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PERFORMANCE
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Optimizing Fitness Using Heart Rate Training Zones

Heart rate training zones help reach fitness and athletic goals more efficiently

The heart responds to exercise by altering the frequency of beats per minute according to the training intensity. An easy way to gain full benefit from an exercise program is to establish heart rate training zones that cover the full range of heart rate responses to exercise. Heart rate training zones bring specificity to training, whether to target improvements in general fitness or weight loss or to develop endurance, speed or power.

Many different methods exist for determining training zones. The most common method is to use a formula for finding the maximal predicted heart rate (Hrmax) and taking a percentage of that heart rate to create five training zones. The most frequently used formula for determining Hrmax is $(220 - \text{age})$. Although this is an easy method, research has shown that most people do not have the same actual Hrmax as their predicted Hrmax. Exercise testing provides more accurate measurement of an individual's true Hrmax.

HR training zones can also be established based on the "individual anaerobic threshold" heart rate and percentages of that heart rate. The anaerobic threshold represents a point where the muscles shift from predominantly aerobic (utilizing oxygen to burn fuel) to anaerobic (burning fuel without oxygen) metabolism. Each person crosses the anaerobic threshold at a unique point, depending on the ability of the muscles to extract and utilize oxygen. The anaerobic threshold heart rate is most often determined through exercise testing.

The training zones target specific results:

Using 5 zones enables individuals to gain specific benefits from their training. The following section describes each of the zones and their training benefit.

Zone 1:

- Use this zone to warm-up at the beginning of the workout and cool down at the end of the workout. With warm up, the heart rate increases and blood circulates to the working muscles. This establishes a steady flow of oxygen from the circulation to the muscle cells which enables the cells to extract energy from fats and carbohydrates. Warming up regularly revs up metabolism in preparation for exercise. The warm-up prepares the muscles for the workout and helps to protect them from injury.
- The cool-down returns the body to a normal temperature and helps to clear metabolic waste products from the muscles and the circulation to speed recovery after the workout.
- Spend about 5-10 minutes in this zone at the beginning and end of exercise. The perceived level of exertion for this zone is "very easy".

Zone 2:

- This zone emphasizes easy endurance and is largely fueled by fat burning. It's the best zone to include when building endurance at the beginning of the training season. For the first 2-4 weeks of training, zone 2 should comprise 50% of total training time.
- After 2-4 weeks of consistent training, this zone should become part of the warm-up and cool-down phases. Zone 2 workouts also help speed recovery the day after a long or hard workout by providing a light training load to stimulate aerobic system adaptations to the training performed the prior day. In this way, physical and physiologic systems experience alternating hard and easy days, which allows better overall training quality, and prevents injury and excessive training stress.

- Zone 2 is also used during workouts containing high intensity intervals for the recovery intervals between the hard portions of the workout as well as during warm-up and cool down.
- This zone should comprise 10-15% of the total training time. The perceived level of exertion for this zone is "easy".

Zone 3

- This zone helps build higher intensity aerobic endurance, train fat burning, and strengthen the heart muscle. Including a longer zone 3 session weekly will further help reduce health risks, such as high cholesterol, stress, diabetes, elevated blood pressure and certain cancers.
- After 2-4 weeks of consistent aerobic exercise, zone 3 should comprise 50% of the total training time. The perceived level of exertion for this zone is "moderate". One should still be able to comfortably converse when training in this zone.

Zone 4

- This zone improves exercise performance by raising the anaerobic threshold, allowing an individual to sustain higher intensity workouts longer and with less effort. For the beginner, even 10 minutes in this zone per week can help advance fitness. Be aware that although this zone helps build fitness, spending too much time at this intensity may actually diminish fitness by creating an imbalance between the aerobic and anaerobic systems, causing endurance to deteriorate. A common training error is to spend too much time in this zone.
- This zone should be introduced only after an aerobic base is established (6-12 weeks of consistent aerobic exercise, depending on fitness level).
- Zone 4 should comprise 10-20% of the total training time. The effort level of this zone is "hard".

Zone 5

- This zone is used for more advanced individuals with a solid base of aerobic training and / or specific competitive goals. It helps build speed and power for brief intervals at very high intensity. Training here teaches the body to tolerate high levels of metabolic waste products and their side effects.
- This zone should comprise 0-5% of total training time. The effort level of this zone is "very hard".
- Considerations
- When using heart rate zones be aware that certain factors independent of exercise can affect the heart rate and interfere with training zone accuracy. Stimulants such as caffeine and certain medications, dehydration, sleep deficits, stress and insufficient recovery can alter the heart rate response to exercise.
- Fitness improvements may lead to changes in the heart rate response after 8-12 weeks of consistent training. If perceived effort seems lower at a given heart rate, then it may be time for heart rate zone re-evaluation. In individuals with more advanced fitness, performance may improve with only slight changes in heart rate zones.

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