



AN OBSERVATIONAL STUDY TO ANALYSE THE SIGNIFICANCE OF VARYING ATTENTION OVER GAIT PARAMETERS IN PARKINSON'S DISEASE

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ABSTRACT

Objectives: To evaluate the effect of varying attention over gait parameters in parkinson's disease.

Design: Observational study of quasi experimental design

Setting: The study was conducted in "Government General Hospital", Chennai.

Procedure: Subjects with a diagnosis of idiopathic parkinson's disease with a non-fluctuating response to syndopa and the ability to walk 10 m unassisted participants in the study with average of 85 years old using Unified Parkinson's Disease Rating Scale (UPDRS) and Hoehn and Yahr scale.

Results: There was significant difference in the step length, stride length, base width, time taken, cadence between the groups with or without attention at a $P < 0.001$.

Conclusion: It is mandatory that attention and auditory cues in treating parkinson's disease patient.

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INTRODUCTION

Parkinsonism is a clinical syndrome characterized by a disorder of movement. Parkinson's disease is a progressive neurodegenerative disorder associated with a loss of dopaminergic nigro striatal neurons. Parkinson's disease is the most common disease affecting the "Basal Ganglia". It is the third most common neurological disease. It is a slowly progressive degenerative disease that affect 2 in 100 of the population. Recent epidemiology community based data suggest that parkinson's disease is more prevalent in Europe, Africa, South East Part of Asia. It was the first disease to be identified as a molecular disease. It was observed that 80% of dopamine in the brain is localised in the basal ganglia and drastically reduced in parkinson's disease patients and that a specific defect in transmitter metabolism was shown to have a causal role in the disease.

Parkinsons disease is characterized by neural loss and depigmentation of the substantia nigra at pars compacta level and locus coeruleus with consequent changes to neural conduction in the nigrostriatal pathway. Parkinsons disease clinical features like tremor rigidity bradykinesia, postural instability has to be differentiated from Huntington's and Wilson's Disease Parkinson's plus syndrome. Gait disturbance is one of the cardinal symptoms in patients with parkinson's disease.

Typically parkinson's disease patients walk slowly with shuffling and dragging steps, diminished arm swing and flexed forward posture. The progressive gait disturbance combined with postural instability finally deprives the patients of locomotor ability and yields medical as well as social problems.

The Parkinsons disease patients show typical hypokinetic gait with higher cadence and smaller stride length and an increase in the proportion of the gait cycle spent in double limb support of stance. In Parkinsons disease particularly affects gait, patients typically experiencing freezing when walking through an enclosed space or when turning. So there is an increased incidence of fall as postural adjustments are impaired.

The reduced brain activity in the medial frontal motor areas is a basic abnormality in motor performance in parkinsons disease. The under activity in the left cerebella hemisphere in contrast to the over activity in the vermis, could be associated with a loss and lateral gravity shifts in parkinsonian gait.

Need For the Study

Similar studies have been carried out in various aspects and this study is an attempt to find the significance of varying attention in parkinson's disease.

MATERIALS AND METHODOLOGY

The study was conducted in "Government General Hospital", Chennai. This is an observational study of Quasi Experimental

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design, done on 20 subjects [17 men, 3 women] diagnosed as idiopathic Parkinson's disease. The sampling technique used is Simple Random Sampling based on the inclusion criteria.

Inclusion Criteria: Diagnosis as idiopathic Parkinson's disease, both sexes were included, 40-85 years of age, ambulating with support and good standing balance of grading 2 to 3 grading in Hoehns & Yahr Scale.

Exclusion Criteria: Non-Ambulatory Parkinson's disease patients, recent episodes of fall, mentally stable, recent surgeries, associated neurological, cardiovascular and musculo-skeletal conditions.

Material Used For the Study

Broad white paper roll, coconut oil, stop watch, Inch tape, scale, pen, pencil, markerpen, cotton wool, assessment chart, Hoehn & Yahr assessment Score Sheet, Unified Parkinson's Disability Rating Scale, plate, glasses, spoon, fork, jam bottle, bread slices.

Procedure

Subjects with a diagnosis of idiopathic Parkinson's disease with a non-fluctuating response to syndopa and the ability to walk 10m unassisted participated in the study. Subjects were excluded if they had associated neurological, cardiovascular, musculoskeletal conditions that affects the walking or vision.

The subjects were on an average of 85 years old (SD 10). They were 3 years (SD 3) post diagnosis. Their motor impairment was assessed using unified Parkinson's Disease Rating scale (UPDRS) and the Hoehn and Yahr Scale. The subjects were included in the study if they had no noticeable cognitive impairment. All subjects are given an overview of the study and consent was sought from the subjects before participating in the study. The subjects were undergone treatment with the same neurophysician and were on prescribed dosage of syndope (110gm x 4/day). The walking tests were conducted 1 hr after medication. Subjects walked at their comfortable speed over a 2 meters distance on a white paper roll. Coconut oil was applied to the subjects feet for both the baseline and experimental conditions given.

There are three baseline conditions and four experimental conditions. The Baseline conditions were

1. Walking with free hand and no specific instruction given.
2. Walking while carrying an empty plate and a glass filled with water and no specific instruction given.
3. Walking while carrying a plate filled with six bread slices, fork, spoon, jam bottle, a glass filled with water and no specific instruction given.

The Experimental conditions are

1. Walking while carrying an empty plate and glass filled with water with an instruction to pay attention to walking big steps.
2. Walking while carrying an empty plate and glass filled with water with instructions to attention to walking with big steps as well as the things carried in hand.
3. Walking while carrying plate filled with bread slices, fork, spoon & jam bottle and glass filled with water with instruction to pay attention to walking with big steps

4. Walking while carrying plate filled with bread slices, fork, spoon & jam bottle and glass filled with water with instruction to pay attention to walking with big steps as well as the things carried in hands.

The baseline conditions were first tested and experimental conditions next. The measurements were taken after a brief physical effort (breathing exercises, warm for 2 minutes) by the subject. A manual foot print analysis used to measure the variables of the gait, such as step length, stride length, base of width, cadence, and time taken to complete the task. Data were represented with means & standard deviations. Paired "t" tests were used to compare baseline and experimental conditions with respect to variables of gait.

METHODOLOGY

The Parkinson's disease subjects, included in the study are assessed prior to the measurements taken.

The Parameters assessed include the following:

1. Step Length
2. Stride Length
3. Base of Width
4. Cadence
5. Time taken

The above parameters were measured by foot print analysis. Cadence and time taken were measured by a stop watch.

Method for Measuring Gait Parameters

Measurements were made according to the technique of (Wall J.C and Turnbull G.I. 1992, Grieve. D.W.1969, Stern G.M.1993, Marsha. E 2002). Their method suggested periodic measurements of changing direction of walking.

The procedures were explained to the Parkinson's disease subjects. Coconut oil was applied on the sole of feet. The subjects were made to walk in the middle of the white paper taped on the floor by cello tapes. After the test subjects were wiped by cotton wool.

On the imprinted paper, initially mark the line of progression. Mark the foot print from the most posterior point of the heel. Measure and mark the half of the distance in the left and right foot. Connect the marks of the left and right foot. Connect the Center point to form the line of progression.

To measure the step length, measure the distance between two successive footprints (i.e. heel to heel) Right to left for left step length and left and right for right step length. To measure the stride length, measure the distance between two successive foot print of the same foot (i.e. heel to heel). Right to right for right stride length and left to left stride length.

To measure the base width, draw a perpendicular lines from posterior border of heel to the line of progression. Then measure the distance between the line of progression to the left and rights posterior border of the heel. Cadence was measured by making the subject to the walk for one minute and calculating or counting the number of steps per minute. Walking should not to be too fast or too slow.

Time taken, was measured by a stop watch for the total duration of activity.

RESULTS

There is a significant difference in the step length, stride length, base width, time taken, cadence between group with and without attention at a level of $P < 0.001$.

CONCLUSION

From this study it is inferred that there is a significant improvement in gait parameters (step length, stride length, base width, cadence, time taken) of Parkinson's patient by varying the attention while walking. But the varying attention can be used as an intervention for Parkinson's disease patients and it is mandatory that attention and auditory cues as a part of treatment rather than conventionally treating Parkinson's disease patients.

Limitations of the Study

1. The sample size may be small for the result to be generalised.
2. Peak period of the disease.
3. Single task at multiple point of interval.
4. Rural and urban setups or hospital versus home care.

Scope of the Study

1. To include more parameters
2. Increased sample size
3. Other stages of Hoehn and Yahr can be included.
4. Multiple set of task
5. Different tasks stimulating ADL scenario
6. Various test conditions

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