

# Restoring Your Fitness and Balance

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Spring 2022



# Agenda

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- Safe Return to Movement
- Aerobic
- Strength
- Balance
- Q&A

# Movement: Why Should We Care?

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- Engaging in regular activities that require effort (walking, cycling, sports) could prevent physical decline
- The likelihood of developing disability in basic activities of daily living with medium or high physical activity level is nearly HALF compared with those of low physical activity level
- Exercise can lessen and even reverse the age-related loss of muscle mass and strength
- Prevention of chronic disease
- Maintenance of functional status and physical independence
- Multicomponent physical activity (that combines aerobic, muscle-strengthening, balance and flexibility) significantly reduces the risk of fall-related injuries by 32-40%, including injuries that require medical care or admission to hospital



# Current Activity Guidelines

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- At least **150 minutes** (2 hours & 30 minutes) and up to 300 minutes (5 hours) per week of **moderate** intensity **aerobic activity** or **75 to 150 minutes of vigorous** intensity **aerobic** activity with **muscle strengthening** of major muscle groups performed on **2 or more days per week**
- Should be Multicomponent→

Combination of **aerobic, strengthening, and balance!**

# AEROBICS

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# What is Aerobic Training?

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- Also called **endurance** or **cardio** exercise
- Rhythmic movement of large muscles for a sustained period of time
- Any activity that make the **heartbeat more rapidly** and **breathing rate increase** to meet the demands of the body's movement
- Over time, regular aerobic exercise **makes the cardiorespiratory system more efficient**
- Examples:
  - Brisk walking, jogging, biking, dancing, and swimming
- The **total** amount of **moderate-to-vigorous physical activity** is more important the length of physical activity in each episode!
- *How can you incorporate more aerobic activities in your daily living?*

# How much aerobic training should I do?

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- How Many Days Per Week and for How Long?
- Spread throughout the week → **at least 3 days per week**
  - Can produce health benefits, reduce risk of injury and prevent excessive fatigue
- ***All*** aerobic activity **counts** towards that target goal!
- Episodes of physical activity **can be divided** throughout the **day** or **week**



# Intensity of Aerobic Exercise

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- Should affect heart rate and breathing
- **Moderate intensity:**
  - Talk-Test for Moderate Intensity: Can **talk**, but **not sing** during activity
  - Medium level of effort: on a scale of 0 to 10 (where 10 is the greatest effort possible), moderate intensity activity is a **5-6** and produces noticeable breathing and heart rate changes
- **Vigorous Intensity:**
  - Talk-Test for Vigorous Intensity: **Cannot say more than a few words** without pausing for a breath
  - Begins at **7-8** out of 10 and produces large increase in breathing rate and heart rate
- General rule of thumb: 2 minutes of moderate intensity counts the same as 1 minute of vigorous intensity
- *Exercise is Medicine: Get clearance from your doctor to start vigorous intensity*



# Every Step Counts!

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- How do we meet the suggested aerobic activity guidelines?
- As simple as brisk walking!
- Who has a watch tracking steps? Or uses an app on their phone?
- How many steps a day are enough?
- Goal per day: 7,000-10,000 steps→ can be performed in 10-minute bouts
  - Equivalent of achieving 30 minutes of moderate to vigorous intensity
- Goal per week: 150 minutes of moderate to vigorous activity
- Not there yet? Gradually set goals to increase number of steps per day

# STRENGTH

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# Muscle Strengthening Exercises

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- Any activities that make **muscles do more work than they are accustomed** to during activities of daily living
- Should involve all major muscle groups:
  - Muscles of the legs, hips, chest, back, abdomen, shoulders, and arms
- Improvements are specific to the muscles used during the activity so a variety of activities should be used!
- Examples of muscle strengthening activities include:
  - Lifting weights, pulling resistance bands,
  - use of body weight for resistance (push-up, pull ups, sit to stand)
  - climbing stairs, shoveling snow and carrying heavy loads (groceries, gardening, grandchildren)

# How much strength training should I do?

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- How Many Days Per Week and for How Long?
- At least 2 days a week
- No specific amount of time is recommended BUT muscle strengthening exercises **should be performed to the point at which it would be difficult to do another repetition**→ moderate or greater level of intensity/effort
- Specifically for muscle strengthening: **1 set of 8-12 repetitions** has shown to be effective, ALTHOUGH 2 or 3 sets may be more effective→ **gradually increase in sets as you build strength**



# Examples for Aerobics and Strength Activities

Aerobic Activities	Muscle-Strengthening Activities
<ul style="list-style-type: none"><li>■ Walking or hiking</li><li>■ Dancing</li><li>■ Swimming</li><li>■ Water aerobics</li><li>■ Jogging or running</li><li>■ Aerobic exercise classes</li><li>■ Some forms of yoga</li><li>■ Bicycle riding (stationary or outdoors)</li><li>■ Some yard work, such as raking and pushing a lawn mower</li><li>■ Sports like tennis or basketball</li><li>■ Walking as part of golf</li></ul>	<ul style="list-style-type: none"><li>■ Strengthening exercises using exercise bands, weight machines, or hand-held weights</li><li>■ Body-weight exercises (push-ups, pull-ups, planks, squats, lunges)</li><li>■ Digging, lifting, and carrying as part of gardening</li><li>■ Carrying groceries</li><li>■ Some yoga postures</li><li>■ Some forms of tai chi</li></ul>

# Getting Back Into the Swing of Things

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## Aerobic: Walking

- Start with 5 minutes of slow walking several times each day, 5-6 days a week
- The length of time could gradually increase to 10 minutes per session, 3 times a day
- The walking speed can also slowly be increased

## Muscle Strengthening:

- Start with 1 day per week starting at a light or moderate intensity
- Over time → the number of days per week can increase to 2 and then more than 2 days per week
- Each week, the intensity can be increased slightly until it reaches moderate or greater intensity



# BALANCE

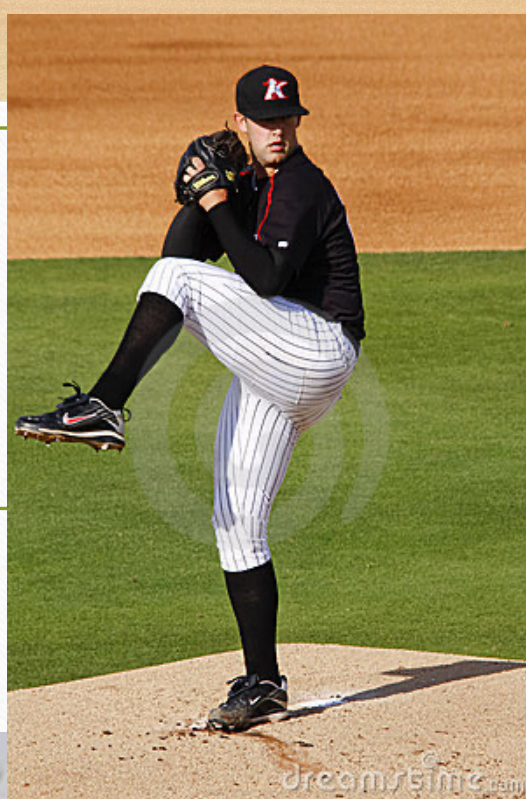
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# What is Balance?

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- The ability to stand or move between positions without falling.
- The ability to maintain our center of gravity within our base of support
- Balance is everywhere in life and is important across the life span.







# Why should we care about balance?

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- Helps us get to places safely and participate in daily activities
- Balance problems can lead to falls
- Falls lead to injury => reduced mobility => disease...



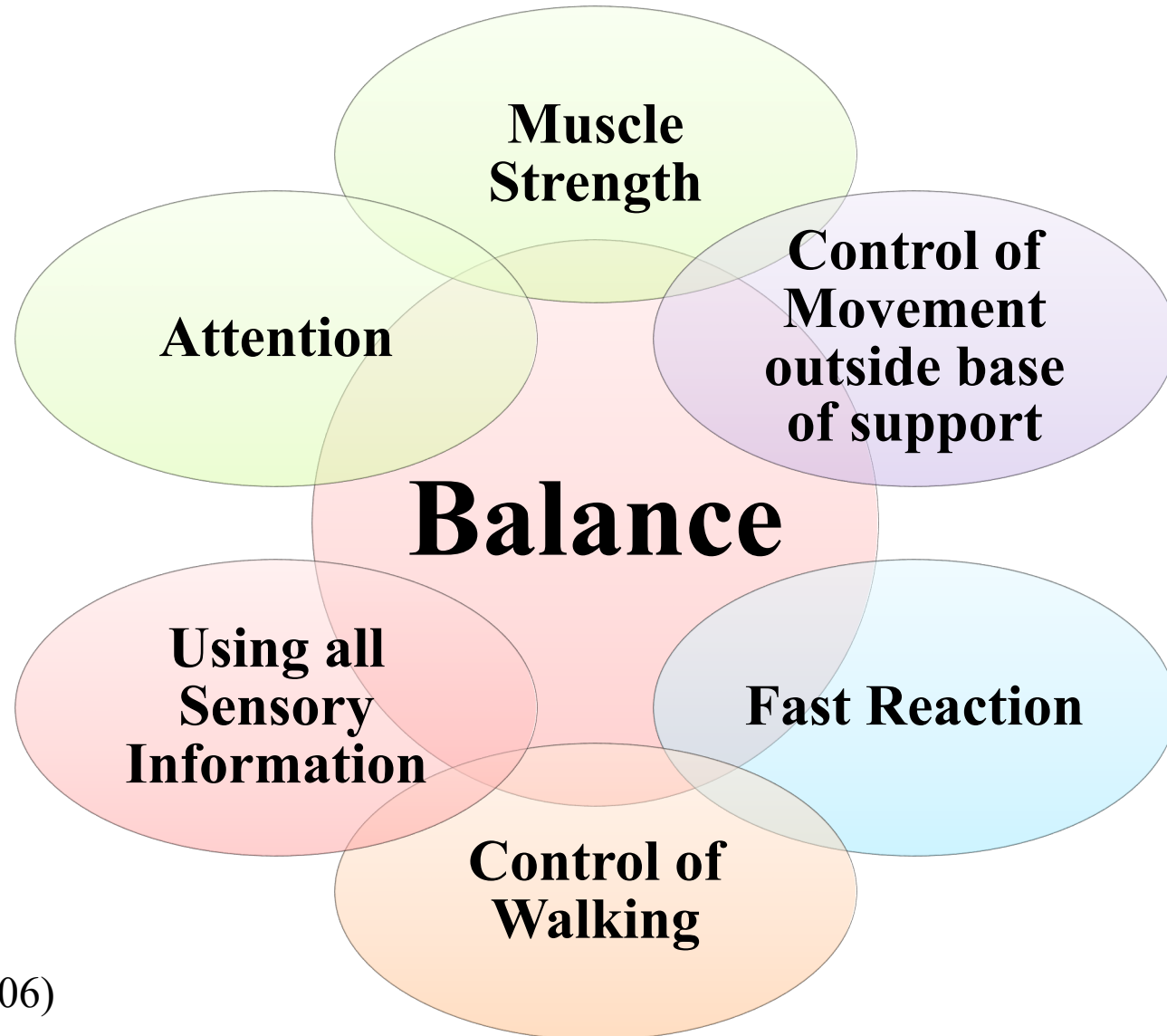
# Working on your balance

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- According to the reason for the fall
- According to the task that you want to improve (standing? Walking? Stairs?)
- **Create Challenge**
- **Maintain Safety**
- **Repeat**

# Subdomains of Balance:

**Exercise according to the reason leading to a fall**



(Adapted from Horak 2006)



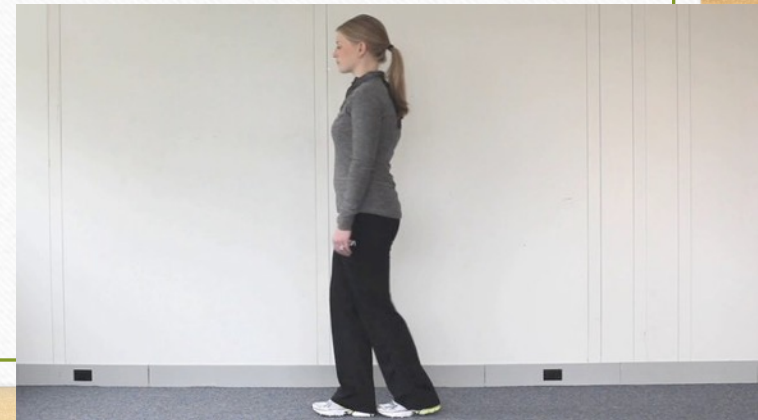
# Muscle Strength: Resistance Training

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- Strengthening your muscles and improving range of motion in your joints can improve balance as well
- It can help climbing stairs, not hitting the curb etc.
- **Examples: (see video)**
  - Sit to stand
  - Heel raise (first with support)
  - Walking on heels
  - Strength training... any exercise you can do consistently!

# Train your planned movements

- Examples:
  - Sit to stand
  - Rise to toes (holding on)
  - Feet together
  - Tandem stance
  - Marching in place
  - Single leg stance (holding on)
  - Alternate stair touching (chair)
  - Standing arm raise/ swing: in all those different positions





# Supervised Planned Movement Practice

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- Can incorporate walking-aid when practicing, try to safely "play" with it if you can (one finger on the walker, hold walker above the ground etc.).
- Practice getting down to the ground and getting up from the floor to get familiar with it without fear
- <https://www.youtube.com/watch?v=FXDPkcrhl0g>
- Intermediate steps: reaching down and touching the floor? squatting until the knees touch the floor? Use a stable object/furniture to lean on and slowly get down?

# Train Your Ability to React?

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- How confident are you that you will not lose your balance when someone is bumping into you?
- Demonstration
  - Pushing
  - Ball tossing



# Practice using all Sensory Information

- Main sensory input for balance: Visual (what we see), somatosensory (where my joints are), vestibular (head-eye coordination)
- Purpose: not losing balance when the sensory environment is changing, such as in theatre, when walking in the dark, or walking on ice
- **Exercises:**
  - Dimmed lights?
  - Standing with eyes closed: feet apart, together, tandem
  - Standing on foam?
  - Walking on grass, sand

# Train your control of movement outside base of support

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- How far you can move in standing or sitting without falling
- **Exercises:** (chair on the side or an assistive device)
  - Sitting reach (front, back, side)
  - **Standing Reach Forward:** Until you need to take a step...





# Control of Walking

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- Some exercises you can do in physical therapy:
  - Change in gait speed
  - Walk with head turns (side to side; up and down)
  - Walk and pivot turn
  - Step over an obstacle
  - Walking backwards

# Train your attention

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- “walk and talk”
- **Exercises:**
- Stand and count backwards: jumps of 3, jumps of 7, alphabet fruit
- Same with marching in place
- Tandem walk



# Screening Tests of Balance

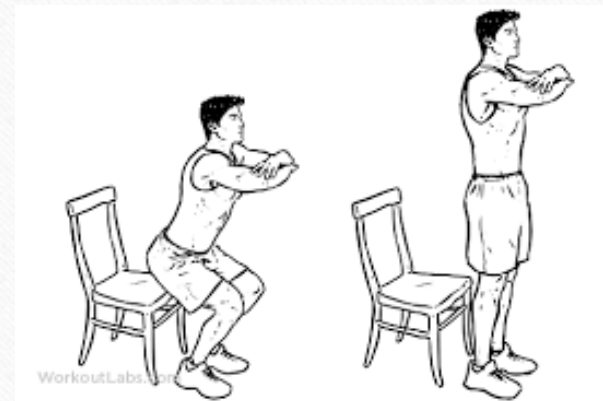
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- There are several tests that can help identify an overall increased fall risk. Normally these are done in a physical therapy clinic.
- We will go over one quick test and time ourselves:
  - 5 times to stand

# 5 Times Sit to Stand

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- Use a straight back chair with a solid seat that is 16" high.
- Sit on the chair with arms folded across your chest.
- Stand up and sit down as quickly as possible 5 times, keeping your arms folded across your chest.
- Increased fall risk > 12 seconds to complete?
- Age Average Norms (Bohannon, 2006)
  - 60-69 y/o **11.4 sec**
  - 70-79 y/o **12.6 sec**
  - 80-89 y/o **14.8 sec**





# Combining What We've Learned: Multicomponent Physical Activity

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- **What is Multicomponent Physical Activity?**
- Physical activity that includes more than one type of physical activity: aerobic, muscle strengthening, and balance
- **Why is Multicomponent Physical Activity Important?**
- Can help reduce risk of falls and improve overall physical function
- Effective in improving muscle strength of lower extremities, dynamic standing balance, gait speed and chair stand
- Could include: walking (aerobic activity), lifting weights (muscle strengthening), and could incorporate balance by walking sideways or standing on one foot while doing any upper body muscle strengthening activity like a bicep curl
- At home or in a community setting
- Recreational activities: dancing, yoga, tai chi, gardening, sports

### Example 1



Moderate-intensity aerobic activity

(e.g., brisk walking) for 150 minutes (for example, 30 minutes a day, 5 days a week)

AND



Muscle-strengthening activities

on 2 or more days a week that work all major muscle groups (legs, hips, back, abdomen, chest, shoulders, and arms).

AND



Balance activities

Walking backward, standing on one leg, or using a wobble board about 3 days a week.

### Example 2



Vigorous-intensity aerobic activity

(e.g., jogging or running) for 75 minutes (1 hour and 15 minutes) every week

AND



Weight\_lifting\_Orange

Muscle-strengthening activities

on 2 or more days a week that work all major muscle groups (legs, hips, back, abdomen, chest, shoulders, and arms).

AND



Balance activities

Walking backward, standing on one leg, or using a wobble board about 3 days a week.

### Example 3



An equivalent mix of moderate- and vigorous-intensity aerobic activity

on 2 or more days a week

AND



Muscle-strengthening activities

on 2 or more days a week that work all major muscle groups (legs, hips, back, abdomen, chest, shoulders, and arms).

AND



Balance activities

Walking backward, standing on one leg, or using a wobble board about 3 days a week.



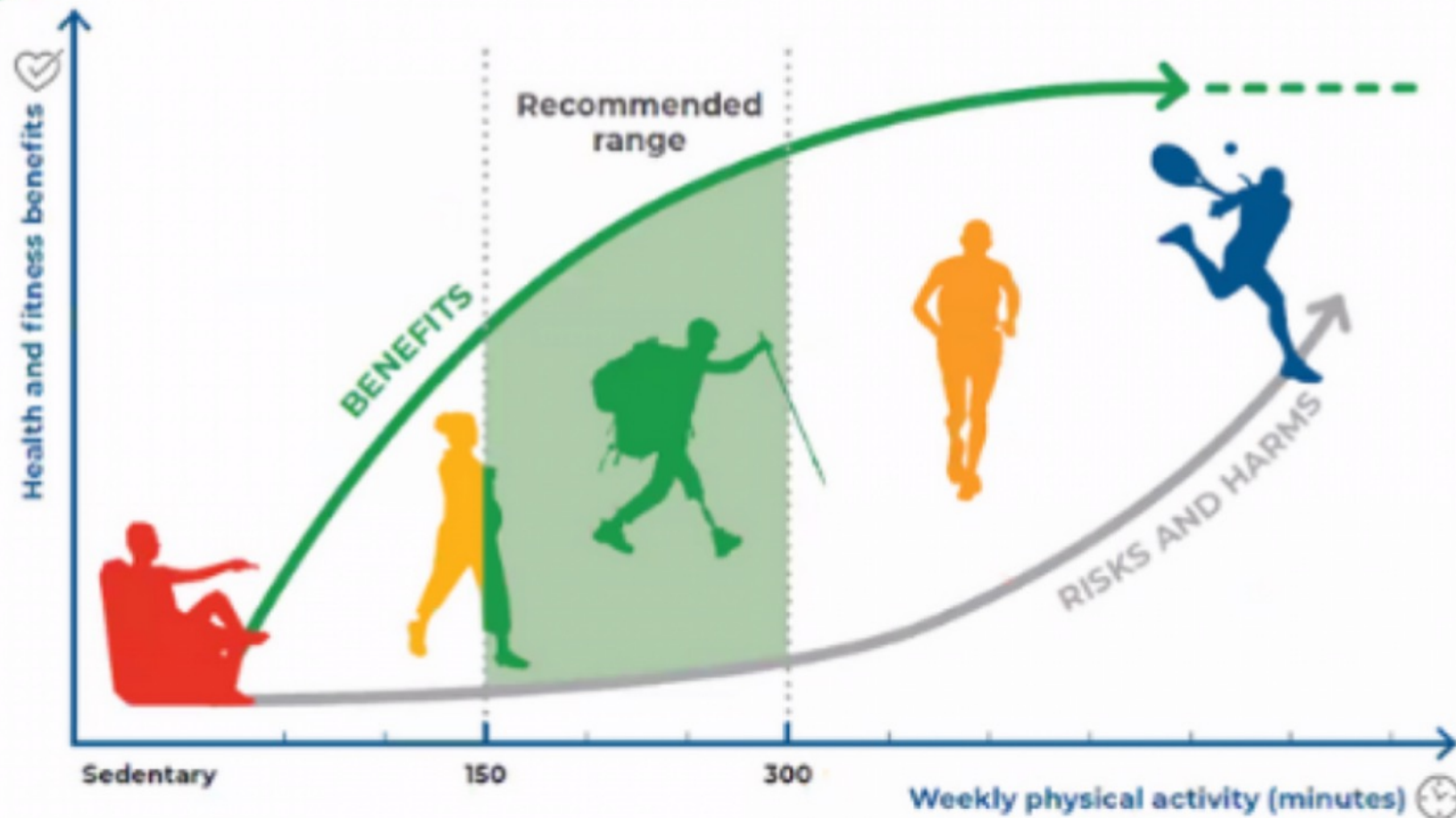
# Takeaways!

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- Never too late to start!
- Move more, sit less
- Some physical activity is better than none
  - Try swapping out sedentary activities (sitting) for light physical activity (housework)
- Set goals and increase gradually
- Try a variety of activities and see what works best for you!
- Be patient! It can take time to gradually meet activity goal and its important to reduce risk of injury
- One can and should increase muscle mass and strength at every age!

# Every Move Counts

Doing some physical activity is better than doing none.





# About Hearing Loss and Balance

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- Does hearing loss increase the risk of falls?
- Does what we hear affect our balance?
- We are currently running a study at New York University together with the New York Eye and Ear Infirmary of Mount Sinai
- We will screen your vestibular system, vision, hearing and sensation at the bottom of your feet.
- Balance is measured when participants are seeing objects and hearing sounds in virtual reality
- 2 sessions about 1-2 hours each.
- Contact me if interested in participating in this study or many others! [anat@nyu.edu](mailto:anat@nyu.edu)

# Take Home Exercises

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- Double-leg Heel Raise Holding onto the kitchen sink
- Marching in place
- Sit to Stand
- See videos!







# SUMMARY: what can you do to prevent falls? (CDC)

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- Have your healthcare provider review your medicines; discuss any concern about falls
- Exercise to improve your balance and strength
- Have your eyes, feet and ears checked
- Make your home safer



# Why should we care about falls?

Past falls are a risk factor for additional falls



ACADEMY OF GERIATRIC  
PHYSICAL THERAPY

# Things you can do for yourself

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- What are some strategies that people use to avoid falls?



# Things you can do for yourself

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- Physical inactivity? **(get active! Find your favorite exercise routine!)**
- Poor vision? (can help by getting your vision checked!)
- Footwear matters (good fit, good soles, no walking with socks, check sensation at the bottom of the feet)
- Check your hearing
- Improper use of cane or walker? (get it checked)
- Low blood pressure when changing positions? (wait before you move, consult healthcare provider)
- Medication errors? (confirm your prescriptions)

# More about your vision

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- What we see (and cannot see) is crucial for balance
- Get annual eye exams after the age of 50 (40?)
- Bifocals or trifocal lenses may blur or distort your vision looking down
- Removing cataract(s) may reduce fall risk
- Use night lights in your hallway and bathroom



# Keeping your environment safe

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- Pay attention on stairs, uneven or wet surfaces
- Trip hazards (E.g., rugs, cables, bags, toys)
- Grab bars in the bathroom, flat bathroom entry, anti-slip mat
- Use higher chairs / toilets / sofas
- Lights
- Accessible cabinets (keep important stuff at eye height)