



WellSpring

Sharing physical activity knowledge

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Reducing prolonged sedentary behaviour after a stroke:

STand Up Frequently From Stroke (STUFFS)

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Introduction

Stroke is a leading cause of adult disability globally. In Canada, about 405,000 individuals live with the effects of stroke.¹ This number is projected to rise by over 60% in the next two decades.¹ Survivors of stroke are often physically inactive (i.e., do not meet recommended guidelines) and sedentary (i.e., prolonged periods of sitting, lying, or reclining with low energy expenditure) which may increase their risk of having secondary health conditions.²

Due to stroke-related challenges with walking and generally moving around, moving fast enough to attain moderate-to-vigorous intensity physical activity targets may be challenging for many stroke survivors. Reducing prolonged sedentary behaviour by frequently standing and taking steps throughout waking hours may be a feasible and sustainable alternative, as a first step to improving activity behaviour and mitigating the risks associated with prolonged sedentary behaviours after a stroke. The relationship between activity behaviour and health benefits is curvilinear, such that marked improvements in outcomes may be observed by simply becoming more active.³

Why should stroke survivors reduce sedentary behaviour?

In the general population, prolonged sedentary behaviour is associated with decreased glucose uptake from the blood, type 2 diabetes mellitus, and metabolic syndrome.⁴ Moreover, there is strong, consistent evidence of the detrimental association between sedentary behaviour and all-cause mortality.⁵ More recent evidence suggests that spending 10 or more hours per day being sedentary increases the risk for adverse cardiovascular events.⁶ There is also an association between prolonged sedentary behaviours and greater risk of blood clots in the legs — and those clots can have life-threatening consequences.⁷

S U M M A R Y

Individuals who have experienced a stroke often face physical challenges with walking and general movement. This can lead to prolonged periods of sedentary behaviour during the months post-stroke.

This WellSpring highlights the benefits and importance of interrupting sedentary behaviour with bouts of physical activity to reduce the risk of developing health-related issues and support steps towards recovery.

Within the first month of experiencing a stroke, survivors are sedentary for about 95% of the day.⁸ In the subacute period (between 1 to 6 months post-stroke), activity levels improve (on average), but survivors of stroke are sedentary for 80-83% of the day.^{9,10} Our study with individuals who went through inpatient stroke rehabilitation showed that one month after discharge from rehabilitation, participants were sedentary for 11.2 hours (75%) of 15 waking hours.¹¹ This is higher than the 9 hours per day reported in population-based studies with healthy older adults aged 60 years or older.^{12,13}

For people with limited mobility, such as after a stroke, there is evidence that every increase of about 30 minutes per day spent sedentary is associated with a 1% increase in myocardial infarction or death from coronary heart disease.¹⁴ Also, prolonged sedentary behaviour is associated with a higher rate of major mobility disability (defined as loss of the ability to walk 400 metres) and sustained major mobility disability in adults with limited mobility.¹⁵



In our study, individuals were sedentary for 75% of their day (11.2 out of 15 waking hours), one month after discharge from rehabilitation.

Monitoring how much we sit or move around every day?

An understanding of daily physical activity or sedentary behaviour levels is important. Lack of awareness of how much time is spent sedentary, along with the potential health consequences associated with prolonged sedentary behaviours, may result in little or no motivation to change these behaviours.

Activity monitoring provides a mechanism to quantify sedentary and activity behaviours. While some research-grade activity monitors provide accurate measures of sedentary or physical activity levels, such devices are not often user-friendly. Consumer-based activity tracking devices (e.g., Fitbit, Garmin, Jawbone, etc.), smart watches (e.g., Apple Watch, Galaxy Gear, Samsung Gear, etc.), phone applications (e.g., Apple Health, Samsung Health, Google Fit, Moves, etc.), and step pedometers may provide some information and are more user-friendly, however, their accuracy for people with limited mobility is still being investigated.

Interrupting prolonged sedentary time

There is evidence from studies with healthy adults that frequent interruption in sedentary time, even just standing up and walking around regularly, is beneficially associated with health outcomes.¹⁶ Studies have shown that light-intensity physical activity is strongly inversely correlated with sedentary behaviour, such that increasing light-intensity activity decreases sedentary behaviour.¹⁷

There is some evidence that light-intensity physical activity provides a sufficient stimulus to improve blood lipids and glucose metabolism in older adults.¹⁸ An increase of 60 minutes per day of light-intensity physical activity is associated with a 14% reduced risk of all-cause mortality in people with limited mobility.¹⁹ Unfortunately, increasing only exercise levels (i.e., structured moderate-to-vigorous intensity physical activity) does not substantially reduce sedentary behaviour.^{20,21} Messaging around improving activity behaviour should include "Sit Less and Move More."

How much should people sit or move after a stroke?

While there is not enough evidence on the optimal sitting time per day, prolonged bouts of sitting are not recommended. There is evidence that short, non-intense, and frequent out-of-bed movement in the week after a stroke is associated with favourable outcomes.²² For those who are able, it is generally safe to engage in moderate intensity activity beginning two weeks after having a stroke.²³ An initial target level of 6,000 steps per day is suggested for survivors of stroke to prevent new vascular events.²⁴

For people who have survived a stroke, new thinking is needed on more effective ways to reduce prolonged sedentary behaviour. With large amounts of sedentary time and low involvement in moderate intensity activity, survivors may uniquely benefit from increasing light intensity activity.²⁵

Increasing upright time (standing and taking steps), which breaks up sedentary time, is an important activity that also improves general mobility. Light-intensity physical activity also contributes to overall daily energy expenditure and has potential health benefits. At the same time, engaging in and increasing light-intensity activity can support the transition into moderate-to-vigorous activities.^{3,26,27}



An initial target level of 6,000 steps per day is suggested for survivors of stroke.

STand Up Frequently From Stroke (STUFFS) program

Our research team developed the STand Up Frequently From Stroke (STUFFS) program to test this new approach of increasing light-intensity activity throughout the whole day while reducing sitting time. The goals of the STUFFS program include knowledge provision on the negative effects of prolonged sedentary behaviour, self-monitoring of activity, and working with survivors of stroke to build self-confidence to move more.²⁸

An initial component of the STUFFS program was baseline objective monitoring of usual activity behaviour. The output obtained from usual activity behaviour monitoring was used to develop action plans targeting areas of high sedentary behaviour throughout the day. A consumer-based activity tracker was used by participants to self-monitor their activity and receive real-time feedback for eight weeks.

Participants were instructed to break up prolonged sitting by moving around for five minutes every half-hour, walking around during television commercial breaks, and completing 2 sets of 10 sit-to-stand transitions three times per day.

ABOUT THE AUTHORS



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Patricia Manns, PT, PhD, is a Professor and Associate Dean of Graduate Studies in the Faculty of Rehabilitation Medicine at the University of Alberta. She works with people who had a stroke, to find ways to optimize health and quality of life.

Although the change in volume of standing and stepping was not statistically different over time, preliminary results showed that the program was well accepted and resulted in reduction of sedentary behaviour by about an hour. It is currently unknown if a reduction of one hour in sedentary time is clinically significant after a stroke.

Supporting reduction of prolonged sedentary behaviours after a stroke

Our findings show that upon leaving the hospital, stroke survivors have a mindset that they are going home to rest and recuperate. Here are some tips for encouraging them to be more active:

For practitioners

- During the transition and prior to discharge, practitioners should emphasize the importance of activity as well as strategies to maintain activity while at home. There should be a good balance between sleep, activity, and rest.
- Messaging around improving activity behaviour should include “sit less and move more”.
- Increasing the frequency of breaks in sedentary time is also important and may help to improve functioning. Encourage patients to get up and take steps at frequent intervals.

For survivors of stroke

- Plan to regularly get up and move around at frequent intervals throughout the day (e.g. every half-hour for 5 or more minutes).
- If you watch TV, walk around during advertisements.
- Keep the remote near the television as this may encourage getting up to change the channels or adjust the volume.
- Use a device (alarm or activity tracker) as a reminder to get up at frequent intervals, as well as to monitor (activity tracker) your daily activity and any change over time.
- Use appropriate walking aids to move safely and protect against falls, since fear of falls can be a barrier to reducing sedentary behaviours.

Reducing prolonged sedentary behaviour means intervening to frequently interrupt sedentary time, as a means to reduce overall sedentary time and to increase light-intensity physical activity. It is part of a whole-day approach to activity promotion and does not preclude inclusion of moderate-intensity activities, where possible. Working with stroke survivors to reduce sedentary behaviour by breaking up sedentary time may more readily lead to behaviour change that is sustainable and can be built on as appropriate.

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