

INTRODUCTION

The word strabismus is derived from a Greek word, meaning “eyes looking obliquely” which simply means misalignment of eyes. In this condition in the primary position of the head, one or both eyes deviate outward or inward and which are appeared to be non-aligned in perspective of the direction of the object of viewing. Now if we investigate the etiological factors there is a broad classification of strabismus but here our objective of interest is the manifest squint. In manifest squint there are two sub classification concomitant(non-paralytic) and incomitant(paralytic) squint. The common causes for concomitant squint are Sensory causes (due to refractive errors, anisometropia, media opacities, obstruction of pupillary area, macular and optic nerve diseases, and wrong glass prescriptions for refractive errors)(1), Motor cause (orbital, extraocular muscle, any accommodation related anomalies)(1), Hereditary cause (congenital squint)(2). Congenital anomalies, including craniofacial malformations and genetic abnormalities, have been identified as potential causes(3). V-pattern exotropia with hypertropia is a complex form of strabismus characterized by an outward deviation of the eyes (exotropia) that increases in a downward gaze(hypertropia) resulting in a V-shaped pattern. This condition poses challenges for optometrists as well as ophthalmologists as it typically affects the normal alignment of the eyes, which leads to visual disturbances and the potential development of amblyopia(4).

For management of this type of binocular vision anomalies, miscellaneous methods are used namely, adjustment of lens refractive power, occlusion prescription, prism prescription, and vision training can be used, patient's willingness, and duration of use/ therapy program (5). From previous studies(6) (7) it has been found that there is a significant role of vision therapy approaches in cases of manifest strabismus.

CASE REPORT

A 24 years old female from Chennai, Tamil Nadu came to Caring Vision Therapy & Near Vision Rehabilitation Center Chennai (India) before one year with h/o manifest squint. She also informed about her planning to undergo squint surgery, though she was not sure about her decision. Mother reported that she noticed her squint when she was 18 years old. Her previous glass prescription was OD -0.75/-5.50 x 10° and in OS- ±/-0.50x 70.

The patient was first diagnosed with refractive error in 2007 when she was in 6th standard. That time her visual acuity was OD- 6/24, OS- 6/9. Then in 2008, she got her first glasses with OD -0.50/-4.50x10 ,6/18 P, OS -0.50 X 10, 6/5. In 2013 she was advised to undergo right eye squint surgery. In 2016 she was diagnosed with meridional amblyopia, at that time she had RXT of 30 Δ and right hypertropia of 30 Δ .There was no complaint of diplopia in distance as well as near. V pattern Exotropia was observed. She was advised left eye patching for twelve hrs. with convergence exercise. That time she was advised for OU Lateral Rectus recession. In 2019 she was diagnosed with end gaze nystagmus on horizontal gaze. In diplopia charting it was found that she had left Inferior Oblique overaction which is the typical characteristic of V pattern exotropia where, there is a higher magnitude of deviation in up gaze than down gaze. Extorsion displaces the superior muscle temporally and the inferior rectus muscle nasally. In 2022, In her right eye, right Superior Rectus underaction was present and in left eye there was Superior Oblique underaction.Again she was advised for R & R with an upshift of one muscle width with left Inferior Oblique recession(mild).

Father had history of squint since childhood, mother had a history of seizure, and was on medication during pregnancy due to seizures.

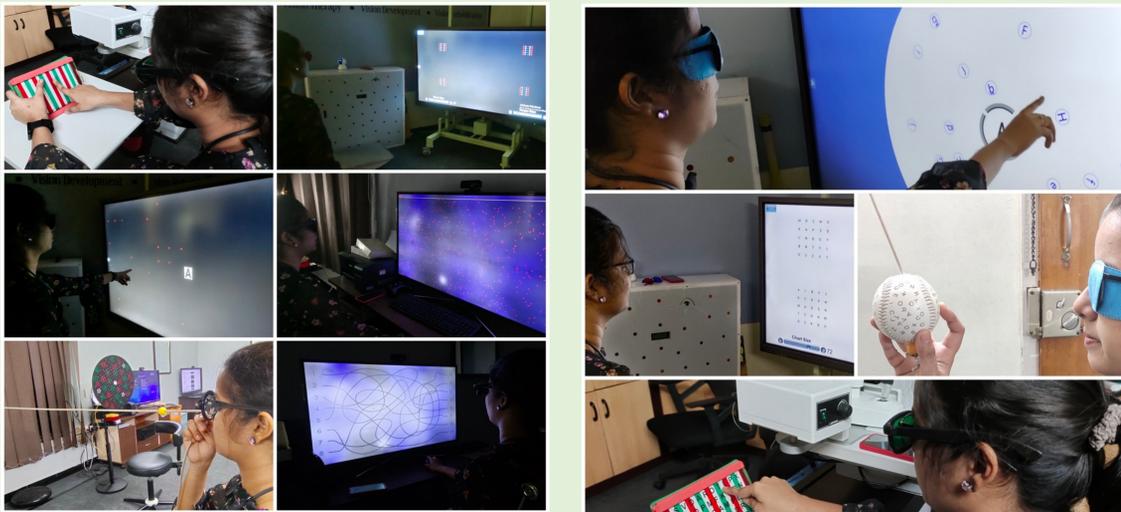
On examination we found that her visual acuity was 6/9P in right eye and 6/6 in left eye and her previous glass prescription was OD -0.75/-5.50x10, OS ±/-0.50 x170. In squint evaluation we found that she was having right exotropia of 40Δ with 26Δ hypertropia(L/R). In the Worth Four Dot Test it was revealed that she had diplopia at near in dark , and suppression in right eye at near & far in bright illumination.

TREATMENT

In the course of her treatment the primary goal was to improve her visual acuity along with eliminating suppression. So, we started with therapy plan with monocular phase in addition with anti-suppression therapies. During anti-suppression therapies we followed MFBF and Bi-Ocular VT procedures. We also started her with Syntonics Phototherapy with naescetization filter for 3 minutes followed by Alpha delta and Mu-Delta.

After completing her vision therapy sessions for one and half months (20 sessions), on her first review, her visual acuity in right eye improved to 6/6 P and in left eye it was 6/6. Her exotropia was measured 24Δ with 20 Δ hypertropia(L/R). Her Worth Four Dot Test, revealed diplopia at near and diplopia at distance. Our next goal was to improve her Binocularity and induce fusion at all the distances and in all the gazes.

In her final follow-up after 3 months (90 sessions) , her review examination revealed exotropia of 4 Δ with 8 Δ hypertropia(L/R). Post follow up we have prescribed her a relieving prism in her right eye with a prescription of 10 Δ base at 150° along with her present glass prescription.



VARIOUS VISION THERAPY ACTIVITIES

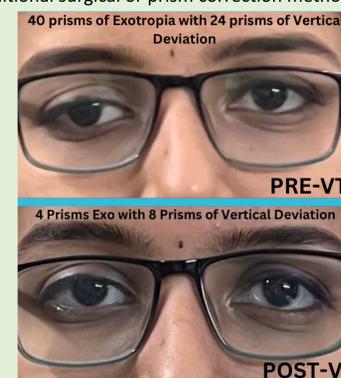
PHASE	ACTIVITIES	BREAF DESCRIPTION
PHASE 1	1. EYE HAND ACTIVITIES 2. SACCADIC EYE MOVEMENT 3. PURSUIT EYE MOVEMENT 4. MARSDEN BALL 5. HART & FOUR SACCADIC CHARTS 6. VISUAL SCAN & SEARCH 7. SYNTONICS PHOTOTHERAPY	IN SANET VISION INTEGRATER IN SANET VISION INTEGRATER IN SANET VISION INTEGRATER TAPPING, CATCHING & TRACKING IN SANET VISION INTEGRATER IN COMPUTERIZED PERCEPTUAL PROCESSING PROGRAME WITH ALPHA-DELTA & MU-DELTA FILTERS (IN 10-10-10 INTERVAL)
PHASE 2	1. BAR READER 2. EYE HAND ACTIVITIES 3. SACCADIC EYE MOVEMENT 4. PURSUIT EYE MOVEMENT 5. VISUAL SCAN & SEARCH 6. HART & 4 SACCADIC CHART 7. BROCK STRING	SMALLER SIZE TARGETS WITH ANTISUPPRESSION TARGETS BI-OCULAR THERAPY PROTOCOL BI-OCULAR THERAPY PROTOCOL BI-OCULAR THERAPY PROTOCOL ANTISUPPRESSION CONVERGENCE TRAINING WITH BIGGER TARGETS
PHASE 3	1. DIPLLOPIA AWARENESS 2. VTS-4 3. CHEIROSCOPE 4. ROTATIONAL & 4 SACCADIC CHART	WITH BROCK STRING (BEATS) & PEN LIGHT MANUAL VERGENCE(BO) WITH BIGGER TARGETS AT NEAR MANUAL & IN VTS-4 WITH ANTISUPPRESSION TARGETS

DISCUSSION

The patient had successful results after completing 90 In-Office Vision Therapy sessions which consisted of 45 minutes each. The evaluation conducted after the training revealed a reduction in subjective fatigue, indicating that the visual training administered successfully alleviated the patient's symptoms of self-awareness, also we noticed her diplopia awareness became more prominent which was not there initially due to the presence of suppression. Nevertheless, in comparison to the observed enhancement in binocular vision functions over one and a half months, the development of stereopsis was not achieved. These findings imply that the enhancement of the sensory ability to perceive and integrate objects, specifically the formation of stereopsis, necessitates a longer training duration of at least 3 months. To date, there have been no documented effects of visual training on cases of hypertropia that have undergone surgical intervention. Existing literature(8,9) has predominantly highlighted surgical or prism correction approaches as the primary treatments for addressing binocular vision dysfunctions in patients with hypertropia. One of the major factors for the reduction of the depth of suppression was the syntonics phototherapy. Studies(10)(11) showed that there is vital role of this phototherapy procedure in conditions of lazy eyes.

CONCLUSION

We can conclude from the above case report that in cases of exotropia associated with hypertropia which was 1st considered for surgical interventions multiple times after 50 sessions of in-office vision therapy along with syntonics phototherapy, the magnitude of the strabismus and reduction of the suppression has resulted. Along with the level of stereopsis and ability to converge has been drastically improved. Visual training has been found to stimulate various regions of the cerebral cortex, making it a training method that enhances brain function. Unlike traditional surgical or prism correction methods, this aspect is believed to have contributed to the improvement of stereopsis in patients.



PARAMETERS	PRE-VT BV EVALUATION	POST VT BV EVALUATION
STEREOPSIS	X	140 SEC OF ARC
WFDT	OD SUPPRESSION	FUSION
COVER TEST	EXO AND HYPYER	MILD EXO WITH HYPER
MADDOX ROD(H)	D- 20 Δ BI	D- 8 Δ BI
	N- 40 Δ BI	N- 4 Δ BI
MADDOX ROD(V)	D- 14 Δ BD	D- 12 Δ BD
	N- 24 Δ BD	N- 8 Δ BD
NPC	BR- X	BR- >30 CM
	REC-X	REC-X
NRA	X	+2.50 DS
PRA	X	-3.50 DS
MEM	+0.50 DS	+0.50 DS
NFV	D- X/X/X	D-X/4/2
	N- X/X/X	N- X/X/X
PFV	D-X/X/X	D- 2/4/2
	N-X/X/X	N-X/X/X
ACCOMMODATIVE FACILITY	OD-0 cpm	OD-5 cpm
	OS-0 cpm	OS-7 cpm
	OU-0 cpm	OU-6 cpm
VERGENCE FACILITY	0 cpm	3 cpm
NPA	OD- X	OD-9 cm
	OS- X	OS-9.5 cm
	OU- X	OU-10 cm
AMPLITUDE OF ACCOMMODATION	X	10 D
AC/A RATIO	X	4: 1

REFERENCES

