

# Feasibility of Implementing an Exercise Program in a Geriatric Assessment Unit: the SPRINT Program



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DOI:<https://doi.org/10.5770/cgj.21.311>

## ABSTRACT

### Background

An exercise program involving patients, caregivers, and professionals, entitled SPecific Retraining in INTerdisciplinarity (SPRINT), has been developed to prevent functional decline during hospitalization of older patients.

### Goal

Assess the feasibility of implementing SPRINT in the context of a Geriatric Assessment Unit (GAU).

### Methods

GAU's health-care professionals were instructed with the SPRINT. All new patients were evaluated by a physiotherapist shortly after admission to validate the eligibility criteria and allocation category of exercises. Questionnaires on physical activities were filled out by professionals, patients, and caregivers at baseline and after intervention. Quantitative and qualitative information was collected on adherence to the program.

### Results

SPRINT was applied to 19 of the 50 patients admitted during the three-month pilot study. A daily average of one exercise session per patient was performed, most frequently with a nurse (37%), physician (20%), care attendant (13%) or by the patient alone (22%). The caregivers participated only 4% of the time. Barriers and facilitators in applying SPRINT have been identified.

## Conclusions

SPRINT appears relevant and applicable within GAUs. Future studies should be conducted to assess its safety and effectiveness in preventing hospital-related functional decline.

**Key words:** feasibility study, frail elderly, Geriatric Assessment Units, functional decline prevention, exercise training

## INTRODUCTION

Studies have shown the benefits of exercise in preventing functional decline in hospitalized older patients.<sup>(1-7)</sup> However, the feasibility of introducing such interventions in a clinical program is an important issue considering the huge organizational and environmental factors involved in patient care.<sup>(4,8-11)</sup> Patients admitted in Geriatric Assessment Units (GAU) are generally aged  $\geq 80$  years, present geriatric syndromes with multi-morbidities, including major cognitive impairment and polypharmacy.<sup>(12)</sup> That frailty places them at high risk of deconditioning and increased disability during hospitalization.<sup>(13)</sup>

Physiotherapists at the Institut universitaire de gériatrie de Montréal (IUGM) developed the “SPecific Retraining in INTerdisciplinarity” (SPRINT) exercise program,<sup>(14)</sup> after Jones *et al.*<sup>(1)</sup> It consists of repetitions of motor activities prescribed after an evaluation of functional abilities ranging from chair transfer to walking. The exercises can be done at any time, without specific equipment. The program engages patients and solicits the contribution of professionals\* and caregivers who gravitate daily around them. SPRINT has never been implemented in clinical practice and very few studies have evaluated the contribution of caregivers in such interventions.<sup>(4)</sup> The main purpose of this pilot study was to assess the feasibility of implementing SPRINT in a GAU.

Evaluation of adherence to the program and identification of facilitators/barriers to participation were performed to achieve that goal.

## METHODS

### Participants

This study was approved by the Institutional Research Ethics Committee and conducted from 10/01/2014 to 01/31/2015 in the GAU (20 beds inpatient program) of IUGM. All patients not having the following exclusion criteria were eligible: length of stay < seven days, terminal phase of illness, living in a long-term care facility (LTCF), contraindication to mobilization, medically unable to maintain at least a seated position, unable to speak French or English.

### Intervention and Procedures

SPRINT consists of four exercise categories color-coded according to a level of mobility (Table 1). It covers all patients' clinical profiles. Each category, but one, proposes two exercise subtypes. Subtype 1 can be done by the patient alone or with a caregiver or professional. Subtype 2 must be done exclusively under the supervision of a professional. All GAU professionals received a 20-min group training on SPRINT prior to study. All newly admitted GAU patients were evaluated by a physiotherapist within 24–48 hrs for eligibility and allocation of a SPRINT category. If available, a visiting caregiver was identified by the patient and contacted by the research assistant to solicit his/her participation. An interview

was conducted at admission with each participant and his/her caregiver, separately, on their motivation to perform/conduct the exercises, as well as their attitude and beliefs towards physical activity. Participants were instructed to do the exercises as often as they wished. Throughout hospitalization, the number of exercise sessions performed by the participant was recorded for each SPRINT category, as well as who of the professional, caregiver or participant alone conducted each session. Reinforcement methods included visual reminders, verbal reminders to professionals, and encouragements to participants and caregivers by the physiotherapist and coaches (a registered or auxiliary nurse for day shift; a care attendant for evening shift). At discharge, the participant and caregiver were met for a post-intervention interview. At the end of study, professionals completed a questionnaire (rating-scales and open-ended questions) regarding their experience.

### Measures

The physiotherapist evaluated each participant for fear of falling, chronic pain, Berg Balance Scale,<sup>(15)</sup> Timed Up and Go test (TUG),<sup>(16)</sup> and comfortable walking speed.<sup>(17)</sup> Participants' characteristics, length of stay, and discharge destination were extracted from medical records. Modified cumulative illness rating scale for Geriatrics (CIRS-G)<sup>(18)</sup> and Mini-Mental State Examination (MMSE)<sup>(19)</sup> were administered by the treating physician. Seven activities of daily living (ADL) were evaluated by the nurse using the Functional Autonomy Measurement System (SMAF).<sup>(20)</sup> The safety of patients' rooms where the exercises were performed was evaluated using the Home Assessment of Person-Environment Interaction (HoPE).<sup>(21)</sup>

Table 1.  
Description of the SPRINT intervention

Level	Sub-Type 1 Exercises <sup>a</sup>	Sub-Type 2 Exercises <sup>a</sup>
1 (red)	Seated position (1 session = at least 3 hours/day, non-consecutive)	Not applicable
2 (orange)	Sit-to-stand transfer with use of hands (1 session = 2 sets of 12 repetitions)	Static standing balance: start holding on, then without holding on (1 session = 2 minutes)
3 (green)	Sit-to-stand transfer without use of hands (1 session = 2 sets of 12 repetitions)	Advanced static/dynamic standing balance: start holding on, then without holding on (1 session = 30 seconds). Examples: <ul style="list-style-type: none"> <li>• Movements of the head and upper extremities</li> <li>• Eyes open/eyes closed</li> <li>• Unilateral stance</li> <li>• Tandem position</li> <li>• Anterior or lateral reaching</li> </ul>
4 (blue)	Encourage the patient to walk on the unit (1 session = 5 minutes, minimum 3 times/day)	Accompany the patient in the stairs: use of railing if needed, be aware of the patient's condition to propose the right step pattern (alternated, non-alternated) (1 session = 5 minutes)

<sup>a</sup>Sub-type 1 can be done by the patient alone or in the presence of a caregiver or a professional. Sub-type 2 must be done under the supervision of a professional.

## Statistical Analyses

Quantitative data were expressed as median and interquartile range or percentage. Characteristics of the participants vs. non-participants were compared using Mann-Whitney U Test or Fisher's Exact Probability Test. SPSS Statistics® (Windows, v24.0) was used. Qualitative data were analyzed by determining the number of times an element was reported.

## RESULTS

Fifty patients were admitted to the GAU during the study. Eleven were ineligible due to mobility contraindication ( $n = 5$ ), length of stay  $\leq$  seven days ( $n=2$ ), living in a LTCF ( $n = 2$ ) or language ( $n = 2$ ). Among those eligible ( $n = 39$ ), 2 refused physiotherapy evaluation, 8 could not collaborate (neurocognitive psycho-behavioural problems), 3 had severe Parkinson's disease motor fluctuations, 7 declined participation, and 19 accepted. At admission, characteristics of participants vs. non-participants did not differ statistically (Table 2), but at discharge, more participants (89.5 vs. 60.0%;  $p = .065$ ) returned home or had shorter length of stay (25 vs. 36 days;  $p = .026$ ). Eight patients (42%) had a participating caregiver, eight (42%) did not have anyone visiting, and the other caregivers refused participation.

Patients' distribution in the SPRINT categories was: green (58%), orange (37%), blue (5%), and red (0%) (Table 3). All rooms were adequate to perform the exercises. Exercise sessions ( $n = 428$ ) were done most frequently with a nurse (37.1%), a physician (20.3%) or the participant alone (22.2%) (Table 3). Caregivers participated 4% of the time. The averaged daily number of sessions was  $0.97 \pm 0.60$  (range: 0.12 to 2.12). Exercise sessions were mainly done during the day (84%). Subtype 1 exercises (59%) were done more often than subtype 2 (41%). Two-thirds of professionals reported having "always" or "most of the time" recorded the exercise sessions done with participants.

Presence of a professional during the exercises was the facilitating factor most reported (44%) by participants. Seventy-five per cent of patients and 33% of caregivers enjoyed performing the SPRINT. Seventy-two per cent of professionals appreciated regular reminders to apply the SPRINT. Poor balance was the barrier most frequently reported (55%) by participants. Pain (18%), weakness in the legs (18%), and avoiding tiredness before physiotherapy (9%) were also reported. Caregivers indicated that their main difficulty was the patient refusing to do the exercises with them, preferring to do it alone (50%). Difficulties most frequently reported by professionals were lack of time due to heavy workload (50%) and lack of collaboration/motivation from patients (21%).

At discharge, all professionals and 60% of participants agreed that SPRINT helps patients maintain functional abilities in ADLs and general well-being.

## DISCUSSION

Our data show that as many as one-third of newly admitted GAU patients were successfully enrolled in the program. This is in line with a systematic review having reported that 14 to 48% of seniors admitted to acute-care hospitals accept participation to early physical rehabilitation programs, while 3 to 19% refused.<sup>(4)</sup>

As adherence is key to any therapy, factors affecting it, as well as solutions, should be identified. Exercise sessions were not recorded systematically, which certainly underestimated adherence. In addition, most patients preferred doing the exercises every other day or on days when they did not have physiotherapy. This is in line with data showing that some patients could complete only one of the two daily sessions planned or that exercises had to be performed in shorter (15 min) more frequent sessions (4×/day).<sup>(1)</sup> On the other hand, some participants did subtype 2 exercises alone, although not recommended, suggesting that the instructions were not well understood. These results stress the importance of optimizing the program for each patient, as well as thoroughly explaining and reinforcing its application to all concerned. To increase adherence, it is also important to attenuate the barriers identified, and thus optimize pain control and reduce fear of falling due to poor balance, by teaching patients how to exercise safely. Furthermore, some patients suggested doing SPRINT in groups, at fixed hours, which could increase motivation and participation.<sup>(22)</sup>

Adherence of caregivers was mitigated because fewer than half of participants had one, and some patients refused to do the exercises in their presence. This suggests that involving people not related to patients, such as volunteers rather than caregivers, could potentially be beneficial to the application of SPRINT.

Adherence of professionals was greater for nurses and physicians, likely because they are more routinely involved with patients on a daily basis. Non-participating professionals acknowledged the usefulness of SPRINT in preventing physical deconditioning of patients, but failed to integrate it into their routine work arguing uneasiness or lack of time. A solution may reside in the enhancement of a culture of increased mobility for patients by the head of each unit, who is ultimately responsible for ensuring quality control of clinical practices. Making SPRINT part of the patient's therapy within the GAU could be a step in that direction.

A study limitation is that it involved only one site, and it did not compare SPRINT to another program for preventing deconditioning. However, evaluating the effectiveness of SPRINT was not an objective in this pilot study. Another limitation is that SPRINT's safety could not be addressed, as statistics on total number of falls incurred in the GAU during the study were not available for comparison with a non-intervention period. Future studies should address this issue. Finally, the recruitment was made on a voluntary basis which may have led to favouring certain types of participants

Table 2.  
Comparison between the SPRINT participants and non-participants at admission and discharge

<i>Characteristic<sup>a</sup></i>	<i>Participants (n = 19)</i>	<i>Non-participants (n = 20)</i>	<i>p-value</i>
<b>Sociodemographic</b>			
Age, years	77.5 (73.6–87.3)	82.8 (78.8–85.3)	.465
Women, %	52.6	60.0	.751
Living at home, %	78.9	60.0	.301
Visiting caregiver at the hospital, %	47.4	50.0	1.0
<b>Clinical State at Admission</b>			
Body mass index, kg/m <sup>2</sup>	25.9 (21.9–30.2)	23.8 (21.0–29.7)	.653
Number of prescribed drugs	10.0 (7.0–12.0)	10.5 (7.0–12.0)	.799
Mini-Mental State Examination score <sup>b</sup>	28.0 (23.8–29.0)	25.0 (22.0–29.0)	.471
CIRS-G score <sup>c</sup>	32.0 (27.0–35.0)	31.0 (28.0–34.8)	.921
SMAF-ADL score <sup>d</sup>	-2.0 (-7.5– 0.0)	-4.0 (-11.0– -1.0)	.140
Fear of falling, %	26.3	20.0	.716
Chronic pain, %	68.4	50.0	.333
Berg Balance Scale score <sup>e</sup>	47.0 (35.0–51.5)	43.0 (34.8–48.8)	.530
Timed Up and Go score <sup>f</sup> , seconds	17.0 (12.5–30.0)	20.0 (15.9–30.0)	.482
Walking speed score <sup>g</sup> , m/second	0.60 (0.41–0.76)	0.55 (0.40–0.75)	.857
Principal diagnosis (%)			n.a.
Diseases of the nervous system	47.4	65.0	
Mental and behavioral disorders	5.3	15.0	
Diseases of the musculoskeletal system	36.8	15.0	
Others	10.5	5.0	
<b>At Discharge</b>			
Length of stay, days	25.0 (21.0–37.0)	36.0 (29.0–46.5)	.026
Discharge destination (% home )	89.5	60.0	.065

<sup>a</sup> Values are presented as median (interquartile range) or percentage.

<sup>b</sup> Score range from 0 to 30, 30 being normal cognitive state.

<sup>c</sup> Score range from 0 to 56, 56 being the worst theoretically clinical state condition with all system failures.

<sup>d</sup> Score range from 0 to -21, -21 being total dependency for ADL.

<sup>e</sup> Score range from 0 to 56, 56 being good balance function with low fall risk.

<sup>f</sup> A score > 14 is an indicator of a risk of fall.

<sup>g</sup> A score < 0.70 is an indicator of a risk of fall and a score < 0.60 is an indicator of morbidity.

CIRS-G = modified cumulative illness rating scale for Geriatrics; SMAF = Functional Autonomy Measurement System instrument; ADL = Activity daily living; n.a. = non-applicable.

(e.g., red-coded category, n = 0). In spite of these limitations, the fact that the team elected to pursue SPRINT as a regular intervention after the study was over is an indication of its appreciation and potential benefits.

## CONCLUSION

SPRINT appears viable and applicable for a considerable proportion of patients admitted to GAUs. Increasing adherence to the program, and assessing its safety and effectiveness in future studies, may reveal its full potential in preventing functional decline.

## ACKNOWLEDGEMENTS

The authors wish to thank the staff from the IUGM's Geriatric Assessment Unit, as well as all participants and their families, for their generous contribution to this project. This study was supported by a research grant from the Comité avisier pour la recherche clinique (CAREC) at the Institut universitaire de gériatrie de Montréal (IUGM).

## CONFLICT OF INTEREST DISCLOSURES

The authors declare that no conflicts of interest exist.

Table 3.  
Participation to the SPRINT intervention

SPRINT Category (n)	Orange (7)		Green (11)		Blue (1)		TOTAL	% of total
	Exercise Sub-type <sup>a</sup>							
	1	2	1	2	1	2		
<i>Exercise Participants</i>	<i>Number of Exercise Sessions</i>							
Day shift registered or auxiliary nurse	23	26	44	39	1	0	133	37.1
Night shift registered or auxiliary nurse	9	8	4	4	1	0	26	
Patient alone (day)	17	20	44	9	1	0	91	22.2
Patient alone (night)	0	0	4	0	0	0	4	
Physician	22	25	28	12	0	0	87	20.3
Day shift care attendant	2	1	7	6	0	0	16	12.6
Night shift care attendant	17	18	1	2	0	0	38	
Caregivers (day)	1	1	13	1	0	0	16	4.2
Caregivers (night)	0	0	1	1	0	0	2	
Neuropsychologist	0	0	6	0	3	0	9	2.1
Physiotherapist	1	1	1	1	0	0	4	0.9
Dietician	1	1	0	0	0	0	2	0.5
<b>TOTAL</b>	<b>93</b>	<b>101</b>	<b>152</b>	<b>75</b>	<b>6</b>	<b>0</b>	<b>428</b>	<b>100</b>

<sup>a</sup>Sub-type 1 exercises can be done by the patient alone or in the presence of a caregiver or a professional. Sub-type 2 exercises must be done under the supervision of a professional.

\*The term “professional” is used to indicate “health-care professional” throughout the text.

## REFERENCES

- Jones CT, Lowe AJ, MacGregor L, et al. A randomised controlled trial of an exercise intervention to reduce functional decline and health service utilisation in the hospitalised elderly. *Austral J Ageing*. 2006;25(3):126–33.
- Martínez-Velilla N, Casas-Herrero A, Zambom-Ferraresi F, et al. Functional and cognitive impairment prevention through early physical activity for geriatric hospitalized patients: study protocol for a randomized controlled trial. *BMC Geriatr*. 2015;15(1):1–9.
- Tucker D, Molsberger SC, Clark A. Walking for wellness: a collaborative program to maintain mobility in hospitalized older adults. *Geriatr Nurs*. 2004;25(4):242–45. Epub 2004/08/18.
- Kosse NM, Dutmer AL, Dasenbrock L, et al. Effectiveness and feasibility of early physical rehabilitation programs for geriatric hospitalized patients: a systematic review. *BMC Geriatr*. 2013;13(1):107. Epub 2013/10/12.
- De Morton NA, Jones CT, Keating JL, et al. The effect of exercise on outcomes for hospitalised older acute medical patients: an individual patient data meta-analysis. *Age Ageing*. 2007;36(2):219–22. Epub 2006/12/22.
- Nolan J, Thomas S. Targeted individual exercise programmes for older medical patients are feasible, and may change hospital and patient outcomes: a service improvement project. *BMC Health Serv Res*. 2008;8:250. Epub 2008/12/11.
- Zisberg A, Shadmi E, Sinoff G, et al. Low mobility during hospitalization and functional decline in older adults. *J Am Geriatr Soc*. 2011;59(2):266–73. Epub 2011/02/15.
- So C, Pierluissi E. Attitudes and expectations regarding exercise in the hospital of hospitalized older adults: a qualitative study. *J Am Geriatr Soc*. 2012;60(4):713–18. Epub 2012/03/21.
- Brown CJ, Williams BR, Woodby LL, et al. Barriers to mobility during hospitalization from the perspectives of older patients and their nurses and physicians. *J Hosp Med*. 2007;2(5):305–13. Epub 2007/10/16.
- Moore JE, Mascarenhas A, Marquez C, et al. Mapping barriers and intervention activities to behaviour change theory for Mobilization of Vulnerable Elders in Ontario (MOVE ON), a multi-site implementation intervention in acute care hospitals. *Implement Sci*. 2014;9:160. Epub 2014/01/01.
- Liu B, Almaawi U, Moore JE, et al. Evaluation of a multisite educational intervention to improve mobilization of older patients in hospital: protocol for Mobilization of Vulnerable Elders in Ontario (MOVE ON). *Implement Sci*. 2013;8(1):76. Epub 2013/07/05.
- Latour J, Lebel P, Leclerc BS, et al. Short-term geriatric assessment units: 30 years later. *BMC Geriatr*. 2010;10(1):41. Epub 2010/06/24.
- Sager MA, Rudberg MA, Jalaluddin M, et al. Hospital admission risk profile (HARP): identifying older patients at risk for

- functional decline following acute medical illness and hospitalization. *J Am Geriatr Soc.* 1996;44(3):251–57.
14. Juneau A, Côté MM, Dubé F, et al. *The SPRINT retraining protocol*. Montréal QC: Institut universitaire de gériatrie de Montréal; 2014. Available from: [https://physioimpact.files.wordpress.com/2014/07/iugm\\_sprint\\_retraining\\_protocole.pdf](https://physioimpact.files.wordpress.com/2014/07/iugm_sprint_retraining_protocole.pdf). Accessed on 21 August 2017.
  15. Berg KO, Wood-Dauphinee SL, Williams JI, et al. Measuring balance in the elderly: validation of an instrument. *Can J Public Health.* 1992;83 (Suppl 2):S7–S11.
  16. Bohannon RW. Reference values for the Timed Up and Go test: a descriptive meta-analysis. *J Geriatr Phys Ther.* 2006;29(2):64–68. Epub 2006/08/18.
  17. Bohannon RW. Comfortable and maximum walking speed of adults aged 20-79 years: reference values and determinants. *Age Ageing.* 1997;26(1):15–19. Epub 1997/01/01.
  18. Salvi F, Miller MD, Towers AL, et al. Guidelines for scoring the Modified Cumulative Illness Rating Scale. *J Am Geriatr Soc.* 2008;56(10):Appendix S1.
  19. Folstein MF, Folstein SE, McHugh PR. “Mini-mental state”. A practical method for grading the cognitive state of patients for the clinician. *J Psychiatr Res.* 1975;12(3):189–98. Epub 1975/11/01.
  20. Hebert R, Carrier R, Bilodeau A. The Functional Autonomy Measurement System (SMAF): description and validation of an instrument for the measurement of handicaps. *Age Ageing.* 1988;17(5):293–302. Epub 1988/09/01.
  21. Rousseau J, Potvin L, Dutil E, et al. Home Assessment of Person-Environment Interaction (HoPE): content validation process. *Occup Ther Health Care.* 2013;27(4):289–307. Epub 2013/10/10.
  22. Picorelli AM, Pereira LS, Pereira DS, et al. Adherence to exercise programs for older people is influenced by program characteristics and personal factors: a systematic review. *J Physiother.* 2014;60(3):151–56.
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