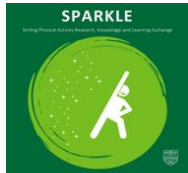


# Strong for Life: Healthy Ageing and Strength

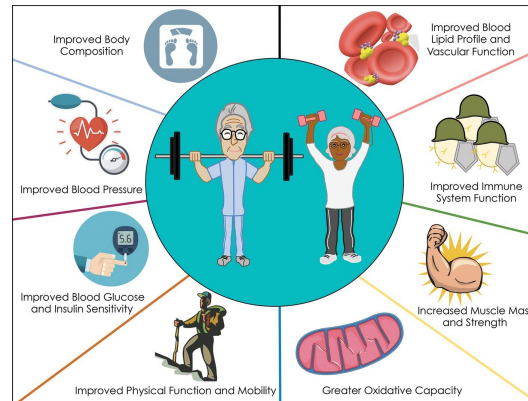


**Bridgitte Swales MSc ASCC**

# This presentation examines the impact of resistance training on multidimensional health in frail older adults



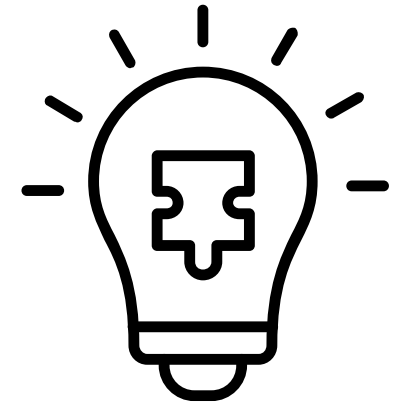
Healthy Ageing



Resistance Training



Research



Application

**Healthy ageing is “the process of developing and maintaining the functional ability that enables wellbeing in older age”**



# Physical activity for adults and older adults

- |                          |                        |                                 |
|--------------------------|------------------------|---------------------------------|
| Benefits health          | Reduces your chance of | Type II Diabetes -40%           |
| Improves sleep           |                        | Cardiovascular disease -35%     |
| Maintains healthy weight |                        | Falls, depression etc. -30%     |
| Manages stress           |                        | Joint and back pain -25%        |
| Improves quality of life |                        | Cancers (colon and breast) -20% |

Some is good, more is better      Make a start today: it's never too late      Every minute counts

## Be active

at least **150** minutes moderate intensity per week  
increased breathing able to talk

OR

at least **75** minutes vigorous intensity per week  
breathing fast difficulty talking

or a combination of both

**Build strength**  
to keep muscles, bones and joints strong  
on at least **2** days a week

Swim, Brisk walk, Cycle, Gym, Yoga, Carry heavy bags, Stairs, Sport, Bowls, Tai Chi

**Minimise sedentary time**  
Break up periods of inactivity



**Improve balance**  
For older adults, to reduce the chance of frailty and falls  
2 days a week



# Being physically active is vitally important to optimise healthy ageing

# Preserving muscle and bone strength in older adults is integral to maintaining quality of life

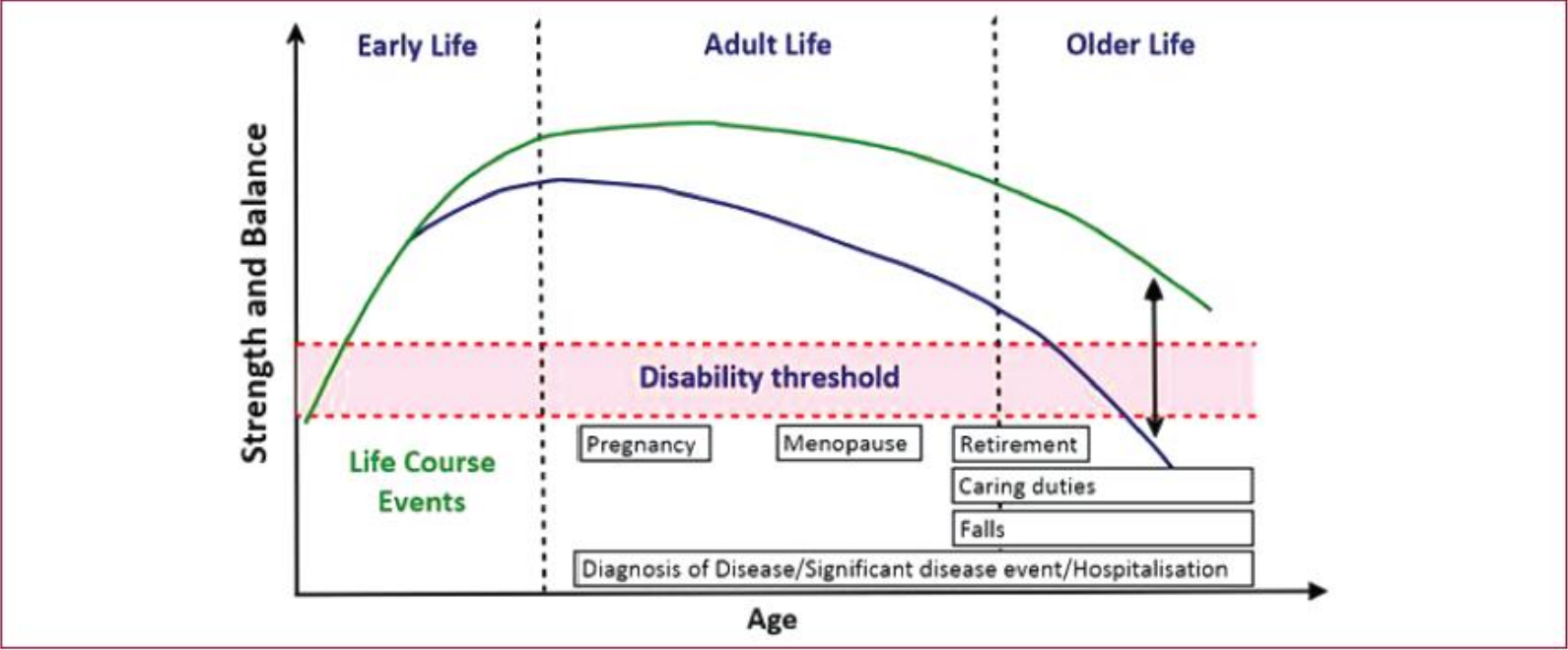


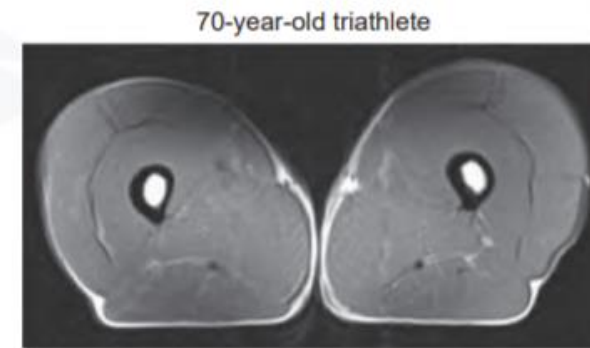
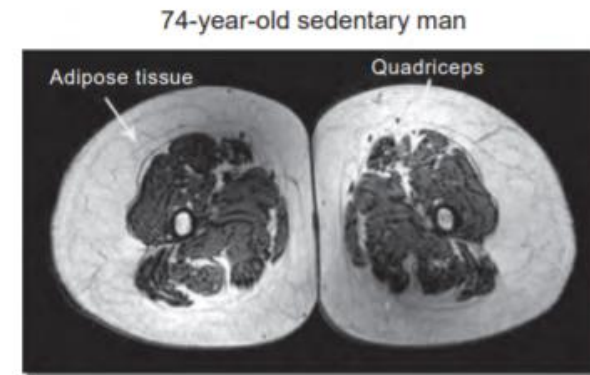
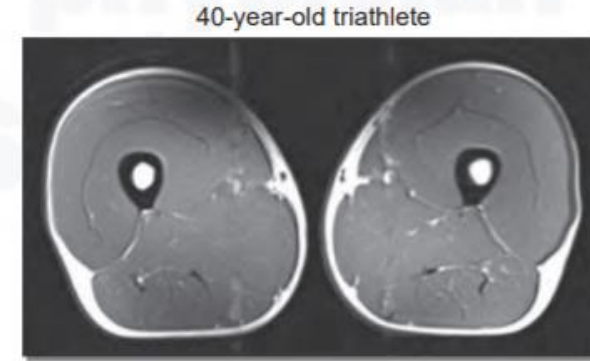
Figure 1. Strength and balance ability over the life course and potential ages or events that may change the trajectory of decline with ageing.



# Muscle disuse is a preventable and reversible factor

**Between the ages of 40 and 50, we can lose more than 8% of our muscle mass: this loss accelerates to more than 15% per decade after age 75**

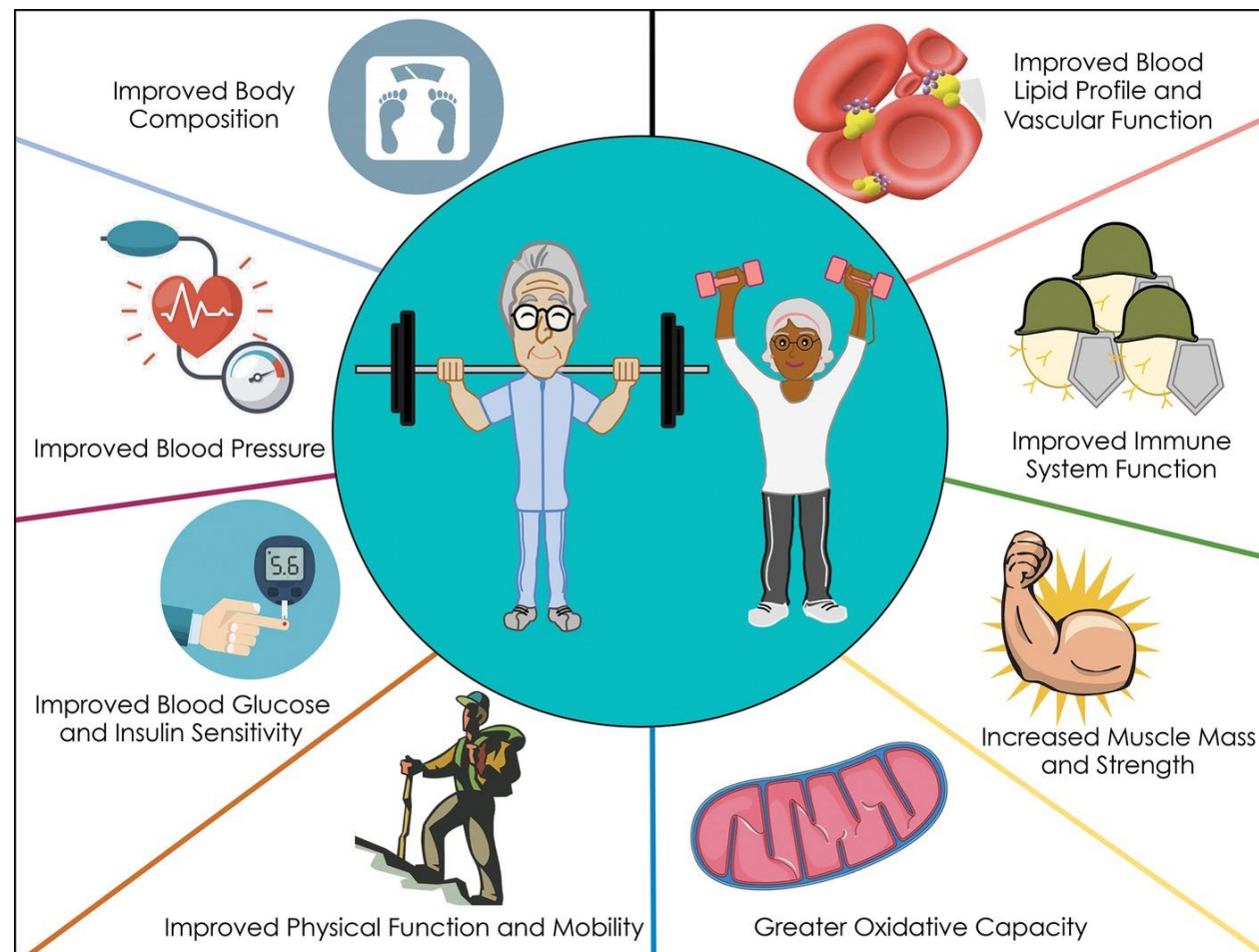
**Figure 1.** Typical quadriceps MRI scan of a 40-year-old triathlete compared with the quadriceps MRI scans of a 70-year-old triathlete and a 74-year-old sedentary man. Note the significant visual difference between the SCAT and IMAT of the sedentary man versus masters athletes.



**Abbreviations:** IMAT, intramuscular adipose tissue; MRI, magnetic resonance imaging; SCAT, subcutaneous adipose tissue.



# Resistance training combats chronic health disease risk in older adults



McLeod, J.C., Stokes, T. and S.M. Phillips (2019) *Front. Physiol.*

# Resistance training is a powerful intervention to combat loss of muscle strength and mass



## Resistance Training for Older Adults: Position Statement From the National Strength and Conditioning Association

Maren S. Fragala,<sup>1</sup> Eduardo L. Cadore,<sup>2</sup> Sandor Dorgo,<sup>3</sup> Mikel Izquierdo,<sup>4</sup> William J. Kraemer,<sup>5</sup> Mark D. Peterson,<sup>6</sup> and Eric D. Ryan<sup>7</sup>

<sup>1</sup>Quest Diagnostics, Secaucus, New Jersey; <sup>2</sup>School of Physical Education, Physiotherapy and Dance, Exercise Research Laboratory, Federal University of Rio Grande do Sul, Porto Alegre, Brazil; <sup>3</sup>Department of Kinesiology, University of Texas at El Paso, El Paso, Texas; <sup>4</sup>Department of Health Sciences, Public University of Navarre, CIBER of Frailty and Healthy Aging (CIBERFES), Navarrabiomed, Pamplona, Navarre, Spain; <sup>5</sup>Department of Human Sciences, The Ohio State University, Columbus, Ohio; <sup>6</sup>Department of Physical Medicine and Rehabilitation, University of Michigan-Medicine, Ann Arbor, Michigan; and <sup>7</sup>Department of Exercise and Sport Science, University of North Carolina-Chapel Hill, Chapel Hill, North Carolina

## Resistance Training for Older Adults: Position Statement From the National Strength and Conditioning Association

There are substantial health benefits of resistance exercise for older adults. There is strong evidence to support the benefits of resistance exercise for countering many age-related processes, including sarcopenia, muscle weakness, mobility loss, chronic disease, disability, and even premature mortality.

A properly designed resistance training program can elicit many physiological adaptations and functional benefits, including:

### Physiological Adaptations

- Muscle strength
- Muscle mass
- Muscle power
- Neuromuscular functioning

### Functional Benefits

- Mobility & movement quality
- Performance in activities of daily living
- Psychosocial well-being
- Resistance to falls & other injuries



### Suggested Resistance Training Program Parameters

#### Frequency

2-3 days per week per muscle group; performing training sessions on non-consecutive days is ideal

#### Exercises & Sets

1-3 sets of 1-2 multi-joint exercises per major muscle group; include complex, dynamic movements

#### Repetitions

6-12 repetitions per set for muscular strength; 8-12 or 10-15 for muscular hypertrophy & endurance

#### Intensity

Progress as tolerated up to 70-85% of 1-repetition maximum (1RM); include power/explosive exercise at higher velocities, using 40-60% of 1RM

#### Individualization & Progress

Follow the principles of individualization, periodization, and progression; Proper exercise form & technique must be established prior to progression

### Important Notes & Considerations

A properly designed resistance training program with appropriate exercise technique and proper spotting is safe for healthy older adults

Programs can be adapted for those with frailty, mobility limitations, cognitive impairment, or other chronic conditions, and even for those residing in assisted living and skilled nursing facilities

All resistance exercise programs should correspond with the specific individual needs & capabilities of each older adult, and participation in such programs is unquestionably beneficial for older adults



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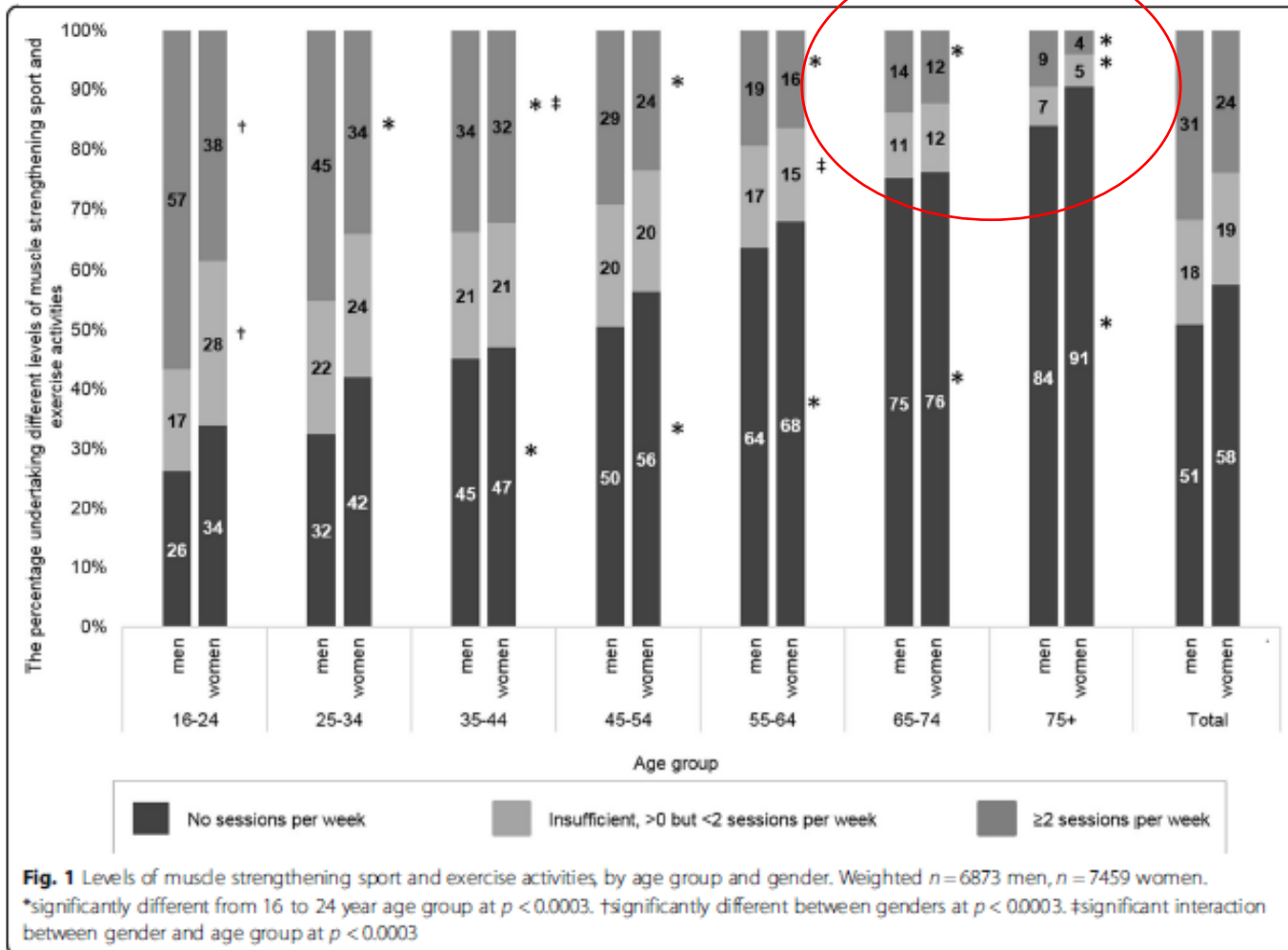
Social Media @AdamVirgile @AVSportSci



Fragala, M. S., Cadore, E. L., Dorgo, S., Izquierdo, M., Kraemer, W. J., Peterson, M. D., & Ryan, E. D. (2019). Resistance Training for Older Adults. *Journal of Strength and Conditioning Research*, 33(8), 2019-2052. doi:10.1519/jsc.0000000000003230



# Those who participate the least will benefit the most



**Scotland: only 9% of men and 4% of women >75 years meeting guidelines**

(Strain et al., 2016)



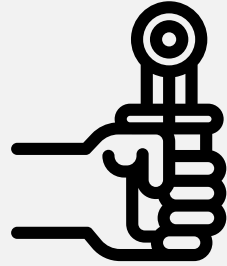
**US: only 8.7% of older adults >75 years participate in muscle strengthening activities**

(National Centre for Health Statistics, 2016)

# Getting stronger can have a transformative effect on people's quality of life, whatever their age and ability



# Frailty is characterised by diminished strength, mobility and functional capacity



Weakness



Slow walking speed



Un-intentional weight loss



Low physical activity



Self-reported exhaustion



# The KARE project was designed to evaluate the impact of resistance training on multi-dimensional health in frail and pre-frail older adults in residential care

*Journal of Aging and Physical Activity*, (Ahead of Print)  
<https://doi.org/10.1123/japa.2021-0130>  
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ORIGINAL RESEARCH

## A Randomized Controlled Feasibility Trial Evaluating a Resistance Training Intervention With Frail Older Adults in Residential Care: The Keeping Active in Residential Elderly Trial

Bridgitte Swales, Gemma C. Ryde, and Anna C. Whittaker

Frailty is associated with negative health outcomes, disability, and mortality. Physical activity is an effective intervention to improve functional health status. However, the effect of resistance training on multidimensional health in frail older adults remains unclear. This randomized controlled trial was conducted in a U.K. residential care home to assess feasibility with limited efficacy testing on health and functional outcomes and to inform a future definitive randomized controlled trial. Eleven frail older adults (>65 years) completed a 6-week machine-based resistance training protocol three times a week. Uptake and retention were greater than 80%. The measures and intervention were found to be acceptable and practicable. The analyses indicated large improvements in functional capacity, frailty, and strength in the intervention group compared with the controls. These findings support the feasibility of a definitive randomized controlled trial and reinforce the value of resistance training in this population. This trial was registered with ClinicalTrials.gov: NCT03141879.

**Keywords:** care home residents, frailty, multidimensional health, physical function, strengthening exercise

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<https://doi.org/10.1123/japa.2022-0170>  
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ORIGINAL RESEARCH

## A Mixed Methods Feasibility Study of Machine-Based Resistance Training With Prefrail Older Adults in Residential Care: The KARE-II Trial

Bridgitte Swales,<sup>1</sup> Gemma C. Ryde,<sup>2</sup> and Anna C. Whittaker<sup>1</sup>

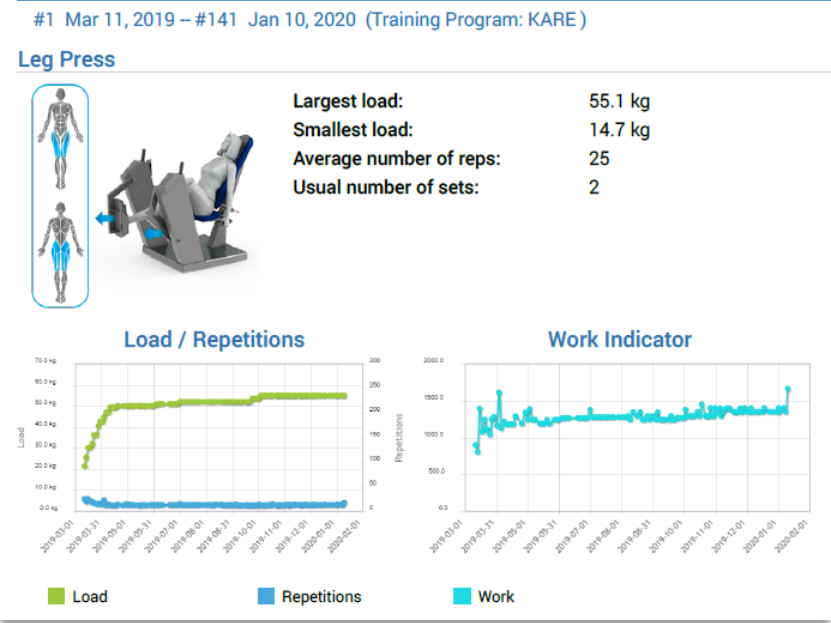
<sup>1</sup>Faculty of Health Sciences and Sport, University of Stirling, Stirling, United Kingdom; <sup>2</sup>Institute of Cardiovascular and Medical Sciences, College of Medical, Veterinary and Life Sciences, University of Glasgow, Glasgow, United Kingdom

Physical activity is an effective, proactive intervention to reduce or reverse frailty and functional decline. However, uncertainty exists about the feasibility and impact of resistance training on multidimensional health in prefrail older adults in residential care. This mixed methods feasibility study assessed practicability with limited efficacy testing on health and functional outcomes. Eleven prefrail older adults participated in a 6-week progressive resistance training protocol three times per week. The intervention and measures were found to be appropriate and acceptable by those who completed the trial, with participants self-reporting improved well-being, mood, and function. Analysis identified several barriers to recruitment, including prior commitments, seasonal impact, and session timing, and offered potential solutions with further recommendations for program refinement prior to a definitive randomized controlled trial. These findings add to our understanding of prefrail older adults' preferences regarding participation in physical activity research and the perceived benefits of resistance training. This trial was registered with ClinicalTrials.gov: NCT03141879.

**Keywords:** prefrailty, physical function, multidimensional health, resistance exercise, assisted living



# Participants used computerised, pneumatic resistance equipment designed to support active aging and lifelong strength



# Exercise prescription was based on published guidelines for older adults



**Frequency: 3 x per week for 6 weeks**



**Intensity: RPE 7-8 'moderate-hard'**



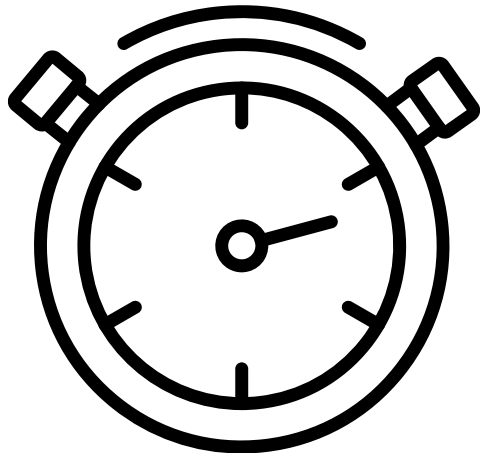
**Time: 30-35 min**



**Type: Progressive Resistance Training**

**7 exercises, lower and upper body**

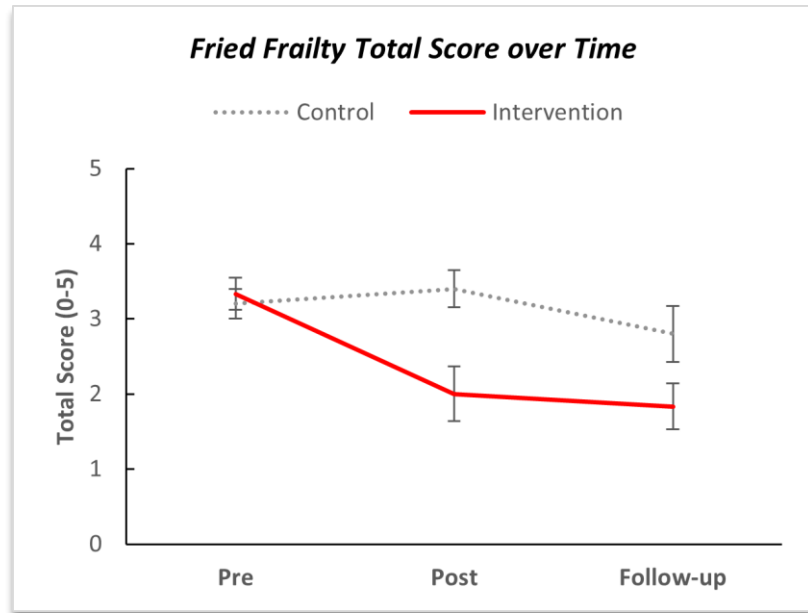
**2 sets of 12 repetitions**



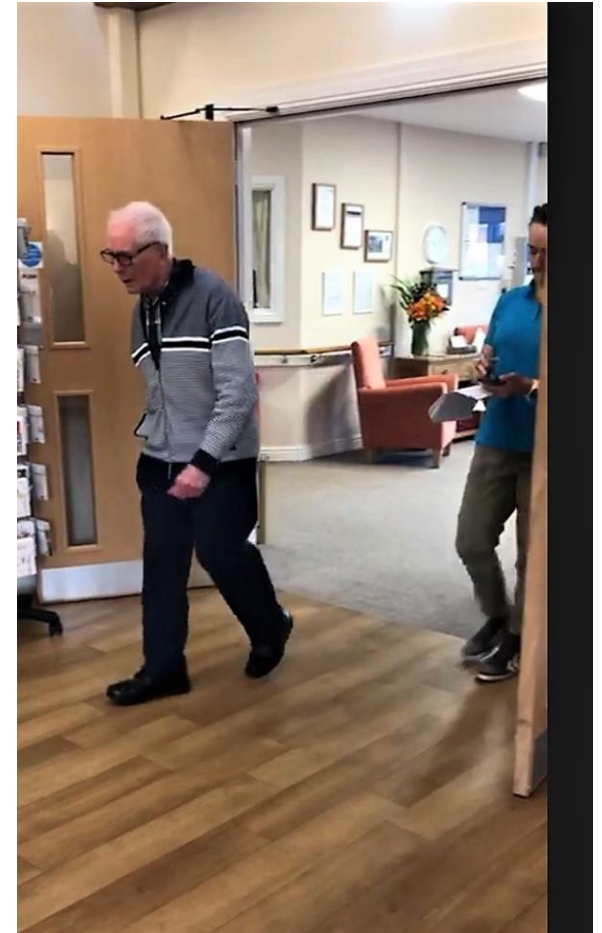




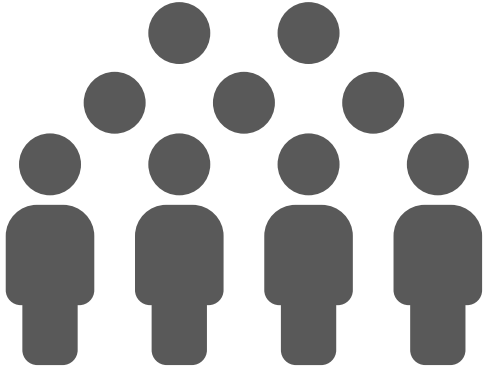
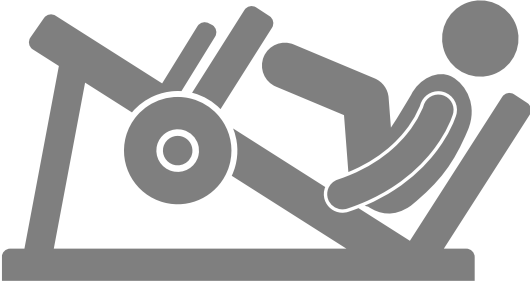
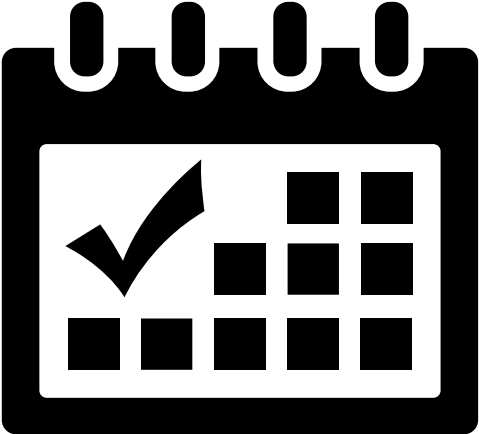
# Improvements in strength and functional capacity contributed to a reduction in frailty



# Resistance training can improve walking speed, movement confidence and wellbeing



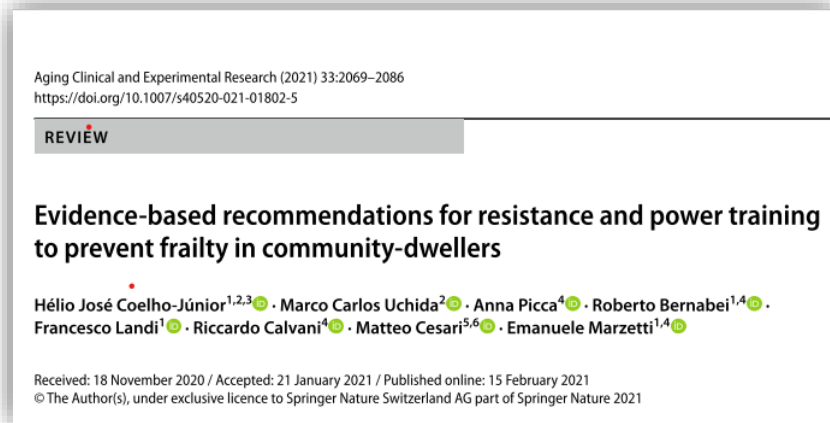
# The feasibility studies had several limitations



# Regular resistance training can deliver cost savings for the health and care system



**“...interventions to reduce the prevalence of muscle weakness among older people are likely to have a substantial beneficial impact on the cost of health and social care in the UK...” Pinedo-Villanueva (2018)**



**“...substantial health care costs are associated with frailty...” Coelho-Júnior (2021)**

# Increasing participation in resistance training among older adults should focus on the specific and unique benefits they value

*Journal of Aging and Physical Activity*, 2016, 24, 119-128  
<http://dx.doi.org/10.1123/japa.2014-0108>  
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ORIGINAL RESEARCH

## Older Adults' Uptake and Adherence to Exercise Classes: Instructors' Perspectives

Helen Hawley-Hague, Maria Horne, Dawn A. Skelton, and Chris Todd

Exercise classes provide a range of benefits for older adults, but adherence levels are poor. We know little of instructors' experiences of delivering exercise classes to older adults. Semistructured interviews, informed by the Theory of Planned Behavior (TPB), were conducted with instructors ( $n = 19$ ) delivering multicomponent exercise classes to establish their perspectives on older adults' uptake and adherence to exercise classes. Analysis revealed 'barriers' to uptake related to identity, choice/control, cost, and venue, and 'solutions' included providing choice/control, relating exercise to identity, a personal touch, and social support. Barriers to adherence included unrealistic expectations and social influences, and solutions identified were encouraging commitment, creating social cohesion, and an emphasis on achieving outcomes. Older adults' attitudes were an underlying theme, which related to all barriers and solutions. The instructor plays an important, but not isolated, role in older adults' uptake and adherence to classes. Instructors' perspectives help us to further understand how we can design successful exercise classes.

**Keywords:** qualitative, attitudes, successful

*Journal of Aging and Physical Activity*, 2017, 25, 311-324  
<https://doi.org/10.1123/japa.2015-0289>  
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SCHOLARLY REVIEW

## Motivators and Barriers for Older People Participating in Resistance Training: A Systematic Review

Elissa Burton, Kaela Farrier, Gill Lewin, Simone Pettigrew, Anne-Marie Hill, Phil Airey, Liz Bainbridge, and Keith D. Hill

Regular participation in resistance training is important for older people to maintain their health and independence, yet participation rates are low. The study aimed to identify motivators and barriers to older people participating in resistance training. A systematic review was conducted including quantitative, qualitative, and mixed-method studies. Searches generated 15,920 citations from six databases, with 14 studies ( $n = 1,937$  participants) included. In total, 92 motivators and 24 barriers were identified. Motivators specific to participating in resistance training included preventing deterioration (disability), reducing risk of falls, building (toning) muscles, feeling more alert, and better concentration. Looking too muscular and thinking participation increased the risk of having a heart attack, stroke, or death, despite the minimal likelihood of these occurring, were barriers. The analysis indicates that increasing participation in resistance training among older people should focus on the specific benefits valued by older people and the dissemination of accurate information to counter misperceptions.

**Keywords:** aging, ageing, strength training, weight training, motivators, barriers, systematic review

JAMDA 17 (2016) 75-84

ELSEVIER

JAMDA

journal homepage: [www.jamda.com](http://www.jamda.com)

Original Study

## An Administrator's Perspective on the Organization of Physical Activity for Older Adults in Long-Term Care Facilities

Veerle Baert PhD, MSc<sup>a,b</sup>, Ellen Gorus PhD<sup>a,b,c</sup>, Koen Calleeuw MSc<sup>a</sup>, Werner De Backer MSc<sup>a</sup>, Ivan Bautmans PhD<sup>a,b,c,\*</sup>

<sup>a</sup>Frailty in Aging Research (FRIA) Department, Vrije Universiteit Brussel (VUB), Brussels, Belgium  
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*Ageing & Society* 39, 2019, 1806-1825. © Cambridge University Press 2018  
doi:10.1017/S0144686X1800034X

## Encouraging older people to engage in resistance training: a multi-stakeholder perspective

SIMONE PETTIGREW\*, ELISSA BURTON†, KAELA FARRIER†, ANNE-MARIE HILL†, LIZ BAINBRIDGE†, PHIL AIREY‡, GILL LEWIN§ and KEITH D. HILL†



# In summary, resistance training can improve and reverse the loss of physical function, build movement confidence, and preserve the independence of older adults in residential care



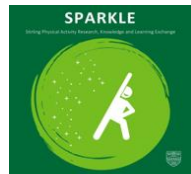
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