

Reference Citations for Levodopa in Visual Rehabilitation

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For the past three years I have used a new therapeutic approach to augment my traditional treatment methods in certain cases. The use of oral levodopa/carbidopa in patients with amblyopia was pioneered by the pediatric ophthalmology department at The Children's Hospital in Columbus, Ohio, with funding from the Ohio Lions Eye Research Foundation. Lawrence E. Leguire, Ph.D., as primary investigator, working with pediatric ophthalmologists there, has published numerous studies in peer reviewed journals detailing this approach.

The following list of abstracts is provided as a suggested starting point for anyone considering adding this unique treatment approach to their clinical toolkit. They provide a good introduction to the use of the neurotransmitter dopamine in the treatment of visual dysfunctions. The majority of these studies deal with the off-label use of the biological precursor to dopamine, levodopa, in amblyopia in both adults and children who are beyond what is held as the "critical period" of treatment by conventional wisdom. One study suggests a possible role for levodopa therapy in childhood retinal disease (4).

Additional prescribing information, published literature citations, and consumer information may be found at www.ohiolionseyeresearch.com ("funded research").

One of the articles (5) discusses the application of levodopa to patients with optic nerve disease. I want to thank Warren Brasher, O.D. of San Angelo, Texas, who brought this clinical application to my attention.

Selected Published Literature

1. Gottlob I., Charlier J., Reinecke R.: Visual Acuities and Scotomas After One Week Levodopa Administration in Human Amblyopia. Investigative Ophthalmology and Visual Science,33:2722-2278,1992

Crossover, double-masked study of single dose of Ldopa resulted in significant improvement of contrast sensitivity and reduction of fixation scotoma in 70% of treated amblyopia patients which persisted after Ldopa administration was completed.

2. Harris J.P., Calvert, J.E., Leendertz J.A., Phillipson O.T.: The Influence of Dopamine on Spatial Vision. Eye, 4, 806-812, 1990

Study demonstrated that a single dose of a dopamine-blocking drug resulted in loss of visual contrast sensitivity at medium and high spatial frequencies. Results are discussed in terms of the functional role of dopamine in the retina and amblyopia.

3. Leguire E., Walson P., Rogers G., Bremer D., McGregor M.: Longitudinal Study of Levodopa/Carbidopa for Childhood Amblyopia. Journal of Pediatric Ophthalmology and Strabismus, 30: 354-360, 1993

Double-masked, placebo-controlled, randomized study demonstrated 3-week ingestion of Ldopa 1) results in significant improvement of visual acuity and contrast sensitivity in amblyopic eye which persisted after study's conclusion 2) is well tolerated as demonstrated by physical examination and blood tests.

4. Leguire L., Jende D., Nairus T., Walson P., Rogers G., Bremer D., McGregor M.L.: Levodopa-Carbidopa and Childhood Retinal Disease. Journal of the American Academy of Pediatric Ophthalmology and Strabismus, 2: 79-85, 1998

Two separate studies, a single dose and longitudinal study, both showed a small but statistically significant improvement in visual acuity in children with retinal disease, consistent with the hypothesis that dopamine is a factor in the receptive field characteristics of retinal cells.

5. Lenworth J., Gould T., Krohel G., Effect of Levodopa and Carbidopa on Recovery of Visual Function in Patients With Nonarteritic Anterior Optic Neuropathy of Longer Than Six Months' Duration. American Journal of Ophthalmology, 121:77-83, 1996

Prospective, randomized, double-masked placebo-controlled clinical trial found significant improvement of visual acuity among patients with longstanding visual acuity loss.