

# Welcome to TOA

# TOA

TRAINING THE OLDER ADULT

*movement is life*

# Proper Resistance Training for the Older Adult

## Part II

| <div> <div> <div>TOA</div> <div>TRAINING THE OLDER ADULT</div> <div>Improving Life</div> </div> <div> <div>TrainingTheOlderAdult.com</div> <div>For the "Older Client" (Age 50+)</div> </div> </div> |                                                                                                                                                                                                                                            | <div> <div>Program Design Blueprint</div> <div>7th Generation</div> </div>                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Foundational Exercise Progressions                                                                                                                                                                   |                                                                                                                                                                                                                                            | Mid-Range Exercise Progressions                                                                                                                                                                                                                                                                        | Complex Exercise Progressions                                                                                                                                                                                                                                                                          |
| <b>Hinge</b><br>(Component 1)                                                                                                                                                                        | <b>Flow Band (Horizontal Hinge)</b><br>Band Glue Band<br>Loaded Glute Bridge<br>BW Feet Elevated Bridge<br>Loaded Feet Elevated Bridge<br>BW Shoulders Elevated Bridge<br>Loaded Shoulders Elevated Bridge                                 | <b>Vertical Hinges (Low-to-Landed &amp; Landed)</b><br>Band the Landed Split Leg Lunge<br>BW Split Leg Lunge<br>Band Seated Single Pull<br>BW Single Leg Split Leg Lunge<br>Loaded Single Leg or Kick Stand Leg Split Leg Lunge<br>Seated Single Pull                                                  | <b>Vertical Hinge with Bent Knee</b><br>Band the Landed Split Leg Lunge<br>Band Split St to Stans or Hinge Squats<br>KB Squat Progressions<br>BW Single Leg Staircases or Hinge Squats<br>Loaded Rack Pulls<br>Loaded Stair Pulls or Repayment Deadlifts                                               |
|                                                                                                                                                                                                      | <b>Horizontal Rows</b><br>Band Seated Chest Pull<br>Restined Row (w. mug)<br>High/Low Pull Starts<br>Biceps Curls (seated, anterior or supinated)<br>BB or B Barred Pull Over                                                              | <b>Horizontal Rows</b><br>Band Mid-Range Pull Starts<br>DB Unilateral or Liss or Lateral Pull Overs<br>Band Frontal Pull Starts<br>DB Six Point Row<br>Band Seated Row New                                                                                                                             | <b>Horizontal Rows</b><br>Band Inert Row<br>DB Rowing Slung Row<br>Band Seated Row<br>Inverted Row (w. mug)<br>Band Seated Inertia Row                                                                                                                                                                 |
| <b>Rows</b><br>(Component 2)                                                                                                                                                                         | <b>Loaded Carries (Vertical)</b><br>Farmer Carry<br>Suitcase Carry<br>Zurcher Cart Carry<br>Front to Back Carry                                                                                                                            | <b>Carries</b><br>Band Assisted Get Up<br>Push & Pull Carry<br>Side Pull<br>Side-Drive                                                                                                                                                                                                                 | <b>Loaded Carries (DB &amp; Camell)</b><br>Platter Carry<br>Suitcase & Water<br>Loaded Carry<br>Platter Carry                                                                                                                                                                                          |
|                                                                                                                                                                                                      | <b>Split Stance</b><br>(Component 6)                                                                                                                                                                                                       | <b>Carries</b><br>Lateral Split Up & Down<br>Push & Pull Carry<br>Loaded Steps Up (w. mug)<br>Push & Pull Carry<br>Step Pull or Reverse Drag Pull<br>Pranker Pull Starts                                                                                                                               | <b>Carries</b><br>Get Up<br>Push & Pull<br>Carry<br>Half Get Ups<br>Wall Sit<br>Side Plank & Row                                                                                                                                                                                                       |
| <b>Over Head Actions</b><br>(Component 3)                                                                                                                                                            | <b>Push &amp; Pulls</b><br>Band Supinated Pull Downs<br>Proneated Pull Downs<br>Up Right Row<br>Band Pull Up Downs                                                                                                                         | <b>Presses</b><br>Band Assisted<br>Landed Row Press<br>Post Press<br>Retraction Row & Raise                                                                                                                                                                                                            | <b>Push &amp; Pulls</b><br>Inverted Pull Starts<br>Hinged Pull Starts<br>Anterior Press<br>Hinge Pulls<br>Strength Arm Pull Downs                                                                                                                                                                      |
|                                                                                                                                                                                                      | <b>Balance</b><br>Inert Hold<br>Inert Balance Pad<br>Band Foot Elevated Eyes                                                                                                                                                               | <b>Balance</b><br>Band Assisted<br>Landed Row Press<br>Post Press<br>Retraction Row & Raise                                                                                                                                                                                                            | <b>Balance</b><br>Inverted Pull Starts<br>Hinged Pull Starts<br>Anterior Press<br>Hinge Pulls<br>Strength Arm Pull Downs                                                                                                                                                                               |
| <b>Leverage Points</b><br>Pivot Point (Landing)<br>(Feature)                                                                                                                                         | <b>Unilateral Actions:</b><br>BB Pivot Point Chest or Over Head Press (seated, low, land)<br>Swiss Bar or BB Pivot Point Row (seated, low, land)<br>BB Limestone Two Handed Press (seated, low, land)<br>Band Limestone Hinge & Retraction | <b>Unilateral Actions:</b><br>BB Single Arm Pivot Point Chest or Overhead Press (seated, low, land)<br>KB/DB Single Arm Pivot Point Row (seated, low, land)<br>BB Limestone Single Leg Chest or Overhead Press (seated, low, land)<br>BB Limestone Single Leg or Center Stance RDL (seated, low, land) | <b>Unilateral Actions:</b><br>BB Single Arm Pivot Point Chest or Overhead Press (seated, low, land)<br>KB/DB Single Arm Pivot Point Row (seated, low, land)<br>BB Limestone Single Leg Chest or Overhead Press (seated, low, land)<br>BB Limestone Single Leg or Center Stance RDL (seated, low, land) |
|                                                                                                                                                                                                      | <b>Balance</b><br>Inert Hold<br>Inert Balance Pad<br>Band Foot Elevated Eyes                                                                                                                                                               | <b>Balance</b><br>Single Leg Hold<br>Single Leg Hold Balance Pad<br>Single Leg Medial Feet                                                                                                                                                                                                             | <b>Balance</b><br>Single Leg Hold<br>Single Leg Hold Balance Pad<br>Medial Retract Over Head                                                                                                                                                                                                           |
| <b>Fall Prevention &amp; Balance</b><br>(Mobility 1)                                                                                                                                                 | <b>Balance</b><br>Inert Hold<br>Inert Balance Pad<br>Band Foot Elevated Eyes                                                                                                                                                               | <b>Balance</b><br>Single Leg Hold<br>Single Leg Hold Balance Pad<br>Single Leg Medial Feet                                                                                                                                                                                                             | <b>Balance</b><br>Single Leg Hold<br>Single Leg Hold Balance Pad<br>Medial Retract Over Head                                                                                                                                                                                                           |
|                                                                                                                                                                                                      | <b>Balance</b><br>Inert Hold<br>Inert Balance Pad<br>Band Foot Elevated Eyes                                                                                                                                                               | <b>Balance</b><br>Single Leg Hold<br>Single Leg Hold Balance Pad<br>Single Leg Medial Feet                                                                                                                                                                                                             | <b>Balance</b><br>Single Leg Hold<br>Single Leg Hold Balance Pad<br>Medial Retract Over Head                                                                                                                                                                                                           |
| <b>Power Model &amp; Dynamic Movement</b><br>(Mobility 2)<br>Retract Only                                                                                                                            | <b>Santhill/Medball</b><br>Kneeling Stands<br>Seated Chest Press<br>Seated Chest Press Vertical (Up & Over)                                                                                                                                | <b>Santhill/Medball</b><br>Standing Hinged Stands<br>Standing Chest Press Horizontal<br>Standing Chest Press Vertical (Up & Over)                                                                                                                                                                      | <b>Santhill/Medball</b><br>Two Handed Hinge the Leg Vertical Tools for Height<br>One Hand Hinged the Leg Vertical Tools for Height<br>Two Handed Lateral Tools for Distance                                                                                                                            |

|                                                                                    |                                          |                                          |
|------------------------------------------------------------------------------------|------------------------------------------|------------------------------------------|
|  | <b>Clients Name:</b> Entry Level Clients | <b>Date:</b> Eight Week Mini-Macro Cycle |
| <b>Major Emphasis or Physical Limitation(s):</b> In Season                         |                                          |                                          |

|                                                    |                                                                                                                |
|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| <b>Mobility Menu &amp; Correctives:</b><br>[10:00] | <b>Movement Prep Warm Up:</b> Upper Body & Lower Body Lifts<br>Should Mimic to Prep for Training Day<br>[5:00] |
|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------|

**Strength 1st:**  
[20:00]

|           | Week 1    | Week 2      | Week 3           | Week 4        | Week 5    | Week 6    | Week 7    | Week 8     |
|-----------|-----------|-------------|------------------|---------------|-----------|-----------|-----------|------------|
| Theme     | SG        | DL          | SG               | NTL           | SG        | DL        | SG        | NTL        |
| Focus     | BL        | UNL         | BL               | UNL           | BL        | UNL       | BL        | UNL        |
| Reps      | 8         | 6-8-10-12   | 10               | 12-10-8-10-12 | 12        | 6-8-8-10  | 8         | 20         |
| Sets      | 3         | 4           | 3                | 5             | 4         | 5         | 4         | 4          |
| Load      | Mod       | Mod - Heavy | Super Sets - Mod | Mod           | Heavy     | Drop Sets | Heavy     | Super Sets |
| Tot. Vol. | 24        | 36          | 30               | 52            | 48        | 40        | 32        | 80         |
| Tempo     | 2:1       | 2:1         | 3:1-1            | 2:1           | 2:1       | 3:2       | 2:1       | 2:1        |
| Recovery  | As Needed | Ready Go    | As Needed        | Ready Go      | As Needed | As Needed | As Needed | Ready Go   |

**Met Con/Ski Strong/Golf Strong:**

|       | BL  | UNL | BL  | UNL | BL       | BL       | BL  | UNL |
|-------|-----|-----|-----|-----|----------|----------|-----|-----|
| Focus | BL  | UNL | BL  | UNL | BL       | BL       | BL  | UNL |
| Reps  | 15s | 20s | 25s | 30s | 30-20-10 | 10-20-30 | 25s | 30s |
| Sets  | 2   | 2   | 2   | 3   |          |          | 2   | 3   |

|                                                          |                                                             |
|----------------------------------------------------------|-------------------------------------------------------------|
| <b>Correctives:</b><br>[5:00] Two Exercises - Two Rounds | <b>Cool Down Menu:</b><br>[5:00] Two Exercises - Two Rounds |
|----------------------------------------------------------|-------------------------------------------------------------|

| Exercise | Reps | Sets | Load | Tempo |
|----------|------|------|------|-------|
|          |      |      |      |       |
|          |      |      |      |       |

| Corrective | Reps | Sets | Load | Tempo | Recovery |
|------------|------|------|------|-------|----------|
|            |      |      |      |       |          |
|            |      |      |      |       |          |

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**With Robert Linkul MS CSCS\*D NSCA\*D FNSCA**  
**Owner of TrainingTheOlderAdult.com**

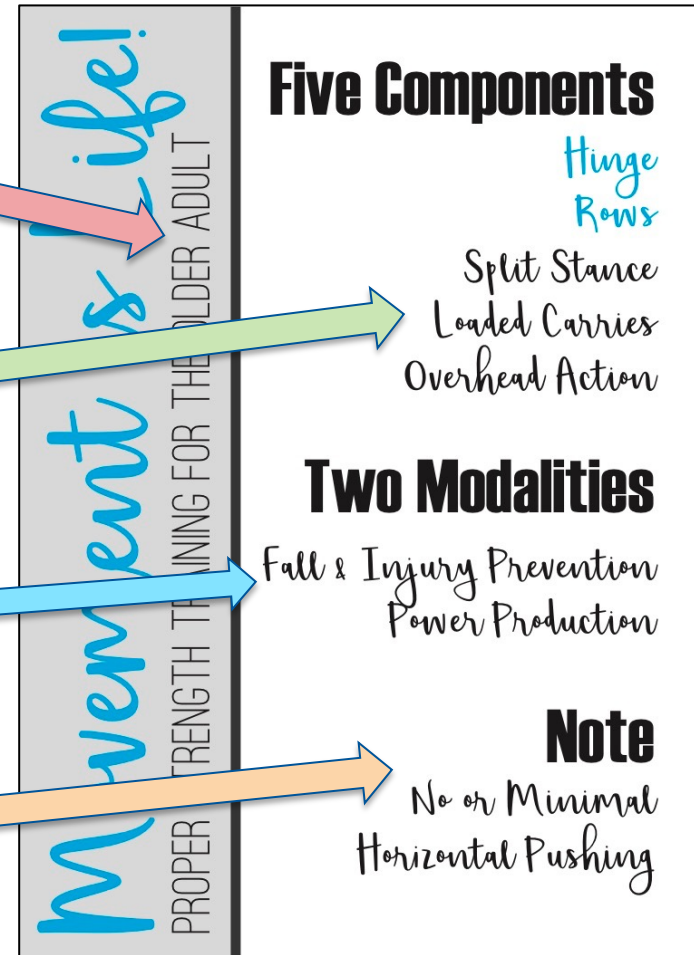
# Client Outline

## Prior to Participation

- Client has inquired about your services
- You contacted the client & scheduled the initial interview & consultation
- Initial interview & consultation, tour of the facility(\*) & training philosophy overview has been completed.  
\*= or online training program overview
- Movement observation & assessment has been completed & data collected
- Client has minimal physical limitations, passed the PAR-Q+ & does not require a doctor's release to participate in your program
- Clients first official workout has been scheduled for today
- **8 Week Adaptation Training Cycle Has Been Completed**

# Create a Training Philosophy

- Select a Target Demographic
- Select the Components You Want to Train in Every Session
- Select the Modalities You Want to Train Every Session
- Make any Side Notes



# Outline Program Design Blueprint



## Program Design Blueprint Foundations

|                                                                      | Beginner |  | Intermediate |  | Advanced |  |
|----------------------------------------------------------------------|----------|--|--------------|--|----------|--|
| <b>Hinges &amp; Swings</b><br>(Component 1)                          | [ ]      |  | [ ]          |  | [ ]      |  |
|                                                                      | [ ]      |  | [ ]          |  | [ ]      |  |
|                                                                      | [ ]      |  | [ ]          |  | [ ]      |  |
| <b>Rows &amp; Pulls</b><br>(Component 2)                             | [ ]      |  | [ ]          |  | [ ]      |  |
|                                                                      | [ ]      |  | [ ]          |  | [ ]      |  |
|                                                                      | [ ]      |  | [ ]          |  | [ ]      |  |
| <b>Pushes, Pivot Points &amp; Over Head Actions</b><br>(Component 3) | [ ]      |  | [ ]          |  | [ ]      |  |
|                                                                      | [ ]      |  | [ ]          |  | [ ]      |  |
|                                                                      | [ ]      |  | [ ]          |  | [ ]      |  |
| <b>Split Stance</b><br>(Component 4)                                 | [ ]      |  | [ ]          |  | [ ]      |  |
|                                                                      | [ ]      |  | [ ]          |  | [ ]      |  |
|                                                                      | [ ]      |  | [ ]          |  | [ ]      |  |
| <b>Loaded Carry, Drags &amp; Release Drills</b><br>(Component 5)     | [ ]      |  | [ ]          |  | [ ]      |  |
|                                                                      | [ ]      |  | [ ]          |  | [ ]      |  |
|                                                                      | [ ]      |  | [ ]          |  | [ ]      |  |

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# Download Exercise Library



## Program Design Blueprint Foundations

|                                                                      | Beginner                                                                                                                                               | Intermediate                                                                                                                                          | Advanced                                                                                                                                       |
|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Hinges &amp; Swings</b><br>(Component 1)                          | <input type="checkbox"/> Bridge<br><input type="checkbox"/> Foot Elevated Bridge<br><input type="checkbox"/> Shoulder Elevated Bridge                  | <input type="checkbox"/> Romanian Deadlift (RDLs)<br><input type="checkbox"/> Traditional Deadlift<br><input type="checkbox"/> Kickstrand RDLs        | <input type="checkbox"/> Rack Pulls<br><input type="checkbox"/> Single Leg RDLs<br><input type="checkbox"/> Swings                             |
| <b>Rows &amp; Pulls</b><br>(Component 2)                             | <input type="checkbox"/> Three Point Single Arm Row<br><input type="checkbox"/> Supinated Chest Pull<br><input type="checkbox"/> Single Arm Pull Start | <input type="checkbox"/> Pull Over<br><input type="checkbox"/> Pronated Chest Pull<br><input type="checkbox"/> Supinated Pull Down                    | <input type="checkbox"/> Pulley Seated Row<br><input type="checkbox"/> Band Straight Arm Pull Down<br><input type="checkbox"/> Up Right Rows   |
| <b>Pushes, Pivot Points &amp; Over Head Actions</b><br>(Component 3) | <input type="checkbox"/> Single Arm Chest Press<br><input type="checkbox"/> Shoulder Raises<br><input type="checkbox"/> Wall Slides                    | <input type="checkbox"/> Pivot Point Press<br><input type="checkbox"/> Landmine Two Hand Press<br><input type="checkbox"/> Band Tensioned Wall Slides | <input type="checkbox"/> Bench Press<br><input type="checkbox"/> Landmine Single Arm Press<br><input type="checkbox"/> Over Head Press         |
| <b>Split Stance</b><br>(Component 4)                                 | <input type="checkbox"/> Band Gait Steps<br><input type="checkbox"/> Band Deloaded Step Ups<br><input type="checkbox"/> Band Deloaded Split Squats     | <input type="checkbox"/> Gait Steps<br><input type="checkbox"/> Single Leg Step Ups<br><input type="checkbox"/> Split Squats                          | <input type="checkbox"/> Loaded Gait Steps<br><input type="checkbox"/> Overloaded Step Ups<br><input type="checkbox"/> Overloaded Split Squats |
| <b>Loaded Carry, Drags &amp; Release Drills</b><br>(Component 5)     | <input type="checkbox"/> Loaded Suitcase Carry<br><input type="checkbox"/> Loaded Chest Pass<br><input type="checkbox"/> Band Simulated Sled Pull      | <input type="checkbox"/> Loaded Farmer Carry<br><input type="checkbox"/> Loaded Slams<br><input type="checkbox"/> Band Simulated Drags                | <input type="checkbox"/> Loaded Waiter Carry<br><input type="checkbox"/> Loaded Vertical Tosses<br><input type="checkbox"/> Loaded Drags       |

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# Outline Mini-Macrocycle



**Clients Name:** *Entry Level Clients*

**Date:** *Eight Week Mini-Macro Cycle*

**Major Emphasis or Physical Limitation(s):** *Based on Clients Training Outcome or Physical Limitations*

**Mobility Menu & Correctives:**  
[10:00]

*Bridge, Six Point Birdog  
& Thoracic Rotation (minimum)*

**Movement Prep Warm Up:**  
[5:00]

*Upper Body & Lower Body Lifts  
Should Mimic to Prep for Training Day*

**Strength 1st:** *Up to Three Primary & Focused Lifts*  
[20:00]

|           | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | Week 8 |
|-----------|--------|--------|--------|--------|--------|--------|--------|--------|
| Theme     |        |        |        |        |        |        |        |        |
| Focus     |        |        |        |        |        |        |        |        |
| Reps      |        |        |        |        |        |        |        |        |
| Sets      |        |        |        |        |        |        |        |        |
| Load      |        |        |        |        |        |        |        |        |
| Tot. Vol. |        |        |        |        |        |        |        |        |
| Tempo     |        |        |        |        |        |        |        |        |
| Recovery  |        |        |        |        |        |        |        |        |

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# Download Mini-Macrocycle



**Clients Name:** *Entry Level Clients*

**Date:** *Eight Week Mini-Macro Cycle*

**Major Emphasis or Physical Limitation(s):** *Based on Clients Training Outcome or Physical Limitations*

**Mobility Menu & Correctives:**  
[10:00]

*Bridge, Six Point Birdog  
& Thoracic Rotation (minimum)*

**Movement Prep Warm Up:**  
[5:00]

*Upper Body & Lower Body Lifts  
Should Mimic to Prep for Training Day*

**Strength 1st:** *Up to Three Primary & Focused Lifts*  
[20:00]

|           | Week 1 | Week 2   | Week 3 | Week 4       | Week 5 | Week 6   | Week 7 | Week 8        |
|-----------|--------|----------|--------|--------------|--------|----------|--------|---------------|
| Theme     | SG     | SG       | SG     | NTL          | SG     | SG       | SG     | NTL           |
| Focus     | BL     | UNL      | UNL    | UNL          | BL     | UNL      | UNL    | UNL           |
| Reps      | 8      | 10       | 12     | 8-10-12-10-8 | 8      | 10       | 12     | 12-10-8-10-12 |
| Sets      | 3      | 3        | 3      | 5            | 4      | 4        | 4      | 5             |
| Load      | Lite   | Moderate | Heavy  | Mod. - Heavy | Lite   | Moderate | Heavy  | Mod. - Heavy  |
| Tot. Vol. | 24     | 30       | 36     | 48           | 32     | 40       | 48     | 52            |
| Tempo     | 2:1    | 2:1      | 3:1:1  | 2:1          | 2:1    | 2:1      | 3:1:1  | 2:1           |
| Recovery  | :35    | :35      | :30    | :30          | :25    | :25      | :20    | :20           |

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# Why is Progressive Resistance Training So Important?

**Resistance Training for Older Adults: Position Statement From the National Strength and Conditioning Association**

There are substantial health benefits of resistance exercise for older adults. There is strong evidence to support the benefits of resistance exercise for countering many age-related processes, including sarcopenia, muscle weakness, mobility loss, chronic disease, disability, and even premature mortality.

A properly designed resistance training program can elicit many physiological adaptations and functional benefits, including:

| Physiological Adaptations   | Functional Benefits                         |
|-----------------------------|---------------------------------------------|
| ↑ Muscle strength           | ↑ Mobility & movement quality               |
| ↑ Muscle mass               | ↑ Performance in activities of daily living |
| ↑ Muscle power              | ↑ Psychosocial well-being                   |
| ↑ Neuromuscular functioning | ↑ Resistance to falls & other injuries      |

**Suggested Resistance Training Program Parameters**

- Frequency**: 2-3 days per week per muscle group; performing training sessions on non-consecutive days is ideal
- Exercises & Sets**: 1-3 sets of 1-2 multi-joint exercises per major muscle group; include complex, dynamic movements
- Repetitions**: 6-12 repetitions per set for muscular strength; 8-12 or 10-15 for muscular hypertrophy & endurance
- Intensity**: Progress as tolerated up to 70-85% of 1-repetition maximum (1RM); include power/explosive exercise at higher velocities, using 40-60% of 1RM
- Individualization & Progress**: Follow the principles of individualization, periodization, and progression; Proper exercise form & technique must be established prior to progression

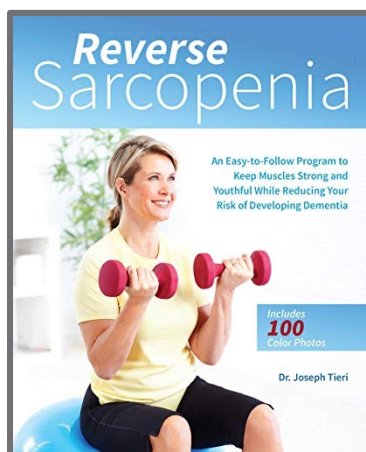
**Important Notes & Considerations**

- A properly designed resistance training program with appropriate exercise technique and proper spotting is safe for healthy older adults
- Programs can be adapted for those with frailty, mobility limitations, cognitive impairment, or other chronic conditions, and even for those residing in assisted living and skilled nursing facilities
- All resistance exercise programs should correspond with the specific individual needs & capabilities of each older adult, and participation in such programs is unquestionably beneficial for older adults

Created by Adam Virgile adamvirgile.com  
 Social Media @AdamVirgile @AVSportSci  
 References: Fragala, M. S., Cadore, E. L., Dorge, S., Izquierdo, M., Kraemer, W. J., Peterson, M. D., & Ryan, E. D. (2019). Resistance Training for Older Adults. *Journal of Strength and Conditioning Research*, 33(8), 2019-2052. doi:10.1519/jsc.0000000000003226  
 NSCA NATIONAL STRENGTH AND CONDITIONING ASSOCIATION

- Increased:
  - Muscle Strength and Mass
  - Mobility and Movement Quality
  - Performance of ADLs and Psychosocial Well-Being
  - Resistance to Falls and Other Injuries
  - Neuromuscular Functioning
  - and....POWER

# Sarcopenia is a BIG Problem



## Estimates Worldwide

60 Years of Age + = 5-13%

80 Years of Age + = 11-50%

Pre-Covid Numbers

## Pandemic Lock Downs

Did NOT Help

### An overview of sarcopenia: facts and numbers on prevalence and clinical impact

Stephan von Haehling,<sup>1,2</sup> John E. Morley,<sup>3</sup> and Stefan D. Anker<sup>1,4</sup>

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See letter "Not being able to see the muscle for the fat" in volume 3 on page 69.

This article has been cited by other articles in PMC.

#### Abstract

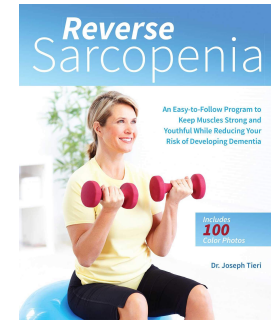
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Human muscle undergoes constant changes. After about age 50, muscle mass decreases at an annual rate of 1–2%. Muscle strength declines by 1.5% between ages 50 and 60 and by 3% thereafter. The reasons for these changes include denervation of motor units and a net conversion of fast type II muscle fibers into slow type I fibers with resulting loss in muscle power necessary for activities of daily living. In addition, lipids are deposited in the muscle, but these changes do not usually lead to a loss in body weight. Once muscle mass in elderly subjects falls below 2 standard deviations of the mean of a young control cohort and the gait speed falls below 0.8 m/s, a clinical diagnosis of sarcopenia can be reached. Assessment of muscle strength using tests such as the short physical performance battery test, the timed get-up-and-go test, or the stair climb power test may also be helpful in establishing the diagnosis. Sarcopenia is one of the four main reasons for loss of muscle mass. On average, it is estimated that 5–13% of elderly people aged 60–70 years are affected by sarcopenia. The numbers increase to 11–50% for those aged 80 or above. Sarcopenia may lead to frailty, but not all patients with sarcopenia are frail—sarcopenia is about twice as common as frailty. Several studies have shown that the risk of falls is significantly elevated in subjects with reduced muscle strength. Treatment of sarcopenia remains challenging, but promising results have been obtained using progressive resistance training, testosterone, estrogens, growth hormone, vitamin D, and angiotensin-converting enzyme inhibitors. Interesting nutritional interventions include high-caloric nutritional supplements and essential amino acids that support muscle fiber synthesis.



# Sarcopenia & Joint Degeneration

Acute & Chronic



*Diversity and Equality in Health and Care (2018) 15(4): 175-183*

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## Research Article

### Prevalence of Sarcopenia and Sarcopenic Obesity Vary with Race/Ethnicity and Advancing Age

Kristy Du<sup>1</sup>, Scott Goates<sup>2</sup>, Mary Beth Arensberg<sup>3</sup>, Suzette Pereira<sup>4</sup> and Trudy Gaillard<sup>5</sup>

<sup>1</sup>PepsiCo; Champaign, Illinois, US

<sup>2</sup>Health Economics and Outcomes Research, Abbott Laboratories; Sylmar, California

<sup>3</sup>Abbott Nutrition Division of Abbott; 3300 Stelzer Road, Columbus, Ohio

<sup>4</sup>Abbott Nutrition Division of Abbott; Columbus, Ohio

<sup>5</sup>Nicole Wertheim College of Nursing and Health Sciences, Florida International University; Miami, Florida

#### What is Known About the Topic

- Individuals are living longer than ever before and in the United States the older adult population is becoming more ethnically and racially diverse.
- There can be genetic variability in body mass index and body composition.
- Sarcopenia and obesity contribute to poor health outcomes and when occurring together as sarcopenic obesity, can cause even further health complications that limit the human condition and functionality.
- Few studies have specifically considered these conditions across different racial/ethnic populations and with advancing age.

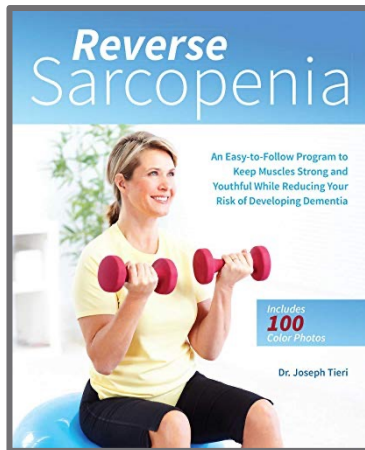
Aging is associated with changes in body composition, and there is some evidence that these changes in body composition vary by ethnic groups [2-4]. Body composition changes can contribute to the decline in health and physical function. Sarcopenia is one such change and is defined by the loss of lean mass with associated loss of strength and/or physical function [5,6]. Sarcopenia develops naturally as a result of aging, decreased physical activity, or extended immobilization (i.e. hospitalization). Acute and chronic disease can also lead to muscle loss and sarcopenia [7,8]. Sarcopenia is associated with an increased risk for falls and mobility-disability, as well as various deleterious health outcomes including poor balance, reduced activities of daily living (ADLs), and dependency leading to nursing home placement [9,10]. These conditions can perpetuate the cycle of inactivity and muscle loss, eventually leading to frailty and even mortality [11-14]. While the prevalence of sarcopenia varies depending on how it is defined and the specific techniques used to measure muscle mass, it is estimated to occur in 25-45% of older adults in the U.S. and in a substantial proportion of older adults across the world even among healthy populations [7, 15-18].

# What Is Sarcopenia?

- Poverty of the Flesh
  - Coined in 1989
- Primary
  - Occurs Naturally Over Time Due to Lack of Use
- Secondary
  - Occurs Due to An Accident, Injury or Recovery Period
- Acute Sarcopenia
  - Acute cases conditions have been present for less than six months
  - This can be from temporary conditions such as being laid up because of recent illness, injury or surgery
  - Without intervention, a rapid decline in strength and function can occur
- Chronic Sarcopenia
  - Chronic cases conditions have been present for six months or more often as a result of a secondary lifestyle or permanent disability

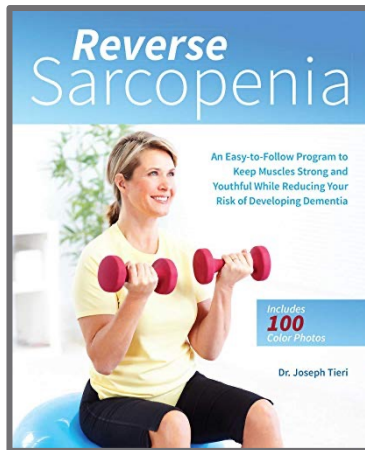


# What Is Sarcopenia Influenced Physical Decline?



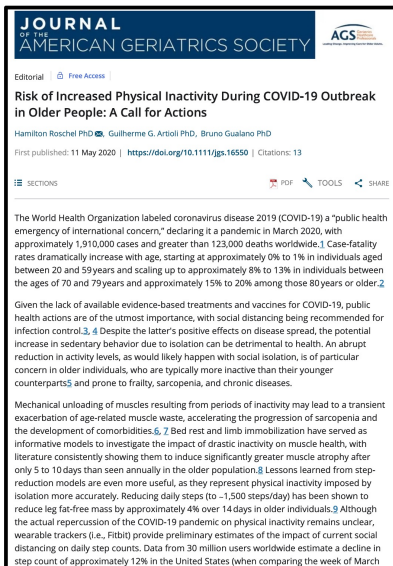
- Signs of Decline in Sarcopenia Influenced Physical Decline:
  - Walk Quickly (using a cane or walker)
  - Reach Over Head (forward head, short range, pain)
  - Sit to Stand (rocking, making noise, using arms)
  - Getting Out of the Car (getting stuck, refusing to get in low cars)
  - Lifting Grandchildren or Children (inability to do so or to try)
  - Opening Windows or Jars (can't perform it or hurts to try)
  - Up & Down from the Floor (can't perform)
  - Up & Down Stairs (holding hard onto railing, avoiding stairs)
  - Carry Groceries from Car to Kitchen (inability to do so)

# What Is Sarcopenia Influenced Cognitive Decline?



- Signs of Decline in Sarcopenia Influenced Cognitive Decline:
- Cognitive Decline Includes:
  - Hand Eye Coordination (dancing, hitting a target, etc.)
  - Balance (long gait, balancing in split foot positions, kick stands and single leg)
  - Reaction Time (ducking when something is thrown at your head, etc.)
  - Coordination (single leg RDL to single leg step up)
  - Implement Tracking (can't throw a ball, catch a ball, balance on an unstable object)
  - Memory & Recall (short-term or long-term recall in the moment)
  - Dual Tasking (throw and catch a ball while counting backwards from 60 by 3 reps)

## Results from 14 Day Stay-At-Home Quarantine in those Over the Age of 59



Before Pandemic Average Person Step Count  
= 6,000 steps per day

During 14 Day Stay-At-Home Quarantine  
= Average was 1,500 steps per day  
= Decreased by 75%

= 4% reduction in fat free body mass  
= 8% reduction in muscular strength  
= 6% reduction in power

Two-week Post-Rehabilitation Training Sessions  
Failed to Rebuild Lost Muscle Mass

*"Two weeks of inactivity has been shown to decrease muscle strength by approximately 8%, and despite a seemingly low value, 2 weeks of rehabilitation were ineffective in recovering muscle function, emphasizing the impact of abrupt reductions in physical activity in an already vulnerable population"*

### Two Days of Immobilization

- Early Onset of Atrophy
- 1.7% Muscle Volume Loss

### Seven Days of Immobilization

- Full Atrophy
- 5.5% Muscle Volume Loss

### 10 Days of Immobilization

- Early Onset of Sarcopenia

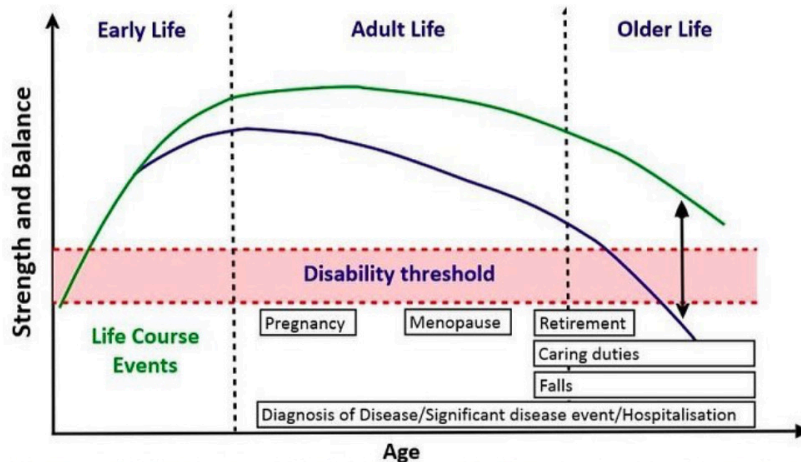
### 14 Days of Immobilization

- Full Sarcopenia
- 6% Decrease in Power Production
- 8%+ Decrease in Strength Production
- 5.5%+ Loss of Muscle Mass

# Volume Controls for TOA

## Areas of Focus

Figure 1 Strength and balance ability over the life course and potential ages or events that may change the trajectory of decline with ageing



Key: Green Line denotes successful ageing with good health and regular strength and balance activity. Blue line denotes the decline in strength and balance if not part of activity throughout lifespan.  
Source: Skelton DA, Mavroeidi A (2018) How do muscle and bone strengthening and balance activities (MBSBA) vary across the life course and are there particular ages where MBSBA are important. *Journal of Frailty, Sarcopenia and Falls* 3(2): 74-84

## Our Greatest Concern:

### Sarcopenia (Strength)

- Three Sets of 8-12 Repetitions
- 60-80% of One Repetition Max

### Fall Risk (Power)

- Three Sets of 6-10 Repetitions
- 30-60% of One Repetition Max

### Osteopenia (Strength & Power)

- Three Sets of 8-12 Repetitions
- 60-80% of One Repetition Max
- Slow Tempo [3:1] Focused Eccentrics

### Arthritis (Strength)

- Three Sets of 6-10 Repetitions
- 60-80% of One Repetition Max
- Neutral Training Positions

# Power & Steady State Strength

## High-Speed Resistance Training in Elderly People: A New Approach Toward Counteracting Age-Related Functional Capacity Loss

Mário C. Marques, PhD, Mikel Izquierdo, PhD, and Ana Pereira, PhD  
Research Centre for Sport, Health and Human Development, Department of Sport Sciences, University of Beira Interior, Covilhã, Portugal

### ABSTRACT

STRENGTH AND HIGH-VELOCITY MOVEMENTS ARE 2 ESSENTIAL CONDITIONS IN AGING HEALTH IMPROVEMENT AND MAINTENANCE. THIS ARTICLE PROVIDES A NEW APPROACH AND STRATEGIES FOR DEVELOPMENT OF STRENGTH AND POWER IN THE ELDERLY POPULATION.

### INTRODUCTION

In the elderly, muscle strength is a main determinant in the performance of everyday tasks (1). Previous recommendations for resistance training (RT) in elderly people concluded that explosive exercises executed at 50–80% of the level of exertion are important to increase muscle performance (37). Combined progressive RT focused on explosive exercises has also been related to improvements in maximal strength (isometric and dynamic actions) and in power performance of the lower-body muscles in men and women of

varying age ranges (15). The strength gains were accompanied by considerable increases in muscle mass as well as neuromuscular activation of the agonist muscles, with significant decreases relative to maximal antagonist coactivation in the experimental groups (15). Moreover, in certain studies, high-speed power training has been reported to enhance muscular performance and functional capacity in older adults (20,21,39). However, the loss of muscular contractions at maximal capacity may result in increased disability in carrying out daily tasks, for example, avoiding traffic and checking accidental forward falls (6). In this way, high-speed power training would appear more efficient in increasing strength and slowing muscular weakness in elderly populations (36). Since the '80s, studies that focused on older women and strength training have attracted increasing research interest. This approach has caused various issues in methodology. The trajectory of normal female aging involves a set of thresholds and disorders (i.e.,

menopause, sarcopenia, and osteoporosis) that complicate the selection of comparable control groups. Also, a combination of many factors, including medical conditions and health habits (obesity, smoking, alcohol, and physical inactivity), are associated with impaired function in elderly women. The inclusion in a strength training program is not always possible, and participation is often irregular because of frequent interruptions caused by, for example, poor health, family obligations, injuries, and falls. In this way, over the past years, the first studies (7,8,23,41) focused on measuring age-related skeletal muscle changes. Isometric and dynamic strength and endurance tests were the main strategies used to observe differences between young and elderly women (20–80 years).

Regardless of the growing interest of sport science coaches and conditioning

**KEY WORDS:**  
high-speed; power; elderly; women; functional capacity

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## Study of 110 Older Adults

### Slow Velocity

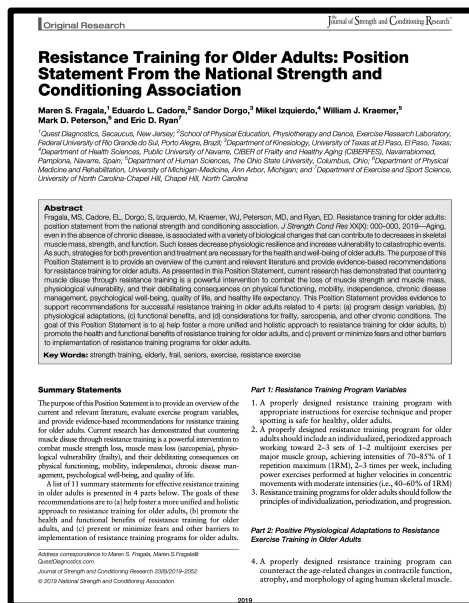
- Three Sets of 8-12 Repetitions
- 60-80% of One Repetition Max
- Study Showed Increase of 4-70% in Strength Production

### Increased Power

- Three Sets of 6-10 Repetitions
- 30-60% of One Repetition Max
- Study Showed Increase of 40-60% in Power Production



# Progressions from Strength to Power



*The Journal of Strength and Conditioning Research*

**Table 2**  
**Resistance training guidelines for older adults with frailty.†**

| Variable            | Recommendation                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Resistance training | Perform 2–3 times per week, with 3 sets of 8–12 repetitions at an intensity that starts at 20–30% of 1RM and progresses to 80% of 1RM.                                                                                                                                                                                                                                                                                                                  |
| Power               | Include power exercises performed at high speed of motion and low to moderate intensity (i.e., 30–60% of 1RM) to induce marked improvements in the functional task performance.                                                                                                                                                                                                                                                                         |
| Functional training | Include exercises in which daily activities are simulated, such as the sit-to-stand exercise, to optimize the functional capacity.                                                                                                                                                                                                                                                                                                                      |
| Endurance training  | Complements resistance training adaptations. Begin once strength and balance are improved. May include walking with changes in pace, incline and direction, treadmill walking, step-ups, stair climbing, and stationary cycling. Start at 5–10 min and progress to 15–30 min. The Rate of Perceived Exertion scale is an alternative method for prescribing exercise intensity, and an intensity of 12–14 on the Borg scale seems to be well tolerated. |
| Balance training    | Include several exercise stimuli, such as line walking, tandem foot standing, standing on one leg, heel-toe walking, stepping practice, and weight transfers from one leg to the other.                                                                                                                                                                                                                                                                 |
| Progression         | Include gradual increases in the volume, intensity, and complexity of the exercises.                                                                                                                                                                                                                                                                                                                                                                    |

\*1RM = repetition maximum.  
†Exercises should be performed with proper form and technique. Form and technique should be established before exercise progression and maintained during progression.

## Power Training Components

### Stability/Balance

- Split Stance
- Near Inline
- Inline

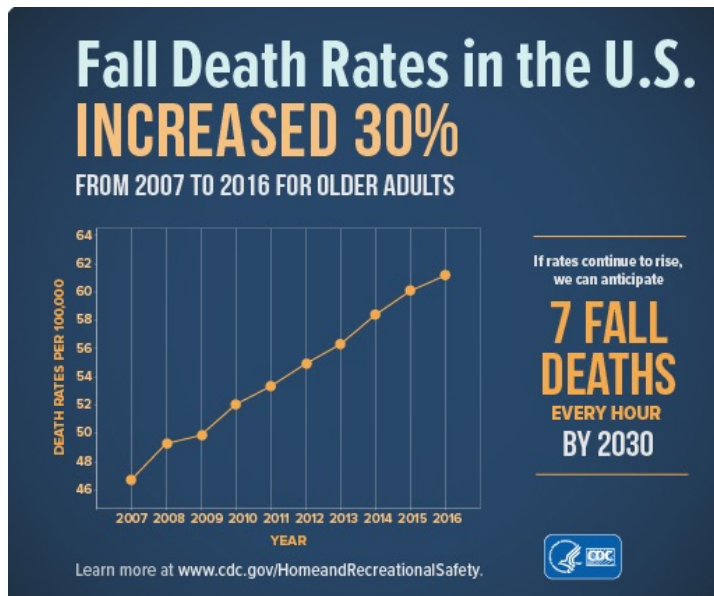
### Power

- Bands with Speed
- Controlled Load with Speed
- Release Drills
- Ground Reaction



# Why Do Some People Become Unstable?

What Earns Them the Label “Fall Risks?”



- Decreases in Eyesight, Hearing & Reaction Time/Reflexes
- Diabetes, Heart Disease, Thyroid Issues, etc. Can All Lead to Dizziness, Sleepiness and Slow Reactions
- Medications Can Cause Dizziness, Motion Sickness, etc.
- Weak Muscles = Poor Stability While Standing or in Motion/Gait
- Soft Bones = Poor Stability of the Human Structure (Doesn't Move Well)

# 2<sup>nd</sup> - 8 Week Mini-Macrocycle

|                  | Week 1                | Week 2    | Week 3              | Week 4         | Week 5               | Week 6    | Week 7              | Week 8          |
|------------------|-----------------------|-----------|---------------------|----------------|----------------------|-----------|---------------------|-----------------|
| <b>Theme</b>     | SG                    | SG *+     | SG                  | NTL            | SG                   | SG        | SG *+               | NTL             |
| <b>Focus</b>     | BL<br>Super Sets Dec. | UNL       | UNL<br>Tri-Set Asc. | UNL            | BL<br>Super Set Asc. | UNL       | UNL<br>Tri-Set Dec. | UNL<br>Zig      |
| <b>Reps</b>      | 8                     | 10        | 12                  | 10-12-15-12-10 | 8                    | 12        | 10                  | 8-10-12-12-10-8 |
| <b>Sets</b>      | 3                     | 3         | 3                   | 5              | 4                    | 4         | 4                   | 6               |
| <b>Load</b>      | Moderate              | Moderate  | Heavy               | Mod. - Heavy   | Moderate             | Heavy     | Heavy               | Mod. - Heavy    |
| <b>Tot. Vol.</b> | 24                    | 30        | 36                  | 59             | 32                   | 48        | 40                  | 60              |
| <b>Tempo</b>     | 2:1                   | 3:1       | 2:1                 | 2:1            | 2:1                  | 3:1       | 2:1                 | 2:1             |
| <b>Recovery</b>  | As Needed             | As Needed | As Needed           | Ready Go       | As Needed            | As Needed | As Needed           | Ready Go        |

# The NEXT 8 Week Training Cycle

- 8 Week Adaptation Training Phase is **Complete**
- Mini-Macrocycle Level Up for **NEW** Challenges
- Physical & Mental Changes Keep the Mind and Body **Sharp**
- Introduction:
  - Super Sets
    - Steady
    - Ascending
    - Descending
  - Tri-Sets
    - Steady
    - Ascending
    - Descending
  - Pyramids
    - Ascending
    - Descending

- Perform One Exercises
- Immediately Perform Another Exercise
- Then Take Recovery
- Opposite Movement Actions
  - Agonist
  - Antagonist
- Complex Followed By Auxiliary Action
  - Chest Press
  - Triceps Push Down



- Steady
  - 3 Sets
  - 8 Reps
  - Weight Stays the Same
- Ascending
  - 3 Sets
  - 8, 10, 12 Reps
  - Weight CAN Decrease
- Descending
  - 3 Sets
  - 12, 10, 8 Reps
  - Weight CAN Increase

- Perform One Exercises
- Immediately Perform Another Exercise
- Immediately Followed by Another Exercises
- Then Take Recovery
- Complex Followed By Complex Followed By Auxiliary Action
  - Chest Press
  - Chest Flys
  - Triceps Push Down

## TRISSET

- Steady
  - 3 Sets
  - 8 Reps
  - Weight Stays the Same
- Ascending
  - 3 Sets
  - 8, 10, 12 Reps
  - Weight CAN Decrease
- Descending
  - 3 Sets
  - 12, 10, 8 Reps
  - Weight CAN Increase



## P Y R A M I D

- Perform Up to Five Exercises
  - More or Less
- Perform All the Same Rep Count for 1st Round
  - Change Reps in 2nd Round
  - Change Reps in 3<sup>rd</sup> Round
  - Return Back to 2<sup>nd</sup> Round Rep Count
  - Return Back to 1<sup>st</sup> Round Rep Count
- With the Same Weight or Changing Weight

- Ascending
  - 8-10-12-10-8
  - Weight CAN Decrease
- Descending
  - 12-10-8-10-12
  - Weight CAN Increase
- Ziggurat
  - 12-10-8-8-10-12
  - 8-10-12-12-10-8
  - Weight CAN Change

# Coming Up Next

## Part II : Episode II

### Agenda:

Episode #2

Learn-By-Demonstration

- Mobilities
- Hinges

See You Next Time :-)

| Intermediate                                                                       |                                                     |
|------------------------------------------------------------------------------------|-----------------------------------------------------|
|  | <input type="checkbox"/> Romanian Deadlift (RDLs)   |
|                                                                                    | <input type="checkbox"/> Traditional Deadlift       |
|                                                                                    | <input type="checkbox"/> Kickstrand RDLs            |
| <b>Hinges &amp; Swings</b><br>(Component 1)                                        | <input type="checkbox"/> Pull Over                  |
|                                                                                    | <input type="checkbox"/> Pronated Chest Pull        |
|                                                                                    | <input type="checkbox"/> Supinated Pull Down        |
| <b>Rows &amp; Pulls</b><br>(Component 2)                                           | <input type="checkbox"/> Pivot Point Press          |
|                                                                                    | <input type="checkbox"/> Landmine Two Hand Press    |
|                                                                                    | <input type="checkbox"/> Band Tensioned Wall Slides |
| <b>Pushes, Pivot Points &amp; Over Head Actions</b><br>(Component 3)               | <input type="checkbox"/> Gait Steps                 |
| <b>Split Stance</b><br>(Component 4)                                               | <input type="checkbox"/> Single Leg Step Ups        |
|                                                                                    | <input type="checkbox"/> Split Squats               |
| <b>Loaded Carry, Drags &amp; Release Drills</b><br>(Component 5)                   | <input type="checkbox"/> Loaded Farmer Carry        |
|                                                                                    | <input type="checkbox"/> Loaded Slams               |
|                                                                                    | <input type="checkbox"/> Band Simulated Drags       |

# Daily Mobilities

| Mobility Menus                                  | Beginner   |                                                       | Intermediate |                                                      | Advanced   |                                                     |
|-------------------------------------------------|------------|-------------------------------------------------------|--------------|------------------------------------------------------|------------|-----------------------------------------------------|
| <b>Six Point &amp; Supine</b><br>(Mobilities 1) | [ ]<br>[ ] | Six Point Bird Dogs (alt)<br>BW Bridge                | [ ]<br>[ ]   | Six Point Bird Dog (same)<br>BW Foot Elevated Bridge | [ ]<br>[ ] | Band Glute Extensions<br>Mini-Band Abduction Bridge |
| <b>Rotation</b><br>(Mobilities 2)               | [ ]<br>[ ] | Side Laying Thoracic Rot.<br>Seated Thoracic Rotation | [ ]<br>[ ]   | Six Point Windmill<br>Standing Thoracic Rotation     | [ ]<br>[ ] | Bretzle Stretch<br>Kneeling Windmill                |
| <b>Standing</b><br>(Mobilities 3)               | [ ]<br>[ ] | Three Step Hinge & Hold<br>½ Kneeling Windmill        | [ ]<br>[ ]   | Three Step Lunge & Twist<br>Hinge-Squat Progression  | [ ]<br>[ ] | Three Step RDL<br>Hinge-Squat Prog. Can Opener      |
| <b>Bands</b><br>(Mobilities 4)                  | [ ]<br>[ ] | Band Seated Abduction<br>Band St. Arm Pull Down       | [ ]<br>[ ]   | Band Lateral Slide<br>Band Rear Facing Pull Over     | [ ]<br>[ ] | Band Monster Walk<br>Band Reverse Push Up           |

# Coming Up Next

## Part II : Episode III

### Agenda:

Episode #2

Learn-By-Demonstration

- Rows
- Overhead Actions

See You Then :-)

| TOA                                      |  | Intermediate |                            |
|------------------------------------------|--|--------------|----------------------------|
| TRAINING THE OLDER ADULT                 |  |              |                            |
| movement is life                         |  |              |                            |
|                                          |  | [ ]          | Romanian Deadlift (RDLs)   |
|                                          |  | [ ]          | Traditional Deadlift       |
|                                          |  | [ ]          | Kickstrand RDLs            |
|                                          |  | [ ]          | Pull Over                  |
| Hinges & Swings                          |  | [ ]          | Pronated Chest Pull        |
| (Component 1)                            |  | [ ]          | Supinated Pull Down        |
| Rows & Pulls                             |  | [ ]          | Pivot Point Press          |
| (Component 2)                            |  | [ ]          | Landmine Two Hand Press    |
| Pushes, Pivot Points & Over Head Actions |  | [ ]          | Band Tensioned Wall Slides |
| (Component 3)                            |  | [ ]          | Gait Steps                 |
| Split Stance                             |  | [ ]          | Single Leg Step Ups        |
| (Component 4)                            |  | [ ]          | Split Squats               |
| Loaded Carry, Drags & Release Drills     |  | [ ]          | Loaded Farmer Carry        |
| (Component 5)                            |  | [ ]          | Loaded Slams               |
|                                          |  | [ ]          | Band Simulated Drags       |

# Coming Up Next

## Part II : Episode IV

### Agenda:

Episode #2

Learn-By-Demonstration

- Split Stance
- Loaded Carries

See You Then :-)

|  | Intermediate |                            |
|------------------------------------------------------------------------------------|--------------|----------------------------|
|                                                                                    |              |                            |
|                                                                                    | [ ]          | Romanian Deadlift (RDLs)   |
|                                                                                    | [ ]          | Traditional Deadlift       |
|                                                                                    | [ ]          | Kickstrand RDLs            |
| <b>Hinges &amp; Swings</b><br>(Component 1)                                        | [ ]          | Pull Over                  |
|                                                                                    | [ ]          | Pronated Chest Pull        |
|                                                                                    | [ ]          | Supinated Pull Down        |
| <b>Rows &amp; Pulls</b><br>(Component 2)                                           | [ ]          | Pivot Point Press          |
|                                                                                    | [ ]          | Landmine Two Hand Press    |
|                                                                                    | [ ]          | Band Tensioned Wall Slides |
| <b>Pushes, Pivot Points &amp; Over Head Actions</b><br>(Component 3)               | [ ]          | Gait Steps                 |
|                                                                                    | [ ]          | Single Leg Step Ups        |
|                                                                                    | [ ]          | Split Squats               |
| <b>Split Stance</b><br>(Component 4)                                               | [ ]          | Loaded Farmer Carry        |
|                                                                                    | [ ]          | Loaded Slams               |
|                                                                                    | [ ]          | Band Simulated Drags       |
| <b>Loaded Carry, Drags &amp; Release Drills</b><br>(Component 5)                   | [ ]          |                            |
|                                                                                    | [ ]          |                            |
|                                                                                    | [ ]          |                            |