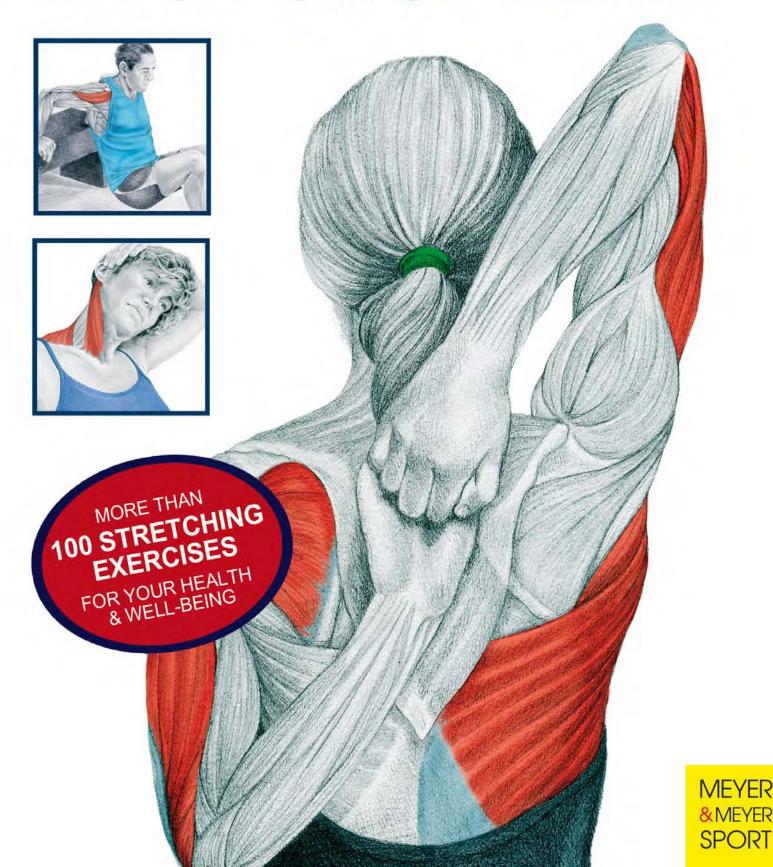
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STRETCHING EXERCISES ENCYCLOPEDIA



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Stretching Exercises

Encyclopedia

Óscar Morán (author) Isabel Arechabala (illustrations)

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Introduction

The human body is, if one can forgive the expression, tremendously conservative. People, like most living creatures, are designed to feed, reproduce and avoid danger. All energy expenditures beyond these basic abilities are unusual among those beings who are less developed than us, from an intelligence point of view. However, as we move up in the evolutionary chain, we find movements designed for socializing, enjoyment, etc. If human beings do not need to stretch in order to carry out their daily lives, they may possibly not find the need to do so. But, if they do not stretch, with the passing of time, their bodies will become clumsier, more painful, incapable, etc. It is of no use to look at oneself in the mirror and not stop asking the reasons why, one needs to exercise or stretch, until one feels "in shape" again. This feeling of being in good shape is so imperceptible that one only becomes aware of it once it has been lost. Therefore, the smart thing to do is to not abandon it.

Turning to nature once again, if we look at the animals, we find that they perform stretches routinely. Some of the better "athletes" in the animal world — like cats — do so very frequently, and they maintain their bodies ready for hunting and to avoid becoming prey to others.

In most of today's societies, human beings do not need to be in such good shape to survive, and the abilities of mobility are the first to be detrimentally affected by the sedentary lifestyle. However, in addition to making people more efficient at the physical level, which implies better athletic performance in some cases and a greater capacity to perform the activities of daily living in others, this book will show how regular stretching also has an effect upon the health and well-being of the individual.

Unfortunately, stretching has been largely forgotten by the people who exercise, whether regularly or sporadically. The reason could be the few aesthetic effects that are derived from its practice, at least compared to strength and resistance training, which mold the body's figure in a much more dramatic way. In modalities such as yoga, the stretches are the base and philosophy of its very essence; in dance, they are an essential complement; but in the practice of sports, they are usually reduced to a few seconds before and after the performance of the sport in question, and sometimes not even that. However, what many people don't realize is that a more agile and "flexible" body is also more proportioned from an aesthetic point of view and, as we have pointed out before, it is also more healthy.

In the book *Muscle Exercises Encyclopedia* (Morán, 2012) from the same publishing company, it is pointed out that a kyphotic posture (commonly called "hunchback"), in many cases, is caused by a lack of tone in the muscles of the back (dorsal, lumbar, etc.) combined with a hypertonicity and lack of flexibility of the anterior muscle (abdominal, pectoral, etc.). This is just an example of how a well-balanced body also needs to be flexible.

After reading this book, any athlete, and even those who are not athletes, will realize how regular stretching can improve their physical body shape and their quality of life.

How to use this book

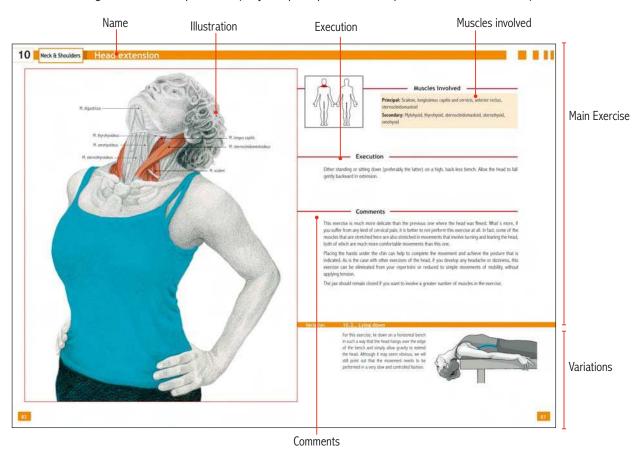
All readers, regardless of their degree of mobility or their knowledge of the subject, will find an interest in this book. This is a reference manual where, with the help of the index, the reader can turn to any page in order to learn how to perform an exercise.

The pictures that accompany the text are of real professional models who were trained to perform the exercises and supervised by the author of this book.

Each exercise includes information about the movement one needs to perform, the posture that one must adopt, common mistakes that should be avoided, the principal and secondary muscles worked with this exercise, as well as a series of very useful tips and advice.

How to interpret the exercise cards

- Name. Most of the stretching exercises lack a common name, and so in this text they are named according to the purpose of the movement or the posture.
- **Ilustration**. The position, correct movement of the basic exercise, and the muscles involved will be shown in a drawing in "anatomical position" (only the principal and the superficial muscles involved).



- Muscles involved. Named according to their order of importance in the exercise, although this order may
 vary depending on slight adjustments in posture or the specific characteristics of the individual person. Some
 muscles that are exercised only slightly have been omitted.
- **Execution**. The manner in which the exercise is to be performed and the final posture that must be adopted.
- Comments. Explanations, tips and common mistakes to avoid.
- **Variations.** Some exercises are complemented with certain variations. In other cases additional explanations and tips are given to the interested reader.
- **Biomechanical introduction to the principal muscles**. Given the practical nature of this book, this section, which precedes every chapter, includes a brief anatomical review of the points of origin and insertion, as well as the function of the principal muscles (whether because of their size or the role they play). This section refers to general human characteristics, which may vary in some cases depending on the individual.

Theory of Muscle Stretching

It is a good idea to begin the study of stretches by clearing up several different concepts that are related but not equivalent. *Stretching* refers to the action and effect of stretching, and we can define stretch as elongating or dilating something, pulling it apart by force so that it gives of itself; it is just like spreading or moving our arms or legs to warm them up and get the stiffness out. *Flexibility* is, on the other hand, the ability to bend easily.

Of the four basic physical qualities (also called abilities, although the author prefers the traditional term) in humans: flexibility, strength, resistance and speed; stretches are included in the first of them.

Stretches have been studied and taught by some of the most important authors in history, such as Ling, Buck, Medau, etc. Around the middle of the 20th century, some authors in the field of neurophysiology spread the technique of contraction-relaxation in the stretching exercises. This marked the beginning of Proprioceptive Neuromuscular Facilitation (P.N.F.) and the modern *stretching* that was popularized by Bob Anderson and others of the time.

This book is a compendium of exercises based on the various theories of physical training in general, and flexibility in particular.

How to stretch

There is a belief concerning stretching exercises that, if there is no pain, there is no gain. What's more, some advocate movements that cause pain in and of themselves, very close to the limits of the joints and ligaments. Other theories recommend bouncing to achieve more and more lengthening.

This author belongs to a different school of thought, the one that promotes a rational, scientifically proven and effective stretching. It is called *stretching* in many languages, an anglicized term that comprises a global concept of stretches. The theory of the stimulus thresholds in physical exercise is also valid in stretching. This can be easily understood with the following examples:

A stretch that is too light will produce almost no effect upon the organism, nor any improvement in joint mobility.

- A stretch that is too violent or too extreme could cause an injury, or in the best of cases, a protective muscular contracture that could prevent you from improving your flexibility.
- A stretch that is just right, forcing mobility but without reaching pain or the limits of danger, will not only be
 more bearable, but it also produces better results. A stretch that is just right means more than the muscle
 is subjected to in everyday life, demanding, but not injurious.

With most physical activity, at least in those of certain intensity, the warm-up is imperative. Stretching is no exception. Some people mistake stretching with warming up, and it is not infrequent to hear some occasional athlete, or even sports journalists, comment that someone is "warming up" when what that person is actually doing is stretching. In fact, the correct thing to do is to first warm up and then stretch. The general warm-up increases blood flow and elevates the body temperature, two beneficial effects when it comes to performing physical exercise; furthermore, the specific warm-up increases the amount of blood that reaches the tissues we are about to stretch, thereby nourishing and oxygenating them.

We could review all the different stretching techniques and point out the strengths and weaknesses of each, but the reader will appreciate that we focus on those which have been proven effective, and here's how to perform them:

- 1. Begin with a light aerobic activity that gets the blood flowing. You can choose to jog, ride a stationary bike, etc., for 5 to 10 minutes.
- 2. Perform joint movements for the area that we are going to work, as well as for adjacent areas, for 2 to 3 minutes.
- 3. Occasionally, perform some resistance movements of the target muscles. For example, flexing movements for the pectoral muscles on the floor or against a wall if you will be stretching this muscle afterward.

The passive warm-up, such as sitting in a sauna before exercising, does not appear to be the best or the most effective way to warm up. It is true that the outside temperature has an influence in the optimization of the stretching sessions, but the real warm-up must come from the body's internal structures. The simple repeated flexion and extension of a joint improves the quality and degree of a subsequent flexibility exercise.

This is the moment to begin stretching, and here comes one of the most important pieces of advice from this book: the stretch should be gentle and controlled, taking it to the point of desired resistance and holding it there for a few seconds. One must avoid bouncing, ballistic movements ("throwing" the body part in question, which could result in an injury), and harmful over-exertions. The help of a partner can be very useful, but he must be knowledgeable enough and never force beyond the threshold of normal movement.

The respiration should be slow and rhythmic, generally breathing out at the same time one stretches in order to disarm the column formed by the intrathoracic-abdominal pressure. The body, and in particular the body part being stretched, must not be under excessive tension, which explains why some athletes injure themselves after practicing their sport when they conclude their training with rough stretches. And they do not understand how it is they got injured "if they were warmed up."

And what about the sedentary people who have decided to begin stretching as part of their overall plan to improve their physical health? Some sound advice is to first strengthen the body, that is, first develop a certain degree of strength, and then begin to stretch without abandoning the strength training.

And what about those periods of inactivity when you have already performed some physical exercise for a while? This is a somewhat delicate topic and one that does not present itself in all the specialties in the same way. A resistance athlete who is subjected to a period of inactivity, and then intends to take it up again, will note how his personal benchmarks are worse, both in terms of the speed sustained as well as in the total time supported. But there is no major problem; the body and its aerobic resistance will know how to dose it. In the case of stretching, as is the case with the strength training, there is a risk in wanting to recover too quickly and get back to the lifts that we were able to do before the layoff, and the uneasiness of the time away could expose one to injury. One must not fall prey to feelings of regret and frustration, but instead, one must plan intelligently, setting multiple small goals that will soon give us back the level of performance that we desire. If the inactivity has lasted too long, it is easier to recover than to start from the beginning since, although for us it may feel like a very long time, in reality it does not take that long.

There is however, one great difficulty, especially among beginners: knowing the difference between pain and discomfort. The first tends to involve a sharp and unbearable sensation, while the latter tends to be a pulling sensation resulting from the stretching. The pain does not go away even when we relax the posture, but the discomfort usually gets better when we manage to concentrate enough to overcome it.

Types of stretches

In order to stretch properly, it is necessary to know several different types of stretches, and in this way, one would be able to exercise based on his needs and objectives. We will talk about static, dynamic and PNF, but we will only detail the steps of the two methods that have been selected for their efficacy and simplicity will be discussed in detail.

- —**Static stretching:** It is also referred to as passive stretching, although the two are not exactly equal. The static stretch consists of taking a joint close to the limit of its mobility and maintaining that posture for a few seconds. It is one of the simplest and most effective stretches, and we can subdivide it in two:
 - **(i) Active Static:** when the person stretching is the one who exerts, through the help of the other muscle groups, the force required to maintain the posture. It is not the most effective because it is not easy to maintain the proper tension for some of the body parts, and thus it is often preferable to perform passive static stretches, as explained below.
 - (ii) **Passive Static:** when a machine or another person helps to maintain the stretching posture. It consists of the following:
 - 1. Stretch slowly until the limit prior to the pain.
 - 2. Hold that position for approximately 20 seconds.
 - 3. Pause for around 20 or 30 seconds (during which time you may stretch a different muscle group, preferably the antagonist).
 - 4. Repeat the process 3 or 4 times.

- —**Dynamic Stretching:** As the name implies, one takes a body part in controlled movement until reaching its maximum point. This is a type of stretching that is reserved, almost always, to certain sports modalities in which an excellent control of mobility, in all its amplitude, is necessary (the most common examples are the martial arts and dance). In any case, this type of stretching should only be practiced by people with a certain level of training and control in their movements, not beginners. This type of stretching can be subdivided into two categories:
- —**Explosive or ballistic stretching:** This is a dynamic stretch that uses the inertia of the movement to take the joint farther than the normal range of motion. It is potentially injurious, which is why it generally should be avoided.
- —**Guided stretching:** This involves performing the movement in a controlled fashion at all times but over a large degree of amplitude.

-- Propioceptive Neuromuscular Facilitation (P. N. F.)

The PNF concept — some authors refer to it as isometrics — quite possibly derives from the North American authors Kabat, Levine and Bobath (in fact, it is also referred to as the "Kabat Method"), who made significant progress with this technique. Given that this method is a little more involved, it is meant for experienced individuals, not beginners. It consists of the following:

- 1. Begin with a light stretch until the point of discomfort.
- 2. Isometrically contract the stretched muscle for 6 to 8 seconds.
- 3. Relax the contraction for 2 or 3 seconds but without changing the posture.
- 4. Stretch a few more degrees of motion and hold the new position for 10 seconds.
- 5. Contract the muscle and repeat the process once or twice more.

This is a good stretching method provided that it is performed correctly. This technique is very similar to the Michell technique, in which, from the position of a stretched muscle, isometric contractions are performed, followed by a period of relaxation. At the end of each contraction, the stretch is increased a little more in search of a new motion barrier.

Smart stretching

In the stretching exercises, although it may not seem obvious to a beginner, the muscle is far from remaining passive. When we stretch a muscle, it reacts in an opposing manner to hold on to the joint and, in and of itself, this is a very important, natural and necessary mechanism to avoid sustaining injuries in our daily lives. When we add bouncing, balancing or pulling, this reflex is accentuated, making the exercise more difficult. It is called the "myotic reflex." This reflex is incredibly useful, and it prevents a joint from being stretched to its limit and thus breaking unconsciously. It is so powerful that in some cases it can manage to dislocate the joint. A clear example is what occurs during traffic accidents, particularly in sudden, unexpected accidents. When the occupant in a vehicle receives an impact upon the vehicle, the body tenses up as a protective mechanism. The majority of the joints return to their normal state in just a few seconds, but some of them, such as the neck, can suffer such

a strong muscle pull that it may produce a cervical sprain, caused by the reflexive pull instead. This enormous tension is understandable if we think about the importance of the structures that they are protecting: the neck and the head.

A smart stretch must be controlled, gentle and continuous.

But it is not only the muscles that are stretched, although they are in fact the biggest protagonists. The entire joint structure is stretched. In fact, some studies confirm that certain muscles may be stretched to almost twice their normal length without injury, but other structures cannot be so easily moved. In this way, the amplitude of the movement of the joints depends on an equilibrium complex between stability and mobility. The ligaments, muscle fascias, joint capsules and especially the tendons, are compromised during the stretching exercises. When one of these structures is stretched beyond its threshold of resistance, it suffers damage, as is the case with sprains.

Smart stretching takes the joint to a point close to its limits, and so a certain amount of discomfort is normal while performing them. When this discomfort becomes pain, then we may have exceeded said limit, and we may be getting dangerously close to an injury. At the opposite extreme is the excessively lax joint, where movements are easily taken beyond the normal limits. It is at the halfway point that one finds virtue and balance. Following the stretching movement, the tension partially gives way after 3 or 4 seconds (without moving, the posture has become more pleasant), and that is a good indication that you are doing things right.

One not-so-smart stretch is that which forces a joint beyond its capabilities, which produces bouncing, or forces a muscle to hold a specific posture at the same time it pretends to stretch it (such as "standing up straight, flexing the torso with knees straight, trying to touch the ground").

Finally, it is necessary to point out a dominant factor in obtaining a good stretch: concentration. While this factor is necessary in the performance of many different sports, in stretching it is absolutely necessary. The person who stretches must concentrate on the area being stretched, and he cannot be distracted in conversations with his stretching partner, television or other things. A person who is distracted will have great difficulty in reaching the optimum stretching point, and if he falls short then the session will not have been very productive, and if he overdoes it, he may injure himself. Furthermore, in order to be able to concentrate and feel the muscles being stretched, it is necessary to have a certain knowledge of anatomy.

The moments and times for stretching

Regular athletes are not all the same when it comes to planning their stretching exercises. Some do it as part of their warm-up, others do it in the rest periods between their sets, after their training or competition is over, or even during times that are totally isolated from their regular athletic activities. What is the correct way to plan stretching? It appears that there is no single correct answer.

From all the different options presented, we could plan two basic models of stretching:

Warm-up — Stretch — Athletic activity — Stretch
Warm-up — Stretch

In the first option, stretching is presented as both a preparation for and a recuperation from the practice of physical exercise itself. In the second option, the stretching "is the physical exercise," meaning this is a session focused on stretching. There is only one exception to stretching without warming up, and that is the stretching done to get the stiffness out of the body resulting from prolonged postures at work or during the course of daily living, although that is more the case of exercises of joint mobility that are not performed for the purpose of improving the degree of flexibility.

Anyone who wishes to maintain an acceptable degree of joint mobility should stretch at least 3 to 7 times a week in sessions lasting approximately 15 minutes. Yet if the goal is to actually improve — not just maintain — flexibility, then these stretching sessions should be increased to 5 or 6 times a week and last from 15 to 30 minutes each. Among the elite athletes, whose sport practices demand tremendous joint mobility from them (for example, some types of gymnastics), the time dedicated specifically to stretching is generally more than one hour per day and it is done every day of the week.

Each exercise described in this book should be repeated between 3 and 6 times, holding each of them for approximately 10 to 20 seconds. It is better to stretch almost all of the muscles during each stretching session rather than divide them into separate muscle groups on different days (as is the case with strength training). To avoid getting tired of the routine and to not leave body parts un-stretched, it is a good idea to change the exercises chosen each week. If pressed for time, you may divide the body in two and do the exercises corresponding to each of the 2 areas of the body on alternate days.

During the short rest periods in the stretching sessions, we can stretch the antagonistic muscle group. For example, if you are stretching the quadriceps, in the rest periods between consecutive sets you could stretch the hamstrings. This is useful for making up time and for not leaving any areas of the body un-stretched.

Even though this book praises the stretching exercises performed to improve flexibility, the author would like to put in its proper place the importance of this quality. It is not true that it is equally beneficial to all sports; it's logical to think that a gymnast or a martial artist will need more flexibility than a sprinter. The first two will dedicate a great part of their training to improving their joint mobility, whereas the latter will spend much more time improving his aerobic resistance. To do otherwise would be counterproductive to their sports performance. What's more, excessive flexibility training can reduce the efficiency of other physical qualities, such as strength. Lastly, while it is true that flexibility training prevents some types of injuries, the majority of these may be suffered whether one has good flexibility or not. So it cannot be said that a flexible person has a "much lower risk" of injury than someone who is not as flexible, especially if his chosen athletic activities do not challenge the limits of joint mobility. Flexibility training is necessary, but the most important thing is to do it in the proper amount.

Place and conditions for stretching

Unlike other physical exercises, stretching does not require any machines, special attire or special equipment. It is enough to simply wear conventional athletic clothing and a mat in case the floor is too hard. However, group stretching and some of the equipment that is found in the gym may favor or improve your stretching, whether it is by improving motivation or by other means.

The environment should be warm, not just in terms of temperature, but also from an emotional or psychological perspective. If there is music, it is preferable that it be slow and relaxing.

The practice of stretching exercises in nature is particularly gratifying. The woods, the beach, the grass in a city park... are all ideal places for stretching. Unlike other sporting activities, stretching requires a high degree of internalizing, and if the environment matches, the results are better.

But these practices are not limited to just scheduled times, whether in a gym or somewhere else. Any daily activity, whether it is during work, study, etc., can be interrupted for a few minutes to practice some stretches. Those who do, so attest that their "batteries are recharged" after they stretch, they feel better physically, and they are ready to perform better when they return to their activities.

Regarding clothing, the recommendations are similar to those for other physical activities; that is, you should wear athletic clothing that is light, breathable, and does not constrain the body. It should not have any bothersome seams, rivets or metal pieces. The footwear is not as important as it is with other athletic activities, and in fact, the majority of the stretching exercises may be performed barefoot or wearing socks. The only difference that should be noted is that, for stretching, it is preferable that the clothing covers most of the body and provides some warmth; that is, it is better to feel a little hot than to perform the exercises wearing a pair of shorts. The temperature is an ally of stretching exercises, both for improving performance and for reducing the risk of injury. But at no point should you wear those plastic outfits (or the like) that increase sweating but hinder natural temperature regulation.

Stretching in pairs

In most athletic activities, when one is not knowledgeable enough about what one is doing, there is a risk of having an accident or suffering an injury. This is just the same when it comes to stretching exercises, but when we stretch in pairs, there is a portion of the activity we do not control and which relies on the knowledge and experience of our stretching partner. Therefore, there are certain guidelines that should be followed which, in addition to preventing injuries, optimize the work and the results. Here are a few of them:

- It is necessary for both partners to know each other and exchange impressions, they should communicate adequately and know the physical shape and the limits of each other.
- The best results are obtained with pairs who are of similar height, weight and physical shape, and who share similar goals.
- Since it is difficult to know the precise moment to stop when one is stretching another person, it is imperative to establish a gesture between the two that tells the person doing the stretching not to take the movement any further. It can be a slap on the ground or something similar.
- Before beginning a stretch, both partners must know and agree between themselves as to what exercise is to be performed and up to what point it will be performed.
- If the general rule in individual stretches is the slowness of movement, this is even more so when it comes
 to stretching in pairs. Any movement that is "not slow" will trigger a defensive contraction reflex in the other
 person and prevent any proper stretching.

- When stretching in pairs, it is imperative that the holds and manipulations by the other person be performed with respect, both physical and moral.
- One must try to make the partner's respiration natural and comfortable.
- Given that concentration is important, outside noises and conversation should be limited to the bare minimum.
- The person who is receiving the stretch should trust his partner, otherwise the individual will remain tense and this will prevent any progress.

Practically all the areas of the body may be stretched individually, but working in pairs always provides a little extra motivation, which undoubtedly will lead to improvement and continuing with the training.

Stretching and pregnancy

Some women who practice sports regularly immediately abandon all exercise as soon as they find out they are pregnant. This is not entirely appropriate. However, as with strength training, if the doctor gives the green light then the majority of women are able to perform stretching exercises during a great part of their pregnancy. What is true is that you cannot stretch in the same way when you are pregnant as when you are not; there are some basic rules to follow, some of which are common to other athletic endeavors:

- 1. Reduce the intensity (reduce the range of motion, less sets, increase rest time, etc.).
- 2. Reduce the total daily training time.
- 3. Avoid holding your breath.
- 4. Do not perform exercises that put pressure on the uterus.
- 5. Do not perform exercises in a decubitus prone position after the first trimester.
- 6. Do not perform the movements right up to the limits of mobility because the hormonal changes may provoke joint instability.
- 7. Fluid intake and diet must be strictly controlled.
- The last months are the most delicate during the pregnancy, and the doctor may recommend reducing or suspending all physical exercise.
- 9. Avoid exercises that involve a difficult technique or are dangerous.
- 10. Eliminate competitive sporting activities.
- 11. Pay special attention to the body temperature and the temperature in the room.
- 12. Be careful with hygiene, and your physical and mental health.