**Exercise Prescription in Older Adults Laboratory**

**Laboratory Questions**

1. What are the current physical activity guidelines for older adults?
   1. 60 minutes/day of running and 30 minutes/day of walking
   2. 100 minutes/week of light physical activity
   3. None. Older adults should rest and relax. Take a nap instead.
   4. 150 minutes/week of moderate-to-vigorous physical activity
2. Circle each of the following statements which are part of the current exercise recommendations for older adults:
   1. Aerobic exercise at least 5 days/week, 30 minutes/day.
   2. Resistance exercise at least 2 days/week, targeting major muscle groups (8-10 exercise, 10-15 repetitions per exercise)
   3. Flexibility exercises at least 2 days/week for at least 10 minutes/day
   4. Balance training on as many days of the week as possible
3. What is physical activity and what are the different domains of physical activity? Is physical activity the same as exercise? Why or why not?

**Introduction**

Physical activity and exercise training are good for both the body and the brain.1 However, maximizing the benefits of physical activity and exercise training require precise prescription (i.e., *frequency*, *intensity*, *type*, and *time*).2 Practitioners and researchers must carefully consider how to prescribe physical activity and exercise in order to ensure participant safety and maximize benefit.

**Purpose**

1. Understand the current physical activity guidelines,3 and the current exercise recommendations for older adult health.4
2. Comprehend essential exercise prescription principles.
3. Create basic exercise programs.

**Laboratory Outline**

1. REVIEW: What is physical activity?
   1. Definition of physical activity
      1. Domains of physical activity
   2. Current physical activity guidelines
2. REVIEW: What is exercise training?
   1. Definition of exercise vs. physical activity
   2. Types of exercise
      1. Aerobic training
      2. Resistance training
      3. Flexibility training
      4. Balance training
      5. Others
3. Important principles of exercise training
   1. The *FITT* Principle
      1. Frequency
      2. Intensity
      3. Type
      4. Time
   2. The Principle of Specificity
   3. The Overload Principle
   4. Current exercise guidelines
4. **ACTIVITY #1:** PAR-Q Plus – *All students will fill out the PAR-Q plus*
   1. Do you have any complications which may prevent you from performing exercise?
   2. What are common issues that may occur that preclude older adults from exercise?
   3. What do you do if the PAR-Q identifies issues that may prevent an older adult from performing exercise?
5. **ACTIVITY #2:** 8RM Biceps Curl Strength Test
   1. For determining the strength of a person, a common test is an 8RM strength test. This can be used to determine how much weight someone should be performing during an exercise session. The results of an 8RM test can then be used to determine how best to increase the intensity of a resistance training program in order to increase muscle strength, hypertrophy, power, etc.
   2. Demonstration of proper form during biceps curl
   3. Warm-up set of 3-4 repetitions
   4. 8 RM Strength Test- *Choose a weight that you can do at least 6 repetitions with good form, but no more than 12 repetitions. If 12 repetitions can be performed, choose a heavier weight and perform test again. Record number of repetitions.*
   5. Determine estimated 1RM using the Brzycki formula.5

1 RM= *weight* \*

* 1. Determine estimated 1 RM using the formula by Lombardi.6

1RM= *weight*\*

* 1. Do you get similar estimates of 1RM using each of these estimators?
  2. %RM Calculator7

|  |  |
| --- | --- |
| **Reps** | **%1RM** |
| 1 | 100 |
| 2 | 95 |
| 3 | 93 |
| 4 | 90 |
| 5 | 87 |
| 6 | 85 |
| 7 | 83 |
| 8 | 80 |
| 9 | 77 |
| 10 | 75 |
| 11 |  |
| 12 | 67 |
| 15 | 65 |

* 1. Using the %RM calculator, how much weight should you be able to do for:
     1. 3 repetitions?
     2. 6 repetitions?
     3. 8 repetitions?
     4. 10 repetitions?
     5. 12 repetitions?
     6. 15 repetitions?

1. **ACTIVITY #3:** Karvonen formula7
   1. The Karvonen formula is a common method for determining the intensity necessary to elicit adaptation to an aerobic training program. That is, it can be used to determine how hard the exercise should be during aerobic training.
   2. Calculate your resting heart rate (RHR)- *take pulse for 15 seconds and determine RHR in beats/minute*
   3. Calculate your max heart rate (HRmax)- *use the formula of HRmax= 220-Age*
      1. HRmax can be used to calculate the target heart rate during an aerobic training session. Target heart rate is usually between 65-85% of HRmax
      2. What should your target heart rate be for 65% of HRmax
      3. What should your target heart rate be for 75% of HRmax
      4. What should your target heart rate be for 85% of HRmax
   4. Calculate heart rate reserve (HRR)- *use the formula of HRR= HRmax – RHR*
   5. The Karvonen formula
      1. The Karvonen formula can be used to determine the intensity of an exercise session.

Target Heart Rate= %HRR + RHR

* + 1. For aerobic training, %HRR is usually between 55-75%.
    2. What should your target heart rate be for 55% of HRR?
    3. What should your target heart rate be for 65% of HRR?
    4. What should your target heart rate be for 75% of HRR?
  1. Run in place for 3-5 minutes. Check heart rate as soon as finished.
     1. What was your heart rate immediately after completing exercise?
     2. What is your heart rate in terms of %HRmax?
     3. What is your heart rate in terms of %HRR?

**Reminder**

The two multiple choice and one short answer (<100 words) questions must be answered online on Canvas by 11:59pm on the day of the laboratory.

**References**

1. Nagamatsu LS, Flicker L, Kramer AF, et al. Exercise is medicine, for the body and the brain. BMJ Publishing Group Ltd and British Association of Sport and Exercise Medicine; 2014.

2. Falck RS, Davis JC, Best JR, Crockett RA, Liu-Ambrose T. Impact of exercise training on physical and cognitive function among older adults: a systematic review and meta-analysis. *Neurobiol Aging.* 2019.

3. Piercy KL, Troiano RP, Ballard RM, et al. The Physical Activity Guidelines for Americans. *JAMA.* 2018;320(19):2020-2028.

4. Nelson ME, Rejeski, W.J., Blair, S.N., Duncan, P.W., Judge, J.O, King, A.C., Macera, C.A., Castaneda-Sceppa, C. Physical Activity and Public Health in Older Adults: Recommendation from the American College of Sports Medicine and the American Heart Association. *Medicine & Science in Sport & Exercise.* 2007;49(8):1435-1445.

5. Brzycki M. *A practical approach to strength training.* Masters Press Grand Rapids, MI; 1989.

6. LeSuer DA, McCormick JH, Mayhew JL, Wasserstein RL, Arnold MD. The accuracy of prediction equations for estimating 1-RM performance in the bench press, squat, and deadlift. *The Journal of Strength & Conditioning Research.* 1997;11(4):211-213.

7. Baechle TR, Earle RW. *Essentials of Strength Training and Conditioning.* 3rd ed. Champaign, IL: Human Kinetics; 2008.