

The logo consists of the letters 'FAI' in a bold, white, sans-serif font, centered within a red shield-shaped background. The shield has a pointed top and a pointed bottom. The background of the entire slide is a dark, grayscale photograph of a group of people, including several older adults, some of whom are smiling and appear to be participating in an exercise program.

**FAI**

# **Exercise Program Design for the 55+ Functional Aging Training Model**



## Cody Sipe, PhD

20 years industry experience

Over 100 presentations internationally

Over 30 published articles

2005 IDEA Program Director of the Year

Advisory Boards for National Posture Institute, International Council on Active Aging, Act!vate Brain and Body, ACSM, CFES, WCAA

Editorial Boards: IDEA, Faith and Fitness Magazine, Boomerbloomer.com

**FAI**

# Dan Ritchie, PhD, CSCS

16+ years experience – personal trainer,  
manager, owner

Certified Strength and Conditioning  
Specialist

FallProof Balance and Mobility  
Enhancement Specialist

Enhance Fitness Master Trainer

2014 PFP Personal Trainer of the Year

Act!vate Brain and Body Advisory Board



FAI



How Long Will You Live?

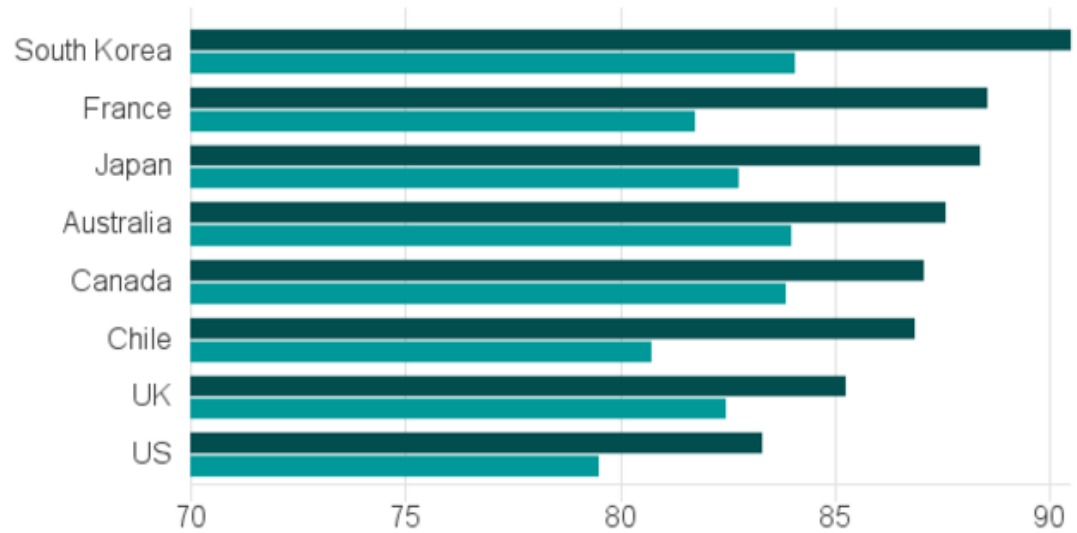


**LONGEVITY**

Are you  
really ready  
for the  
longevity  
revolution?

### Average life expectancy at birth by 2030 (in years)

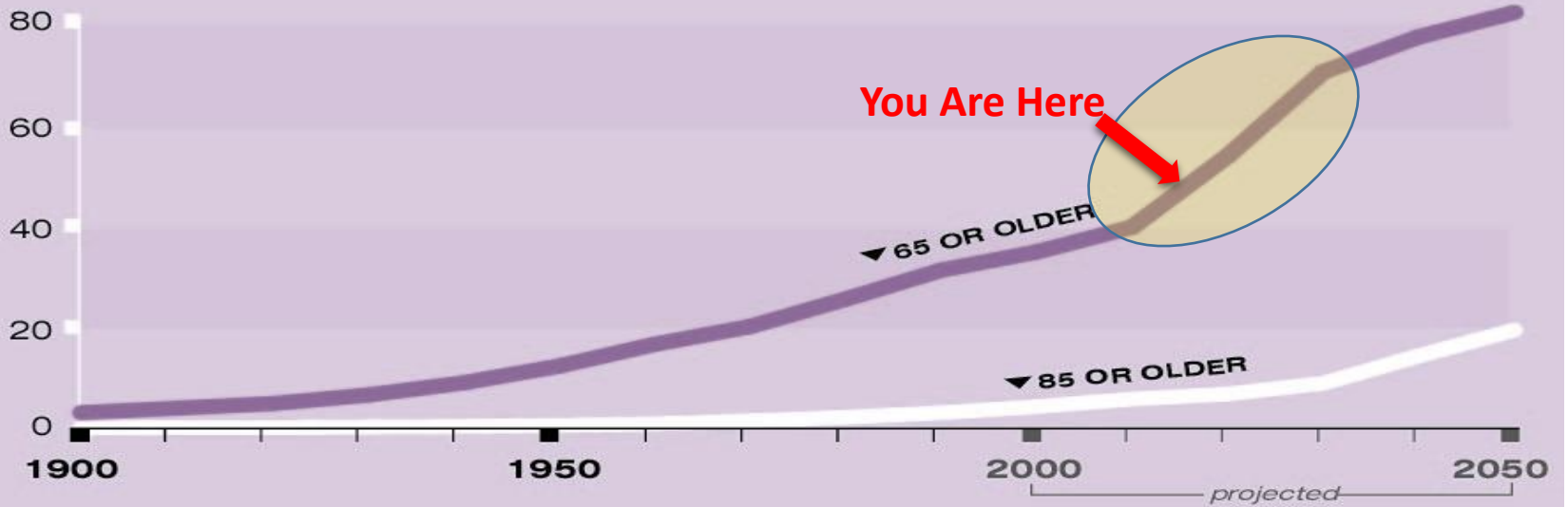
■ Women ■ Men



Source: Imperial College London / World Health Organization

BBC

## Total number of persons age 65 or older, by age group, 1900 to 2050, in millions



Note: Data for the years 2000 to 2050 are middle-series projections of the population.  
Reference population: These data refer to the resident population.  
Source: U.S. Census Bureau, Decennial Census Data and Population Projections.

## BIG & GETTING BIGGER



**TODAY:**    **50+**    **100M**

		Growth Rate
<b>20 YEARS:</b>	<b>50+</b>	<b>+34%</b>
	<b>18-49</b>	<b>+12%</b>

**1946-1964**

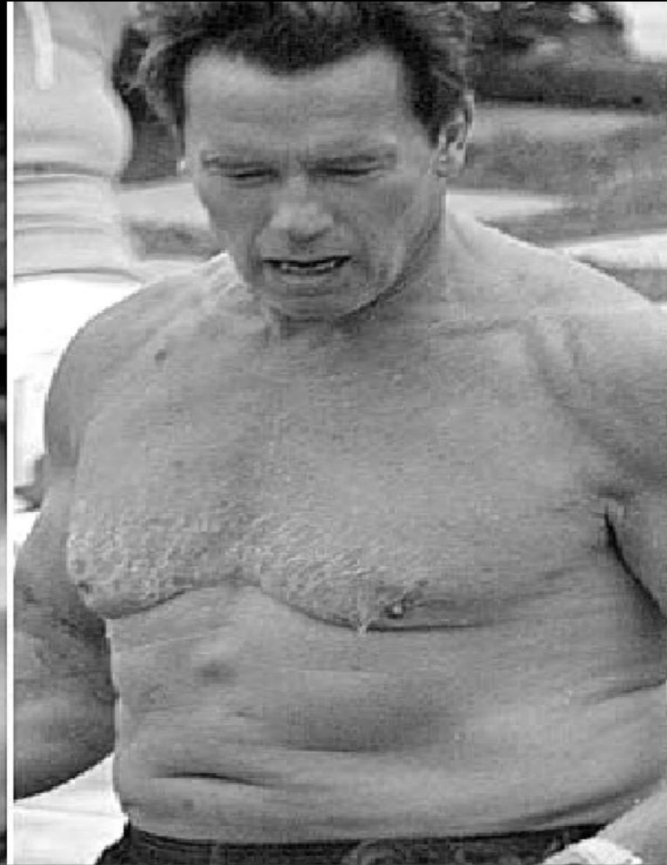
**Currently Ages 55-73**

**76,000,000+**



# We've Missed the Mark





**FAI**

# WHAT FUELS MY PASSION?

THESE TWO WOMEN ARE  
APPROXIMATELY THE SAME AGE.

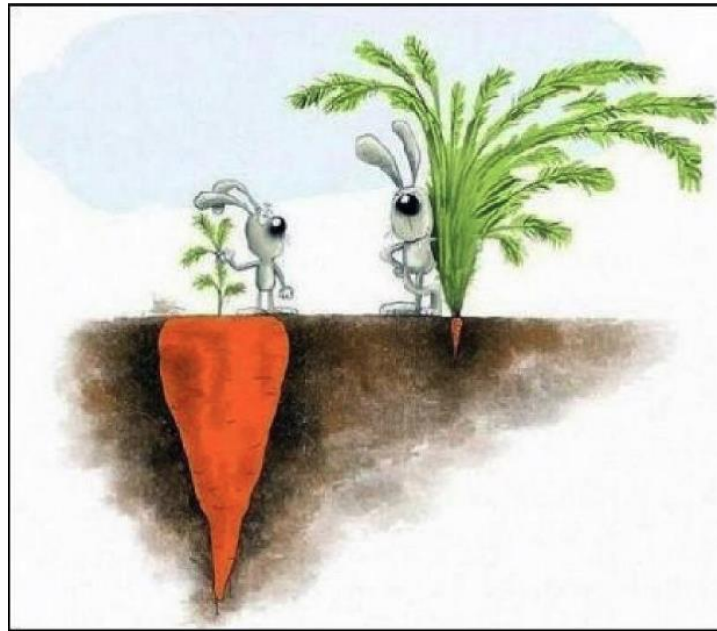


*Which life are you designing?*

Which would you choose?

Quality

Quantity



# Functional Longevity

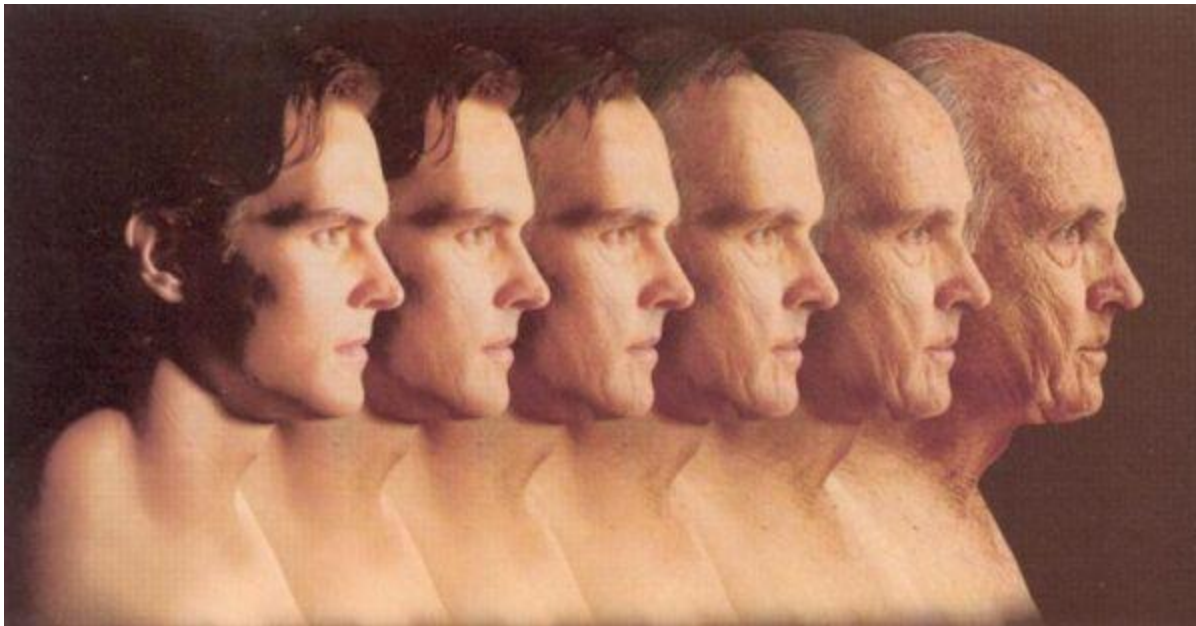
Maintaining your ability to do what you *need* to do, what you *want* to do and what you *like* to do as late in life as possible.





# Genetics and Aging

- Account for 25% of aging



# Primary vs. Secondary Aging



# Which type of exercise is best?

Walking



Strength Training



# Walking



- Sufficient for older adults
- Easy
- Convenient
- No equipment necessary
- Limiting



# Strength Training

- Safe
- Traditional weight lifting
  - Improved strength and muscle mass
  - Strength gain may not translate to functional ability





# Both Are Limited

Walking



Strength Training



# The Research Says...

## Have we oversold the benefits of late-life exercise? (2001)

### Critical review of 31 studies

- Impairment – Strength, ROM, Aerobic capacity, body comp
- Function – Walking, chair rise, balance
- Disability – Physical, social, emotional, overall

### Results

- Impairment: Very Strong
- Function: Strong but inconsistent
- Disability: Weak and inconclusive

## Systematic review of PRT in older adults (2004)

### Pooled data from 62 trials

- Randomized controlled trials
- PRT with subjects aged 60+

### Results

- Large positive effect on muscular strength
- Small to moderate effect on functional ability
  - Strength gains do not equate to similar functional gains
- No evidence of an effect was found for physical disability

# Multi-modal exercise programs for older adults – a systematic review (2007)

- 15 studies that concurrently used PRT, cardio and balance training
- Subjects aged 60+
- Conclusion:
  - Positive effect on falls prevention
  - Small effect on physical, functional\* and quality of life outcomes

\* - habitual gait, maximal gait, chair stand

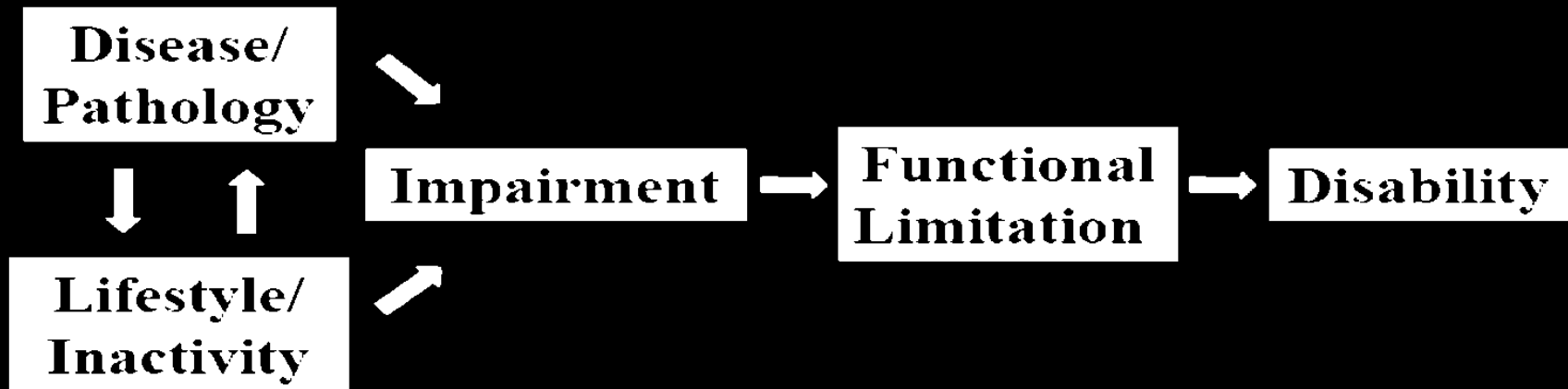
# Exercise: necessary but not sufficient for improving function and preventing disability? (2011)

## Key Points:

- There is consistent and convincing evidence that older adults and adults with knee OA who engage in strength training or aerobic exercise are able to decrease pain and increase strength and physical function
- The effects on strength, pain and function, though, are modest, at best
- It is not clear that exercise interventions alone will minimize or prevent disability
- Exercise may be necessary but not sufficient in minimizing or preventing disability. **Effective interventions for minimizing disability are scarce and novel approaches are needed**

# The Nagi Model

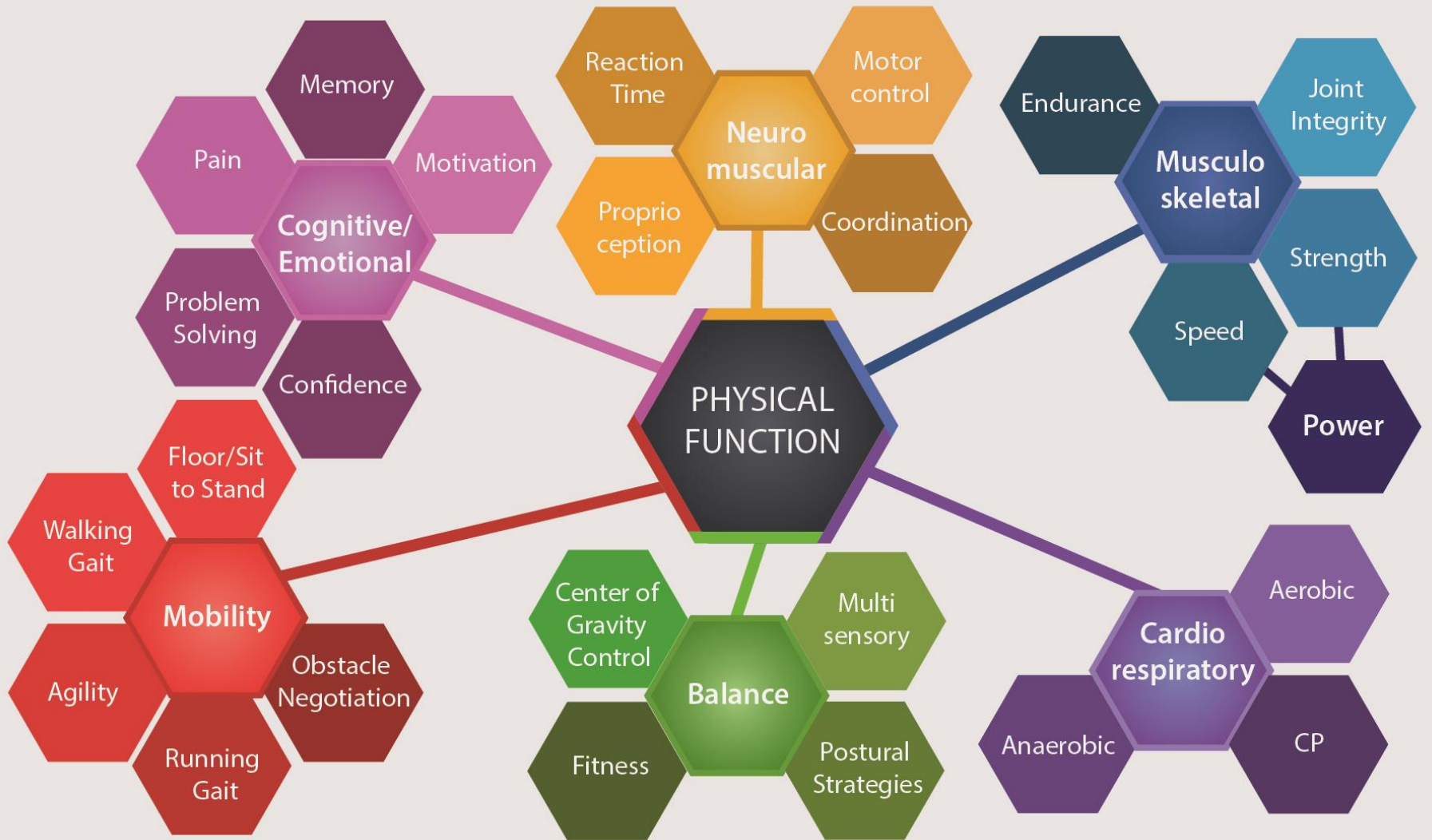
Revised, Rikli and Jones, 1997





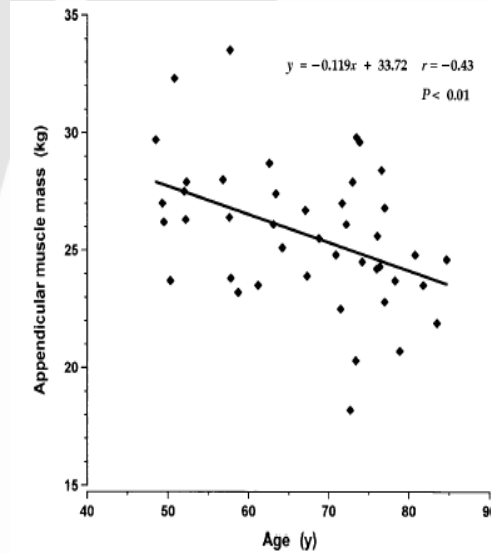
# What Impairment Level Factors are Vital for Function?

- Muscular Strength
  - Concentric
  - Eccentric
  - Isometric
- Contractile Velocity
  - Acceleration
  - Deceleration
- Muscular Power
- Muscular Endurance
- Aerobic Power
- Flexibility
- Joint Range of Motion
- Coordination
- Reaction Time
- Motor Control
- Proprioception
- Somatosensation
- Vestibular control
- Vision
- Mobility
- Agility
- Balance
- Stability
- Gait
- Postural Control





## **Sarcopenia = age related decline in muscle mass**



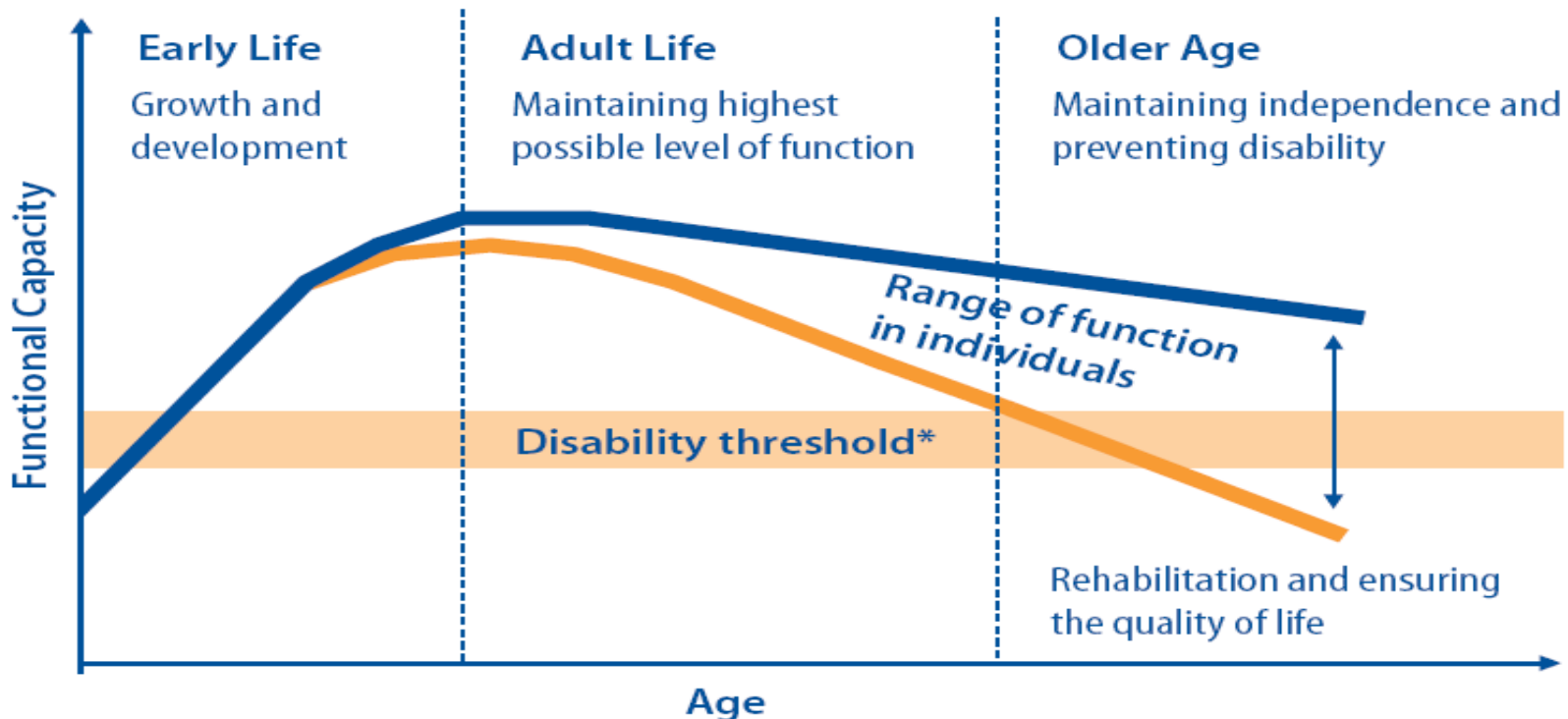
Starling et al. *Am J Clin Nutr* 1999

[www.sarcopenia.com](http://www.sarcopenia.com)

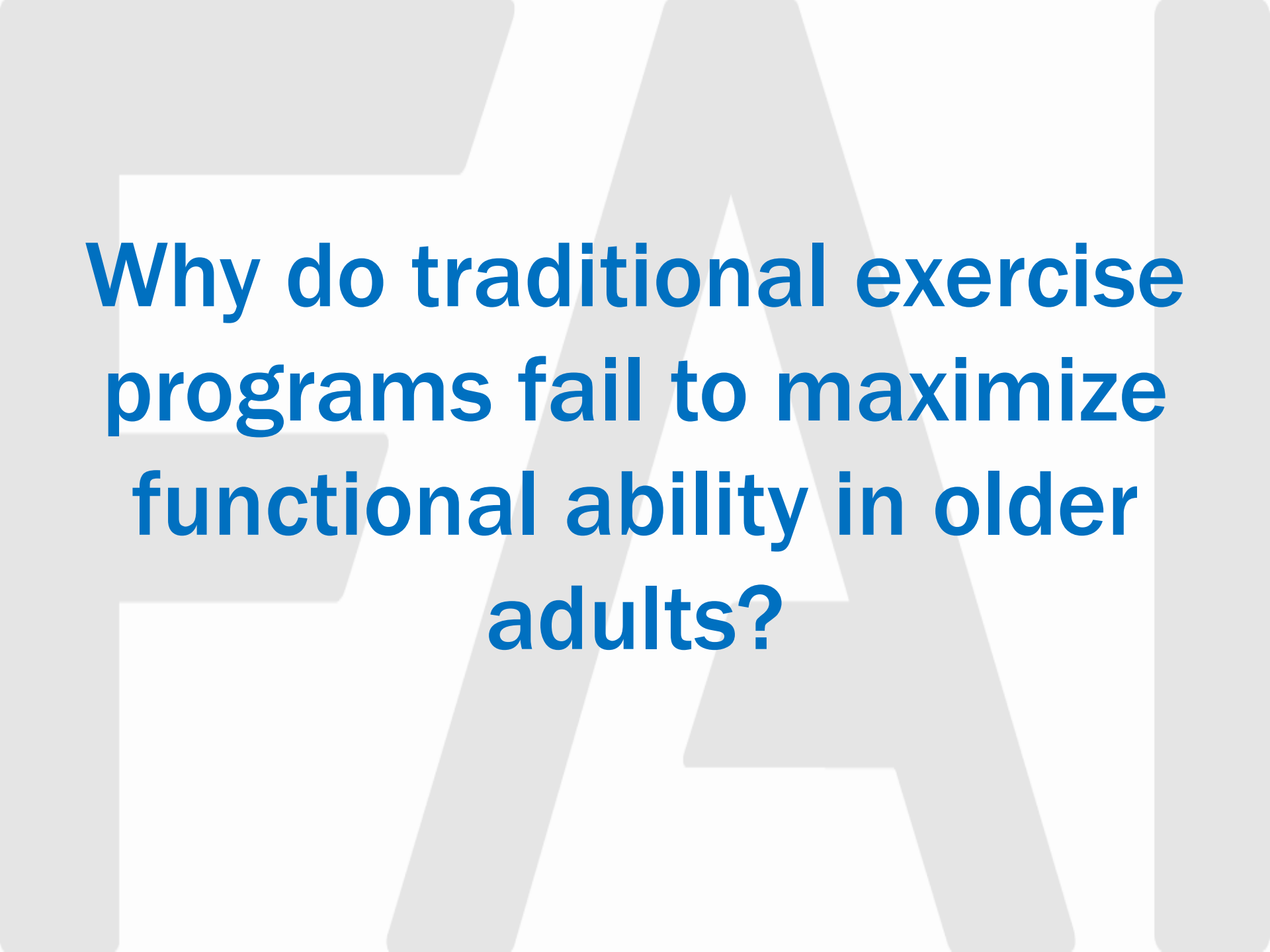
Muscle strength declines 30% (on average) from age 50-70,  
more dramatic losses after age 80  
Large degree of variability between individuals

# Huge variability in impairments means huge variability in functional abilities

Figure 4. Maintaining functional capacity over the life course



Source: Kalache and Kickbusch, 1997



**Why do traditional exercise programs fail to maximize functional ability in older adults?**



The background features two large, light gray, semi-transparent letters: a large 'E' on the left and a large 'A' on the right, both centered vertically. The text is overlaid on the white space between these letters.

**The following Information  
needs to be considered  
and addressed!**

## 4 Cornerstones

1. An in-depth **UNDERSTANDING** of the aging process and its implications for exercise
2. A **RECOGNITION** of the desires, goals and aspirations that accompany the third age
3. A strong **BELIEF** that people can be fit, healthy, vibrant and functional at any age
4. An **APPROACH** to exercise that is grounded in evidence and honed with experience.

# 2 Pillars

## Specificity

- SAID
- How you train is how you gain
- Correlation of the exercise to the functional goal

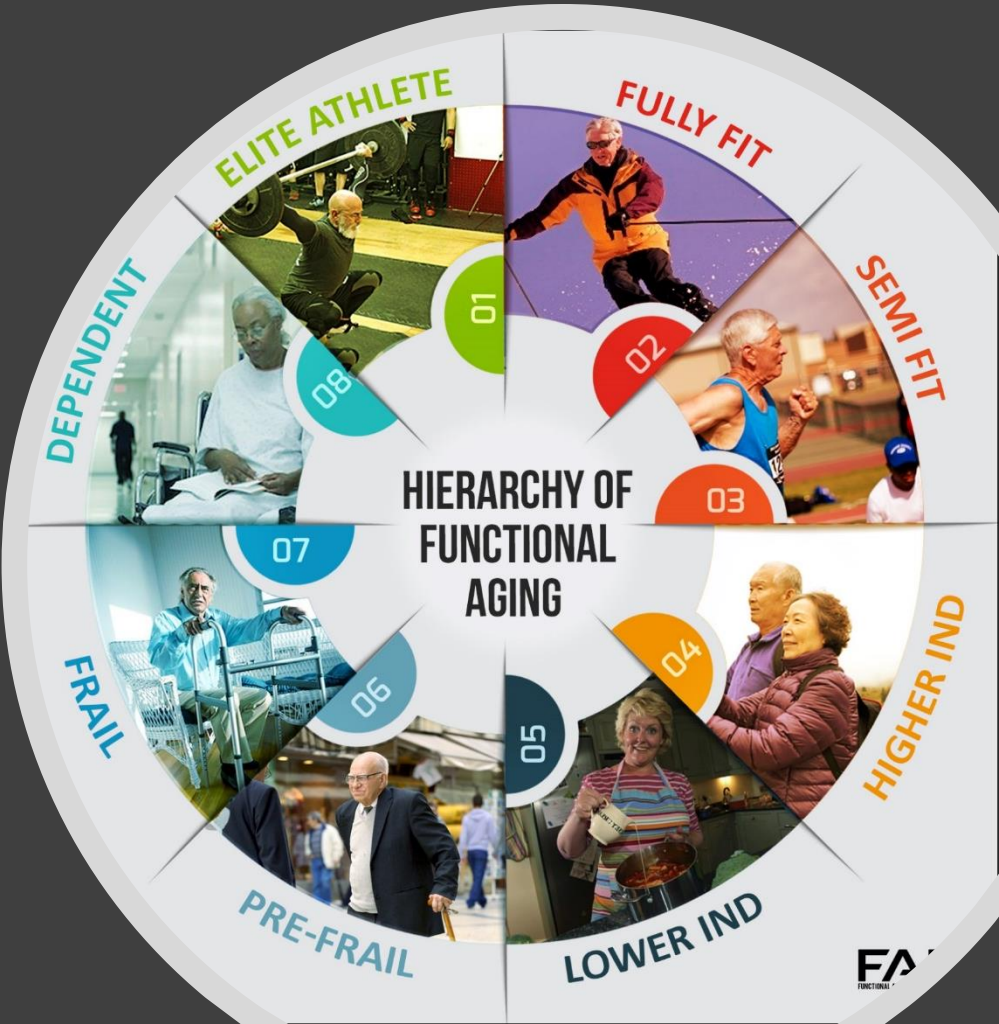
## Progressive Overload

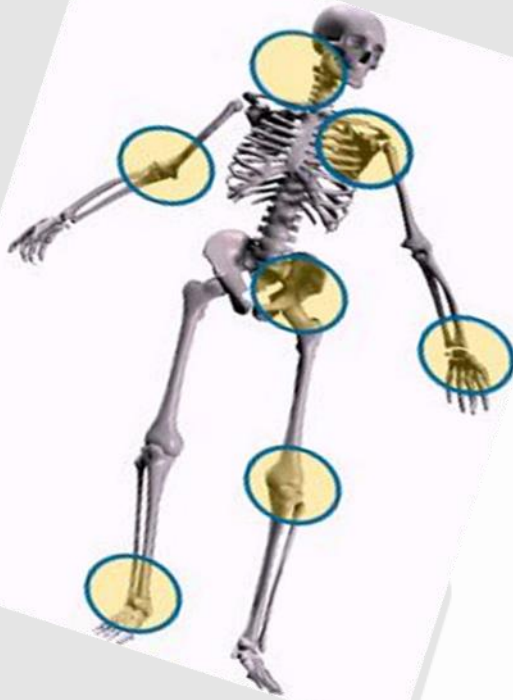
- Body adapts to overload (at any age)
- Overload must be progressed in order to stimulate further improvement

# 7 Key Principles

1. Assess, prioritize and train ALL components of function
2. Make purposeful decisions for every aspect of training
3. Integrate movement patterns (train in all 3 planes) to prepare for functional demands
4. Include isolation-type exercise movements as supplementary and complementary rather than the primary component of the routine
5. Perform exercise movements in a seated position only when absolutely necessary or when it serves a specific purpose
6. Order the session according to energy level with more complicated, multi-component movements occurring earlier and less complicated, isolation-type movements occurring later
7. Maximize client safety and success by taking a holistic approach to training

# Hierarchy of Physical Function





## Is the Exercise Safe and Effective?

1. Purpose?
2. Does it Fulfill the Purpose?
3. Stress Points?
4. Risk Benefit Ratio?
5. Specificity and Appropriateness?





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**FAI**

A grayscale photograph of a diverse group of people, including men and women of various ages, sitting on exercise bikes in a gym or studio setting. The image is dimly lit and serves as a background for the text.

# Functional Fitness Assessments

# Screening & Health History

- PARQ is inadequate
- Comprehensive health history interview is highly recommended
  - Current health conditions
  - Current medications
  - Current problems or issues
  - Current activity and exercise
  - Past...all of them
- Informed consent

# Qualities of Functional Assessments

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**Validity** – Does it measure what it is intended to measure?

**Reliability** – Are the results able to be replicated accurately?

**Intra-Rater**

**Inter-Rater**

**Floor Effect** – a lower (min) limit for potential scores

**Ceiling Effect** – a higher (max) limit for potential scores



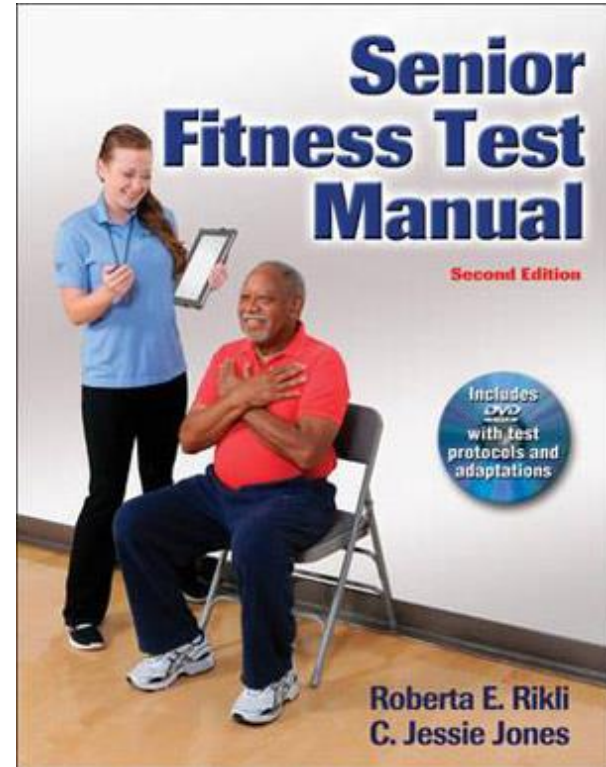
# Develop the Hawk Eye

- Observe
- Collect Data
- Coach
- Customize
- Hypothesize
- Research
- Network



# Senior Fitness Test Battery

- Chair Stand
- Arm Curl
- 8' Up and Go
- 2-min Step in Place
  - Or 6 min Walk
- Chair Sit and Reach
- Back Scratch





# Chair Stand

- Assesses lower-extremity strength under practical (functional) conditions
- Validated against 1RM leg press
- Number of times a person can rise from a chair in 30 seconds

# Chair Stand Norms

	Women				Men			
% Rank	60-64	65-69	70-74	75-79	60-64	65-69	70-74	75-79
90	20	18	18	17	22	21	20	20
80	18	16	16	16	20	19	18	18
70	17	15	15	14	19	18	17	16
60	16	14	14	13	17	16	16	15
50	15	14	13	12	16	15	14	14
40	14	13	12	12	15	14	13	13
30	12	12	11	11	14	13	12	12
20	11	11	10	9	13	11	11	10
10	9	9	8	8	11	9	9	8

# 8' Up and Go

- Assesses agility/dynamic balance
- How long it takes a person to rise from a chair, walk around a cone 8' away and return to their seat
- Older adults who required greater than 8.5 seconds to complete the UG were classified as fallers.
- Overall prediction rate of classification was 82%.



# 8' Up and Go Norms

	Women				Men				
% Rank	60-64	65-69	70-74	75-79	60-64	65-69	70-74	75-79	
90	3.7	4.1	4.0	4.3	3.0	3.6	3.6	3.5	
80	4.2	4.6	4.7	5.0	3.6	4.1	4.2	4.3	
70	4.6	5.0	5.2	5.5	4.0	4.5	4.6	4.9	
60	4.9	5.3	5.6	5.9	4.4	4.8	5.0	5.4	
50	5.2	5.6	6.0	6.3	4.7	5.1	5.3	5.9	
40	5.5	5.9	6.4	6.7	5.0	5.4	5.6	6.4	
30	5.8	6.2	6.8	7.1	5.4	5.7	6.0	6.9	
20	6.2	6.6	7.3	7.6	5.8	6.1	6.4	7.5	
10	6.7	7.1	8.0	8.3	6.4	6.6	7.0	8.3	

# MCTSIB

Modified Clinical Test of Sensory Interaction in Balance

Test in Four Conditions for 30 seconds:

- Eyes Open Stable EOS
- Eyes Closed Stable ECS
- Eyes Open Unstable EOU
- Eyes Closed Unstable ECU

Cross arms over chest, Stand erect, Shoulder-width stance

Unstable Surface = 2 high density foam pads

Limitation: Cannot identify a deficit in one specific system



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**FAI**

The background of the slide is a dark, semi-transparent image of a diverse group of people, including men and women of various ages, some of whom are smiling. They appear to be in a social or professional setting.

# **Functional Strategies, Techniques and Exercises**

# Functional Continuum

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Less Functional

More Functional

**Isolation vs. Integration**

FAI

Glenohumeral = Mobility

Scapulothoracic = Stability

Thoracic spine = Mobility

Lumbar spine = Stability

Hip = Mobility

Knee = Stability

Ankle = Mobility

Foot = Stability

## The Body Works as a Unit

When Postural Muscles are Compromised – The Whole Body is Affected

### Misalignments Lead to:

- Compensations
- Wearing in Joints
- Injury and Pain

**The purpose of these techniques and strategies is to address as many impairment level factors as possible.**

# Start Positions

---

Shoulder-width (athletic)

Wide

Narrow

Side-by-Side

Semi-Tandem

Tandem

In-Line

One-Legged

Lunge

Squat

Half-Kneeling

Full Kneeling

Prone

Supine

Quadruped

Seated

# Arm Movements

---

Bilateral

Unilateral

Alternating

Reciprocating

Multidirectional



# Temporal, Speed and Rhythm Variations

---

Slower to Faster

On “beat”

Varied beat pattern

Cueing: Snap, Clap, Verbal

## Benefits:

- Higher velocity = higher power
- More acceleration and deceleration
- More challenging COG control
- Increases cognitive demands



# Three Dimensional Core Stability Training

---

## Sagittal

Anterior chain

Posterior chain

## Frontal

Left lateral chain

Right lateral chain

## Transverse

Anterior Right

Anterior Left

Posterior Right

Posterior Left

## Combination

# Moves to Consider Avoiding/Modifying

---

## Rotation away from midline with resistance

Cable rotation

Twisting med ball crunch

Twisting med ball throws

## Excessive spinal flexion

Sit-Up (any leg position)

Unsupported crunch

Weighted side bend

Ab crunch machine

## Superman

## Roman chair extension

# Push/Pull Variations

---

## Rows

- Standing, half-kneeling, kneeling
- 2 arm (sagittal)
- 1 arm (transverse)

## Pull-Downs

- Standing, half-kneeling, kneeling
- 1 arm (frontal plane)

## Chest Press

- Standing 2 arm (sagittal)
- Standing 1 arm (transverse)
  - Punch with rotation
  - Lateral punch (multiplanar)

## Shoulder Press

- Standing, half-kneeling, kneeling
- 1 arm (frontal)

# Chop and Lift Sequences

- Cable

- Seated on Stability Ball
- Half-Kneeling
- Standing
  - Add step

- CorBall

- Lifts
  - Seated on Stability Ball
  - Half-Kneeling
  - Standing
  - Lunge
- Chops
  - Ball slams

# Lunge and Squat

## Lunge Variations

- Rotation
- Forward Reach
- Rear lunge with twist
- Multi-directional lunges with reach

## Squat

- Air squat
- Potty squat
- “Spread the Floor” squat
- Sit to stand
- Elevator Squat
- Total Body Extensions

# Exercise Movements for Power

## Frail/Lower Independent

- Power Stands
- Step Ups/Stair Climb
- Get Up and Go
- Chair Drills
- Red Light/Green Light



## Independent/Average

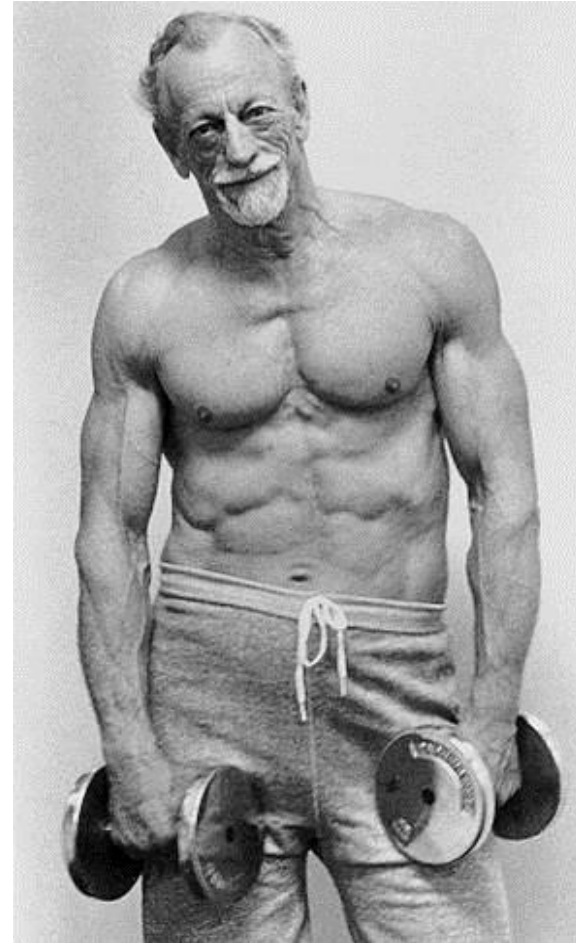
- Power Stands/Jumps
- Line Hops
- Short Sprints
- What Time is It?
- Jumping Jacks



# Exercise Movements

## Fit/Athletic

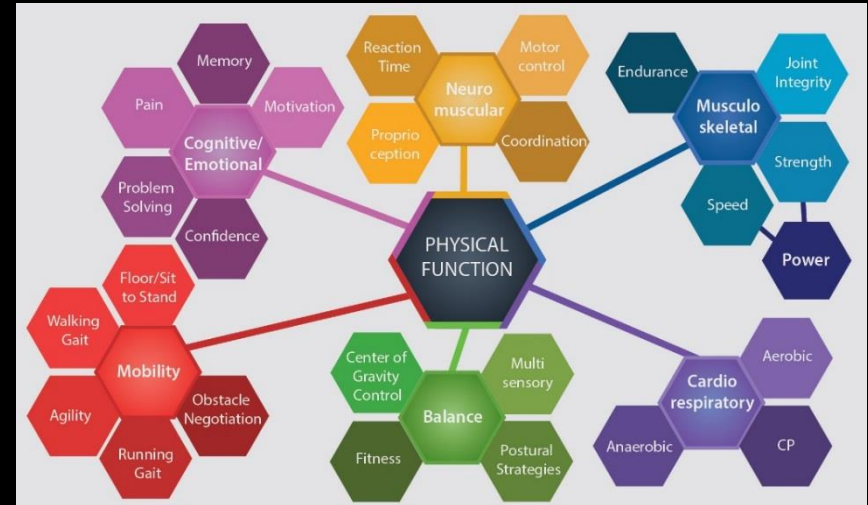
- Plyometrics\*
- Med Ball Throws
- Power Punch
- Power Row
- Hang Cleans
- Push Press





# Specific Strategies and Techniques

- Balance Training
- Mobility
- Neuromuscular
- Musculoskeletal
- Cardiorespiratory
- Cognitive/Emotional



You MUST continue to gain knowledge and skill in specifically addressing each of these areas

# Balance and Mobility Training

## FallProof™ Model

1. Center of Gravity Control
2. Postural Strategies
3. Gait Pattern Enhancement and Variation
4. Multisensory
5. Fitness Parameters
  - Strength, Power, Flexibility, CV Endurance...

# Balance and Mobility Training: Gait Exercises

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Goal: Create an adaptable, flexible and efficient gait pattern

## Marching

Straight-leg

In-line

Crossover

Backwards

Pause

Dog/Bush

## Walking

Narrow/Wide

Heels/Toes

Backwards

## Obstacle Negotiation

Sleeping Dog

Steps

Up/Down

Swing Through

Over

# Sample Stations

## **Posture Station (5 min total)**

Supine Snow Angels (15 sec)

(Rest 5 sec) X3

Dead Bug (30 sec)

(Rest 15 sec) X2

Prone Snow Angels (15 sec)

(Rest 5 sec) X3

Plank Series

Front, Left Side, Front, Right Side (15 sec ea)

(Rest 15 sec)

Front, Left Side, Front, Right Side (15 sec ea)

(Rest 15 sec)

## **Balance Station (6 min total)**

One leg balance (15 sec ea leg x 2)

Walk the Line on Toes (15s fwd; 15s bwd)

Forward Reach with Narrow Stance (15s ea arm x 2)

Side Reach with Narrow Stance (15s ea arm x 2)

Red Light, Green Light (60 sec)

One leg balance (15 sec ea leg x 2)

Walk the Line on Toes (15 sec fwd; 15 sec bwd)

Forward Reach with Narrow Stance (15s ea arm x 2)

Side Reach with Narrow Stance (15 sec ea arm x 2)

Red Light, Green Light (60 sec)

# Sample Stations

## **Gait and Agility Station (6 min total)**

Carioche Left and Right (30 sec)

Square Stepping Clockwise (15 sec)

Rest 15 sec

Square Stepping Counterclockwise (15 sec)

Rest 15 sec

Tick Tock Walks (60 sec)

High Knee March Fwd/Bwd on Toes (30 sec)

Skipping (30 sec)

Cross the Stream (60 sec)

Rest 60 sec

Repeat all

## **Strength Station (6 min total)**

Tall kneeling DB front raises to side raises (60 sec)

Prisoner Get Ups alternating feet (60 sec)

Rest 30 sec

Squat to DB hammer curl (30 sec)

DB deadlift to high pull (30 sec)

Walking Lunges DB in Right Hand (30 sec)

Walking Lunges DB in Left Hand (30 sec)

Rest 30 sec

Alternating DB curl to shoulder press (30 sec)

Bent over one arm DB row to tricep kickback (30 sec ea side)

Rest 30 sec

Repeat Station

# 24" Box Jumps at 83?



# Functional Program Design

- Prioritize Primary Areas of Individual Deficit for Significant Improvement
- Address ALL of the Secondary Areas for Maintenance or Slight Improvement
  - Neuromuscular
  - Musculoskeletal
  - Cardiorespiratory
  - Balance
  - Mobility
  - Cognitive/Emotional
- For Efficiency Use Movements that Address Multiple Components Simultaneously
- Use Corrective Exercise Strategies as needed



# Level 2 Workout

Equipment: Tubing anchored chest level, dumbbells,

Time: 17 min

- Split Squat – 12 reps each leg
- Sleeping Dog front and back – 3 reps each leg
- Two arm standing dumbbell lateral raises – 12 reps  
(repeat)
  
- Standing alternating tubing rows – 12 reps each arm
- Sleeping Dog side to side – 5 reps
- Standing alternating chest press – 12 reps each arm  
(repeat)
  
- Standing alternating lat pull down – 12 reps each arm
- Heel Toe Rocks – 30 seconds
- Side Step Ups – 12 reps each leg  
(repeat)
  
- Bridge with arms together – 3 reps (5 sec hold)
- Bird Dog with limb movement to side – 2 reps each limb  
(repeat)

# Level 3 Workout

Equipment: tubing anchored chest level, tubing anchored above head, step

Time: 16 min

- Stationary Lunge – 12 reps each leg
- Bush Walk – 30 seconds
- Standing upright tubing row – 12 reps
  
- Standing reciprocating row – 12 reps each arm
- Monster Walk – 30 seconds
- Standing reciprocating chest press – 12 reps each arm
  
- Stationary Lunge – 12 reps each leg
- Bush Walk – 30 seconds
- Standing upright tubing row – 12 reps
  
- Standing reciprocating row – 12 reps each arm
- Monster Walk – 30 seconds
- Standing reciprocating chest press – 12 reps each arm
  
- Half-kneeling reciprocating lat pull down -12 reps each arm
- High kicks – 30 seconds

You can't help  
getting older,  
but you don't have  
to get **old.**

(GEORGE BURNS)



## The Aging Opportunity

- Traditionalist or silent generation (seniors)
  - 28 million
- Baby Boomers
  - 76 million
- Gen Xers (already turning 50)
  - 64 million

Functional Aging  
Specialist  
Certifications

**FAI**  
FUNCTIONAL AGING INSTITUTE

# FAI Programs



CEC's – ACE, AFAA, NFPT, ACSM, NASM, AFN

Completely online

- 13 educational modules
- 5 hours of video
- 90 question test

Coupon FitnessFest

# AGELESS FITNESS

## The Aging Opportunity

- To Learn More about Ageless Fitness and FAI Training
- [www.functionalaginginstitute.com](http://www.functionalaginginstitute.com)



Free Gift  
For You



\$11.99  
on Amazon

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FUNCTIONAL AGING INSTITUTE

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**BOOMER  
FITNESS  
CLIENTS  
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Dan Ritchie, PhD and Cody Sipe, PhD  
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