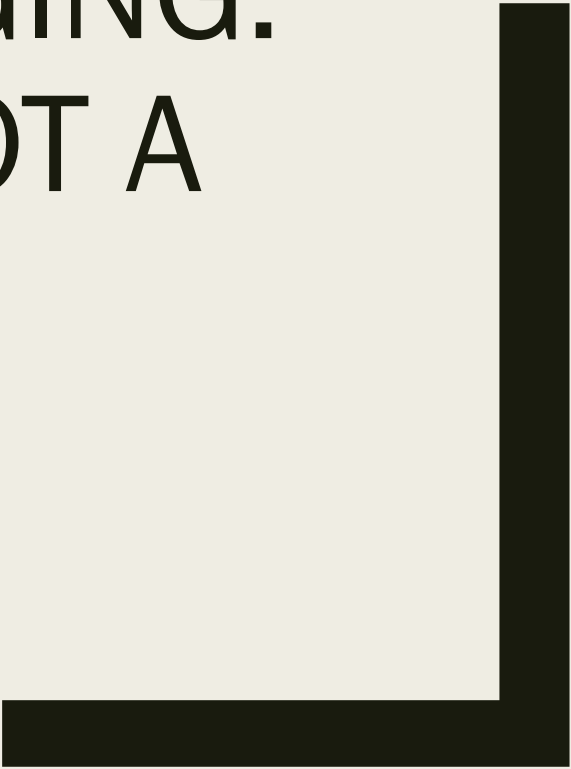


FITNESS AND AGING: WHY AGE IS NOT A NUMBER

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"If the body be feeble, the mind will not be strong. The sovereign invigorator of the body is exercise, and of all the exercises walking is best."

-- Thomas Jefferson



Objectives

- Introduce the science of aging
- The benefits of BEING and STAYING active
- The benefits of BECOMING active and how to start
- The benefits of specific exercise programs

What is Aging?

Primary Aging

- Age-related physical changes that have biological basis and are universally shared and INEVITABLE
- Examples:
 - *Gray/Thinning Hair*
 - *Wrinkles*
 - *Decreased muscle strength/size*
 - *Decreased cardiovascular function*

Secondary Aging

- Age-related changes that are due to environmental influences, poor health habits, or disease.
- Examples:
 - *Smoking*
 - *Poor diet*
 - *Lack of exercise*
 - *Exposure to unhealthy environment*

Age is Not a Number

Chrono

- How many have been



em to be
[.org/#/](#)

Evidence

- Methods: 57,085 individuals with no history of cardiovascular disease referred for maximal clinical treadmill stress testing; Median age was 53 years old.
- Results: Patients were followed for 5-10 years. 6,356 deaths and 1,646 heart attacks were reported. Biological age (stress test performance) was a better indicator of mortality and heart attack than chronological age

Blaha, et al. *Heart* (2016);0: 1-7

Conclusions

- Exercise capacity is a stronger predictor of survival than chronological age.



The Evidence

In women under 40, there was as much as a 38 year difference in Biological age vs Chronological age

Table 2 Unadjusted cumulative incidence of mortality and MI

| | <6 METS | 6–9 METS | 10–11 METS | ≥12 METS |
|------------------|------------------|------------------|------------------|-----------------|
| Mortality | | | | |
| <40 | 17% (12% to 23%) | 4% (3% to 6%) | 1% (1% to 2%) | 1% (1% to 1%) |
| 40–49.9 | 14% (12% to 17%) | 4% (4% to 5%) | 2% (2% to 3%) | 2% (1% to 2%) |
| 50–59.9 | 16% (14% to 18%) | 6% (5% to 7%) | 4% (4% to 5%) | 3% (2% to 4%) |
| 60–69.9 | 27% (25% to 29%) | 13% (12% to 14%) | 8% (7% to 9%) | 6% (5% to 9%) |
| ≥70 | 42% (40% to 44%) | 27% (25% to 29%) | 22% (19% to 25%) | 11% (6% to 23%) |
| MI | | | | |
| <40 | 4% (2% to 8%) | 1% (1% to 2%) | 1% (1% to 1%) | 0% (0% to 1%) |
| 40–49.9 | 3% (2% to 5%) | 1% (1% to 2%) | 1% (1% to 1%) | 1% (0% to 1%) |
| 50–59.9 | 3% (2% to 4%) | 2% (2% to 3%) | 1% (1% to 1%) | 1% (1% to 1%) |
| 60–69.9 | 5% (4% to 6%) | 3% (2% to 3%) | 1% (1% to 2%) | 1% (1% to 2%) |
| ≥70 | 7% (6% to 9%) | 5% (4% to 6%) | 4% (3% to 6%) | 5% (2% to 16%) |

Unadjusted cumulative incidence of mortality and MI by age groups at median follow-up of 10.4 and 5.5 years, respectively, with stratification by METS categories. 95% CIs shown in parentheses. p Value shows the variance across METS categories within each age group.

METS, metabolic equivalents; MI, myocardial infarction.

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TABLE 7.2

Effects of Aging on Selected Physiologic and Health-Related Variables (107)

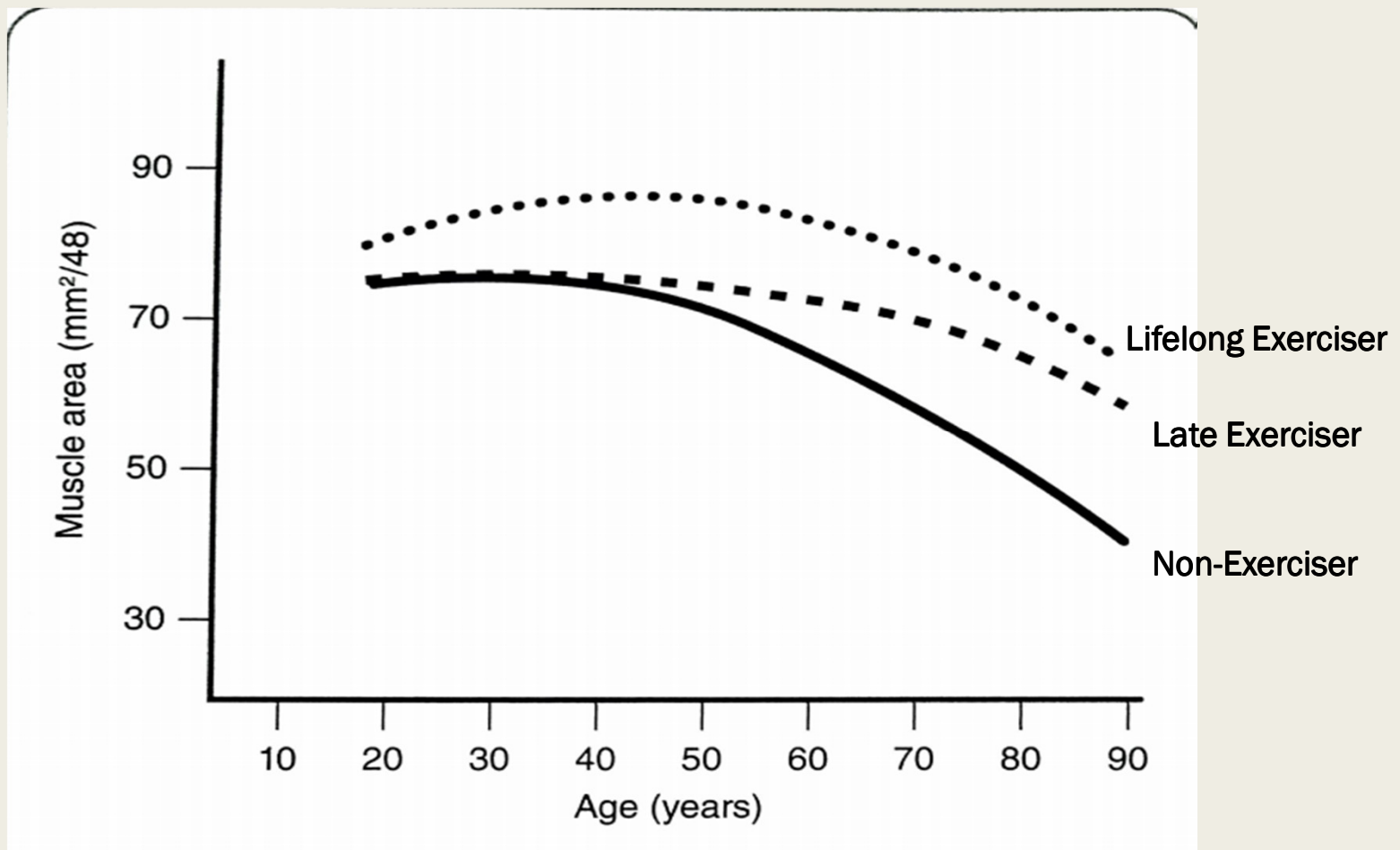
| Variable | Change |
|--|-----------|
| Resting heart rate | Unchanged |
| Maximum heart rate | Lower |
| Maximum cardiac output | Lower |
| Resting and exercise blood pressure | Higher |
| Absolute and relative maximum oxygen uptake reserve ($\dot{V}O_{2R_{max}}$ L · min ⁻¹ and mL · kg ⁻¹ · min ⁻¹) | Lower |
| Residual volume | Higher |
| Vital capacity | Lower |
| Reaction time | Slower |
| Muscular strength | Lower |
| Flexibility | Lower |
| Bone mass | Lower |
| Fat-free body mass | Lower |
| % Body fat | Higher |
| Glucose tolerance | Lower |
| Recovery time | Longer |

TABLE 1.2

Evidence for Dose-Response Relationship between Physical Activity and Health Outcome

| Variable | Evidence for Inverse Dose-Response Relationship | Strength of Evidence ^a |
|--|---|-----------------------------------|
| All-cause mortality | Yes | Strong |
| Cardiorespiratory health | Yes | Strong |
| Metabolic health | Yes | Moderate |
| Energy balance: | | |
| Weight maintenance | Insufficient data | Weak |
| Weight loss | Yes | Strong |
| Weight maintenance following weight loss | Yes | Moderate |
| Abdominal obesity | Yes | Moderate |
| Musculoskeletal health: | | |
| Bone | Yes | Moderate |
| Joint | Yes | Strong |
| Muscular | Yes | Strong |
| Functional health | Yes | Moderate |
| Colon and breast cancers | Yes | Moderate |
| Mental health: | | |
| Depression and distress | Yes | Moderate |
| Well-being: | | |
| Anxiety, cognitive health, and sleep | Insufficient data | Weak |

Bend the Aging Curve



Credit to: Joe Signorile

Being Active and Staying Active

Aerobic athletes.

Compared to their sedentary, age-matched peers, older athletes exhibit a broad range of physiological and health advantages. These benefits include, but are not limited to the following: 1) a more favorable body composition profile, including less total and abdominal body fat (^{10,98}), a greater relative muscle mass (% of body mass) in the limbs (²⁰⁰), and higher bone mineral density (BMD) at weight bearing sites (^{18,164}); 2) more oxidative and fatigue-resistant limb muscles (^{98,188,247}); 3) a higher capacity to transport and use oxygen (^{173,189,206}); 4) a higher cardiac stroke volume at peak exertion (^{77,173}) and a "younger" pattern of left ventricular filling (increased early-to-late inflow velocity, *E/A* ratio) (^{55,98}); 5) less cardiovascular (⁸³) and metabolic (^{38,206,211,212}) stress during exercise at any given submaximal work intensity; 6) a significantly reduced coronary risk profile (lower blood pressure, increased HR variability, better endothelial reactivity, lower systemic inflammatory markers, better insulin sensitivity and glucose homeostasis, lower triglycerides, LDL, and total cholesterol, higher HDL, and smaller waist circumference) (²⁶⁴); 7) faster nerve conduction velocity (²⁵⁵); and 8) slower development of disability in old age (²⁰¹).

ACSM position stand on exercise in older adults

Dose-response associations between cycling activity and risk of hypertension in regular cyclists

- Methods: 6,949 men and women were surveyed regarding their cycling habits and health in the UK. Subject age ranged from 16-88 years with an average age of 47.
- Results: Dose-response relationship between cycling volume and risk of diagnosed hypertension and an inverse relationship with cycling volume and BMI and high cholesterol
- Conclusions: Cycling at volumes above the recommended minimum activity guidelines (150 minutes/week) can provide additional health benefits

Hollingworth, et al. *Journal of Human Hypertension* (2015) 29, 219–223



Associations of specific types of sports and exercise with all-cause and cardiovascular-disease mortality: A cohort study of 80,306 British adults

- Methods: Investigate the association between sport exposure and all-cause/CVD mortality
- Results: Cycling, swimming, aerobics and racquet sports significantly reduced CVD mortality

Pekka, et al. *British Journal of Sports Medicine* (2016)

Conclusions

- Participation in sports could have a significant impact on public health
 - *If you play sports, ask a friend who does not to join you*
 - *If you do not play, it can be a great way to exercise but also to improve social life*



Effects of six weeks of detraining on retention of functional fitness of old people after nine weeks of multicomponent training. Use it or lose it

- Methods: Subjects aged 60–86 years completed a nine week multicomponent exercise training program. Fitness testing was performed at baseline and every two weeks during detraining period
- Results: Fitness test scores began to significantly decline after 2 weeks in older participants (74-86). Test scores declined for all participants at 4 weeks and continued to decline after 6 weeks of detraining.

Conclusions

- Fitness training should not be stopped for extended periods in the elderly population
 - *Active recovery is a good way to find time to rest*
 - *If you are slowed down by an injury or surgery, be as active as possible within your comfort level*
 - *Seek professional advice if you are stuck*



Objectives

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NO - RUNNING
LATE, JUMPING TO
CONCLUSIONS,
PUSHING YOUR LUCK
AND JOGGING YOUR
MEMORY, DOESN'T
COUNT AS
EXERCISE



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LYN2H

BENEFITS OF EXERCISE TRAINING IN PREVIOUSLY SEDENTARY INDIVIDUALS

Evidence statement and recommendation.

Evidence category A. AET programs of sufficient intensity ($\geq 60\%$ of pretraining $\dot{V}O_{2\max}$), frequency, and length (≥ 3 d \cdot wk $^{-1}$ for ≥ 16 wk) can significantly increase $\dot{V}O_{2\max}$ in healthy middle-aged and older adults.

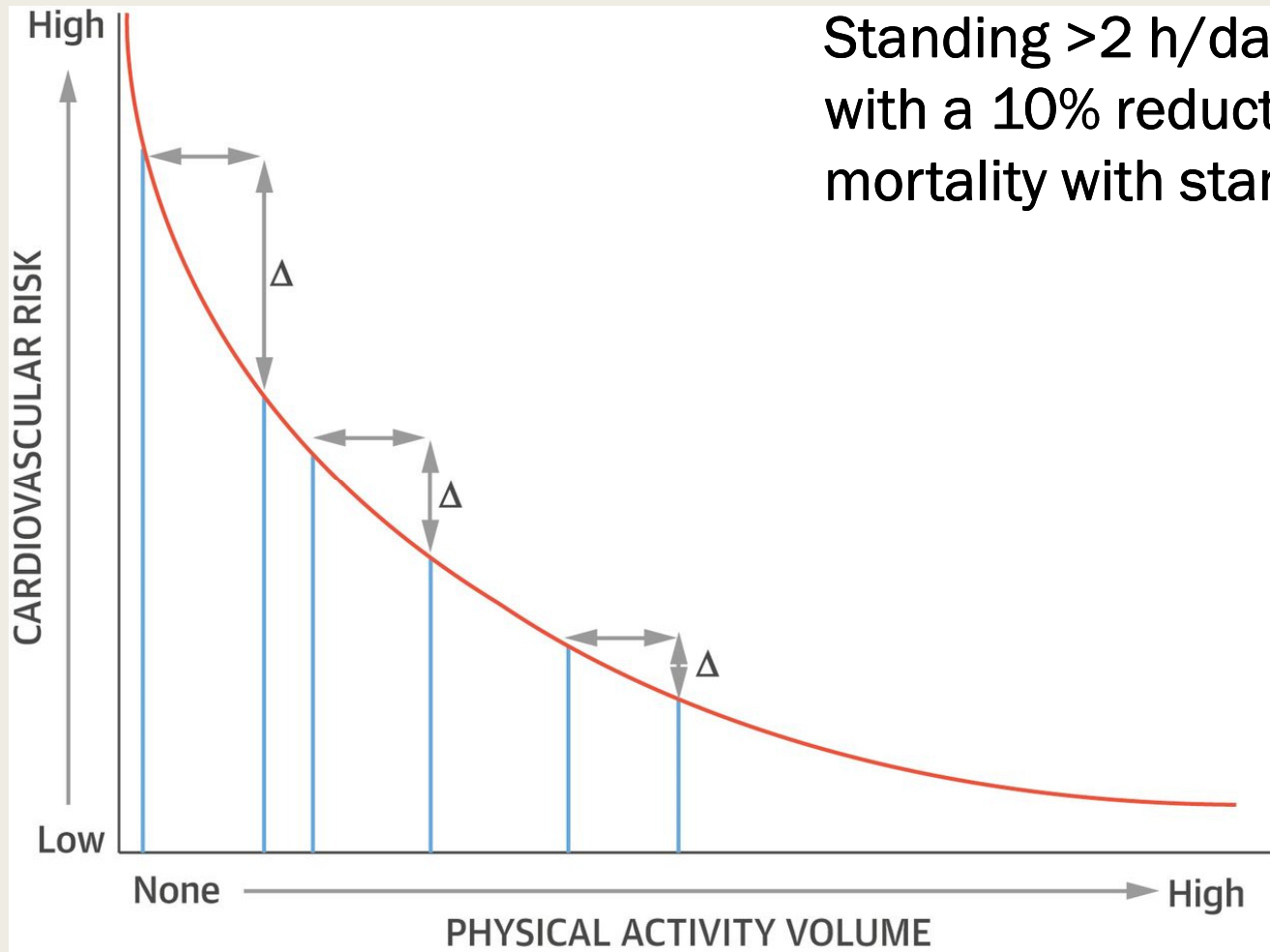
Evidence statement and recommendation.

Evidence category A. Three or more months of moderate-intensity AET elicits cardiovascular adaptations in healthy middle-aged and older adults, which are evident at rest and in response to acute dynamic exercise.

Evidence statement and recommendation.

Evidence category A/B. In studies involving overweight middle-aged and older adults, moderate-intensity AET has been shown to be effective in reducing total body fat. In contrast, most studies report no significant effect of AET on FFM.

Standing >2 h/day is associated with a 10% reduction of all-cause mortality with standing <2 h/day



Thijs M.H. Eijsvogels et al. JACC 2016;67:316-329



Leisure Time Physical Activity and Mortality

- Compared with individuals reporting no leisure time physical activity, we observed a 20% lower mortality risk among those performing less than the recommended minimum (150 minutes moderate intensity activity per week)



Arem, et al. *JAMA Intern Med.* 2015;175(6):959-967.

Leisure-Time Physical Activity Reduces Total and Cardiovascular Mortality and Cardiovascular Disease Incidence in Older Adults

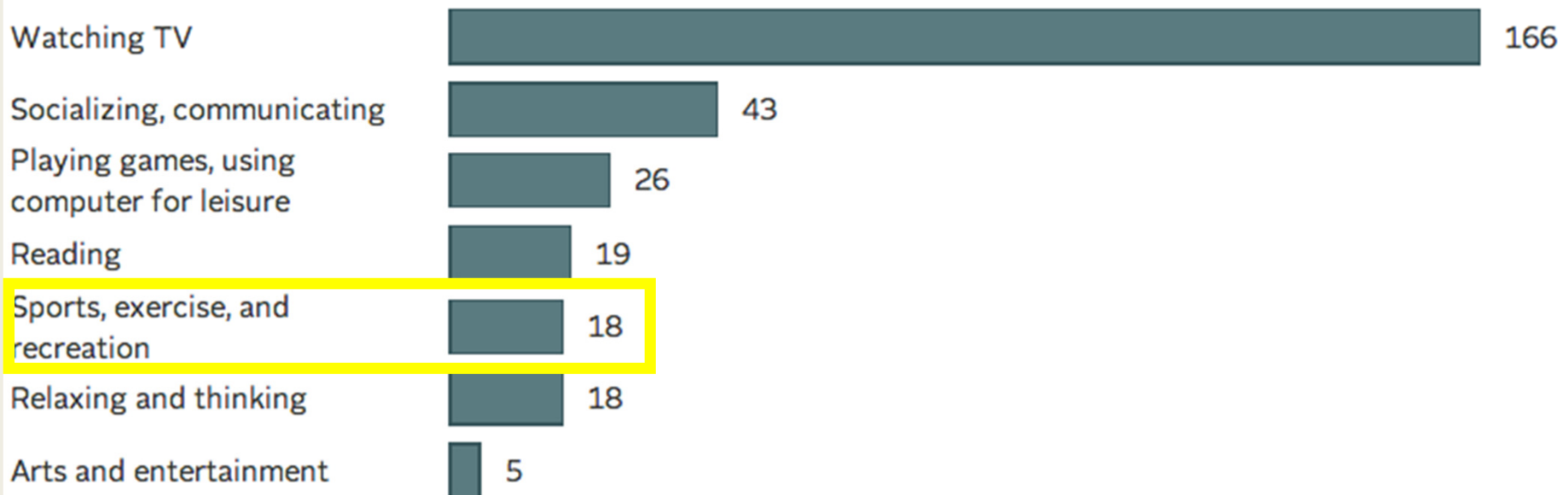
- Participants: Men and women aged 65 to 74 who participated in a baseline risk factor survey between 1997 and 2007 in Finland (N = 2,456)

Conclusions

Baseline LTPA reduces the risk of total and CVD mortality and incident CVD events in older adults independently of the major known CVD risk factors. The protective effect of LTPA is dose dependent.

How Americans spend their leisure time

Average time spent per day, minutes (selected activities)



Source: BLS



Tips on Becoming Active

- Start ASAP!!
- Don't do it alone
 - *Exercise with a friend or family member*
 - *Take advantage of exercise professionals*
- Lapham Center Fitness
- New Canaan YMCA
 - *Aqua Fitness*
- SilverSneakers at Halo
- Certified Personal Trainer



Fitness Myths

- MYTH: Exercise increases the likelihood of falling
 - *TRUTH: When appropriately instructed, exercise and activity can reduce fall risk*
- MYTH: Exercising causes soreness and will make sore joints hurt worse
 - *TRUTH: Strength training and regular activity helps reduce joint pain by improving muscle strength and improving the natural lubrication of the joints*
- MYTH: Exercise will make you tired
 - *TRUTH: When prescribed appropriately, exercising should improve energy levels and vitality*

Objectives

- ~~Introduce the science of aging~~
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Specific Exercise Programs

- Resistance (Strength) Training
- Balance Training



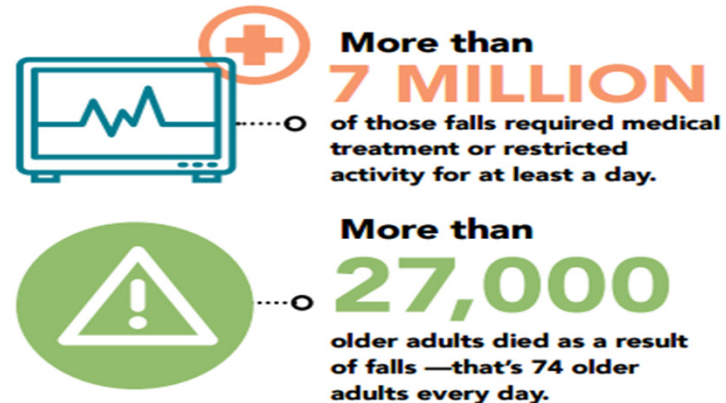
Sarcopenia

- Age related loss of muscle mass and strength and decrease in physical performance.
- Lose 1% of muscle mass annually after the age of 50
- Lose 2-4% of strength annually
- Sarcopenic individuals are 3x more likely to suffer a fall

The Concern:

IN 2014:

Every second an older American falls. These falls threaten the health and independence of older adults and result in high medical costs across the U.S. healthcare system.



Benefits of Resistance Training

Evidence statement and recommendation.

Evidence category B. Increases in MQ are similar between older and younger adults, and these improvements do not seem to be sex-specific.

Evidence statement and recommendation.

Evidence category A. Older adults can substantially increase their strength after RET.

ACSM position stand on exercise in older adults



Is it how much weight you lift, or how many times you lift it? How about both!!

- Methods: 49 resistance trained young men (avg. 23 years) were randomly assigned to a High Weight/Low Rep exercise routine or a Low Weight/High Rep exercise routine for 12 weeks
- Results: Both groups demonstrated equal strength and muscle mass gains.



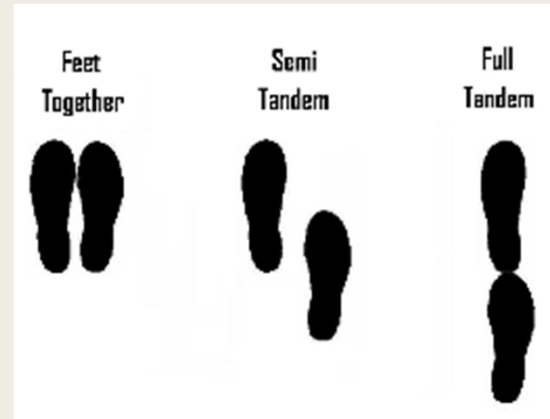
Morton, et al. *Journal of Applied Physiology* 2016 Vol. 121 no. 1, 129-138

Conclusions

- Load does not dictate gains in strength or muscle mass, as long as exercise is performed to fatigue.
 - *Regardless of how much weight or how many reps you perform, if the exercise was challenging, you will improve strength*



Balance Training



- Balance drills with:
 - *Altered foot position*
 - *Eyes closed*
 - *Head Turns*
- Navigate difficult terrain
 - *Planned "obstacle course"*
- Tai Chi
- Recreational sports
 - *Golf*
 - *Racket sports*



***Improving balance requires you to challenge it! Please perform balance training with the assistance of a trained professional 😊

Live Longer. Live Better

- Aerobic Activity: Walking, swimming, biking, gardening, dancing, rowing, etc.
 - *Minimum 3 days per week 30 minutes per day*
- Resistance Training: Strength machines, dumbbells, resistance bands, ankle weight, body weight, etc.
 - *2 non-consecutive days per week*
- Balance Training: Tai chi, balance exercises
 - *2 days per week*
- Be ACTIVE everyday

Summary

- We are as old as we FEEL
- Improving fitness is the best way to FEEL better!
- Prolonged periods of inactivity will reverse health gains in as little as 2 weeks!
- Do not be afraid or nervous to start exercising. Use your resources!
- Start a strength training and balance training routine to reduce fall risk and improve strength

GET FIT
FOR LIFE.
NOT JUST
FOR SUMMER.

fb.com/FitnessandFaithfulness



THANK YOU

QUESTIONS???