



# FLEXIBILITY



It has been proven that participating in a flexibility program will have numerous benefits. A flexibility-training program is a planned and deliberate program of specific stretching exercises that progressively increases the functional range of motion of a joint or set of joints over a period of time. Flexibility is not only the ability of a joint to move freely through a full range of motion, but also the ability to contract and recover without injury. Flexibility differs from person to person and from joint to joint on the same person. Flexibility involves all components of the musculoskeletal system, as well as specific neuromuscular pathways of the body. **The primary benefit of participating in a flexibility-training program is reduction of the risk of injury.**

Some of the benefits of participating in a flexibility-training program are:

- Increased physical efficiency and performance
- Increased neuromuscular coordination
- Increased enjoyment and sense of well-being
- Decreased risk of incidence and severity of injury
- Decreased risk of lower back pain
- Decreased onset of muscle soreness
- Decreased stress and tension

***You should consult your physician before beginning any exercise program.***

Stretching exercises are typically performed during the warm-up and/or cool-down components of workouts or athletic events. Stretching during the warm-up phase and cool-down phase serves different purposes.

A warm-up is a group of exercises or activities performed immediately before an activity, providing the body with a period of adjustment from rest to exercise. Stretches performed during a warm-up should be light to moderate with the goal of lengthening muscle fibers and preparing them for the activity to follow.

A cool-down is a group of exercises or movements performed immediately after an activity that provides a period of adjustment from exercise to rest. Stretches performed during this time should be deeper and longer to promote long-term increases in flexibility.

## **WARM-UP**

An effective warm-up consists of the following two phases. This important process will improve the quality of your workout and accelerate your recovery.

Phase 1: General warm-up. This phase consists of 5 to 10 minutes of activity, such as stationary cycling, jogging, light calisthenics, fast walking, running in place or jumping jacks. The intensity should be enough to increase the body core temperature and cause a light sweat, but not fatigue.

Phase 2: Specific warm-up or pre-stretch. The specific warm-up phase involves 5 to 10 minutes of movements that either mimic or are similar to the actual performance of the activity to follow. This phase includes light sport stretches. The stretching techniques that are most effective during this pre-stretch phase are held less than 10 seconds or are controlled dynamic stretches throughout a range of motion.

The biggest misconception is that stretching is the warm-up. The pre-stretch can be an optional part of the warm-up and should never replace the general warm-up.

A warm-up will:

- Increase the speed of contraction and relaxation of warmed muscles.
- Reduce muscle stiffness.
- Help nerve transmission and muscle metabolism at higher temperatures.
- Increase blood flow through active tissues as local vascular beds dilate, raising metabolism and muscle temperatures.
- Provide greater economy of movement because of lowered resistance with warm muscles.

## **COOL-DOWN**

The cool-down provides many benefits. It facilitates muscular relaxation, promotes the removal of metabolic waste products, reduces muscle soreness, and allows the cardiovascular system to adjust to a lowered demand. Your body will have built-up chemicals in your muscles and you may also have incurred a collection of microscopic strains and tears. A cool-down simply raises your breathing without overstraining your muscles. It also increases the concentration of oxygen within the blood. The cool-down is a group of exercises or movements performed immediately after an activity that provides the mind and body with a period of adjustment from exercise to rest. The cool-down is the optimal time to

improve long-term flexibility due to the increased muscle temperature created during the activity.

An appropriate cool-down will:

- Aid in the dissipation of waste products, including lactic acid.
- Reduce the potential for DOMS (delayed onset muscle soreness).
- Reduce the chance of dizziness or fainting caused by the pooling of venous blood at the extremities.
- Reduce the level of adrenaline in the blood.

## **FACTORS THAT INFLUENCE FLEXIBILITY POTENTIAL**

- **Past and current injuries**

Injuries can decrease joint range of motion temporarily, and sometimes permanently. Lack of activity, usually associated with injury, also causes loss of flexibility.

- **Lifestyle and current activity level**

A sedentary lifestyle usually results in the loss of flexibility. Regular participation in physical activity involving a full range of motion generally enhances flexibility.

- **Body composition/body type**

Range of motion is not affected by arm or leg length, arm span, height, or weight. However, an obese person may be very flexible, but may have a limited range of motion depending on the type of stretch performed (due to low adipose tissue in the abdominal area).

- **Age**

The aging process involves a loss of elasticity of connective tissues, including the tissues surrounding muscles. Regular exercise and stretching can minimize age-related muscle shortening and loss of flexibility.

- **Gender**

At any age, females tend to be more flexible than males. This is due to anatomical variations in joint structures.

- **Muscle temperature**

An increase in body temperature due to participation in physical activity increases the range of motion. Lowering the body temperature results in decreased flexibility.

- **Ability to relax**

Reduction in internal tension facilitates elongation of connective tissue, enabling you to have more range of motion.

## **STRETCHING TECHNIQUES**

There are many stretching techniques that can be used in flexibility training programs. The basic techniques are static, dynamic, ballistic, controlled dynamic, and PNF stretching (Proprioceptive Neuromuscular Facilitation). Each stretching technique uses passive (relaxing), active stretching (contracting), or a combination of both.

### **Passive (Relax)**

In passive stretching, the individual's muscles do not generate the stretching force. The stretching motion is performed by an outside aid, such as a partner, or a piece of equipment (i.e., a strap or rope) or the floor.

### **Active (Contract)**

In active stretching, the individual uses their own muscle contraction to perform the stretch without aid.

### **Combination of Passive and Active**

In passive-active stretching, the stretch begins with muscles relaxed and a partner or piece of equipment initiating the range of motion. Then, that range of motion is held only by the muscle contraction of the individual.

In active-passive stretching, the stretch begins with the individual contracting either the target muscles or the antagonist muscles, and then a partner or piece of equipment is used to increase the range of motion as the muscles relax. This is the most popular method used in PNF.

### **Static**

Static stretching is the safest and most common method of stretching. It involves slow and controlled muscle elongation held at an end point. The stretch is held for a period of time ranging from 10 to 60 seconds or more. Static stretching is low in intensity and long in duration. The advantages are that it is easy to perform, increases range of motion and enhances relaxation. The disadvantage is that it does not usually produce an increase in dynamic range of motion. Static stretching can be active, passive, or a combination of both.

### **Dynamic**

Dynamic stretching is movement through a range of motion. The movement can be ballistic or controlled. Dynamic stretching can be active, passive, or a combination of both.

### **Ballistic**

Ballistic stretching involves dynamic movements of high force and short duration. Ballistic stretches may appear to be rapid bouncing or bobbing. This type of stretching can be appropriate and functional for specific sports, such as martial arts, and specific job-related skills. However, it is generally considered unsafe and is likely to cause injury if not performed properly.

Ballistic stretching should only be performed when training for a specific sport or skill that uses similar ballistic action. Ballistic stretching should not be used for a cool-down.

### **Controlled Dynamic**

Controlled dynamic stretching is a slow and controlled movement through a range of motion, while not being held at an end point. It is often used by athletes to increase sport-specific flexibility. It keeps the heart rate up and is low force and short duration. The advantages are that it involves a functional range of motion and feels good prior to exercising. The disadvantage is that it is difficult to increase long-term flexibility with this type of stretching. It is typically performed only during the warm-up phase.

### **Proprioceptive Neuromuscular Facilitation (PNF)**

PNF is usually done with a partner, trainer, or therapist. An individual using a strap or towel for assistance can do many PNF stretches. Communication between partners is vital. PNF stretching is very effective in increasing range of motion. The PNF method requires thorough knowledge of proper techniques and effective trainer/client communication.

### **PNF techniques**

A wide variety of techniques can be used in PNF stretching, but the two most common techniques are: contract-relax and contract-relax-agonist contract.

#### **PNF/contract-relax**

- Stretch the target muscle to the end point.
- Using a partner or strap for resistance, contract the stretched muscle for **4 to 8 seconds**.
- Relax the contracted target muscle and gently move it to a new end point. Repeat **2 to 3 times**, starting at a new end point.

#### **PNF/contract-relax-agonist contract**

- Stretch the target muscle to the end point.
- Using a partner or strap for resistance, contract the stretched muscle for **6 to 10 seconds**.
- Relax the contracted target muscle and gently move it to a new end point.
- Using a partner or strap for resistance, contract the agonist muscle (opposite the target muscle) for **4 to 8 seconds**.
- Release the agonist contraction and move the target muscle to a new end point.
- Repeat **2 to 3 times**, starting at the new end point.

Safety is always the top priority. Not all stretches are safe and effective for everyone. Every stretch should have a specific purpose. A stretch should not cause extreme or sharp pain. Never stretch areas recently sprained or strained, or joints or muscles that are infected or inflamed, or are arthritic.