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Heart Matters (by Jeremy Likness)

Bodybuilders train their muscles, but they often neglect the most important muscle of them all - the heart. Your heart is a great indicator of your level of fitness. Training your heart can improve all aspects of your health. Your heart can even be used as a guide to help improve your training and, more importantly, customize training to your body. When you understand how the heart works and how it can be used as an amazing tool for training, you will appreciate exactly how much the heart matters!

Your heart is between one to two times the size of your clenched fist. Contrary to popular belief, it is not located to one side of the body - it is located almost in the exact center of your chest. Due to the shape of the heart and chest cavity, the heart pounds against the chest wall on your left side, so the heart rate is stronger when felt there. Your heart is responsible for pumping about six quarts of blood throughout your body, with about the same amount of force that the average person applies when squeezing a tennis ball. The heart is not under voluntary control. A system known as the autonomic nervous system, which includes the sympathetic and parasympathetic nervous system, is responsible for regulating your heart rate.

There are many ways to measure how healthy a heart is. A healthy heart should beat with a fairly regular rhythm that will change based on levels of exertion and oxygen requirements. A healthy heart has a high stroke volume, which refers to the amount of blood that is pumped out with each beat. A healthy heart does not have to work as hard to pump blood, so the resting heart rate of a healthy heart will be lower than average. Blood pressure is another indicator of heart health and should be in the healthy range of around 120 over 80, as determined by the national average.

Various types of training have different effects on the heart. Training that elevates the heart rate for even brief durations can increase the size of the heart. This will increase the stroke volume, and result in a lower resting heart rate. Training can also increase the rate at which the heart recovers from a bout of intense work. In other words, a trained individual will return to their resting heart rate faster than a sedentary individual. Exercise has been shown to lower blood pressure. In addition, regular cardiovascular exercise can increase the concentration of hemoglobin in blood, allowing the body to become more efficient at transporting oxygen to the cells that need it (as well as removing waste products such as carbon dioxide).

The average resting heart rate for an adult is around 72 beats per minute, or 75 for women and 70 for men. The lowest recorded heart rate is 28 beats per minute, attributed to a Spanish cyclist named Miguel Indurain. Many athletes have resting heart rates between the mid 30's and mid 40's. Bradycardia refers to a resting heart rate less than 60 beats per minute. It is simply a name for the condition of a slow heart, and does not imply an unhealthy heart or disease. Tachycardia refers to a resting heart rate over 100 beats per minute, and is considered a very dangerous condition to have.

The notion of maximum heart rate was designed to help people safely and effectively exercise. The maximum heart rate is theoretically the most times that your heart can safely beat in the span of one minute. The traditional formula for computing maximum heart rate is 220 - age. I am 29, so my maximum heart rate would be computed at 191 beats per minute. As you can see, maximum heart rate will decrease with age.

It has been speculated that the generic equation for determining maximum heart rate is not very accurate. Individuals of the same age will have different sized hearts, stroke volume, blood pressure, resting heart rates,

and other factors that would contribute to the maximum possible beats per minute. A few attempts have been made to "fine tune" the formula, but even those efforts may fall short. One formula is known as the "adjusted heart rate". It involves removing the resting heart rate from the maximum before applying a target formula. For example, if my target heart rate were 193, 80% of my maximum would be 154 beats per minute. In other words, my "target" heart rate at 80% is 154 beats. Using the adjusted method, I would first subtract my resting heart rate, apply the percentage, then add it back in. So, in this example:

193 (maximum heart rate) - 39 (resting heart rate) = 154.

154 x 80% = 123.

123 + 39 (adding resting heart rate back) = 162.

Click here for a special section about target heart rate, with a built-in calculator to compute your heart rate zones.

Therefore, instead of the traditional 154 beats per minute, my "adjusted target" at 80% would be 162 beats per minute. Another "tweak" to the traditional formula is known as the Tanaka method. Based on a study of literally thousands of individuals, a new formula was devised which is believed to be more accurate. The formula is 208 - 0.7 x age. Using this formula, my maximum heart rate when I was 27 would have been 208 - 0.7 x 27 = 189, or about 3 beats per minute less than the traditional formula.

So why even worry about your heart rate? Heart rate is a great indicator of training. In order to better understand heart rate, you must understand the various "systems" of energy that your body uses when you train. There are three systems that are always in effect, but one system will dominate based on the type of training. These systems are ATP-CP and glycolytic (both are anaerobic, or systems that do not rely on oxygen as the primary energy source) and aerobic.

The ATP-CP system is the system that bodybuilders are most familiar with. It is the system where your body is forced to perform work without the aid of oxygen. When you perform a repetition during a weight training exercise, your muscles contract and must generate force quickly to resist the weight. This action happens quickly, and your body is not able to use oxygen to fuel the contraction. Instead, your body will rely on stores of energy within the muscle cells, namely a compound called adenosine triphosphate (ATP) and creatine phosphate. ATP depletes rapidly, and is replenished by CP. Sports that rely on this system include power lifting, shot put, and short distance sprints.

Bouts of work lasting more than a few seconds will draw energy mainly from the glycolytic system. Once ATP and CP are depleted, the glycolytic system kicks in. This system takes carbohydrate stored in the muscle cell (glycogen) and breaks down the glycogen to replenish ATP. Sports that utilize the glycolytic system include mid-distance sprinting, basketball, volleyball, boxing, and football. These are all sports that involve prolonged periods of moderate activity mixed with short bouts of near maximal effort.

Marathon runners and other distance runners use the aerobic system. The aerobic system utilizes oxygen for energy. The blood transports oxygen, so this system has the largest influence on the heart. Any type of activity that is prolonged (more than a few minutes) and does not involve repeated bouts of near maximal effort would use the aerobic system as the primary source of energy. Keep in mind that all systems are being used, but the aerobic system becomes the predominant system.

The rate at which your heart is pumping can help indicate which energy system is dominant at any given period of time. This is where the maximum heart rate and target heart rates become useful. Traditionally, training "zones" have been determined based on percentage of the target heart rate. The common breakdown of these training zones is:

50% - 60% = low intensity

60% - 70% = fat-burning zone
70% - 80% = aerobic zone
80% - 90% = anaerobic zone
90% - 100% = maximal zone

The low intensity zone is ideal for burning calories without stressing your body. If you are recovering from a workout or an injury, on a reduced-calorie diet, or looking to burn additional calories with minimal impact on muscle gains, this a great zone to work out in. Brisk walking on an incline is an ideal way to reach this zone, and the main drawback is time. It takes the longest amount of time to burn a given number of calories when training in this zone.

The fat-burning zone is what I consider the land of myth. This is the most misunderstood zone in training. When you are at 60 to 70 percent of your target heart rate, the majority of your calories burned will come from fat, *during* that training session. Over 65% of your burned calories can come from fat. Due to this trivial fact, many people believe that this is the necessary zone to burn fat. This is not necessarily true. Any time you create a caloric deficit, or expend more calories than you consume, you will lose weight in the form of fat and/or muscle mass. While other systems may burn less percentage of fat, they can burn more calories and therefore result in greater fat loss!

As an example, let's talk about the "aerobic zone." In this zone, intensity increases, so less of your calories are burned from fat. However, due to the increased intensity, you burn more calories per minute. Does this mean that you should avoid the aerobic zone if fat loss is your goal? Let's break this down.

It is estimated that 45% of calories in the "aerobic zone" are burned from fat. Let's say you run 6mph to reach the "fat-burning zone" and you run 9mph to reach the "aerobic zone".

In one hour, you will run either 6 miles or 9 miles. According to research, a 175-pound person burns on average about 34 calories per mile. So, in one hour, you might burn:

6 x 34 = 204 calories, or
9 x 34 = 306 calories

In the fat-burning zone, you burned 65% of your calories from fat. This is 204 x .65 = 133 calories from fat.

In the aerobic zone, you burned 45% of your calories from fat. This is 306 x .45 = 138 calories.

As you can see, getting comfortable and going into the "fat burning" zone actually burned *fewer* calories. You might say, "What's the big deal? It was only 5 calories difference." But when you take into account *total* calories, you burned over 100 *more* calories in the aerobic zone. Since total calories expended have the largest impact on the amount of fat you will lose, obviously the aerobic method will result in more fat loss (provided you also resistance train so that you are not losing muscle) than the "fat-burning" method.

The fat-burning zone and below used the aerobic system. In the aerobic zone, you are still using the aerobic system of energetics, but may see a shift towards the glycolytic system. Once you reach 80%, you are venturing into the glycolytic and ATP-CP zones (over 90% is going to be predominantly ATP-CP). So heart rate relative to your maximum heart rate can help understand where your fuel is coming from and even how many calories you will burn. What is interesting to note is that the longer you sustain an elevated heart rate (i.e. aerobic zone or higher), the longer it takes for your body to recover by slowing down. This means you continue to have a faster metabolism and to burn more calories even after your training is done!

I mentioned these "traditional" zones because I don't like to follow tradition when it comes to monitoring heart rate. For one, I feel that perceived effort is just as valid an indicator. Why limit yourself based on a "zone" you must workout in, when you can simply push yourself to achieve your results! Another problem with the traditional method is that it does not take into account errors with the heart rate calculations - should I train in the same zone as someone whose resting heart rate is 75 beats per minute (my own resting heart rate is around 39 beats per minute)? I don't think so - I think that the lower resting heart rate is an indicator of advanced

fitness and means that I can train more intensely. What if your heart is maxing out at 170 beats per minute instead of 193? Should you still "push the limit" because the equation tells you to? I don't think so.

Heart rate can still be a useful tool for training, but you must learn to use your body as the tool, not the equation. For example, if you want to understand what your anaerobic zone is, instead of plugging away at a formula, why not perform anaerobic work? I can guarantee that you will be using your ATP-CP system (a completely anaerobic system) when you perform a one-rep max. So instead of taking 90% of 220 minus your age, just strap on a heart rate monitor the next time you perform a maximum lift. Then, instead of relying on statistics, your body will tell you what your "anaerobic" zone is. This may not be traditional, but do you think your heart will lie?

Once you have this useful information, you can apply it to your training. If you are performing high intensity interval training, and would rather have your heart dictate the intervals than your perception, let your body be the guide. Start by walking on an incline for several minutes. This is your low intensity zone. Now go outside and perform an all-out sprint. This will be your high intensity zone. Now you simply build intervals between those two heart rates for your training. Again, no equation that has no clue what the size of your heart is or what your blood chemistry is like - let your body be the tool.

As a final note, heart rate can apply to resistance training as well. If you are looking to reduce body fat, calories are king. Should you rest 15 seconds? 1 minute? How about staying in the "aerobic" zone? Pick a target rate for your training. Your "75% effort" (somewhere between your sprinting and incline walking) could be the bottom line. Simply rest until your heart rate drops to that level, and then perform the next set. This will ensure your heart rate is always elevated to a minimal level while allowing sufficient recovery to move on. When you are training for strength or heavy lifts, how long should you rest? 3 minutes? 10 minutes? Again, why not let your body decide. Rest until you fall to the fat-burning zone or even less, then start the next set. For you, this may only take 2 minutes, while another person will recover after 10 minutes of rest. The key is that your body is telling you when sufficient recovery has taken place to perform the next set - not some rigid standard like "4 minutes" that doesn't take into account your specific, individual recovery ability.

When you are training, don't forget the most important muscle: your heart. Not only is it an indicator of health, it is a tool that can help to improve your health. Instead of relying on cookie-cutter formulas, you can use your heart as an interactive gauge to tailor your workouts to your own unique body. Learn that the heart matters and use the powerful information it provides to build your peak physique.

Editor's Note

To purchase heart rate monitors and other equipment mentioned in this article, Natural Physiques™ recommends our affiliate partner:

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