

LIVING SENSIBLY AS AN ALTERNATIVE APPROACH TO EXERCISE TO IMPROVE HEALTH

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THE PHYSICAL INACTIVITY EPIDEMIC

One of the biggest problems facing the world today is the global physical inactivity epidemic, with around 25% of the World's population failing to meet minimum recommended guidelines¹. The magnitude of the problem is greater in developed countries such as the United States, where around 50% of people are described as inactive². The problem is even worse in the United Kingdom, with close to 70% of adults classed as inactive³.

The primary consequence of an inactive lifestyle is an increased risk of non-communicable diseases (NCDs), particularly diabetes and cardiovascular disease. Physical inactivity has been identified as being directly responsible for over 3 million deaths globally each year according to the World Health Organisation (WHO). The WHO even goes so far as to rate physical inactivity as the fourth biggest global healthcare concern. The main effect of inactivity-related NCDs is a massive burden on healthcare services, with the estimated cost to the NHS exceeding £7 billion per year⁴.

EXERCISE AS MEDICINE

The link between inactivity and poor health is well known, with physical activity the focus of many health promotion campaigns worldwide. In the UK, campaigns such as "Let's Get Moving", have been used by the NHS in primary care to promote the health benefits of physical activity⁵. More generic campaigns such as Public Health England's "Everybody Active, Every Day" campaign have also been widely publicised using different forms of media. Each of these health promotion campaigns stresses the importance of adopting a healthier lifestyle, and in

particular increasing physical activity⁴. In many cases, an "exercise as medicine" approach has been proposed to combat the effects of numerous diseases, and in many cases exercise can be at least as effective as medical treatment⁶. Although the optimal dose and intensity of exercise as medicine needs to be determined, many different organisations such as the American College of Sports Medicine (ACSM) and the NHS, have published guidelines for recommended physical activity levels, with levels differing according to age group. These guidelines are broadly similar, with recommended levels of activity increasing if the intensity is lower. For instance, both the NHS and ACSM recommend that adults undertake 30 minutes of moderate intensity aerobic activity at least five days per week, giving a total of 150 min per week⁷. In addition, it is also recommended to perform both resistance and flexibility exercises at least twice per week⁷.

Despite the numerous campaigns that have been used to promote physical activity, such as those mentioned above, the problem shows no sign of improving. In the Health Survey for England (HSE), trends



in physical activity from 1991 to 2004 were assessed ⁸. Older people did show some small increases in leisure time physical activity, however workplace activity decreased. Similar findings were reported in a Canadian survey, with workplace activity identified as the main cause of decreased activity and rising obesity in Canadian adults ⁹. Although the decrease in physical activity outside of work seems to have stabilised recently, the inactivity problem seems likely to increase even more in coming years as the highest percentage of inactive people is found in adolescents, with more than 80% of the adolescents worldwide classified as inactive according to the WHO ¹.

THE DANGERS OF SITTING

It's not just the lack of physical activity that is problematic, but also the amount of sedentary behaviour, particularly sitting. Many studies have directly linked the total number of hours spent sitting with measures of health and even mortality rates. Indeed, in one study, people who spent more than 11 hours per day sitting were 40% more likely to die in the following three years, irrespective of how active they were outside of the time they spent sitting down ¹⁰. This ground-breaking study has led to a whole raft of studies that have targeted interrupted sitting as a means of improving health. These studies have trialled different methods of breaking up prolonged periods of sitting in order to investigate effects of interrupted sitting on health.



So far, these studies have tended to be limited to short-term interventions that have shown cardio-metabolic changes as a result of interspersing sitting work with standing work using methods such as sit-to-stand desks and active standing work stations ¹¹. These results, although promising, have yet to be tested to see whether people can actually implement them as part of a lifestyle change.

BARRIERS TO EXERCISING REGULARLY

There is a plethora of sound advice available about the benefits of a healthy lifestyle, whether that be an increase in the amount of physical activity, or adopting a healthy diet. Why then, are people so inactive when so much information about the benefits of exercise and the dangers of inactivity is readily available? People know they should be more active, but remain sedentary. One of the main contributory reasons identified in recent research, particularly for working people, is a lack of time for exercise ¹². The majority of adults work in sedentary jobs, which when combined with a daily commute and the pressures of daily life, make it hard to squeeze an exercise habit into a busy day. Another problem could be that, to many people, exercise is less enjoyable than the sedentary activity it would be replacing ¹³. However, it is apparent that one of the biggest difficulties is in changing an already established behaviour and adopting a new one. It seems clear that the barriers to activity and the difficulty in changing behaviour makes it extremely difficult to get people to increase their daily activity levels.

CHANGING BEHAVIOUR

Research looking at behaviour change has shown that it is very difficult to create new habits, whether the habits are exercise or any other beneficial behaviour. Studies have shown that forming new habits could lead to positive behaviour change to improve health¹⁴. This finding would also hold true for changing behaviour such as spending the entire working day sitting, to suddenly becoming active throughout the day. Studies have shown that it takes 18-250 days to ingrain a new behaviour, and that any lapse in the behaviour during this period can cause a major setback in the habit acquisition¹⁵. The key to implementing a long-term approach to physical activity could be related to the formation of new habits.

An alternative solution to adopting programmed physical activity could be to adopt a sensible living approach. So what exactly does such an approach entail? Someone who lives sensibly would adopt numerous strategies designed to increase their daily activity and specifically focus on avoiding sedentary behaviour, particularly the amount of time spent sitting, without necessarily performing any specific exercise. Examples of types of activities that could be done are many, such as taking the stairs rather than the lift, parking further away from the office so that you are required to walk at least some of the way to work. Once at work, movement could be incorporated into the working day using strategies such as standing for meetings or phone calls. For people who use public transport for a daily commute, standing up while on the bus or the train could be encouraged. The same approach can just as easily be used at home. Rather than sitting down for activities, it is possible to stand up and reap important health benefits.

The key to following this approach is the use of a reminder system that could identify when certain behaviours occur, and when alternative behaviours could be used. This idea is now possible thanks to recent advances in sensor technology and the ready availability of smart devices such as phones and watches.



SMART PROMPTING TO ADOPT HEALTHY LIFESTYLE BEHAVIOURS

There are many new smart devices, which take advantage of the latest technology to identify behaviours and activities that need to be changed. For instance, by the use of body-worn inertial sensors, it is possible to detect if someone has remained sitting for a pre-determined time period and prompt them to move, or to do a chosen alternative activity. In the workplace this could take the form of an active workstation, which can change from a seated to a standing position, such as the last 10 minutes of every hour. Studies looking at this type of intervention have found increases in activity levels that should lead to long-term health benefits¹⁶. Such solutions could be costly, depending upon the type of intervention proposed. For instance, sit-to-stand desks cost several hundred pounds, while other solutions such as balance boards,

treadmill, or cycle desks can be expensive. However, such a reminder system could also be used to prompt the user to perform a cost-free activity like standing to take a phone call, or walking to perform a work-related activity.

This idea is backed up by some sound evidence from behaviour change research. In order to change habits, small steps have been shown to be more effective than larger steps that frequently lead to failure, despite the best will in the world ¹⁷. The key is to work closely with the person involved in order to propose appropriate activities at times at which the proposed activity could be performed. This is where a smart device comes in, one that is able to learn from experience. For instance, if someone has spent the pre-determined amount of time sitting at their desk, a reminder to perform a short active break could be beneficial, not only for health, but also for work productivity. An example of the idea already in use is the Pomodoro technique, which was invented in the 1980s by Francesco Cirillo ¹⁸. This technique was designed to improve work productivity by breaking the day up into 25-min segments during which time only one task was performed, followed by a five-min break. The activity during the five-minute break wasn't the focus of the technique, leaving the choice to the individual. Various activities such as a short relaxing exercise including breathing, stretching, or walking to get a drink of water have been proposed in the time management version as a means of getting refocused before the next 25-min session. After four sessions a longer break time is used, offering an opportunity for a longer activity to be performed. The Pomodoro technique and others in a similar vein have

been shown to increase work productivity ¹⁸. If such a technique was synchronised with a prompted activity programme, people could be reminded to change behaviours regularly throughout the day, and could adopt a sensible living approach.

The types of activity proposed during the the pauses in the working day and the most effective type of reminders need to be determined. Likewise, the choice of the reminder system, including the interface, also needs to be investigated. For instance, there are some advantages of using a device you wear or keep with you compared to a system on a workstation. A worn device could monitor activity and also ensure that the users receive reminders. There are a range of different devices available, with some people preferring to wear a watch, while others might prefer a pendant, or even a key ring. Mobile phones are also useful, with a multitude of different apps available. It is also possible to use software on desktop computers, although such applications would need to be synchronised with body-worn sensors to ensure that an accurate measure of inactivity can be used to prompt healthier behaviours.

CONCLUSION

The physical inactivity epidemic needs tackling head on. A promising solution could be to use an activity reminder system to alert people to the opportunity to become more active. A full trial is currently being planned in the University of Bedfordshire Institute for Health Research to test this hypothesis on a diverse population of different ages, genders, and cultures.

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