

# Exergaming-Based Sitting Tai Chi for Older Adults in Residential Care at Risk of Sarcopenia and/or Prefrailty: A Randomized Controlled Trial Protocol

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## Background

Older adults in residential care commonly experience sarcopenia and frailty-related decline. Frailer residents may have difficulty accessing or sustaining conventional exercise programs, creating a need for engaging, lower-impact alternatives.

This trial evaluates whether a chair-based exergaming Tai Chi program can offer a feasible gerontechnology approach to support healthy aging in institutional settings.

## Clinical problems

- Muscle weakness and frailty-related functional decline
- Elevated fall risk and reduced independence
- Limited suitability of standard exercise formats

## Intervention rationale

- Sitting Tai Chi lowers physical demands
- Exergaming may improve motivation and adherence
- Interactive training targets multiple domains

## Participants

- 152 residents aged 60+ meeting screening criteria for risk of sarcopenia and/or prefrailty
- Allocation: 1:1 randomized
- Masking: outcome-assessor blinded
- Assessment points: baseline, mid-intervention, post-intervention, and a 3-month follow-up

## Outcome Measures

Primary outcome: Dominant-hand grip strength

Key secondary outcome: Sitting balance and functional reach (Modified Functional Reach Test)

Additional secondary outcomes:

- Muscle mass (skeletal muscle mass index)
- Lower-extremity function (Five Times Sit-to-Stand)
- Independence in activities of daily living (Katz Index of Independence in Activities of Daily Living)
- Upper-limb dexterity and eye-hand coordination (Box and Block Test)
- Global cognition (Montreal Cognitive Assessment)
- Attention (finger-press reaction task)
- Anxiety and depression (Hospital Anxiety and Depression Scale)
- Health related-quality of life (EuroQol-5 Dimensions 5-Level)

## Poster snapshot

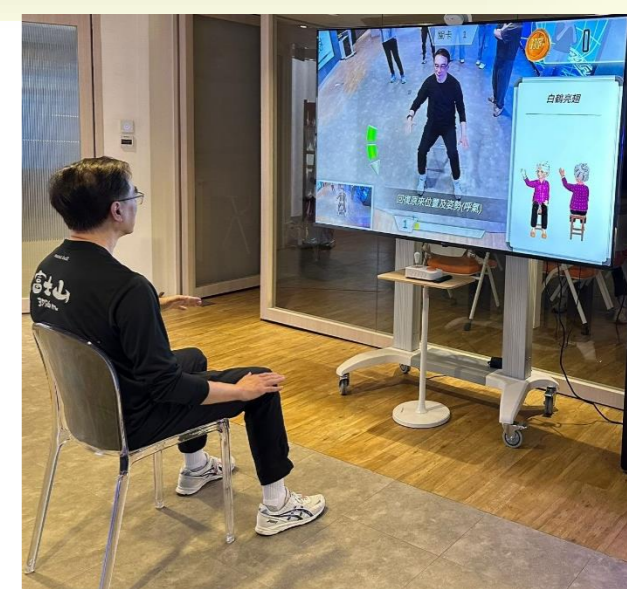
**Status:** recruitment began February 2026; ongoing

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## Intervention Group

- ❑ Structured exergaming-based sitting Tai Chi delivered via a gaming console (Alpha, Motive Force Hong Kong), co-designed with an industrial partner
- ❑ Two 60-minute sessions per week over 12 weeks
- ❑ Interactive body-tracking and real-time feedback
- ❑ Progressive phases: learning, skill-specific training, game modes
- ❑ Targets balance control, eye-hand coordination, and limb flexibility



## Control Group

- ❑ Time-matched health education programme with no exercise or sarcopenia/frailty content

## Analysis

Linear mixed-effects models will be used to examine group-by-time effects across repeated measurements

## Why This Matters

- 🎯 Addresses an important care gap for residents with mobility limitation or low exercise tolerance
- 🎯 Tests a chair-based, potentially scalable intervention in real-world residential care settings
- 🎯 Combines mind-body exercise with Gerontechnology to improve engagement



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