

Everyday Strength for the Aging Female Client

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Course Objectives

Define who is the older female adult

Examine the five categories of aging

Older Female Adult Snapshot

Elements and Mechanisms of Balance

Define Sarcopenia

Examine Sarcopenic Obesity

Review Osteoporosis with Sarcopenia

Program Design Ideas

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Who is the Older Adult?

- The term older adult defines individuals aged 65yr+ and individuals aged 50-64yr with clinically significant conditions or physical limitations that affect movement, physical fitness or physical activity and represents a diverse spectrum of ages and physiologic capabilities.
- ACSM Guidelines for Exercise Testing and Prescription 10th Edition



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Five Simple Categories of Aging

- Chronological: Years
- Functional: ADL's
- Biological: Physical functioning
- Psychological: Cognitive performance (neuroplasticity)
- Social: Acceptance self efficacy



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Six Categories of Aging

- Rikli (et. al.) Defined Categories of Aging
 - Physically Ill or Disabled
 - Frail and Sedentary
 - Frail and Able
 - Independent and Sedentary
 - Independent and Active
 - Athletic and Elite

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Five Categories of Aging

- The Spirduso (et.al.) Research elaborates and expands the over 50 age group into five major groups
 - Level 1 – Healthy
 - Level 2 – Ambulatory/Non-active
 - Level 3 – Ambulatory/Disease
 - Level 4 – Frail Elderly
 - Level 5 – Wheelchair-dependent

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Older Adult Snapshot

- In the US, the older adult population is projected to more than double by 2060, from 48 million (2015 status) to 98 million
- Due in part to the increase in life expectancy from 68 in 1950 to 78.7 yrs old in 2018
- The gender gap in life expectancy is approximately 5 years with life expectancy of males at 76.2 and female at 81.2 yrs as of 2018

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Falls Statistics

- One in four Americans age 65+ falls each year.
- Every 11 seconds, an older adult is treated in the emergency room from a fall; every 19 minutes, an older adult dies from a fall.
- Falls are the leading cause of fatal injury and the most common cause of nonfatal trauma-related hospital admissions among older adults.
- - NCOA National Council on Aging

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Age Related Decline

- After the age of 62 there's a marked decrease in walking speed associated with dysfunction, poor mental and physical health, a loss of independence and a higher mortality risk
- Fatal falls due to dysfunction more than doubled between 2000 and 2012, while nonfatal falls increased by 23%
- - Burns, Stevens & Lee 2016
- 10% of all people older than 65 and 50% of those older than 80 have some form of cognitive impairment, ranging from mild deficits to dementia (Yaffe, Barnes, Nevitt, Lui, & Covinski, 2001)

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Age Related Decline

- Beyond the age of 50, there is a tendency of older individuals to lose muscle mass (sarcopenia).
- A selective loss of fast-twitch motor units has been observed; this loss adversely affects the older adult's ability to execute movements quickly (Erim, Beg, Burke, & De Luca, 1999; Luff, 1998, Roubenhoff, 2001)
- This is especially pronounced in women, who do not have enough testosterone to support the muscle mass. ACE PT Manual, 5th Edition

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Position Standpoint of NSCA for Resistance Training for Older Adults

- Studies show that up to 76% of muscle mass and 65% of muscle strength is attributed to heredity
- Develop a combination of strength, power and endurance as the best strategy for counteracting declines in muscular strength, mass CV fitness, neuromuscular function and functional capacity for older people
- Program should strike an optimal balance among training variables and work duration for both CV and resistance training

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NSCA Position Standpoint cont.

- Functional training is the best focus
- Frail older adults, beginning exercisers and those with functional limitations, machine-based resistance equipment is an appropriate starting point
- Higher functioning adults gain greater benefits using free weights

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Four Overriding Considerations

- Avoiding cardiovascular risk (Heart Disease)
- Avoiding orthopedic risk - Falls risks (Osteoporosis)
- The need to preserve muscle tissue (Sarcopenia)
- The rate at which older individuals adapt to training

• Foster et al., 2007

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Movement Considerations

Longer warm up

Slower rotation

Limit time kneeling/all-fours/Weigh bearing on hands

More time getting up of the floor/not getting on the floor

Joint replacements/arthritis

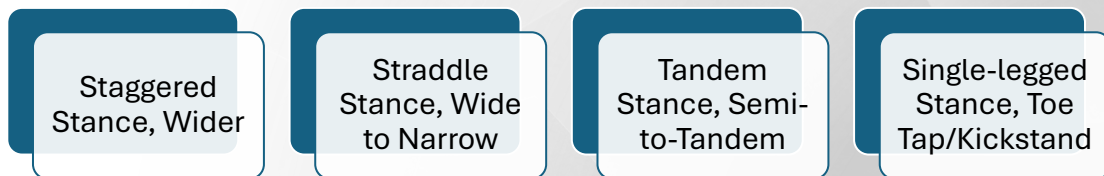
Hydration and sleep

Balance/Osteopenia/Osteoporosis

Blood pressure & poly-pharmacy

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Base of Support Progressions



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Balance Terminology

Balance - The process of controlling the body's center of mass (COM) with respect of its base of support (BOS), whether the body is moving or stationary.

Posture - The biomechanics alignment of the individual body parts and the orientation of the body to the environment

Anticipatory Postural Control - Actions that are planned in advance

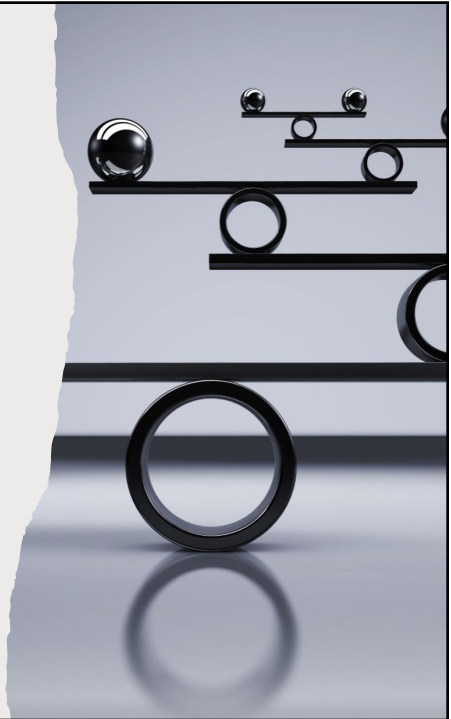
Reactive Postural Control - Actions that cannot be planned in advance due to the unexpected nature of an event.

- Fall Proof Debra J. Rose

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Balance Terminology

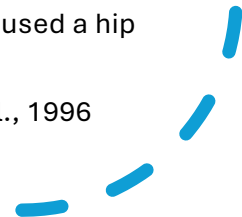
- **Stability Limit** - The maximum distance an individual is able or willing to lean in any direction without changing the BOS
- **Sway Envelope** - The path of the body's movement during quiet standing
- **Mobility** - The ability to move independently and safely from one place to another



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Balance Control Strategies

- **Ankle Strategy** - The postural control strategy in which the body moves as a single entity about the ankle joint (ie., the upper and lower body sway in the same direction)
- **Hip Strategy** - The postural control strategy in which the upper and lower body move in opposite directions as a result of the hip muscles being activated to control balance
- **Step Strategy** - The postural control strategy used when the COM is displaced beyond the maximal stability limits or sway is too great to use a hip strategy.
- - Horak & Nashner, 1986; Jensen et al., 1996



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Postural Control Strategies

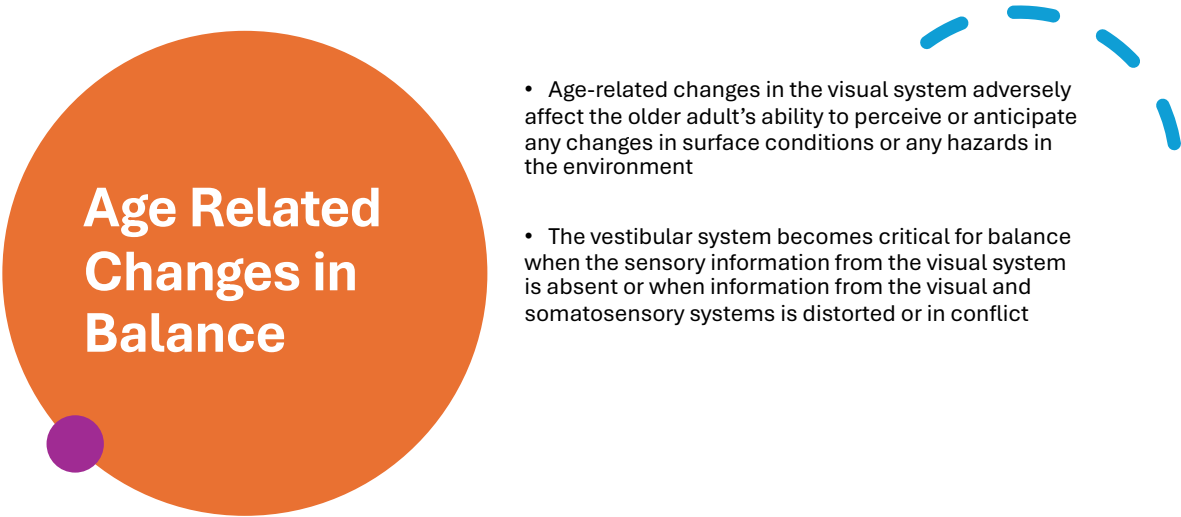
- Sensory Systems - Anticipate changes that affect current and future actions as well as respond to changes that have already occurred
- Motor System - Acts on internally and externally provided sensory information
- Somatosensory System - Provides information about our spatial location and the movement of the body relative to the support surface
- Vestibular System - In conjunction with the visual system, helps us determine whether the world or our body is moving
- - Fall Proof, Debra J. Rose

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Multiple Systems Contribute to Balance and Mobility

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- - Fall Proof, Debra J. Rose

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Age Related Changes in Balance

- Age-related changes in the visual system adversely affect the older adult's ability to perceive or anticipate any changes in surface conditions or any hazards in the environment
- The vestibular system becomes critical for balance when the sensory information from the visual system is absent or when information from the visual and somatosensory systems is distorted or in conflict

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Sarcopenia



What is sarcopenia?

- The term comes from the Greek roots of the word SARX for flesh and PENIA for loss/starvation
- Onset occurs in adults as young as 30 years old and affects up to 50% of those over 80 years old

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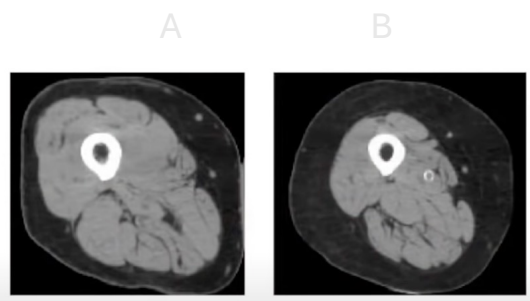
What Sarcopenia Looks Like

Mid-thigh CT scans of
72-year-old women:

A without sarcopenia

B with sarcopenia

Both have a BMI of 25

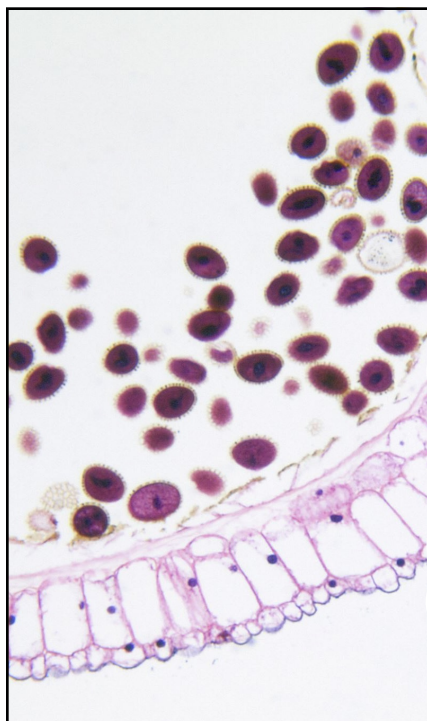


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Sarcopenic Obesity

- Sarcopenic Obesity may be defined as having both sarcopenia (age-related loss of muscle mass and either low muscular strength or low physical performance) along with obesity.
- Individuals with SO are at a greater risk for the development of frailty and disability (Tyrovolas et al., 2016)
- The functional implications of obesity in older populations are significant as it can exacerbate the age-related decline in physical functions and mobility. Hirani et al. (2017) found that functional capacity, particularly mobility, is diminished in older adults with overweight and obesity as compared to adults of normal weight.

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Relationship between postmenopausal osteoporosis and the components of clinical sarcopenia

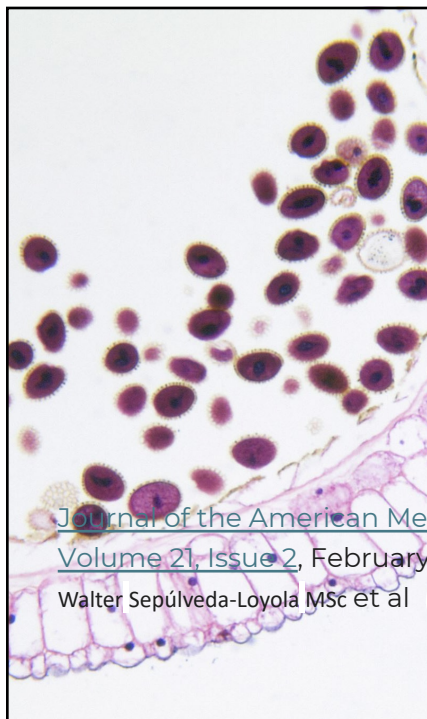
As individual ages, she loses muscle mass, strength and performance (sarcopenia). Aging is also associated with bone fragility (osteoporosis). Both sarcopenia and osteoporosis can lead to restrictions in activities of daily living. The prevalence of sarcopenia has been reported to be between 10% and 40% in a postmenopausal population depending on which reference method is being used and also the reference population. Osteoporosis affects approximately 30% of the female population over 50 years.

[Maturitas](#)

[Volume 75, Issue 2](#), June 2013, Pages 175-180

[Samu Siöblom](#), [Juha Suuronen](#), [Toni Rikkinen](#), et. Al.

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The Joint Occurrence of Osteoporosis and Sarcopenia (Osteosarcopenia): Definitions and Characteristics

- Compared with the non-osteosarcopenic group, those with [osteosarcopenia](#) had greater impairment of physical performance and balance. The criteria resulted in the strongest associations with physical performance and self-reported falls and fractures.

[Journal of the American Medical Directors Association](#)

[Volume 21, Issue 2](#), February 2020, Pages 220-225

[Walter Sepúlveda-Loyola MSc et al](#)

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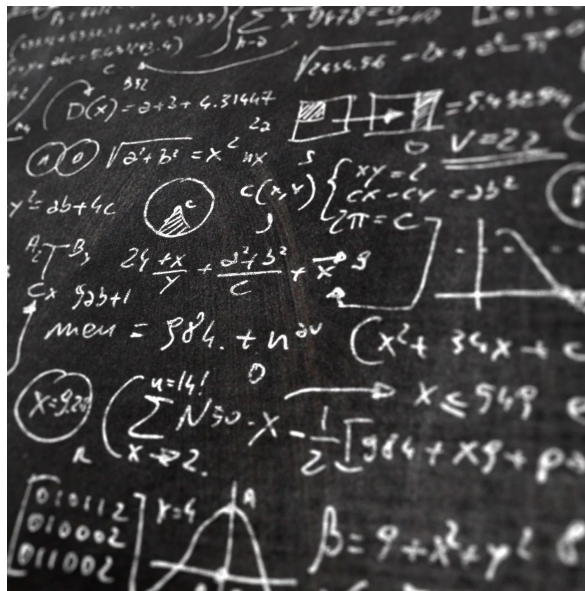
Menopause: Highlighting the Effects of Resistance Training

- The increase in lifespan and in the proportion of elderly women has increased the focus on menopause induced physiological alterations.
- These modifications are associated with the elevated risk of several pathologies
 - such as cardiovascular disease, diabetes, obesity, hypertension, dyslipidemia, non-alcoholic fat liver disease, among others. Because of estrogen levels decline, many tissue and organs (muscular, bone, adipose tissue and liver) are affected. Additionally, body composition suffers important modifications.
- Resistance training promotes beneficial effects on several organs and systems, mainly, on muscular, bone and adipose tissue, allowing for a better quality of life in this population.
- R. D. Leite^{1,2}, J. Prestes³, G. B. Pereira¹, G. E. Shiguemoto¹, S. E. A. Perez¹
- Int J Sports Med 2010; 31(11): 761-767
DOI: 10.1055/s-0030-1263117

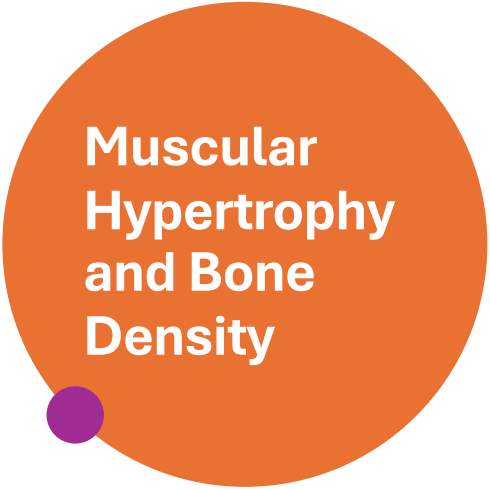
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Program Design Ideas

- Program design is a little like math, algebra or solving a puzzle.
- The fitness assessment helps you find the functional limits or the edges of the puzzle
- Once you have the edges established you can then put the pieces together with goals in mind



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Muscular Hypertrophy and Bone Density

- 
- Sumo Squat
 - Hinge and Row
 - Rear Lunge and Curl
 - Dead Lift
 - Push Press
 - Loaded Bridge/Hip Thrust
 - Pullover/Leg Drop
 - Plank
 - Supine Triceps Press/Bridge
 - Bird Dog
- 6-10 Reps, 2-3 Sets, 2 x PW
 - Heavier Load, Low Rep, Slow Eccentric, Faster Concentric
 - DB loading, BW exercises for time

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Balanced Infused Strength: Dumbbells

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- 
- 
- Rear Lunge to Tandem Heel Tap
 - Shoulder Press/ALT Push Press
 - Side Lunge to Stork Stance
 - Hinge and Row
 - Transverse Sumo to Toe Tap
 - Biceps Curl in Tandem/Semi-Tandem Stance
 - Crossover Lunge to Tandem Stance
 - Triceps Kick-Back
- Finish with Core
 - Use Balance Progressions as appropriate
 - Moderate Load: Perform for time – 45:20 x 4 x 4
 - Warm up and Cooldown Stretch = 45 min

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Sarcopenic Obesity

- Warm up: Stationary Bike, RPE 3-4, 5 minutes
- Goblet Squat or Leg Press, 8-12 Reps
- Incline or Seated Chest Press, 8-12 Reps
- Stationary Bike RPE 4-6, 3-5 minutes
- Step Up or Knee Extension Machine, 8-12 Reps
- Standing Shoulder Press or Seated Machine, 8-12 Reps
- Stationary Bike RPE 4-6, 3-5 minutes
- Hip Hinge/Dead Lift KB or DB, 8-12 Reps
- Seated Row or Standing Bilateral Cable Row, 8-12 Reps
- Stationary Bike RPE 4-6, 3-5 minutes

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Mixed Format: Strength and Balance

- Squat and Press
- Hinge and Row
- Bug Stomps
- Push Press
- Rear Lunge and Curl
- Tandem Walking FWD/Back (ADV Progression)
- Sumo Squat
- 1-Arm Row R/L
- Braided Walking FWD/Back (ADV Progression)
- Dead Lift
- Chest Press with Bridge
- Heel Drops or Jump Rope w/or without Rope (ADV Progression)
- DB and BW. 6-10 Reps, 2-3 Sets, 2 x PW
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Programming for Travel with Resistance Tubing

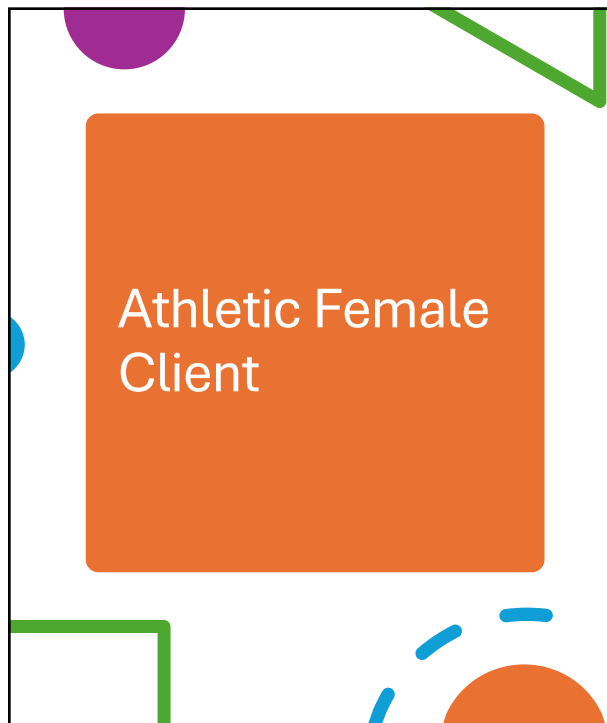
- Rear Lunge
- Shoulder Press
- Rear Lunge and Shoulder Press
- Transverse Sumo
- Chest Press
- Transverse Sumo and Chest Press
- Side Lunge
- Row
- Side Lunge and Row
 - Perform all reps on one side of the body before going to the other side
 - Timed for 45:20 x 9 x 2
 - Warm up and cooldown = 45 min

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Complex Combination Dumbbell and Resistance Tubing

- Rear Lunge + Shoulder Press Tubing R/L.
- Rear Lunge and Shoulder Press DB
- Side Lunge + Row Tubing R/L.
- Side Lunge and Row DB
- Transverse Sumo + Chest Press R/L.
- Transverse Sumo and Biceps/Triceps
- Finish with Core Training
- Perform all for time
- All Tubing is Unilateral
- Dumbbell exercise alternates using both sides of body
- 45:25 x 5 x 3
- Warmup and cooldown = 40 min

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Athletic Female Client

- Circuit Training - 45:15 x 9 x 2
 - Kettlebell Swing
 - TRX Row
 - Agility Ladder
 - Kettlebell Suitcase Dead Lift
 - Battle Rope Slams
 - Jump Rope
 - BOSU Squat Jump Dome Side Up
 - Dumbbell Push Press
 - Attack Bike/Rower/Treadmill on incline

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Contact

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