

ASPECTS OF KUNG FU TRAINING

STRETCHING

INTRODUCTION

Athletic activities, Kung Fu and other Martial Arts require a high degree of physical flexibility. This quality, also known as suppleness, mobility or agility has many benefits to the health of a person. Flexibility is a product of a number of other training aspects such as a person's level of coordination, balance, strength and stretch within the body. Stretching is the most single practical way of developing flexibility and can be singled out and studied but it remains part of a dynamic process of physical training.

In general, stretching improves the person's ability to deal with a greater range of physical activities and has the added advantage of reacting to physical crisis with less wear and tear on the muscles. The reason for this lies in the physiology of the body's muscles. To understand how to stretch correctly, the physiology of the body will be outlined. The actions, injuries and remedies associated with muscles and joints are fundamental clues to the continued exercise of stretching.

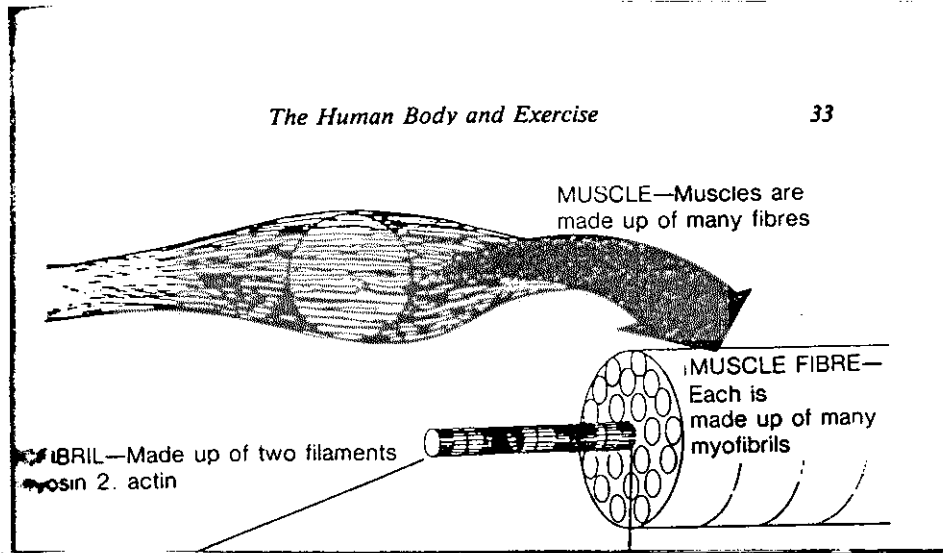
More beneficial methods of stretching have been discovered during this century. The benefits of Proprioceptive Neuromuscular Facilitation (PNF) will be covered in light of the physiology of muscles.

There are general and specific rules as well attitudes to adopt when stretching as a result of the relatively new study of stretching. The general rules can be drawn up in a 'DO AND DON'T' list. The specific stretches for muscle groups of the body were not included in this brief outline of stretching the body.

MUSCLE PHYSIOLOGY REGARDING STRETCHING

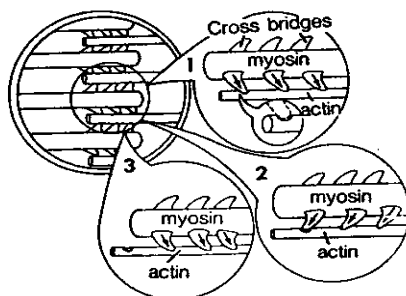
Muscles are formed from a grouping of muscle fibres. The muscle fibre is composed of numerous strands of muscle cells, termed myofibrils. The myofibrils are held together by connective tissue and are contained in a fluid known as sarcoplasm.

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The myofibrils contain interlocking, basic protein filaments referred to earlier as connective tissue. These provide the mechanism for a muscle to contract. The filaments are of either myosin or actin. The muscle may only exert itself by contracting. It cannot exert pressure in the other directions as found in an hydraulic mechanism. The connective tissue may only extend itself when relaxed and an outside force such as an opposing antagonist muscle draws the muscle out. An example of the antagonist muscle action is evident in the triceps and biceps of the human arm.

Fig. 2.5: The Basic Structure of Muscle Tissue



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Fig. 2.6: Muscle Movement Sequence: (1) cross bridges extend towards actin; (2) cross bridges pull the actin forward; (3) stimulation ceases, connection is broken and cross bridges swivel back to next connection causing muscle to shorten

Muscle Physiology continued....

Throughout the muscle fibres are nerve endings which detect muscle movement. A reaction known as ballistic movement is a result of the body's nervous system resisting an unexpected movement. An example would be to drop a small weight into the palm of an outstretched arm. The nervous system detects the extension of the muscle and an involuntary/reflex contraction occurs. This is a safeguard against overstretching and subsequent tearing of the myofibril filaments of the muscle.

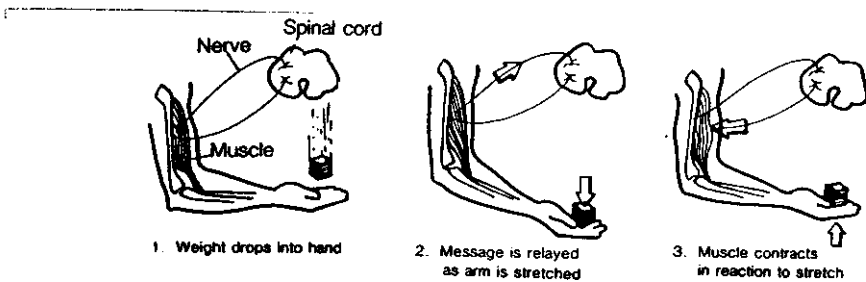
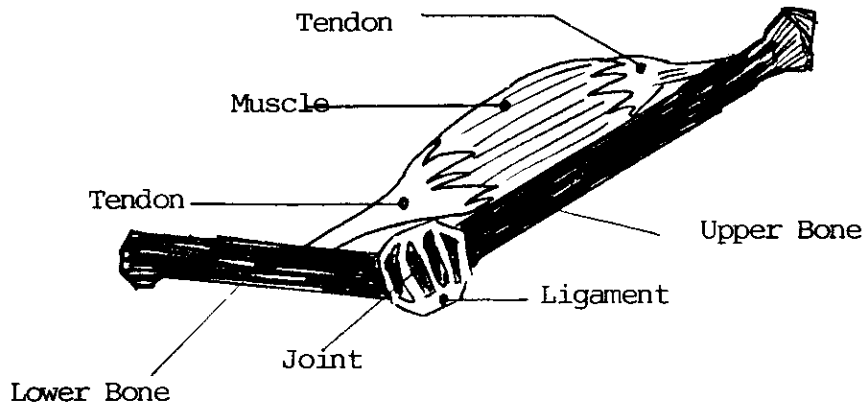


Fig. 2.7: The Case Against Ballistic Stretching

MECHANICS OF JOINT AND MUSCLE ACTION

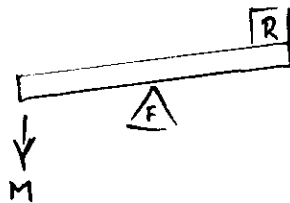


SCHEMATIC DIAGRAM
OF MUSCLE, JOINT
AND LIGAMENT

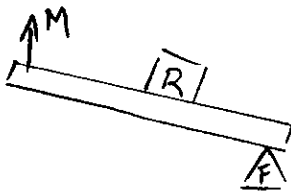
The skeletal muscles operate on the limb/joint via leverage. The joint acting as the fulcrum of the lever.

Three Classes of Leverage

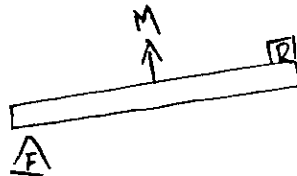
Class I



Class II



Class III



R = RESISTANCE
F = FULCRUM
M = MOVEMENT

To stretch a muscle needs the co-operation of the bones, joint, ligaments and tendon.

An injury may jeopardise an effective stretch in the future.

MUSCLE SORENESS

The most obvious sign to an individual that over exertion of the muscle has taken place is muscle soreness. The soreness has been attributed to different theories put forward such as "The Pressure Theory", "The Tear Theory", "The Spasm Theory" and "The Connective Tissue Theory". Still in their infancy, these theories deal with either the ability of the muscles blood flow to carry away waste products or with the muscles ability in coping with unaccustomed movement.

Quote: The New Fitness Leaders Handbook, Page 28.

"The connective tissue theory is perhaps the most
.....
scientifically supported theory of muscle pain. This is based on observations that soreness is more common following negative (eccentric) muscle contractions than following positive (concentric) muscle contractions. Research indicates that negative contractions put a greater strain on a muscles inelastic components (ie connective tissue). This is supported by observations that soreness is usually located in and around the tendon of an eccentrically contracted muscle."

TYPES OF MUSCLE FIBRE

There are two types of Muscle fibre known as Fast Twitch and Slow Twitch. There are also transitional Fast Twitch muscle fibres classed as Fast Twitch type. These fibres are mentioned only in passing as they deal with the muscle's ability to contract and are more relevant to strength training and aerobics rather than stretching. Both muscle fibre types need to be stretched for optimum function.

AGEING AND GENDER

As we grow older, elasticity diminishes within the body's muscles and skin. At about 40 years of age, senile atrophy takes place and it is important to maintain the exercise of stretching for better physical health. The muscles of the body lose elasticity but not their power of contraction.

Women tend to be more supple throughout life than men. The reasons are not clear. Pregnant women are susceptible to the dangers of hyperextension of the joints if they overstretch.

INJURIES TO MUSCLES AND JOINTS

MUSCLE STRAIN refers to a tear in the muscle-tendon complex.

MUSCLE SPASM will usually occur after an injury has been sustained. It is a protective mechanism involving uncontrolled, painful muscle contractions.

LIGAMENT SPRAIN results in the reduced movement of the joint. The ligaments hold the bones at the joint whilst joint is moving. The ligament usually suffers a tear, which causes associated pain and swelling.

TENDONITIS or muscle soreness is an inflammation of the tendons, due to poor blood flow or damage to connective tissue of the tendon sheath.

if stretching is discontinued as a result of injury, qualified advice (ie Physiotherapist etc) should be sought before flexibility training is performed. A sprained ankle may take six to nine months to heal, in a middle aged person. Mobility loss takes about 2 weeks or less. A professional therapist is able to advise on the correct use of the joint without interrupting the healing process and also will not let the joint cease moving and the muscles atrophy.

FIRST AID FOR EXERCISE RELATED INJURY

Treatment for a sport related injury where skin is not broken involves a five part procedure. Treatment must be applied immediately for best results.

REST the injured area and the individual as continued use of injury may extend damage.

ICE preferably a cold-pack should be applied. The cooling decreases bleeding from injured blood vessels.

A

reaction known as vaso-constriction. Apply ice every 2 to 3 hours for about 15 minutes. Do not apply heat for the first 48 hours.

COMPRESSION by bandage is the usual method. The reduction of swelling assist healing process. Bursae sacs containing synovial fluid are located in joints of high friction such as the knee. Compression is important regarding fluid on the knee.

ELEVATION of the injured part of the body (at least above the level of the heart) reduces swelling.

DOCTOR or other qualified advice should then be sought for a more speedy recovery.

R. I. C. E. D

STRETCHING METHODS

The two recognised types of stretching are Ballistic and Static stretching.

Ballistic stretching involves bouncing movements whilst static stretching refers to slow or reaching out stretches.

Both types of stretching increase flexibility, but the ballistic methods are not currently recommended due to the danger of muscle fibre tears eventuating. Apparently, the momentum of a bouncing movement may cause uncontrollable stretch beyond the muscle's limits. Also, the faster a bouncing movement, the stronger is the body's stretch reflex to that movement. The ballistic stretch prevents the relaxation of the muscle to achieve a full stretch and may even cause injury.

Slow static stretching can be made to act upon one or a group of muscles and should be held for a period of time for best results. The stretch reflex is not stimulated with static stretching and there are reports that, if done slowly enough, an inverse stretch reflex occurs allowing further relaxation of the muscle.

Proprioceptive Neuromuscular Facilitation (PNF) stretching is another static method of stretching. Developed by Herman KABAT in the 1940's PNF stretching was done to rehabilitate injured muscles. Theoretically PNF stretching works on two processes:

- 1) 'Irradiation', in that a muscle can relax more fully after it has undergone a maximum isometric contraction. The muscle resistance to stretching is reduced.

Provided that the exercise is carried out after a total body warm-up and the isometric contraction (ie equal pressure contraction) of the antagonist muscle against the static resistance is not an explosive contraction.

- 2) 'Successive Induction' , when a muscle becomes stronger if its antagonist muscle is isometrically contracted before hand.

Studies by Canadian based Dr Lawrence HOLT compared static, ballistic and PNF stretching on people for 3 months. The static and ballistic method showed an improvement but PNF produced three times better results.

The PNF stretch involves a static stretch followed by an isometric contraction of that muscle against an immovable resistance(ie a partner, the floor or a wall). The muscle is then relaxed and further stretched statically and the action repeated. Each isometric contraction is held for a minimum of 6 seconds. The contraction should build up in strength gradually during the first 2 to 3 seconds.

STRETCHING PRACTICES

Relaxation and regularity are the most important factors in stretching. Three to four stretching sessions a week are recommended. Noticeable increases in flexibility can be reached within 2 to 3 weeks. A decrease can occur almost as quickly.

Breathing should be done slowly, deeply and naturally. Exhale as you stretch the body and bend forward.

Concentrate on the area being stretched. Feel the stretch and make sure it is not causing pain. Tension will be felt, but that should subside as you hold the stretch or otherwise you are overstretching.

Stretching should be carried out immediately before, after and during an active sports event. One third of flexibility gains from stretching can be lost in half an hour of sitting still before an event and up to two thirds in one hour.

Warm-up the muscles of the whole body before stretching. Different warm-ups are used by different athletes and coaches from a sauna to callisthenic exercises. Callisthenics being exercises done without weights but use the body as resistance. Callisthenic exercises may become aerobic when carried out repeatedly over a certain period (such as the Canadian Air Force Fitness Programs). The warm-up, as a prelude to stretching and other exercise, is a subject in itself - but it can be defined as low to medium activity of the body in order to increase the body temperature.

Avoid bouncy movements during warm-ups.

An increase in temperature induced by either direct or indirect heat can increase the range of motion and elasticity of a muscle. Conversely a 20% decrease is possible when body is at lower temperatures.

THINGS TO AVOID WHEN STRETCHING

Competitive or comparative stretching is potentially damaging. Stay within comfortable limits of tension. Setting a goal to reach may cause undue harm if attempted too early.

Avoid holding your breath when stretching as it has other repercussions on the body due to lack of air.

The back bone should be kept straight especially on forward bends. Do not initiate a movement forward from the head and shoulder region but from the hips, keeping the back bone straight.

Avoid allowing the feet to lean. Keep feet pointing in the same direction as the knee to avoid injury to the legs.

Contradictory information regarding neck stretches was apparent but it is wise to err toward avoiding an exercise if it is reported as damaging. It is currently advised not to circle the neck/head. It is allowable to statically stretch the neck in all directions but do not circle the head or lean the head back too far.

Straight legs are not required when bending at the waist. With the knees slightly bent, the chance of injuries is reduced.

DEVELOPMENTAL STRETCH

Following an easy static stretch which should be held for 20 to 30 seconds, a developmental stretch is made by stretching again to a comfortable reach and holding for 10 to 30 seconds. Tension of the muscles during stretching should diminish if performed properly.

CONCLUSION

Flexibility can be improved to a great extent through stretching on a regular and relaxed basis. Slow or static stretching is the recommended method to use in maintaining good elasticity in the muscles. Developmental stretches to improve the extension and elasticity of the muscles can be achieved through PNF or a developmental static stretch.

The physiology of the body changes within certain boundaries depending upon the age, gender, fitness/activity levels and injuries carried by an individual. The effects of static stretching are beneficial for our prolonged health and our ability to cope with physical crisis.

More can be said about stretching and a typically western or scientific approach has been adopted for this report. Stretching is however related to other aspects of training and other topics, such as Yoga, and will be considered at some time in the future.

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