



Non-Pharmacological  
Intervention Society

Non Pharmacological Interventions Registry

## Protocol : LiFE (Lifestyle-integrated Functional Exercise) program

Health problem: Risk of falls



Psychosocial

Sheet Code

**NPIS-00000007**

### Designation

Lifestyle-integrated Functional Exercise Programme.

### Abbreviation

LiFE

### Category

Psychosocial

### Main Health benefit

- Risk of falls <https://icd.who.int/browse10/2019/en#/W00-W19>.
- Decrease of 31 % of risk of falls (Clemson, 2012).

- ICD10: W00-W19

## Explanation

NPI designed to integrate physical activity into the daily routines of the elderly.

## Routine Test

Monopodal test and Timed Up and Go (TUG).

## Threshold

Maintenance of less than 5 seconds in the monopodal test and of more than 15 seconds in the Timed Up and Go (TUG) test.

## Minimal Clinically Important Change

Improvement of Test monopodal and/or Timed Up and Go (TUG) tests.

## Secondary benefits

- Improvement of balance (Clemson, 2012).
- Improvement of autonomy (Clemson, 2012).
- Decrease of healthcare costs (Dams, 2024).

## Direct Risks

- Falls with minor consequences.
- Fatigue and minor pain.

## Risks of interaction

None found to date.

## Biological and Psychosocial Mechanisms

The LiFE program improves knowledge, behaviour and attitudes towards falls, rather than functional elements. By accumulating short episodes of walking, it is possible to achieve significant gains in physical activity that can be beneficial to health, particularly for people living in institutions or for those who are very cautious or anxious about walking outdoors, for example (Endress, 2023).

### **The NPI mobilizes neurological mechanisms simultaneously:**

- Neuroplasticity, the brain's ability to reorganize itself by forming new neuronal connections, leading to improved cognitive functions, notably memory, learning and executive functions.
- Cognitive reserve, brain resistance that can delay the onset of cognitive decline and reduce the risk of neurodegenerative diseases.
- Neurotrophic factors, increased levels of brain-derived neurotrophic factor (BDNF) through physical activity, a protein that helps protect existing neurons and encourages the growth of new neurons and synapses.
- Mood regulation.

### **The NPI also mobilizes functional mechanisms:**

- Minimal improvement in balance and coordination through advances in proprioception (the body's ability to perceive its position in space), essential for maintaining balance and coordination.
- Minimal improvement in muscular strength through gains in muscle fibre and muscular efficiency.
- Improved functional mobility, the ability to move more easily and safely in different environments (walking, climbing stairs, using the toilet, etc.).
- Minimal improvement in cardiovascular health by boosting blood circulation, reducing blood pressure and improving lipid profiles. This promotes overall heart health and reduces the risk of cardiovascular disease.
- Hormonal regulation through the release of various hormones such as endorphins (mood enhancement and stress reduction) and blood sugar management (insulin sensitivity).

## Responding population

- People over 65 at high risk of falling.
- People over 80 at moderate or high risk of falling.

- Program feasible for people with moderate cognitive impairment (Belala, 2019).

## Nonresponding population

- People with severe cognitive impairment.
- Acute conditions (severe infection, recent surgery, uncontrolled chronic illness).
- Uncontrolled cardiovascular conditions (severe hypertension, heart failure).

## Participants

### Individual

## Duration

8 weeks

## Sessions per week

1 supervised 30-minute session.

## Procedure

- Easily acceptable program if the professional is trained (Reicherzer, 2021).
- Initial assessment at home with a health check-up by the healthcare professional to evaluate physical abilities and identify fall risks.
- Integrated functional exercises with the aim of integrating exercises into daily activities to improve strength, balance and coordination.
- Personalization and progression according to each individual's abilities.
- Incorporate exercises into daily routines such as housework, gardening or shopping.
- Exercises are performed several times a day, every day of the week.
- Follow-up and adjustments based on progress and feedback from the participant.
- Encouragement to progressively increase the difficulty of the exercises.
- Encouragement of regularity with continuous integration of exercises into daily routine to maintain long-term benefits.
- Regular follow-up to ensure that exercises are performed correctly and safely.

## Components

The LiFE program focuses on integrating exercise into everyday tasks. This approach ensures that physical activity becomes an integral part of daily life, making it easier to maintain over the long term.

### **The program is based on 6 components:**

- Muscle mobilization using everyday activities such as carrying groceries or lifting household objects to develop muscle strength.
- Personalization of everyday movements to ensure that exercises are both stimulating and achievable, promoting adherence and effectiveness, and may involve small modifications to the home to facilitate physical activity in complete safety (tidying up, support bars, etc.).
- Mobilization of balance by strengthening the lower limbs, ankles (toe-lifting exercises, posture on heels, etc.) and trunk (leg lifts while sitting, posture on one leg while brushing teeth or washing dishes, etc.).
- Functional movements from real life, such as getting up from a chair without using your hands, or going up and down stairs.
- The use of behavior change techniques (strategies to encourage long-term adherence, such as setting realistic and achievable physical activity goals, self-monitoring and self-assessment of progress, problem-solving by identifying and overcoming barriers to exercise such as lack of motivation or physical limitations) (Mikolaizak, 2022).
- Support for the justification of daily physical activity and living arrangements, in particular for falls prevention (information on the benefits of exercise and advice on how to integrate it into daily life, regular follow-up).

## Equipment

- Comfortable clothes and shoes.
- Common household tools.
- Chairs.
- Stairs.

## Location

Home.

## Best implementation practices

- A professional manual of the LiFE programme <https://open.sydneyuniversitypress.com.au/9781743324004.html> is available online (Clemson, 2014a).
- A free LiFE program guide for participants also available online (Clemson, 2014b).
- The success of the program lies in the willingness to integrate physical exercise into daily routines (Hezel, 2021).
- Provide information on the benefits of physical exercise and advice on how to integrate it into daily life (Dargent-Molina, 2017).
- Offer periodic check-ups to adjust the program if necessary and provide encouragement.
- The NPI can be prescribed as a first-line treatment in general practice (Gibbs, 2019).
- Participants who performed balance activities more frequently ( $\geq 4$  days/week) scored better in the balance and physical activity domain (Nerz, 2022).

## Best practices for sustainability

- The NPI prepares all participants to pursue pleasant, independent physical activity in their immediate environment, in line with public health recommendations on frequency, intensity and variety.
- Medication and dietary supplements should be regularly reviewed by the attending physician.
- Alcohol consumption should be limited, particularly in cases of dizziness or drowsiness.
- Regular visits to an ophthalmologist are recommended, as reduced vision induced by advanced glaucoma or cataracts, for example, is a risk factor for falls.
- Shoes should be well-fitting, with good support both inside and out.

## Precautions

Organization of safe practices adapted to the difficulties and/or impairments in adapted areas of the home and surrounding area.

## Regulatory specification

- Medical prescription.

- Free of charge, but the practitioner must systematically cite the LiFE program <https://open.sydneyuniversitypress.com.au/9781743324004.html>

## Main Initiator

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## Qualification required

- Occupational therapist trained at the NPI.
- Nurse trained at the LiFE program.

## References

### Prototypical study

Clemson L et al. LiFE Pilot Study: A randomised trial of balance and strength training embedded in daily life activity to reduce falls in older adults. *Aust Occup Ther J.* 2010 Feb;57(1):42-50. <https://doi.org/10.1111/j.1440-1630.2009.00848.x>

### Pivotal mechanistic study

Endress C et al. Lifestyle-integrated functional exercise for fall prevention: How and why do walking characteristics change?. *Z Gerontol Geriatr.* 2023 Oct;56(6):464-469. German. <https://doi.org/10.1007/s00391-023-02230-y>

### Pivotal intervention trials

Clemson L et al. Integration of balance and strength training into daily life activity to reduce rate of falls in older people (the LiFE study): randomised parallel trial. *BMJ.* 2012 Aug 7;345:e4547. <https://doi.org/10.1136/bmj.e4547>

Jansen CP et al. Comparison of falls and cost-effectiveness of the group versus individually delivered Lifestyle-integrated Functional Exercise (LiFE) program: final results from the LiFE-is-LiFE non-inferiority trial. *Age Ageing.* 2023 Jan 8;52(1):afac331. <https://doi.org/10.1093/ageing/afac331>

## **Intervention studies assessing the risks**

Jansen CP et al. Comparison of a group-delivered and individually delivered lifestyle-integrated functional exercise (LiFE) program in older persons: a randomized noninferiority trial. *BMC Geriatr* 2018;18:267. <https://doi.org/10.1186/s12877-018-0953-6>

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## **Implementation study in Europe**

Nerz C et al. Group-based and individually delivered LiFE: Content Evaluation and Predictors of Training Response - A Dose-Response Analysis. *Clin Interv Aging*. 2022 Apr 27;17:637-652. <https://doi.org/10.2147/CIA.S359150>

## **Other**

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Dargent-Molina P et al. Prévention des chutes chez les personnes âgées de plus de 75 ans vivant à leur domicile: analyse des interventions efficaces et perspectives de santé publique. *Bull Epidemiol Hebd*. 2017;(16-17):336-43. [https://beh.santepubliquefrance.fr/beh/2017/16-17/2017\\_16-17\\_6.html](https://beh.santepubliquefrance.fr/beh/2017/16-17/2017_16-17_6.html)

Gibbs JC et al. Measuring the implementation of Lifestyle-Integrated Functional Exercise in primary care for older adults: Results of a feasibility study. *Can J Aging*. 2019 Sep;38(3):350-

366. <https://doi.org/10.1017/S0714980818000739>

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Mikolaizak AS et al. Impact of adherence to a lifestyle-integrated programme on physical function and behavioural complexity in young older adults at risk of functional decline: a multicentre RCT secondary analysis. BMJ Open. 2022 Oct 5;12(10):e054229. d <https://doi.org/10.1136/bmjopen-2021-054229>

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**LiFE (Lifestyle-integrated Functional Exercise) program**, NPIS reference document for INM, Code sheet NPIS-00000007, Version V02, 2024.

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