



# VISUAL OUTCOME POST NEURO OPTOMETRIC REHABILITATION AND ITS IMPACT ON BALANCE, GAIT AND POSTURE POST STROKE IN A 70 YEARS OLD MALE

Priya Pandey, M.Optom, MCOptom-UK, FCSO-USA, Rabindra Kumar Pandey, M.Optom MCOptom -UK, FCOVD-USA, FAAAO  
Sarumathi K, B.Optom

## INTRODUCTION

Neuro-optometric rehabilitation is a specialized area of optometry focused on the assessment and treatment of visual problems resulting from neurological conditions or injuries. It involves techniques and therapies aimed in improving visual function and integration, including addressing issues such as binocular vision, eye movement control, visual processing, and visual perception. This type of rehabilitation often involves collaboration with other healthcare professionals, such as neurologists and physical therapists, to provide comprehensive care for patients with neurological visual impairments.. [1]

The incidence of ocular movement disorders is 70% in stroke survivors. Vision related difficulties causes inability to participate in rehabilitation, independent living leading to depression, increased risk of falling, feeling unsafe and becoming anxious.[2] In addition to ocular movement disorders stroke survivors can have problem with eye hand coordination, reduced fusional vergence, reduced or absence of stereopsis, visual processing problems, visual hallucinations, visual neglect, visual field defects predominantly homonymous hemianopia and reading difficulties which can be either hemianopic alexia, pure alexia or visual neglect.[3]The incidence of acquired manifest strabismus is 28 - 52% and predominantly the type of deviation is Exotropia or High Exophoria. [2]

Visual input has a greater influence on a person's posture while standing resulting in greater sway when individuals are presented with erroneous or conflicting cues. This postural control is dependent upon inputs and informations from visual, vestibular and proprioceptive systems.[4]

Post stroke some or all the following tasks becomes more difficult, increased sway during quiet standing, uneven weight distribution with increased weight bearing on unaffected limb, decreased weight shifting ability in stance and abnormalities in postural responses. The ability to balance requires that the body's center of Gravity (CoG) lie over base of support. If individuals are provided with accurate visual representation of CoG position, some literatures indicates that motor behaviors can be improved.[5]

## CASE SUMMARY

A 70 years old patient presented to Caring Vision Therapy and Neuro Rehabilitation Centre, Chennai, India with the complaints of difficulty in day-to-day activities which includes Facial recognition, Persistent movement of letters and words while reading or writing along with poor balance and posture while standing or walking. Past general health history revealed presence of diabetes mellitus which is under control by medication. The patient had history of acute onset of Necrotizing Pancreatitis, and which was managed conservatively, and two days post he had cardiac arrest.

This all lead to the incidence of Hypoxic ischemic encephalopathy, which was managed under rehabilitation care for 2 months. Associated Acute kidney injury and septic shock also resolved. In October 2021, the patient underwent pancreatic necrosectomy surgery. After this the above-mentioned vision and motor related complaints were started.

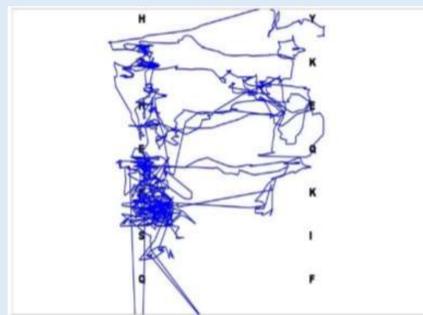


Figure 1: Saccades Pre-Vision Therapy

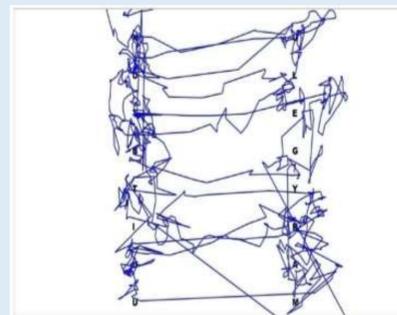


Figure 2: Saccades Post-Vision Therapy



Figure 3: Reading Test Post 25 sessions of VT

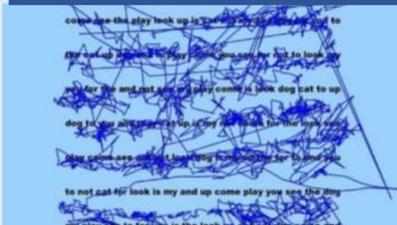


Figure 4: Reading Test Post 75 sessions of VT

## Neuro Optometric Rehabilitation approach (in-office VT)

Visual Efficiency Skills (Phase 1 & 2)	VVRT – Visuo-Vestibular Rehabilitation Therapy (phase 2)	Syntonic Phototherapy (Phase 1 & 2)
Sanet Vision Integrator	Added high density foam balance pad	Upsilon Omega for 10 minutes
Marsden Ball Training	Wooden balance board	followed by Mu-Upsilon 10 minutes with a break of 10 minutes.
Pegboard Rotator	Balance Cognitive Training	
Eyeport Fixation Trainer		
VTS-4 / VTS 4-HOLO LENS		

## RESULT

		Pre-Vision Therapy	Post-Vision Therapy
Pursuits (NSUCO)	Ability	1	5
	Accuracy	1	5
	Head movement	2	5
Saccade (NSUCO)	Ability	2	5
	Accuracy	2	4
	Head movement	1	4
	Body movement	2	4



Clinical Test	Pre-Vision Therapy	Post-Vision Therapy
<b>Spectacle Prescription</b>	OD: PLANO OS: +1.00DS/-2.00 × 80 ADD: +2.50	
<b>Final Acceptance (Distance)</b>	OD: Distance PLANO/-1.25DC × 90 OS: Distance +1.00DS/-2.00DC × 80	
<b>Final Acceptance (Near)</b>	OD: Near +2.50DS/-1.25DC × 90 OS: Near +3.50DS/-2.00DC × 90	
<b>Visual Acuity with Best Corrected Visual Acuity (BCVA)</b>	OD: (Distance, Near)(Aided) 6/18P, N10 with strain OS: (Distance, Near)(Aided) 6/18, N10 with strain	6/9, N6 with strain 6/18 <sup>+</sup> , N6 with strain
Lens Status (OU)	Pseudophakia	
Advanced Romberg test	Grade 4	Grade 1
<b>BIVSS</b>	74	28
Advanced Romberg test	Grade 4	Grade 1

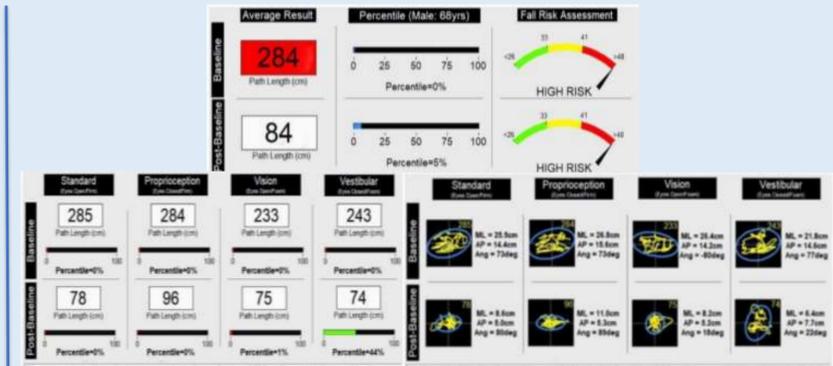


Figure 5: Posturography of Pre- and Post-Vision Therapy (Balance/fall risk assessment & modified CTSIB score)

In phase 1, the primary clinical goal was to improve monocular visual skills, including pursuits, saccades and building fusional vergence ranges. In the first phase, therapies for stabilizing oculomotor deficits were carried out which included SVI saccades module, Rotational Hart chart, Marsden ball and pegboard rotator.

In phase 2, integration of visual system with other sensory inputs were also added along with the previous activities. Post VT his monocular fixation test revealed central, steady and maintained. His Advanced Romberg test grade reduced to grade 1 indicated a better control of his balance and posture. In office VT sessions were administered for 45 minutes each day along with that patient was simultaneously advised syntonic phototherapy for 30 sessions with follow up every 10 days.

## DISCUSSION

After completing 75 In office sessions, the patient started feeling ease in performing the ADL, walking speed also improved drastically.

It is evident from clinical practice and literature that visual disorders are prevalent in stroke which adversely affects the quality of life and performance of day-to-day activities. These patients can benefit from intervention by neuro optometrist.

Routine screening for the common visual disorders post stroke are recommended and awareness among other professionals who are involved in the process of rehabilitation about these visual dysfunctions post stroke also plays an important role in referring these patients to a Neuro optometrist.

## CONCLUSION

This case report illustrates the importance of intervention of neuro optometric rehabilitation in post stroke rehabilitation which improves their oculo motor skills, balance, gait & posture. Thus, the combined approach of neuro optometrist along with other healthcare professionals such as neurologists and physical therapists can do wonders in the life of post stroke patients. It is evident from clinical practice and literature that visual disorders are prevalent in stroke which adversely affects the Quality of Life and performance of day-to-day activities. These patients can benefit from intervention by neuro optometrist.

## REFERENCES

