MUSCLE-STRENGTHENING EXERCISE

Get your muscle-strengthening exercise at least twice a week in addition to other exercise; if you can combine it with other types of exercise for balance, flexibility and fitness then even better.

Muscle-strengthening physical activity and exercise increases skeletal muscle strength, power, endurance, and muscle mass.(1) It may include strength training, resistance training, or muscular strength and endurance exercises.(1) There are additional health benefits to be gained by getting muscle-strengthening physical activity for up to 60 minutes per week as part of your weekly exercise regimen including reducing the risk of early death from any cause as well as cardiovascular disease, cancers, type 2 diabetes and lung cancer.(1, 2)

In older people over the age of 65, higher levels of multicomponent physical activity that combine balance, strength, gait, and functional training are shown to reduce the risk of falls and injury from falls.(1) It is uncertain if only resistance training reduces falls in older people.(3) Multimodal exercise that may include progressive strength resistance training along with balance, flexibility and aerobic activity has been associated with significant effects on bone health and prevention of osteoporosis. (1, 4) In women after the menopause, progressive resistance strength training for the legs has been shown to improve the bone mineral density in the upper leg bone (femur) while combination exercise seems to be the most effective for improving bone mineral density in the spine.(5) Sarcopenia can occur resulting in loss of muscle mass as we age and this can contribute to reduced mobility and loss of physical functioning resulting in physical frailty.(6) However muscle mass and strength can be improved through exercise and adequate nutritional protein intake.(6, 7)

Guidelines

The UK Chief Medical Officers' and the World Health Organization guidelines:(1, 8)

- In addition to cardiovascular physical activity, all adults should also do muscle-strengthening physical activity:
  - On at least 2 days each week
  - At moderate or greater intensity
  - Involving all major muscle groups
- New to exercise? Start by doing small amounts and gradually, over time, increase how often, how intensely and for how long you exercise.
- For those age 65 years and over, be as physically active as your abilities allow and adjust how much effort you put into physical activity based on your fitness and strength levels.

GOLDSTER Points and Evidence Levels for this Activity

Domain	Impact Strength	Points	Information on Evidence	Evidence Type	Evidence Level
Cognitive	Medium	2	In older people, muscle-strengthening exercise has shown a medium impact on executive function and global cognitive function.(9, 10)	Systematic Review	Moderate
Physical	Medium	2	In older people over the age of 65, higher levels of multicomponent physical activity that combine balance, strength, gait, and functional training are shown to have a medium impact on reducing the risk of falls and injury from falls and significant effects on bone health and osteoporosis prevention.(1)	Guideline, Systematic Review	High, Moderate
Emotional	Medium	2	Evidence on structured exercise programmes has shown medium impact on reductions of symptoms of depression and anxiety in older women.(11, 12)	Systematic Review	Moderate

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AEROBIC PHYSICAL ACTIVITY

Get 30 to 60 minutes of moderate-intensity exercise at least 5 times a week; or
Get 15 to 30 minutes of vigorous-intensity exercise at least 5 times a week.

Aerobic physical activity, also known as cardiovascular exercise, includes physical activities that increase the heart and breath rate along with increasing effort.(1) Aerobic physical activity can be achieved through activities like planned exercise classes, sports, active games, walking, running, cycling, swimming, dancing, some types of yoga, active gardening or wheeling a manual wheelchair.(2, 3) The level of exercise intensity varies depending on the type of exercise, how much effort is put into the physical activity and your fitness level.

Regular physical activity is a key component of healthy ageing that has been shown to improve physical function, reduce the loss of function related to ageing and reduce the risk of falls and injuries from falls.(2, 4-6) It also improves physical function in older people with frailty.(4) Health benefits include preventing loss of muscle mass (sarcopenia), loss of bone density (osteopaenia and osteoporosis) and cognitive impairment.(6) Regular physical activity also reduces the risk of early death from cardiovascular disease and other causes, and reduces risk of high blood pressure, certain cancers, type 2 diabetes, depression and anxiety.(2) People who exercise regular can enjoy better sleep quality and cognitive health as well.(2)

Guidelines

The UK Chief Medical Officers' and the World Health Organization guidelines state that all adults should get:(2, 5)

- 150 to 300 minutes of moderate-intensity physical activity per week; or
- 75 to 150 minutes of vigorous-intensity physical activity per week.
- (but don't forget to add your muscle-strengthening and multicomponent activities)
- New to exercise? Start by doing small amounts and gradually, over time, increase how often, how intensely and for how long you exercise.
- For those age 65 years and over, be as physically active as your abilities allow and adjust how much effort you put into physical activity based on your fitness and strength levels.

GOLDSTER Points and Evidence Levels for this Activity

Domain	Impact Strength	Points	Information on Evidence	Evidence Type	Evidence Level
Cognitive	Medium	2	For all adults aged 50 and over, evidence demonstrates that regular physical activity has been shown to have a medium impact on improving cognitive health and function and reduces the risk of cognitive decline.(2, 7, 8)	Guideline, Systematic Review	Moderate
Physical	High	3	For people aged 65 and older in the general population, evidence demonstrates that regular physical activity has been shown to have a strong impact on improving physical function as well as preventing functional decline and falls.(2, 4, 5) More aerobic physical activity is associated with a lower risk of limited physical function.(2)	Guideline	Moderate High
Emotional	Medium	2	For all adults, regular physical activity has been shown to have a medium impact on reducing symptoms of anxiety and depression and a medium impact on improving sleep quality.(2, 9)	Guideline	Moderate

Exercise Intensity

Exercise intensity is based on a person's own perception of how much they feel they are exerting themselves. This can be measured on a Rate of Perceived Exertion Scale from 6 to 20 (Borg).(10, 11) A person exercising at moderate intensity doing brisk walking, ballroom dancing or slower cycling would experience an increase in the heart and breathing rates and may start to sweat. A person doing vigorous exercise like speed walking, jogging or aerobic dancing would experience an even faster heart rate and may only be able to speak a few words between breaths.(12, 13) The table below gives an impression of the relative intensity and effect on the body of different exercise intensities.

Physical Activity Exertion

Borg Rate of Perceived Exertion Scale	**6 7 8** No exertion Extremely light	**9** Very light	**11** Light	**12**	**13** Some what hard	**14**	**15** Hard	**16**	**17** Very hard	**18**	**19 20** Extremely hard Maximal exertion
Exercise Intensity	None	Very light	Light	Moderate			Vigorous			Very vigorous	
Heart rate	Resting rate	♥	♥	♥ ♥			♥ ♥ ♥			♥ ♥ ♥ ♥	
Breathing rate	Resting rate	🌬	🌬	🌬 🌬			🌬 🌬 🌬			🌬 🌬 🌬 🌬	
Sweating	None	Little	💧	💧 💧			💧 💧 💧			💧 💧 💧 💧	

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