

Nutritional Supplementation, Electrical Stimulation and Age Related Macular Degeneration

Leland D. Michael, O.D.¹ and Merrill J. Allen, O.D., Ph.D.²

Published in J Orthomol Med, 1993; 8: 168-171.

Abstract

This is a preliminary report of an ongoing study of the rate of development of age related macular degeneration in people using nutritional supplements and treated with weak electrical currents. Twenty-five subjects, ages 48 to 79 years have been treated for periods from two to seven years. Fifteen subjects have improved their acuity, 10 have lost acuity. Two have had laser treatment, two had to stop because of age and transportation problems and two have died. The subjects have lost an average of 0.30 letters of acuity over an average of 4.0 years. By comparison, Newsome's² test group lost 4.1 letters and his placebo group lost 7.1 letters of acuity in 2 years using nutritional supplements without electrical treatment. It appears that electrical stimulation of the eyelids can enhance the success rate of nutrients alone in controlling AMD.

Key Words

age-related macular degeneration, nutrition, zinc, electrical stimulation, micro ampere.

Introduction

Age-related macular degeneration (AMD) and cataract are the major causes of visual impairment and blindness in the United States in persons over 55 years of age.¹ AMD damages the retinal tissues in the macular area causing fine pigmentary stippling, pigment epithelium changes and the development of drusen. Drusen usually occur in a mirror pattern in both eyes.

AMD is called "dry" or "wet". The dry type is characterized with either normal acuity or only a moderate acuity loss, while the wet type may progress to rapid and severe vision loss. The average rate of acuity reduction has not been clearly defined in the literature.

At the present time there is no recognized therapy for the dry type of AMD. A study by Newsome et al² showed that a slower progression of AMD occurred over a two year period, for subjects receiving vitamin and mineral supplements high in zinc compared to unsupplemented (control) subjects.

The treatment for the "wet" type of AMD involves using a laser³ to seal off the leakage in the choriocapillaris layer up through Bruch's membrane. There is the real possibility of further vision loss due to leakage in the area around where the laser burn was applied. This stage of AMD is a depressing time for the patient.

In 1985, one of us (LDM) upon recovering from a retinal detachment, decided to try to help patients with early signs of macular degeneration. He began a study of the effects of nutritional supplements and micro ampere electrical treatments on the rate of progress of the "dry" type of AMD. Electrical treatment was incorporated because the eye has an electrical potential that may play a role in retinal health and that can be modified with an external source of electricity. (The first patient, age 74, has been in the study for seven years and has had no further acuity decline.)

Procedure

Each patient who was diagnosed as having AMD was referred to a local ophthalmologist who confirmed the diagnosis. The patient was then offered three alternatives: a) evaluation every 6 months; b) use a nutritional supplement and be evaluated every 6 months; or c) use a nutritional supplement and receive micro ampere electrical treatments at least once every month. Most AMD patients chose alternative c) and became part of this study. The control for this study is the data presented by Newsome² because this study differs from Newsome's study only by the addition of electrical treatment to the area around the eyes.

1. 809 Kansas City Street, Rapid City, SD 57701.

2. Professor Emeritus of Optometry, 800 E. Atwater Ave.,
Bloomington, IN 47405.

Figure 1. The formula for the nutritional supplement that was provided to all subjects.+

Eight Tablets Contain		%RDA
Vitamin A (Fish Liver Oil)	25,000 IU	500
D (Fish Liver Oil)	800 IU	200
Vitamin E (d-alpha Tocopherol Acetate)	400 IU	1333
Vitamin C (Ascorbic Acid)	2,000 mg	3333
Vitamin B ₁ (Thiamin HCL)	100 mg	6567
Vitamin B ₂ (Riboflavin)	150 mg	8838
Niacin	80 mg	400
Vitamin B ₆ (Pyridoxine)	150 mg	7500
Pantothenic Acid (dCalcium Pantothenate)	100 mg	550
Inositol	150 mg	*
Calcium (Phosphate)	500 mg	50
Magnesium (Oxide)	250 mg	62
Selenium	100 mcg	*
Zinc (Gluconate)	75 mg	495
Bioflavonoids	300 mg	*
Glycine	200 mg	*
L-Glutamine	200 mg	*
L-Arginine	300 mg	*
L-Cysteine HCl	400 mg	*
Glutathione	40 mg	*

* RDA has not been established.

+ Vision-Eze Professional Products, 925 Hale Place, Suite A4, Chula Vista, CA 91914

Suggested Use: four tablets two times daily.

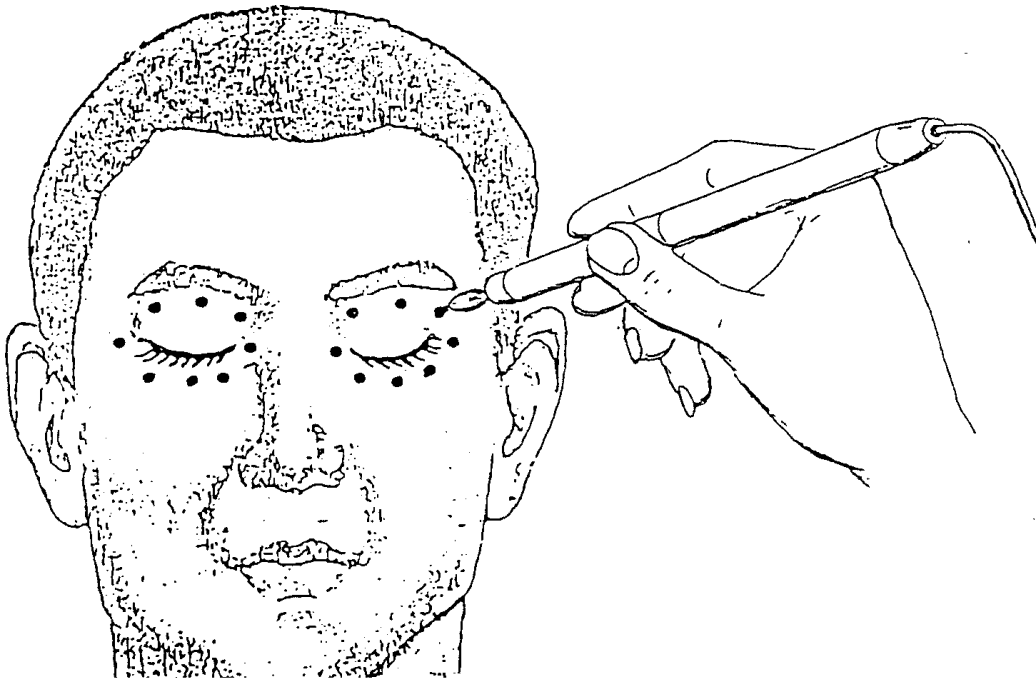


Figure 2. Each point on the eyelids was stimulated for about one minute with a square wave alternating electric current of 200 micro amperes at 10 cycles per second. The eyelid contact was via a wet cotton electrode and the ground was the palms of the subject's hands.

Figure 3. Summary of the data for 25 subjects treated with nutritional supplements and weak electrical stimulation during the period from July '85 to July '92. Subject 11 was dropped from the study when she received a cardiac defibrillator because electrical stimulation might have adversely affected it. Subject 14 suffered severe vision losses *after* lasering because she had begun to show signs of leakage. One line of acuity is 5 letters.

#	Age	Sex	Date Start	Date End	Beginning Acuity		End Acuity		Number of Letters change		REASON FOR LEAVING STUDY	
					Right	Left	Right	Left	Right	Left		
1	74	F	7-18-85	7-92	30	20	30+2	15-2	+2	+3		
2	71	F	7-31-85	7-92	30	25	30+3	20+2	+3	+7		
3	74	M	9-10-85	11-91	100	30-2	100+1	30+2	+1	+4	Deceased	
4	56	M	12-2-85	7-92	20	30	15	20+3	+5	+8		
5	77	M	5-28-86	7-92	20	15	20-2	20-2	-2	-7		
6	69	F	7-29-86	10-91	20	30	20+3	20	+3	+5	Poor health	
7	76	F	10-14-86	9-91	20	25+1	20-1	400	-1	-66	Leakage, not lasered	
8	48	M	1-19-87	7-92	40-3	20-2	30+1	20-1	+6	+1		
9	79	F	3-23-87	7-92	20-1	25-2	20	30+3	+1	-4		
10	65	F	8-17-87	7-92	30-2	15-3	40-2	15-2	-5	+1		
AL	67	F	2-25-88	4-90	25	25	15	15	+10	+10	Cardiac defibrillator	
12	79	F	6-28-88	7-92	25	40+3	20-3	25-1	+2	+6		
13	74	F	5-10-88	6-89	40-2	400	30+4	400	+7	0	Deceased	
14	78	F	5-17-88	8-90	20-1	60-1	25-1	60-1	-5	0	Lasered OU = 20/400	
15	74	F	9-16-88	4-92	400	25-1	400	70	0	-22	Poor health	
16	66	F	5-30-89	7-92	25-1	40-1	30-1	40-1	-5	0		
17	73	F	11-15-89	4-92	20	25	25	50	-5	-15	Leakage, not lasered	
18	76	F	1-03-90	6-92	25	30	25-2	25-2	-2	+3	Poor health	
19	79	F	1-02-90	7-92	30	30	20-1	20-3	+9	+7		
20	65	M	1-09-90	09-91	25+2	100+1	100	100	-28	-1	OS Lasered	
21	70	F	1-29-90	7-92	30	30-1	20-2	25	+8	+6		
22	70	M	3-05-90	7-92	400	40+3	400	40-3	0	-6		
22L	66	F	4-09-90	7-92	50-2	25	25	20	+17	+5		
24	79	F	5-17-90	7-92	30-1	30-3	25-1	25-2	+5	+6		
25	66	F	8-13-90	7-92	70	20+4	^0-2	10+3	+8	-1		
									SUM	+34.0	-50.0	
									AVG.	+1.4	-2.0	
									AVG. BOTH	Eyes	-0,30	

Supplemental vitamins and minerals (see Figure 1) were assigned to be taken twice per day with meals. During the first 10 weeks the patient was seen 20 times for fundus and acuity examination and for electrical treatments. After this initial period the subject was examined and treated once a month. The electrical treatments of 200 micro amperes were applied to points on the closed eyelids as shown in Figure 2 for a total of about 7 minutes for each eye using the Electro-Acuscope.⁵

Results

Figure 3 shows the initial age of the subjects who have been in the study from two to seven years. It also shows the duration of involvement, the entering acuity, the acuity at the end and the number of letters change in

acuity during the study. For those who have received laser treatment, the final acuity was taken just before lasering. Fifteen subjects improved acuity from 1 to 17 letters and 10 lost 1 to 66 letters. On average a slight reduction of vision occurred during this study amounting to 0.3 letters where 5 equals one line of test letters.

Discussion

To evaluate the results, Newsome's data were used for comparison. The visual acuity test letter sequence that Newsome used was as follows.

20/10	20/32	20/100
20/12.5	20/40	20/125
20/16	20/50	20/160
20/20	20/63	20/200
20/25	20/80	

There were five letters in each line. Three lines totaling 15 letters doubles the visual angle of the test letters.

Newsome found that for his 71 untreated control subjects, average age 68 years (42 to 88), 18.3% lost 10 to 14 letters of acuity, 8.45% lost 15 to 18 letters and 7% lost 20 or more letters over a period of 24 months using a standardized visual acuity test.⁴ Newsome's zinc-treated experimental group contained 80 subjects of average age 67.6 (46 to 89) years, of whom 6.25% lost 10 to 14 letters, 5% lost 15 to 19 letters and 2.5% lost 20 or more letters.

Newsome has shown a positive effect of selected nutrients on AMD. The average rate of acuity reduction that Newsome found was 7.1 letters for the control population and 4.1 letters for the test population over a two year period. Our study can be compared to Newsome's because our study uses similar visual acuity criteria, the same diagnostic procedures, and includes pharmacological dosages of supplemental zinc.

The possibility of a Hawthorn effect causing an improvement in visual acuity was considered. In situations where the rewards are high as in a driver license test, the acuity test must be randomized to obtain accurate acuity measures. However, when the subject is concerned about permanent vision loss, we believe that learning the charts will have a minimal effect on acuity measures.

According to Lane,⁶ the dry type of AMD is different from the wet type and is related to inadequate amounts of zinc. If the wet type AMD subjects had been omitted from this study the results would have shown a gain rather than a loss. We did not do this because Newsome did not do it.

There have been no reported adverse ef-

fects either from the nutritional supplements or the electrical stimulation. Subjects are protected by examinations once a month. In the event of fundus leakage, these monthly examinations assure early detection and immediate referral to the retinal specialist and laser expert. These professionals and the subject then decide whether to proceed with laser therapy.

Conclusion

This is a preliminary report of an ongoing study, and so far the results are very encouraging. On average, the subjects have shown only a slight reduction in visual acuity. By comparing this study to Newsome's study, it appears that adding electrical stimulation has improved the ability of nutritional supplements to slow the progression of AMD. To permit a proper statistical evaluation more subjects are needed. Thus the experiment is continuing for another four or five years.

References

1. National Eye Institute: Vision Research - A National Plan: 1983-1987. Vol. 1, 2. NIH Publication 83-2471. Bethesda MD: US Dept. Health Human Serv, 1984.
2. Newsome DA, Swartz M, Leone NC, Elston RC, Miller E: Oral zinc in macular degeneration. *Arch. Ophthalmol.* 106: 192-198, 1988.
3. Macular Photocoagulation Study Group: Argon laser photo-coagulation for senile macular degeneration. *Arch. Ophthalmol.* 100: 912-918, 1982.
4. Ferris FL III, Kassoff A, Bresnick GH, Bailey I: New visual acuity chart for clinical research. *Am. J. Ophthalmol.* 94:91-96, 1982.
5. Electro-Acuscope. Current Medical Instruments Inc., 135 Kessler Street, Petaluma, California 94952.
6. Lane BC: *Invest. Ophthalmol. Vis. Sci.* 32 (4, Suppl): 1050, abstr. #1876, 1991.