

## Parkinson's Disease Annotated Bibliography

**Adkin, A.L., J.S. Frank, et al. (2003). Fear of falling and postural control in**

**Parkinson's disease. Mov Disord. 18: 496-502.**

**Ashburn, A., Stack, E., Pickering, R., & Ward, C. (2001). A community-dwelling**

**sample of people with Parkinson's disease: characteristics of fallers and non-fallers. *Age and Ageing*, 30, 47-52.**

**Abstract:** Recurrent falls are a disabling feature of Parkinson's disease (PD). We have estimated the incidence of falling over a prospective 3 month follow-up from a large sample size, identified predictors for falling for PD patients repeated this analysis for patients without prior falls, and examined the risk of falling with increasing disease severity. We pooled six prospective studies of falling in PD (n = 473), and examined the predictive power of variables that were common to most studies. The 3-month fall rate was 46% (95% confidence interval: 38–54%). Interestingly, even among subjects without prior falls, this fall rate was 21% (12–35%). The best predictor of falling was two or more falls in the previous year (sensitivity 68%; specificity 81%). The risk of falling rose as UPDRS increased, to about a 60% chance of falling for UPDRS values 25 to 35, but remained at this level thereafter with a tendency to taper off towards later disease stages. These results confirm the high frequency of falling in PD, as almost 50% of patients fell during a short period of only 3 months. The strongest predictor of falling was prior falls in the preceding year, but even subjects without any prior falls had a considerable risk of sustaining future falls. Disease severity was not a good predictor of falls, possibly due to the complex U-shaped relation with falls. Early identification of the very first fall therefore remains difficult, and new prediction methods must be developed.

**Błaszczyk, J., Orawiec, R., Duda-Kłodowska D., & Opala, G. (2007). Assessment of postural instability in patients with Parkinson's disease.**

**Abstract** Postural instability is one of the most disabling features of idiopathic Parkinson's disease (PD). In this study, we focused on postural instability as the main factor predisposing parkinsonians to falls. For this purpose, changes in sway characteristics during quiet stance due to visual feedback exclusion were studied. We searched for postural sway measures that could be potential discriminators for an increased fall risk. A group of 110 subjects: 55 parkinsonians (Hoehn and Yahr: 1–3), and 55 age-matched healthy volunteers participated in the experiment. Their spontaneous sway characteristics while standing quiet with eyes open and eyes closed were analyzed. We found that an increased mediolateral sway and sway area while standing with eyes closed are characteristic of parkinsonian postural instability and may serve to quantify well a tendency to fall. These sway indices significantly correlated with disease severity rated both by the Hoehn and Yahr scale as well as by the Motor Section of the UPDRS. A forward shift of a mean COP position in parkinsonians which reflects their flexed posture was also significantly greater to compare with the elderly subjects and exhibited a high sensitivity to visual conditions. Both groups of postural sway abnormalities identified here may be used as accessible and reliable measures which allow for quantitative assessment of postural instability in Parkinson's disease.

**Bloem, B., Grimbergen, Y., Cramer, M., Willemsen, M., & Zwinderman, A. (2001).**

**Prospective assessment of falls in Parkinson's disease. *Journal of Neurology*, 248, 950-958.**

**Abstract** We studied prospectively the epidemiology, clinical impact and prediction of falls in 59 moderately affected patients with Parkinson's disease (PD) (mean UPDRS motor score 31.5; mean age 61 years) and 55 controls (mean age 60 years). At baseline, balance and gait were evaluated extensively. The retropulsion test (response to sudden shoulder pull) was executed first unexpectedly and five more times following prior warning. All persons used standardized scoring forms to document their falls during six months. Thirty patients (50.8 %) and eight controls (14.5 %) fell at least once (relative risk [RR] 6.1; 95% confidence interval [CI] 2.5–15.1,  $p < 0.001$ ). Recurrent ( $\geq 2$ ) falls occurred in 15 patients (25.4 %), but in only two controls (RR 9.0; 95% CI 2.0–41.7;  $p = 0.001$ ). Recurrent falls were more common among persons taking benzodiazepines (RR 5.0; 95% CI 1.6–15.5;  $p < 0.01$ ). Sixty-two percent of the falls in patients caused soft tissue injuries, but no fractures occurred. A fear of future falls was common (45.8% of patients) and was accompanied by restriction of daily activities (44.1% of patients). Seventy percent of falls reported by patients were 'intrinsic' (due to patient-related factors), but falls in controls were mainly (50 %) 'extrinsic' (due to environmental factors). None of the baseline posture and gait variables predicted falls adequately. The first 'unexpected' retropulsion test was more often abnormal than all subsequent (predictable) tests. Irrespective of its method of execution, the retropulsion test did not predict falls. A combination of asking for prior falls, disease severity and the Romberg test yielded the best overall diagnostic utility (sensitivity 65 % and specificity 98 %). Recurrent fallers were best predicted by disease severity (RR for Hoehn and Yahr stage 3 was  $> 100$ ; 95% CI 3.1–585) and asking for prior falls (RR 5.0; 95% CI 1.2–20.9). We conclude that falls are common and disabling, even in relatively early stage PD. Recurrent fallers were best predicted by disease severity and presence of prior falls. Strategies to prevent falls in PD should particularly focus at intrinsic (patient-related) factors, such as minimising the use of benzodiazepines.

**Bloem, B., Van Vugt, J., & Beckley, D. (2001). Postural instability and falls in**

**Parkinson's disease. *Gait Disorders*, 87, 209-223**

**Cakit, B., Saracoglu, M., Genc, H., & Erdem, H. (2007). The effects of incremental**

**speed-dependent treadmill training on postural instability and fear of falling**

**in Parkinson's disease. *Clinical Rehabilitation*, 21, 698-675.**

**Objective:** To detect the effectiveness of incremental speed-dependent treadmill training on postural instability, dynamic balance and fear of falling in patients with idiopathic Parkinson's disease. **Design:** Randomized controlled trial. **Setting:** Ankara Education and Research Hospital, 2nd PM&R Clinic, Cardiopulmonary Rehabilitation Unit. **Subjects:** Fifty-four patients with idiopathic Parkinson's disease in stage 2 or 3 of the Hoehn Yahr staging entered, and 31 patients (21 training, 10 control) had outcome data. **Interventions:** Postural instability of patients with Parkinson's disease was assessed using the motor component of the Unified Parkinson's Disease Rating Scale (UPDRS), Berg Balance Test, Dynamic Gait Index and Falls Efficacy Scale. Twenty-one patients with Parkinson's disease participated in an eight-week exercise programme using incremental speed-dependent treadmill training. Before and after the training programme, balance, gait, fear of falling and walking distance and speed on treadmill were assessed in both Parkinson's disease groups. **Main measures:** Walking distance and speed on treadmill, UPDRS, Berg Balance Test, Dynamic Gait Index and Falls Efficacy Scale. **Results:** Initial total walking distance of the training group on treadmill was 266.45  $\pm$  82.14m and this was progressively increased to 726.36  $\pm$  93.1m after 16 training session ( $P < 0.001$ ). Tolerated maximum speed of the training group on treadmill at baseline was 1.9  $\pm$  0.75 km/h and improved to 2.61  $\pm$  0.77 km/h ( $P < 0.001$ ). Berg Balance Test, Dynamic Gait Index and Falls Efficacy Scale scores of the training group were improved significantly after the training programme ( $P < 0.01$ ). There was no significant improvement in any of the outcome measurements in the control group ( $P > 0.05$ ). **Conclusions:** Specific exercise programmes using incremental speed-dependent treadmill training may improve mobility, reduce postural instability and fear of falling in patients with Parkinson's disease.

**Davey, C., Wiley, R., Ashburn, A., & Murphy C. (2004). Falling in Parkinson's disease: the impact on informal caregivers. *Disability and Rehabilitation*, 26(23), 1360-1366**

Abstract Purpose: The aim of this study was to explore the views and experiences of the informal caregivers of repeat fallers with Parkinson's disease. Method: Individuals were invited to participate in this study if they were the informal caregiver of a person with Parkinson's disease (PD) who had experienced more than one fall in the previous 12 months. Participants were interviewed about their experience of managing falls using a semi-structured interview schedule. Interview data were transcribed and analysed using thematic analysis. Results: Fourteen caregivers (11 female) participated in the study. All were marital partners of a repeat faller with Parkinson's disease. The average age of the participants was 69.9 years (44 – 79). Their partners had had PD for an average of 16.7 years. Six major themes emerged from the analysis of the interview data, four directly related to falls management (the falls; consequences of the falls for the person with PD; caregivers' experiences of falls; consequences of falls for the caregiver). The majority of caregivers were frightened about their spouse falling. They used a number of methods of getting their spouse up from the floor but often injured themselves as a consequence. Caregivers highlighted the high level of care they provided and the social and psychological impact of the condition on them. They received limited help in looking after their spouse and little information about falls or about the disease in general. Conclusion: Caregivers in this study felt unprepared for their role and expressed a need for more support and advice, especially about managing falls.

**Franchignoni, F., Martignoni, E., Ferriero, G., & Passetti, E. (2005). Balance and fear of falling in Parkinson's disease. *Parkinsonism and Related Disorders*, 11, 427-433.**

**Gray, P. & Hildenbrand, K (2000). Fall risk factors in Parkinson's Disease. *Journal of Neuroscience Nursing*, 32(4). 222-228**

**Grimbergen, Y., Munneke, M., & Bloem, B. (2004) Fall's in Parkinson's disease. *Current Opinion in Neurology*, 17, 405-415.**

**Kegelmeyer, D., Kloos, A., Thomas, K., & Kostyk, S. (2007). Reliability and validity of the Tinetti mobility test for individuals with Parkinsons disease. *Physical Therapy*, 87(10), 1369-1378.**

**King, L., & Horak, F. (2008). Lateral Stepping for Postural Correction in Parkinson's Disease. *Arch Phys Med Rehabil*, 89, 492-499.**

ABSTRACT. King LA, Horak FB. Lateral stepping for postural correction in Parkinson's disease. *Arch Phys Med Rehabil* 2008;89:492-9. **Objective:** To characterize the lateral stepping strategies for

postural correction in patients with Parkinson's disease (PD) and the effect of their anti-parkinson medication. **Design:** Observational study. **Setting:** Outpatient neuroscience laboratory. **Participants:** Thirteen participants with idiopathic PD in their on (PD on) and off (PD off) levodopa state and 14 healthy elderly controls. **Interventions:** Movable platform with lateral translations of 12cm at 14.6cm/s ramp velocity. **Main Outcome Measures:** The incidence and characteristics of 3 postural strategies were observed: lateral side-step, crossover step, or no step. Corrective stepping was characterized by latency to step after perturbation onset, step velocity, and step length and presence of an anticipatory postural adjustment (APA). Additionally, percentages of trials resulting in falls were identified for each group. **Results:** Whereas elderly control participants never fell, PD participants fell in 24% and 35% of trials in the on and off medication states, respectively. Both PD and control participants most often used a lateral side-step strategy; 70% (control), 67% (PD off), and 73% (PD on) of all trials, respectively. PD participants fell most often when using a crossover strategy (75% of all crossover trials) or no-step strategy (100% of all no-step trials). In the off medication state, PD participants' lateral stepping strategies were initiated later than controls (370\_37ms vs 280\_10ms,  $P_{.01}$ ), and steps were smaller (254\_20mm vs 357\_17mm,  $P_{.01}$ ) and slower (0.99\_0.08m/s vs 1.20\_0.07m/s,  $P_{.05}$ ). No differences were found between the PD off versus PD on state in the corrective stepping characteristics. Unlike control participants, PD participants often (56% of side-step strategy trials) failed to activate an APA before stepping, although their APAs, when present, were of similar latency and magnitude as for control participants. Levodopa on or off state did not significantly affect falls, APAs, or lateral step latency, velocity, or amplitude ( $P_{.05}$ ). **Conclusions:** PD participants showed significantly more postural instability and falls than age-matched controls when stepping was required for postural correction in response to lateral disequilibrium. Although PD participants usually used a similar lateral stepping strategy as controls in response to lateral translations, lack of an anticipatory lateral weight shift, and bradykinetic characteristics of the stepping responses help explain the greater rate of falls in participants with PD. Differences were not found between the levodopa on and off states. The results suggest that rehabilitation aimed at improving lateral stability in PD should include facilitating APAs before a lateral side-stepping strategy with faster and larger steps to recover equilibrium.

**Matinoli, M., Korpelainen, J., Korpelainen, R., Sotaniemi, K, Virranniemi, M., &**

**Myllyla V. (2007). Postural Sway and Falls in Parkinson's Disease: A**

**Regression Approach. *Movement Disorders*, 22(13), 1927-1935.**

**Abstract:** A population-based study was designed to evaluate the clinical associates of postural sway and to identify the risk factors for falls in Parkinson's disease (PD). From a total population of 205,000 inhabitants, 215 PD patients were identified of which 120 home-dwelling cases were finally included in the study. Medical data were collected and patients were clinically examined and tested for static balance using an inclinometric device. Recent falls occurred in 40 (33%) of the subjects and 27 (23%) subjects were recurrent fallers. The fallers had a significantly larger sway area ( $P_{.021}$ ) and a larger maximum deflection in anterior-posterior ( $P_{.016}$ ) and lateral directions ( $P_{.006}$ ) than the nonfallers. A significant correlation was found between the sway measures and the UPDRS total score, motor subcore and UPDRS "bradykinesia" item. A higher UPDRS total score (OR: 1.04, 95% CI: 1.01-1.07) and an increased sway area (OR: 1.25, 95% CI: 1.02-1.54) were independent risk factors for recent falling in PD. In addition, the duration and severity of PD, antiparkinsonian medication, recent falling and the use of a walking aid were associated with increased sway measures. The results can be used to identify PD patients who are at a risk of falling. Both antiparkinsonian medication and nonmedical treatment should be optimized to reduce falls in PD

**Michalowska, M., Fiszer, U., Krygowska, A., & Owczarek, K. (2005). Falls in**

**Parkinsons disease. Causes and impact on quality of patient's life. *Functional***

***Neurology*, 20(4), 163-168.**

**Pickering, R. et al. (2007). A Meta-Analysis of Six Prospective Studies of Falling in Parkinson's Disease. *Movement Disorders*, 22 (13), 1892-2000.**

**Abstract:** Recurrent falls are a disabling feature of Parkinson's disease (PD). We have estimated the incidence of falling over a prospective 3 month follow-up from a large sample size, identified predictors for falling for PD patients repeated this analysis for patients without prior falls, and examined the risk of falling with increasing disease severity. We pooled six prospective studies of falling in PD (n\_473), and examined the predictive power of variables that were common to most studies. The 3-month fall rate was 46% (95% confidence interval: 38 –54%). Interestingly, even among subjects without prior falls, this fall rate was 21% (12–35%). The best predictor of falling was two or more falls in the previous year (sensitivity 68%; specificity 81%). The risk of falling rose as UPDRS increased, to about a 60% chance of falling for UPDRS values 25 to 35, but remained at this level thereafter with a tendency to taper off towards later disease stages. These results confirm the high frequency of falling in PD, as almost 50% of patients fell during a short period of only 3 months. The strongest predictor of falling was prior falls in the preceding year, but even subjects without any prior falls had a considerable risk of sustaining future falls. Disease severity was not a good predictor of falls, possibly due to the complex U-shaped relation with falls. Early identification of the very first fall therefore remains difficult, and new prediction methods must be developed.

**Qutubuddina, A., Cifua, D., Armistead-Jehleb, P., Carnea, W., McGuirkb, T., & Baron, M. (2007). A comparison of computerized dynamic posturography therapy to standard balance physical therapy in individuals with Parkinson's disease: A pilot study. *NeuroRehabilitation*, 22, 261-265.**

**Abstract.** Postural instability is a common impairment in idiopathic Parkinson's disease (PD). People with PD are prone to balance and walking difficulties. This study analyzed the feasibility of a prospective investigation of Computerized Dynamic Posturography (CDP) and standard Physical Therapy (PT) treatments in individuals with mild-moderate PD. Treatment tookplace at two sites: 1) CDP therapy at the Southeast Parkinson's Disease Research Education and Clinical Center (PADRECC) within a Veterans Affairs Medical Center and 2) standard physical therapy at a community outpatient rehabilitation center. Final analysis compared 15 patients randomly assigned for therapy to either the CDP or PT treatments. Therapy time was eight weeks (four weeks of CPD or PT followed by home therapy for four weeks). The CDP therapy included gradually intensified closed chain and mobility training. Standard PT consisted of upright, mat, and theraball exercises and gait training. The home exercise phase was identical for both groups. The pilot data demonstrated treatment was tolerated by 68 percent of the sample despite the occurrence of a progressive neurological condition and medical comorbidities. While results failed to reveal any differences between treatment groups, both groups demonstrated improvement on selected outcome measures. An expanded prospective study with methodological improvements appears warranted.

**Robinson, K. et al. (2005). Falling risk factors in Parkinson's Disease. *NeuroRehabilitation*, 20, 162-182.**

**Abstract. Objective:** to identify falling risk factors that are potentially modifiable among individuals who have idiopathic Parkinson's disease. **Design:** a between group comparison of 19 fallers and 21 nonfallers who have Parkinson's disease, across an array of variables that have been identified as falling

risk factors among the elderly and among those who have Parkinson's disease. *Results*: several variables were demonstrated significantly to distinguish fallers: disease duration and severity; dyskinesias associated with the use of dopaminergic agents; freezing; postural instability; depression; fear of falling; impaired fine motor control and motor planning in the feet; decreased proximal strength and muscular endurance in the legs; and a higher level of disability. *Conclusions*: several of these variables can be viewed as potentially modifiable during a future intervention trial that aims to reduce falls in those who have Parkinson's disease using multidimensional risk factor modification.

**Smithson, F., Mowis, M., & Zansek, R. (1998). Performance on Clinical Tests of Balance in Parkinson's Disease. *Physical Therapy, 78(6). 577-592.***

**Background and Purpose.** Due to the high incidence of falls in people with idiopathic Parkinson's disease (PD), the assessment of standing balance is a key component of physical therapist evaluation. This study investigated performance on clinical tests of standing balance in subjects with and without PD. **Subjects.** The subjects were 10 persons with PD who had a history of falls (age range=60-80 years), 10 persons with PD who had no history of falls (age range=63-79 years), and 10 persons with no known neurological impairment (age range = 60 -78 years) who served as a comparison group. **Methods.** Subjects were tested on their ability to maintain stability in 3 conditions: (1) steady standing (feet apart, feet together, tandem stance, step stance, and single-limb stance), (2) in response to perturbations generated by self-initiated movements (arm raise, functional reach, bend-reach, and step tests), and (3) in response to an external perturbation to upright stance (shoulder tug). Balance was measured at peak dosage in the levodopa medication cycle (in the morning) and 7 days later. **Results.** The mean Hoehn and Yahr Disability Scale score was 3.0 for the fallers with PD and 2.5 for the nonfallers with PD. Performance on the tandem stance, single-limb stance, functional reach, and shoulder tug tests demonstrated differences between the subjects with PD and the comparison group and between the fallers and nonfallers with PD. The results of these tests were highly repeatable over 7 days (ICC=.61-.94). **Conclusion and Discussion.** Although there was a small sample size, performance was highly consistent across 7 days when testing occurred during peak dosage of levodopa. A small battery of tests were sensitive enough to discriminate between people with PD who fall and those with no history of falls. [Smithson F, Morris ME, Iansek R. Performance on clinical tests of balance in Parkinson's disease.

**Stack, E. & Ashburn, R. (2004). Developing methods to evaluate how people with Parkinson's Disease turn 180°: an activity frequently associated with falls.**

***Disability and Rehabilitation, 26 (8), 478-484***

**Abstract Purpose:** To develop a test that identified fallers from their turning strategies, as people with Parkinson's Disease (PD) commonly fall turning. **Method:** We compared (1) Turn Types demonstrated when turning 180° during the Timed Up and Go Test (TUG Test) by 19 non-fallers and 29 fallers (median age 71) and (2) Turn Types, Turning Steps, Heelstrike, Stability and the Use of Space and Support demonstrated when turning 180° during an everyday activity by 15 non-fallers and 26 fallers (median age 75). Turns were rated from video by observers blinded to group. Inter-observer agreement was tested. **Results:** Similar proportions of fallers and non-fallers demonstrated multiple-step Turn Types during the TUG Test (69% v 58%; p=0.433) and the everyday activity (66% vs. 46%; p=0.241). When turning, similar proportions of each group lacked Heelstrike, lost Stability and used the available Space and Support (p<0.05); Turning Step counts were also similar (p=0.891). Inter-observer agreement proved acceptable except for Turn Type during everyday activity (Kappa=0.46). **Conclusions:** The anticipated differences between fallers and non-fallers were not identified, perhaps obscured by insufficiently or overly challenging protocols and/or the compensations deployed by fallers. Further methodological development is needed in the analysis of fall-related activities with high-risk groups.

**Stolze, H., Klebe, S., Zechlin, C., Baecker, C., Friege, L. & Deuschl, G. (2004). Falls in frequent neurological diseases: Prevalence, risk factors and aetiology.**

*Journal of Neurology, 251, 79-84.*

**Abstract** The prevalence of falls among neurological patients is unknown, although disturbances of gait and posture are common. Falls may lead to burdens for the patient, the caregivers and the health system. We designed a prospective study and investigated all patients for a history of falls admitted to a neurological hospital during a 100- day period. Clinical investigation was carried out and several disease specific rating scales were applied. A total of 548 patients were investigated. Of all patients 34% had fallen once or more often during the last twelve months. A disturbance of gait was blamed for the fall in 55%, epileptic seizures in 12%, syncope in 10 % and stroke in 7%. Intrinsic risk factors for falls were high age, disturbed gait, poor balance and a fear of falling. As extrinsic factors we identified the treatment with antidepressants, neuroleptics and different cardiovascular medications, adverse environmental factors in the patients' home and the use of walking aids. Within the diagnoses, falls were most frequent in Parkinson's disease (62 %), syncope (57%) and polyneuropathy (48 %). According to these findings falls in neurological in-patients are twice as frequent as in an age-matched population living in the community. Falls in neurological patients are particularly linked to medication and disorders affecting gait and balance.

**Vanderkooij, H. Van asseldonk, E., Geelen, J., Van vugt, P, & Bloem, B. (2007).**

**Detecting Assymetries in balance control with system identification: first experimental results from Parkinson patients. *Journal of Neural***

*Transmission, 114, 1333-1337.*

**Wielinski, C., Erickson-Davis, C., Wichmann, R., Walde-Douglas, M., & Parashos,**

**A. (2005). Falls and Injuries Resulting From Falls Among Patients With Parkinson's Disease and Other Parkinsonian Syndromes. *20(4). 410-415.***

**Abstract:** We sought to ascertain frequency, type, risk factors of falling, and resulting injuries among parkinsonian patients. A survey was mailed to all patients treated at our center between 1/1/2000 and 4/30/2002 (N = 1,417). Information was collected on falls within the past 2 years, related injuries, and use of health care services. A total of 1,131 responses (response rate, 79.8%) were received. After the exclusion of nonparkinsonian disorders, statistics for the remaining group (n = 1,092) and predictive statistics for those diagnosed before 1/1/2000 (n = 1,013) were calculated. Outcomes included falls, fractures, injuries, surgery, and related use of health care services. Explanatory variables included sex, age, age at diagnosis, disease duration, atypical parkinsonism, and dementia. Most patients (55.9%) were men; 12.2% had atypical parkinsonism; 12.5% had dementia; median age was 74.7 years; median disease duration was 7 years; 55.9% had at least one fall in the past 2 years; 65.0% of them sustained an injury; 33.0% sustained a fracture; 75.5% of injuries required health care services; 40.6% of fractures required surgery. Older age, atypical parkinsonism, longer disease duration, and dementia were risk factors for falling; female sex and older age were predictors of fractures. Need for health care services after an injury was higher among older patients. Further prospective studies will be necessary to elucidate the specific prognostic outcomes of injuries due to falls among parkinsonian patients, and the impact of these injuries on disease progression and quality of life.

**Wood, B.H., J.A. Bilclough, A. Bowron, and R.W. Walker. (2002) Incidence and prediction of falls in Parkinson's disease: a prospective multidisciplinary study. *Journal of Neurology, Neurosurgery and Psychiatry*. 721(1), Retrieved March 1 2008, from the World Wide Web: [http://0-find.galegroup.com.catalog.lib.cmich.edu:80/itx/infomark.do?&contentSet=IAC-documents&type=retrieve&tabID=T002&prodId=AONE&docId=A87373048&source=gale&srcprod=AONE&userGroupName=lom\\_cmichu&version=1.0](http://0-find.galegroup.com.catalog.lib.cmich.edu:80/itx/infomark.do?&contentSet=IAC-documents&type=retrieve&tabID=T002&prodId=AONE&docId=A87373048&source=gale&srcprod=AONE&userGroupName=lom_cmichu&version=1.0)**

Objectives: To accurately establish the incidence of falls in Parkinson's disease (PD) and to investigate predictive risk factors for fallers from baseline data. Methods: 109 subjects with idiopathic PD diagnosed according to the brain bank criteria underwent a multidisciplinary baseline assessment comprising demographic and historical data, disease specific rating scales, physiotherapy assessment, tests of visual, cardiovascular and autonomic function, and bone densitometry. Patients were then prospectively followed up for one year using weekly prepaid postcards along with telephone follow up. Results: Falls occurred in 68.3% of the subjects. Previous falls, disease duration, dementia, and loss of arm swing were independent predictors of falling. There were also significant associations between disease severity, balance impairment, depression, and falling. Conclusions: Falls are a common problem in PD and some of the major risk factors are potentially modifiable. There is a need for future studies to look at interventions to prevent falls in PD.