

Vision Therapy for a Patient with Infantile Nystagmus Who Wants to be a Pilot

ABSTRACT

This case study describes optometric treatment for improving vision issues related to Infantile Nystagmus Syndrome (INS). Optometrists can benefit from better understanding nystagmus and offering their expertise in treating this visually-significant condition. This case will describe key features of INS, along with how an effective program of vision therapy may be used to treat patients with INS.

INTRODUCTION

Nystagmus is an oscillation of the eyes, beginning with a drift away from the intended viewing target and succeeded by a slow or fast refixation1. Nystagmus can produce a significant reduction in clarity and efficiency of vision and may lead to social difficulties due to reduced performance and cosmesis2. Infantile Nystagmus Syndrome (INS), one type of nystagmus, occurs in ~ 1 in 1000 people3. Patients with INS have distinct signs that eye care professionals can diagnose and treat in order to improve the quality of life for people with INS. Optometrists can benefit from understanding INS and what to do for this patient population.

DIAGNOSING INS

The presence of a variable jerk and/or pendular nystagmus with medium amplitude and frequency, presenting between birth and six months of age3.

Diagnostic Features of INS: Using the Acronym SLOFUN3,4

S = Symptomless (No reports of blur and oscillopsia)1. Symmetrical amplitudes in each eye

L = Latent component (Nystagmus increases with occlusion and binocular VA is better)

 $\mathbf{O} = \text{Abnormal OKN response}$

 $\mathbf{F} = \mathbf{N}\mathbf{y}\mathbf{s}\mathbf{t}\mathbf{a}\mathbf{g}\mathbf{m}\mathbf{u}\mathbf{s}$ worsens with fixation

 $\mathbf{U} =$ Horizontal nystagmus remains in upgaze5

N = Presence of null point or zone, where oscillation is minimal

*Note: If all criteria are not met for INS, neuroradiologic testing is warranted5

When to refer for further testing

- Typical INS features are absent
- Refer for neurological evaluation and MRI if nystagmus is asymmetrical or unilateral6
- In cases of a suspected visual input disorder order an ERG and VEP6

CASE SUMMARY

A 12 YO CM presented to the office with significant visual complaints. Refer to Table 1 for a summary of his initial findings. Based on his initial vision therapy evaluation, a vision therapy program was personalized for his diagnoses, which included:

> Infantile Nystagmus Syndrome Intermittent Left Exotropia Oculomotor Dysfunction Accommodative Insufficiency

NS goals included:

- To focus and see clearly without headaches
- Improve handwriting
- See still words when reading
- Reduce double vision
- •Become a pilot
- Reduce 'shakiness' of eyes
- Improve grades to all A's
- Learn computer programming skills

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Table 1. Examination Findings Including Initial and Progress Evaluations

	Initial Findings	After 6 months of VT (PE 1)	After 1.9 years of VT (PE 4)
Complaint/Symptoms	 eye turns outward double vision eyestrain & headaches loss of place while reading feels as though he is 'writing blind' 	 no longer has double vision easier to read able to keep track of word he is reading 	 reading and schoolwork has improved greatly able to see the board at farther distances sits further back and to the right of center ability to focus quickly at various distances
Grade, Interests	6th grade Video games, reading	7th grade Baseball (but has difficulty seeing the ball)	8th grade Computer programming, trumpet playing
Spectacle Rx & DVA	OD +4.50 20/40 OS +4.50 20/100 OU 20/30	OD +4.50 20/25+1 OS +4.50 20/40 OU 20/20	OD +4.25 20/20 OS +4.25 20/30-2 OU 20/20
NVA	OD +2.25 add 20/70 OS +2.25 add 20/100 OU 20/40	OD +2.25 add 20/15 OS +2.25 add 20/30- OU 20/15	OD +2.25 add 20/20-2 OS +2.25 add 20/20 (8 inches) OU 20/20
EOM	restricted, bilateral symmetrical nystagmus; left beating nystagmus, increased amplitude in left gaze.	; improved range of motion; most difficulty in up and down gazes and extreme right and left gazes	FROM OU; unsteady monocular fixation OS>OD Steady fixation and pursuits in vertical gazes OU. Right to left saccades slower to generate than left to right.
Head Position	Tilt to right shoulder	Tilt to right shoulder	Slight head tilt
Cover Test	Distance 10 ILXT Near 10ILXT	Distance 20 XP Near 14 XP	Distance 10 IAXT (OD preferred fixation) Near 14 XP
Fusion	Brief R/G Luster, then OS suppression	Luster at D and N	Luster at D and N
Stereopsis	Absent stereopsis	200"Randot	70"Randot
DEM Age-expected: 33 sec V & 36 sec H	V 107 H 158 Ratio 1.48 Errors 74	V 40 H 46 Ratio 1.15 Errors 0	V 34 H 31 Ratio 0.91 Errors 0
Vergence	Unable to measure without horizontal and vertical prism	Distance: unable Near: unable	Distance: BO 30/24/24 BI x/24/18 Near: BO 30/40/28 BI x/30/26
Prism facility	unable	vertical diplopia; unable	8 cpm
Randot Ductions	unable	BO 4/2 BI 5/3	BO 44/34 BI 66/56
PRA NRA	-2.00 +2.00	-2.50/-2.00 +2.00	-3.50/-3.0 +2.25/+2.00
AF	OD 8 OS unable OU unable	OD 13 OS 12 OU 12 *with polaroid suppression check	OD 14 OS 12 OU 8 *with polaroid suppression check
Ocular Health	unremarkable	unremarkable	unremarkable

Graph 1. Progress Evaluation Results Over 2 Years of Vision Therapy



NS Treatment consisted of weekly 45-minute vision therapy sessions with supplemental home VT. A summary of his vision therapy program is provided in Table 2.

fusion technique.

- Virtual reality gaming
- Stereoscopic images

Table 2. Summary of Vision Therapy Program

Perceptual & Motor	Oculomotility	Accommodation	Fusion
Bilateral Integration Trampoline Jumps with tracking	Eye Stretches Marsden Ball Sequence Eye mazes	Near-Far Rock (Binocular)	Mirror Superimposition Brock String Red-Green luster
Directionality - turns with Marsden ball Metronome & tracking	Afterimage Flash with tracking Rotating Pegboard (MFBF) Wayne Saccadic Fixator	Binocular Accommodative Rock (+/-0.50-1.00) Red/Red Rock	Mirror Tracing Tranaglyph Vectograms
Ball bounce - right & left hands SUNY Charts Fine Motor Figure-Ground	Alphabet & Word Tracking Decoding & Scanning Binocular Reading (Red- Blue) Theraband with Eye Stretches	Near-Far Red Green Chart while on balance beam Split Spirangle Rock	Stereoscope Computer smooth vergences VO star Polaroid Walk-aways
Four chart fixations on balance board Visual Memory Techniques Tachistoscope	Moving Window Eye Tracking fixation & saccades Computer Pursuits	BIM/BOP	Virtual Reality Prism Facility Eccentric circles Computer jump ductions

CONCLUSION

NS significantly improved his oculomotor, accommodative, and binocular skills in vision therapy. He has developed better awareness and control of his visual instability with intensive oculomotor, fixation, and fusion training. NS continues to attend weekly vision therapy sessions since his ultimate goal is to be a pilot, which requires 20/20 vision monocularly. Additionally the goal is to achieve 100 standard score in all areas of vision in order to reach greater visual efficiency for daily life. NS is closer to achieving the visual requirements necessary to achieve his goal of becoming a pilot. Patients with infantile nystagmus syndrome can benefit immensely from optometric treatment modalities7,8. In this case, a combination of bifocal spectacle correction and vision therapy, including biofeedback techniques, were utilized to improve oculomotor control, visual acuity and performance.

REFERENCES

Each session included: perceptual/motor, oculomotor, accommodative, and

Progress evaluations were performed every 6 months.

Aspects of program that were particularly useful to NS:

• Eye tracking with visual feedback (eye tracking software, after-images)

• Balance beam and near-far accommodative rock

• Figure-ground techniques

Marsden ball series

I. Khanna, S., L.F. Dell'Osso (2006) The diagnosis and treatment of infantile nystagmus syndrome (INS). Scientific World Journal; 6:1385-1397.

2. Goldrich, S.G. (1982) Oculomotor biofeedback therapy for exotropia. American Journal of Optometry and Physiological Optics; 59(4):306-317.

3. Abadi, R.V., and A. Bjerre (2002) Motor and sensory characteristics of infantile nystagmus. Br J Ophthalmol; 86:1152-1160.

4. Gresty, M., Page, N. and H. Barratt (1984) The differential diagnosis of congenital nystagmus. J of Neurology, Neurosurgery, and Psychiatry; 47:936-942.

5. Casteels, I., Harris, C.M., Shawkay, F., and D. Taylor (1992) Nystagmus in Infancy. Br J Ophthalmol; 76:434-437.

6. Abel, L.A (2006) Infantile nystagmus: current concepts in diagnosis and management. Clin Exp Optom; 89(2):57-65.

7. Mein, J., R. Trimble (1991) Diagnosis and Management of Ocular Motility Disorders, 2nd Ed. Blackwell. Chapter 22, Nystagmus.

8. Ciuffreda, KJ, Goldrich, SG, Neary, C. (1982) Use of Eye Movement Auditory Biofeedback in the Control of Nystagmus. Optometry & Vision Science; 59 (5).