

Table S1 Define the spinal cord injury in behavioural terms

Question	Definition
What is the maladaptive behaviour?	Physical activity avoidance due to experiencing a SCI
What is the desired behaviour?	Improving physical activity to meet SCI recommended guidelines and reducing time spent being sedentary
Where does the behaviour occur?	Any context (e.g., home- or gym-based)
Who is involved in performing the behaviour?	Individuals experiencing SCI

SCI, spinal cord injury.

Table S2 Candidate behaviours related to the problem behaviour identified in step 1

Intervention aim
Improve physical activity for adults with SCI to meet recommended guidelines
Intervention designer response
Goal setting and monitor progress over time
Enhanced problem-solving abilities for relapse prevention
Increased self-confidence, interest and motivation to undertake a lifestyle change and to participate in physical activity
Changing beliefs about capabilities regarding what physical activities are suitable for individuals with SCI
Increasing understanding of the amount and type of activity needed to achieve health benefits
Reducing the stigma and negative attitudes associated with undertaking physical activity
Improving the knowledge/awareness of the physical activity opportunities and resources (both local and far-reaching) available
Enhancing the knowledge of people delivering physical activity (e.g., coaches, personal trainers, etc.) with regards to how sessions can be adapted to meet the needs of people with SCI
Improved access to disability-related experts and accessible rehabilitation infrastructures
Provide community support networks (i.e., family, friends, caregivers)
Planning strategies to overcome any adverse effects (e.g., pain/fatigue) as a result of participating in physical activity
Improving the accessibility to and affordability of facilities/equipment and resources
Overcoming negative past experiences of physical activity through positive reinforcement/reflection opportunities

SCI, spinal cord injury.

Table S3 Criteria for prioritising the identified candidate behaviours

Potential target behaviours	Impact of behaviour change ^a	Likelihood of changing behaviour ^a	Spillover score ^a (i.e., impact on other behaviours, such as stress or anxiety)	Measurement score ^a (i.e., monitoring)
Goal setting and monitor progress over time through weekly diary keeping	Promising	Promising	Very promising	Promising
Enhanced problem-solving abilities for relapse prevention	Promising	Promising	Very promising	Unpromising but worth considering
Increased self-confidence, interest and motivation to undertake a lifestyle change and to participate in physical activity	Promising	Promising	Very promising	Promising
Changing beliefs about capabilities regarding what physical activities are suitable for individuals with SCI	Promising	Promising	Very promising	Promising
Increasing understanding of the amount and type of activity needed to achieve health benefits	Promising	Promising	Very promising	Promising
Reducing the stigma and negative attitudes associated with undertaking physical activity	Promising	Unpromising but worth considering	Very promising	Unpromising but worth considering
Improving the knowledge/awareness of the physical activity opportunities and resources available (both local and far-reaching) available	Promising	Promising	Very promising	Promising
Enhancing the knowledge of people delivering physical activity (e.g., coaches, personal trainers, etc.) with regards to how sessions can be adapted to meet the needs of people with SCI	Promising	Promising	Very promising	Promising
Improved access to disability-related experts and accessible rehabilitation infrastructures	Promising	Promising	Very promising	Unpromising but worth considering
Provide community support networks (i.e., family, friends, caregivers)	Promising	Promising	Very promising	Promising
Planning strategies to overcome any adverse effects (e.g., pain/fatigue) as a result of participating in physical activity	Promising	Promising	Very promising	Promising
Improving the accessibility to and affordability of facilities/equipment and resources	Promising	Unpromising but worth considering	Very promising	Unpromising but worth considering
Overcoming negative past experiences of physical activity through positive reinforcement/reflection opportunities	Promising	Promising	Very promising	Promising

^a, rate as: unacceptable, unpromising but worth considering, promising, very promising. SCI, spinal cord injury.

Table S4 Describe the target behaviour according to who, needs to do what, when, where, how often and with whom?

Target behaviour	Improving physical activity for adults with SCI
Who needs to perform the behaviour?	Individual experiencing SCI by adhering to the intervention resources
What do they need to do differently to achieve the desired change?	React adaptively to SCI by applying the strategies suggested by the intervention
When do they need to do it?	On a regular basis, preferably daily at a time that suits the individuals, to achieve SCI-specific recommended physical activity guidelines (i.e., 20 minutes of moderate to vigorous intensity aerobic exercise 2 times per week) (3)
Where do they need to do it?	Any given situation
How often do they need to do it?	On a regular basis to achieve SCI-specific recommended physical activity guidelines (i.e., 20 minutes of moderate to vigorous intensity aerobic exercise 2 times per week) (Martin Ginis <i>et al.</i> , 2018)
With whom do they need to do it?	Individually or as part of a group alongside family/friends

SCI, spinal cord injury.

Table S5 Behavioural analysis of what needs to change for the target behaviour to occur

COM-B components	Theoretical domains linking to COM-B component	What needs to happen for target behaviour to occur?
Physical capability	Physical skills—Do you know how to undertake physical activity?	Have better physical ability to undertake physical activity; having the physical capability and skills to undertake physical activity
Psychological capability	Knowledge—Do you know about how and where to do physical activity?	Develop knowledge of the amount and type of activities needed for health benefits; better understanding of the physical activity opportunities and resources available; enhanced awareness of people delivering physical activity
	Memory, decision, and attention processes—Is undertaking physical activity something you usually do?	Ability to problem solve and make decisions related to physical activity
	Behavioural regulation—Do you have systems in place for monitoring whether or not you have carried out physical activity?	Improve abilities of goal setting (i.e., SMART targets) and self-monitoring strategies; provide a weekly/monthly diary to monitor progression; increase confidence in ability to undertake physical activity; increase ability to deal with emotions related to physical activity (e.g., anxiety about capacity)
Physical opportunity	Environmental context and resources—To what extent do physical or resource factors facilitate or hinder the opportunity to undertake physical activity?	Have access to facilities, equipment, and resources to undertake physical activity; provide more sessions to undertake physical activity that are not too far-reaching
Social opportunity	Social influences—To what extent do social influences facilitate or hinder the opportunity to undertake physical activity?	Social support networks (i.e., family, friends, community) to encourage involvement with the Accessercise application and to practice the tactics; encouragement from health care professionals (e.g., doctors, nurses, physiotherapists); observe role models with SCI undertaking physical activity
Reflective motivation	Beliefs about capabilities—How difficult or easy is it for you to undertake physical activity?	Hold beliefs that undertaking physical activity is achievable; hold beliefs that undertaking physical activity will reduce any negative consequences; being optimistic that regularly engaging in physical activity will lead to positive health outcomes; goal setting and monitoring to encourage and support progression
	Optimism—How confident are you that undertaking physical activity will lead to positive health outcomes?	
	Beliefs about consequences—What do you think will happen if undertake physical activity?	
	Goals—How much do they want to undertake physical activity?	
Automatic motivation	Reinforcement—Are there incentives to regularly undertake physical activity?	Undertake weekly/monthly diaries; receive professional support/advice throughout the intervention; produce well-known habits and practices for adaptively reacting to physical activity to alleviate negative outcomes
Behavioural diagnosis of the relevant COM-B components	Physical/psychological capability, physical/social opportunity and reflective/automatic motivation need to be altered for the target behaviour to occur	

Table S6 Consideration of the candidate intervention functions using the APEASE criteria

Candidate intervention function	Definition	COM-B component	Meet the APEASE criteria?
Education	Increasing knowledge or understanding (e.g., providing information on strategies to undertake physical activity)	Psychological capability—provide the correct strategies of undertaking physical activity/preventing sedentary behaviours through educational materials (e.g., videos, booklets, leaflets); improve the knowledge and understanding of why undertaking physical activity is beneficial Reflective motivation—facilitate positive attitudes about undertaking physical activity; encourage to celebrate small wins and turn ‘near misses’ into success	Yes
Persuasion	Using communication to induce positive or negative feelings or stimulate action (e.g., using imagery to motivate an increase in physical activity)	Reflective motivation—facilitate to generate more positive feelings about undertaking physical activity; encourage to read exercise/health related articles to increase their self-confidence in making changes to their physical activity habits	Yes
Incentivisation	Creating an expectation of reward (e.g., emphasising the advantages of undertaking physical activity)	Reflective motivation—incentivise to feel more positive about engaging in physical activity; incentivise an expectation of reward for increasing involvement of family, friends, community in undertaking physical activity	Yes
Coercion	Creating an expectation of punishment or cost (e.g., emphasising that by not changing will not improve physical activity levels)	Automatic motivation—coerce to motivate users to habitually participate in physical activity, and reward users with entries in draws for prizes Reflective motivation—coerce to feel more positively about improving physical activity	Yes
Training	Imparting skills (e.g., training to support an effective response to physical activity)	Physical capability—train the physical skills needed to undertake physical activity through educational material (e.g., written/spoken instruction and demonstration videos) Psychological capability—train sustained resistance to undesired behaviour(s); train the psychological skills needed to perform physical activity; train psychological strength skills needed to perform physical activity Physical opportunity—train to provide cues, prompts, notifications to undertake physical activity; train to reduce travelling demands physical activity facilities (e.g., gyms, leisure centres). Automatic motivation—train to boost habitual engagement in undertaking physical activity	Yes
Restriction	Using rules to reduce the opportunity to engage in the target behaviour (or to increase the target behaviour by reducing the opportunity to engage in competing behaviours (e.g., disallowing a non-adaptive response to physical activity)	Physical/social opportunity—restriction to remove unfavourable behaviour(s) encompassing habits that have a damaging impact (e.g., eating unhealthy food)	No
Environmental restructuring	Changing the physical or social context (e.g., offering prompts such as reminders or notifications to foster an effective response to physical activity)	Physical opportunity—restructure the physical environment to improve accessibility demands (e.g., more lifts, raised curbs); restructure the physical environment to provide prompts/cues/notifications to undertake physical activity; restructure the physical environment to reduce challenges involving pain and fatigue difficulties Social opportunity—restructure the environment to increase social support (e.g., family, friends, community); restructure the environment to provide suggestions on how to be active with family, friends or significant other, which can be shared via social media	No
Modelling	Offering a role model for individuals to follow or to imitate (e.g., motivational videos, success stories and patient testimonials of how they have effectively responded to physical activity)	Social opportunity—modelling to restructure individuals’ mentality/views about undertaking physical activity Automatic motivation—modelling undertaking physical activity to induce automatic imitation; modelling positive attitudes of other role models undertaking physical activity Reflective motivation—modelling to feel confident and positive about undertaking physical activity	Yes
Enablement	Increasing means/reducing barriers to increase capability or opportunity (e.g., behavioural support to effectively respond to physical activity)	Psychological capability—enable the knowledge on the ways of undertaking physical; enable the development of mental strength to undertake physical activity Automatic motivation—enable to improve habitual engagement in undertaking physical activity Reflective motivation—enable to feel more positively about undertaking physical activity	Yes

Table S7 Policy categories that might support the identified intervention functions

Intervention function	COM-B component	Potential policy categories	Does the policy meet the APEASE criteria in the context of facilitating an adaptive response to physical activity?
Education	Psychological capability, reflective motivation	Communication/marketing	Yes
		Guidelines	Not practical in this context
		Regulation	Not practical in this context
		Legislation	Not practical in this context
		Service provision	Yes
Persuasion	Reflective motivation	Communication/marketing	Yes
		Guidelines	Not practical in this context
		Regulation	Not practical in this context
		Legislation	Not practical in this context
		Service provision	Yes
Incentivisation	Reflective motivation	Communication/marketing	Yes
		Guidelines	Not practical in this context
		Fiscal measures	Not relevant in this context
		Regulation	Not practical in this context
		Legislation	Not practical in this context
Coercion	Automatic motivation, reflective motivation	Communication/marketing	Yes
		Guidelines	Not practical in this context
		Fiscal measures	Not practical in this context
		Regulation	Not practical in this context
		Legislation	Not practical in this context
Training	Physical capability, psychological capability, physical opportunity, automatic motivation	Communication/marketing	Yes
		Guidelines	Not practical in this context
		Fiscal measures	Not practical in this context
		Regulation	Not practical in this context
		Legislation	Not practical in this context
Modelling	Social opportunity, automatic motivation, reflective motivation	Communication/marketing	Yes
		Service provision	Yes
Enablement	Psychological capability, automatic motivation, reflective motivation	Guidelines	Not practical in this context
		Fiscal measures	Not practical in this context
		Regulation	Not practical in this context
		Legislation	Not practical in this context
		Environmental/social planning	Not practical in this context
		Service provision	Yes

Policy categories selected: communication/marketing and service provision.

Table S8 Behaviour change techniques (BCTs) identified based in intervention functions selected in step 5

Intervention function	COM-B component	Most frequently used BCTs	Does the policy meet the APEASE criteria?
Education	Psychological capability, reflective motivation	Feedback on behaviour	Yes
		Feedback on outcomes of behaviour	Yes
		Self-monitoring of behaviour	Yes
		Self-monitoring of outcomes of behaviour	Yes
Persuasion	Reflective motivation	Feedback on behaviour	Yes
		Feedback on outcomes of behaviour	Yes
		Self-monitoring of behaviour	Yes
		Credible source	Yes, demonstrations completed by like-minded individuals
Incentivisation	Reflective motivation	Feedback on behaviour	As above
		Feedback on outcomes of behaviour	As above
		Self-monitoring of behaviour	As above
		Self-monitoring of outcomes of behaviour	As above
		Material incentive (behaviour)	Yes, a shop feature is provided offering users discounts after accomplishing their goals
		Material reward (behaviour)	Yes, a shop feature is provided offering users discounts after accomplishing their goals
		Social reward	Yes, users are congratulated after successfully finishing a workout
Coercion	Automatic motivation, reflective motivation	Feedback on behaviour	As above
		Feedback on outcomes of behaviour	As above
		Self-monitoring of behaviour	As above
		Self-monitoring of outcomes of behaviour	As above
Training	Physical capability, psychological capability, physical opportunity, automatic motivation	Feedback on behaviour	As above
		Feedback on outcomes of behaviour	As above
		Self-monitoring of behaviour	As above
		Self-monitoring of outcomes of behaviour	As above
		Instruction on how to perform the behaviour	Yes, through step-by-step instructions on how to perform an exercise
		Demonstration of the behaviour	Yes, using videos demonstrating how to perform an exercise
		Behavioural practice rehearsal	Yes, encouraged to exercise in various locations (e.g., home, gym, outside)
Modelling	Social opportunity, automatic motivation, reflective motivation	Demonstration of the behaviour	As above
Enablement	Psychological capability, automatic motivation, reflective motivation	Goal setting (behaviour)	Yes, goals set before undertaking the workouts on the application
		Goal setting (outcome)	Yes, monitored throughout the workout on the application
		Action planning	Yes, action plans prior to undertaking any workout
		Review behaviour goal(s)	Yes, after completing each workout on the application
		Review outcome goal(s)	Yes, reviewed (monitored) during and after each workout on the application
		Feedback on behaviour	As above
		Self-monitoring of behaviour	As above
		Self-monitoring of outcomes of behaviour	As above
		Social support (unspecified)	Yes, social support encouraged through the social hub feature
		Social support (practical)	Yes, social support encouraged through the map of local facilities ranked by users according to accessibility
		Generalisation of a target behaviour	Yes, users were encouraged to perform the exercises in different settings (e.g., home, gym, outside)
		Graded tasks	Yes, exercises can be made increasingly difficult but achievable
		Restructuring the physical environment	As above
Body changes	Yes, the number of repetitions and sets can be increased/decreased on the application		
Most frequently used BCTs selected	Goal setting (behaviour), goal setting (outcome), action planning, review behaviour goal(s), review outcome goals, feedback on behaviour, self-monitoring of behaviour, self-monitoring of outcomes of behaviour, feedback on outcomes of behaviour, social support (unspecified), social support (practical), instruction on how to perform the behaviour, demonstration of the behaviour, behavioural practice rehearsal, generalisation of a target behaviour, graded tasks, credible source, material incentive (behavioural), social reward, body changes, material reward (behaviour)		

Table S9 Identification of the mode(s) through which the intervention could be delivered

Mode of delivery	Does the policy meet the APEASE criteria?
Face-to-face (in-person)	
Individual	No
Group	No
Distance	
Population-level	
Broadcast media	
TV	No
Radio	No
Outdoor media	
Billboard	No
Poster	No
Print media	
Newspaper	No
Leaflet	No
Digital media	
Internet	Yes
Mobile phone app	Yes
Individual-level	
Phone	
Phone helpline	No
Mobile phone text	No
Individually accessed computer programme	Possible