



# ***2021 NSCA PERSONAL TRAINERS VIRTUAL CONFERENCE***

#NSCAPT21

# ***CONFLICT OF INTEREST STATEMENT***

I have no actual or potential conflict of interest in relation to this presentation.

# Exercise Management Strategies for Clients with Comorbidities

## A Case Study Approach

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# Learning Objectives

## You will Learn How To:

- Design safe/effective exercise programs for medically cleared clients with comorbid health conditions
- Identify exercise safety concerns/considerations and modifications for clients with specific conditions
- Describe new tools and resources to better educate and serve clients with comorbid health conditions

# Personal Trainer Scope of Practice

- Educate and safely enhance exercise experiences and quality of life of medically cleared clients
- Design programs to ↑ strength, flexibility, balance, endurance & function
- Help clients set new goals and safely progress the fitness programs
- Modify exercises based upon Sx, meds. & exercise tolerance when warranted!

# Safety

## Pre-activity Screening

- Unsupervised exercise is not right for everyone!
- *ACSM Pre-activity Screening Algorithm & **consult MD or HCP!!!***
- Determine clients' current versus desired PA levels!!!
- Do they have CV, Metabolic or Renal disease symptoms?
- Discuss hydration, hypoglycemia & fall risk reduction

# Case Study of Brenda

## A 63 Y/O Woman

Brenda is an accountant and takes her 60-pound Staffordshire Terrier puppy, "Georgie" for daily walks along her beach but finds it increasingly difficult to control him when he gets excited.

They walk half a mile (10 minutes) and she reports having general muscle soreness throughout her body during their walks and some back pain after and experiences some generalized back pain. She would like to start playing in a double's tennis league in a few months. **\*She loves tennis and gardening.**

# Brenda's Case

## Continued

She sits at her desk for most of her eight hours. **She has Osteopenia in her lumbar spine and hips and reports difficulty getting up from a kneeling position when washing/ waxing the floor or gardening.** She takes the bus to work and finds that lately she cannot get off at her stop in time unless she sits in the front of the bus.

She recently completed 14 minutes (**approximately 7 METs**) on the Modified Naughton Treadmill Test. **She had some low back pain alleviated 5 minutes after the test with gentle extension exercises.**

# Brenda's Biometric Profile

- Height 63" Weight 170 lbs **BMI 30**
- Waist 36" (>35") **"High Risk"**
- Hip Circumference 37"
- HR (Rest) 70 Beats/min.
- BP 130/80 (**Stage I HTN**); **Medicated**
- Waist: Hip Ratio (>.85) **"High Risk"**

# More of Brenda's Biometrics

## LAB TEST RESULTS

- TC 190 mg/dL **Medicated**
  - LDL-C 130 mg/dL (**Elevated**) Bullet point
  - HDL-C 30 mg/dL (**Low**)
  - Triglycerides 150 mg/dL (**Borderline High**)
  - Fasting glucose 110 ml/dL (**IFG**)
  - Hb-A1C 5.8% (**IFG**)
- BMD **Osteopenia**

# ***Medications***

## **POLYPHARMACY**

Metformin/ (Glucophage) **IFG**

Zestril/ (Lisinopril) **HTN**

Tenormin/ (Atenolol) **HTN**

Amlodipine/Norvasc **HTN**

Crestor/ (Rosuvastatin) **Dyslipidemia**

Ibandronate (Boniva) **Osteopenia**

Naproxen Sodium (Aleve) PRN **CNSLBP**

<http://www.labtestsonline.org/understanding/>

<http://www.nlm.nih.gov/medlineplus/druginformation.html>

<https://www.drugs.com/>

# Test Results

## FUNCTIONAL FITNESS

10-Meter walk 0.9 meters/sec<sup>-1</sup> ↑ **Fall Risk**

Hand Grip Strength R 18 kg L 18kg **Poor**

30 Second Arm Curl 10 Reps **Below Avg.**

30 Second Chair Stand 12 Reps **Below Avg.**

Gallon Jug Shelf Test 11 sec. **Fair**

Timed Up & Go **11 sec. Borderline Fall Risk** Lusardi 2017

# General Impressions of Brenda

## THE CLINICAL BOTTOM LINE

- Her walking speed is less than .1 meters/second<sup>-1</sup> which places her at an **elevated fall risk** and at a reduced ability to perform several daily activities
- Her **upper and lower body muscle strength** (30-second arm curl, grip strength and 30-second chair stand are **poor**).
- She **lacks the dynamic agility and power** to change directions and maneuver around objects quickly and to avoid a fall if she loses her balance
- Her **cardiorespiratory endurance is low**, and she is at **high risk for cardiovascular, metabolic and renal diseases** and for premature mortality from all causes.

# More Impressions About Brenda

- Brenda has dyslipidemia, abdominal obesity, hypertension and impaired fasting glucose, and henceforth **Metabolic Syndrome**
- Her **10-year cardiovascular disease risk** is 12.3%; warranting moderate to high dose statin medications in most people
- She has Osteopenia in her lumbar spine and femoral neck and is at a **higher fracture risk**.
- Due to ↑fat mass, ↓lean (skeletal muscle) mass, ↓gait speed and grip strength, she has “**Sarcopenic Obesity**” and “**Dynapenia**” or poor skeletal muscle quality and function.
- **She is also at risk of a stroke**

# Special Considerations

- She is **flexion intolerant**; trunk flexion is not advised based on her BMD, symptoms and ↑ fall risk
- She is **not “regularly physically active”**, and doubles tennis which (a 6 MET activity) represents 90% of her predicted aerobic capacity (of 7 METs)
- She currently **lacks the physical reserve** necessary to participate in vigorous activities.

# Brenda's Needs and Program Features

- Brenda needs to ↑ her lower body strength and power, upper body strength, cardiorespiratory endurance/fitness, dynamic agility and balance. She needs to ↑ her muscle mass and BMD.
- Brenda's program should include endurance training, strength and power training, balance and fall prevention training for dog walking and ambulating on the bus.
- Her strength training routine should focus on ↑ **osteogenesis** through multi-planar, multi-joint strength exercises with progressive increases in loading intensity over the course of time.

# Why Brenda Should Resistance Train

## CLINICAL RATIONALE and BENEFITS

- Increase Muscular Strength and Endurance and Power
- Enhance Physical Function, ↑performance of ADLs, Vocational Tasks
- Maintain Independence, Improve self-confidence, ↓ Fall Risk

# Why Brenda Should Resistance Train

CONTINUED

- Slow Age and Disease-related Declines in Muscle Strength and Mass! (Sarcopenia, Dynapenia, Arthritis)
- Prevent/attenuate development of other diseases and conditions (Met Syn, osteoporosis, type 2 diabetes, obesity)!
- Reduce Rate Pressure Product (RPP) (Myocardial O<sub>2</sub> demand) during daily activities!

ACSM 2018, Squires, Signorile, Kravitz, Maestroni 2020, AACVPR 2020

# Precautions

## THINGS TO REMEMBER

- **Potential dizziness** due to rapid body position changes, postural hypotension, and some of her medications (Metformin/Glucophage, Lisinopril/Zestril, Tenormin/Atenolol)
- In addition to HR and BP ↓ effects of Beta Blockers, other autonomic functions like blood glucose release and sweating may also be ↓
- In combination with an ↑ rate of muscle contraction mediated glucose uptake, Brenda will be at an ↑ **risk of hypoglycemia, hyperthermia** and potentially nocturnal hypoglycemia if she exercises too close to bedtime.

# Precautions-More

- Brenda has ↑ stroke risk and should learn about early warning sign recognition (The F.A.S.T. acronym),
- **Close exercise supervision/spotting** and avoiding rapid postural changes can ↓ dizziness and Brenda's risk of falls and of Fractures
- **Upright exercise postures**, spine support, limiting flexion and rotation, and ↓ **sudden** changes in body positions are warranted
- **Glucose monitoring** before during and after exercise is prudent; Brenda should bring a carbohydrate snack in case she has hypoglycemia, and should remain well hydrated

# Basic Pathophysiologic Considerations

## METABOLIC SYNDROME OSTEOPENIA and CNSLBP

- ✓ **Hypertension** Considerations -Monitoring, Speed, Sub-maximal Loading, Rest Periods, Single VS. Double Limb, RPE, Body Positions, **BP Monitoring!**
- ✓ **Dyslipidemia** Considerations (Hydration ALL Conditions)
- ✓ **Obesity Considerations** Balance/Thermoregulation, \*Orthopedic Injuries, \*Weight Loss/Energy Expenditure
- ✓ **Impaired Fasting Glucose/Meds.** ↑energy expenditure, (Orthostatic Intolerance, Hypoglycemia, Neuropathy, Retinopathy, Thermoregulation, Silent Ischemia, Nocturnal Hypoglycemia)

# Basic Pathophysiologic Considerations

## Osteopenia/Osteoporosis

✓ Considerations, Indications, Contraindications, Posture, Balance, Osteogenic Loading



## Chronic Non-specific Low Back Pain

✓ Posture, Stability, Movement Directional Preferences, Weight Loss, ↑ muscular and cardiorespiratory endurance, comprehensive exercise/fitness programming with specific exercise modifications



# Hypertension

## DID YOU KNOW THAT:

- Cluster sets with short intra-set recovery periods seemed to reduce Rate x Pressure Product in elderly male cardiac rehabilitation patients (Ribeiro-Torres)
  
- Lower cardiac output, heart rate and Rate x Pressure Product have been observed in cardiac rehab. patients performing 3 sets of 8 to 10 reps with relatively  $\uparrow$  ( $\geq 70\%$  of 1-RM) than 3+ sets of 15+ repetitions with lighter loads of ( $\leq 50\%$  of 1-RM)  
(Lamotte 17, 05, Hansen 19, de Souza 10, Gjøvaag 16, Sardeli 17)
  
- Set duration and “time under tension” seem to be critical determinants of BP response (Hansen)

# Hypertension

## PRACTICAL TIPS

- Resting BP values should be <160/100 mmHg (controlled)
- Use single limb (instead of double limb) in patients who have an exaggerated rise in blood pressure or RPP during resistance training or with CHF (NYHA Classes II - III)
- Monitor BP before, during and after! \*
- Consider prescribing 3 sets of 10 repetitions with 75% of 1-RM with a 1 sec, concentric and 1 sec. eccentric phase durations!  
(Lamotte 17) (Lamotte 17, 05, Hansen 19, de Souza 10, Gjøvaag 16, ACSM GETP 10 2018, AACVPR 2020 Sardeli 17, Adams 2006, Spencer 2007, Volaklis 2005, Volaklis 2006, Williams 2007)

# Osteoporosis

## PRACTICAL TIPS

- Avoiding Spinal flexion (bending), twisting
- Perform all exercises in upright posture and maximize axial loading
- Emphasize hip, knee and gentle spine extension and scapular retraction (hip hinges, scapular rows, shoulder external rotation, partial squats and leg presses)
- Avoid painful activities and rapid body position changes!!!

# Osteoporosis

## TIPS

- Avoid painful activities and rapid body position changes!
- Start with 1 - 2 sets of 8 to 10 exercises; w/8 to 12 repetitions
- Start w/RPE 11 to 13 or OMNI RPE of 3 to 6; and ↑ to 13 to 15 or OMNI of 7 to 8. 2x/week
- Progress using the “2 for 2” rule

ACSM GETP 10 2018. , ACSM (Ratames) 2009, ACSM GETP 2022

# Osteoporosis

**EXERCISE EXAMPLES** Metcalf, L et al. 2001

- Multi-Joint, Multi-Angle Exercises ↑ Bone Loading Domains
- ***\*Activate & Stimulate All Major Muscle Groups!***
- Standing Shoulder Press (**Alternate Single Arm**)  
↑ Bone ↓ HR and BP Response!
- Leg Press-(no spine flexion)→Wall Squat → Smith Machine Squat

# Osteoporosis

## MORE-EXERCISE TIPS

- Seated Row (No Trunk Flexion)
- Lat Pull-down (Underhand to start)
- Back Extension (B.E.S.T. Program)
- ***$\Delta$  in angles of Force =  $\uparrow$  BMD & Function!***
- **4-6 reps/set for some exercises** (Metcalf et al. 2001)

# Chronic Non-specific Low Back Pain-CNSLBP

## EXERCISE MANAGEMENT GOALS

- Strive to meet Current PA Guidelines! (USDHHS, WHO, ACSM, etc.)
- Maintain an Active Lifestyle and Avoid Being Sedentary
- ↑ Health and Well-being and ↑ Exercise Tolerance
- ↑ Physical Function/Capacity
- ↑ Health Related Quality of Life



# CNSLBP Exercise Considerations

## AEROBIC/ENDURANCE TRAINING

- Accumulate minimum of  $\geq 30$  minutes on  $\geq 5$  days/week (**Moderate Intensity**)
- Multiple daily bouts ( $\leq 10$  min. ea.) May be better tolerated
- Initial RPE of 12 to 15 (**6-20 Scale**)
- Select Exercise Positions Tolerated Best!  
\***Standing Upright- if Flexion Intolerant!**  
\*\***Seated/Recumbent if Extension Intolerant!**

# CNSLBP Exercise Considerations

## RESISTANCE/STRENGTH TRAINING-ACSM 2018, 2022

- **8–10 Exercises** (all Major Muscles); w/12- (Strength), 15-20- (Endurance) or 10-15 (older Individuals) Reps!
- **Variety of Modalities** (machines, free weights, bands, balls, calisthenics, etc. over 2-3 non-consecutive days
- **Initial RPE/OMNI RPE 12-13 (20) or 3-5 (10) respectively.** \* → either **14-16** or **4 - 6** as tolerated
- **Lower intensity Initially**-60-70% 1 RM, Advanced- ≥80%, Older Clients-40%-60%
- **Single Set VS. Periodized Programs as tolerated**

# RT Workout Template: Flexion vs Extension Intolerance

Muscle Group(s)	Flexion Intolerance- Avoid Bending, Twisting and Prolonged Sitting, Keep Upright Trunk	Extension Intolerance- Avoid Arching, Twisting, Prolonged Overhead Work or Prolonged Standing
Gluteus Maximus, Quadriceps, Hamstrings	Chair Squat; Wall Squat with a Stability Ball	Seated or Supine Leg Press (Machine)
Quadriceps	Stair Step-up	Seated Leg Extension (Machine)
Hamstrings	Standing Leg Curl (Machine)	Seated Leg Curl (Machine)
Latissimus Dorsi/Teres Major	Standing Straight Arm Cable Pull-down or Assisted Pull-up (Machine)	Seated Lat Pull-down (Machine)
Pectorals/Deltoids/Triceps	Standing Cable or Resistance Tubing Chest Press	Seated Chest Press (Machine)
Rhomboids/Middle/Lower Trapezius	Standing Cable or Resistance Tubing Scapular Row	Seated Scapular Row (Machine with a Chest Support Pad)
Deltoids	Standing Dumbbell Shoulder Press (Alternating)	Seated Lateral Shoulder Raise (Machine)
Biceps	Standing Biceps Curl (Dumbbell)	Seated Biceps Curl (Machine)
Triceps	Standing Triceps Pushdown	Seated-Triceps Pushdown; Dip Machine
Trunk/Core	Standing Bird Dog, Plank, Paloff Press	Seated- Crunch, Paloff Press, Bird Dog

# Basic RT Rx Suggestions for Brenda

Component	Recommendation
Frequency	2-3 Sessions/week <sup>1</sup>
Intensity	<ul style="list-style-type: none"><li>• Use resistance that allows 10 -15 repetitions without significant fatigue (RPE of 11-13/20 or OMNI RES of 3 -6</li><li>• Complete movement through a full ROM, avoid straining and breath holding (Valsalva Maneuver) by exhaling on exertion and inhaling on the recovery phase</li><li>• Maintain secure but not overly tight grip on weights to prevent excessive BP response</li><li>• RPP should not exceed that identified as the threshold for CRF</li></ul>
Type	<ul style="list-style-type: none"><li>• Select equipment that is safe, comfortable, effective and accessible</li><li>• Use a variety of modalities which include: weight machines, pulley-weights, dumbbells, bands/tubing, calisthenics, light wrist and ankle cuff weights, and exercise balls.</li></ul>
Volume	<ul style="list-style-type: none"><li>• Perform a minimum of 1 and maximum of 3 sets per exercise avoiding significant fatigue</li><li>• May increase to 2 or 3 sets when patient is accustomed to exercises/routine, tolerating it well, and if greater gains are desired</li><li>• Perform 8-10 exercises for major muscles (i.e. chest press, shoulder press, Lat pulldown, row, triceps extension, biceps curl, leg press, Leg extension, leg curl, calf raise back extension, abdominal curl)</li></ul>
Progression	<ul style="list-style-type: none"><li>• Training loads may be increased 5% when patient can comfortably achieve the upper limit of prescribed repetition range</li><li>• Alternatively consider the "2 for 2" Rule as long as RPP, RPE and/OMNI ratings are appropriate at patient is tolerating the exercises well</li></ul>

RPE-Rating of Perceived Exertion, OMNI-OMNI (Omnibus) Rating of Perceived Exertion Scale, CRF-Cardiorespiratory Fitness, RPP-Rate x Pressure Product, ROM-Range of Motion. (Adapted from AACVPR 2020, ACSM GETP 10 2018, Williams 2007, ACSM GETP 11, 2022)

# Sample Program Progression for Brenda

	WEEKS				
	1 – 4	5 – 8	9 – 12	13 – 16	17 – 20
➤ <b>VARIABLES</b>					
➤ <b>FREQUENCY</b>	2x/week	2x/week	2x/week	2x/week	2-3x/week
➤ <b>TIME</b>	As Needed	As Needed	As Needed	As Needed	As Needed
➤ <b>TYPE *</b>	S.M./RB	S.M./RB	S.M./RB/BW	ALL TYPES	ALL TYPES
➤ <b>INTENSITY **</b>	<b>40% 1-RM</b>	<b>50% 1-RM</b>	<b>60% 1-RM</b>	<b>70% 1-RM</b>	<b>80%-1RM</b>
➤ <b>REPETITIONS</b>	8-10	8-10	8-10	8-10	8-10
➤ <b>SETS***</b>	1	1	2	2 – 3	3***
➤ <b>REST****</b>	60 sec.	60 sec.	60 sec.	60 sec.	60 sec.

➤ **PROGRESSION:** Increase repetitions, then weight as tolerated and then sets as time and goals dictate. \*= (S.M.) Selectorized Machine, (RB) Resistance Bands, (BW) Bodyweight, (FW/DB) Free Weights/Dumbbells. \*\*=(1-RM) One Repetition Maximum \*\*\*=As Time and Tolerance Dictate \*\*\*\*=Rest periods may be extended (e.g., 90 seconds) if necessary to allow blood pressure to return to near baseline levels. **MONITOR HR/BP DURING & AFTER!**

# Sample Novice Exercises for Brenda

- Seated Leg Press or Chair Squats
- Seated Machine or Standing Cable Chest Press
- Seated Leg Extension
- Seated Row (W/Chest Pad) or Standing adjustable Cables; Tubing
- Shoulder Press Machine or Standing w/Stability Ball (Alt. Arms)
- Latissimus Dorsi Pull-downs
- Back Extension w/Bands in Chair
- Seated (bird-dogs) in a chair
- Standing Side Wall Plank

# Aerobic Exercise Rx Suggestions-Brenda

- Brenda will treadmill walk and stationary bicycle for  $\geq 10$  minutes, 2x each day
- She will exercise 3 x/week for the first 2 weeks and **progress to  $\geq 5$  days** as tolerated.
- She will do  $\geq 30$  minutes of light-to moderate (**initial 11-13 RPE rating**) exercise
- Brenda's exercise volume can  $\uparrow$  to  $\geq 60$  min. and progressed as tolerated

# More Aerobic EX Rx Suggestions

- Do treadmill or Nordic walking, stationary cycling, elliptical & walk Georgie for 60-90 minutes/day
- Avoid injuries, by increasing exercise time gradually and cross train (H2O activity too)
- Add other exercise modes; elliptical trainer, recumbent arm/leg ergometer
- Brenda can do these activities in an interval training format 2 to 3 days/week!

# Implementation Strategies/Safety

- Testing; Multiple RM vs 1-RM Testing
- Initial Adaptation-“Start Low/Go Slow” Anatomical Prep. ↑ *Movement Competence*
- Improvement- Δ from Simple → Intermediate; Δ exercise type, ↑ load & volume
- Maintenance- Δ *Complexity & technical demands*; ↑ *resistance*, ↑ *Functionality*
- **USE OMNI-RES-10 scale as Alternative for Testing, Rx & Exercise Progression!**

# Brenda's Program

## INITIAL STAGE

- 4 to 6 weeks at a “light to “Moderate” intensity of approximately 30%-59% of her  $\dot{V}O_{2\text{Reserve}}$  or Heart Rate Reserve (HRR) at an RPE of approximately 9-11
- Accumulating 30 minutes in 10- minute bouts between 3 and 5 times a week<sup>-1</sup>
- Exercise volume of approximately 500 MET-Minutes – Week<sup>-1</sup> (**MET-MINUTES = METs X MINUTES**)!
- Volume should gradually ↑ over time to well exceed 1,000 MET-Minutes – Week<sup>-1</sup> (**ex. 4 METs X 5 days X 50 Minutes ea. Session**)!

# Brenda's Program

## INITIAL STAGE-CONTINUED:RESISTANCE TRAINING (RT)

- **RT** should include: a **single sets** for all major muscle groups done 2x/week<sup>-1</sup> w/an intensity load = to approximately 40%-50% of her 1-RM if conducted.
- \*In this case, multiple RM testing is prudent based on **BMD** and symptomatology; use the **OMNI-RES scale** w/**initial ratings of 5-6**.
- Short sets of **8-10 repetitions** are appropriate for her age, **novice RT status** and **Blood Pressure!**
- Primarily multiple joint, large muscle group exercises w/some single joint as needed

# Brenda's Program

## IMPROVEMENT STAGE

- Endurance training time can ↑ to  $\geq 10$  minutes, totaling 45 to 60 minutes if tolerated and time permits
- Intensity may ↑  $\geq 60\%$  of her  $VO_{2\text{Reserve}}$ , Heart Rate Reserve (HRR) at an RPE of approximately 12-13
- To ↓ her **Met Syn** factors, ↑ **Volume** to  $\geq 750$  MET-Minutes – Week<sup>-1</sup>; over  $\geq 5$  days/week!
- The Compendium of Physical Activity provides variety, so Brenda sustains a safe, effective exercise program

# Brenda's Program

## IMPROVEMENT STAGE-RESISTANCE TRAINING

- Resistance training sets can ↑ to 2-4 per major muscle group and intensity load can ↑ to  $\geq 60\%$  of 1-RM or an 8-12 RM. \* **KEEP REPS @ 8-10 to KEEP HR & BP ↓**
- Loading can ↑ by following the “two for two” rule; and 2 – 3 workouts per week<sup>-1</sup> is appropriate
- She can perform circuit strength workouts to save time if she prefers

# Brenda's Program

## MAINTENANCE STAGE

- Her goal is to play doubles tennis (a 6 MET activity)!
- Volume should  $\uparrow$   $>1,000$  MET-Minutes – Week<sup>-1</sup>; **primarily weight bearing** activities as tolerated!
- In order to safely  $\uparrow$  her  $VO_{2\text{Max}}$  and thresholds necessary to do this, **some vigorous intensity activity** in the form of **interval training** will be appropriate
- Intensity can exceed 60% of  $VO_{2\text{Reserve}}$  or Heart Rate Reserve (HRR) w/corresponding RPEs of 13-15!

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## MAINTENANCE STAGE-CONTINUED

- Keep using the Compendium of Physical Activity to give Brenda more exercise variety
- Spread volume over  $\geq 5$  days;  $\uparrow$  effects on her Met Syn.
- She may use  $\downarrow$  repetitions during some workouts (ex. 6 to 8 repetitions) and exercises; implement a heavier and lighter day \***Monitor BP!**
- A total body workout consisting of two to three workouts is appropriate

# What About HIIT for Brenda?

## Getting Started

- *Start with 10 – 20 total minutes*
- *Brenda should perform successive repetitions w/equal tolerance ! (Adjust length, intensity and # of repetitions to her comfort/tolerance)*
- *Common work to recovery ratios  $\leq 45$  seconds-120 seconds of higher intensity work followed by  $\geq 30$ -60 seconds of “very light” activity*
- *Initial work to recovery ratios of  $\leq 1:6$  gradually transitioned to  $\rightarrow 1:2$  or  $1:0$  may be appropriate*

# Tips on Interval Training

*Any activity can become part of a HIIT workout*

- Overground walking, Nordic Walking, Stair Climbing
- H2O Walking/treading, UBE (standing or seated)
- Recumbent cycling, stepping or UBE/LBE ergometry
- Treadmill walking, Elliptical Trainer, NuStep, etc.
- ***16/20 or 7-8/10 “Hard”*** for most clients doing HIIT!!!

# Common Medications and Precautions

MEDICATION-PURPOSESM	POTENTIAL SIDE EFFECTS	PRECAUTIONS
ANTI-HYPERTENSIVE/B.P. -Lisinopril-ACE Inhibitor -Tenormin-Beta Blocker -Norvasc-Calcium Channel Blocker	lightheadedness/dizziness, fatigue, weakness, postural hypotension, Beta Blockers may mask Sx of hypoglycemia in diabetics and , ↓ thermoregulation	Extend Warm-up, Cool-down Period, Avoid Rapid Body Position Changes, Use RPE/OMNI RPE Scales, Proper hydration; monitor/adjust exercise facility temperature/humidity
STATINS-DYSLIPIDEMIA ↓LIPIDS	In some cases; Myositis, Myalgia, Joint Pain, Weakness, (Rare instances of Rhabdomyolysis)	Ensure proper hydration, monitor for Sx of overexertion and muscle soreness, check for dark urine color, gradual ↑in RT Intensity and w/ eccentric muscle actions
METFORMIN/GLUCOPHAGE IMPAIRED FASTING GLUCOSE/T2DM	GI upset, Lactic Acidosis and hypoglycemia are most common	Glucose monitoring, exercise and meal timing, adequate hydration, avoiding exercise close to bed- time

# Common Safety Tips and Precautions

- Avoid, rapid body position changes w/HTN, Alternate limb Reps ↓ BP Response
- Use Regular BP & Glucose Monitoring for HTN & T2 DM
- Select Exercises Consistent w/Directional Preferences-Standing; Sitting; Flex., Ext. w/CNSLBP, Osteoporosis.
- Double vs. Single Limb reps=↓ vs↑ rate/amount impact loading; ↑ vs. ↓rest times; ↓ BP Response!!!

# Common Safety Tips and Precautions

- Reinforce proper technique, breathing and upright spine and posture!
- Avoid Overtraining - Monitor progress, performance and symptoms- (**OMNI, Pain Scale, etc.**)
- **Circuit Resistance/Mixed Circuit Training for Weight/Glucose Management !!!**  
(DeNardi 2018, Fealy 2018, Batacan 2017, Phillips 2017, Milanovic 2015, Weston 2014 )
- **The Arthritis Foundation “two- hour rule”. ↓ or modify intensity & volume next session when pain is ↑two (2) hours after than it was before exercises!!!**

# Take Away Points

- ✓ Personal trainers should understand how all comorbidities and medications affects exercise responses and safety
- ✓ Exercise program design should compliment management goals of all comorbidities
- ✓ Exercise plans should address first the precautions of comorbidities requiring the most conservative care recommendations
- ✓ Exercise modifications based upon client Sx, meds. and exercise tolerance may be warranted

# Resources

- World Health Organization (WHO) Physical Activity Guidelines

<https://www.who.int/news-room/fact-sheets/detail/physical-activity>

- USDHHS Physical Activity Guidelines for Americans-2<sup>nd</sup> Ed.  
[https://health.gov/sites/default/files/2019-09/Physical\\_Activity\\_Guidelines\\_2nd\\_edition.pdf#page=56](https://health.gov/sites/default/files/2019-09/Physical_Activity_Guidelines_2nd_edition.pdf#page=56)

- American College of Sports Medicine Position Stands  
<https://www.acsm.org/acsm-positions-policy/official-positions>

- National Strength and Conditioning Association: Resistance training for older adults: position statement from the national strength and conditioning association:  
[https://www.nscs.com/contentassets/2a4112fb355a4a48853bbafbe070fb8e/resistance\\_training\\_for\\_older\\_adults\\_position.1.pdf](https://www.nscs.com/contentassets/2a4112fb355a4a48853bbafbe070fb8e/resistance_training_for_older_adults_position.1.pdf)

# *More Electronic Resources*

- National Heart Lung and Blood Institute. What is Metabolic Syndrome?

<https://www.nhlbi.nih.gov/health-topics/metabolic-syndrome>

- American Heart Association. Metabolic Syndrome.

<https://www.heart.org/en/health-topics/metabolic-syndrome>

# Electronically Accessible Tools and Resources-II

"HEALTH TOPICS" AND ("DRUGS & SUPPLEMENTS")

<https://medlineplus.gov/druginformation.html>

**DRUGS.COM** [Drugs.com](https://www.drugs.com)

**Lab Tests Online** <https://labtestsonline.org/> An online resource which explains the purpose of, procedures for and the results of commonly performed lab tests  
<http://www.labtestsonline.org/understanding/>

**BONE FIT USA** Evidence informed exercise training  
<https://www.bonesource.org/bonefit-usa>

**10-Year Cardiovascular Disease Risk Calculator** [10 Year CVD Risk Calculator Tool](#)

**Compendium of Physical Activities** available at:  
<https://sites.google.com/site/compendiumofphysicalactivities/Activity-Categories>

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- **National Stroke Association Stroke Risk Card.**  
[https://www.floyd.org/medical-services/Stroke/Documents/RiskStrokeScorecard\\_Eng.pdf](https://www.floyd.org/medical-services/Stroke/Documents/RiskStrokeScorecard_Eng.pdf)  
[https://icahn.org/wp-content/uploads/2018/10/Risk\\_Assessment\\_Scorecard.pdf](https://icahn.org/wp-content/uploads/2018/10/Risk_Assessment_Scorecard.pdf)
- **Osteoporosis Risk Check and Fracture Risk Assessment Tool** <https://www.sheffield.ac.uk/FRAX/tool.aspx?country=23>  
<https://riskcheck.osteoporosis.foundation/en/form>
- **National Institutes of Health: Osteoporosis and Related Diseases National Resource Center:**  
<http://www.niams.nih.gov/bone/>

# Continued

- **Strength, assistance with walking, rising from a chair, climbing stairs, and falls (SARC-F) questionnaire:**

[https://www.physio-pedia.com/SARC-](https://www.physio-pedia.com/SARC-F)

[F: A Simple Questionnaire to Rapidly Diagnose Sarcopenia](https://www.physio-pedia.com/SARC-F)

- **STEADI Elderly Fall Prevention**

<https://www.cdc.gov/steady/materials.html>

[Timed Up and Go Handout](#) [CDC NIH Toolbox Grip Strength Test Video](#)

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