Just starting out on running?

Want to know some basic facts before starting to train?

**In this first series of monthly articles we will set out to give you a brief and fundamental appreciation of the basic aspects of exercise with specific relation to running.**

**Where to start? How fit are you now? Heart rate is the key .......**

**Oxygenated blood carries fuel to your muscles and waste products away – this fuelled blood is pumped throughout the body by the action of the heart.**

**The rate with which this takes place is measured in beats per minute (pulse rate is measured in BPM or bpm). Normally resting heart rate is an excellent initial gauge of your fitness. The lower your resting heart rate the better for you – it is universally believed that the average adult has a RPR (resting pulse rate) of about 70 – 80 bpm. Often endurance runners have a pulse rate of less than 45 bpm.**

**The key to cardiovascular fitness is therefore heart rate – it is easily measured as it never leaves you!**

**You firstly need to take a few measurements - try to gain some consistency in taking these useful tests on a regular basis.**

**The grid below guides you through these tests but we first need to do to gain a clear understanding of how they fit together.**

**TEST 1: BODY MASS INDEX: This is a means of calculating whether you should start running immediately or perhaps lose a little weight before starting by doing low load bearing activity such as swimming or using a cross training machine. Body Mass Index measures the relationship between your weight and height. A BMI of between 18 and 25 is a good start since between these indices you are not likely to put undue stress on joints, ligaments and cartilage.**

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| **Weight** | **Height** | **BMI** | **Suitability to run** |
| **80kgs** | **1.60m** | **31.25** | **Overweight – needs to lose at least 5kgs before starting to run** |
| **80kgs** | **1.90m** | **22.16** | **Ideal combination to start running** |
| **50kgs** | **1.70m** | **17.30** | **Slightly underweight – needs to watch out for joint strain** |

**TEST 2: RESTING HEART RATE: While at night we often have a fluctuating heart rate despite being asleep and during the day our normal working activities lead to a fluctuating demanding on our heart, in the morning as soon as soon as we wake up if we take our heart rate the reading likely to reveal the lowest reading. If we having RHR of which is lower than 70bpm we are likely to have very few problems when starting exercise. Exercise stimulates the recovery process of muscles as the heart gets used to the demands made on it by the body and beats more slowly and purposefully as the muscles which operate the heart get stronger. However, this is not a ‘fits all – fail proof’ method and some people can start with a higher pulse rate. See a doctor if your resting pulse is above 90bpm or below 40bpm just in case there may be an underlying medical problem which causes these slight differences from the accepted norm.**

**The key factor is that with regular exercise the RHR will decrease – you need to test this regularly (bi-weekly)**

**TEST 3: MAXIMUM HEART RATE: The younger heart in general has a a higher RHR than an older one as it is less well developed. So it is best to set training perameters which are governed by a safe maximum heart rate. Average resting heart rate for an adult is 70 - 80 bpm and for a baby 110 – 120 bpm. It is generally assumed that the maximum rate at which an adult heart can beat is 220 bpm but it is very likely that individuals would pass out before reaching this level as a defence mechanism initiated by the brain.**

**Therefore an individual’s MHR is linked to this absolute bpm rating and age. By subtracting your age from 220 you will get a safe MHR and it advised never to exceed this level in the first six months of running.**

**For a 20 year old this would be 220 – 20 = 200bpm For a 60 year old 220 – 60 = 160bpm**

**TEST 4: TRAINING HEART RATE ZONE: Research supports the theory that the best returns on exercise are made at between 60% and 70% of MHR. This permits the heart to fuel and vacate muscles at optimum rate and strengthens the heart muscles in a controlled way. It is recommended that a regime of 3 times per week exercise in your THRZ (Training Heart Rate Zone) for at least 6 months before attempting to increase the intensity of efforts i.e. attempting faster runs above 70% of MHR and then only with appropriate recovery after each effort. We will come on to this in future weeks.**

**The Grid below helps you personalise your information by explaining how to collect the various readings to plan your training.**

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| --- | --- | --- | --- | --- |
| **Key things to measure** | **Resting heart rate**  **C:\Users\Geoff\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\P1S3K306\MPj04403030000[1].jpg** | **Body Mass Index**  **C:\Users\Geoff\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\P1S3K306\MCj01209950000[1].wmf** | **Maximum Heart Rate** | **Aerobic training Heart rate zone** |
| **Basic equipment you need** | **Stopwatch or heart monitor (if you have one!)** | **Scales + Height measurement** | **Nothing** | **Calculator or good mental maths!** |
| **Key terms** | **BPM (beats per minute)** | **BMI (body mass index)** | **220BPM – your age** | **60%-70% of MHR** |
| **How do you measure this!?** | **Resting Heart Rate (RHR) is best taken as soon as you get up in the morning – sit on the edge of your bed; using your index + middle finger find your carotid pulse in your neck; count the number of pulses (beats of your heart) for a period of 15 secs and multiply the bests by 4 to achieve your resting heart rate in terms of one minute. If you have a heart monitor it will give you an exact as soon as it kicks in (more on this later)** | **Weigh yourself (Kgs)**  **Measure your height (Metric)**  **Your BMI is:-**  **Weight**  **divided by**  **Height**  **A reading of between 18 and 25**  **is healthy** | **This a very simple and rudimentary method of finding your Maximum Safe Heart Rate**  **Assume that the ultimate BPM (ie before you pass out) is 220 beats.**  **Subtract your age from this to give your safe Maximum Heart rate.**  **Therefore a 20 year old would have a MHR of 220-20 BPM = 200BPM while a 60 year old would have a MHR of 220 – 60 BPM = 160BPM** | **Using your age related Maximum Heart Rate you can now calculate your safe zone for aerobic training.**  **Research suggests that the best results come by training at between 60 – 70% of your MHR**  **So a 20 year old would aim to keep their Pulse (BPM) between 120bpm and 140bpm**  **A 60 year old would aim to keep their pulse (BPM) between 96bpm and 120bpm**  **This is likely to produce a good aerobic base for their respective training.** |

**Want to find out a little more about ENERGY PATHWAYS?**

**Whereas sprinters require skill, speed and specific strength, endurance athletes experience a progressive dependence upon increasing distance – this in turn demands an increasing duration of running.**

**The energy required to move our limbs is delivered by muscular contraction and is derived from our FUEL. This fuel comes from the food we eat (absorbsion) but is broken down into more useable fuels of Glycogen (similar to Glucose) and Free Fatty Acids. The fuel is carried in the digestive system to storage or circulation by the blood.**

**As with other fuels it burns better (the chemical reaction is stronger) with OXYGEN available which is inhaled through breathing. Oxygen is collected in blood from the lungs (gaseous exchange) and pumped around an elaborate system of blood vessels by the heart, linking lungs and working muscles.**

**This is called the OXYGEN TRANSPORTING SYSTEM or CARDIO-RESPIRATORY SYSTEM or CARDIO VASCULAR SYSTEM.**

**It not only transports oxygen to the muscles but also transports waste products back to the lungs, liver or excretory systems to be recycled or passed out of the body.**

**A good basic working knowledge of the THREE ENERGY PATHWAYS will help you understand how important this is to middle and long distance running.**

**The OUTCOME OF BURNING FUEL is a chemical compound called ATP (adenosine triphosphate) A+P+P+P. Whenever P is split from the substance which is caused by an electrical impulse at the sarcomere from the motor neuron, energy is released – this is the energy which the muscle requires to contract. Thus chemical energy is converted to mechanical energy and the muscles move your limbs!!**

**AEROBIC (with oxygen) PATHWAY: The oxygen transporting system ensures a supply of oxygen and fuel. The provision of ATP can only be ensured here for as long as this supply lasts. For this reason, the energy pathway is called aerobic.**

**FUEL + OXYGEN → ATP + waste which is easily disposed of.**

**If this is the only means of making ATP then clearly there would be no energy available to the muscle if fuel or oxygen were to run out. Provided the rate of oxygen consumption is equal to the rate of provision then the aerobic pathway can operate until fuel runs out. This is the main problem for a longer distance athlete as he must take on extra fuels as the race proceeds. This would be in the form of glucose drinks and a mixture of water and salts to replace fluid and salts lost through sweating. Aerobic exercise is the fundamental requirement for an endurance athlete.**

**ANAEROBIC (without oxygen) PATHWAY: It is often the case that an athlete will run so hard that the body’s oxygen needs exceed its rate of provision. In these circumstances, ATP may still be formed, but the waste products cannot be flushed away (disposed of).**

**BLOOD TRANSPORTED FUEL → ATP +WASTE (produces by product LACTIC ACID which cannot be readily disposed of.**

**This situation cannot continue indefinitely and after a limited period of time activity will need to cease completely, the waste products are flushed away and the oxygen debt brought on by spending more than was available is replenished. This pathway is *without oxygen* and is named ANAEROBIC. As lactic acid is the indisposable waste product it is often referred to as the LACTIC ANAEROBIC PATHWAY. This pathway is exhausted after approximately 45 secs. Hence for sprinters the World record for 100/200/400 bear a close relationships to eachother with a significant falloff after 39/40secs.**