

# FALLS AND FRACTURES

## THE INFLUENCE OF VISUAL ENVIRONMENT ON POSTURAL STABILITY IN HEALTHY OLDER WOMEN

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### Introduction

Poor postural stability in the elderly is associated with increased risk of falling. It is recognised that visual environment factors (such as poor lighting and repeating patterns on escalators) can contribute to falls, but there is little information as to the effects of the visual environment on postural stability in the elderly. This study thus compared postural stability (using body sway as a measure) under five different visual environment conditions.

### Methods

Subjects used were 34 healthy women aged 56–76 y. Body sway was measured using an electronic force platform. This determined the excursion of centre of gravity every 0.05 seconds. Maximal lateral and antero-posterior sway were determined and sway velocity calculated. Body sway was measured under each of the following conditions for 1 minute: [A] bright lighting (186 lux); [B] moderate lighting (10 lux); [C] dim lighting (1 lux); [D] eyes closed; [P] repeating pattern projected onto wall.

### Results

Measures of postural stability were significantly poorer in condition [D] (eyes closed) than in all other conditions (Table 1). Lateral sway did not differ significantly between different lighting levels (conditions [A] to [C]). Antero-posterior sway was greater in condition [C] than conditions [A] and [B]. Sway velocity was greater in condition [C] than condition [A]. Measures of postural stability did not differ significantly between condition [P] (projected pattern) and other conditions with eyes open (conditions [A] to [C]).

**Table 1. Lateral sway, antero-posterior sway and sway velocity under each lighting condition. (Means ± standard error)**

	Condition [A] (bright light)	Condition [B] (moderate)	Condition [C] (dim light)	Condition [D] (eyes closed)	Condition [P] (projected pattern)
Lateral sway (mm)	1.18 ± 0.11 <sup>d</sup>	1.78 ± 0.14 <sup>d</sup>	1.36 ± 0.17 <sup>d</sup>	2.11 ± 0.26 <sup>abcp</sup>	1.20 ± 0.12 <sup>d</sup>
Antero-posterior sway (mm)	1.87 ± 0.14 <sup>cd</sup>	1.91 ± 0.16 <sup>cd</sup>	2.21 ± 0.25 <sup>abd</sup>	3.78 ± 0.62 <sup>abcp</sup>	1.95 ± 0.16 <sup>d</sup>
Sway velocity (m/s)	6.30 ± 0.91 <sup>d</sup>	5.73 ± 0.90 <sup>cd</sup>	9.32 ± 2.27 <sup>bd</sup>	25.99 ± 9.80 <sup>abcp</sup>	6.59 ± 1.47 <sup>d</sup>

<sup>a</sup>Significantly different from condition [A]; P < 0.05 <sup>b</sup>Significantly different from condition [B]; P < 0.05

<sup>c</sup>Significantly different from condition [C]; P < 0.05 <sup>d</sup>Significantly different from condition [D]; P < 0.05

<sup>p</sup>Significantly different from condition [P]; P < 0.05

### Conclusion

The substantially greater body sway with eyes closed than eyes open confirms the importance of the visual system in maintaining postural stability. Increases in body sway at reduced lighting levels were substantially smaller than those on closing eyes, and only evident at the dimmest lighting condition studied. A projected repeating pattern did not influence these static measures of postural stability. Extremely dim lighting levels thus appear to be associated with poorer postural stability in older people, and hence might be associated with increased risk of falls.

## FALLS RECORDED BY THE GENERAL PRACTITIONER AND THE SUBSEQUENT RISK OF HIP FRACTURE: A CASE-CONTROL STUDY USING THE UK GENERAL PRACTICE RESEARCH DATABASE

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### Introduction

The aim of this study is to quantify the association between falls recorded by General Practitioners and subsequent risk of hip fracture, and thereby determine whether this simple and readily available measure is useful in identifying patients at increased risk of fracture. This analysis is part of a larger study of the pharmacoepidemiology of hip fracture, and involves a case-control dataset derived from the UK General Practice Research Database (GPRD).

### Methods

Cases consisted of all episodes of hip fracture present in the GPRD. Controls were individually matched by age, sex and practice with a case : control ratio of 1 : 1. Each control was assigned a 'pseudo date of diagnosis' to match their case and only case-control pairs with identical periods of prescribing data up to and including the date of diagnosis were included in the analysis. For each subject data for all episodes of fall recorded by the general practitioner prior to the date of diagnosis were extracted. In addition to a binary variable "ever or never fall" a fall rate was calculated for each subject by dividing the total number of recorded falls by the years of available data. Analysis was by conditional logistic regression using STATA.

### Results

A total of 16,489 hip fractures were identified and 10,143 case-control pairs were eligible for analysis. The median age of cases was 80 years (interquartile range 73 to 86 years) and 7945 (78%) were female. Median duration of prescribing data was 2.3 years (interquartile range 0.9 to 4.3 years). A total of 2642 (26%) cases and 823 (8%) controls had a fall recorded at some time prior to date of diagnosis. A previous fall was a strong risk factor for hip fracture (Table). There was evidence of interaction such that the effect of falls was stronger in men than women ( $p_{\text{interaction}} 0.0001$ ) and in younger age groups ( $p_{\text{interaction}} 0.0001$ ).

	Odds ratio	95% CI
<b>Ever had a fall recorded</b>		
Everyone	4.78	4.33 to 5.28
Females	4.38	3.94 to 4.87
Males	7.56	5.79 to 9.87
< 75 years	8.74	6.72 to 11.37
75–80 years	5.32	4.20 to 6.75
80–85 years	4.70	3.85 to 5.74
> 85 years	3.52	3.03 to 4.09

Within subjects with at least one recorded fall the risk of fracture increased progressively with increasing quartile of fall rate: odds ratio per increase in quartile 1.23, 95% CI 1.13 to 1.33.

### Summary

A history of falls within computerised general practice records represents a strong predictor of subsequent hip fracture. The potential pharmacological explanations for this association are under current investigation. From a public health perspective recorded falls in general practice records may represent an effective means of identifying a population at high risk of hip fracture.

## FALLS AND FRACTURES

### FACTORS ASSOCIATED WITH RECURRENT FALLING AMONGST WOMEN WITH VERTEBRAL FRACTURES: A PROSPECTIVE STUDY

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#### Introduction

Vertebral osteoporosis subjects have an increased risk of peripheral fractures, particularly if they are recurrent fallers. Identification of those at risk of falls is clinically important so that intervention can be appropriately targeted. The aim of this prospective study was to identify simple clinical tests that can be performed in an outpatient setting, which are associated with recurrent fallers.

#### Methods

Women with at least one vertebral fracture (confirmed by >25% reduction in vertebral height on lateral radiological imaging) consecutively referred to the bone clinic were studied prospectively. Recurrent fallers were defined as those women who fell at least twice in the year of follow-up. The same clinician performed the following tests at baseline and 12 months later in a standardised manner: Geriatric Depression Score (GDS), Abbreviated Mental Test Score (AMTS), postural sway, ability to rise from a chair with the arms folded, "get up and go test", tandem walk, time to walk 10 metres, number of steps to turn 180 degrees, leg extensor power and blood pressure drop on standing. Telephone interviews were conducted at intervals to record fall episodes. Demographic details including fall history in the preceding year, age, weight and height were recorded.

#### Results

104 women, mean age  $78 \pm 7$  years, range 63–91 years were studied of which 86 (82.7%) completed follow-up. 18 of 86 (20.9%) reported 2 or more falls during follow-up. Logistic regression analysis showed that a history of recurrent falls in the preceding year ( $r=0.30$ ,  $P=0.002$ ), the get up and go test ( $r=0.27$ ,  $P=0.035$ ), the number of steps to turn around ( $r=0.23$ ,  $P=0.011$ ), timed 10 m walk ( $r=0.2$ ,  $P=0.019$ ), postural sway ( $r=0.15$ ,  $P=0.035$ ) and the AMTS ( $r=-1.16$ ,  $P=0.037$ ) were significantly associated with recurrent falls. The get up and go test and a history of recurrent falls in the preceding year remained significantly associated with recurrent falls in multivariate analysis.

#### Conclusion

In conclusion, the "Get up and go test" in combination with a history of recurrent falling may prove useful as simple clinical predictors of recurrent falling amongst elderly women with vertebral osteoporosis.

### ONE-YEAR INCIDENCE OF FALLS AND FRACTURES IN A 70 TO 77 YEAR OLD FEMALE COHORT

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304 women aged 70 to 77 years were assessed for fracture risk by examination and interview, then re-interviewed after a period of one year. Initial examination and interview were performed either at this centre, or at the subject's local GP surgery. Those who attended at this centre had spine, femur and heel DXA BMD and heel ultrasound BUA and VOS examinations, whilst those attending their local surgery had BUA and VOS measurements. The mobility and cognitive function of all subjects was assessed by functional testing (walking and turning ability) and mini-mental test respectively. Subjects were also questioned regarding previous medical and drug history and social factors thought to influence bone density and fracture risk. They were advised on diet, exercise and lifestyle factors aimed to reduce the incidence of falling and fracture. The interview was repeated (by phone) one year later. At both the initial interview and the re-interview, subjects were specifically asked if they had fallen at any time within the previous year, and if so, how often.

Reported falls were common with 106 subjects (34.9%) reporting at least one fall in the year prior to the initial interview, and 74 subjects (24.3%) reporting a fall in the following year. 23 (7.6%) of these subjects reported falls in both years. 10 fractures occurred between initial interview and subsequent re-interview. 9 of these fractures occurred as a result of a fall, giving an annual incidence of fall-related fracture of 3.0%. In this group the percentage of reported falls that led to fracture was 8.3%. Functional testing was not able to identify those who fell, either previously or over the subsequent year. Spine and femoral neck BMD were associated with previous fracture ( $P<0.001$  and 0.05, respectively), but only femoral neck BMD was associated with recent fracture ( $P<0.001$ ). BUA and VOS were not significantly associated with fracture or falls. Closer questioning over the circumstances of each fall revealed that some subjects were confusing falls they had already reported on their initial visit with falls suffered since. This raises the possibility that subjects over-reported falls at the first interview, and it is therefore not clear if the reduction in falls reported at the second interview was solely due to the advice given.

Falls were comparatively common in this age group, and caused 90% of observed fractures. However, no adequate method of predicting falls and subsequent fracture was demonstrated. Self-reporting of falls may be unreliable, and a more objective method of assessing fall propensity is required.

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## THE VALUE OF CAROTID SINUS MASSAGE IN PATIENTS WITH UNEXPLAINED SYNCOPES, FALLS OR DIZZINESS

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### Introduction

Carotid sinus syndrome (CSS) has recently emerged as a cause of unexplained syncope and falls in older subjects. The different types of CSS (cardioinhibitory, vasodepressor and 'mixed') can be diagnosed by performing a standardised carotid sinus massage (CSM) test under controlled conditions. Diagnosing the condition is important because interventions can successfully abolish symptoms. As well as general advice such as avoiding tight collars and sudden neck turning movements, dual chamber pacemakers are the treatment of choice for the cardioinhibitory and 'mixed' types of CSS and pharmacological treatments can be tried for the vasodepressor type CSS. The aim of this study was to assess the positive yield of CSM in different patient groups (unexplained syncope, falls and dizziness), as well as in a control group of asymptomatic subjects.

### Methods

A consecutive group of patients aged  $\geq 60$  years with either syncope, falls or dizziness, the causes of which were unexplained (after a full history, examination, postural blood pressure measurements, routine blood tests, 12 lead ECG and 24 hour Holter monitoring) were recruited. Fallers had no definite history of syncope and subjects with dizziness had no definite history of syncope or falls. A control group of asymptomatic subjects aged  $\geq 60$  years were also recruited from a General Practice age-sex register. Subjects with a history of stroke disease, or with signs of aortic stenosis or carotid bruits were excluded. Continuous electrocardiography using a cardiac monitor and beat-to-beat blood pressure monitoring using digital plethysmography [Finapres] were performed. In the presence of resuscitation and external pacing equipment, CSM was performed in the supine position for 5 seconds separately on both sides. The procedure was repeated in the upright position with the subject strapped to a tilt table.

Cardioinhibitory CSS (CI-CSS) was defined as a period of asystole for  $\geq 3$  seconds, vasodepressor CSS (VD-CSS) was defined as a 50 mmHg systolic blood pressure drop [without a 3 seconds pause] (or 30 mmHg with symptoms) and "mixed" CSS was diagnosed if there was evidence for both.

### Results

222 subjects (130 women, 92 men) in total were studied [mean age = 78.1, range = 60–96 years]. 178 of the subjects were symptomatic (syncope = 101, falls = 30, dizziness = 47) and 44 were asymptomatic controls. The type of subject by CSM response is shown in the table.

	n	Normal CSM	VD-CSS	CI-CSS	Mixed-CSS
Syncope	101	73 (72.3%)	15 (14.9%)	9 (8.9%)	4 (4.0%)
Fallers	30	26 (86.7%)	2 (6.7%)	2 (6.7%)	0
Dizziness	47	40 (85.1%)	5 (10.6%)	1 (2.1%)	1 (2.1%)
Controls	44	44 (100%)	0	0	0

Overall, any type of CSS was present in 27.7% (n = 28) of syncope subjects, 13.3% (n = 4) of fallers and 14.9% (n = 7) of dizziness subjects, compared to none of the control subjects [ $\chi^2 = 17.2$ ,  $P = 0.001$ ]. None of the subject had any adverse outcome after the test was finished.

### Conclusions

CSM under controlled conditions is a useful test which can diagnose CSS in patients with unexplained syncope, falls or dizziness. The positive yield of CSM in unexplained syncope patients was almost 28% and was approximately twice that in patients with unexplained falls or dizziness. Unexplained syncope patients, in particular therefore, should be targeted for CSM. It is possible that in the unexplained fallers and dizziness patients the positive responses to CSM occurred in those patients who had no memory of previous syncopal episodes and this requires further study.

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### THE INVOLVEMENT OF BEHAVIOUR IN RISK OF OLDER PEOPLE FALLING ON STAIRS

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Stairs in the home are a dangerous place for older people, with up to 1000 deaths and 57,000 hospital A&E attendances each year from falls in this location. In 22,000 incidents casualties suffer a fracture, concussion, or otherwise require admission to hospital for more than a day. The cost to health services of treating these patients is substantial. Falls also have serious psychological and social consequences, affecting mobility, confidence and quality of life. Although the personal and environmental factors involved in falls on stairs are well known, the influence of behaviour has received much less attention from the research community. The aim of this investigation was to improve understanding of how older people keep and use their stairs, and to assess the implications for stair safety.

Interviews were conducted with 157 older people, aged 65–96 years, in their own homes. Using a combination of open and closed questions, participants were asked about their behaviour on and around the stairs, awareness of safety factors and any history of falling on stairs. During each visit, information was also collected about the stairs in the home including design and repair of stair coverings, number of handrails and their condition, objects on and around the stairs, lighting, and position of windows. In addition, standard anthropometric dimensions of interviewees were recorded, along with other measurements including grip strength, ability to get up from a stool without using hands, and measures of visual acuity and depth perception.

*Behaviour involved in direct use of stairs:* Two thirds of participants (63%) reported 'hurrying' on occasions, to answer the telephone, deal with a caller at the door, or use the toilet, for example. Although 92% of interviewees recognised that carrying items up and down stairs could be hazardous, almost a third (29%) stated that they would attempt to carry something that might cause them difficulty. Cleaning the stairs appears to present particular problems, due to difficulties with access or the need to use heavy equipment, such as a vacuum cleaner. Among the 61% of households where low daytime luminance readings were found, 23% of participants reported not switching on stair lights during the day.

*Behaviour affecting the stair environment:* This includes leaving objects on stairs, generating either a slip or trip hazard or an object to fall into. While two thirds of participants (64%) recognised this as a problem, in almost one third of households visited (29%) objects were found on the stairs. Also, although most participants (86%) reported their stair covering to be in reasonable condition, in almost a third of cases (29%) the stair covering was judged by the researcher to be in need of replacement or repair. Additional handrails can increase confidence and around one third of homes (34%) had at some time had a second handrail fitted.

*Behaviour affecting individual capability:* Use of medication and alcohol are examples of behaviour, which can affect individual capability. Among study participants, 82% were taking at least one prescribed medication daily, with 16% reporting that their medication makes them feel drowsy, dizzy or affects their vision. Over one third of participants (38%) reported drinking alcohol when taking prescribed medications. Almost all of the sample (99%) reported using spectacles, although these are not always worn

when using the stairs. Some 16% of participants indicated that their spectacles cause them visual problems on stairs.

The findings indicate a widespread prevalence of behaviour-based risk factors for older people falling on stairs. While many participants were able to recognise hazards once prompted, many had not given much thought to stair safety prior to this. It is noteworthy that only 13% of the sample recalled having ever received advice about stair safety. Scope for prevention exists through improvement to the design of the stair environment or equipment installed or used around stairs. Beyond this, efforts to reduce falls need to raise awareness of risks and provide guidance and support to help older people deal with these. The Department of Trade and Industry/Health Promotion England 'Avoiding Slips, Trips and Broken Hips' campaign is a welcome initiative in this respect.

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## EXPLORATION INTO THE EFFECTS OF AN EXERCISE PROGRAMME ON THE LIVES OF ELDERLY FEMALE FALLERS

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### Introduction

As the number of elderly people increases in our society so does the number of falls and resultant injuries in this age group. Falls can profoundly threaten the quality of life for the faller especially when the ability to live independently is concerned. The resultant fear of falling<sup>1</sup> has been reported as a major consequence. Cumming et al<sup>2</sup> related this to fall self-efficacy and demonstrated that those people with a high fall self-efficacy had a significantly lower risk of falling. A lot of studies have concentrated on the effect of different fall prevention programmes<sup>3,4</sup> but the experience of falls on the faller's life has less often been reported. Porter (1999) argued that understanding the variability of these different experiences was an essential basis for falls intervention measures.

### Methods

Qualitative research methodology using a phenomenological approach was chosen as the most appropriate for exploring the experiences of elderly lady fallers attending exercise classes ranging in duration from one year to eighteen months. These classes were part of a large research project run by Dr Dawn Skelton. A total of thirty ladies agreed to take part in five focus groups representing the five exercise classes and six other members of these groups took part in in-depth interviews. The focus groups were used in an exploratory way to gain insight into a complex problem and the emerging categories became the conceptual framework for the interviews. Confidentiality was ensured and the full transcript was offered to all the participants. The analysis of the data was carried out following established guidelines<sup>6</sup>.

### Results and Discussion

It may not be surprising that the participants' reasons for falling were multifactorial. However the perceived benefits from the programme had some similarity in that it was possible to categorise changes within the social domain (e.g. re-engagement with the community), psychological (e.g. a reduction in fear of falling) and functional improvement (e.g. activities necessary for daily living) amongst others. One question that emerged was whether the similarity of responses reflected the similarity of the participants and therefore was not representative. On the other hand one of the major pitfalls of the focus technique is the potential impact of censoring and conforming and for this reason six in-depth interviews were carried out. All of these participants detailed a transformation both psychological and functional to a varying degree. They were explicit about their feelings of increasing age and how they think society viewed them. On the whole they all concurred that the elderly were underestimated in their physical abilities. Their strong desire to be independent was a major finding. The fallers felt that the classes addressed this by being task directed, providing explanations and high expectations without being patronising. The role of the instructor was linked to this. The group members responded to the classes by commitment to a task. They all appeared to have full lifestyles and maintained a strong sense of curiosity. Judging by the benefits experienced, the

interviewees stated the importance of making a wider group of fallers aware of these programmes.

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## LIFESTYLES AND ACTIVITY LEVELS IN AN ELDERLY POPULATION WITH AND WITHOUT MINIMAL TRAUMA FRACTURES

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### Introduction

Although lifelong activity is positively correlated with bone health, the optimal activities for reduced fracture risk are areas of research and debate<sup>1,2</sup>. Recent studies indicate that social activities may also have health benefits<sup>3</sup>. To prescribe appropriate lifestyle modification for any age group requires baseline information that few studies provide. In this survey, type and level of physical & other pursuits & hobbies were assessed to benchmark lifestyle behaviours in people aged 60–79 years, with & without recent low trauma fractures.

### Methods

A questionnaire was administered during interview to 207 patients (26; 12.6% male; 181; 87.4% female), to determine lifestyle behaviours in the three months preceding the fracture or interview. Excluded were those with neurological, severe cardio-respiratory or other disease related to inactivity or osteoporosis. Levels of activity 'out of' & 'about' the house were ranked using a 5 point scale (low to high). For the fracture group (Fg) (n=120; 12.5% male) interviews were conducted in the fracture clinic, the ward, or by telephone. The non-fracture (NFg) sample, matched for race, age and gender, (n=87) was obtained from local GP lists, & telephone interviews were conducted. Pearson's chi-square analyses were conducted.

### Results

As expected the physical activity levels for the Fg were significantly less than the NFg ( $P < 0.01$ ). Only 26% (32/120) of the Fg reported high levels of activity (HLA), against 59% (51/87) of the NFg. Surprisingly the Fg were associated with active former occupations that were manual ( $P < 0.01$ ); & in addition were more likely to have had a bereavement & to smoke. The range of physical, social and other pursuits differed significantly between those with high and low levels of activity (HLA and LLA), a result comparable to those in other studies<sup>3,4,5</sup>. The picture that emerged in this study indicates that level of education & certain skills may contribute to lifestyle activities. Over 60% (55/83) of the HLA group could drive ( $P < 0.01$ ). This group also had busier lifestyles – they were more likely to be members of a society or club ( $P < 0.05$ ); visit a library ( $P < 0.05$ ), indulge in hobbies ( $P < 0.02$ ) and go to a pub or restaurant ( $P < 0.01$ ). Age was a factor in reduced activity. 65% of participants with LLA were in the 8<sup>th</sup> decade; & many respondents gave 'getting older' as a reason for a decrease in activities. Fear of falling is a barrier to activity, as identified by 15% of the NFg with previous fractures: post-fracture rehabilitation should take this into account. Dominant pursuits for all were shopping, reading & TV viewing. Curiously 78% of interviewees viewed one particular word-quizz program\* – the majority from the NFg.

### Conclusion

In conclusion, The non-fracture group were generally active & 'busy', & could better account for their time. Education and social factors may also predict health status. Reasons for these results could lie in social attitudes or in personality differences. Further research is required to verify these findings and establish the reasons for health behaviours.

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### CORRECTIVE STRATEGIES TO A STANDARDISED TRIP IN YOUNG AND OLDER SUBJECTS

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We have previously reported on the corrective responses to a standardised trip in a group of young adults<sup>1</sup>. Two distinct recovery strategies were observed with seven out of the nine subjects showing an increased duration of the swing phase of the perturbed leg while two of the subjects tended to shorten the swing phase of the perturbed leg. In this study results from 11 young subjects aged 24–33 years (mean 27.3), nine of whom were those previously reported, were compared with those of eight older adults (5 men and 3 women) aged 62 to 77 years (mean 67.5) to determine whether there were any age-related changes in the recovery response to these trips. Ethical approval was obtained from the R.N.O.H.T. Ethical Committee.

The subjects were asked to walk on a treadmill at their customary walking speed for a minimum of 10 minutes to establish a comfortable and consistent gait pattern. After this had been achieved a resistance was applied to the right foot via a cord at the beginning of the swing phase of randomly selected strides, which were separated by at least twenty normal strides. This method was adapted from those of Garrett et al<sup>2</sup> and Dietz et al<sup>3</sup>. Five to eight perturbations of 180 ms duration were applied to each subject. Kinematic responses were recorded by a Coda *mpx30* motion analysis system, which also triggered the trip.

A total of 48 perturbed strides were observed for older subjects and compared with 60 perturbed strides from younger subjects of which 50 were those previously reported by Birtles et al (1999). The average walking speed for the younger subjects was 4.04 km/h and for the older group was 2.89 km/h. Average stride length was 1.19 m in the young subjects and 0.91 m in the older. Average stride time was 1.11 s in the young subjects and 1.18 s in the older.

Following perturbation the same two recovery strategies were observed in young and older subjects. In comparison to normal walking, higher forward velocities of the swinging limb were often observed during the longer swing phase recovery pattern, whereas lower than normal velocities were seen in those subjects using the shorter swing. Most individual subjects were consistent in their choice of strategy: 8 of 11 young subjects and 6 of 8 older subjects demonstrating only one of the two responses. This tendency towards consistency is statistically significant ( $\chi^2 > 25$ ,  $P < 0.001$ , for each group). There was a significantly greater use of the short swing phase strategy in the older subjects, 48% of the total perturbed strides compared with 22% in the young subjects ( $\chi^2 = 7.13$ ,  $P = 0.008$ ).

When the short swing phase strategy was used we observed that during the stance phase following a perturbation the centre of gravity was further forward relative to the supporting foot compared to its normal position. When the long swing phase strategy was used no such difference was apparent. This suggests that the short swing strategy is more likely to be unstable and result in a stumble becoming a fall.

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### LOW-DOSE PINDOLOL IN ORTHOSTATIC HYPOTENSION

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#### Introduction

Postural hypotension is one of the intrinsic causes for falls. Pindolol's apparent efficacy in patients with orthostatic hypotension has been explained in terms of the inotropic effect on cardiac beta – receptors. Most studies have been very small (3–5 patients) and used high doses of Pindolol (15–45 mg) resulting in side-effects. The aim of the current study was to determine the benefit of low dose Pindolol on postural hypotension.

#### Methodology

In this observational study 10 patients admitted over 1 year with postural hypotension (9 – Orthostatic hypotension of the elderly. 1 – Possible MSA) were treated with Pindolol 10–20 mg. Fludrocortisone was added if postural hypotension was partially corrected. Their presenting symptoms were falls (70%), dizziness/giddiness (20%) and blacking out (10%). The decrease in systolic BP (SBP) ranged from 20 to 69 mmHg (mean – 38.5 mmHg, median – 37.6 mmHg) and the diastolic BP (DBP) ranged from 11.7 to 31 mmHg (mean – 12.5 mmHg, median – 13.4 mmHg) confirmed on repeated testing.

#### Results

Mean age – 87.4 years, Range 79–96 years. Pindolol increased the SBP in 7 patients, which varied from 4.5 to 37 mmHg (mean – 22.5 mmHg, Median – 20.0 mmHg,  $p$  value – 0.09). It also increased the DBP in 4 patients and the increase was from 3.3 to 28 mmHg (mean – 6 mmHg, Median – 3.5 mmHg,  $p$  value – 0.09). In these 7 subjects postural hypotension was completely corrected in 2 and only partially corrected in 5 patients who required additional Fludrocortisone. 1 patient developed side effect (wheeze) and 2 were unresponsive to Pindolol.

#### Conclusion

Low dose Pindolol (10–20 mg) appears to increase both systolic and diastolic BP and was well tolerated in this small study. Fludrocortisone can be used in lower doses with Pindolol. In view of the frequent complications associated with Fludrocortisone treatment, we suggest a randomised controlled trial of these agents.

### SPECIALISED PHYSIOTHERAPY ASSESSMENT AND FALLS PREDICTION IN PARKINSON'S DISEASE

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#### Introduction

Potential risk factors for falls in Parkinson's Disease (PD) have been suggested to include generic factors (inability to rise from a chair, postural and gait impairment) and disease specific factors (postural instability, freezing, festinating and dyskinesia). Although retrospective studies confirm that PD itself is an independent risk factor for falls, the relative predictive ability of these general and specific factors is not yet clear. Physiotherapy is often used to address these risk factors, some of which fail to respond to pharmacological treatments. Little evidence exists to support a comprehensive, objective physiotherapy assessment tool to identify them.

The Physiotherapy assessment of falls in PD forms part of a larger prospective, descriptive, multidisciplinary cohort study "A Prospective Study of Falls in Parkinson's Disease in the Catchment Area of a District General Hospital".

#### Methods

All patients with idiopathic PD known to our service (excluding those who were immobile or had severe cognitive impairment) were invited to participate. Multidisciplinary baseline assessments, of which physiotherapy was a component part, were undertaken on the 109 volunteers. The 30 minute physiotherapy assessment included subjective data in relation to their PD, falls history, other medical conditions, level of mobility both indoors and outdoors and access to the physiotherapy service. Objective data was recorded for: postural status, timed and rated functional activities, and balance and gait analysis including a timed walking test and Tinetti balance and gait score<sup>1</sup>.

Over the next year, as part of the larger study, we are following up the number and circumstances of all falls using weekly postcards and reminders. Specific causes amenable to physiotherapy will be addressed as part of our normal service.

#### Results and Conclusions

All 109 have undergone initial assessment. Proposed analysis of the results will address: the predictive value of aspects of the specialised physiotherapy assessment for falls in PD; correlation of the physiotherapy data with other independent factors for falls; aspects of the specialised physiotherapy assessment which may inform further experimental work in falls prevention in PD.

#### Reference

1. Tinetti M, Williams F and Mayewski R. 1986. A fall risk index for elderly patients based on number of chronic disabilities: American Journal of Medicine, 80, p. 429-434.