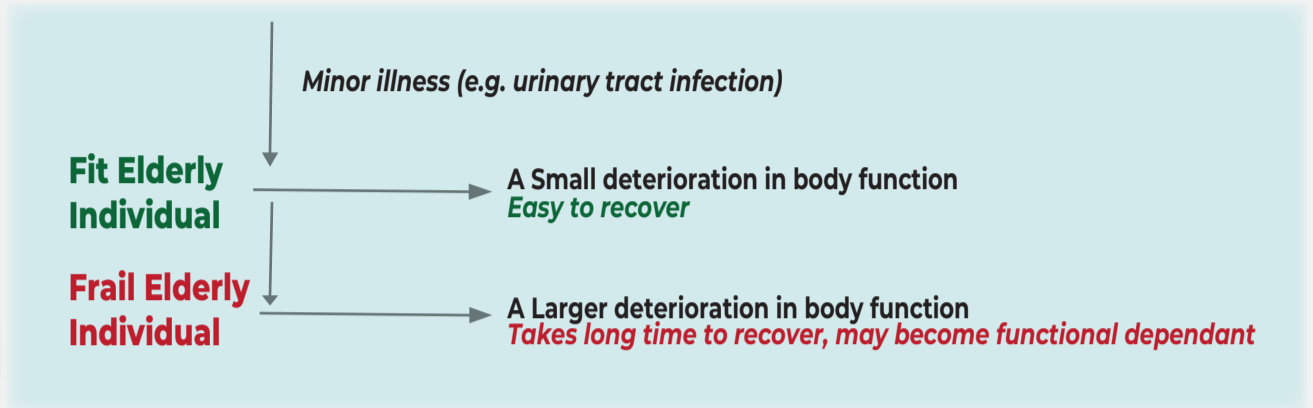


Understanding Frailty



“Frailty is not an inevitable part of aging!”

Frailty is a state of increased vulnerability across multiple health domains that leads to adverse health outcomes. Around 10% of people aged over 65 have frailty, rising to between 25% - 50% of those aged over 85.



FRAILTY HEALTHY OUTCOMES



Falls (e.g. collapse, “found lying on floor”)



Immobility (e.g. “gone off legs”, “stuck in toilet”)



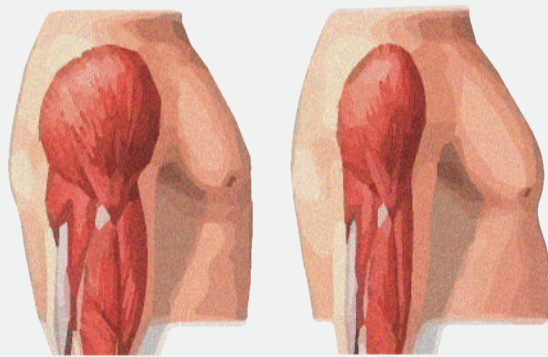
Incontinence (e.g. new onset or worsening of urine or faecal incontinence)



Delirium (e.g. acute confusion, “muddledness”)



Susceptibility to side effects of medication
(e.g. confusion with codeine, hypotension with antidepressants)



SARCOPENIA

Sarcopenia is a key component of frailty, characterised by progressive loss of skeletal muscle mass and strength. Muscle strength is required for the critical basic mobility skills of getting out of bed, standing up from a chair, etc.

Sarcopenia may be a precursor to the development of frailty and its adverse health outcomes (dependent for care needs)).

Left: Normal Body Mass;
Right: Muscle Wasting
(Figure from the International Osteoporosis Foundation (2017))

FRIED’S FRAILTY MODEL

- Standard Model to Identify Frailty

Indicators/Phenotypes

Measure

Weight loss

Self-reported weight loss >4.5 kg or recorded weight loss >5% per annum

Exhaustion

Self-reported exhaustion on CES-D scale (3-4 days per week or most of the time)

Low Energy Expenditure

Energy expenditure <383kcal/week (males) or <270kcal/week (females)

Slowness

Standardized cutoff times to walk 4.57m, stratified by sex and height

Weakness

Grip strength, stratified by sex and body-mass index

Frailty states

no frail (0 measure present); pre-frail (1-2 measures present); and frail (>=3 measures present)

Understanding Frailty



ROOTHEAL
MEDICAL CLINIC

Prevalence of Frailty

Women had higher rates of frailty than men.

Men with frailty had higher mortality than women.

Around 10% of people aged over 65 live with frailty. This figure rises to between 25% and a 50% for those aged over 85.

Modifiable Risk Factors

Lifestyle

Dietary patterns, physical inactivity, smoking and alcohol consumption increases the risks of developing frailty.

Clinicals

Obesity, chronic disease, malnutrition, and depression can be the clinical risk factors for frailty.

Biologicals

Immune function, nutrient deficiencies, sarcopenia

Frailty

Stressors

(Stressful events/chronic conditions)

Stressful events/ chronic conditions. Frailty increases vulnerability for patient's capacity to adapt, so patients tend to result in risk adverse outcomes (e.g. falls, delirium)

Frequent Clinical Presentations

Falls

(Balance and gait impairment are major features of frailty which patients experience repeated and spontaneous falls.)

Delirium

(Rapid onset of fluctuating confusion and impaired awareness.)

Fluctuating Disability

(Patient can have "good" independent day, and "bad" days on which care is often needed.)

Increased Care Needs
Admission to Hospital
Admission to Long-term Care



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Managing Frailty



Although certain interventions are benefit to frailty syndrome, especially diets, nutritional supplements, hormonal supplements, exercises have been shown to improve the signs and symptoms of frailty, but there is currently no specific medical therapy available to prevent or treat the frailty syndrome.

PHYSICAL ACTIVITY & EXERCISE

Exercise showed positive study to prefrail or frail individuals. **Postive outcomes:**

- Improved frailty score
- Reduced frailty prevalence
- Improved strength, gait speed, physical activity and balanced and reduced exhaustion

Examples:

Resistance training, balance and gait retraining, aerobic training, high intensity walking training (HIWT)



Recommended Total Exercise Duration

60 Min

Pre-Frail

45 Min

Frail

However, supervision and tailor-made program are needed to achieve different goals and prevent low efficacy of the program.

NUTRITION

Unintentional weight loss is one of the criterion in frailty phenotype model and a risk factor to increase prevalence of frailty.

Proper nutrition provides energy and essential nutrients while helping to maintain homeostasis.

Examples:

Nutritional supplementation (including protein formula, micronutrients, milk fat globule membrane)



MULTICOMPONENT INTERVENTIONS

Multicomponent interventions comprise exercise and nutrition programs (& cognitive training)

Exercise + Nutrition ± Cognitive Training

Components appeared to have additive effects which are robust to the good compliers of the intervention to get the benefits.

Postive outcomes:

- Reduced frailty prevalence
- Improved frailty score
- Improved (or preserved) gait speed, improved hand-grip strength and physical activity & reduced exhaustion



COGNITIVE TRAINING

Cognitive training (CT) is a treatment, that does not taking any medication, focusing on guided practice on tasks that target specific cognitive functions, such as memory, attention, or problem-solving.

Examples:

Weekly and fortnightly sessions incorporating cognition enhancing activities (targeting memory, attention, problem solving, judgement and reasoning)

However, less studies were conducted to show the effects of cognitive training alone on frailty.



EDUCATION SESSIONS & HOME VISITS

The effectiveness of group education sessions appeared to vary according to the frailty status of participants.

Postive outcomes:

- Reduced frailty prevalence
- Reduced progression in frailty status from not-at-risk to at-risk

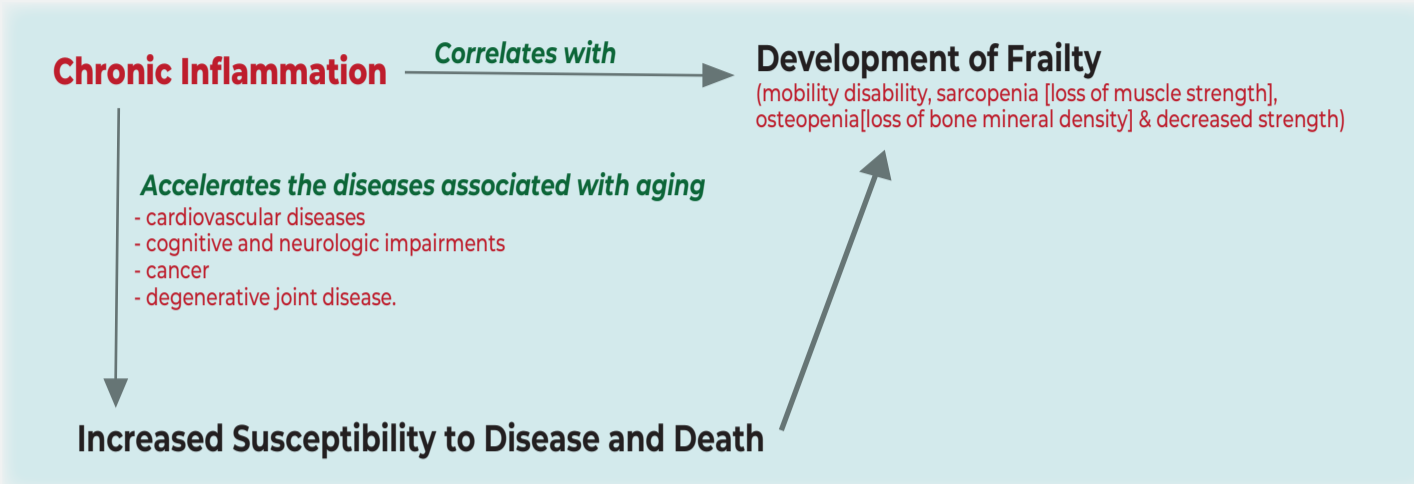
Examples:

- Group / Individual education
- Single/ regular home visits by a trained professional
- Education content included the ageing process, available support services and home risk assessment and modification.

Regenerative Medicine & Frailty

Frailty does not fall neatly into classical medical definitions of disease, because they result from gradual declines in physiological function that occur over many years instead of specific organ-related disease. Regenerative medicine in frailty targets the research either in treating the frailty-affected organs or the aging pathway.

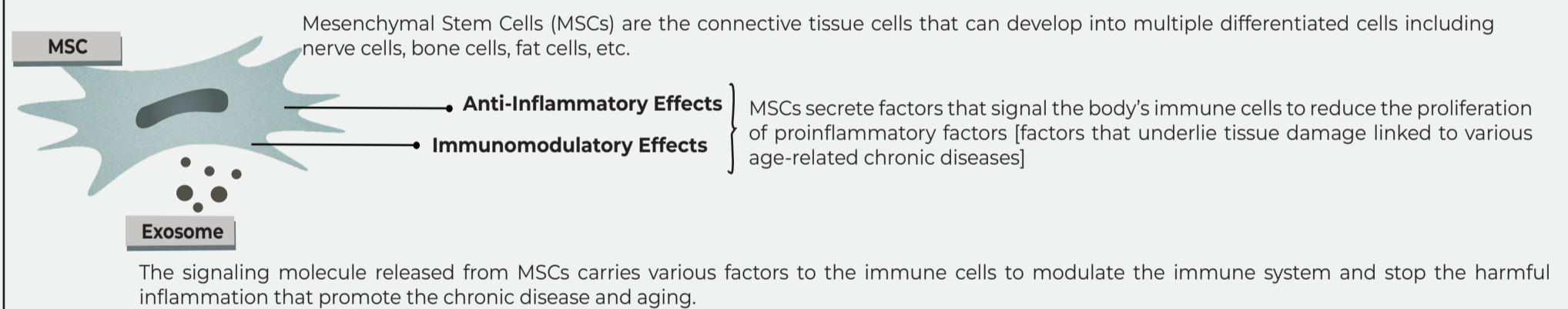
Role of Inflammation in Frailty



Inflammation is the body's immune system to fight against harmful irritant. In some diseases, the immune system fights against body's own cells by mistakes, causing own cell damage. Harmful inflammation when comes to a severe condition, can cause organ failure.

➤ Evidences had shown that chronic inflammation could underlie, link to or accelerate the syndrome of aging frailty, leading to various impairments.

MSCs as a Therapeutic Strategy for Frailty



The Potential Effects of MSCs on Frailty Phenotypes

Frailty Phenotypes	Therapeutic MSCs Effects
<i>Unintentional Weight Loss</i>	Decreased Chronic Inflammation
<i>Low Energy Levels and Exhaustion</i>	Increased Pulmonary Function, Decreased Chronic Inflammation
<i>Low Physical Activity</i>	Decreased Chronic Inflammation, Increased Quality of Life
<i>Slow Gait Speed</i>	Increased 6-min Walk Distance
<i>Weak Grip Strength</i>	Increased Physical Performance

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