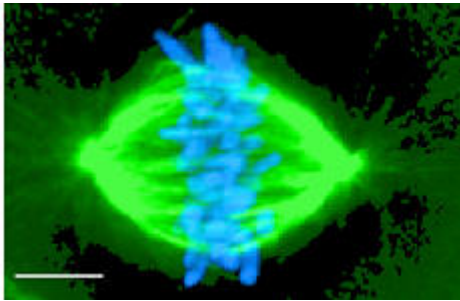


Mobility Training and the Application of Proper Warm-up for Body Builders



Researched and Composed by Adam "Old School" Knowlden

Abstract

There is a profusion of scientific confirmation for the benefits of proper warm-up in relation to athletic events. Athletes generally warm up prior to activity with the purpose of improving performance and reducing the occurrence of injuries. The principal intention of this regime is to organize the athlete physically and mentally for optimal performance while reducing the risk of injury. The purpose of this article is to discuss warm-up and, in particular, to review recent research and its application to the sport of body building.

Upon examination of current research, combined physiology studies confirm a protocol of aerobic activity, dynamic and static stretching, accompanied by coordinated voluntary muscular contractions, as the most likely regimen for increasing flexibility and decreasing injuries in the sport of body building.

(McArdle, W.D., F.I. Katch, and V.I. Katch/ Safran, M.R., W.E. Garrett, A.V. Seaber, R.R. Glisson, and B.M. Ribbeck/ Stewart, I.B., and G.G. Sleivert)

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(The above photo is an Immunofluorescence staining of a mitotic spindle. Microtubules and chromatin are shown in green and blue respectively. [Photo courtesy: Chemical genetics](#))

Flexibility and Applications

As opposed to strength, speed and other motor abilities, flexibility belongs not to the causative factors of movement but to the morpho-functional properties; in laymen terms, it helps govern motion.

Aside from governing simple contraction and relaxation, the motor system carries out the additional task of coordination within the muscle groups.

Proprioceptors in the muscles, tendons and joints, which detect muscle length, tension and joint angle, are critical in providing information to the motor system. As a result, flexibility enhances the development of coordination and technique and the ability of the proprioceptors to receive stimuli (Apostolopoulos, Nikos. p.49).

The practice of preparing a warm-up segment of activity and then a flexibility program prior to engaging in weight training for injury prevention has been well-documented. Exercise specialists are aware of the need for proper stretching to promote a reduced risk of musculoskeletal damage.

Flexibility is defined as the range of motion (ROM) of a joint or a series of joints (Stewart, I.B., and G.G. Sleivert. p. 154).

Flexibility is an important aspect of any sports program, especially when the activity is dynamic and demanding in nature. Optimum flexibility provides increased resistance to muscle injury while also helping to eliminate movement that is awkward and/or inefficient. This has the effect of improving athletic performance (Hendrick, Allen. v. 14, pp. 33-38, 25-27).

Furthermore, flexibility is specific to a particular joint or set of joints. Flexibility increases with heat and decreases with cold temperatures. Studies show that physically active individuals are usually more flexible than inactive individuals (Hendrick, Allen. v. 15, pp. 25-27, 62-66, / Hardy, L. pp. 150-153).

This is due to the fact that connective tissues tend to become less pliable when exposed to a limited ROM, which would be seen in people with a sedentary lifestyle. A decrease in activity level will result in an increase in percent body fat and a decrease in the pliability of connective tissue. Further, an increase in fat deposits around the joints creates obstructions to ROM (Anderson, B., and E.R. Burke, pp. 63-86).

A vital component of a complete conditioning program is proper flexibility training. Being flexible provides many benefits in training as well as in daily life activities (Roetert, E. Paul. p. 76).

Flexibility is responsible for the following benefits (*Safran, M.R., W.E. Garrett, A.V. Seaber, R.R. Glisson, and B.M. Ribbeck*):

- Allocates for sport-specific strengthening in movement extremes.
- Accommodates stresses by helping tissue distribute impact shock and force loads more effectively.
- Lightens the work of opposing muscle groups by providing less restricted motion and enhances blood supply and tissue nourishment.
- Allows for good form without compensation from other body segments.
- Overcomes imbalances created by the specific sport and by daily activities.

Injury Report

Skeletal muscle cells are contiguous with tendon fibrils. There is no continuity between the muscle cells and the tendon fibrils from the origin and insertion ends of the musculotendon system to the bone (Ippolito, Perugia, and Postacchini 1986).

The maximal tensile strength of a muscle (its resistance to pull) is approximately 77 to 80 pounds per square inch (Hollinshead and Jenkins 1981). This enables a large muscle to act through a small tendon. Therefore, it is almost physically impossible for an injury to result from a tendon tearing in the middle. When an injury does happen, it occurs either in the muscle fiber near the junction between muscle and tendon or where the tendon connects to the bone (Apostolopoulos, Nikos. p. 52).

Many athletic activities and sports have the potential to facilitate increased laxity within the joints involved because of the repetitive stressful motions.

When stretching, connective tissue (muscles, ligaments and tendons) is the central target of the exercise. Although muscle is not technically deemed a connective tissue makeup, studies have revealed that when a relaxed muscle is stretched, all of the resistance to stretch is a derivative from the extensive connective tissue framework and sheathing within and around the muscle.

Under normal circumstances, connective tissue is the major structure limiting joint extent of motion. Furthermore, range of motion is primarily limited by one or more connective tissue structures, including ligamentous joint capsules, tendons and muscles (*McArdle, W.D., F.I. Katch, and V.I. Katch*).

There are two fundamental types of stretch that occur. These are referred to as *elastic and plastic*.

An elastic stretch is a “spring-like” action in which any lengthening of the connective tissue that occurs during stretching is recovered when the load is removed. This makes elastic stretch a momentary condition. In contrast, the elongation that occurs in a plastic stretch remains, even after the load is removed, making a more permanent aftereffect.

Muscle has only elastic properties, whereas ligaments and tendons have both plastic *and* elastic properties. As connective tissue is stretched, some of the lengthening transpires in the elastic tissue elements and some in the plastic elements. When the stretch is removed, the elastic deformation recovers, but the plastic deformation remains.

This reveals that stretching procedures should primarily be premeditated to produce a plastic deformation, as a permanent increase in ROM is the objective.

When stretching, the proportion of elastic and plastic deformation can vary, depending on how and under what conditions the flexibility training occurs.

Emphasizing stretching to the position of mild distress (defined as intensity level), holding the selected stretched arrangement for a period of time (defined as duration) and stretching only when the core temperature has been elevated will support plastic stretch!

“Warm-up” and static stretching are not synonymous, as static stretching does little in the way of increasing body temperatures. “Warm-up” is an activity that raises the total body temperature, as well as the temperature of the muscles, to prepare the body for intense exercise. The increase in tissue temperature that occurs during warm-up is the result of three physiological processes (Anderson, B., and E.R. Burke. pp. 63-86):

- (a) Friction of the sliding filaments during muscular contraction
- (b) The metabolism of fuels and
- (c) The dilation of intramuscular blood vessels.

Theoretically, the following physiological changes take place during warm-up and should enhance performance:

- The temperature increases within the muscles that are being recruited during the warm-up session. A warmed muscle contracts more forcefully and relaxes more quickly. Because of this, both speed and strength should be enhanced during exercise.
- The temperature of the blood as it travels through the working muscle increases. It is an established fact that as blood temperature rises, the amount of oxygen it can hold becomes reduced (especially at the partial pressures in the muscle). This makes available more oxygen to the working muscles.

- The ROM around joints is increased because elevated core temperatures lower muscle, tendon and ligament viscosity (Anderson, B., and E.R. Burke. pp. 63-86).

Because of these changes, many researchers believe that heavy load static stretching should occur only after warming up. The benefits of increasing muscle temperature prior to flexibility training are accepted by a majority of strength and conditioning professionals. The physiological responses that occur after warming up warrant the continuation of the warm-up as a method to prepare the body for flexibility training.

Unfortunately, the pre-work warm-up program often consists predominantly or solely of static stretching.

There are 3 distinct disadvantages to using static stretching to increase core temperature:

- (a) Static stretching is a passive activity and there is minimal friction of the sliding filaments occurring
- (b) There is little, if any, increase in the rate of fuels being metabolized and
- (c) There is no need for the intra-muscular blood vessels to dilate in response to static stretching (McBride, J. 1995).

Because of this, athletes using static stretching to warm-up begin exercise with negligible core body temperature elevation. This reveals that they are missing out on the benefit of increased core temperature, resulting in decreased viscosity of the muscle, which can reduce muscle and joint stiffness. The decrease in viscosity leads to increases in ROM, which provides protection to the body during explosive exercises (Ninos, Joel pp. 48-49).

As recommended by J. McBride, the warm-up is part of the foundation of a successful practice session. Getting fully warmed up, mentally and physically, is a strategic aspect of achieving a training intensity required to attain optimal results. However, many athletes endeavor to take shortcuts in the warm-up protocol, which translates into a poor workout or competition (Hedrick, A. v. 14, 25-27).

There are several types of injuries related to bodybuilding, which will be covered more in depth in future articles.

Opposing muscle group strength ratios are a common cause of injury. Research shows that great differences in strength between two opposing muscle groups, for example, having a hamstring-quadriceps ratio lower than 61%, as well as a strength imbalance of 8–10% between right and left hamstrings, are the main causes of hamstring injuries (Orchard et al. 1997, Burkett 1970).

However, the primary injury body builders are prone to receive is tendonitis.

The medical term, *-itis*, means "inflammation". Tendonitis is literally, "inflammation of a tendon".

Common symptoms of tendonitis include sharp pain and irritation at the site of the inflammation. Tendonitis resulting from bodybuilding activities is commonly caused by a lack of appropriate warm-up.

To avoid common ROM injuries, body builders should adhere to a workout ritual based upon these fundamental foundations:

1. Proper form of an exercise.
2. Hydration before, during and after exercise.
3. A proper mobility program.
4. Adequate post-workout nutrition (see: [The Window of Opportunity](#))

Warm-up, Flexibility and Stretching Compositions

There are various sub-topics of flexibility and stretching that must be identified before a proper analysis of workout advancement can be discussed.

Warm-up Variations

There are 3 types of warm-up methods: *passive, general and specific*.

Regardless of the warm-up method chosen, the general purpose of warming up prior to physical activity is to increase muscle temperature (Silvey, S. 1999). The 3 warm-up methods are the following:

1. *Passive*. This warm-up incorporates external heating factors, such as hot baths, heating pads, massage and ointments.
2. *Standard*. Standard warm-up is aimed at increasing core temperature.
3. *Specific*. This type includes actions that are a part of the sport activity, such as a baseball pitcher throwing a baseball at practice. Specific warm-up allows for increasing tissue temperature and rehearsal of the activity prior to full exertion (Hardy, L., and D. Jones. p. 150–153).

Because of the many benefits of warming up, a quality flexibility program should always begin with activities designed to increase core temperature. Body temperature should be elevated to a point that the athletes have broken out in a sweat before beginning flexibility work (McBride, J. 1995).

Flexibility Variations

Kinetic – requires dynamic movements of the muscles to bring a limb through its full range of motion in the joints.

Active - maintains extended positions using only the tension of the agonists and synergists, while the antagonists are being stretched.

Passive – involves an external factor such as another body part or partner involved to facilitate the stretch. Passive flexibility assumes extended positions and then holds them using only body weight, limb support, or some other device.

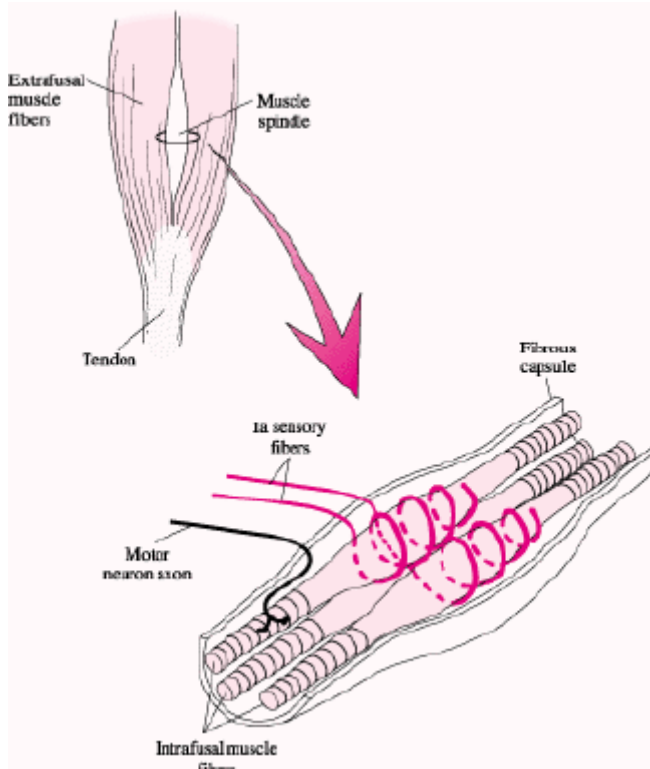
Stretch Factor Training

Performance flexibility is balanced flexibility and is best developed through the techniques of the principles of frequency, intensity and duration.

Repetition of a stretch reinforces the imprint on the neuromuscular system (Apostolopoulos, Nikos. p. 61).

Static stretching

Static stretching means stationary stretching and involves no movement. Statically stretching a muscle entails pulling it to its farthest point and then holding that position. The stretch will be greater, as only the length monitoring muscle spindles will be activated during a static stretch because no speed is involved.



(**Table 1** shows the anatomical organization of the muscle spindle stretch receptor. Encapsulated structures (muscle spindles) parallel the muscle fibers making up the bulk of the muscle (extrafusal muscle fibers). As shown in the magnified view in the lower part of the figure, the capsule of the spindle contains specialized muscle fibers (intrafusal muscle fibers) that receive sensory fibers (shown in red) from group Ia sensory neurons. The sensory fibers spiral around the muscle fibers. The intrafusal muscle fibers also receive inputs from motor neurons. (Photo courtesy of the 11th hour, Blackwell Science)

In one case study, both static and dynamic stretches were factors in considering which had a greater impact on range of motion of the hamstrings.

The results of this study revealed that, although both static stretch and DROM will increase hamstring flexibility, a 30-second static stretch was more effective than dynamic stretching for enhancing flexibility, and actually doubled the range of motion (J Orthop. Sports Phys Ther. pp. 295-300)!

Static stretching is perhaps the most commonly used method to increase flexibility. Static stretching involves passively stretching into a near maximal position and holding for an extended duration.

Attaining the maximal position of the static stretch should be done slowly and only to a position where minor discomfort is felt. The feeling of tension should lessen as the stretch is continued and, if it does not, the stretched position should be reduced to some extent. This technique will likely avoid activation of the stretch reflex (Hedrick, A. v. 15, pp. 62-66) to offset overstretching.

In one particular case study testing the flexibility parameters of the human hamstring, ROM was increased after static stretching. ROM remained unchanged in the resistance training group as well as in the control group. However, the end ROM torque showed a significant increase after static stretching (Wiemann, K., and K. Hahn. pp. 340-346).

Active stretching

Ballistic Stretching

Ballistic stretching utilizes the momentum of a moving body or a limb in an attempt to force it past its standard range of motion. This is stretching by bouncing into a stretched position, using the stretched muscles as a spring, which pulls you out of the stretched position.

Dynamic stretching

Dynamic means, "Of or relating to energy or to objects in motion." Dynamic stretching is stretching that requires motion! Dynamic stretching is a highly effective utilization of warming-up and involves moving parts of the body while gradually increasing reach, speed or both, depending upon the activity. Dynamic stretching consists of controlled, strict movements that smoothly take the body to the boundaries of its range of motion.

Passive stretching

A passive stretch involves holding a stretch by means of partner assistance or apparatus to maintain balance.

The American Journal of Sports Medicine (Noonan, T.J., T.M. Besat, A.V. Seaber, and W.E. Garrett) conducted a field study on the tibialis anterior and extensor Digitorum Longus of rabbits to discover the effect of temperature had on the mechanical failure properties of the muscles.

"Muscles were pulled to failure according to assignment into one of three groups: 1) passive failure at 10 cm/sec, 2) passive failure at 1 cm/sec, or 3) active (muscle is stimulated to contract as it is pulled) failure at 10 cm/sec."

Which concluded: "This study offers experimental data to support the theory that warming muscles can aid in injury prevention and improvement in athletic performance."

Isometric stretching

Isometric stretching is a branch of static stretching. It involves the resistance of muscle groups through isometric contractions, or tensing, of the stretched muscles. The standard means of practical resistance for this variation is self-induced resistance manually applied to one's own limbs, to have a trainer submit external resistance. Equipment such as a bench or wall is also applicable. (Safran, M.R., W.E. Garrett, A.V. Seaber, R.R. Glisson, and B.M. Ribbeck).

The proper method of isometric stretching is as follows:

1. Take the position of a passive stretch for the targeted muscle.
2. Tense the stretched muscle for a prescribed duration, resisting against an immobile force such as a bench or training partner.
3. Lastly, rest the targeted muscle.

A study conducted by the American Journal of Sports medicine found isometric preconditioning is of benefit in preventing muscular injury by increasing the length to failure and elasticity of the muscle-tendon unit.

PNF Stretching

Over time, proprioceptive neuromuscular facilitation (PNF) stretching techniques have been used as an effective method of increasing muscular flexibility.

PNF stretching consists of three components:

1. A Static stretch, followed by
2. An isometric (static) contraction for approximately 6 – 10 seconds of the muscle(s) against an immovable resistance (such as a trainer or piece of equipment), followed by
3. Relaxation of the muscle before being stretched further statically. The action is normally repeated 2 – 3 times before gently relaxing to normal (Etnyre, B.R., and L.D. Abraham).

PNF was first developed by physical therapists and is now widely accepted as a helpful method of increasing range of motion. The PNF method involves slowly placing the muscle or joint in a static stretch while keeping the muscle relaxed.

Subsequent to this static stretch, the muscle is briefly contracted isometrically against a selected, external force, acting in the same direction as the stretch. This force should be resistant enough to avert any movement in the joint. The muscle or joint is taken out of the stretched position momentarily and a second stretch is completed, potentially resulting in a greater stretch.

The isometric contraction will effect the stimulation of the particular Golgi tendon organs, which may help maintain low muscle tension during the terminal stretching

maneuver, allowing for connective tissue to further lengthen and increase, resulting in increased ROM (Hedrick, A. 15: (4)62–66).

In a study evaluating increases in ROM resulting from static and PNF stretching procedures, it was found that, although both procedures resulted in increased flexibility, subjects using the PNF method gained the most ROM (Sady, S.P., M. Wortman, and D. Blanke).

PNF is one of the best methods for increasing the range of motion. Some studies have shown that PNF stretching is more beneficial than static stretching in the elongation of muscles. Although some studies suggest that PNF stretching produces superior results, it can be impractical to utilize. One reason is that a partner is needed to really get the effect and then the partner must be sure not to overstretch the muscle. This stretching method can be dangerous unless each person is familiar with the appropriate techniques, as too much stress can be placed on flexibility and not as much on correct technique (Sullivan, P.E., P.D. Markos, and M.D. Minor).

One of the techniques used in PNF stretching is called hold–relax ((Ninos, Joel). This technique calls for the athlete to assume a stretch and then contract the muscle that is to being stretched for several seconds, then slowly relax the same muscle. As the muscle is relaxed, the muscle is stretched to a new length.

This process can be repeated several times for each muscle group to be stretched.

Often PNF stretching is done with partner assistance. However, it is possible for a person to utilize a form of PNF stretching while exercising solo.

To describe completion of individualized contract–relax stretching, stretching of the hamstrings will be detailed and quoted from the “Strength and Conditioning Journal” (Ninos, Joel).

- Assume the position for stretching the hamstrings.
- Be sure that the knee of the leg to be stretched is fully extended and that the back is kept straight so that forward flexion of the trunk occurs at the hip. If tightness within the hamstrings does not allow for the knee to be fully extended while keeping the back straight, it would be better to allow the knee to remain flexed while keeping the back straight. This is helpful for protecting the lower back.
- Lean the trunk forward to the point of feeling a comfortable stretch within the hamstrings.
- To elicit a contraction of the hamstrings, slightly flex the knee and push the heel of the leg to be stretched into the supporting surface.
- Hold this isometric contraction for several seconds. Do not try to create a maximal isometric contraction.

- Relax the contraction and lengthen the hamstrings to a new stretched position by slowly leaning the trunk forward until you again feel a stretch in the hamstrings.
- This new stretched position should be held for 20 to 30 seconds.
- Repeat the last 3 steps 3 to 5 times for each muscle group intended to be stretched.

When emphasizing a stretch position that maintains the position, resist the isometric contraction of the muscle to be stretched with the hand that is holding the position. Upon relaxing the contracted muscle, stretch the muscle for 20 to 30 seconds. Repeat the process 3 to 5 times (Wallin, D., B. Ekblom, R. Grahn, and T. Nordenborg).

It is possible to apply the above-mentioned contract-relax PNF self-stretching techniques to any muscle group within the body (Etnyre, B.R., and L.D. Abraham. Gains pp. 189-196).

Application of Mobility Training:

As mentioned earlier, flexibility increases with heat and decreases with cold temperatures. Muscle stiffness is a precursor for injury. With this in mind, proper workout attire is recommended.

During colder weather or days in which your body feels stiffer or "rigid," dress can become a significant factor in a proper warm-up. In such instances, heavier clothing can be worn during the warm-up phase and stripped off during the actual workout phase. As such, a good rule of thumb is that a body builder should have broken a sweat before starting their first working set. This ensures that core body temperatures have risen and flexibility is enhanced.

Initial Warm-Up Phase:

- 5-10 minutes light to medium aerobic activity

Physiologically, a warm-up phase of 5-15 minutes of aerobic activity has proven to increase blood flow to the extremities and increase oxygenation of the working muscle tissue. Increasing the intra-muscular temperature reduces the likelihood of muscle, connective tissue or ligamentous damage by enhancing tissue elasticity (Brooks, G.A., T.D. Fahey, and T.P. White).

Elevated muscle temperature also amplifies the muscles' ability to tolerate stresses with a reduced level of strain. After lifting weights in a concentric or shortening fashion for a desired number of repetitions and sets, the contractile muscle-resting length is reduced. Now that blood flow has increased to the focused muscle group region, the blood vessels within the musculotendinous environment can further

benefit from performing both static and dynamic stretches during the warm-up phase of the training session (Sullivan, P.E., P.D. Markos, and M.D. Minor).

The result of the warm-up segment will aid in maintaining muscular length and further assists in vasodilatation or opening of blood vessels to promote better tissue elasticity and nutrient exchange at the cell membranes.

Through this it can be confirmed that warming up first with moderate aerobic activity will increase blood pumps!

Flexibility-Warm-Up Phase:

- Dynamic stretching
- Low load static stretching

Gambetta states,

“...Static stretches before warm-up or competition can actually cause tiredness and decrease coordination. In addition, static stretching improves static flexibility, while dynamic stretching improves dynamic flexibility; therefore, it is not logical to use static stretches to warm-up for dynamic actions.”

Dynamic flexibility is the action of moving a joint through its range of motion with little resistance and is used to improve flexibility, coordination, balance, proprioception and movement speed (Fredrick, Gregory A., Szymanski, David J. pp. 21–30).

Dynamic stretching raises core body and deep muscle temperatures, elongates active muscles (elasticity), decreases the inhibition of antagonist muscles, stimulates the nervous system (arousal) and helps to significantly decrease the chance of injury (Brooks, G.A., T.D. Fahey, and T.P. White. pp. 260-78).

In addition, dynamic stretching aids in practicing the mechanics and technique that would normally be practiced at some stage in a speed, agility, or plyometric training session.

This means that dynamic stretching and flexibility can be employed to improve running exercise mechanics separate from a training session targeted at accomplishing the same goal. Therefore, if a body builder engages in both types of training sessions, he or she will receive twice the opportunity to rehearse range of motion (Fredrick, Gregory A., Szymanski, David J. pp. 21–30).

Dynamic stretches:

Dynamic stretching offers the opportunity to create a body movement that gently loosens the targeted muscle group(s). Dynamic or “action” stretch variations are

literally limited only to the imagination of the athlete. Understanding the biomechanics of a muscle can only enhance one's ability to create dynamic stretches for all areas of the body. The list presented here is by no means exclusive!

With dynamic stretching exercises, the movements should be highly controlled and balanced. There should be no forced or sudden changes in movement. Rep ranges for dynamic movements are typically between 6-15 and should **never** be taken to failure.

During a dynamic stretch it is important to work up to the maximum range of motion. In other words, Swiss ball dynamic squats (see below) should be executed by performing partial repetitions that gradually work up to 1 full rep. At this point, begin counting reps.

This is especially imperative for dynamic stretches that mimic compound exercises.

Understanding the biomechanics of muscle movement will open up a plethora of variations. A comprehension of muscle movements, bone mechanics (osteology) and arthrology will allow the body builder to incorporate an unlimited amount of dynamic stretches into his or her warm up protocol.

For more information on this topic, see:

[The Mechanics Of Bone Tissue Part I](#)

[Anatomy of The Deltoid Complex](#)

(Also see the entire "[Muscle group training guides](#)", located under the "Anatomy" section of the site)

For example, static stretching of the calf may consist of pushing into a wall with the hip in a flexed position or stretching the calf against a flat surface.

The shortcoming of this static stretch is that it does little if anything to raise core body temperature.

The same movement could be mimicked to produce a dynamic stretch.



- Double leg raise/spring- Lean with hands on the wall and weight on toes, raise and lower both heels rapidly (bounce).
- Each rep, lift heels one to two inches from the ground while maintaining ground contact with the balls of the feet.
- Single leg raise/spring - lean with hands on a wall and all body weight on the left foot, raise the right knee forward while pushing the left heel towards the ground.

Afterward lower the right foot to the floor while raising the left heel one or two inches.

Another possibility can be to include the dynamic stretch into an aerobic activity. To make this exercise a dynamic aerobic stretch, the body builder could simply walk on his/her toes for a length of 10 yd both forward and backward.

To incorporate the frontal calf into the stretch, the body builder walks on his or hers heels. Next, combine the 2 stretches in a heel-to-toe walk. This exercise can be done first walking and sped up as the stretch progresses (Shellock, F.G., and W.E. Prentice).

The key to this stretch, and any dynamic stretch, is to contract the muscle at its maximum range of motion throughout the movement.

Substituting static stretching exercises with dynamic ones is not difficult. The main difference is that dynamic stretching does not hold the stretched state and involves movement to illicit a heating response. Many times, the actual stretching exercise is the same, but it is preceded and followed by some form of action (Sullivan, M.K., J.J. DeJulia, and T.W. Worrell).

Dynamic exercises tend to be sports-specific; as such, this paper will look at stretches that can be incorporated into a body builder's warm-up plan.

An effective static stretch for the posterior deltoids involves positioning your right hand across the chest until the same hand touches the left anterior delt. This arm

position is the bottom of the range of motion of the rear delts. From this point, the athlete would use his or her free hand to press against the wrist. When done statically, a firm pull will be felt on the posterior deltoid head.

Making this stretch dynamic involves simply performing the same static stretch in motion! Start by slowly performing the same movement. As you reach the peak of the range of motion, pull on the muscle slightly, emphasizing a good stretch. Once this point is reached, bring your arm back to the starting point. Remember to only hold the stretch for a brief "1 count" and return to the original position.

Now repeat the same motion with the other arm. After a few repetitions, the athlete can begin quickening the pace, alternating arms; however, the movement is always kept under control and feeling the pull at the end of the range of motion is emphasized.

Upon observation, the movement executed is the same extent of action as a standing bent over lateral, utilizing its full range of motion.

However, when done dynamically, this motion will give the benefit of stretching the muscle and heating the muscle, while not taking any of its strength away.

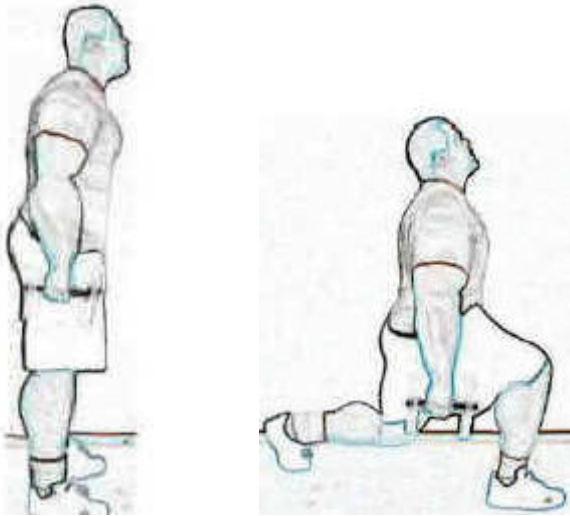
Other examples include doing weightless lateral and frontal raises, emphasizing the "peak stretch" at the end of the range of motion for shoulders. Again, by "peak stretch" the body builder needs to feel the muscle slightly 'pull' as it reaches the end of the range of motion for the movement and then hold it for a brief "1 count".

Take the movement to this point, and not beyond this point, and return to the starting position.

Flexibility of the adductor muscles is important for maximum leg training. This can be incorporated through the use of side and forward lunges. Allow for a brief stretch as the dynamic movement is performed.

Dynamic Lunges

Keep your head up and back straight; this is your start position. Drop your left leg toward the floor by bending both knees, making sure your right knee doesn't pass over the plane of your toes. Stop just short of your rear knee touching the ground as your front thigh comes parallel to the floor. Press back up, forcing your bodyweight through the heel of your forward foot. Complete reps on this side then switch to work the other (done without extra weight!).



Swiss Ball Dynamic Squat

Other excellent apparatus for dynamic stretching are the Swiss ball and thera bands. In this example, the Swiss ball is utilized to prepare for heavy squats dynamically.

- *Begin by standing away from a wall. Place a Swiss ball between the back and wall, keeping it pressed firmly against the wall with the middle of the back. Stand tall with good posture, holding the hands out in front for balance.*
- *Now bend at the knees until thighs are parallel with the floor*
- *Keep the back long throughout the movement and look straight ahead*
- *Knees always point in the same direction as the toes*
- *Head up and back straight, bend the knees and lower until thighs are parallel with the ground. Once at parallel, push back up to the starting position flexing the legs.*

Leg Swings

For warming up the leg extensors and abductors dynamically, a prescription of leg swings is in order.

Extension-

- *Stand sideways bracing the wall.*
- *Keep weight on right leg and your left hand on the wall for balance.*
- *Swing your left leg forward and backwards; remember controlled movements that feel the stretch.*
- *Repeat for each leg.*

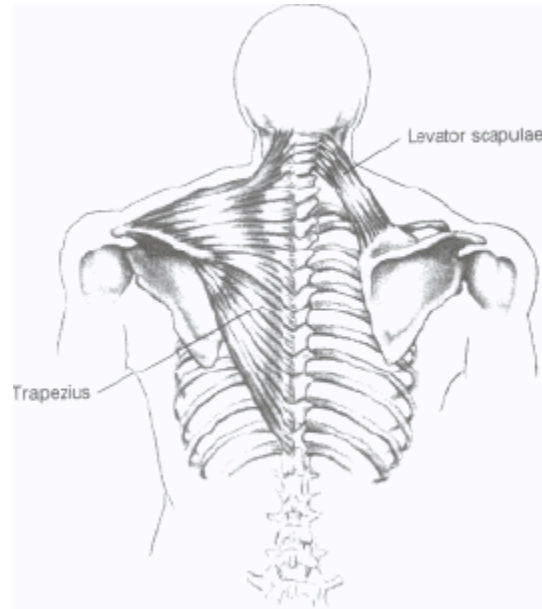
Abduction –

Leaning slightly forward with both hands on a wall and with the athlete's body weight on the left leg, swing the right leg to the left of the body, pointing his or her toes upwards as the foot reaches its furthest point of motion.

Then swing the right leg back to the right as far as comfortable, again pointing the toes up as the foot reaches its final point of movement.

If the athlete is training legs, leg dynamic stretch exercises are recommended for a complete warm-up. However, if the athlete desires to do a full body dynamic stretch routine, it is allowed, but not required.

The shoulder and neck musculature are often overlooked during the warm-up/stretching period. Static stretching of the shoulder does little to warm up the body or place the shoulder musculature in the positions it will be forced into during competition and practice. Arm circles both forward and backward are effective beginning dynamic flexibility stretches (Purdam, C., A. Davies, K. Finley, and M. Hilly).



To incorporate arm circles,

- Stand with feet slightly wider than shoulder-width apart, knees slightly bent
- Raise your right shoulder towards your right ear, move it backwards, down and up again to the ear in a smooth motion
- Repeat with the other shoulder, alternating back and forth between arms.

Another excellent dynamic routine for warming up the entire arm is arm swings.

- Stand straight, feet somewhat wider than shoulder-width apart, knees slightly bent
- Keep the back straight throughout the entire movement
- Overhead/Down and back - Swing both arms continuously to an overhead position and then forward, down and backwards.
- Side/Front Intersect - Swing both arms out to your sides and then cross them in front of your chest.

As such, a dynamic neck-stretching program is an excellent system for this need.

To undergo this process, a sample dynamic neck routine may involve the following:

1. Extension - Tuck your chin into your chest and then lift your chin upward as far as possible.
2. Lateral Flexion - lower your left ear toward your left shoulder and then your right ear to your right shoulder.
3. Rotation - Turn your chin laterally toward your left shoulder and then rotate it toward your right shoulder.

As stated earlier, there is an almost unlimited supply of dynamic stretches available to the body builder.

A general procedure is to include dynamic stretches that mimic isolation exercises in preparation for heavy compound exercises.

For instance, preparing a warm-up for heavy compound deltoid work may include dynamic stretch arm swings, dynamic stretch neck work and dynamic stretch lateral/front raises.

Upon completing a dynamic stretch, perform a light load static stretch applicable to the muscle that is going to be exercised. Apply pressure just prior to the sensation of pain, hold for 5 seconds and relax. Recall that, prior to the warm-up, heavy static stretching can reduce strength (Sale, D.G).

Dynamic Support Mobility-

Compound movements require a great deal of support from smaller muscle groups.

As the muscles progress through a joints range of motion, they perform in the succeeding assisting groups:

- **Agonists**-are the primary movers responsible for causing the movement to occur or produce an action. Agonists create the normal range of movement in a joint by contracting.
- **Antagonists** - An antagonist acts against and blocks an action that is generated by the agonists. An antagonist is responsible for returning a limb to its initial location. For example, in biochemistry, insulin lowers the level of glucose in the blood, whereas glucagon raises it; therefore, insulin and glucagon are antagonists.
- **Synergists** – Synergists assist in working the same set of joint motion as the prime movers. Synergists aid to neutralize additional motion from the agonists to ensure that the force generated stays within the ideal range of motion.
- **Stabilizers**- These provide the necessary support to contribute in holding the body firm while the exercise transpires. Larger muscles often call upon their smaller neighbors to function as synergists. As such warming up supporting muscle groups is a highly effective way to prepare for heavy compound movements and reduce injuries.

The protocol for Dynamic support mobility warm-up regime entails:

- Work larger muscle groups first in the warm-up, followed by the subsequent smaller muscle groups.
- Utilize one set for each muscle group.
- Moderate weight, approximately 30-35% of 1 Rep max.
- 12-15 reps not performed to failure (remember this is just a warm-up).

- Do this protocol "circuit style", in other words, one exercise immediately after another.

For instance, if utilizing dynamic support mobility in preparation to train the pectorals:

1. Begin by first working the pectorals, followed by the deltoids, followed by the triceps. A good regimen may include a single set of machine or cable exercise that works each of the muscles.
2. Perform 12-15 reps at each station and move immediately to the next muscle group. The symptoms of a correct warm-up should be a light pump in the targeted muscle groups. Be sure not to go to failure, as this procedure IS NOT intended to pre-exhaust smaller muscle groups, only warm them up for the advanced workload.

As an illustration of this practice, in preparation for heavy bench press, perform one set of machine bench press, preceded by one set of machine shoulder press, followed by one set of machine tricep press, one exercise after another circuit style.

This will prepare both the larger and smaller muscle groups for a heavy bout of pectoral exercises, such as the bench press.

The following split should be utilized for using dynamic support mobility warm-up of large muscle groups preceding a workout consisting of heavy compound exercises:

-Chest/delt/tri

-Back/bis/fore

-Quads/Hams/calves

General Dynamic Specific Training

Prior too all compound lifts and/or the first two exercises working a muscle grouping, a protocol of two warm-up sets is prescribed.

The first set should consist of a repetition regimen of 12-20 controlled, light-weighted reps, approximately 20-25% of your 1 Rep Max.

The second set should consist of a repetition regimen of 7-8 controlled, medium-weighted reps, approximately 40-45% of your 1 Rep Max.

Neither of these sets should be performed to failure. As such, the protocol of dynamic training will be applied:

- Controlled movement

- *Gradual increase of resistance*
- *Not performed to failure*

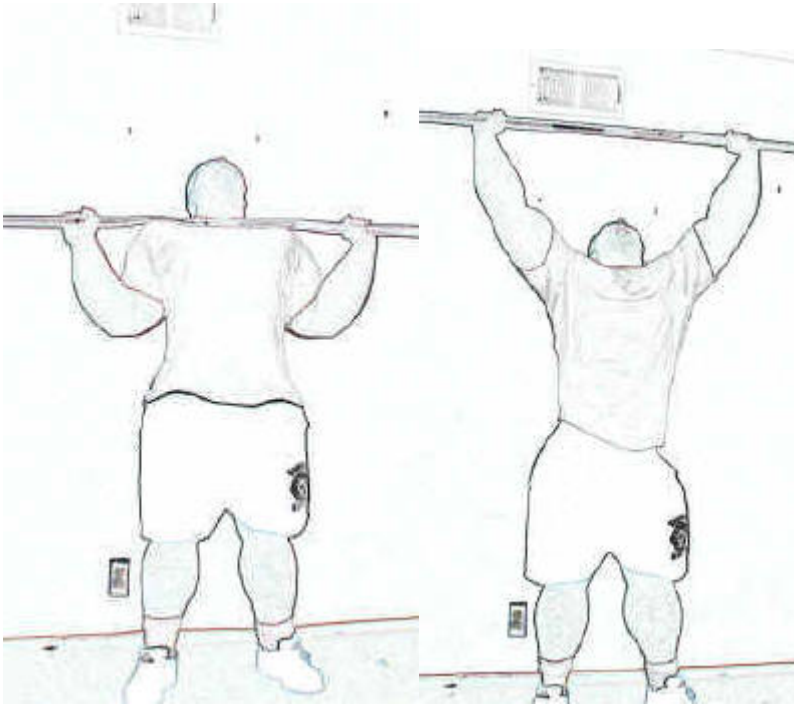


Table 2

For example, in table two, the [Push Press](#) is observed at both its starting point and maximum range of motion. To properly utilize dynamic specific training, reach the maximum range of motion in “phases.”

Begin in the starting position and press to $\frac{1}{4}$ of the range of motion and return to the starting point. Continue in this manner, gradually increasing the range of motion, until a full repetition is achieved. The protocol for the range of the “phases” is not absolute. The body builder’s discretion is advisable; some may go in phases of $\frac{1}{8}$ of the range of motion. Once the full range of motion is reached, continue performing full reps in the range of an 8-15 rep scheme.

Again this action is not performed to muscular failure and is not intended as pre-exhaustion.

Dynamic flexibility provides a more sport-specific mode of stretching than does the other more commonly used stretching techniques. When performed after an effective warm-up session, dynamic specific flexibility can be a very effective method of developing flexibility necessary to perform a variety of athletic skills safely and effectively. The varieties of dynamic stretches that can be used are limited only by the creativity of the person designing the flexibility-training program (Mann, Douglas P., Jones, Margaret T. 1999).

Following each working set, static stretching will be utilized as described in the next stanza.

Mid and Post-Workout

- Static and/or dynamic stretching
- Fascia stretching (if utilized)
- Posing
- Active Recovery (see [Active Recovery - A Threefold Breakdown](#))

It is clear that static stretching is effective in causing an acute increase in the ROM at a joint (static flexibility) (Gesztesi, Béla).

Integrating inter-set stretching can be highly beneficial in reducing muscle tissue and ligamentous damage by aiding in realignment of tissue fibers to prepare for reengagement of extraneous muscular contraction.

The probability of maintaining a long-term injury-free bodybuilding career is enhanced when stretching the muscle group exercised immediately after the set for 15–30 seconds, bilaterally if so be it, in a static manner (Gesztesi, Béla. 1999).

Also reduced is delayed onset muscle soreness (DOMS)—the accumulation of lactic acid in muscle tissue, which occurs due to micro-trauma occurring in the muscle from eccentric contractions.

Executing static flexibility exercises to the main targeted muscle group being worked between sets will assist in better blood flow to in turn allow for increased available waste product removal.

Again, the emphasis is placed on static stretching for 1–2 reps of 15–30 seconds, which limits the possibility of surpassing muscle tissue extensibility extremes and minimizes chronic micro-trauma.

Performing the above-indicated stretching procedure within a strength-training regimen must also be accompanied by a pre- and post-training warm-up/stretching routine for an overall attempt at a program that is low in injury occurrence (Shellock, F.G., and W.E. Prentice).

Posing between sets and post-workout can both increase the mind to muscle connection, but is also anabolic!

SUMMARY

[Warm-up Phase](#)

1. 5-15 minutes of moderate aerobic activity
2. Dynamic stretching/Low load static stretching
3. Dynamic Support Mobility
4. General Dynamic Specific Training



Training Phase

1. Static or Dynamic stretching/Fascia stretching
2. Posing
3. Post-Workout Window of Opportunity
4. For more details on this subject see: [Active Recovery - A Threefold Breakdown](#)

Discussion

Upon review of scientific research, it is apparent that a habitual practice of properly induced warm-up and active recovery can not only ensure the longevity of a body builder's career, but can also increase hypertrophic/hyperplastic gains from training. In summary, *stretching has healing properties.*

13 Then saith he to the man, "Stretch forth thine hand". And he stretched *it* forth; and it was restored whole, like as the other.

Adam "Old School" Knowlden

Vice-President of Biomechanical Engineering

oldschoolabcbbing@gmail.com

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