

# Posture in Parkinson's Disease How Much Physiotherapy Can Help – An Evidence based Case Control Study

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**Abstract:** *Introduction: Living with dignity is the right of human. As the age advances numerous health disorders and diseases have an impact on the quality of living with poor hygiene, dependency for daily activities. Parkinson's disease is a major neurological disorder where posture, gait, mobility are widely impaired. Aims & Objective of this research was to analyse posture and its impact among a PD subject and the role of physiotherapy with its outcome. Materials & Methodology: 78 year old male Parkinson's disease for one year was treated with specific physiotherapy from January 2017 to January 2018. With a weekly twice frequency and analyzed mainly the impact of posture with physiotherapy means Results on his quality of life was statistically analyzed with using UPDRS has shown  $P < .05$  and clinical impact (MCID) with evidence are presented Conclusion: swallowing, speech and posture are key components in the rehabilitation of Parkinson's disease subjects. Hence physiotherapy in improving and maintaining good posture is paramount among PD subjects is evident.*

**Keywords:** PD, MCID, QOL, ADL, MNR, UPDRS

## 1. Introduction

Parkinson Disease (PD) is one of the most common neurodegenerative diseases and its relentless progression results in severe disability (Campenhausen et al 2005) with more preponderance for men from 1.5 to 2 fold increase than women (Granieri et al 1991). While studies have shown that subjects with PD have a higher relative risk of death compared with non Parkinson subjects in the same range (Rajput et al 1984, Bennet et al 1996) studies from India have documented genetic contribution up to 8.5% of cases of familial and sporadic P.D (Biswas et al 2006). In India, with an ageing population and increased life expectancy, it is expected that the disease burden due to PD will be enormous (Zhang et al 1993). However prevalence rate of PD in India and mortality rate are not recorded (Das et al 2006). Lack of social support system and paucity of trained manpower and socioeconomic factors are the main constraints influencing higher mortality rate among PD subjects (Das et al 2005)

## 2. Background Information

78 year old male, retired officer from a nationalized bank in India, father of two children, and wife as the caregiver was found to have dyskinesia, pill rolling movement of left hand, forward head posture, mobile thoracic kyphosis, mild degree of urge incontinence, decreased balance in standing and occasional falls in open environment was getting treated with 20 mg since 4 years

### C/O

Decrease in phonation, fear of fall, difficulty and depending for daily living activities

### O/E

• Obliterated cervical lordosis, forward head posture, restricted cervical spine movements with pain and

- tightness of stern mastoid and anterior neck muscles low pitched voice with dysphagia (Difficulty in Swallowing)
- Mobile thoracic kyphosis, exaggerated lumbar lordosis, both hip flexor adductor and knee flexor tightness spinal movements were stiff painful and restricted due to disuse, pain and soft tissue tightness
  - Ambulant unaided for short distance, unilateral stance decreased on left > right – resting pill rolling tremors of left hand
  - Hyper tonicity and hyper reflexia recorded on left upper and lower extremities
  - Range of motion of peripheral joints due to faulty posture, pain, soft tissue tightness restricted and painful.
  - Cognitive domain is intact but with low self confidence and esteem
  - For activities of daily living he was partially dependent for eating, bathing social and activities

### Aims & Objectives of the study was

- 1) To evaluate effect of exercises on posture
- 2) To find related clinical prognosis with physical exercises

## 3. Materials & Methodology

This original case study was conducted in Chennai during the period from January 2017 to January 2018 with weekly two sessions of specific physiotherapeutic means after due explanation, consent of the subject and the care giver were obtained for the study. After detailed physical evaluation as mentioned above (the subject continued his prescribed medication by neurophysician) he was treated with non pharmacological means using specific exercises with weekly twice frequency. Each session lasted for 25-30 minutes. Subjects cadence, quality of life were recorded prior to beginning of the study and after 12 months of therapy. Isometric neck exercises, shoulder bracing exercises, Pilates exercises using physioball, closed kinematic exercises

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inversion therapy were used. Progression was done with increase in number of repetitions longer periods of holding the contraction from partial to weight bearing positions.

#### 4. Results

Table of results on QOL with ADL related items were analyzed UPDRS on a 5 point scale with 13 components once prior to the beginning of this study and after one year of treatment with specific physiotherapy.

|      | QOL | SD   | SE   | t    | p    |
|------|-----|------|------|------|------|
| Pre  | 54  | 8.87 | 5.12 | 4.10 | <.01 |
| Post | 33  |      |      |      |      |

Subject's heart rate was monitored and intensity of exercises were between 50-70% of his maximal heart rate. No untoward incidents were reported such as giddiness and falls.

#### 5. Discussion

##### Clinical prognosis during this study period from January 2017 –January 2018:

After few sessions of therapy he was able to extend the neck for eating food and drinking water otherwise he was fed by his wife. An improved eye contact, while interaction, hence his level of confidence, also phonation, body language and gestures have improved as reported by the care giver and the author. He was able to walk erect with an improved posture and gait

However social activities he was advised not to venture alone but to attend with care giver for safety and prevention of falls. A moderate improvement in bladder continence was reported by the care giver. Also he had started regular walking with monitoring for 15 minutes daily and a set of exercises as home programme.

##### Postural Deformities in P.D

- Patients with PD often present with abnormal posture (Doherty et al 2011) 1/3<sup>rd</sup> of PD subjects had a deformity of their limbs, neck or trunk. The most recognized type of deformity is the classic stooped simian appearance with flexion of the hips and knees and rounding of the shoulders, these postural abnormalities leading to significant disability which includes camptocormia, antecollis, pisa syndrome and scoliosis (Ashour & Jankovic 2006).
- Camptocormia (CC) used to describe bent spine among P.D with at least 45 thoracolumbar flexion when standing or walking with a prevalence rate of 3% to 17.5% (Tiple et al 2009)
- Asian patients have a higher prevalence of camptocormia might reflect genetic difference in skeletal shape (Ashour et al 2006) and a positive correlation with PD patients with camptocormia to have more advanced Parkinson's than those without (Margraf et al 2010) and camptocormia presents 7-8 years after. **The onset of PD (Schäbitz et al 2003) also as this study subject whose occupation for 35 years was sedentary with long sitting nature could have added along with age related changes could have**

##### further added musculoskeletal changes leading to postural problems.

- However treatments for camptocormia includes manipulative physiotherapy, spinal braces with little to no evidence (Bloch et al 2006) but DBS of both sub thalamic nuclei is a potential treatment for CC in P.D, with mild to excellent improvements (Chenji et al 2017)
- Antecollis (AC) in Parkinson disorders refers to forward flexion of the head and neck, with dropped neck that is more pronounced than expected relative to the fixed posture of the trunk and limbs (Quinn et al 1989). With an average of AC in PD at 5.8% (Yamada et al 2003). Patient complaints of pain in the posterior aspect of the neck or develop problems secondary to neck flexion such as difficulty swallowing, excessive drooling (Vandewarrenburg et al 2007). Antecollis is often associated with a limited range of movement as the deformity becomes more long standing in P.D (Doherty et al 2011). With tightened sternocleidomastoid, neck muscles limiting voluntary neck extension (Fujimoto et al 2010), where as AC in P.D may be associated with increased axial tone patients might be able to have passive extension to normal position, but in other patients AC can become a fixed deformity.
- Few case reports AC might be induced by dopamine agonist therapy (Fujimoto et al 2010). Intensive physiotherapy might be of benefit although there is no supporting evidence in AC (Doherty et al 2011)
- **This study subject who was treated through for a short period with intensive physiotherapy has benefited with MCID as supported by the above study.**
- Also Proprioception and dyskinesia are impaired in P.D as evidenced by (Schneider et al 1987) as it can affect axial motor control. Subsequently Proprioceptive defects can affect postural leading to deformity (Wright et al 2010)
- **This study subject was treated with more exercises to improve Proprioception and kinesthetic sensation, hence could have benefited with specific therapy as supported by the above reports.**
- Spinal and soft tissue changes with degenerative spinal conditions is common in P.D with postural deformities (Tiple et al 2009) and with direct mechanical effect of pain might prone compensatory posture as supported by (Ashour et al 2006) who have reported that connective tissue changes as a potential path physiological mechanism in the development of deformities.
- Hence early detection of postural abnormalities could help to avoid fixed irreversible deformities and complications that can accompany them like pain, difficulty swallowing (Doherty et al 2011). **In line with these findings, this study subject who was treated with due medication and physiotherapy has shown adequate functional improvements with speech and swallowing, but long term follow up could not be established for sustained clinical outcome.**

**Limitation of the Study** was being a case study report of shorter duration and few variables studied. But larger sample size of both sex, other techniques, evaluation with other variables, scales on movement disorders are highly recommended. The author has no conflict financially or any other means while publishing this original case report for professional enhancement.

## 6. Further Recommendation

Interdisciplinary work along with audiologists and physiotherapy in the rehabilitation of PD can be given a trial for more evidenced benefit of PD subjects. Analysis and therapy using posture using EMG, biofeedback are recommended. RCTS with larger sample size of subjects and other means of non invasive physical interventions can be of more use

### Critical Analysis of this Study

- 1) No specific protocol was used for therapy
- 2) Lacks long term follow up as the study was done for 5 months and subject resides in some other city of 500km away, hence monitoring gets tough to sustain benefits of exercises
- 3) The role of inversion therapy and Pilates among dyskinesia and Parkinson's disease were not evidenced
- 4) Effects of specific exercises on his posture through recorded with positive prognosis, but maintaining the restored good posture, motor power of muscles and range of motion are questionable

## 7. Conclusion

Speech and swallowing are key components for communication and proper digestion. Hence physiotherapeutic approach should include on these unfocussed areas, as normally walking, gait, movements and muscle weakness are only treated in a regular means.

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