

## Case Report

# PHYSIOTHERAPY MANAGEMENT FOR PROGRESSIVE SUPRANUCLEAR PALSY

Chennupati. Ashok Chakravarthi\*, A. Anitha kumari, P. Keerthi Chandra Shekhar.

Assistant Professor, Swatantra Institute of Physiotherapy and Rehabilitation, Rajahmundry, India.

## ABSTRACT

**Background:** An elderly patient with disturbances in gait, impaired balance, difficulty moving the eyes and history of frequent falls are not commonly seen in physiotherapy referral cases. Progressive supranuclear palsy (PSP) is relatively uncommon and is the most frequently occurring form of Atypical Parkinsonism with cardinal features of vertical gaze palsy, gait instability with frequent falls. However, because the initial clinical features often resemble Parkinson's disease (PD) many patients are referred for rehabilitation services with the wrong diagnosis as PD. The progression of the symptoms in PSP is much faster than in PD and there is no cure or effective medication to manage PSP. We describe a case of 59 years old male, patient who was referred to physiotherapy department for asymmetric limb apraxia, markedly impaired balance and frequent falls during transitional movements. Two years before the patient was diagnosis as PD and later the patient was re-diagnosed as PSP based on the progression of the disease. The patient was rehabilitated using coordination exercises and reciprocal rhythmic movements to reduce rigidity, transfer training exercises for balance, gait training using weights strapped to ankles in parallel bar and visual tracking exercises. The exercises were programmed for 1 ½ hours a day, 5 days a week, for 8 weeks. After 15 weeks there was improvement in gait and balance of the patient with decrease in fall incidence on a Progressive Supranuclear Palsy Rating Scale (PSPRS).

**KEY WORDS:** Gait; Balance; Falls; Progressive supranuclear palsy; Atypical Parkinsonism; Coordination exercises; Transfers training; Parallel bars; Visual tracking exercises.

**Address for correspondence:** Chennupati. Ashok Chakravarthi, Assistant Professor, Swatantra Institute of Physiotherapy and Rehabilitation, Rajahmundry, India. Email:chennupati.ashok1@gmail.com

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International Journal of Physiotherapy and Research

ISSN 2321- 1822

[www.ijmhr.org/ijpr.html](http://www.ijmhr.org/ijpr.html)

Published: 11 June 2013

Received: 21 April 2013

Accepted: 02 May 2013

## BACK GROUND

Progressive supranuclear palsy (PSP), also known as Steele-Richardson-Olszewski syndrome, is a neurodegenerative disease involving the gradual deterioration and death of specific volumes of the brain that affects cognition, eye movements, posture and control of gait and balance. PSP has a slight male predominance in most studies. The disease usually develops after the fifth decade of life, and the diagnosis is purely clinical.

The cause of PSP remains unknown. Most cases appear to be sporadic. Both environmental and genetic influences have been postulated.

The cardinal manifestations of PSP are Supranuclear ophthalmoplegia, Pseudobulbar palsy, prominent neck dystonia, Parkinsonism, Behavioral, cognitive, and gait disturbances that cause imbalance, Frequent falls/impaired postural reflexes.

Other features that can be prominent include Focal or segmental dystonia in the form of limb dystonia or blepharospasm, Asymmetric apraxia resembling corticobasal degeneration, Micturition disturbances, including urinary incontinence (common in the later stages), Progressive apraxia of speech, non-fluent aphasia, or a combination and Photophobia.

Patients with PSP are often misdiagnosed as having Parkinson's Disease however presence of vertical gaze palsy along with walking difficulties are used as primary indications in the diagnosis of PSP.

PSP cannot presently be cured. A true cure would require the ability to regenerate, restore and renew the brain tissue and neurotransmitter connections destroyed or damaged by the disease. Treatment with drugs is usually disappointing and experimental which may cause serious side-effects.

Individuals with PSP should remain physically, mentally, and socially active as long as they are able. Daily physical exercise helps maximize body and mind functions and helps to maintain a healthy weight, retain joint mobility and prevent complications.

The primary complications of PSP are related to Impaired balance, Decreased cognition, Immobility in late disease and other complications related to falls include orthopedic injury and other posttraumatic problems. Immobility in late disease leads to infectious complications such as pneumonia, urinary tract infection, and sepsis.

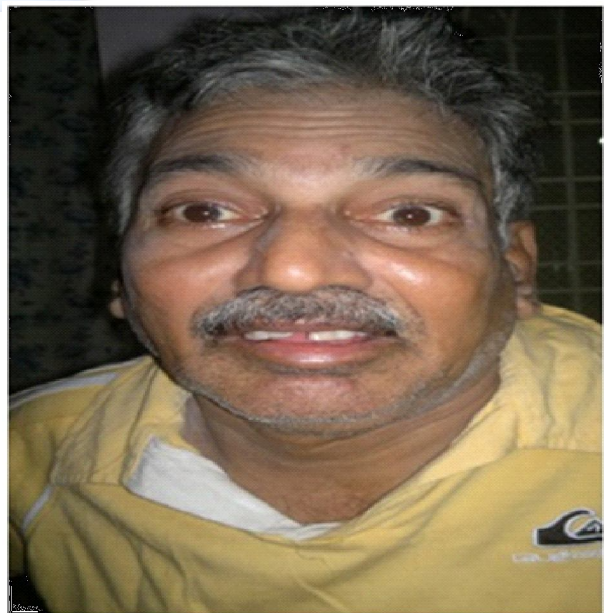
Prognosis, the primary causes of death in patients with PSP are infections and pulmonary complications (e.g. pneumonia) that are frequently related to immobility. Often, the primary morbidity relates to imbalance leading to immobility, though dementia, visual symptoms, and dysphagia are major concerns. About 50% of patients require some aid to walk within 3 years of the initial onset of symptoms. The usual interval from initial symptom occurrence to the need for a cane or a walker is 3.1 years, and the interval to confinement to a chair or bed is 8.2 years.

## CASE REPORT

A 59 years old male presented to physiotherapy department with complaints of difficulty in walking, balance problem and episodes of frequent retropulsion falls since last 2 years and slurred speech.

On clinical examination we found Atypical Parkinsonian face "surprised look", widening of the eye lids with decreased frequency of blinking, fixed visual gaze and a distinctive "rocket sign" on raising from chair. His Face, neck and body has been stiff. He exhibited trismus. On examination of gait there is unsteadiness of walking, decreased arm swinging, moderate rigidity and bradykinesia of movements, easy fatigability, and dystonia without tremors. Three years before the case was diagnosed as Parkinsons disease and later as the patient failed to respond to anti-Parkinson's medication and has developed vertical gaze palsy, the case was re-diagnosed by features suggestive of Progressive Supranuclear Palsy and has been confirmed by MRI brain.

Level of impairment was assessed using Progressive Supranuclear Palsy Rating Scale (PSPRS). Total score the patient attained is 53/100 score which includes sub sections scores on history 9/24, mental exam 2/16, bulbar exam 5/8, ocular exam 13/16, limb exam 9/16 and gait exam 15/20. The rehabilitation program includes exercises to decrease rigidity by using coordination exercises, reciprocal rhythmic movements for the upper limbs and lower limbs using weights and functional task activities for 20 minutes.



**Image1:** Characteristic facial appearance of patient with Progressive supranuclear palsy

For Flexibility and Balance training we incorporated, Transfers training to and from a bed to chair and sit to stand activities for 20 minutes. Gait training in parallel bars, the patient was made to walk in forward, backward and sideways using 2 kg sand bags strapped to ankles for 30 min. Exercises to decrease freezing using weight shifts and for impaired eye movements were taught by using Upper trunk flexion, rotation exercises with visual cues for better visual tracking for 15 minutes. The exercises were programmed for 1 hour 30 MINS a day, 5 days a week for 8 weeks. Before discharge the patient was given a home exercise program incorporating functional activities, balance exercises and was taught correct way of getting in and out of bed and sit to stand positions. The patient was asked to come for a review checkup later after 15 weeks.

Levels of impairment measured using Progressive Supra-nuclear Palsy Rating Scale (PSPRS) on review checkup the patient attained a total score of 33/100, improvements in sub sections of history 7/24, mental exam 1/16, ocular exam 10/16, limb exam 5/16 and gait exam 5/20 were found and improvements in bulbar exam were not found and the score remained 5/8. Overall there was improvement in transfer activities from lying to sitting and sit to stand activities and standing balance of the patient. Improvement in gait characteristics mainly cadence, step length and stride are notable. Functional activities like eating, drinking and button up of cloths have also become easier. Patient and his assistance reported safer feeling during ambulation and decrease in fall incidence.

## DISCUSSION

Despite the demand for rehabilitation in Progressive supranuclear palsy (PSP), there is less evidence in the literature to support its effectiveness. Studies with controlled methods are necessary to provide guidance for physiotherapists in the management of PSP. Because the prevalence of this disorder is low, case studies allow researchers and clinicians to present informative data to help others deal with these diseases.

Early recognition of the disease is vital, as gait impairment and the associated falls are a major source of morbidity and mortality in people with PSP.<sup>1</sup> Gait changes associated with defective scaling of stride length and postural instability were more marked in PSP than those with PD despite similar disease duration between the groups. This may be a manifestation of more rapid progression of the disease.<sup>2</sup> some literature supports the rehabilitation of gait using balance and eye exercises have shown to improve spatial gait parameters and gait speed in individuals with PSP and are still ambulatory.<sup>3</sup>

So an ongoing, intensive program of exercise and locomotor training may help people with PSP maintain upright balance, decrease falls, and decrease the rate of decline of ambulation.<sup>4</sup> One case study could be found that studied the effect of locomotor training on the function of people with PSP. This case study, 8 weeks of body weight support tread mill training showed a decrease in falls and improved balance for a person with PSP after.<sup>5</sup>

Two other case reports of physical therapy intervention for people with PSP were found. In that case report by Izzo et al (1986) on rehabilitation in progressive supranuclear palsy, found that rehabilitation program which includes limb-coordination activities, tilt-board balancing, ambulation activities incorporating trunk flexion and rotation and strategies to compensate for impaired visual scanning improved patients standing balance and ability to scan environment and to some extent gait characteristics.<sup>6</sup> likewise, Sosner et al (1993) in their study on 2 patients with individualized rehabilitation program that involved strength training with progressive resistive exercises and isokinetic exercises, coordination exercises, gait training, transfer training to and from a bed and chair, and stretching of the neck muscles and in one patient used head movements to compensate for downward gaze impairment provided information regarding achieving safer ambulation in their outcome.<sup>7</sup> In both the studies patients improved in walking ability and safety over the course of therapy, but this improvement was dependent on heavy-weight ambulatory devices or a structured environment.



Laurie A King (2009), introduced a conceptual framework for the therapists to develop an exercise program to delay mobility disability in people with Parkinson disease (PD) in that he identified how constrains such as rigidity, bradykinesia, freezing, poor sensory integration and impaired cognitive processing limit mobility in people with PD and summarized principles for improving mobility,<sup>8</sup> which can also be used in PSP.

In this study we have reported rehabilitation activities including limb-coordination, gait training, balance and eye movement exercises useful in improving locomotor ability and in decreasing the fall rate. The difference in the outcomes in this study and previous studies may be explained by the difference in diagnosis, individualized therapy or length of hospital stay.

However choice of physiotherapy interventions depends on disease severity its progression, ability of the patient to cope up and the experience of the therapist.

## CONCLUSION

This article outlined the model for physiotherapy management for people with PSP. Although Physiotherapy interventions may not cure the patients with PSP they may offer symptomatic relief against rigidity, bradykinesia, postural instability, unsteadiness of walking and balance problems with gaze palsy. Exercises are useful in maintaining optimal condition of the patient and in prevention of falls. Hence Physiotherapy has the potential to reduce disability among the people with this disease and to enhance the quality of life.

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### How to cite this article:

Chennupati. Ashok chakravarthi et.al, Physiotherapy management for progressive supranuclear palsy. *Int J Physioth Res* 2013;02:42-45.