Physical Activity and Workplace Sedentary Behaviour

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Sedentary behaviour, or too much sitting, is increasingly recognized as a serious contributor to poor health outcomes.^{1,2} Research evidence is rapidly emerging on the contributing role of our increasingly sedentary lifestyle on morbidity³ and mortality.¹ Growing up in the 1960s and 1970s, I looked forward to an environment filled with automation. There was an idea that we would have little physical labour to do and more time to think and create. While this was an exciting period, I am not sure we really thought this through. So here we are in 2011, and the dreams of automation have been realized—but this efficiency has come at a price. In the often-quoted words of Dr. Steven Blair, “we have engineered energy expenditure out of our lives.”⁴ This loss of light activity may be a significant contributor to our increasing obesity rates in North America and in other countries around the world.^{5,6}

My background and training is in physiotherapy, specifically physical activity and the promotion of active lifestyles. Over the past few years, however, I have transitioned from practising physiotherapist to academic faculty member. This transition has led to a significant reduction in my own workplace activity. Although my focus remains in the area of increasing physical activity, I began to recognize that the more I studied physical activity, the less active I became. At the same time, I was cognizant that despite best evidence, and our best efforts, it remains a challenge for people to take up and adhere to an active lifestyle. My research focus therefore expanded to increasing physical activity *and* ways to reduce sedentary behaviour, or sitting time. This expanded focus, in turn, forced me to re-evaluate my own life: I had always aimed to meet physical activity guidelines, but I was beginning to think I was one of those “active couch potatoes” spending hours in front of a computer screen. Importantly, emerging literature highlights the fact that even if we are active enough to meet physical activity guidelines, there may be negative health consequences if we sit the rest of the day.⁷

In the midst of preparing for a lengthy grant submission (ironically, on the topic of reducing sedentary behaviour), I was also testing out some new accelerometers purchased to objectively describe physical activity

and sedentary behaviour patterns. As per my normal protocol, I wore the accelerometer for a week to better understand the data output and determine its full capacity and application. I was quite surprised, on receiving my results, to find that, indeed, on some days that I was not walking more than 3,000–4,000 steps. Thus began an experiment to examine my own patterns of physical activity and sedentary behaviour.

Since January 2010 I have captured my step count with a pedometer and my hours worked on a daily basis in a spreadsheet. My job involves collecting data, so tracking my own activity patterns and work hours was not difficult. Over the course of 20 months I monitored how active or sedentary I was to determine whether there was any association between my physical activity and my work hours. I deliberately chose to use a pedometer rather than an accelerometer to track my activity patterns, for two reasons: the lower cost and ease of pedometer use, and the immediate feedback I received.

Wearing a pedometer every day for 20 months has been less challenging than I initially anticipated. Figure 1 charts my average step count versus my average work hours per day. I was not particularly surprised to see that I was active all year long; my own experience collecting data from this region of Canada suggested that there is little seasonal variation in moderate to vigorous physical activity⁸ for healthy community-dwelling older women, although we did find a difference in sedentary time between summer and winter.⁹ But there were clear patterns that emerged in the relationship between my work seasons and my physical activity. The noticeable dip in walking seen in Figure 1 corresponds to a period of increased work (and sitting) accumulated around submission of grant applications. In this case study, there was indeed a statistically significant correlation between step count and work hours ($r = -0.355$, $p < 0.0001$). However, the limitation of using a pedometer rather than an accelerometer for this exploration was that I did not directly capture my sitting time.

As my understanding of the literature on sedentary behaviour increased, I tried to add light activity throughout my day in order to sit less. For example, I developed a routine of taking the stairs while at work and taking

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Figure 1 Summary highlighting the average number of steps and the average daily work minutes over 20 months. The horizontal line indicates 10,000 steps.

frequent breaks from the computer. Based on available evidence,¹⁰ it is important to have frequent postural transitions throughout the day, rather than just sitting or standing all the time. So, despite having a standing desk, I do not stand all the time but, rather, alternate between sitting and standing. I also try to increase my workplace activity in other ways—walking meetings, walking to a printer farther away, taking the stairs rather than an elevator, walking to see a colleague rather than sending an e-mail. In this area, however, more empirical evidence is needed to provide specific guidance on best practice for how long to sit before getting up, not only for cardio-metabolic health but also for musculoskeletal health and productivity.

I believe that my behaviour change may also have had an impact on some of my colleagues. Since moving into a new activity-permissive building, I have an office very close to the elevator. Colleagues have commented on whether I might have been placed there strategically to try to dissuade people from using the elevator; sometimes when people see me, they start taking the stairs rather than using the elevator. I have noticed that several colleagues in my group have also started to wear a pedometer, and we give updates on how many steps we are at during the day. My colleagues and I often joke that perhaps now I am an intervention; that is, when people

see me they are more physically active. I think I can live with this—unless, of course, it means that people are running away from me.

For the moment, my plan is to keep up this journey of tracking my activity patterns. I have resolved to think of it like writing a diary, only a more interactive journal. As I realize that I am able to incorporate more activity into my day, I am now trying to incorporate more moderate to vigorous physical activity throughout my week. I support the idea that it is a two-step message that we need to deliver—“move more and sit less!”¹¹

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L'activité physique et la sédentarité dans les milieux de travail

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La sédentarité, ou le fait de demeurer trop longtemps assis, est de plus en plus reconnu comme un facteur qui contribue grandement à un piètre état de santé^{1,2}. Des données de recherche sont de plus en plus nombreuses à faire état du rôle d'un mode de vie sédentaire sur la morbidité³ et sur la mortalité¹. J'ai grandi dans les années 60 et 70, à une époque où l'on rêvait d'un environnement où tout serait automatisé. Nous avions alors une idée de l'avenir où nous aurions peu de travail physique à faire, et plus de temps pour réfléchir et pour créer. Bien que cette époque ait été pour le moins stimulante, je ne suis pas certaine que ces réflexions étaient bien approfondies. Alors nous voilà en 2011, et nos rêves d'automatisation se sont matérialisés – mais cette efficacité a un prix. Pour citer le Dr Steven Blair, qui l'a été plus souvent qu'à son tour, « nous avons fait en sorte d'éliminer la dépense d'énergie de nos vies »⁴. Cette perte des activités légères du quotidien peut être un facteur important qui explique la hausse du taux d'obésité en Amérique du Nord et dans d'autres pays du monde^{5,6}.

Mon expérience et ma formation sont dans le domaine de la physiothérapie, particulièrement l'activité physique et la promotion d'un mode de vie actif. Au cours des dernières années, toutefois, je suis passée de la pratique de physiothérapeute à membre universitaire d'une faculté. Cette transition a donné lieu à une réduction importante de mes propres activités en milieu de travail. Même si je continue à me concentrer sur l'augmentation de l'activité physique, je commence à réaliser que plus j'étudie l'activité physique, moins j'en fais. Du

même coup, j'ai pu constater que, malgré les meilleurs éléments probants et en dépit de tous nos efforts, adopter un mode de vie actif et continuer de l'être constitue un défi pour bien des gens. Ma recherche est donc axée sur l'augmentation de l'activité physique *et* sur des moyens de réduire les comportements sédentaires, ou le temps passé à rester assis. Ce champ d'intérêt plus large m'a toutefois forcée à réévaluer ma propre vie : j'ai toujours cherché à satisfaire les lignes directrices en matière d'activité physique, mais je commençais à croire que j'étais peut-être devenue moi aussi l'un des millions d'êtres humains à passer des heures assis devant un écran d'ordinateur. De plus, la littérature récente vient souligner le fait que même si nous sommes suffisamment actifs pour satisfaire les lignes directrices en matière d'activité physique, il risque d'y avoir des conséquences négatives pour la santé dû au fait de rester assis le reste de la journée⁷.

Alors que j'étais en train de préparer une longue demande de subvention de recherche (justement, pour approfondir la question de la réduction des comportements sédentaires), j'ai eu l'occasion de tester de nouveaux accéléromètres achetés dans le but de décrire objectivement les modèles d'activité physique et de comportement sédentaire. Comme je le fais habituellement dans le cadre de mes protocoles de recherche, j'ai porté l'un de ces accéléromètres pendant une semaine afin de mieux comprendre les données saisies et d'évaluer toutes les possibilités et les applications de cet appareil. J'ai été plutôt étonnée, en recevant mes résultats, de constater qu'il m'arrivait, certains jours, de ne pas marcher plus de 3 000

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