

Sitting and health: The emerging evidence and potential solutions

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In the last issue of Agility, we introduced you to the potential detrimental effects of prolonged sitting to health and asked you to review your practice and reflect on whether you were giving a consistent message to all your older patients that they need to

move more often. Here we discuss the emerging research evidence and suggest potential opportunities to intervene and help older people get active.

Sedentary Behaviour Definition: Any waking activity characterized by an energy expenditure ≤ 1.5 METs, and a sitting or reclining posture.

Sedentary Behaviour Network, 2012

Emerging health risks

Physical inactivity is the fourth leading cause of death worldwide. Inactivity is defined as not meeting the physical activity guidelines for health (150 minutes of moderate physical activity a week). However, the 2011 Chief Medical Officer's (CMO) guidelines for physical activity and health include (for adults and older adults) a recommendation to break up prolonged periods of sitting (Department of Health, 2011). Sedentary behaviour is a pattern of behaviour distinct from inactivity and its effects on health are noticeable even if people reach physical activity recommendations (Owen et al., 2009). For example, older adults who are sedentary have a 42% increased risk of all-cause mortality, but older adults who are sedentary and physically inactive have a 127% increased risk of all-cause mortality (Martinez-Gomez et al., 2013).

"All Older adults should minimise the amount of time spent being sedentary (sitting) for extended periods"

CMO: Start Active, Stay Active 2011

Sedentary Behaviour has been linked to frailty, mortality and chronic health problems, and is also likely to affect function, quality of life and social inclusion (de Rezende et al., 2014).

In the general population (adults >18 years old), high levels of sedentary behaviour are associated with (Wilmot et al., 2012; Schmid & Leitzmann, 2014):

- 112% increased risk of diabetes
- 147% increased risk of a cardiovascular event
- 90% increased risk of cardiovascular mortality
- 49% increased risk of all-cause mortality
- 28% increased risk of colon cancer
- 36% increased risk of endometrial cancer and
- 21% increased risk of lung cancer

Less is known about the effects of sedentary behaviour in older adults (>60 years old), but those who are sedentary are twice as likely to have high blood pressure, a high cholesterol ratio and metabolic syndrome and almost four times more likely to have a high waist:hip ratio (Gao et al., 2007). Time spent watching TV is a good self report indicator of sedentary time and one study has shown that each additional hour of TV watching a day is associated with a 19% increased likelihood of metabolic syndrome (Diabetes) (Gao et al., 2007). There are also strong relationships with higher plasma glucose and body mass index (Gennuso et al., 2013), reduced muscle strength (Skelton et al., 1997) and reduced bone density (Chastin et al., 2014). Not unexpectedly, sedentary behaviour is also linked to musculoskeletal pain and can affect quality of life, social inclusion and engagement (WHO, 2010).

There is a dose response relationship between sedentary behaviour and health, with the risk of death rising markedly with percentage of sitting time in the day (Katzmarzyk et al., 2009) (Figure 1).

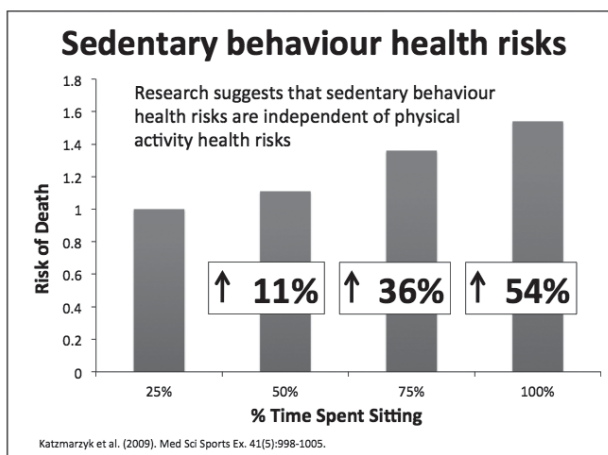


Figure 1: Dose relationship between percentage of day sitting time and percentage risk of death.

Older adults are the most sedentary sector of the population, spending on average 80% of their waking day (8-12 hours) in sedentary activities (Harvey et al., 2013). Interestingly, self-report of sedentary behaviour vastly underestimates objectively measured (with accelerometers) sedentary behaviour (Harvey et al., 2014) as most people do not think about all the activities that involve sitting. There are many contexts for sitting, including eating, self-care activities, social activities, travel, leisure activities such as reading and of course screen based activities (TV, computer). In order to further understand the contexts and reasons for sitting, an innovative “folksonomy” is using tagged photographs of sedentary behaviour to build up a wider view and link to a published consensus on the taxonomy and domains of sedentary behaviour (Chastin et al., 2013).

Many older people, and indeed many of us, feel they are active if they manage 30 minutes of moderate physical activity on 5 days of the week. But what are they doing the rest of the day? (Figure 2).

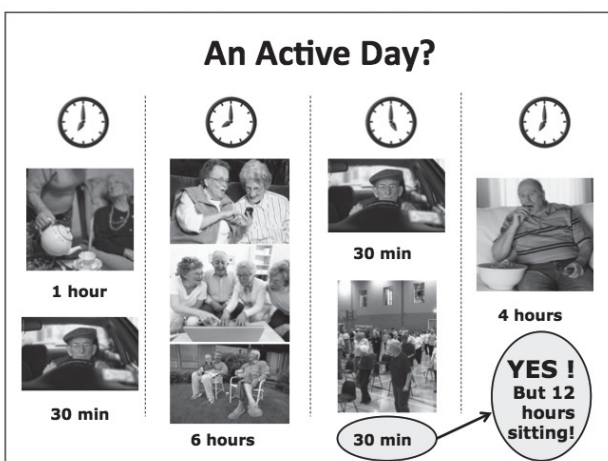


Figure 2: An active day or a day full of sitting?

We know that inactivity is one of the many risk factors for falls. Another concern for increased falls risk is the recent research suggesting that older people sitting in a cold room (15°C) for just 45 minutes can lead to a loss of muscle power in the region of 5%, a 10% reduction in sit to stand speed, reduced quadriceps strength and slower walking speed (Lindemann et al., 2014a). Similarly, sitting for 45 minutes in a hot room (30°C) for the same amount of time can also have potential falls risk effects by reducing blood pressure and walking speed, and increasing the risk of orthostatic hypotension (Stotz et al., 2014).

Still so many unanswered questions

As yet, we know little about how long is too long to sit! More work is needed on acute effects of sitting in normal temperatures and whether increased age or certain medical conditions alter the effects. We also know little about the determinants of sedentary behavior, although some are rather obvious, such as poor lower limb strength and function, depression and increasing age. If self report is so low compared to objective report, how should we best ask the questions on sitting in large health surveys or research studies so we get the most accurate representation as it is unlikely that any such surveys will use more expensive objective monitors on a regular basis. Are certain people more likely to underreport? Are certain people more likely to be sedentary in later life, how do past individual, social and environmental factors affect sedentary behaviour now? Can we predict who these are and maybe intervene at an earlier stage in order to help change behaviour? What can older people tell us about their views of sitting and what might help them break up long periods of sitting?



Glasgow Caledonian University, along with the Universities of Edinburgh, Glasgow, Birmingham and

Salford, are involved in a large MRC funded study called Seniors: USP – Understanding Sedentary Patterns, where we hope to be able to answer some of these questions. 750 older people in two separate cohorts in Edinburgh and Glasgow, who have previously been characterized extensively, will have their sedentary behaviour monitored for a week with an ActivPal (Pal Technologies ©) and will complete self report questions at intervals over that week. Previously collected information on them, including IQ, education, physical and mental health, personality, brain scans and deprivation will be considered against their current levels of activity. A purposeful sample of those who sit most and sit less will be interviewed about their beliefs, views and perceptions of sitting and asked how we might best help them break up long periods of sitting and reduce sitting time. Find out more by visiting www.gcu.ac.uk/seniorsusp and you can listen to a free ‘webinar’ on the issues.

So what opportunities are there to intervene?

As highlighted in the last issue of Agility, patients in hospital are particularly sedentary, on average, patients were in an upright position for only 70 (\pm 50) min. per day, with 70% of this time spent in standing or walking epochs of less than 5 minutes (Grant et al., 2010) – and this was in a rehabilitation ward. Stroke patients spend 66-94% of their day sitting (Kunkel et al. 2014, English et al., 2014). So the first opportunity to get the message across is in the hospital setting and with patients in rehabilitation. In community dwelling older people, 70% of their sitting is at home, 47% in the afternoon and 57% are alone (Leask et al., 2014). 49% are sitting doing leisure activities (such as reading, knitting, crosswords, bingo) and it is unlikely that we will be able to intervene in these periods (Leask et al., 2014). Therefore we may need different strategies to encourage moving more often at different times of the day and individualise the message.

Older people say that they sit for a variety of reasons, such as relaxation, leisure, pain management and managing energy levels. On the other hand, pain and stiffness are mediators to moving more regularly for some people. We must not demonize sitting, instead we must find the right message that will motivate people to find the right time in the day for them to break up prolonged periods of sitting, or sit less. For a start we want older people to have strong thigh muscles. These are important, not just to ensure people can transfer easily, but to live independently and help maintain core temperature, there is also a strong relationship between chair rise ability (use of hands to rise) and all cause mortality (taking into account age, body mass index and gender) (de Brito et al., 2012). So encourage them to get up every hour they have sat, this alone will contribute to improved strength outcomes by increasing the number of weight transfers done every day.

For some it is a lack of confidence in staying upright or a fear of falling, they only move if they have to. For these individuals we have to ensure they understand that avoidance of activity increases risk of falls (Skelton et al., 2001). Possibly if you explain that regular sit to stands will improve strength and balance and help reduce their risk of falls, showing them one or two Otago strength and balance exercises (Campbell et al., 1999) they could do whilst in standing, they may be encouraged to self manage. Others are depressed and socially isolated or bored and again, for them, discussions and encouragement will be very different.

There have only been four small studies on intervening to reduce sedentary time in older adults and none have had a long follow up to see if any effects are maintained. Three used individual consultations with motivational messages about reducing sedentary behaviour (Fitzsimons et al. 2013; Gardiner et al., 2011; King et al., 2013), and one used group sessions (Chang et al., 2013). All showed reductions in sedentary time, but three had very short follow up periods (less than 8 weeks) and all targeted fairly young and healthy older adults so there is much more to learn in how to work with frailer older people with multiple co-morbidities.

There are many more studies have been published investigating interventions to decrease sedentary behaviour in adults less than 60 years old. These interventions have included:

- Computer alerts that warn after periods of long use
- Sit-stand workstations for office workers
- Face-to-face and telephone coaching
- Web-based interventions (education/video)
- Altering TV viewing habits and/or reducing screen time
- Motivational emails suggesting walking routes and hints to increase incidental walking

Some suggestions for helping to break up long periods of sitting and potentially reduce total sitting time in a day are given in Figure 3. By reducing sedentary behaviour, the journey towards moving more often begins.

Summary

Physiotherapists are in an ideal place to champion physical activity wherever appropriate, starting at the in-patient stage, and continuing right along the patient pathway – and beyond. Breaking up long periods of sedentary behaviour is an appropriate starting place for many older patients you work with, to start them on their activity journey.

Further Reading/Information

Visit the Seniors USP Website – www.gcu.ac.uk/seniorsusp for downloadable factsheet, webinar access

Tag sedentary behaviour pictures to contribute to the folksonomy - <http://www.sedentarybehaviourclassification.net/tag-your-sedentary-time/>

Watching TV

- Stand up during advertisement breaks or at the end of each programme
- Put the remote control next to the TV rather than next to you

Reading

- Stand up to read the mail
- Stand up to read the newspaper
- Stand up after finishing a chapter of your book

Phone calls

- Stand up and move around while talking on the phone

Transport

- Park further away from the shops
- Stand up on the bus/train for one stop or more (holding on)

Socialising

- Walk to visit a neighbour instead of phoning them
- When offered a cup of tea, suggest you stand in the kitchen while the kettle is boiling

Going for a walk

- Try to get out of the house at least twice a day for a short walk around your neighbourhood

Figure 3: Top Tips for breaking up long periods of sitting

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