

**Cardiovascular exercise offers several health benefits.** For example, cardiovascular fitness improves cardiovascular, metabolic, and cognitive function in all age groups. Moreover, cardiovascular exercise can improve bone density and muscular function which can minimize the risk for osteoporosis. According to the American College of Sports Medicine, individuals should participate in light to moderate intensity exercise, 30 to 60 minutes per day, most days of the week for cardiovascular benefit. For weight loss and maintenance, duration should increase to 60 to 90 minutes per day.

**An alternative to increased duration is increased intensity.** Individuals can obtain the same cardiovascular benefits with shorter bouts (20 to 30 minutes) of high intensity exercise. Moreover, caloric expenditure is higher post higher intensity than performing moderately intense exercise of longer durations. An example of this form of exercise is known as interval training. Interval training is a type of exercise program that includes short periods (intervals) of very high intensity exercise followed by a period to recover before starting the high intensity output again. An example for interval training might include a 30 to 60 second duration of higher intensity exercise followed by a one to five minute recovery period of lower intensity exercise. A patient will repeatedly perform this cycle over 20 to 30 minutes.

There are practical and formal methods for establishing exercise intensity with your patients.

## Practical Methods

A practical method for recommending appropriate exercise intensity is **The Talk Test**.

The Talk Test was developed to be an informal, subjective method of estimating appropriate cardiorespiratory exercise intensity (Persinger, 2004). The method entails maintaining an intensity of exercise at which conversation is comfortable. When a patient reaches an intensity at which he or she can “just barely respond in conversation,” the intensity is considered appropriate for cardiorespiratory endurance improvement.

A second option is to **use a rating of perceived exertion or Borg scale** for recommending specific exercise intensity (Borg, 1970). The original Borg scale used a Likert scale of 6 to 20 and a modified version uses a 0 to 10 scale. A high intensity activity would equate to more exertion. Most exercise physiologists recommend a Borg or exertion level of 13 to 14.

## Heart Rate Method

A more formal method for recommending specific exercise intensity is through heart rate monitoring and/or use of the Borg Scale.

To determine a patient’s training heart rate you should determine the age defined maximal heart rate (HRM). Second, you have two options for determining training intensity.

### 1) Multiply the aged defined maximal heart rate by the percent maximal effort (i.e., % Maximal Heart).

Age Defined HRM =  $220 - \text{age (yrs)}$

Training Rate =  $\text{HRM} * \% \text{ of HRM}$

**2) You can use the Karvonen formula to account for resting heart rate (RHR). The latter accounts for individual differences versus using a standardized equation for all.**

Heart Rate Reserve (HRR) = HRM – RHR

Training Heart Rate = (HRR \* % of HRM) + RHR

## Patient Monitoring

**Individuals can monitor the progress of the exercise session by tracking exercise heart rate.** Most cardiovascular exercise equipment (e.g., treadmills, bikes, cross trainers, etc.) have heart rate sensors and can provide immediate feedback on training heart rate.

Those who participate in structured exercise classes or exercise outdoors may consider using a heart rate monitor. Heart rate monitors cost between \$50-100.00.

If a heart rate monitor is unavailable, individuals can use a Borg Scale or apply the Talk Test to ensure they are performing at an optimal intensity for cardiovascular and metabolic performance.

## Exercise Prescription Example

A 45-year-old sedentary female would like to begin an exercise program. Based on her health history she does not have contraindications that would limit or prevent physical activity. Her blood pressure and resting heart rate are 123 /74 mmHg and 78 beats per min. Therefore, she could exercise at a moderate intensity level or choose interval training.

### **30 Minutes of Continued Exercise** (*Moderate Intensity = 65% HRM / Borg 12-13*)

Warm-up: 5 minutes of very light intensity exercise (45% HRM) (HR 120 bpm / Borg 9)

Exercise: 20 minutes of moderate intensity exercise (65% HRM) (HR 140 bpm / Borg 12-13)

Cool down: 5 minutes of very light intensity exercise (40% HRM) = 115 bpm / Borg 8)

### **30 Minutes of Interval Training** (*Light-Moderate to Hard Intensity*)

Warm-up: 5 minutes of very light intensity exercise (45% HRM) (HR 120 bpm / Borg 9)

Interval Session (Repeat 5 times): 1-Minute at 80% HRM ( HR 155 bpm / Borg 15-16)

3-Minute at 55% HRM ( HR 130 bpm / Borg 10-11)

Cool down: 5 minutes of very light intensity exercise (40% HRM) = 115 bpm / Borg 8)

## Exercise Training Intensity Scale

Borg RPE	Modified RPE	Description	% of Maximal Heart Rate
6	0	No Exertion	40-45%
7		Very Light	
8	1		
9			
10	2	Light	50-59%
11			
12	3	Moderate	60- 69%
13			
14	4	Somewhat Hard	70-79%
15	5	Hard	80-89%
16	6		
17	7	Very Hard	90-99%
18	8		
19	9		
20	10	Maximal Exertion	100%

## References:

Borg, G. (1970) Perceived exertion as an indicator of somatic stress. Scand J Rehabil Med, 2(2); 92-98

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