**(DSD Fitness for Life Online) Assignment 7: Heart Rate**

Your heart rate tells you how hard you are working during exercise. It is important to learn to monitor your heart rate so you can tell if you are working too hard, or not working hard enough. People typically take their heart rate while resting, exercising, or recovering from exercise. You can measure your heart rate at the carotid artery (on your neck) or the radial artery (on the thumb side of your wrist).

Resting Heart Rate

Your resting heart rate is the number of beats per minute (bpm) that your heart beats while relaxing. The best time to take your resting heart rate is early in the morning, as soon as you wake up. If you forget to take it then, you can also lie or sit down and take it after a 5 minute rest. A good reason to regularly take your resting heart rate is because you can tell how fit you are currently, and you can tell whether or not you are overtraining. The average resting heart rate for men is typically higher than that for women (e.g., men = 70 beats per minute; women = 75 beats per minute). If you are physically fit, your resting heart rate will typically be below 60 beats per minute. If you take your heart rate at the beginning of this class and it is 70 beats per minute, you would expect that your resting heart rate would *decrease* as you increase your physical activity level and become more fit. Your heart becomes more efficient as you exercise more regularly, thus, it beats fewer times each minute and pumps more blood with each beat. If, during one week, your resting heart rate is 60, and you are also working 40 hours a week, taking several exams in school, and getting 5 hours of sleep per night, your resting heart rate might show an increase. Anytime your resting heart rate goes up, despite continued training, this is typically a sign that you are overtraining.

Maximal Heart Rate

Your maximal heart rate is the maximal number of beats per minute that your heart can beat during a hard exercise bout. As you age, your maximal heart rate declines, mostly due to a decrease in physical activity, but also due to a less efficient heart. Just as a car motor becomes less efficient with age, so does your heart.

The only way to truly assess your maximal heart rate is to have an EKG test. Since that is not practical for most of us, an easy formula can be used to estimate your maximal heart rate. To estimate your maximal heart rate, subtract your age in years from 220. For example: If you are 15 years old, your estimated maximal heart rate is 220 - 15 or 205.

Target Heart Rate Range

Now that you know how to find your resting heart rate and your maximal heart rate, you can use this information to calculate your target heart rate range. Your target heart rate range is the range of heart rate values you want to keep your heart rate in while you're exercising. If you workout such that your heart rate stays within this specific range, you should be working out hard enough to see improvements in your fitness, and you should not be working so hard that you risk injury, excessive soreness, or exercise burnout.

There are two ways to calculate your target heart rate range. To use the heart rate range method, subtract your resting heart rate from your maximal heart rate. This value is your heart rate range. Multiply your heart rate range by .50, assuming that 50% of your maximal heart rate is the *minimal* level at which you should exercise. Add your resting heart rate back to this value for the threshold heart rate, or your minimal level of intensity.

**EXAMPLE:**

205 (maximal heart rate)

-70 (resting heart rate)

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135 (heart rate range)

x .50 (minimal level of exercise or percentage of maximal heart rate)

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67.5

+70 (resting heart rate)

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**137.5 (threshold heart rate or minimum heart rate at which you should workout)**

You should also calculate your target ceiling rate, or the *highest* intensity level at which you should exercise. Once again using your heart rate range,, multiply your heart rate range by .85, assuming that 85% of your maximal heart rate is the *maximum* level at which you should exercise. Add your resting heart rate back to this value for the target ceiling rate, or your maximal level of intensity.

**EXAMPLE:**

205 (maximal heart rate)

-70 (resting heart rate)

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135 (heart rate range)

x .85 (maximal level of exercise or percentage of maximal heart rate)

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114.75

+70 (resting heart rate)

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**184.75 (target ceiling rate or maximum heart rate at which you should workout)**

To summarize the above information, the threshold heart rate at which this 15 year old should workout is 137.5 bpm and the target ceiling rate is 184.75 bpm. Athletes and those already in good physical condition can (and do) workout at intensities higher than 85% of maximum heart rate, however, this is most effectively done with a coach or fitness trainer.

Another way to calculate your recommended heart rate during exercise is using the percent of maximal heart rate method. This method is much simpler than the previous method, but it is less accurate given that a persons' fitness level (e.g., resting heart rate) is not considered when using this formula.

To calculate the lower end of the percent of maximal heart rate method, multiply your estimated maximal heart rate by .60, which represents 60% of your maximal heart rate.

**EXAMPLE:**

205 (estimated maximal heart rate for a 15 year old)

x .60

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123 = lower end of heart rate range

To calculate the upper limit of the percent of maximal heart rate method, multiply your estimated maximal heart rate by .90, which represents 90% of your maximal heart rate.

**EXAMPLE:**

205

x .90

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184.5 = upper end of heart rate range

So, using the percent of maximal heart rate method, a 15 year old student should get his or her heart rate up to at least 123 bpm, but not higher than 184.5 bpm.

Recovery Heart Rate

Immediately after exercising, it is important to track your recovery heart rate. The higher your level of fitness, the more quickly your heart rate will drop after exercise. For example, if you finish a mile run and your exercise heart rate is 160 bpm and 1 minute later, your heart rate is down to 100 bpm, you are very physically fit and your body is used to being physically challenged on a regular basis. If, on the other hand, you run a mile and your post-exercise heart rate of 160 bpm drops only to 140 after 1 minute, you have a lower level of fitness and regular training should improve the speed with which you recover from hard exercise.

**Heart Rate Assignment #7**

Name: Date:

1. What is your resting heart rate (bpm)? **2 pts.**
2. In the space below, calculate your estimated maximal heart rate (220 - age). **2 pts.**
3. In the space below, calculate your target heart rate range using the heart rate range method. SHOW YOUR WORK! **2 pts.**

Threshold HR =

Target Ceiling HR =

1. In the space below, calculate your target heart rate range using the percent of maximal heart rate method. SHOW YOUR WORK! **2 pts.**

Lower Limit =

Upper Limit =

1. Are your target heart rate ranges different in questions 3 and 4, using the two methods of calculation? If so, why? If not, why not? **2 pts.**
2. Perform each of the activities below for 2-5 minutes. Take your heart rate and record it next to the activity listed below. **(20 pts.)**
3. sitting
4. standing
5. walking briskly
6. exercising fairly intensely (take measurement immediately after finishing exercise)
7. 1 minute after completing the exercise bout
8. 3 minutes after completing the exercise bout
9. Answer the questions below relative to your heart rate comparisons: **10 pts.**
10. During which activity was your heart rate the highest?
11. How fast was your recovery from exercise? Did your heart rate get below 100 bpm after 1 minute or after 3 minutes?

**8) What did you learn from this assignment? 10 pts.**

**Evaluation:**

This assignment is worth 50 points. **2 points** each for questions #1-#5, **20 points** for #6, and **10 points** for #7 and #8.