

## Running and posture

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### ABSTRACT

An athlete, to get the best result, brings the body to its maximum through targeted and personalized training. To do this, the athlete must be in a state of psycho-physical balance and it is possible not only thanks to proper training, but above all to a correct posture. It depends on many factors and once analysed, there are different ways to improve it. The aim of the research is to demonstrate, from the recognition of scientific literature, how posture can influence sporting performance, in particular in a fast-running race, of an élite athlete and how it can be improved. Therefore, the method adopted is that of the "Prisma" protocol, with the comparison of reviews of carefully selected scientific products. The data reported in the research describe a series of mechanisms according to which our body carries out a series of adaptations, which over time, can be fixed as postural defects and which can negatively influence performance. It is therefore necessary for the athlete to acquire a good running technique by performing a series of exercises aimed at improving the tone of the various muscle areas, joint mobility, coordination and harmonious movements, associated with a targeted postural and corrective exercise program, instead, to recover the flawed attitudes. In conclusion, it is possible to affirm how, through postural correction, and therefore of specific exercises of postural re-education and muscle tone, it is possible to achieve balance, well-being and an improvement in athletic performance. **Keywords:** Sprint training; Training methods; Running; Posture; Postural correction.

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## INTRODUCTION

By posture it currently means the position of the human body in space and the relative relationship between its body segments with the surrounding environment (Raiola, 2017, Raiola, Di Tore, 2017, Raiola, 2014, 2013, Altavilla, 2014, Gaetano, 2012). Over the years, several definitions of "posture" have been given, this because each author has identified his own point of view that falls within the so-called "ideal posture" (D'Isanto, 2019, D'Isanto et al, 2019, Raiola et al, 2018). Generally, it is possible to say that it is necessary to keep the body aligned to avoid postural imbalances, and to enable the organism to function according to the gestures required without overloading the structures that compose it, allowing effective ergonomics and seeking a right and more balanced body structure (D'Elia, 2019, Valentini et al, 2018ab). Posture depends on a multitude of factors, based on the type of movement that one decides to perform, on the psycho-emotional aspects of the subject and can be represented in a physiological manner or, in the worst case, in a pathological manner. By physiological, we mean when the muscular tone and the skeletal attitude are able to keep the organism in a state of equilibrium both in static and dynamic conditions, respecting the physiological curves of the spine and the alignment of all the subsystems that compose it, while by pathological we mean, instead, a physiological alteration as a consequence of a damage (Pisapia et al, 2019, Martino et al, 2019, Pisapia, D'Isanto, 2018, Cassese, Raiola, 2017). When something is wrong, the body puts into effect a series of adaptations that, if protracted over time, can be fixed as postural vices. This situation can influence sports performance, in fact it leads to the same athletic gestures with a greater sense of fatigue or with greater difficulty in achieving the objectives, or even the athlete cannot recover with rest and the following day he feels pain (Di Domenico et al, 2019). Postural gymnastics can lead to improved athletic performance, which is why most elite athletes are followed by specialists such as posturologists, physiotherapists, etc. The following research, therefore, wants to demonstrate, through the comparison of revisions of carefully selected scientific products, as a series of exercises aimed at improving the tone of the various muscle areas, joint mobility, coordination and harmonious movements, associated with a gymnastics program targeted postural and corrective, can recover the aforementioned flawed attitudes (Severino et al, 2019, Giordano et al, 2019). Running and jumping are two efficacy mode to perform (D'Elia et al, 2019, Forte et al, 2019) and the reflections on posture are consequentially. So, teaching method (Invernizzi et al, 2019ab, D'Isanto, 2016) has the fundamental role for the running, jumping and posture.

## METHOD

The method adopted to conduct the following research is that of the so-called "PRISMA", an acronym that stands for "Preferred Reporting Items for Systematic reviews and Meta-Analysis". In particular, it is a careful drafting of Scientific Review and Meta-Analysis based on a rigorous standardized work protocol. They offer a summary, accurate and reliable overview of a specific topic and provide, with greater value than the individual studies analysed, more precise and reproducible global measures of effectiveness. Furthermore, RS and MA are considered ideal tools for making decisions in the health field in a rational way, since they allow to evaluate how effective the instruments of health care are and how the available economic resources are optimally employed. Finally, they guide and direct clinical research because, synthesizing the results of previous studies, they stimulate the formulation of new hypotheses and plan the need for future research projects.

## RESULTS

As with any discipline, even in the race there are principles to be respected and acquired to make the right movement. It is essential, first of all, to know how the movement of the legs and feet during the technical gesture of the race is, in fact we can distinguish the race in two moments or phases:

- Flight phase: during which the supporting limb extends and the athlete abandons contact with the ground;
- Support phase: this in turn is divided into 3 moments. In the first moment, called "contact", the foot takes contact with the ground. Depending on the running speed, the contact can be made with the heel, forefoot or with the entire sole of the foot. In the second moment, called "support", corresponds to the moment of maximum load of the weight of the whole body on the foot, as it increases the surface of contact with the ground. Finally, in the third moment, called "push", the movement of the foot is the opposite of the previous one.

In addition to the lower limbs, the other parts of the body must also respect certain positions: the head must be neither too bent downwards nor too bent forward, but it is necessary to maintain a frontal view. The trunk must be upright, balanced and protrude slightly forward with respect to the ankles. The shoulders must be relaxed and projected downwards. The arms must swing back and forth with respect to the trunk. The optimal opening angle of the arm on the forearm must be about 90 ° and the hands must remain relaxed, so as to favour oscillation. Therefore, the position of each part of the body has direct consequences on balance and therefore on the running technique. This is closely related to 3 factors: tonicity of the various muscle districts, joint mobility, coordination and harmonious movements. A very effective training method for running is the "Fartlek method", which in Swedish means "speed game", a technique developed by the Swedish athlete Gosta Holmer in 1930. This type of training involves frequent increases and decreases in speed and therefore also an alternation of the training load. Unlike a race focused on durability, during fartlek the body must constantly adapt to different surfaces and speeds. The only care is not to exceed the heart rate, which must always be between 60 and 80% compared to the maximum HR. This method has many advantages:

- The continuous alternation between effort and recovery increases the heart rate and therefore improves the general resistance level;
- The change of rhythm and surface makes the tendons and muscles work more, consequently injuries risks are strengthened and prevented;
- Running downhill on different surfaces also trains balance, coordination and flexibility.

In addition, athletic training has always included the use, also, of machinery to increase strength, in particular explosive strength, strengthening individual muscle areas. However, this does not guarantee an improvement in the performance of the athlete, on the contrary, it increases the risk of muscular injuries. In fact, the continuous strengthening of the so-called "agonist" (main) muscles often creates serious morphological and functional imbalances, as the rigidity and tasks of the "antagonist" muscles are not adequately respected. Postural re-education, in most cases, is used only to recover injured athletes or those suffering from low back pain or pubalgia. When postural gymnastic exercises are included in normal athletic programming, it is mistakenly compared to stretching. In reality it plays a fundamental role, as it prevents injuries and this is why it should be included in the work program that includes the entire racing season. Referring to different postural schools, we can mention the "Mézières method" which consists in simultaneously exercising an action on the muscle, on pain, because it reduces muscle stiffness, and on joint blockage, determined by the contractured muscle. Thanks to thirty sessions a week, these techniques allow to obtain good results with athletes who have muscular rigidity. To these, we can also propose some static postures (the 3 Mézières teams)

maintained for about ten minutes every day. Muscle tension occurs slowly and progressively (without ever forcing), so you always start at 10 minutes, then increase and maintain the position for a longer time, even 30 minutes. The method of the 3 teams mentioned above is based on 3 fundamental concepts: tension (consisting in going to the limit of muscular extensibility without exceeding it), progression and relaxation. These postures must be constantly monitored by the preparer, who works through a well-defined teaching progression: passive phase, active-passive phase, active phase. All the work of putting in tension and all the postural exercises must be accompanied by a conscious and controlled exhalation. Below is an example of training-type to increase aerobic capacity, explosive-elastic strength of the lower limbs, joint mobility (hip, knee and ankle):

**METHOD**

- Training with the ball and dry of medium intensity aerobic capacity (HR max 80%);
- Dynamic mobilization of the trunk and lower limbs;
- Stretching at a targeted level;
- Power circuits for the muscles of the trunk and lower limbs;
- Acceleration uphill on short distances (10 - 15 - 20 mt).

**CONTENTS**

- Continuous race;
- Race at a varied pace;
- Fartlek;
- Free-body gaits;
- Exercises with the ball;
- Stretching;
- Sprint uphill at 15% gradient at maximum speed;
- Step on stairs;
- Abdominals, lumbar, legs, bending and exercises for the general musculature.

Table 1. Training period

<b>Day 1</b>	<ul style="list-style-type: none"> <li>- Dry heating with upper limb mobility attached 8'</li> <li>- Stretching 4': stretching of the tensor muscle of the fascia lata; of the ischiocrural muscles; of the quadriceps muscle; of the adductor muscles; of the anterior hip muscles; of the muscles of the gluteal region; of the hamstrings; of the calf muscles.</li> <li>- Free body strides 5':                         <ul style="list-style-type: none"> <li>2x10 mt skip high (4 mt) and race</li> <li>2x10 mt low skip (4mt) and race</li> <li>2x10 mt race kicked back</li> <li>2x10 mt crossover pitch</li> <li>2x10 mt lateral travel</li> <li>2x10 mt thighs opening</li> <li>2x10 mt thigh closure</li> </ul> </li> <li>4x15 mt stretch</li> <li>- Continuous run with a medium speed 20' gait</li> <li>Recovery 4'</li> <li>- Exercise for moderate intensity aerobic training with the ball:                         <ul style="list-style-type: none"> <li>The Chain Game 30'</li> </ul> </li> </ul>
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	<p>Recovery 5 '</p> <ul style="list-style-type: none"> <li>- Step 5 '</li> <li>- Cooling down 5 '</li> </ul>
<b>Day 2</b>	<ul style="list-style-type: none"> <li>- Dry heating with upper limb mobility attached 8 '</li> <li>- Free body strides 5 '</li> <li>- Race at a varied pace with a medium-high 20 "gait</li> </ul> <p>Recovery 5 '</p> <ul style="list-style-type: none"> <li>- Sprint uphill (max slope 15%): 5x10 mt forward + 2x10 mt with right and left direction changes between one series and the other 20 "recovery</li> </ul> <p>Recovery 2</p> <p>5x15 m forward + 2x15 m forward (5 m) - back (5 m) - forward (5 m) between one series and the other 30 "of recovery</p> <p>Recovery 3</p> <p>5x20 mt forward + 2x20 mt with right and left direction changes between a series and the other 40 "of recovery</p> <p>recovery</p> <p>Recovery 4 '</p> <ul style="list-style-type: none"> <li>- Circuit of strength:</li> </ul> <p>3x20 high abs between one series and the other 20 "recovery</p> <p>3x20 low abdominals between one series and the other 20 "recovery</p> <p>2x25 lumbar between one series and the other 20 "of recovery</p> <p>Alternating legs bench 4x20 (2xgamba) between one set and the other 25 "of recovery</p> <p>Lateral bench with lifting legs 4x20 (2xgamba) between a series and the other 25 "of recovery</p> <p>Ischiaocrural 3x15 between a series and the other 30 "of recovery (getting help from a partner)</p> <p>Squat monopodalic lunges 3x15 between one series and the other 20 "recovery</p> <p>Folds on the arms 2x20 between a series and the 20 "recovery</p> <ul style="list-style-type: none"> <li>- Drain down and drain the column 5 '</li> </ul>
<b>Day 3</b>	<ul style="list-style-type: none"> <li>- Dry heating with upper limb mobility attached 8 '</li> <li>- Stretching 4 '</li> <li>- Free body strides 5 '</li> <li>- Fartlek (1:45 'race at a medium-low pace, 15' at a high pace) 15 '</li> </ul> <p>Recovery 4 '</p> <ul style="list-style-type: none"> <li>- Exercise for moderate intensity aerobic training with the ball: The Game of the Stereo Ball 15 '</li> </ul> <p>Recovery 4 '</p> <p>The Chain Game 25 '</p> <p>Recovery 4 '</p> <ul style="list-style-type: none"> <li>- Step 5 '</li> <li>- Cooling down 5 '</li> </ul>

## DISCUSSION

From the following analysis it is possible to notice how Fartlek is a versatile and excellent method to obtain certain results. In order for it to be effective, it must be adapted according to its physical characteristics. The

important steps for a good fartlek session are first of all a warm-up, which can include about ten minutes of running. Once warmed up, proceed at a brisk pace for a couple of kilometres, raising the pace. Then follows a recovery phase expressed by a five-minute rapid walk. From this moment on, the real training begins, which foresees a constant race alternating with sprints of about 50 meters. Follows a recovery phase in which short run alternate with moderate accelerations. Proceed with a run of at least 200 meters uphill and one flat, for at least one minute. In the end there is a phase of cooling and of melting of the muscles with anti-fatigue exercises. By regularly doing fartlek, the whole body is strengthened by developing muscle mass. However, during the athletic gesture, all the muscles and all the joints are involved, which, if not kept constantly under control by the coach, can cause discomfort and pain, activating a compensation mechanism that solicits other districts. The posture, therefore, must be analysed and connected to the technical gestures of each sport, precisely to prevent any kind of damage through postural gymnastics, so as to restore a correct balance. Thus, once the athlete has optimally increased muscle tone, joint mobility and coordination of movements, he not only manages to prevent injuries, but also produces a technical gesture, as well as an economical and effective race.

## CONCLUSION

In conclusion, we can state that the objective of the following research is to demonstrate how, through postural correction, and therefore through specific exercises of postural re-education and muscle tone, it is possible to achieve balance, well-being and an improvement in athletic performance, thanks to a recognition of scientific literature. This is a preliminary deductive-argumentative study aimed at verifying this efficacy through future hypotheses and experiments on elite athletes.

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