoms include headache, vomiting, fever, behavioral changes, dysarthria, impairment of speech, spasms and periodic alternating nystagmus.<sup>4,9,11,12</sup>

## TREATMENT AND RECOVERY

There are different types of treatment mentioned in various studies. Most of them include initially antibiotics, acyclovir, high dose of corticosteroids and/or intravenous methylprednisolone to confront the inflammatory agent<sup>10,13,14</sup>. When this appears ineffective, plasmapheresis is widely recommended and as a last alternative the use of intravenous immunoglobulin. Some literature also presents hemicraniectomy as a successful treatment in case of increased intracranial pressure (ICP) under the risk of secondary brain damage<sup>4,15,16</sup>. The prognosis of ADEM in children is good and they usually recover after 4-6 weeks<sup>17</sup>. Mortality rate is considered low and in most cases patients end up having no or minor disabilities for the rest of their lives<sup>18</sup>.

Pre - VT (on 18/5/2013)	Post - VT (on 4/4/2014)
<ul style="list-style-type: none"><li>Cover Test (Distance) : <math>\approx 80 \Delta</math> Alternating EXT (20/80)</li><li>Cover Test (Near) : <math>&gt; 80 \Delta</math> Alternating EXT (20/80)</li><li>Ocular Motility : Small nasal restriction, jerky with unstable fixation (O.U.)</li><li>NPC : Totally unable to converge</li><li>Visual Midline Shift : Right</li><li>Head Posture : Left turn, right tilt</li><li>Vsc : OD = 20/20</li><li>OG = 20/25</li><li>Retinoscopy: O.D. +0,50 sph -1,50 cyl x 10</li><li>O.G. -0,25 sph -1,50 cyl X180</li><li>#7 : O.D. = -0,25 sph.</li><li>O.G. = -0,50 sph.</li><li>#14A O.D. = +1,50 (over #7)</li><li>O.G. = +1,75 (over #7)</li><li>Visual Fields: Left Homonymous Hemianopsia</li></ul>	<ul style="list-style-type: none"><li>Cover Test (Distance) : 40 <math>\Delta</math> Alternating EXT (50/50)</li><li>Cover Test (Near) : 45 <math>\Delta</math> Alternating EXT (50/50)</li><li>Ocular Motility : Full, smooth, accurate (O.U.)</li><li>NPC : 12/14 cm</li><li>Visual Midline Shift : None</li><li>Head Posture : Slight turn to the left</li><li>Vsc : OD = 20/16</li><li>OG = 20/16</li><li>Retinoscopy: O.D. +0,50 sph -0,75 cyl x 10</li><li>O.G. +0,50 sph -1,00 cyl X180</li><li>#7 : O.D. = Plano</li><li>O.G. = Plano</li><li>#14A O.D. = +0,50 (over #7)</li><li>O.G. = +0,50 (over #7)</li><li>Visual Fields : Left Homonymous Hemianopsia</li></ul>

Table 1: Pre and Post VT examination results



## CASE REPORT

N.D. a 26-year-old male was transported on 5/3/2012 to a N/L clinic due to severe headache and altered level of consciousness. Symptoms included sudden blurred vision and diplopia but absence of fever. According to the patient's medical history, he had experienced cerebrospinal meningitis at 3 years of age and has right deafness ever since, while he had manifested extensive herpetic stomatitis the previous year. During clinical examination, the patient retained his consciousness and perception of time and space. Left homonymous hemianopia and exotropia were diagnosed along with left hemiplegia. Increased intracranial pressure and a sub-dense edematous brain area were detected with CT scan while MRI that followed revealed right parietal, occipital and corpus callosum abnormalities. Retinal findings were normal with no signs of optical neuritis. Repeated MRI one day later showed multifocal lesions spread across both hemispheres and stem, and patient's increased intracranial pressure was measured at 60mmHg. He presented persistent anisocoria, with the right eye being more mydriatic, and visual midline shift. He underwent successful right decompressive craniotomy and treatment included high doses of corticosteroids, antibiotics and 17 sessions of plasmapheresis.

One year after the episode and excessive training in a rehabilitation center, N.D. was referred to our office for receiving vision care for diplopia and left homonymous hemianopia. We introduced a weekly office-based Vision Therapy (VT) program combined with daily home activities. Pre and post VT data are presented in table 1. Some of the main VT activities that were incorporated in his program are presented in table 2.

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>Eye Control</li><li>Thumb Pursuits</li><li>Head Rotations in Mirror</li><li>Look - Ready - Touch - Back</li><li>Flash Light Pointing</li><li>C - P Saccades</li><li>Eye Search (Web based)</li><li>Multi-matrix</li><li>Pointer in a Straw</li><li>Mirror Overlap</li><li>Brock String</li><li>Bug on String</li></ul> | <ul style="list-style-type: none"><li>Mirror Stereoscope</li><li>Projected Vectograms</li><li>Hart Chart</li><li>Monocular Accommodative Rock</li><li>Mental Minus</li><li>Monocular Prism Jumps</li><li>Door Saccades</li><li>Red - Green Cluster</li><li>Marsden Ball with Septum</li><li>Dissociated Pointing</li><li>Vision Builder (Software)</li></ul> |
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Table 2: Indicatory VT activities

## CONCLUSION

N.D.'s case suggests that even rare cases of neurologic origin, can benefit from a VT program. Earlier intervention could have been more beneficial for the patient suggesting that co-management and participation of optometrists in a multi-disciplinary setting can have a significant effect in patient's rehabilitation.



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