

Stretching and Flexibility - How to Stretch

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How to Stretch

- [References on Stretching](#): (next chapter)
- [Types of Stretching](#): (previous chapter)

When done properly, stretching can do more than just increase flexibility. According to *M. Alter*, benefits of stretching include:

- enhanced physical fitness
- enhanced ability to learn and perform skilled movements
- increased mental and physical relaxation
- enhanced development of body awareness
- reduced risk of injury to joints, muscles, and tendons
- reduced muscular soreness
- reduced muscular tension
- increased suppleness due to stimulation of the production of chemicals which lubricate connective tissues (see section [Connective Tissue](#))
- reduced severity of painful menstruation (*dysmenorrhea*) in females

Unfortunately, even those who stretch do not always stretch properly and hence do not reap some or all of these benefits. Some of the most common mistakes made when stretching are:

- improper warm-up
- inadequate rest between workouts
- overstretching
- performing the wrong exercises
- performing exercises in the wrong (or sub-optimal) sequence

In this chapter, we will try to show you how to avoid these problems, and others, and present some of the most effective methods for realizing all the benefits of stretching.

- [Warming Up](#)
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Warming Up

- [Cooling Down](#): (next section)
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Stretching is *not* warming up! It is, however, a very important part of warming up. Warming up is quite literally the process of "warming up" (i.e., raising your core body temperature). A proper warm-up should raise your body temperature by one or two degrees Celsius (1.4 to 2.8 degrees Fahrenheit) and is divided into three phases:

1. general warm-up
2. stretching
3. sport-specific activity

It is very important that you perform the general warm-up *before* you stretch. It is *not* a good idea to attempt to stretch before your muscles are warm (something which the general warm-up accomplishes).

Warming up can do more than just loosen stiff muscles; when done properly, it can actually improve performance. On the other hand, an improper warm-up, or no warm-up at all, can greatly increase your risk of injury from engaging in athletic activities.

It is important to note that active stretches and isometric stretches should *not* be part of your warm-up because they are often counterproductive. The goals of the warm-up are (according to *Kurz*): "an increased awareness, improved coordination, improved elasticity and contractibility of muscles, and a greater efficiency of the respiratory and cardiovascular systems." Active stretches and isometric stretches do not help achieve these goals because they are likely to cause the stretched muscles to be too tired to properly perform the athletic activity for which you are preparing your body.

- [General Warm-Up](#)
- [Warm-Up Stretching](#)
- [Sport-Specific Activity](#)

General Warm-Up

- [Warm-Up Stretching](#): (next subsection)
- [Warming Up](#): (beginning of section)

The general warm-up is divided into two parts:

1. joint rotations
2. aerobic activity

These two activities should be performed in the order specified above.

- [Joint Rotations](#)
- [Aerobic Activity](#)

[Joint Rotations](#)

- [Aerobic Activity](#): (next subsection)
- [General Warm-Up](#): (beginning of subsection)

The general warm-up should begin with joint-rotations, starting either from your toes and working your way up, or from your fingers and working your way down. This facilitates joint motion by lubricating the entire joint with synovial fluid. Such lubrication permits your joints to function more easily when called upon to participate in your athletic activity. You should perform slow circular movements, both clockwise and counter-clockwise, until the joint seems to move smoothly. You should rotate the following (in the order given, or in the reverse order):

1. fingers and knuckles
2. wrists
3. elbows
4. shoulders
5. neck
6. trunk/waist
7. hips
8. legs
9. knees
10. ankles
11. toes

[Aerobic Activity](#)

- [Joint Rotations](#): (previous subsection)
- [General Warm-Up](#): (beginning of subsection)

After you have performed the joint rotations, you should engage in at least five minutes of aerobic activity such as jogging, jumping rope, or any other activity that will cause a similar increase in your cardiovascular output (i.e., get your blood pumping). The purpose of this is to raise your core body temperature and get your blood flowing. Increased blood flow in the muscles improves muscle performance and flexibility and reduces the likelihood of injury.

[Warm-Up Stretching](#)

- [Sport-Specific Activity](#): (next subsection)
- [General Warm-Up](#): (previous subsection)
- [Warming Up](#): (beginning of section)

The stretching phase of your warmup should consist of two parts:

1. static stretching
2. dynamic stretching

It is important that static stretches be performed *before* any dynamic stretches in your warm-up. Dynamic

stretching can often result in overstretching, which damages the muscles (see section [Overstretching](#)). Performing static stretches first will help reduce this risk of injury.

- [Static Warm-Up Stretching](#)
- [Dynamic Warm-Up Stretching](#)

[Static Warm-Up Stretching](#)

- [Dynamic Warm-Up Stretching](#): (next subsection)
- [Warm-Up Stretching](#): (beginning of subsection)

Once the general warm-up has been completed, the muscles are warmer and more elastic. Immediately following your general warm-up, you should engage in some slow, relaxed, static stretching (see section [Static Stretching](#)). You should start with your back, followed by your upper body and lower body, stretching your muscles in the following order (see section [Exercise Order](#)):

1. back
2. sides (external obliques)
3. neck
4. forearms and wrists
5. triceps
6. chest
7. buttocks
8. groin (adductors)
9. thighs (quadriceps and abductors)
10. calves
11. shins
12. hamstrings
13. instep

Some good static stretches for these various muscles may be found in most books about stretching. See section [References on Stretching](#). Unfortunately, not everyone has the time to stretch all these muscles before a workout. If you are one such person, you should at least take the time to stretch all the muscles that will be heavily used during your workout.

[Dynamic Warm-Up Stretching](#)

- [Static Warm-Up Stretching](#): (previous subsection)
- [Warm-Up Stretching](#): (beginning of subsection)

Once you have performed your static stretches, you should engage in some light dynamic stretching: leg-raises, and arm-swings in all directions (see section [Dynamic Stretching](#)). According to *Kurz*, you should do "as many sets as it takes to reach your maximum range of motion in any given direction", but do not work your muscles to the point of fatigue. Remember -- this is just a warm-up, the real workout comes later.

Some people are surprised to find that dynamic stretching has a place in the warm-up. But think about it: you are "warming up" for a workout that is (usually) going to involve a lot of dynamic activity. It makes sense that you should perform some dynamic exercises to increase your dynamic flexibility.

Sport-Specific Activity

- [Warm-Up Stretching](#): (previous subsection)
- [Warming Up](#): (beginning of section)

The last part of your warm-up should be devoted to performing movements that are a "watered-down" version of the movements that you will be performing during your athletic activity. *HFLTA* says that the last phase of a warm-up should consist of the same movements that will be used during the athletic event but at a reduced intensity. Such *sport-specific activity* is beneficial because it improves coordination, balance, strength, and response time, and may reduce the risk of injury.

Cooling Down

- [Massage](#): (next section)
- [Warming Up](#): (previous section)
- [How to Stretch](#): (beginning of chapter)

Stretching is *not* a legitimate means of cooling down. It is only part of the process. After you have completed your workout, the best way to reduce muscle fatigue and soreness (caused by the production of lactic acid from your maximal or near-maximal muscle exertion) is to perform a light *warm-down*. This warm-down is similar to the second half of your warm-up (but in the reverse order). The warm-down consists of the following phases:

1. sport-specific activity
2. dynamic stretching
3. static stretching

Ideally, you should start your warm-down with about 10-20 minutes of sport-specific activity (perhaps only a little more intense than in your warm-up). In reality however, you may not always have 10-20 minutes to spare at the end of your workout. You should, however, attempt to perform at least 5 minutes of sport-specific activity in this case. The sport-specific activity should immediately be followed by stretching: First perform some light dynamic stretches until your heart rate slows down to its normal rate, then perform some static stretches. Sport-specific activity, followed by stretching, can reduce cramping, tightening, and soreness in fatigued muscles and will make you feel better.

According to *HFLTA*, "light warm-down exercise immediately following maximal exertion is a better way of clearing lactic acid from the blood than complete rest." Furthermore, if you are still sore the next day, a light warm-up or warm-down is a good way to reduce lingering muscle tightness and soreness even when not performed immediately after a workout. See section [Pain and Discomfort](#).

Massage

- [Elements of a Good Stretch](#): (next section)
- [Cooling Down](#): (previous section)
- [How to Stretch](#): (beginning of chapter)

Many people are unaware of the beneficial role that massage can play in both strength training and flexibility training. Massaging a muscle, or group of muscles, immediately prior to performing stretching or strength exercises for those muscles, has some of the following benefits:

increased blood flow

The massaging of the muscles helps to warm-up those muscles, increasing their blood flow and improving their circulation.

relaxation of the massaged muscles

The massaged muscles are more relaxed. This is particularly helpful when you are about to stretch those muscles. It can also help relieve painful muscle cramps.

removal of metabolic waste

The massaging action, and the improved circulation and blood flow which results, helps to remove waste products, such as lactic acid, from the muscles. This is useful for relieving post-exercise soreness.

Because of these benefits, you may wish to make massage a regular part of your stretching program: immediately before each stretch you perform, massage the muscles you are about to stretch.

Elements of a Good Stretch

- [Some Risky Stretches](#): (next section)
- [Massage](#): (previous section)
- [How to Stretch](#): (beginning of chapter)

According to *SynerStretch*, there are three factors to consider when determining the effectiveness of a particular stretching exercise:

1. isolation
2. leverage
3. risk

- [Isolation](#)
- [Leverage](#)
- [Risk](#)

Isolation

- [Leverage](#): (next subsection)
- [Elements of a Good Stretch](#): (beginning of section)

Ideally, a particular stretch should work only the muscles you are trying to stretch. Isolating the muscles worked by a given stretch means that you do not have to worry about having to overcome the resistance offered by more than one group of muscles. In general, the fewer muscles you try to stretch at once, the better. For example, you are better off trying to stretch one hamstring at a time than both hamstrings at once. By isolating the muscle you are stretching, you experience resistance from fewer muscle groups, which gives you greater control over the stretch and allows you to more easily change its intensity. As it turns out, the splits is not one of the best stretching exercises. Not only does it stretch several different muscle groups all at once, it also stretches them in both legs at once.

Leverage

- [Risk](#): (next subsection)
- [Isolation](#): (previous subsection)
- [Elements of a Good Stretch](#): (beginning of section)

Having leverage during a stretch means having sufficient control over how intense the stretch becomes, and how fast. If you have good leverage, not only are you better able to achieve the desired intensity of the stretch, but you do not need to apply as much force to your outstretched limb in order to effectively increase the intensity of the stretch. This gives you greater control.

According to *SynerStretch*, the best stretches (those which are most effective) provide the greatest mechanical advantage over the stretched muscle. By using good leverage, it becomes easier to overcome the resistance of inflexible muscles (the same is true of isolation). Many stretching exercises (good and bad) can be made easier and more effective simply by adjusting them to provide greater leverage.

Risk

- [Leverage](#): (previous subsection)
- [Elements of a Good Stretch](#): (beginning of section)

Although a stretch may be very effective in terms of providing the athlete with ample leverage and isolation, the potential risk of injury from performing the stretch must be taken into consideration. Once again, *SynerStretch* says it best: Even an exercise offering great leverage and great isolation may still be a poor choice to perform. Some exercises can simply cause too much stress to the joints (which may result in injury). They may involve rotations that strain tendons or ligaments, or put pressure on the disks of the back, or contain some other twist or turn that may cause injury to seemingly unrelated parts of the body.

Some Risky Stretches

- [Duration](#): (next section)
- [Elements of a Good Stretch](#): (previous section)
- [How to Stretch](#): (beginning of chapter)

The following stretches (many of which are commonly performed) are considered risky (*M. Alter* uses the term 'X'-rated) due to the fact that they have a very high risk of injury for the athlete that performs them. This does not mean that these stretches should never be performed. However, great care should be used when attempting any of these stretches. Unless you are an advanced athlete or are being coached by a qualified instructor (such as a certified Yoga instructor, physical therapist, or professional trainer), you can probably do without them (or find alternative stretching exercises to perform). When performed correctly with the aid of an instructor however, some of these stretches can be quite beneficial. Each of these stretches is illustrated in detail in the section *X-Rated Exercises* of *M. Alter*:

the yoga plough

In this exercise, you lie down on your back and then try to sweep your legs up and over, trying to touch your knees to your ears. This position places excessive stress on the lower back, and on the discs of the spine. Not to mention the fact that it compresses the lungs and heart, and makes it very difficult to breathe. This particular exercise also stretches a region that is frequently flexed as a result of improper posture. This stretch is a prime example of an exercise that is very easy to do incorrectly. However, with proper instruction and attention to body position and alignment, this stretch can be performed successfully with a minimal amount of risk and can actually improve spinal health and mobility.

the traditional backbend

In this exercise, your back is maximally arched with the soles of your feet and the palms of your hands both flat on the floor, and your neck tilted back. This position squeezes (compresses) the spinal discs and pinches nerve fibers in your back.

the traditional hurdler's stretch

This exercise has you sit on the ground with one leg straight in front of you, and with the other leg fully flexed (bent) behind you, as you lean back and stretch the quadricep of the flexed leg. The two legged version of this stretch is even worse for you, and involves fully bending both legs behind you on either side. The reason this stretch is harmful is that it stretches the medial ligaments of the knee (remember, stretching ligaments and tendons is *bad*) and crushes the meniscus. It can also result in slipping of the knee cap from being twisted and compressed.

straight-legged toe touches

In this stretch, your legs are straight (either together or spread apart) and your back is bent over while you attempt to touch your toes or the floor. If you do not have the ability to support much of your weight with your hands when performing this exercise, your knees are likely to hyperextend. This position can also place a great deal of pressure on the vertebrae of the lower lumbar. Furthermore, if you choose to have your legs spread apart, it places more stress on the knees, which can sometimes result in permanent deformity.

torso twists

Performing sudden, intense twists of the torso, especially with weights, while in an upright (erect) position can tear tissue (by exceeding the momentum absorbing capacity of the stretched tissues) and can strain the ligaments of the knee.

inverted stretches

This is any stretch where you "hang upside down". Staying inverted for too long increases your blood pressure and may even rupture blood vessels (particularly in the eyes). Inverted positions are especially discouraged for anyone with spinal problems.

[Duration, Counting, and Repetition](#)

- [Breathing During Stretching](#): (next section)
- [Some Risky Stretches](#): (previous section)
- [How to Stretch](#): (beginning of chapter)

One thing many people seem to disagree about is how long to hold a passive stretch in its position. Various sources seem to suggest that they should be held for as little as 10 seconds to as long as a full minute (or even several minutes). The truth is that no one really seems to know for sure. According to *HFLTA* there exists some controversy over how long a stretch should be held. Many researchers recommend 30-60 seconds. For the hamstrings, research suggests that 15 seconds may be sufficient, but it is not yet known whether 15 seconds is sufficient for any other muscle group.

A good common ground seems to be about 20 seconds. Children, and people whose bones are still growing, do not need to hold a passive stretch this long (and, in fact, *Kurz* strongly discourages it). Holding the stretch for about 7-10 seconds should be sufficient for this younger group of people.

A number of people like to count (either out loud or to themselves) while they stretch. While counting during a stretch is not, by itself, particularly important @dots{ } what is important is the setting of a

definite goal for each stretching exercise performed. Counting during a stretch helps many people achieve this goal.

Many sources also suggest that passive stretches should be performed in sets of 2-5 repetitions with a 15-30 second rest in between each stretch.

[Breathing During Stretching](#)

- [Exercise Order](#): (next section)
- [Duration](#): (previous section)
- [How to Stretch](#): (beginning of chapter)

Proper breathing control is important for a successful stretch. Proper breathing helps to relax the body, increases blood flow throughout the body, and helps to mechanically remove lactic acid and other by-products of exercise.

You should be taking slow, relaxed breaths when you stretch, trying to exhale as the muscle is stretching. Some even recommend increasing the intensity of the stretch only while exhaling, holding the stretch in its current position at all other times (this doesn't apply to isometric stretching).

The proper way to breathe is to inhale slowly through the nose, expanding the abdomen (not the chest); hold the breath a moment; then exhale slowly through the nose or mouth. Inhaling through the nose has several purposes including cleaning the air and insuring proper temperature and humidity for oxygen transfer into the lungs. The breath should be natural and the diaphragm and abdomen should remain soft. There should be no force of the breath. Some experts seem to prefer exhaling through the nose (as opposed to through the mouth) saying that exhaling through the mouth causes depression on the heart and that problems will ensue over the long term.

The rate of breathing should be controlled through the use of the glottis in the back of the throat. This produces a very soft "hm-m-m-mn" sound inside the throat as opposed to a sniffing sound in the nasal sinuses. The exhalation should be controlled in a similar manner, but if you are exhaling through the mouth, it should be with more of an "ah-h-h-h-h" sound, like a sigh of relief.

As you breathe in, the diaphragm presses downward on the internal organs and their associated blood vessels, squeezing the blood out of them. As you exhale, the abdomen, its organs and muscles, and their blood vessels flood with new blood. This rhythmic contraction and expansion of the abdominal blood vessels is partially responsible for the circulation of blood in the body. Also, the rhythmic pumping action helps to remove waste products from the muscles in the torso. This pumping action is referred to as the *respiratory pump*. The respiratory pump is important during stretching because increased blood flow to the stretched muscles improves their elasticity, and increases the rate at which lactic acid is purged from them.

[Exercise Order](#)

- [When to Stretch](#): (next section)
- [Breathing During Stretching](#): (previous section)
- [How to Stretch](#): (beginning of chapter)

Many people are unaware of the fact that the order in which you perform your stretching exercises is

important. Quite often, when we perform a particular stretch, it actually stretches more than one group of muscles: the muscles that the stretch is primarily intended for, and other supporting muscles that are also stretched but which do not receive the "brunt" of the stretch. These supporting muscles usually function as synergists for the muscles being stretched (see section [Cooperating Muscle Groups](#)). This is the basis behind a principle that *SynerStretch* calls the *interdependency of muscle groups*.

Before performing a stretch intended for a particular muscle, but which actually stretches several muscles, you should first stretch each of that muscle's synergists. The benefit of this is that you are able to better stretch the primary muscles by not allowing the supporting muscles the opportunity to be a limiting factor in how "good" a stretch you can attain for a particular exercise.

Ideally, it is best to perform a stretch that isolates a particular muscle group, but this is not always possible. According to *SynerStretch*: "by organizing the exercises within a stretching routine according to the principle of interdependency of muscle groups, you minimize the effort required to perform the routine, and maximize the effectiveness of the individual exercises." This is what *Health For Life* (in all of their publications) calls *synergism*: "combining elements to create a whole that is greater than the mere sum of its parts."

For example, a stretch intended primarily for the hamstrings may also make some demands upon the calves and buttocks (and even the lower back) but mostly, it stretches the hamstrings. In this case, it would be beneficial to stretch the lower back, buttocks, and calves first (in that order, using stretches intended primarily for those muscles) before they need to be used in a stretch that is intended primarily for the hamstrings.

As a general rule, you should usually do the following when putting together a stretching routine:

- stretch your back (upper and lower) first
- stretch your sides after stretching your back
- stretch your buttocks before stretching your groin or your hamstrings
- stretch your calves before stretching your hamstrings
- stretch your shins before stretching your quadriceps (if you do shin stretches)
- stretch your arms before stretching your chest

[When to Stretch](#)

- [Stretching With a Partner](#): (next section)
- [Exercise Order](#): (previous section)
- [How to Stretch](#): (beginning of chapter)

The best time to stretch is when your muscles are warmed up. If they are not already warm before you wish to stretch, then you need to warm them up yourself, usually by performing some type of brief aerobic activity (see section [General Warm-Up](#)). Obviously, stretching is an important part of warming-up before (see section [Warming Up](#)), and cooling-down after a workout (see section [Cooling Down](#)). If the weather is very cold, or if you are feeling very stiff, then you need to take extra care to warm-up before you stretch in order to reduce the risk of injuring yourself.

Many of us have our own internal body-clock, or *circadian rhythm* as, it is more formally called: Some of us are "early morning people" while others consider themselves to be "late-nighters". Being aware of your circadian rhythm should help you decide when it is best for you to stretch (or perform any other type of activity). *Gummerson* says that most people are more flexible in the afternoon than in the morning,

peaking from about 2:30pm-4pm. Also, according to *HFLTA*, evidence seems to suggest that, during any given day, strength and flexibility are at their peak in the late afternoon or early evening. If this is correct then it would seem to indicate that, all else being equal, you may be better off performing your workout right after work rather than before work.

- [Early-Morning Stretching](#)

[Early-Morning Stretching](#)

- [When to Stretch](#): (beginning of section)

On the other hand, according to *Kurz*, "if you need [or want] to perform movements requiring considerable flexibility with [little or] no warm-up, you ought to make early morning stretching a part of your routine." In order to do this properly, you need to first perform a general warm-up (see section [General Warm-Up](#)). You should then begin your early morning stretching by first performing some static stretches, followed by some light dynamic stretches. Basically, your early morning stretching regimen should be almost identical to a complete warm-up (see section [Warming Up](#)). The only difference is that you may wish to omit any sport-specific activity (see section [Sport-Specific Activity](#)), although it may be beneficial to perform it *if* you have time.

[Stretching With a Partner](#)

- [Stretching to Increase Flexibility](#): (next section)
- [When to Stretch](#): (previous section)
- [How to Stretch](#): (beginning of chapter)

When done properly, stretches performed with the assistance of a partner can be more effective than stretches performed without a partner. This is especially true of isometric stretches (see section [Isometric Stretching](#)) and PNF stretches (see section [PNF Stretching](#)). The problem with using a partner, however, is that the partner does not feel what you feel, and thus cannot respond as quickly to any discomfort that might prompt you to immediately reduce the intensity (or some other aspect) of the stretch. This can greatly increase your risk of injury while performing a particular exercise.

If you do choose to stretch with a partner, make sure that it is someone you trust to pay close attention to you while you stretch, and to act appropriately when you signal that you are feeling pain or discomfort.

[Stretching to Increase Flexibility](#)

- [Pain and Discomfort](#): (next section)
- [Stretching With a Partner](#): (previous section)
- [How to Stretch](#): (beginning of chapter)

When stretching for the purpose of increasing overall flexibility, a stretching routine should accomplish, at the very least, two goals:

1. To train your stretch receptors to become accustomed to greater muscle length (see section [Proprioceptors](#)).
2. To reduce the resistance of connective tissues to muscle elongation (see section [How Connective Tissue Affects Flexibility](#)).

If you are attempting to increase active flexibility (see section [Types of Flexibility](#)), you will also want to strengthen the muscles responsible for holding the stretched limbs in their extended positions.

Before composing a particular stretching routine, you must first decide which types of flexibility you wish to increase (see section [Types of Flexibility](#)), and which stretching methods are best for achieving them (see section [Types of Stretching](#)). The best way to increase dynamic flexibility is by performing dynamic stretches, supplemented with static stretches. The best way to increase active flexibility is by performing active stretches, supplemented with static stretches. The fastest and most effective way currently known to increase passive flexibility is by performing PNF stretches (see section [PNF Stretching](#)).

If you are very serious about increasing overall flexibility, then I recommend religiously adhering to the following guidelines:

- Perform early-morning stretching everyday (see section [Early-Morning Stretching](#)).
- Warm-up properly before any and all athletic activities. Make sure to give yourself ample time to perform the complete warm-up. See section [Warming Up](#).
- Cool-down properly after any and all athletic activities. See section [Cooling Down](#).
- Always make sure your muscles are warmed-up before you stretch!
- Perform PNF stretching every other day, and static stretching on the off days (if you are overzealous, you can try static stretching every day, in addition to PNF stretching every other day).

Overall, you should expect to increase flexibility *gradually*. However, If you really commit to doing the above, you should (according to *SynerStretch*) achieve maximal upper-body flexibility within one month and maximal lower-body flexibility within two months. If you are older or more inflexible than most people, it will take longer than this.

Don't try to increase flexibility too quickly by forcing yourself. Stretch no further than the muscles will go *without pain*. See section [Overstretching](#).

[Pain and Discomfort](#)

- [Performing Splits](#): (next section)
- [Stretching to Increase Flexibility](#): (previous section)
- [How to Stretch](#): (beginning of chapter)

If you are experiencing pain or discomfort before, during, or after stretching or athletic activity, then you need to try to identify the cause. Severe pain (particularly in the joints, ligaments, or tendons) usually indicates a serious injury of some sort, and you may need to discontinue stretching and/or exercising until you have sufficiently recovered.

- [Common Causes of Muscular Soreness](#)
- [Stretching with Pain](#)
- [Overstretching](#)

[Common Causes of Muscular Soreness](#)

- [Stretching with Pain](#): (next subsection)
- [Pain and Discomfort](#): (beginning of section)

If you are experiencing soreness, stiffness, or some other form of muscular pain, then it may be due to one or more of the following:

torn tissue

Overstretching and engaging in athletic activities without a proper warm-up can cause microscopic tearing of muscle fibers or connective tissues. If the tear is not too severe, the pain will usually not appear until one or two days after the activity that caused the damage. If the pain occurs during or immediately after the activity, then it may indicate a more serious tear (which may require medical attention). If the pain is not too severe, then light, careful static stretching of the injured area is supposedly okay to perform (see section [Static Stretching](#)). It is hypothesized that torn fibers heal at a shortened length, thus decreasing flexibility in the injured muscles. Very light stretching of the injured muscles helps reduce loss of flexibility resulting from the injury. Intense stretching of any kind, however, may only make matters worse.

metabolic accumulation

Overexertion and/or intense muscular activity will fatigue the muscles and cause them to accumulate lactic acid and other waste products. If this is the cause of your pain, then static stretching (see section [Static Stretching](#)), isometric stretching (see section [Isometric Stretching](#)), or a good warm-up (see section [Warming Up](#)) or cool-down (see section [Cooling Down](#)) will help alleviate some of the soreness. See section [Why Bodybuilders Should Stretch](#). Massaging the sore muscles may also help relieve the pain (see section [Massage](#)). It has also been claimed that supplements of vitamin C will help alleviate this type of pain, but controlled tests using placebos have been unable to lend credibility to this hypothesis. The ingestion of sodium bicarbonate (baking soda) before athletic activity has been shown to help increase the body's buffering capacity and reduce the output of lactic acid. However, it can also cause urgent diarrhea.

muscle spasms

Exercising above a certain threshold can cause a decreased flow of blood to the active muscles. This can cause pain resulting in a protective reflex which contracts the muscle isotonicly (see section [Types of Muscle Contractions](#)). The reflex contraction causes further decreases in blood flow, which causes more reflex contractions, and so on, causing the muscle to spasm by repeatedly contracting. One common example of this is a painful muscle cramp. Immediate static stretching of the cramped muscle can be helpful in relieving this type of pain. However, it can sometimes make things worse by activating the stretch reflex (see section [The Stretch Reflex](#)), which may cause further muscle contractions. Massaging the cramped muscle (and trying to relax it) may prove more useful than stretching in relieving this type of pain (see section [Massage](#)).

[Stretching with Pain](#)

- [Overstretching](#): (next subsection)
- [Common Causes of Muscular Soreness](#): (previous subsection)
- [Pain and Discomfort](#): (beginning of section)

If you are already experiencing some type of pain or discomfort before you begin stretching, then it is very important that you determine the cause of your pain (see section [Common Causes of Muscular Soreness](#)). Once you have determined the cause of the pain, you are in a better position to decide whether or not you should attempt to stretch the affected area.

Also, according to *M. Alter*, it is important to remember that some amount of soreness will almost always be experienced by individuals that have not stretched or exercised much in the last few months (this is the price you pay for being inactive). However, well-trained and conditioned athletes who work-out at elevated levels of intensity or difficulty can also become sore. You should cease exercising immediately if you feel or hear anything tearing or popping. Remember the acronym *RICE* when caring for an injured body part. RICE stands for: Rest, Ice, Compression, Elevation. This will help to minimize the pain and swelling. You should then seek appropriate professional medical advice.

Overstretching

- [Stretching with Pain](#): (previous subsection)
- [Pain and Discomfort](#): (beginning of section)

If you stretch properly, you should *not* be sore the day after you have stretched. If you are, then it may be an indication that you are overstretching and that you need to go easier on your muscles by reducing the intensity of some (or all) of the stretches you perform. Overstretching will simply increase the time it takes for you to gain greater flexibility. This is because it takes time for the damaged muscles to repair themselves, and to offer you the same flexibility as before they were injured.

One of the easiest ways to "overstretch" is to stretch "cold" (without any warm-up). A "maximal cold stretch" is not necessarily a desirable thing. Just because a muscle can be moved to its limit without warming up doesn't mean it is ready for the strain that a workout will place on it.

Obviously, during a stretch (even when you stretch properly) you are going to feel some amount of discomfort. The difficulty is being able to discern when it is too much. In her book, *Stretch and Strengthen*, Judy Alter describes what she calls *ouch! pain*: If you feel like saying "ouch!" (or perhaps something even more explicit) then you should ease up immediately and discontinue the stretch. You should definitely feel the tension in your muscle, and perhaps even light, gradual "pins and needles", but if it becomes sudden, sharp, or uncomfortable, then you are overdoing it and are probably tearing some muscle tissue (or worse). In some cases, you may follow all of these guidelines when you stretch, feeling that you are not in any "real" pain, but still be sore the next day. If this is the case, then you will need to become accustomed to stretching with less discomfort (you might be one of those "stretching masochists" that take great pleasure in the pain that comes from stretching).

Quite frequently, the progression of sensations you feel as you reach the extreme ranges of a stretch are: localized warmth of the stretched muscles, followed by a burning (or spasm-like) sensation, followed by sharp pain (or "ouch!" pain). The localized warming will usually occur at the origin, or point of insertion, of the stretched muscles. When you begin to feel this, it is your first clue that you may need to "back off" and reduce the intensity of the stretch. If you ignore (or do not feel) the warming sensation, and you proceed to the point where you feel a definite burning sensation in the stretched muscles, then you should ease up immediately and discontinue the stretch! You may not be sore yet, but you probably will be the following day. If your stretch gets to the point where you feel sharp pain, it is quite likely that the stretch has already resulted in tissue damage which may cause immediate pain and soreness that persists for several days.

Performing Splits

- [Pain and Discomfort](#): (previous section)
- [How to Stretch](#): (beginning of chapter)

A lot of people seem to desire the ability to perform splits. If you are one such person, you should first ask yourself why you want to be able to perform the splits. If the answer is "So I can kick high!" or something along those lines, then being able to "do" the splits may not be as much help as you think it might be in achieving your goal. Doing a full split looks impressive, and a lot of people seem to use it as a benchmark of flexibility, but it will not, in and of itself, enable you to kick high. Kicking high requires dynamic flexibility (and, to some extent, active flexibility) whereas the splits requires passive flexibility. You need to discern what type of flexibility will help to achieve your goal (see section [Types of Flexibility](#)), and then perform the types of stretching exercises that will help you achieve that specific type of flexibility. See section [Types of Stretching](#).

If your goal really is "to be able to perform splits" (or to achieve maximal lower-body static-passive flexibility), and assuming that you already have the required range of motion in the hip joints to even do the splits (most people in reasonably good health without any hip problems do), you will need to be patient. Everyone is built differently and so the amount of time it will take to achieve splits will be different for different people (although *SynerStretch* suggests that it should take about two months of regular PNF stretching for most people to achieve their maximum split potential). The amount of time it takes will depend on your previous flexibility and body makeup. Anyone will see improvements in flexibility within weeks with consistent, frequent, and proper stretching. Trust your own body, take it gently, and stretch often. Try not to dwell on the splits, concentrate more on the stretch. Also, physiological differences in body mechanics may not allow you to be very flexible. If so, take that into consideration when working out.

A stretching routine tailored to the purpose of achieving the ability to perform splits may be found at the end of this document. See section [Working Toward the Splits](#).

- [Common Problems When Performing Splits](#)
- [The Front Split](#)
- [The Side Split](#)
- [Split-Stretching Machines](#)

[Common Problems When Performing Splits](#)

- [The Front Split](#): (next subsection)
- [Performing Splits](#): (beginning of section)

First of all, there are two kinds of splits: front and side (the side split is often called a *chinese split*). In a Front split, you have one leg stretched out to the front and the other leg stretched out to the back. In a side split, both legs are stretched out to your side.

A common problem encountered during a side split is pain in the hip joints. Usually, the reason for this is that the split is being performed improperly (you may need to tilt your pelvis forward).

Another common problem encountered during splits (both front and side) is pain in the knees. This pain can often (but not always) be alleviated by performing a slightly different variation of the split. See section [The Front Split](#). See section [The Side Split](#).

[The Front Split](#)

- [The Side Split](#): (next subsection)
- [Common Problems When Performing Splits](#): (previous subsection)

- [Performing Splits](#): (beginning of section)

For front splits, the front leg should be straight and its kneecap should be facing the ceiling, or sky. The front foot can be pointed or flexed (there will be a greater stretch in the front hamstring if the front foot is flexed). The kneecap of the back leg should either be facing the floor (which puts more of a stretch on the quadriceps and psoas muscles), or out to the side (which puts more of a stretch on the inner-thigh (groin) muscles). If it is facing the floor, then it will probably be pretty hard to flex the back foot, since its instep should be on the floor. If the back kneecap is facing the side, then your back foot should be stretched out (not flexed) with its toes pointed to reduce undue stress upon the knee. Even with the toes of the back foot pointed, you may still feel that there is too much stress on your back knee (in which case you should make it face the floor).

[The Side Split](#)

- [Split-Stretching Machines](#): (next subsection)
- [The Front Split](#): (previous subsection)
- [Performing Splits](#): (beginning of section)

For side splits, you can either have both kneecaps (and insteps) facing the ceiling, which puts more of a stretch on the hamstrings, or you can have both kneecaps (and insteps) face the front, which puts more of a stretch on the inner-thigh (groin) muscle. The latter position puts more stress on the knee joints and may cause pain in the knees for some people. If you perform side splits with both kneecaps (and insteps) facing the front then you **must** be sure to tilt your pelvis forward (push your buttocks to the rear) or you may experience pain in your hip joints.

[Split-Stretching Machines](#)

- [The Side Split](#): (previous subsection)
- [Performing Splits](#): (beginning of section)

Many of you may have seen an advertisement for a *split-stretching* machine in your favorite exercise/athletic magazine. These machines look like "benches with wings". They have a padded section upon which to sit, and two padded sections in which to place your legs (the machine should ensure that no pressure is applied upon the knees). The machine functions by allowing you to gradually increase the "stretch" in your adductors (inner-thigh muscles) through manual adjustments which increase the degree of the angle between the legs. Such machines usually carry a hefty price tag, often in excess of \$100 (American currency).

A common question people ask about these machines is "are they worth the price?". The answer to that question is entirely subjective. Although the machine can certainly be of valuable assistance in helping you achieve the goal of performing a side-split, it is not necessarily any better (or safer) than using a partner while you stretch. The main advantage that these machines have over using a partner is that they give you (not your partner) control of the intensity of the stretch. The amount of control provided depends on the individual machine.

One problem with these "split-stretchers" is that there is a common tendency to use them to "force" a split (which can often result in injury) and/or to hold the "split" position for far longer periods of time than is advisable.

The most effective use of a split-stretching machine is to use it as your "partner" to provide resistance for

PNF stretches for the groin and inner thigh areas (see section [PNF Stretching](#)). When used properly, "split-stretchers" can provide one of the best ways to stretch your groin and inner-thighs without the use of a partner.

However, they do cost quite a bit of money and they don't necessarily give you a better stretch than a partner could. If you don't want to "cough-up" the money for one of these machines, I recommend that you either use a partner and/or perform the lying 'v' stretch described later on in this document (see section [Working Toward the Splits](#)).

Go to the [previous](#), [next](#) chapter.

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