



CANADIAN  
**Stroke**  
**BEST PRACTICE**  
RECOMMENDATIONS

# CANADIAN STROKE BEST PRACTICE RECOMMENDATIONS

## **Stroke Rehabilitation Evidence Tables** ***Falls Prevention and Management***

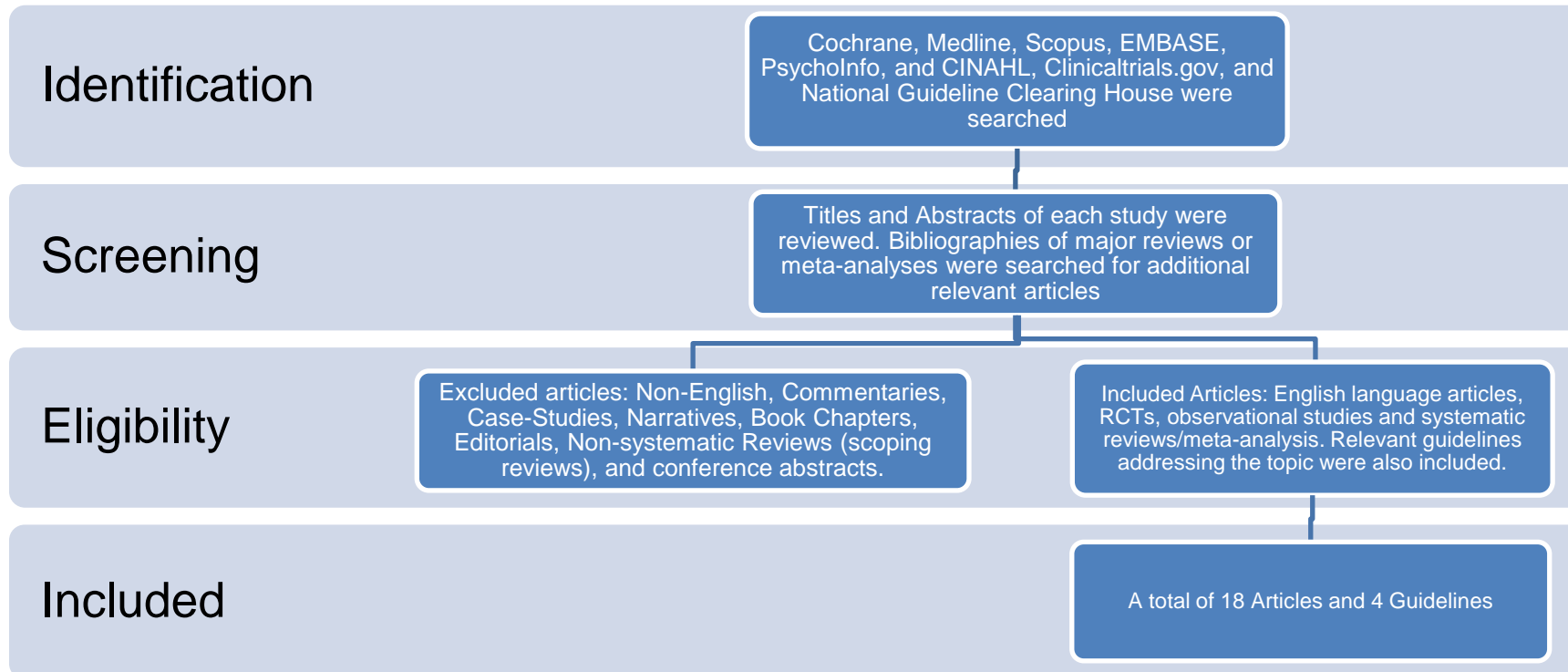
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## Search Strategy



Cochrane, Medline, and CINAHL, Clinicaltrials.gov, National Guideline Clearing House, Scopus, EMBASE, and PsycINFO were searched using the keywords: (Stroke OR CVD OR cerebrovascular disease) AND (lower limb OR lower extremity) AND falls. The same databases were searched to identify paediatric related evidence using the keywords: (stroke OR CVD OR cerebrovascular disease) AND (rehabilitation OR intervention OR therapy) AND (paediatric OR paediatrics OR youth OR child OR children OR young) AND ("Lower Limb" OR "lower extremity" OR gait OR mobility OR falls). Titles and abstract of each article were reviewed for relevance. Bibliographies were reviewed to find additional relevant articles. Articles were excluded if they were: non-English, commentaries, case-studies, narrative, book chapters, editorials, non-systematic review, or conference abstracts. Additional searches for relevant best practice guidelines were completed and included in a separate section of the review. A total of 18 articles (11 new for the 2014 update) and 4 guidelines (1 new and 1 updated for the 2014 update) were included and were separated into categories designed to answer specific questions.

## Published Guidelines

Guideline	Recommendations
<p><b>Scottish Intercollegiate Guidelines Network (SIGN). Management of patients with stroke: rehabilitation, prevention and management of complications, and discharge planning. A national clinical guideline. Edinburgh (Scotland): Scottish Intercollegiate Guidelines Network (SIGN); 2010 Jun.</b></p>	<p>Falls risk assessment should be undertaken using a valid tool on admission to hospital. A management plan should be initiated for all those identified as at risk of falls. [Grade GPP]</p> <p>Multifactorial interventions in the community, including an individually prescribed exercise program, should be provided for people who are at risk of falling. [Grade B]</p>
<p><b>Royal College of Physicians, National Clinical Guidelines for Stroke Intercollegiate Stroke Working Party : United Kingdom (2008)</b></p>	<p><b>6.9 Balance impairment and risk of falling: assessment and intervention</b> Any patient with significant impairment in maintaining their balance should receive progressive balance training.</p> <p>Any patient with moderate to severe limitation of their walking ability should be given a walking aid to improve their stability.</p> <p>Falls and injury prevention, and assessment of bone health, should be part of every stroke rehabilitation plan including providing training for patients and carers about how to get up after a fall.</p> <p>Stroke patients should have their nutritional status assessed and should be given vitamin D3 (800 to 2000 International Units per day) and calcium supplementation if they are at risk of deficiency, particularly if they are house-bound or reside in care homes.</p> <p><b>5.3 Lifestyle measures</b> For older people at risk of falls, additional physical activity which incorporates balance and coordination, at least twice per week, is also recommended.</p>
<p><b>Management of Stroke Rehabilitation Working Group. VA/DoD clinical practice guideline for the management of stroke rehabilitation. Washington (DC): Veterans Health Administration, Department of Defense; 2010.</b></p>	<p>Recommend that all patients be assessed for fall risk during the inpatient phase, using an established tool. [B]</p> <p>Recommend that fall prevention precautions be implemented for all patients identified to be at risk for falls while they are in the hospital.</p> <p>Refer to the falls prevention toolkit on the National Center for Patient Safety (NCPS) for specific interventions.</p> <p>Recommend regular reassessments for risk of falling including at discharge, ideally in the patient's discharge environment. [B]</p> <p>Recommend that patient and family/caregiver be provided education on fall prevention both in the hospital setting and in the home environment. [B]</p>
<p><b>Clinical Guidelines for Stroke Management 2010. Melbourne (Australia): National Stroke</b></p>	<p><b>7.15 Falls</b> a. Falls risk assessment should be undertaken using a valid tool on admission to hospital. A management plan should be initiated for all those identified as at risk of falls. [GPP]</p>

Guideline	Recommendations
<b>Foundation; 2010 Sep. p. 101</b>	b. Multifactorial interventions in the community, including an individually prescribed exercise program, should be provided for people who are at risk of falling [B]

# Evidence Tables

## Falls Prevention and Management

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
<p><b>Batchelor et al. 2010</b></p> <p><b>Australia</b></p> <p><b>Systematic Review and Meta-analysis</b></p>	N/A	<p>13 RCTs investigating an intervention designed to impact fall-related outcomes.</p> <p>Studies included stroke survivors' ≥18 years of age at any stage of stroke recovery in any setting. Studies investigating a mixed sample (&lt;20% with conditions other than stroke) were excluded unless subgroup analyses were presented.</p>	<p>RCTs evaluated physical activity interventions (4 trials), modification of environment/knowledge (1 trial), models of care (4 trials including the same sample), and pharmacological interventions (4 trials).</p>	<p>All primary and secondary falls related outcomes were included.</p>	<p>Examining unpooled effect estimates, only one trial investigating vitamin D vs. placebo in a sample of women was associated with a significant reduction in fall rate (RR=0.16, 95% CI 0.10 to 0.25) and/or proportion of fallers (RR=0.33, 95% CI 0.19 to 0.56).</p> <p>Pooled analysis were possible for two intervention types: exercise vs. usual care (3 trials) and bisphosphonate vs. placebo (2 trials).</p> <p><u>Exercise:</u> Fall rate: RR=1.22, 95% CI 0.76 to 1.98; p&gt;0.05 Proportion of fallers: RR=0.77, 95% CI 0.24 to 2.43; p&gt;0.05</p> <p><u>Bisphosphonate:</u> Proportion of fallers: RR=0.95, 95% CI 0.73 to 1.22, p&gt;0.05</p>
<p><b>Batchelor et al. 2012</b></p> <p><b>Australia</b></p> <p><b>RCT</b></p>	<p>CA: <input checked="" type="checkbox"/></p> <p>Blinding: Patient <input checked="" type="checkbox"/> Assessor <input checked="" type="checkbox"/></p> <p>ITT: <input checked="" type="checkbox"/></p>	<p>156 stroke patients at high risk of falls (in-hospital fall, Berg&lt;50, or Step Test&lt;7) within 2-weeks of discharge home from inpatient rehabilitation.</p> <p>11% of those assessed were randomized.</p>	<p>Participants were randomized to a tailored multifactorial falls prevention program plus usual care (71) or usual care alone (n=85). The intervention involved an individualized home exercise program (based on the Otago Exercise Program), falls risk and injury risk minimization strategies, and education.</p> <p><u>Duration of Intervention:</u> 12-months.</p>	<p><b>Primary Outcomes:</b> Rate of falls and proportion of fallers.</p> <p><b>Secondary Outcomes:</b> Injurious falls, falls risk, participation, activity, leg strength, gait speed, balance, functional independence, and fear of falling.</p> <p>Baseline and 12-month follow-up.</p>	<p>No significant between group differences were reported for any of the outcomes, including fall rate (1.9 vs. 1.8), injurious fall rate (0.7 vs. 0.5), and proportion of fallers (RR=0.83, 95% CI 0.60 to 1.14), all at p&gt;0.05.</p> <p><u>Lost to follow-up:</u> intervention group=12%; control=20%.</p>

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
<p><b>Dean et al. 2012</b></p> <p><b>Australia</b></p> <p><b>RCT</b></p>	<p>CA: <input checked="" type="checkbox"/></p> <p>Blinding: Patient <input checked="" type="checkbox"/> Assessor <input checked="" type="checkbox"/></p> <p>ITT: <input checked="" type="checkbox"/></p>	<p>151 community-dwelling stroke survivors with an average of 5.9 years post-stroke. Individuals who could not walk 10 meters (independent or with aid) and those with a medical condition precluding exercise were excluded.</p> <p>49% of those assessed were randomized</p>	<p>Participants were randomized to receive either an experimental exercise program (lower limb exercises designed to improve walking, physical activity and reduce falls; n=76) or a control exercise program (designed to improve upper limb and cognitive functions; n=75). Both groups completed at least 3, 45-60 minute sessions per week in addition to receiving advice and a home program.</p> <p><u>Duration of Intervention:</u> 40-weeks over 1-year,</p>	<p><b>Primary Outcomes:</b> Walking capacity (6-minute walk test), walking speed (10 meter walk test), and fall rate.</p> <p><b>Secondary Outcomes:</b> Falls risk, quality of life, community participation, and physical inactivity.</p> <p>Baseline and at the end of the 12-month program, with falls reported monthly over the study period.</p>	<p>At the end of the 12-month program, participants in the intervention group improved significantly more than those in the control group in terms of walking capacity (mean difference=34 meters, 95% CI 19 to 50; p&lt;0.001) and walking speed (mean difference=0.07 m/s, 95% CI 0.01 to 0.14; p&lt;0.5). However, no difference was found between the two groups with respect to proportion of fallers (62% vs. 51%; RR=1.22, 95% CI 0.91 to 1.62) or fall rate (1.7 vs. 1.8; IRR=0.96, 95% CI 0.59 to 1.51). The two groups also demonstrated non-significant differences in falls risk, physical activity, and quality of life.</p> <p><u>Lost to follow-up:</u> intervention group=14%; control group=9%.</p>
<p><b>Taylor-Piliae et al. 2014</b></p> <p><b>USA</b></p> <p><b>RCT</b></p>	<p>CA: <input checked="" type="checkbox"/></p> <p>Blinding: Patient <input checked="" type="checkbox"/> Assessor <input checked="" type="checkbox"/></p> <p>ITT: <input checked="" type="checkbox"/></p>	<p>145 subjects who sustained a stroke and live in the community.</p>	<p>Participants were randomized into the Yang style 24-posture short-form Tai Chi (TC) group, strength and range of movement exercises (SS) group, or the usual care (UC) group (written material/ resources).</p>	<p><b>Primary Outcomes:</b> Short Physical Performance Battery (SPPB), fall rates, 2-minute step test, Medical outcomes study 36-item short-form health survey (SF-36), Centre for Epidemiologic Studies Depression Scale, and Pittsburgh Sleep Quality Index.</p>	<p>123 fall related events occurred during the study. TC participants had two thirds fewer falls (5) than the SS (14) and UC (15) groups (p= 0.06). TC group had significantly fewer falls than the UC group (p= 0.04). There were no significant differences found for falls between the other groups (TC vs. SS, p=0.11; UC vs. SS, p=0.59) After the intervention, all groups had significant improvement in SPPB score (p&lt; 0.01). There was a significant group by time interaction for the 2-minute step test (p&lt; 0.01). The TC (p= 0.02) and SS (p&lt; 0.01) groups had significantly better aerobic endurance over time, this was not seen in the UC group. All groups reported better perceived physical (SF-36 physical composite score, p= 0.04) and mental health (SF-36 mental composite score, p&lt; 0.01). No significant change in perceived physical health for any of the groups, all groups had significant improvements in perceived mental health after 12-week intervention (p&lt; 0.05).</p>

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
<p><b>Verheyden et al. 2013</b></p> <p><b>Belgium</b></p> <p><b>Cochrane Review</b></p>	N/A	Studies evaluating the effectiveness of interventions for preventing falls post stroke.	<p>A total of 10 RTCs (n=1004) were included.</p> <p>5 studies evaluated the effect of exercise on falls and 2 studies had multifaceted interventions.</p>	<p><b>Primary Outcomes:</b> Rate of falls and number of fallers.</p> <p><b>Secondary Outcomes:</b> number of fall related fractures and hospital admissions, near-fall events, quality of life and adverse events.</p>	<p>Exercise on Falls: in terms of number of falls, there were no significant differences between the two groups in the acute (risk ratio 1.19, 95% CI 0.83 to 1.71) or chronic (risk ratio 1.02, 95% CI 0.83 to 1.24) stages post stroke.</p> <p>Medication: one study revealed that patients prescribed alendronate resulted in a 55% reduction of falls (95% CI 25% to 72%, p=0.0021). Another study reported that Vitamin D supplements accounted for a 59% reduction in falls (95% CI 28% to 82%, p=0.003).</p>

## Hip Protectors

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
<p><b>Parker et al. 2014</b></p> <p><b>Canada</b></p> <p><b>Cochrane review</b></p>	N/A	<p>14 RCTs</p> <p>Mean age range: 78 to 86 yr.</p> <p>Subjects were recruited in institutional care (n=11) and the community (n=3).</p>	Effectiveness of hip protectors in reducing hip fracture after a fall compared to no hip protectors.	Primary outcome: Hip fractures	<p>Incidence of hip fractures in institutions: Relative risk=0.77, 95% CI 0.62 to 0.97, p=0.10. Results from 11 trials included.</p> <p>Incidence of hip fractures in institutions only individually randomised studies: Relative risk=0.86, 95% CI 0.54 to 1.34, p=0.50. Results from 5 trials included.</p> <p>Incidence of hip fractures in institutions only cluster randomised studies: Relative risk=0.75, 95% CI 0.58 to 0.97, p=0.03. Results from 6 trials included.</p> <p>Incidence of hip fractures in community: Relative risk=1.16, 95% CI 0.85 to 1.59, p=0.36. Results from 3 trials included.</p> <p>Problems with compliance-the acceptance of, and</p>



Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
					adherence to, the use of hip protectors- were reported in all included studies.

## Incidence and Risk Factors for Falls Post-Stroke

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
<p><b>Maeda et al. 2009</b></p> <p><b>Japan</b></p> <p><b>Observational Study</b></p>	N/A	72 hemiplegic stroke patients consecutively admitted to a rehabilitation center. Patients with major musculoskeletal problems or neurological disorders in addition to stroke were excluded.	<p>Falls were documented by medical staff on a dedicated falls incident form. Additional information regarding demographics and scores on assessment measures were extracted from hospital records.</p> <p><u>Study Duration:</u> April 2006 to March 2008.</p>	<p>Fall occurrence, the Berg Balance Scale (BBS) the Functional Independence Measure (FIM), and the Mini Mental State Examination (MMSE).</p> <p><u>Timing of Assessment:</u> Admission to and discharge form rehabilitation.</p>	<p>38% of patients experienced a fall during the study period. As compared to non-fallers, fallers were significantly older and had a shorter time from stroke onset to admission, a longer hospital stay, a lower BBS and MMSE score at admission, and a lower FIM score at both admission and discharge (all at p&lt;0.05). However, the two groups did not differ in terms of gender, stroke type, or side affected.</p> <p>In a logistic regression analysis, BBS score at admission was found to be a significant predictor of fall occurrence (OR=0.94, 95% CI 0.89 to 0.98, p&lt;0.01), controlling for age, time from stroke onset to admission, length of stay, admission and discharge cognitive FIM subscore, and MMSE at admission. Results of a receiver operating characteristic (ROC) curve suggested a threshold BBS score of 29 (sensitivity=80%, specificity=78%; area under the curve=0.81, p&lt;0.001) to identify patients at risk of falling.</p>
<p><b>Czernuszenko et al. 2009</b></p> <p><b>Poland</b></p> <p><b>Observational</b></p>	N/A	1155 stroke patients consecutively admitted to a neurological rehabilitation unit.	<p>Documented fall incident reports, as reported by a witness of the faller, were identified. The site, circumstances, and consequences of the fall were noted.</p> <p><u>Study Duration:</u> June 2002 to January 2006.</p>	<p>Fall occurrence, Scandinavian Stroke Scale (SSS), Barthel Index.</p> <p><u>Timing of Assessment:</u> Admission to and discharge form rehabilitation.</p>	<p>253 falls involving 189 (16%) patients were reported during the study period. The incident rate for a first fall was 6.5/1000 patient days (95% CI 5.6 to 7.4) and 14.5/1000 patient days (95% CI 11.0 to 18.1) for a subsequent fall. The majority of falls took place during the day (82%) in the patient's room (59%). 28% of falls resulted in injuries.</p> <p>Significant associations were found between the occurrence of a fall and admission Barthel Index&lt;15</p>

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
					(HR=8.9), SSS<46 (HR=5.0), time from onset to admission<12 weeks (HR=3.0), presence of neglect (HR=2.1), left-sided motor deficit (HR=1.4), and age over 65 (HR=1.7), all at p<0.001 (except left-sided motor deficit, p<0.05). Patients who experienced greater gain in Barthel Index score and greater rehabilitation efficiency (Barthel Index gain/weeks in rehabilitation) were significantly more likely to experience a fall.
<b>Teasell et al. 2002</b>  <b>Canada</b>  <b>Observational Study (retrospective)</b>	N/A	238 stroke patients' consecutively admitted to an inpatient stroke rehabilitation unit.	Documented fall incident reports, as reported by a witness or the faller, were identified. Only falls that occurred in inpatient rehabilitation were recorded. Fall-related injuries were also identified and categorized as contusions, abrasions, lacerations, or fractures.  <u>Study Duration:</u> January 1992 to December 1996.	Fall occurrence, Berg Balance Scale (BBS), Functional Independence Measure (FIM), and the Chedoke McMaster Stroke Impairment Scale (CM).  <u>Timing of Assessment:</u> Admission to rehabilitation	37% of patients experienced at least one fall, with the majority occurring from a wheelchair (33%) or bed (25%). 22% of falls resulted in injuries (contusions=49%, abrasions=41%). 31% of injuries involved the upper extremity, 26% the lower extremity, 21% the head and face, and 23% the hip or torso.  Although fallers and non-fallers did not differ significantly in terms of stroke type, stroke location, or gender, fallers obtained significantly lower admission scores on the BBS (p<0.001), the FIM (p<0.001), and the CM arm, leg and foot subscales (all at p<0.05), but not the CM hand subscale. Fallers were also significantly more likely to have cognitive deficits or apraxia (both at p<0.05).
<b>Aizen et al. 2007</b>  <b>Israel</b>  <b>Observational Study (prospective)</b>	N/A	82 stroke patients in inpatient rehabilitation, 41 of whom experienced a fall during hospitalization.  During the study period, 263 stroke patients were admitted.	Falls recorded in an incident book were identified, as were the details and consequences associated with each fall. Each faller was matched by age, gender and functional disability to a control patient who had not experienced a fall during hospitalization. Additional information relating to falling risk factors were obtained from the patient's medical	Occurrence of falls, the Timed Up and Go (TUG), the Functional Independence Measure (FIM), the Clinical Dementia Rating Scale (CDR), and the Geriatric Depression Scale (GDS).	The fall rate was 0.16 per patient during the study period, with the majority of falls occurring from a wheelchair (61%) and/or during a risk-taking activity (85%).  Of the variables examined, only presence of vertigo was identified as a significant predictor of falling (19.5% vs. 2.4%; OR=9.67, 95% CI 1.15 to 81.85). Risk of falling was not found to be associated with older age (59% vs. 42%), use of anti-depressives (54% vs. 46%), or use of anti-hypertensives (27% vs. 15%).

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
			records.  <u>Study Duration:</u> 6-months.		
<b>Baetens et al. 2013</b>  <b>Belgium</b>  <b>Prospective Cohort Study</b>	N/A	32 stroke patients within a mean of 10.6 weeks after the stroke and a FAC score of $\geq 3$ .	Patients were observed under 3 conditions: (1) single task – walking; (2) dual task – walking and performing subtraction; and (3) dual task – walking and naming animals. Patients then kept a falls diary.  <u>Study Duration:</u> 6 months	Fall rates, Gait analysis using the GaitRite System, safety while ambulating, and the Motricity Index (MI).  Patients were divided into two groups based on whether or not they fell.	56.3% of the patients fell within the 6-months; 10 fell once and the remaining 8 had $\geq 2$ falls. No significant differences were found between those who fell once vs. multiple times.  Those with hemorrhagic or mixed strokes fell more ( $p=0.053$ ). Fallers used walking aids more frequently ( $p=0.039$ ) and were in need of supervision (FAC score = 3, $p=0.044$ ).  All gait parameters (e.g., cadence, velocity, stride length, step length) showed significant differences between the single task and each of the dual tasks ( $p<0.05$ ).
<b>Mansfield et al. 2013</b>  <b>Canada</b>  <b>Retrospective Review</b>	N/A	136 patients were included in the review based on their ability to stand independently and complete perturbation-evoked step reactions.	Retrospective chart review at an inpatient rehabilitation institute. Patient's length of stay, type of stroke, sex, age and time post stroke was recorded. Incident reports and patient interviews at discharge were reviewed for fall information.	National Institutes of Health Stroke Scale (NIHSS), Clinical Outcome Variables Scale (COVS) scores, and STRATIFY fall risk assessment.	14.7% ( $n=20$ ) of patients had a fall – total of 29 falls (5 had more than 1, 1 had 6 falls).  On admission, those who fell had lower functional mobility (COVS, $p=0.0006$ ) than non-fallers. Fallers also had a longer length of stay by 9 days ( $p=0.0035$ ).  51.7% of falls happened in the patient's home/hospital bedroom. 10.3% of falls resulted in minor injuries (e.g., bruises).  Increased fall rates, Relative Risk (RR): Frequency of assists (RR= 2.9; $p=0.014$ ), no-step responses (RR = 6.2; $p=0.0012$ ), slide steps (RR = 5.9; $p=0.008$ ), and increased unloading onset times (RR = 7.2; $p=0.044$ ).
<b>Nystrom &amp; Hellstrom 2013</b>  <b>Observational Study (prospective)</b>	N/A	68 participants recruited between 1-4 days post stroke.	An assessment was completed at baseline using the Modified Motor Assessment Scale and Predict FIRST. All falls occurring on the acute	Fall rates, Predict FIRST scores, Modified Motor Assessment Scale (M-MAS) – version 99.  Predict FIRST scores	21% of participants had $\geq 1$ fall. A total of 36 falls occurred, with 72% of those falls occurring for a male patient. Majority (63.9%) of falls occurred on the unit.  Predict FIRST scores were as follows: 0 points,

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
<b>Sweden</b>			stroke unit were recorded and a call was placed after discharge to obtain if any falls occurred at home.	correlation with risk of falling (e.g., 0=2%, 1=4%, 2=9%, 3=18%, 4=33%, and 5=52%)	n=3; 1 point, n=19; 2 points, n=21; 3 points, n=18; and 4 points, n=7.  For predicting falls, the significant variables were the Predict FIRST score (OR=5.21, 95% CI = 1.10 to 24.78, p=0.038) and the M-MAS section C-E (OR=0.65, 95% CI = 0.44 to 0.95, p=0.026).
<b>Morone et al. 2014</b>  <b>Italy</b>  <b>Observational</b>	N/A	64 patients who were: able to ambulate, had hemiparesis, first-ever stroke, FAC Score 2-4, and gait deficits.	Prior to discharge (within 3 days) patients at a neurorehabilitation hospital were assessed after a 3-month neurorehabilitation program. For 1 year patients were contacted (every 2 months) for a fall count.	Fall rates, 6 meter walk test (6MWT), 10 meter walk test (10MWT) and Barthel Index (BI).	83 falls were recorded (n=32). Falls based on months (mo) after discharge were as follows: within 2 mo = 37; 2-4 mo=16; 4-6mo=8; 6-8mo=4; 8-10mo=10; and 10-12mo=8 falls.  6MWT and 10MWT significantly correlated with the number of falls (p<0.001).
<b>Said et al. 2013</b>  <b>Australia</b>  <b>Observational</b>	N/A	32 stroke patients receiving physical therapy, who could independently walk 10m were included.  Only 20 participants recorded falls during the 6-month follow-up testing.	A motion system was used to record the patient walking unobstructed (4 trials), then obstructed (8 trials) when a balsa wood obstacle was placed in front on them. A successful trial was if a patient cleared the obstacle with both limbs and maintained balance. Two groups were created: Pass or Fail (≥1 unsuccessful attempt).  Those in the second set of testing, recorded falls in a diary for 6-months.	Fall rates, Ability to complete an obstructed trial.	10 of 32 participants had ≥1 unsuccessful attempts.  Of the 20 who completed the fall diary, 7 were classified as fallers and had a fall. Those who fell were older (mean 70.4 years vs. 56.1 years, p=0.039). The fall incident rate was higher for those in the “fall group” (p=0.007).  Of those who successfully passed the trial, they had greater crossing speed (p=0.001) than the fall group.
<b>Pinto et al. 2014</b>  <b>Brazil</b>  <b>Observational</b>	N/A	150 Stroke patients (mean 13.5 months post stroke) living in the community and able to walk independently (with or without aids).	Patient demographic information was collected, as well as history of falls in past year. Medications were reviewed and assessments were completed.	Fall rates, Modified Barthel Index, National Institutes of Health Stroke Scale, Timed Up & Go (TUG)	History of falls was reported by 37% (median 2 falls). Falls occurred most often in the morning and at home.  Predictors of falls were the TUG (OR=1.035, 95% CI =1.003-1.069, p=0.034); right hemisphere lesions (OR=2.621, 95% CI= 1.196-5.740, p=0.016); and

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
<b>Schmid et al. 2013</b> <b>USA</b> <b>Cohort</b>	N/A	160 Participants had a stroke and diagnosis of hypertension.	<p>Secondary analysis of a previous study.</p> <p>Baseline data was collected through interviews, chart review, and examinations. Participants were then contacted (in-person or by telephone) and asked about fall events for 1 year.</p>	<p>Fall rates, circumstance, and consequence; modified Rankin Scale; National Institutes of Health Stroke Scale; Patient Health Questionnaire; and Generalized Anxiety Disorders</p>	<p>months since stroke (OR=1.012, 95% CI=1.002-1.021, p=0.015).</p> <p>33% reported at least one fall; 19 of the 53 reported multiple falls. 36% fell doing an activity of daily living and 70% occurred at home. 55% of those who fell sought medical attention.</p> <p>When comparing fallers to non-fallers: Fallers were more likely to be older (71 vs. 67 yr, p=0.05), Caucasian (87% vs. 69%, p=0.02), married or a couple (58% vs. 43%, p=0.07).</p> <p>Significant differences between fallers and non-fallers were: fallers were less independent on the modified Rankin Scale (70% vs. 86%, p=0.02), had lower diastolic blood pressure (p=0.01), and had a greater number of co-morbidities (3.06 vs. 2.24, p=0.03).</p>
<b>Van Swigchem et al. 2014</b> <b>Netherlands</b> <b>Observational</b>	N/A	<p>19 individuals in the chronic stroke phase and 20 able bodied age-matched controls.</p> <p>Stroke patients had FAC score of 5 and used an Ankle foot orthosis.</p>	<p>Stroke patients walked on a treadmill and had to avoid an obstacle put in front of their paretic leg (controls used left leg). 30 trials were completed.</p>	<p>Rate of successful obstacle avoidance, gait parameters (e.g., step length, duration, etc.).</p>	<p>For the stroke group, the mean success rate for the long step strategy and short step strategies were 62.9% and 29.1%, respectively.</p>

**Glossary**

RCT= Randomized Controlled Trial  
 N/A = Not Applicable  
 CA = Concealed Allocation  
 ITT = Intention to treat  
 FAC = Functional Ambulation Categories  
 OR = Odds Ratio  
 IQR = Interquartile Range  
 SMD = Standardized Mean Difference  
 CI = Confidence Interval

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