PDHPE
Improving Performance Case Study

Aerobic Training Program Suited to a Half Marathon Runner (sub 100 minutes)

Aerobic Training Methods and how they are suited to a half marathon runner

Summary/Abstract:
The aerobic training program, presented in the appendix, is highly suited for a half-marathon athlete as it is able to provide sufficient cardiovascular overload to stimulate increases in the athlete's cardiovascular efficiency. In order to achieve this and hence improve performance, the program has incorporated several different aerobic training methods. These include predominantly continuous training, which is seen to be used several times progressively through the 12 week program, and interval training. Although restricted, cross-training is also evident in the program to a certain degree; however there is a limited extent of circuit training and Fartlek training.

Suitability for Aerobic Training Program:
Continuous Training
Continuous training is used extensively throughout the 12 week program which ultimately is in preparation for the half marathon. It is highly specific as the race is at the end of the final week. The program uses long aerobic, and medium long aerobic running exercises which progress effectively throughout the program. The longer, continuous runs are a key to improving times for a half-marathon performance, as they are aimed at providing the aerobic development and strength endurance necessary for success in this event. The use of specificity throughout the program, and in particularly continuous training, allows the athlete to "train at the same intensity as they would if they were competing" and gain improvements in areas that are vital when competing in a half marathon race. Furthermore, the use of progressive overload is a major strength as it allows for development of the aerobic energy system to be constantly increased throughout the program. Through the use of continuous training an athlete competing in this event, is likely to achieve improvements in such areas as


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stroke volume and cardiac output, hence allowing it to be a highly and effectively suited to the specific activity of half marathon running itself.

**Interval Training**
The second major training method that is explicit in this half marathon program is interval training; it is seen extensively throughout the 12 week program. Aerobic interval training allows athletes to work at a higher intensity, that is more specific to race-pace, then they could if they worked at a continuous pace etc. therefore aerobic interval training puts more strain on the cardiovascular system and hence will lead to greater increases in cardiovascular efficiency. *The recommended recovery is not enough time for complete recovery; this is so that the athlete's aerobic system is stressed, so that circulatory and metabolic adjustments are made to increase their body's aerobic capacity* One example of a successful interval training methods in this program is tempo/strength training, which aims at improving the anaerobic threshold and mentally conditioning yourself to maintain solid intensities for extended periods. This is an example of the training principle, training thresholds. This certainly is a definitive feature of the program as a half marathon athlete needs to be able to work right on the anaerobic threshold to maximise performance. VO2 training aims to provide improvements on VO2 max, which is applied through the use of interval training which places tremendous strain on to the aerobic system. Speed sessions are also used effectively in the program using the training method of interval training as they *Provide neuromuscular adaptations* which helps improve efficiency and technique. These sessions often lead up to intense interval training. Incorporated into interval training again is progressive overload which allows for the athlete to maintain and further improve aerobic functions as the program develops. Considering these factors, interval training offers a great opportunity to improve the aerobic energy system of an athlete and in particular an event such as the half-marathon which is extremely demanding on this very system. In turn, interval training is tremendously suited for this aerobic training program for a half marathon athlete who intends to run sub 100 minutes, as it allows for the aerobic functions to be improved which will ultimately lead to an enhanced performance.

**Cross Training**
Although used to a small degree, cross-training is also a relevant training method identified in this half marathon training program. This is seen in the forms of tempo/strength training which combines aerobic fitness with strength. This session is done using slight hills which permits and athlete to use and improve strength of their muscle systems. To only a small degree, cross-training illustrates the training principle of variety as it provides small range diversity to the training. This is very accurate to what an athlete of a half marathon will endure in a race. Hence, the

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2 "Bodybuilding.com - Training Power Systems: Anaerobic And Aerobic Training Methods!."  


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incorporation of cross training has value in this program, although as outlined below, should be modified further to incorporate a greater range of training methods.

**Areas of Improvement**

Although the program is immensely suitable for a half-marathon athlete aiming to improve aerobic fitness and overall performance, there are some minor issues that could be improved upon. A factor that is not incorporated in the program is warm up and cool down. This is vital as it is needed for proper muscles recovery and development. A further variety of training methods is another area that can be improved on. Including lower impact exercises and more muscular endurance sessions will greatly increase the athlete’s strength and overall performance. Other training methods such as circuit training and fartlek training will also contribute heavily to development of higher muscular endurance and a greater aerobic fitness. However, the program is highly suitable for a half marathon athlete and the training methods used allow for this.

**Effectiveness of Aerobic Training adaption’s measured and monitored in the program**

Although the program is undoubtedly strong in areas that apply to a half marathon athlete in improving aerobic fitness and performance, there is a notable absence of measuring and monitoring of the athlete. In this regard, the program is not effective in the monitoring and measuring of an athlete’s performance, as it clearly has not incorporated these factors. In order for the program to be thoroughly effective provision of these aspects should be implemented. If monitoring and measurement is used effectively in the program, you can make informed decisions about each athlete’s training. A pre-test should be used to establish the athlete’s physiological level of fitness and aerobic ability; however this is clearly not evident in this program. Reliable monitoring and measuring of an athlete should also be incorporated and consistently placed at intervals throughout the program. This in turn will give good reference to the athlete’s current performance as well as indicating whether there is a need for altering components of the program. Furthermore for the program to improve on its effectiveness in monitoring a half marathon athlete, deeper measurements can be made. Measurements such as; 

6 “RPE, soreness, sleep quality, nutrition and motivation”, will be taken into account and ultimately improve performance.

My recommendation for the placement of these tests in the program would be in weeks 4 and 8, the recovery weeks. This is because they are points placed evenly

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through the 12 weeks allowing for adequate decisions to be made on the athlete and for further development of the program. Testing for the level of aerobic performance in an athlete can be monitored/measured using the Coopers 12 minute run test. The test acts as an "easy way to measure aerobic fitness and provide an estimate of VO2 max". Evidently it can be seen that the coopers run test is able to act as an appropriate as method of monitoring the aerobic performance of a half marathon athlete before and during an aerobic training program. Hence to be as effective as possible, the program situated previously in the appendix should attempt to incorporate these factors.

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**Safe/potentially harmful aerobic training procedures in program**

Even though this aerobic training program for a half marathon athlete is fairly valid and reliable while being specific to the sport, there are a few concerns that lie within which are potentially harmful to an athlete. The foremost potentially harmful procedures seen in the program is the development of muscles injuries through the absence of warm up/cool down and the increase in overtraining/overuse injuries.

**Warm up/Cool down**

As looked upon in part 1, the absence of a warm up and cool down incorporated to that program is potentially dangerous to the athlete involved in the program. Warm up and cool down should be aimed at reducing 'muscle stiffness' as "Muscle stiffness is thought to be directly related to muscle injury". It is therefore essential for athletes to engage in a warm up/cool down when training to prevent further injury that may occur in the future. The risk of succumbing to a ‘muscles stiffness’ injuries is a clear safety concern that could come about with the absence of warm up and cool down in the program.

**Overtraining/Overuse Injuries**

The most common and potentially harmful concern for half marathon athletes and athletes using this program is overtraining injuries. Overtraining has been defined as

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"an increased training volume and/or intensity, that results in physical performance decrements". As this program is a full on, 12 week program athletes can succumb easily to overtraining. Overtraining itself has been demonstrated to be "dysfunction of the nervous and endocrine systems." Half marathon athletes should be incredibly careful not to fall into the trap of overtraining as it may be extremely detrimental to their individual health. Another sub-branch of overtraining is the development of overuse injuries in which are described as "tissue damage that results from repetitive demand over the course of time". Common overuse injuries that are developed from half marathon runners are shin splints, knee and ankle problems and lower back injuries. To help reduce acquiring such injuries is able to be done through the incorporating of resistance training, in particular core strength. This will develop muscles strength, endurance effectively decreasing risk of overuse injuries. Core strength will prevent the occurring of lower back injuries from the program, an injury very familiar to half marathon athletes and endurance athletes. Therefore core strength will build and strengthen the surrounding muscles of the lower back reducing threat of injury. These of course are injuries that certainly can be developed in this aerobic training program. In light of this, both overtraining and overuse injuries can be minimised through implementing a wider variety of exercise and training methods. Through incorporating more 'low impact' training into the program such as strength/resistance or spin bike sessions theses injuries can definitely be reduced. Incorporating a wider range and variety of training methods will allow for a decrease in these areas.

**Conclusion**

Considering these factors, there are only several potentially harmful procedures found in this aerobic training program. However as discussed above these can be addressed and even minimised through the incorporation of several different training implications such as the inclusion of warm ups and cool downs, and creating a wider variety of training methods, including more muscular endurance training.

**Bibliography**


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<http://sportsmedicine.about.com/od/fitness/evalandassessment

