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## WARM UP

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### Abstract\*

*Aim.* A prior warm-up of the physiological parts of movement is needed and it is considered important in the technical execution of athletic gestures, which may require high-level systematic-muscular activities. In order to express our potential in any motoric and athletic element and to make it work, a systematic activation which will modify and make the body efficient also at maximum levels is needed. The fundamental aim is to increase the body temperature at central and muscular level, firstly to increase the vascularization at muscular level, secondly to foster a better efficacy of the chemical relations in the organism, all of this to make the technical-athletic performance as working as possible. It may be divided in 3 consecutive stages at growing intensity:

1. The first can be defined as "mild stage" of muscular activation;
2. The second is the "stage of more specific muscular activation", with functional exercises;
3. The third "stage of muscular stimulation", technical exercises which are done with the same intensity of the competition.

*Conclusion.* In conclusion, the general and specific body warm-up before a motoric performance, especially if it is athletic, must follow a stage of activation of the components of movement, which could call for a maximal effort of the various structures. An optimal warm-up allows the athlete to execute movements, especially in acyclic motions, to make choices in a very small amount of time and to reach a solution, which is not only technically and tactically right but also at a maximum performing level.

*Keywords:* warm-up, training, exercises.

### Introduction

The warm-up represents a stage of prior physiological and biomechanical activation which is done before an athletic performance, either competitive or training, in order to improve the athletic efficiency, to train the body at our requests, even maximum ones, that it will have to bear and moreover to reduce the risks of injuries.

It generally consists of floor exercises, a light running or a medium speed riding. In the case of sport activities, an initial generic warm up is followed by a more specific one, depending on the kind of sport that is going to be practised. In each case, the physical activity during the warm up must be moderate, in terms of both effort and duration, and progressive.

The increase of body temperature leads to an improvement of the viscoelastic capabilities of the muscle, improving the efficiency of the performance as far as speed and flexibility are concerned, also thanks to the enrolment of a higher number of muscular fiber.

The execution of warm-up consists of a stage of global activation of the organism and a following more specific stage with more technical exercises that will partially or totally simulate the athletic, technical or tactical gestures required.

It is important to highlight that the efficiency of the warm-up is related to the time pause which separates it from the real performance, therefore it may become a restricting factor if it is too long, in that case frustrating the preparatory work and its benefits.

### Discussion

The warm-up is an essential element, unavoidable and preparatory at any physical-athletic activity. It activates the muscular-skeletal and neurophysiological apparatus.

It can also be considered an 'adjuvant' for the production of energy, with a preparatory role for the performance.

It consists of generic athletic- specific movements, simple or complex, that lead the organism to optimal athletic conditions in a

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restrained period of time, reducing the risks of injuries which may occur when we stimulate our muscles and joints while still cold.

The increase of body temperature (one or two degrees) implicates a general improvement of the muscular activation, giving higher biomechanical flexibility of the movement, which is decisive in the performance.

The warm up has an effect on:

1. Tendons and muscles; the increase of body temperature raises proportionally their flexibility, reducing the risks of fractures, injuries, strains and so on... ;

2. Joints; the synovial liquid produced from the warm-up makes the lubrication of the joints better, allowing to gradually expand the movements.

3. Cardiovascular apparatus; the increase of the circulatory flow leads to a higher supply of oxygen to the tissues, preparing them to an optimal physical performance (aerobic or anaerobic), thus a higher speed of the mechanism "contraction-relaxation".

4. Respiratory apparatus, with an improvement of the respiratory activities, thus of the pulmonary ventilation;

The warm-up also influences the neuromuscular sphere. Indeed some authors (McGowan, Pyne1, Thompson, Rattray, 2015), affirm that warm-up is able to speed up the nervous conductivity and doing so, it fosters the activation of muscular contractions at the beginning of a performance and the memorisation of the fulfilled exercises during that stage, which itself fosters muscular activation.

Nowadays everyone tends to agree about the categorisation of the different types of warm-ups, about its duration and about the optimal intensity in which it is executed. (Bishop, 2003)

The main two categories are:

1. Active, when the increase of body temperature is caused by a muscular activation (and everything that follows);

2. Inactive, when the increase of body temperature is caused by a passage of heat (EG by conduction) from the outside to the inside of our body.

Actually, it has been discussed from a long time about the effective benefit of the warm up. Between 1950 and 1970, many studies have been made to verify the effectiveness of the warm up on the athletic efficiency of various athletes, with contrasting results. Later on, some authors, concerning the efficiency of this phase defined as pre-athletic activation, which is what concerns us,

and consists in various exercises that can be general or specific or selected by priority: competition or training (Gray, Nimmo, 2001).

The Active Warm-up can actually be prior to a training or prior to a competition: the first one often fuses together with the first technical exercises of the training, that tend to be more and more intense so that there will not be dangerous forcing at the beginning of the performance.

The warm-up prior to a competition lasts about 25-30 minutes and is composed by all those exercises that will appear again during the competition. Moreover, the warm-up also has a psychological value: some athletes do certain technical or athletic gestures, like smashes at basketball, in order to "energize themselves" psychologically, which will be useful during the performance.

The Warm-up prior to a competition can also be divided into 4 different ways of approach:

1. Active Warm-up "equal" to the performance, consisting of movements and muscular activities which are identical to the gestures of a competition either in intensity and in dynamics.

2. Active Warm-up "directly connected" to the performance, consisting of muscular activities that are the same as the specific ones done during the competition but not fully accomplished or accomplished at lower intensity.

3. Warm-up "indirectly connected" to the performance, consisting of nonspecific movements that are not executed at the same intensity of the competition.

4. Active Warm-up with specific athletic activities that follows a nonspecific part (EG stretching) with a growing intensity (Izzo, 2015)

Consequently, if the warm-up is executed in the most appropriate and suitable way, the player will be able to start the competition with a body-system ready to respond to different requests on the court. As far as the warm-up prior to a competition concerns, the admission of subs on the court is a very delicate topic (McGowan, Pyne1, Thompson, Rattray, 2015)

At soccer and volleyball, for example, they are given some minutes of advice, in which they can get ready in order to enter the field and immediately give their best. On the other hand, at basketball it often happens that the sub enters the court with only some short seconds of advance or with no advice at all.

Clearly, this could lead to dangerous injuries caused by the entrance in a "cold muscles" situation of the athlete who, in that situation, other than at risk of bad performance, also risks to injure himself (Hoffman, 2002). Therefore,



it would be suitable, also in basketball, when possible, to let the subjects enter the court in the most appropriate way, giving them some minutes of advice.

In conclusion, it is due to underline in planning warm up, both if it is pre-competition or pre-training, that it's necessary to consider some fundamentals aspects that influences the positive performance of warm up itself:

- The athlete's state of training and age
- The athlete's nervous typology; very calm athletes may get benefits from a more intensive warm up, while the "nervous" subjects require a mild and extended one

- The kind of effort that has to be prepared in: the warm up, especially in its "specific phase" would vary a lot, depending on which kind of effort we have to accomplish later. For example, an athlete that has to make a running session at a slow rhythm will need a very different warm up compared to a sprinter, which training involves sprints at almost maximal speed.

- Duration of the effect; the physiological effects of a warm up on the organism last between the 20' and 30'; in case of interruption or postponement of the effort (it happens mainly during competitions) it is necessary to "remain warmed up" passively and eventually use a reduced training schedule.

- As soon as the warm up phase ends, the organism passes in a phase of slight fatigue. It should have some rest (from 5' to 10') before another effort – that is very important as a function of competitions and maximal efforts, which require high performances. During competitions, use this lapse of time for exercitations of mental preparation.

- Weather, increase the warm up duration and graduation in case of cold temperatures (in winter); during summer, thanks to warmer temperatures, obviously, muscles reach the desired condition in less time.

#### Purposes

- a) To make the organism adjust to strong efforts, particularly the cardiovascular apparatus which has to reach 180 pulsations per minutes and over.

- b) To avoid articular and muscular injuries.

- c) To mentally prepare for the competition or for the training.

#### Principles

Getting from a condition of rest to an intense activity without a transition would be hasty and dangerous.

#### Characteristic

- a) We cannot talk about a "localized warm-up", because the entire organism must be prepared to the performance.

- b) If it is necessary, there can be an individualized orientation of warm-up.

#### Composition

- a) Before a training: about 10 minutes of slow stride (for example execution of fundamentals, followed by about 10 minutes of stretching), 10 minutes of medium-high stride (for example exercises at middle court or, better, all court). This is only an example of warm-up that can and must be changed and improved according to the sport or to the team.

- b) Before a competition: execution of athletic elements at growing intensity, for example basketball athletes usually perform two types of warm-up drills ("entrata a canestro" executed on both sides of the basket, using both their hands and all their dynamic anatomic-articular components, and give and go drill, which starts the collaboration of the players and includes the fundamental of the pass.

Sometimes, especially in Europe, a great part (15') of the warm-up is executed using a mixed methodology of stretching exercises and functional exercises.

The warm-up usually follows 7-10' of static stretching, in this case also using as prior to the beginning of the warm-up itself.

#### Duration

- a) 30-40 minutes prior to the competition, the equivalent of the warm-up prior to the training with the conditions given before.

- b) individualization in certain cases like athletes late in preparation, athletes after injury and other special circumstances that require it.

#### Physiological Adjustments

- a) heartbeat half-quickened at 120-140 pulsations per minute, and respiratory function quickened too.

- b) slight increase of body temperature

- c) perspiration

As far as stretching is concerned, which is amply used during the warm-up, we should establish some principles, for its right use.

The main objective of the stretching is to foster the natural maximum extent of the gesture and the execution of the technical gesture itself.

#### Conditioning Factors

1. Shape of the joints
2. Extensibility of muscles
3. Characteristics of the muscular ligaments and development of the articular capsule

The appropriate use of the muscular relaxation can improve the points 2 and 3.

#### Execution



Figure1.

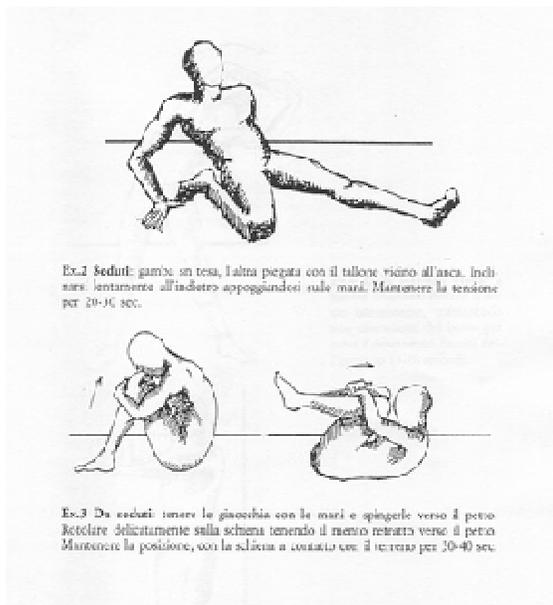


Figure2.

A tension of the muscle without feeling pain should be reached by stretching or bending various osseous segments. After this first stretching, the athlete goes on and stretches one more time without exaggerating and this last one should be hold for 10-15 to 30-40 seconds depending from the circumstances.

Another way to stretch the muscle comes from another American school of thought, which is judged positive by the inventor of the stretching Bob Anderson, who suggests the athlete makes "micro bends" or sub-maximal bends of the same duration as the ones explained before.

You can see some stretching exercises in the following images (fig.1,2,3,4).

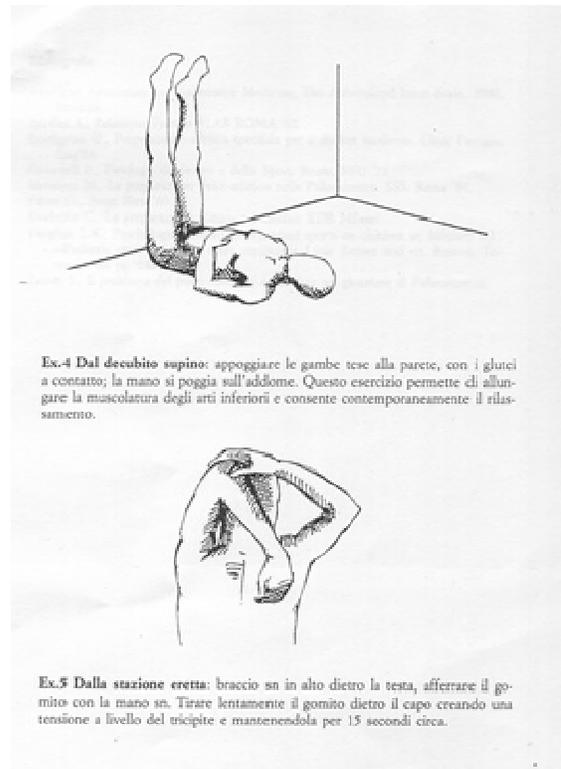


Figure3.

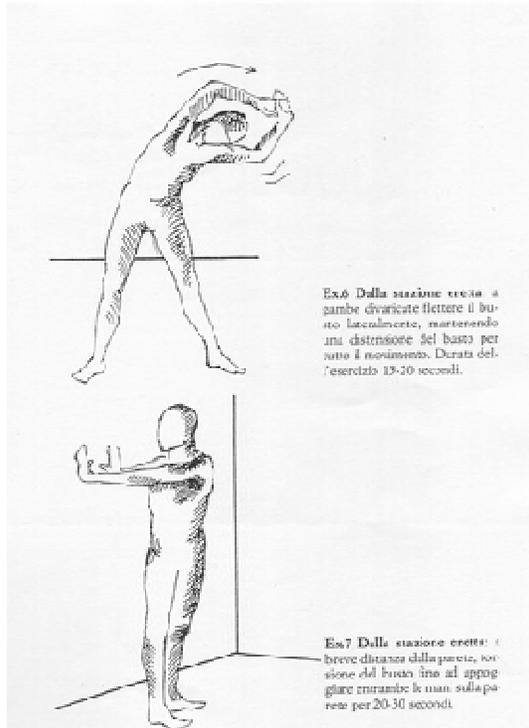


Figure4.

### Conclusion

In conclusion, the general and specific body warm-up before a motoric performance, especially if it is athletic, must follow a stage of activation of the components of movement, which could call for a maximal effort of the various structures. An optimal warm-up allows the athlete to execute movements, especially in acyclic motions, to make choices in a very small amount of time and to reach a solution, which is not only technically and tactically right but also at a maximum performing level.

Usually the use of performing elements, for example, in team sports with competition, in order to be better than the opponents is what leads the athlete who uses his body not adequately warmed up to an injury. Therefore, it is obvious that a warm-up is necessary, but it needs to have a particular quality attention that it does not always get

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