

Flexibility

- Definitions
- Factors of Flexibility
- Anatomical elements
- Types of Flexibility and Stretching
- Flexibility Training Programs
- Benefits of Stretching
- Mistakes made when you stretch
- How to stretch
- Static Stretching Exercises
- Dynamic Stretching Exercises
- References



Definitions



- **Flexibility** refers to the absolute range of movement in a joint or series of joints, and length in muscles that cross the joints.
- **Stretching** is a form of physical exercise in which a specific skeletal muscle is deliberately elongated, in order to improve the muscle's felt elasticity and reaffirm comfortable muscle tone.
- **Elasticity** – The property of a material to resist deformation from a force and to quickly return to its normal shape.



Factors of flexibility

- Joint structure
- Ligaments,
- Tendons,
- Muscles,
- Skin,
- Tissue injury,
- Fat (or adipose) tissue,
- Body temperature,
- Age
- Gender



Anatomical Elements of Flexibility

- Joints
- Ligaments
- Tendons
- Connective Tissue
- Muscular Tissue
- Stretch Receptors

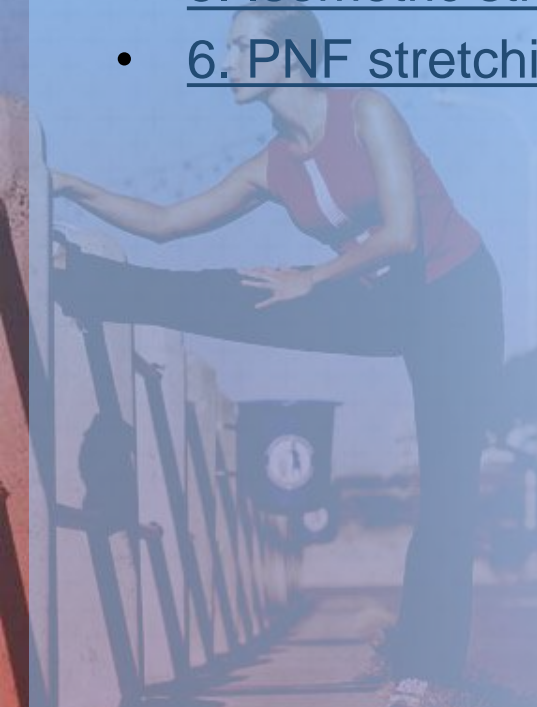


Types of Flexibility and Stretching

- **1. Dynamic flexibility** -- the ability to perform dynamic movements within the full range of motion in the joint. Dynamic flexibility is generally more sport-specific than other forms of mobility.
p.e.twisting from side to side or kicking an imaginary ball.
- **2. Static Active flexibility** -- this refers to the ability to stretch an antagonist muscle using only the tension in the agonist muscle.
p.e.holding one leg out in front of you as high as possible. The hamstring (antagonist) is being stretched while the quadriceps and hip flexors (agonists) are holding the leg up.
- **3. Static Passive flexibility** -- the ability to hold a stretch using body weight (with help of gravity) or some other external force.
p.e.holding your leg out in front of you and resting it on a chair. The quadriceps are not required to hold the extended position.

Flexibility Training Programs

- 1. Dynamic stretching
- 2. Ballistic stretching
- 3. Static Active stretching
- 4. Static Passive stretching
- 5. Isometric stretching
- 6. PNF stretching



Benefits of Stretching

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
- reduced severity of painful menstruation (*dysmenorrhea*) in females

Mistakes made when stretching

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



How to Stretch

- Do not overstretch or stretch to the point of pain or discomfort.
- A low-resistance, sustained stretch is preferred to high-resistance stretch with quick, bouncing movements.
- Stretch gradually. If you stretch the muscle too quickly, it responds with a strong contraction which increases tension. If stretched slowly, the contraction is avoided, muscle tension falls and you can then stretch the muscle further.
- Hold each stretch for 30 to 40 seconds. To gain the most benefit from stretching, do a short warm-up first, then stretch.



When to stretch

- Stretching is an important part of warming-up before and cooling-down after a workout.
- Stretch periodically throughout the entire day.
- Stretch before exercise



Dynamic Stretching

- Slow controlled movements through the full range of motion
- Improves dynamic flexibility and is quite useful as part of your warm-up for an active or aerobic workout
- Do not confuse dynamic stretching with ballistic stretching!
- In dynamic stretches, there are no bounces
- e.g. slow, controlled leg swings, arm swings, or torso twists.





Static Active Stretching

- An active stretch is one where you assume a position and then hold it there with no assistance other than using the strength of your agonist muscles
- The tension of the agonists in an active stretch helps to relax the muscles being stretched (the antagonists) by reciprocal inhibition
- 10-15 sec.
- Yoga
- e.g. bringing your leg up high and then holding it there without anything to keep the leg in that extended position.



Static Passive Stretching

- where you assume a position and hold it with some other part of your body, or with the assistance of a partner or some other apparatus.
- Relaxed stretching is also very good for "cooling down" after a workout and helps reduce post-workout muscle fatigue, and soreness.
- e.g. bringing your leg up high and then holding it there with your hand, splits (the floor is the apparatus)



Ballistic Stretching

- Ballistic stretching uses the momentum of a moving body or a limb in an attempt to force it beyond its normal range of motion.
- This type of stretching is not considered useful and can lead to injury.
- It does not allow your muscles to adjust to, and relax in, the stretched position.
- e.g. bouncing down repeatedly to touch your toes.



Isometric Stretching

- Involves the resistance of muscle groups through isometric contractions (tensing) of the stretched muscles.
- The proper way to perform an isometric stretch is as follows:
 - Assume the position of a passive stretch for the desired muscle.
 - Next, tense the stretched muscle for 7-15 seconds (resisting against some force that will not move, like the floor or a partner).
 - Finally, relax the muscle for at least 20 seconds.
- Isometric stretching is *not* recommended for children and adolescents whose bones are still growing.
- To apply resistance manually to one's own limbs, to have a partner apply the resistance, or to use an apparatus such as a wall (or the floor) to provide resistance.



P.N.F.(Proprioceptive Neuromuscular Facilitation)

- It is not really a type of stretching but is a technique of combining passive stretching (see section [Passive Stretching](#)) and isometric stretching (see section [Isometric Stretching](#)) in order to achieve maximum static flexibility.
- The most common PNF stretching techniques are:
 - the *hold-relax* (20 sec.)
 - the *hold-relax-contract* (7-15 sec.)
 - the *hold-relax-swing*
- 3-5 repetitions (resting 20 seconds between each repetition).



How do you test your Flexibility?

- Deep lunge
- Sit and reach
- Shoulders stretch
- Trunk lift



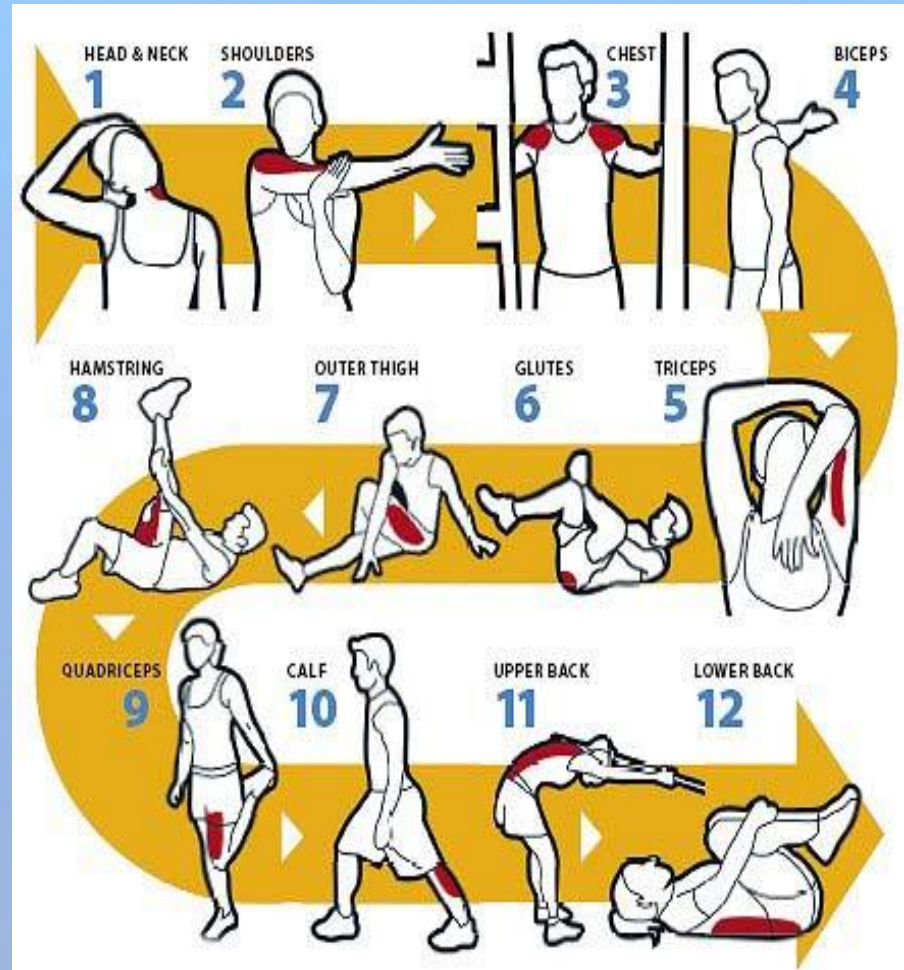
Dynamic Stretching Exercises

- **Neck Mobility**
- **Shoulder Circles**
- **Arm Swings**
- **Side Bends**
- **Hip circles and twists**
- **Half Squat**
- **Leg Swings**
- **Lunges**
- **Ankle Bounce**



Static Stretching Exercises

- Chest Stretch
- Biceps Stretch
- Upper Back Stretch
- Shoulder Stretch
- Shoulder and Triceps Stretch
- Side Bends
- Abdominal and lower back muscles
- Hamstring Stretch
- Calf Stretch
- Hip and Thigh Stretch
- Adductor Stretch
- Groin Stretch
- Front of Trunk Stretch
- Iliotibial Band Stretch
- Quadriceps Stretch



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