

Exercise prescription

Dr. Muthoni Gichu

Division of Geriatric Medicine

Department of Non-communicable Diseases

Ministry of Health

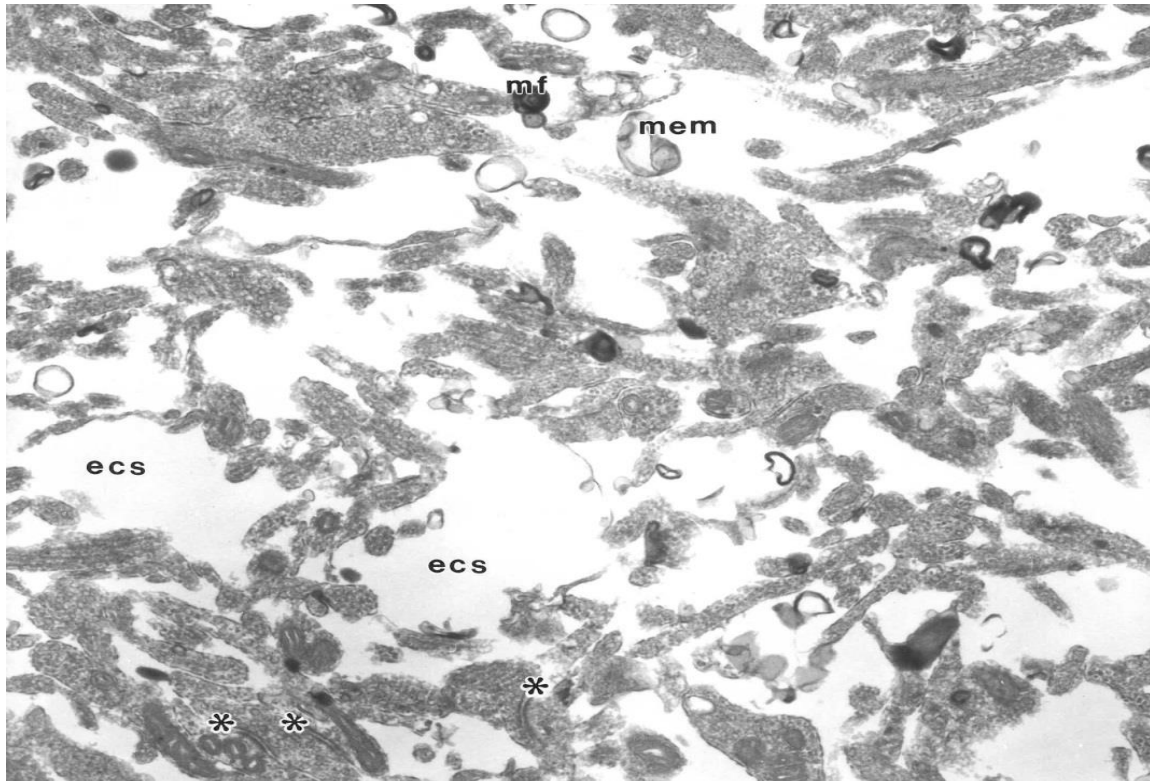
DEMENTIA

- Alzheimer's disease is *one type* of dementia
- **Dementia** is a *general term* meaning “progressive mental decline” – can involve memory, language, judgment, intellect
- Dementia can be
 - **Primary (progressive and irreversible)**; examples include Lewy-Body dementia, fronto-temporal dementia, Alzheimer's disease, and other less common dementias
 - **Secondary (potentially reversible)**; for example, secondary to a brain tumor

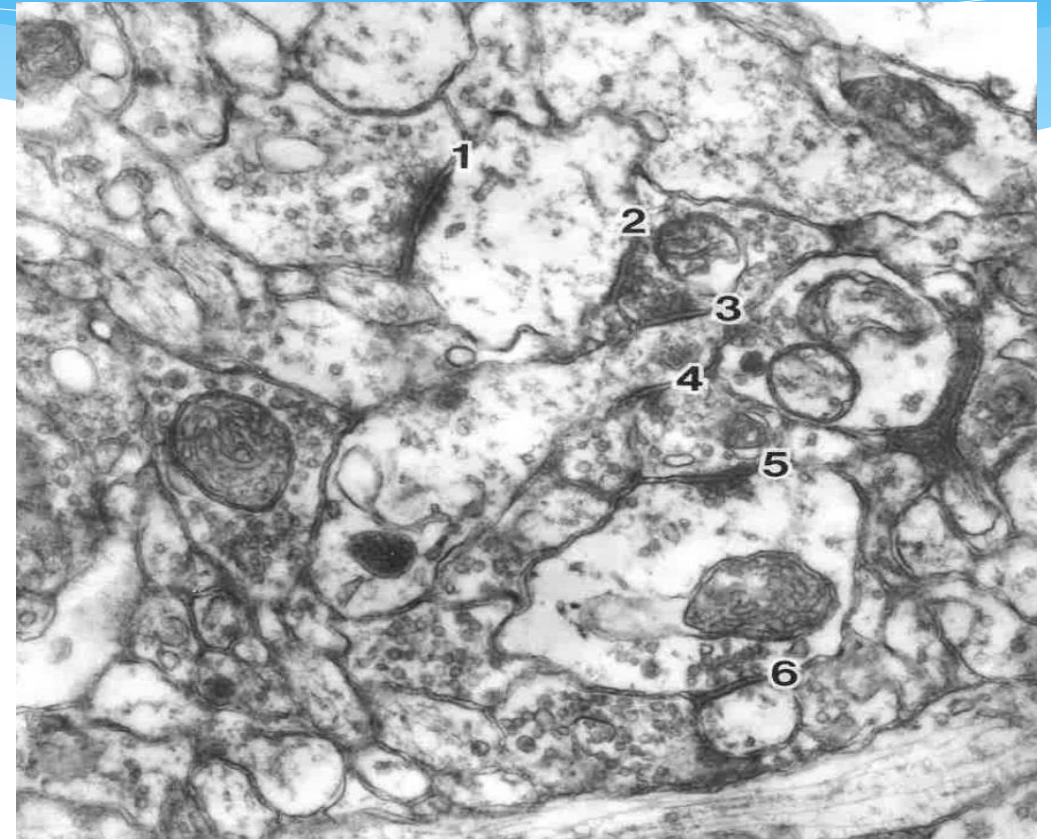
ALZHEIMER'S DISEASE IS A DISORDER OF *DYSREGULATION*

- *Dysregulation of cortical neurons*
- *Dysregulation of the brain's immune response*
- *Dysregulation of the brain's metabolism*
- *Dysregulation of the normal removal of toxic substances from the brain*

β -Amyloid Protein is Normally removed from the Brain during Restful Sleep



Extracellular (ecs or interstitial) space is abundant in the developing brain



In the adult brain, there is much less extracellular space; this *increases* by 60% at night – and toxic waste products are removed across the blood-brain barrier

BEHAVIORAL CHANGES IN ALZHEIMER'S DISEASE

- * **Memory loss**
- * **Decreased initiative**
- * **Depression; emotional instability**
- * **Inability to inhibit behavior**
- * **Faulty judgment, loss of insight**
- * **Severe language deficits**
- * **LOSS OF “SELF” and ABILITY TO “ENGAGE” INTERNALLY**

Physical Benefits of Exercise

■ Increases

**Endurance
Strength (muscle & bone)
Flexibility
Balance & posture
Restful sleep
Resistance to stress
Overall cardiovascular fitness
Weight control**

■ Decreases

**Hypertension
Heart disease
Type II diabetes
Osteoporosis
Falls**

Cognitive Benefits of Exercise

■ *Increases*

- ❖ Generation of new neurons in hippocampus and prefrontal cortex
- ❖ Survival of neurons (by ↑ neurotrophic factors and ↑ blood supply)
- ❖ Synaptic Plasticity (modifiability of synapses through multiple mechanisms)
- ❖ Restful sleep (promotes memory consolidation and ↑↑ amyloid clearance from the brain)
- ❖ Production of Neurotransmitters/Substances that play a role in Attention, Arousal, Mood & Well-Being

■ *Decreases*

- ❖ Age-related loss of neurons in cortex
- ❖ Age-related decline in cognitive performance
- ❖ Risk for Alzheimer's Disease

Promoting functional independence

- ◆ Encourage “dyadic” interventions including environmental assessment and modification, problem solving and carer training
- ◆ Encourage exercise

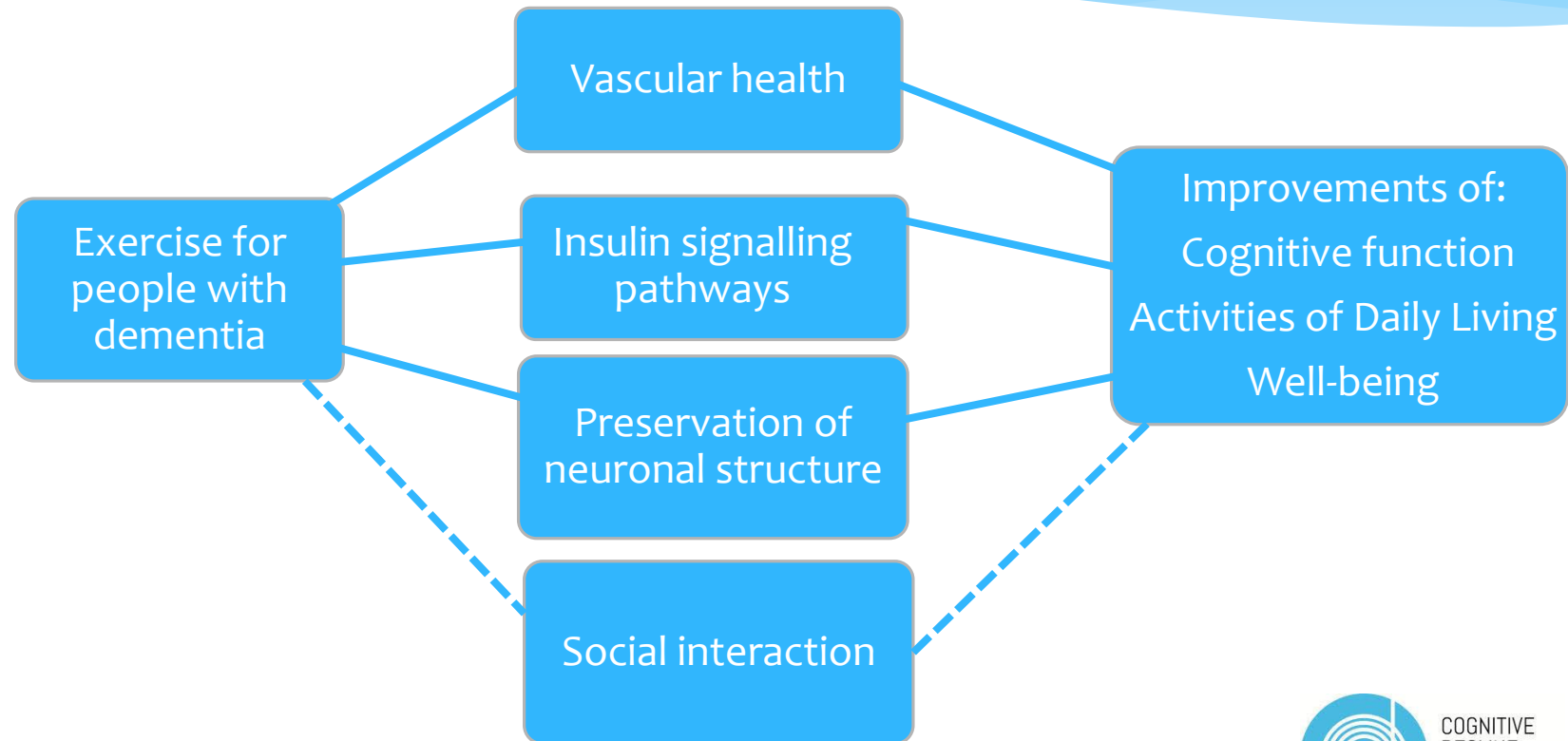
Exercise and Dementia



Exercise

- * **Exercise** is a subcategory of physical activity that is *planned, structured, repetitive and purposeful* whose main objective is to improve one or more components of physical fitness
- * **Physical activity** is any bodily movement produced by skeletal muscles that requires energy expenditure

How exercise may benefit people with dementia



Recommendations for management of frailty in dementia

* Aerobic exercise:

- * Some suggestion increases hippocampal size
- * Slows cognitive decline and improves function in people with mod-severe dementia
- * Is feasible in nursing home residents with dementia

* Resistance/strength training:

- * Lowers interleukins and TNF- α
- * Improves cognitive function (in older people without cognitive impairment)

General Principles of Exercise Prescription

An Introduction to the Principles of Exercise Prescription

- * Designed to meet *individual* health and physical fitness goals
- * The principles of exercise prescription (Ex R_x) are intended to exercise professionals in the development of an *individually* tailored Ex R_x for the apparently healthy adult whose goal is to improve physical fitness and health

An Introduction to the Principles of Exercise Prescription (cont.)

- * *FITT-VP* principle of exercise prescription
 - * Frequency (how often)
 - * Intensity (how hard)
 - * Time (duration or how long)
 - * Type (mode or what kind)
 - * Total Volume (amount)
 - * Progression (advancement)
- * Based on application of existing scientific evidence
- * Intended as guidelines for apparently healthy adults

An Introduction to the Principles of Exercise Prescription (cont.)

- * For most adults, an exercise program including aerobic, resistance, flexibility, and neuromotor exercise training is *indispensable* to improve and maintain physical fitness and health
- * Some individuals will want to or need to include only some of the health-related components of physical fitness in their training regimen or exercise less than suggested by the guidelines presented in this chapter
 - * Performing some exercise is beneficial, especially in inactive or deconditioned individuals, and, for that reason, should be encouraged except where there are safety concerns

General Considerations for Exercise Prescription

- * The optimal Ex Rx should address the health-related physical fitness components of
 - * cardiorespiratory (aerobic) fitness
 - * muscular strength and endurance
 - * flexibility
 - * body composition

General Considerations for Exercise Prescription

- * Separately, a reduction in the time spent in sedentary activities is important for the health of both physically active and inactive individuals and a plan to decrease periods of physical inactivity should be included in the Ex Rx.
- * Long periods of sedentary activity are associated with elevated risks of cardiovascular disease (CVD) mortality, worsened cardiometabolic disease biomarkers, and depression.
- * The adverse health effect of prolonged sedentary activity is more pronounced in inactive adults, but also applies to those adults who are currently meeting the PA guidelines

General Considerations for Exercise Prescription (cont.)

- * Musculoskeletal injuries may be reduced by including a warm-up and cool-down, stretching exercises, and gradual progression of volume and intensity

General Considerations for Exercise Prescription (cont.)

- * The risk of CVD complications, which is of particular concern in middle-aged and older adults, can be minimized by
 - * following the pre-participation health screening and evaluation
 - * beginning a new program of exercise at light-to-moderate intensity, and
 - * employing a gradual progression of the quantity and quality of exercise.

General Considerations for Exercise Prescription (cont.)

- * Bone health is of great importance to younger and older adults, especially among women
 - * Loading exerciss (i.e., weight bearing and resistance exercise should be part of the exercise program, especially in individuals at risk for low bone density
- * An individual's goals, physical ability, physical fitness, health status, schedule, physical and social environment, and available equipment and facilities should be considered when designing the FITT-VP principle of Ex Rx for a client or patient

Components of an exercise training session

Warm-up: at least 5–10 min of light-to-moderate intensity cardiorespiratory and muscular endurance activities

Conditioning: at least 20–60 min of aerobic, resistance, neuromotor, and/or sports activities (exercise bouts of 10 min are acceptable if the individual accumulates at least 20–60 min · d⁻¹ of daily aerobic exercise)

Cool-down: at least 5–10 min of light-to-moderate intensity cardiorespiratory and muscular endurance activities

Stretching: at least 10 min of stretching exercises performed after the warm-up or cool-down phase

Aerobic (Cardiorespiratory Endurance) Exercise

- * Frequency of exercise
 - * Aerobic exercise is recommended on 3–5 d/ wk for most adults, with the frequency varying with the intensity of exercise.
 - * Improvements in cardiorespiratory fitness (CRF) are attenuated with exercise frequencies more than 3 d /wk and a plateau in improvement with exercise done more than 5 d/wk
 - * Vigorous intensity exercise performed more than 5 d/wk might increase the incidence of musculoskeletal injury, so this amount of vigorous intensity, physical activity is not recommended for adults who are not well conditioned

Aerobic Exercise Frequency Recommendation

Moderate intensity, aerobic exercise done at least 5 d/wk;

Or

vigorous intensity, aerobic exercise done at least 3 d/wk;

Or

a weekly combination of 3–5 d/wk of moderate and vigorous intensity exercise is recommended for most adults to achieve and maintain health/fitness benefits

Aerobic (Cardiorespiratory Endurance) Exercise (cont.)

- * Intensity of exercise

- * There is a positive dose response of health/fitness benefits that results from increasing exercise intensity
- * The minimum threshold of intensity for benefit seems to vary depending on an individual's CRF level and other factors such as age, health status, physiologic differences, genetics, habitual physical activity, and social and psychological factors

Aerobic (Cardiorespiratory Endurance) Exercise (cont.)

- * Methods of estimating the relative intensity of exercise
 - * %Heart Rate Reserve (HRR)
 - * %HR_{max}
 - * %VO₂R
 - * %VO₂
 - * %METs

Aerobic (Cardiorespiratory Endurance) Exercise (cont.)

- * Methods of estimating the intensity of exercise
 - * Rating of perceived exertion (RPE)
 - * Affective valence
 - * OMNI Scale
 - * **Talk Test**
 - * Feeling Scale

Commonly used equations for Estimating Maximum Heart Rate

Author	Equation	Population
Fox et al. (35)	$HR_{max} = 220 - \text{age}$	Small group of men and women
Astrand (8)	$HR_{max} = 216.6 - (0.84 \times \text{age})$	Men and women age 4–34 yr
Tanaka et al. (101)	$HR_{max} = 208 - (0.7 \times \text{age})$	Healthy men and women
Gellish et al. (38)	$HR_{max} = 207 - (0.7 \times \text{age})$	Men and women participants in an adult fitness program with broad range of age and fitness levels
Gulati et al. (47)	$HR_{max} = 206 - (0.88 \times \text{age})$	Asymptomatic middle-aged women referred for stress testing

HR_{max} , maximal heart rate.

$\%HR_{max}$ (Measured or Estimated) Method:

Available data:

A man 45 yr of age

Desired exercise intensity: 70%–80%

Formula: $THR = HR_{max} \times \text{desired \%}$

Calculate estimated HR_{max} (if measured HR_{max} not available):

$$HR_{max} = 220 - \text{age}$$

$$HR_{max} = 220 - 45 = 175 \text{ beats} \cdot \text{min}^{-1}$$

1) Determine THR range:

$$THR = \text{Desired \%} \times HR_{max}$$

Convert desired % HR_{max} into a decimal by dividing by 100

Determine lower limit of THR range:

$$THR = 175 \text{ beats} \cdot \text{min}^{-1} \times 0.70 = 123 \text{ beats} \cdot \text{min}^{-1}$$

Determine upper limit of THR range:

$$THR = 175 \text{ beats} \cdot \text{min}^{-1} \times 0.80 = 140 \text{ beats} \cdot \text{min}^{-1}$$

THR range: 123 beats \cdot min⁻¹ to 140 beats \cdot min⁻¹

Aerobic (Cardiorespiratory Endurance) Exercise (cont.)

- * Exercise time (duration)

- * Prescribed as a measure of the amount of time PA is performed

- * It is recommended that most adults accumulate 30–60 min/d⁻¹ (≥ 150 min \cdot wk⁻¹) of moderate intensity exercise, 20–60 min/d⁻¹ (≥ 75 min \cdot wk⁻¹) of vigorous exercise, or a combination of moderate and vigorous exercise per day

Aerobic (Cardiorespiratory Endurance) Exercise (cont.)

- * Exercise time (duration)

- * For weight management, longer durations of exercise (≥ 60 – 90 min/d) may be needed, especially in individuals who spend large amounts of time in sedentary behaviors

Aerobic (Cardiorespiratory Endurance) Exercise (cont.)

- * Exercise time (duration)

- * The recommended time/duration of physical activity may be performed continuously (*i.e.*, one session) or intermittently and can be accumulated over the course of a day in one or more sessions of physical activity that total at least 10 min · session⁻¹
- * Exercise bouts of less than 10 min may yield favorable adaptations in very deconditioned individuals or when done as part of a high intensity aerobic interval program

Aerobic Exercise Time (Duration) Recommendation

Most adults should accumulate 30–60 min · d⁻¹ (≥150 min · wk⁻¹) of moderate intensity exercise, 20–60 min · d⁻¹ (≥75 min · wk⁻¹) of vigorous intensity exercise, or a combination of moderate and vigorous intensity exercise daily to attain the recommended targeted volumes of exercise.

This recommended amount of exercise may be accumulated in one continuous exercise session or in bouts of ≥10 min over the course of a day

Durations of exercise less than recommended can be beneficial in some individuals.

Aerobic (Cardiorespiratory Endurance) Exercise (cont.)

* Type (mode)

- * Rhythmic, aerobic type exercises involving large muscle groups are recommended for improving cardiorespiratory fitness
- * The specificity principle states that the physiologic adaptations to exercise are specific to the type of exercise performed

Modes of Aerobic (Cardiorespiratory Endurance) Exercises to Improve Physical Fitness

Exercise Group	Exercise Description	Recommended for	Examples
A	Endurance activities requiring minimal skill or physical fitness to perform	All adults	Walking, leisurely cycling, aqua-aerobics, slow dancing
B	Vigorous intensity endurance activities requiring minimal skill	Adults (as per the preparticipation screening guidelines in <i>Chapter 2</i>) who are habitually physically active and/or at least average physical fitness	Jogging, running, rowing, aerobics, spinning, elliptical exercise, stepping exercise, fast dancing
C	Endurance activities requiring skill to perform	Adults with acquired skill and/or at least average physical fitness levels	Swimming, cross-country skiing, skating
D	Recreational sports	Adults with a regular exercise program and at least average physical fitness	Racquet sports, basketball, soccer, downhill skiing, hiking

Aerobic Exercise Type Recommendation

Rhythmic, aerobic exercise of at least moderate intensity that involves large muscle groups and requires little skill to perform is recommended for all adults to improve health and CRF. Other exercise and sports requiring skill to perform or higher levels of fitness are recommended only for individuals possessing adequate skill and fitness to perform the activity.

Aerobic (Cardiorespiratory Endurance) Exercise (cont.)

- * Exercise volume (quantity)
 - * Product of *Frequency*, *Intensity*, and *Time* (duration) or *FIT* of exercise.

Aerobic (Cardiorespiratory Endurance) Exercise (cont.)

- * Exercise volume (quantity)
 - * There is a dose-response *association* between the volume of exercise and health/fitness outcomes (*i.e.*, with greater amounts of physical activity, the health/fitness benefits also increase).

Aerobic (Cardiorespiratory Endurance) Exercise (cont.)

- * Exercise volume (quantity)
 - * Pedometers are effective tools for promoting physical activity and can be used to approximate exercise volume in steps per day
 - * The goal of 10,000 steps · d⁻¹ is often cited, but it appears that achieving a pedometer step count of at least 5,400–7,900 steps · d⁻¹ can meet recommended exercise targets

Aerobic Exercise Volume Recommendation

A target volume of $\sim 150 \text{ min} \cdot \text{wk}^{-1}$ of moderate intensity exercise, or pedometer counts of $\geq 5,400\text{--}7,900 \text{ steps} \cdot \text{d}^{-1}$. Because of the substantial errors in prediction when using pedometer step counts, use $\text{steps} \cdot \text{d}^{-1}$ combined with currently recommended time/durations of exercise.

Lower exercise volumes can have health/fitness benefits for deconditioned individuals, and greater volumes may be needed for weight management.

Aerobic (Cardiorespiratory Endurance) Exercise (cont.)

- * Rate of progression

- * The recommended rate of progression in an exercise program depends on the individual's health status, physical fitness, training responses, and exercise program goals.
- * Progression may consist of increasing any of the components of the FITT principle of Ex R_x as tolerated by the individual.

Aerobic (Cardiorespiratory Endurance) Exercise (cont.)

- * Rate of progression
 - * During the initial phase of the exercise program, applying the principal of “Start Low and Go Slow” is prudent to reduce risks of adverse cardiovascular events and musculoskeletal injury as well as to enhance adoption and adherence to exercise
 - * An increase in exercise time/duration per session of 5–10 min every 1–2 wk over the first 4–6 wk of an exercise training program is reasonable for the average adult.
 - * After the individual has been exercising regularly for at least 1 month, the FIT of exercise is gradually adjusted upward over the next 4–8 months — or longer for older adults and very deconditioned individuals — to meet the recommended quantity and quality of exercise presented in the *Guidelines*.

THE FITT-VP Principle of Ex R_x Summary

The FITT-VP principle of Ex R_x features an individually tailored exercise program that includes specification of the Frequency (F), Intensity (I), Time or duration (T), Type or mode (T), Volume (V), and Progression (P) of exercise to be performed. The exact composition of FITT-VP will vary depending on the characteristics and goals of the individual. The FITT-VP principle of Ex R_x will need to be revised according to the individual response, need, limitation, and adaptations to exercise as well as evolution of the goals and objectives of the exercise program.

Muscular Fitness


- * The phrase “muscular fitness” is used to refer collectively to muscular strength, endurance, and power.

Muscular Fitness (cont.)

- * Muscular strength and endurance are often the foundation of a general training regimen focusing on health/fitness outcomes for young and middle-aged adults, however, muscular power should be equally emphasized.
- * Older adults (≥ 65 yr) may particularly benefit from power training because this element of muscle fitness declines most rapidly with aging, and insufficient power has been associated with a greater risk of accidental falls. Importantly, aged individuals can safely perform the fast-velocity muscular contractions, or repetitions, that optimally develop muscular power



■ GOALS FOR A HEALTH-RELATED RESISTANCE TRAINING PROGRAM



For adults of all ages, the goals of a health-related resistance training program should be to (a) make activities of daily living (ADL) (e.g., stair climbing, carrying bags of groceries) less stressful physiologically and (b) effectively manage, attenuate, and even prevent chronic diseases and health conditions such as osteoporosis, Type 2 diabetes mellitus, and obesity. For these reasons, although resistance training is important across the age span, its importance becomes even greater with age (5,37,72).

Muscular Fitness (cont.)

- * Frequency of resistance exercise

- * For general muscular fitness, particularly among those who are untrained or recreationally trained (not engaged in a formal training program), an individual should resistance train each major muscle group (the muscle groups of the chest, shoulders, upper and lower back, abdomen, hips, legs) 2–3 d · wk⁻¹ with at least 48 h separating the exercise training sessions for the same muscle group.

Muscular Fitness (cont.)

- * Frequency of resistance exercise

- * All muscle groups to be trained may be done so in the same session (*i.e.*, whole body), or each session may “split” the body into selected muscle groups so that only a few of groups are trained in any one session.
- * This split weight training routine entails $4 \text{ d} \cdot \text{wk}^{-1}$ to train each muscle group 2 times $\cdot \text{wk}^{-1}$
- * The split and whole body methods are effective as long as each muscle group is trained $2\text{--}3 \text{ d} \cdot \text{wk}^{-1}$.

Resistance Training Frequency Recommendation

Resistance training of each major muscle group 2–3 d/ wk⁻¹ with at least 48 h separating the exercise training sessions for the same muscle group is recommended for all adults

Muscular Fitness (cont.)

- * Types of resistance exercises
 - * Many types of resistance training equipment can effectively be used to improve muscular fitness including free weights, machines with stacked weights or pneumatic resistance, and even resistance bands.

Muscular Fitness (cont.)

- * Types of resistance exercises

- * Resistance training regimens should focus on multijoint or compound exercises that affect more than one muscle group (e.g., chest press, shoulder press, pull-down, rows, push-ups, leg press, squats, deadlifts).
- * Single joint exercises targeting major muscle groups (e.g., biceps curls, triceps extensions, quadriceps extensions, leg curls, and calf raises) and exercises that affect core muscles should also be included in a resistance training program.

Muscular Fitness (cont.)

- * Types of resistance exercises
 - * To avoid creating muscle imbalances that may lead to injury, opposing muscle groups (*i.e.*, agonists and antagonists), such as the chest and upper back or the quadriceps and hamstring muscles, should be included in the resistance training routine.

Types of Resistance Exercises

Many types of resistance training equipment can effectively be used to improve muscular fitness. Both multijoint and single-joint exercises targeting agonist and antagonist muscle groups are recommended for all adults as part of a comprehensive resistance training program.

Muscular Fitness (cont.)

- * Volume of resistance exercise (sets and repetitions)
 - * Each muscle group should be trained for a total of two to four sets.
 - * These sets may be derived from the same exercise or from a combination of exercises affecting the same muscle group.
 - * A reasonable rest interval between sets is 2–3 min.
 - * Using different exercises to train the same muscle group adds variety, may prevent long-term mental “staleness”.

Muscular Fitness (cont.)

- * Volume of resistance exercise (sets and repetitions)
 - * Four sets per muscle group is more effective than two sets; however, even a single set per exercise will significantly improve muscular strength, particularly among novices.
 - * The resistance training intensity and number of repetitions performed with each set are inversely related.
 - * To improve muscular strength, mass, and — to some extent — endurance, a resistance exercise that allows an individual to complete 8–12 repetitions per set should be selected.

Muscular Fitness (cont.)

- Each set should be performed with proper form and to the point of muscle fatigue but not failure, because exerting muscles to the point of failure increases the likelihood of injury or debilitating residual muscle soreness, particularly among novices.
- If the objective of the resistance training program is mainly to improve muscular endurance rather than strength and mass, a higher number of repetitions, perhaps 15–25, should be performed per set along with shorter rest intervals and fewer sets (*i.e.*, 1 or 2 sets per muscle group).

Muscular Fitness (cont.)

- * Volume of resistance exercise (sets and repetitions)
 - * Older and very deconditioned individuals who are more susceptible to musculoskeletal injury should begin a resistance training program conducting more repetitions (*i.e.*, 10–15) at a very light-to-light intensity of 40%–50% of 1-RM, or an RPE of 5–6 on a 10-point scale assuming the individual has the capacity to use this intensity while maintaining proper lifting technique.
 - * Subsequent to a period of adaptation to resistance training and improved musculoskeletal conditioning, older individuals may choose to follow guidelines for younger adults (higher intensity with 8–12 repetitions per set).

Volume of Resistance Exercise (Sets and Repetitions) Recommendation

Adults should train each muscle group for a total of;

- 2–4 sets with 8–12 repetitions per set with
- rest interval of 2–3 min between sets to improve muscular fitness
- For older adults and very deconditioned individuals, ≥ 1 set of 10–15 repetitions of moderate intensity resistance exercise is recommended.

Muscular Fitness (cont.)

- * Resistance exercise technique

- * Each resistance exercise should be performed with proper technique regardless of training status or age.
- * The exercises should be executed using correct form and technique, including performing the repetitions deliberately and in a controlled manner, moving through the full ROM of the joint, and employing proper breathing techniques (*i.e.*, exhalation during the concentric phase and inhalation during the eccentric phase and avoid the Valsalva maneuver).

Resistance Exercise Technique Recommendations

All individuals should perform resistance training using correct technique. Proper resistance exercise techniques employ controlled movements through the full ROM and involve concentric and eccentric muscle actions.

Muscular Fitness (cont.)

* Progression/maintenance

- * As muscles adapt to a resistance exercise training program, the participant should continue to subject them to overload or greater stimuli to continue to increase muscular strength and mass.
- * The most common approach is to increase the amount of resistance lifted during training.
- * Other ways to progressively overload muscles include performing more sets per muscle group and increasing the number of days per week the muscle groups are trained.

Muscular Fitness (cont.)

- * **Progression/maintenance**

- * Increasing the overload by adding resistance, sets, or training sessions per week is not required during a maintenance resistance training program.
- * Muscular strength may be maintained by training muscle groups as little as 1 d/ wk as long as the training intensity or the resistance lifted is held constant.

Progression/Maintenance of Resistance Training Recommendation

As muscles adapt to a resistance exercise training program, the participant should continue to subject them to overload to continue to increase muscular strength and mass by gradually increasing resistance, number of sets, or frequency of training.

Flexibility Exercise (Stretching)

- * Joint ROM or flexibility can be improved across all age groups by engaging in flexibility exercises
- * The ROM around a joint is improved immediately after performing flexibility exercise and shows chronic improvement after about 3–4 wk of regular stretching at a frequency of at least 2–3 times/ wk
- * Postural stability and balance can also be improved by engaging in flexibility exercises, especially when combined with resistance exercise

Flexibility Exercise (Stretching) (cont.)

- * The goal of a flexibility program is to develop ROM in the major muscle/tendon groups in accordance with individualized goals.
- * Static stretching exercises may result in a short-term decrease in muscle strength, power, and sports performance when performed immediately prior to the muscle strength and power activity is important to performance, especially with longer duration (>45 s) stretching.

Flexibility Exercise Recommendation

ROM is improved acutely and chronically following flexibility exercises. Flexibility exercises are most effective when the muscles are warm. Static stretching exercises may acutely reduce power and strength so it is recommended that flexibility exercises be performed after exercise and sports where strength and power are important for performance.

Flexibility Volume Recommendation

A total of 60 s of flexibility exercise per joint is recommended. Holding a single flexibility exercise for 10–30 s to the point of tightness or slight discomfort is effective

Older adults can benefit from holding the stretch for 30–60 s

A 20%–75% maximum voluntary contraction held for 3–6 s followed by a 10–30 s assisted stretch is recommended for PNF techniques. Performing flexibility exercises ≥ 2 –3 d/ wk is recommended with daily flexibility exercise being most effective

Types of Flexibility Exercises

Ballistic methods or “bouncing” stretches use the momentum of the moving body segment to produce the stretch.

Dynamic or slow movement stretching involves a gradual transition from one body position to another, and a progressive increase in reach and range of motion as the movement is repeated several times.

Static stretching involves slowly stretching a muscle/tendon group and holding the position for a period of time (*i.e.*, 10–30 s). Static stretches can be active or passive.

Active static stretching involves holding the stretched position using the strength of the agonist muscle as is common in many forms of yoga.

Passive static stretching involves assuming a position while holding a limb or other part of the body with or without the assistance of a partner or device (such as elastic bands or a ballet barre).

Proprioceptive neuromuscular facilitation (PNF) methods take several forms but typically involve an isometric contraction of the selected muscle/tendon group followed by a static stretching of the same group (*i.e.*, contract-relax).

Sedentary Behavior and Brief Activity Breaks

- * Sedentary behaviors can have adverse health effects, even amongst those who regularly exercise.
- * There is increasing evidence that concurrently reducing sedentary time results in health benefits that are additive to exercise.
- * Sedentary behavior negatively impacts cardiometabolic markers, body composition, and physical function, and these effects might be attenuated by interspersing brief PA (e.g., 1-5 minutes of standing and walking).
- * Although the frequency, intensity, time (duration), and type of brief PA breaks have not been clearly identified, standing or engaging in light to moderate walking or other PA \geq once per hour to breakup sedentary stretches may be encouraged.

Consideration in dementia

Simple

- * Walking – one of the best exercises around (and it's free!). Walking around the house, the yard, or outside for any amount of time is wonderful for body and mind. You could even combine the walk by doing an errand together like walking the dog or going to the grocery store.
- * The [sit to stand exercise](#) – strengthens muscles needed for essential activities like using the toilet
- * Stay balanced in a standing position (hold on to a support when needed) – improves balance and posture, can be a standalone exercise or part of an everyday activity like washing dishes

Consideration in dementia cont.

- * Sit unsupported for a few minutes each day (with constant supervision to prevent falls) – strengthens the abdominal and back muscles needed for posture
- * Stretch while lying in bed – move various body parts and stretch stiff muscles, this can be done with assistance or independently

Consideration in dementia cont.

Moderate

- * Stretches and/or strength exercises – try this simple [chair stretching routine](#) or this easy [strength and balance routine](#)
- * Tai chi – try [these routines](#) that can be adapted for a variety of physical conditions
- * Gardening – something simple like raking or pulling weeds gives a sense of accomplishment and is a great workout
- * Household chores – basic chores can be great exercise, like folding laundry, dusting, light vacuuming, or washing the car

Consideration in dementia cont..

Advanced

- * Dancing – this is a fun activity that doesn't feel like exercise. Play your older adult's favorite dance music at home and lead them in a private dance party in the living room. Or, look for social events at senior centers that include dancing.
- * Exercise class – some senior centers or similar organizations offer classes specifically for people with dementia
- * Water exercise – consider going with your older adult to a local class at the pool or senior center

Consideration in dementia cont..

Safety tips:

- * Before starting, check with the doctor to make sure that exercise is safe for their physical and cognitive conditions.
- * Monitor the level of exertion by checking in with brief conversations. If they can speak without being short of breath, the pace is comfortable. If they can't hold a conversation because they're breathing too hard, slow the pace.
- * Keep them hydrated with plenty of water before, during and after exercising.

Consideration in dementia cont..

- * For outside activities, make sure they're wearing a medical alert bracelet, personal identification, and/or a GPS tracker in case they get separated from you.
- * If they get dizzy, weak, or experience pain, stop immediately and rest. Talk to their doctor to find out if future exercise will be safe



Your Turn: Prescribe Exercise Using Components of Fitness, FIT Principle