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# STRENGTHS AND WEAKNESSES ASPECTS IN MARATHON RUNNERS TRAINING

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**Abstract**

*Problem statement*:Running is a natural activity. Marathon is a track and field race that involves special physical and mental effort and less technical requirements. Marathon is the activity that connect body and mind in a whole effort. Marathon means a race of 42.195 km in relatively constant speed tempo. The effort support is mainly based on a strong and flexible locomotor system combined with heathy heart and lungs.As much important is a healthy diet that improve the performance:a diet strategy based on the principle "eating less but often", provides energy levels constant all the day.

It is possible to appear some unpleasant aspects in training schedule. These can be in physical integrity, as: skin wounds, ankle or knees pain. The knee is the most frequently injured joint in runners at all distances. Foot and ankle injuries are the most common injuries supported by marathon runners.One of the most unpleasant pain training is plantar fasciitis as the result of irritation of the plantar fascia. So, the content of marathon runners training has to be carefully managed according to the strong and weak points.

*The aim of the research*:The paper's goal is to present some aspects that improve or limited the quality of marathon runners training. In this regard we try to identify the strengths and weaknesses points of these athletes.

*Conclusions:*Nowadays more and more people are interested in marathon running. Besides the performance runner, ordinary people enjoy running in nature or on the cities' streets.In order to be healthy and have fun, it is important to know the strengths and weaknesses aspects of amateur or performance runner training.

*Key words:*marathon, runner, training.

## Problem statement

Running is a natural activity. Running is one of the first basic skills in human's motor abilities. Run is a method of locomotion, conducted by alternative foot support, interleaved by an aerial phase, in which both feet are above the ground. There is a basic difference between walk and run. Walking means one foot is always in contact with the ground, the support foot keeps the balance, while running means moments without any foot support this being aerial moment.

For technique explanation running skill is divided into two phases: stance and swing. Each one has some moments. Stance phase is structured in: absorption, vertical, and propulsion. Swing phase is structure into: posterior, vertical, and anterior swing.

The ancient times were crossed by track and field contests, among that being running, too. The Olympics Games were the most importance Greek competitions. The ancients Olympics Games were revived on 1896

Running on elite high elite athletes means hard working on the track and field stadium. Marathon running is the test for personal limits of performance athletes and amateur individuals.

The training schedule of the Marathon athletes, contents all the components, as: physical, technical, mental, biological, and theoretical matters. And yet, the marathon preparation includes both strengths and weaknesses aspects.

on the first edition in Athens. One of the most attractive events is Marathon running. The race is a long-distance running about 42.195 kilometers conducted on the road or streets may include changes in elevation. On Olympics race the final part must be on the stadium. The race has some interesting historical roots. It is about a Greek soldier, named Pheidippides. He was the messenger of the Greeks who won the battle with the Persians. He ran from Marathon field to Athens announced the Greeks victory. The run became is the activity connecting body and mind in a whole effort. Marathon means a race of 42.195 km in relatively constant speed commemorative race for the Greek soldier effort.Marathon is a track and field race that involves special physical and mental effort and less technical requirements. Marathon means a race of 42.195 km in relatively constant speed tempo.

## The aim of the research

The paper's goal is to present some aspects that improve or limited the quality of marathon runners training. In this regard we try to identify the strengths and weaknesses points of these athletes.

## Conclusions

***Strengths aspects in marathon runners training means*** the aspects that can be managed by the trainer and the athletes himself.

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The main strength aspect of marathon is training schedule preparation. We emphasize the large data base of know how to plain each day training, according to the runner's needs. Coaches can use the information from the other specialists and adapt the content to their athletes. The coach has to know a lot of personal life aspects in order to plan a success training schedule.

The information covers health status, past run experience, injuries' history, and time and nutrition availability.The marathon runners must have strength, speed and endurance at personal best.

Each runner has a base level of physical fitness. In order to be able to run marathon race, they must have extra speed and endurance and take their performance to a high level. The marathon training plans depends on runner experience. It means we know they are at beginner, intermediate, advanced, and high level. The coaches indicate marathon training plans from 12 up to 24 weeks, according to the runner level.

Like most endurance athletes, marathon runners are characterized by their highly developed aerobic capacities ($Vo_2$ max) and an ability to tolerate high rates of energy expenditure (70% to 90% $Vo_2$ max) without accumulating blood lactate (Costil, 1972).

Most typical marathon training plans are 16 to 20 weeks long, with run three to five times a week (McGuire, 2019). The traditional accepted method of marathon training is to run six or seven days a week, submitting about 160 km (Hufton, E., 2015).

Marathon running places an increased workload on athletes' physiological function over the course of several hours (Takayama, F. et al., 2017).

The high performance marathon athletes run twice a day, from Monday to Friday. Their warm-up consists 4 km running and a lot of physical exercises for joints and muscles. The main goal is to prepare the neuromuscular function, and to prevent injuries.

It is important to prepare the muscular system involved in specific movement, as: quads, gluteus, pisiforms, hip external rotators, chest, deltoids, upper back, hamstrings lower back, hamstrings, hip flexors, lower back, hamstrings, hip flexors.

The most frequent exercises used are:static and dynamic movements, followed by dynamic and static stretching, skipping, vertical jumps.Most of elite marathon athletes use to run 6-10 km each morning five days a week.

The goal of an efficient training race is a comfortable pace, on own rhythm that assure a stable endurance. It is necessary the comfortable race pace, to assure the necessary endurance all long runs. It is important the personal pace on running, in order to reach a new superior level of effort response. That means a certain km speed along the race, to fulfillfinal goal. So, it is necessary to follow the calculated pace runs for each training run.

The training plans have three elementary keys that determine athlete progress:

- Frequency of the trainings (efforts);
- Intensity of the effort;
- Time of effort.

A consequent training program improves the health and physical fitness. Being more fit, the runner is able to work more often and for longer in each session. According to Declan a beginner can gradually run more and need to walk less and an intermediate level, is able to run distances faster. There are some different kinds of efforts, used on marathon training, each having its goal:

- Easy run is used as a recovery means, at the end of the training session. This kind of run hurry up the metabolism of effort products, as blood lactate. So, the muscular fatigue is abolished.
- Steady run is used along the run race with a moderate race, more than 50% intensity. The run improve aerobic fitness, especially on endurance.
- Tempo run used a constant a higher speed race, about 80% intensity that improves running pace.
- Interval run meansrunning intervals of fast, short periods of effort, alternated with active or static pause. Interval run improves aerobic fitness, strength and speed.
- Cross activities means other physical effort, different from run, as cycling, swimming, rowing, skating, and other exercises like light weight movements. These kinds of effort improve basic runner physical fitness.
- Strength training improves muscle strength. A higher strength is a higher protection of joints stability thatforbids body's injuries. Muscle strength must be improves early period of marathon training. Strength exercises are plannedat least three days a week, about 10 repetitions, 1-5 sets of each exercise. Marathon runners needs less maximal force. It is suitable strength resistance, for legs, abdominals and back. This strategy imposes strength training drills two days a week.
- Stretching training reduces muscular strain. These exercises improve muscular elasticity and influence the joints mobility. In the same time, stretching training reduces and prevents muscular pain. Stretching should be practiced daily after effort. Each stretch keeps 15 to 30 seconds and repeat 3 to 5 times.

*Psychological aspects***.**The best structure of psychological training section seems to be: emotional, life management, self-esteem, recognition, affiliation, weight concerns, health orientation and keep fit, competition, and personal goal achievement, for Marathon runners (Sima, Z. et al., 2017).

Nowadays it is recognized the sports psychology, as essential component in the preparation of top athletes, and marathon runners, too.

Brasher, C. highlights the factors in the outcome of competition, experienced runners:

- The ability to relax and control anxiety;
- Being self-confident;
- The capacity to concentrate on the present;
- The use of imagery;
- Developing determination and tough-mindedness.

***Weaknesses aspect in marathon runners training***

*Weaknesses aspect in marathon runners training consists in fatigue.* There are some reasons that cause fatigue. One important reason is glycogen depletion (Bruke, L.M. et al, 2019). Some runners participate in consecutive weekend races that may cause overtraining syndrome, it means results in performance decrements with or without related change physiological sign (Takayama, F. 2017).

There are some signs of overtraining in marathon runners training (UC). One is fatigue it means some aspects as lack of energy: the athletes have no interest in moving, difficult wake up in the morning, and increasing resting pulse rate. In the same mater we notice the muscular pain that affect muscular system soon after run begin, or pain which do not disappear two days after a training run. Studies underline the idea that marathon runners need at least 7-10 days of rest, in order to recover post cellular damage caused by specific effort (Tsai, K et al., 2001).

Smith, L.L. (2003) confirmed that the immune system is affected about 3 days after the marathon and this is an important factor on overload syndrome.
somepotential injuriesrisks cause by shock absorption capabilities between heel and mid/forefoot footstrikes.

The heel impact is mainly associated with higher rates of injury. Calcaneusbones reduce the impact and take over the shock, better than being absorbed by muscles. However, the shock is not enough dissipated and the soft anatomical parts of the foot, like muscles, ligaments, and tendons became serious in danger, because of injuries. The lower legs are exposed, too. The causes are the compensations of the plantar arch, ankle, knee, hips joins and the muscular chains.
Hikida, R.S et al. (1983) concluded that intensive training and the marathon run, induced inflammation and fibber necrosis. They believed that inflammatory

Racoobian, T. (2018) thought that top performance in any sport also demands mental fitness and training. She said people who talked about their feelings had increased activity in the part of the brain that regulates emotions. As a result, they became calmer. In this matter it is recognized the power of positive attitude in marathoners' preparing and race.

*Nutrition limitations*

Fatigue related to glycogen depletion, hypoglycaemia, possible dehydration, hyperthermia depending on environmental conditions, and central fatigue, possibly muscle damage.
Days designated to rest are very important. Muscles actually regenerate and get stronger during rest and rest helps prevent injury. The key to this guide is consistency – so if you are feeling particularly tired at any stage, take an extra rest day and get your energy back to keep going.

*Injuries limitations*

Although running is a less complicated skill, there are some limits and dangers on run motion. It is about

reaction is related to muscle fibber type compositions of endurance athletes.

An important anatomical element that provides support for the arch and makes shock absorption on marathon running is plantar fascia, composed of three segments, arises from the calcaneus bone (Figure 1).A frequent marathoner's injury is plantar fasciitis as the result of degenerative irritation of the plantar fascia origin at the medial calcaneal tuberosity of the heel and around perifascial structures (Figure 2).

This is often an overuse injury that is primarily due to a repetitive strain causing micro-tears of the plantar fascia.


Figure 1.Plantar fascia

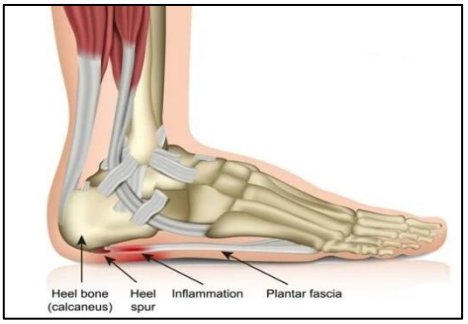


Figure 2. Plantar fasciitis

Another cause of plantar fasciitis is excessive stretching which can induce micro trauma along the fascia or at the point of insertion on heel. Long-term repetition of stretching will cause degeneration of the fascia fibers. Marathon running involves too many strikes on different kind of ground and the trauma can often set on athlete's foot. During running, vertical forces act on the foot when it touché the ground, and may reach two or three times the marathoner's body weight.

Plantar fasciitis is like a tendinosis, meaning a chronic degenerative condition, a fibroblastic hypertrophy. The diagnostic do not involves any inflammation, but a disorganized of collagen and vascular hyperplasia in contrast with unvascularized zones. For a marathoner this state is an unpleasant that impedes the preparation fluency. Plantar fascia and the longitudinal plantar arch are part of the mechanical shock absorption. During the swing phase when the heel does not touch the ground, there is an increase tension on plantar fascia with potential energy. So,

plantar fascia contracts passively converting into kinetic energy.

Training errors can cause disorders on plantar fascia. The addition of high speed exercises, or increasing intensity over a certain limit, extra jumps on the heel landing constituted risky factor for the development of plantar fasciitis.

Practice on poorly cushioned surfaces is another risky factor. Prolonged standing on hard surfaces increases the risk of developing plantar fasciitis, too. Sport shoes lose their shock absorbing properties relatively quickly, that being the reason for periodic changes (Schwanitz, S., Odenwald, S., 2008).

Runners which have a lower or a higher plantar arch, suffer a more pronounced tension of plantar fascia, when walk or practice. Identic situation happened on excessive foot pronation (Ferber, R., Macdonald, S., 2008).

About 10% of runners suffer injuries and 11% to 15% of all foot symptoms requiring professional medical care.

The main symptom of plantar fasciitis felt by marathoner is pain close to the heel on the bottom of the foot, which can range to extreme. Foot pain can make physical exercises too difficult and the daily training fail.

The objectives proposed in plantar fasciitis (Buchanan, B.K., Kushner, D. 2020).

- Identify pathophysiologic cause of plantar fasciitis.
- Recall the normal foot function and plantar fascia role.
- Identification of treating methods for plantar fasciitis.
- Periodical evaluation for treatment of plantar fasciitis.

Athletes suffering from plantar fasciitis should be warned about the long rehabilitation that takes even longer if they continue their training, without any special adaptations. Ferreira (2014) said that conservative treatments have 90% success rate, after 12 months.

For the present case, the physiotherapistthe will focus on investigating the amplitude of movements in the ankle and toe joint. It is important to pay attention to the dorsiflexion of the foot (with the knee flexed and extended) because there is a close causal relationship between dorsiflexion. Also, measure the angles achieved while walking, measure the length of the step, palpate the heel and plantar fascia, and observe any muscle imbalances, swelling or atrophy of the foot area and check the sensitivity of the area. Ideally, a lateral radiograph would be shown for the calcaneus spurs.

Marathon runners affected by plantar fasciitis should be informed about the nature of their condition and expectations about the healing period, which can last from a few weeks to a few months.

They will also be explained the practical steps they will need to take at home.

- Wearing shoes with adequate support for the plantar arch and with a shock absorber in the heel area;
- Avoiding long periods of standing;
- Deep warming and stretching the plant before training;
- Stretching of the plantar fascia and calves after training;
- Avoiding sports activities on hard surfaces;
- Avoiding barefoot ironing on hard surfaces;
- Avoid sports that impact the lower limb joints, especially jumping.

Figures 3.Dynamic exercises for plantar fasciitis from different position:
Lyingdown, sitting, standing, without or with different objects

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