

## **BIBLIOGRAPHY**

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### **Videos**

Anatomy videos (Atlas of Human Anatomy)  
Focus "Hands On"  
Resist-A-Ball

### **Fitness Products**

SPRI Tubing  
Creative Health Products (Skyndex)  
Fitness Resources Associated (Metronomes)  
Power Systems (Agility Ladders)  
Lange Skinfold Calipers

Exertools (various balance training)  
OPTP (foam rollers and Swiss balls)  
Perform Better (balance equipment, agility ladders and videos)  
Sissel USA (Swiss balls)

### **Fitness Organizations, Workshops and Seminars**

IDEA  
Sports Health Care (Balance Workshop)

### **Additional Business Resources**

Personal Trainer Liability Insurance  
**800-844-0536 Ext.2232**

Visa, Mastercard, Discover, and AMEX (Executive BankCard Services)  
**1-866-222-8791 ask for Joe Hamemeh.**

**\*Most of these book & products can be purchased through our web page at  
[www.futurefit.net](http://www.futurefit.net). or call us at (800) 778-6060.**

**RE-CERTIFICATION REQUIREMENTS FOR  
NATIONAL COUNCIL FOR CERTIFIED PERSONAL TRAINERS**

Your **Personal Trainer certification** is valid for *two years* from the date you become certified. In order to renew your certificate, you must send us a copy of the certificate that is about to expire along with proof in writing of attendance to at least **20 hours or health and fitness related classes, seminars or workshops**. Check the website for our Continuing Education Unit (CEU) Packet and forms.

The **Advanced Personal Trainer** is valid for *two years*. In order to renew, you must do the same as above. Remember that to qualify for the Advanced Personal Trainer, *you must already hold a Personal Trainer certificate*.

The **Weight Management Specialist** is valid for *two years*. To renew, you must prove in writing you've completed 15 hours of continuing education pertaining to the study or application of nutrition.

**WARNING!**

We do not keep track of your certification. If you let it expire, then it has expired. It will be too late to renew. You must then retake the class and pass the test to become certified again.

## GLOSSARY

**Acceleration:** force/mass.

**Aerobic Exercise:** Exercise which creates energy in the presence of oxygen. It is a steady exercise, usually performed a 60–80% of your maximum heart rate for 20 minutes or longer. Prolonged effort such as distance bicycling requires the aerobic energy system.

**Aerobic Threshold:** The point at which the body metabolism changes from aerobic to anaerobic. During an exercise test, it usually is associated with sudden increase in breathing, increased fatigue, burning in the muscles and production of carbon dioxide greater than consumption of oxygen. Anaerobic threshold is usually expressed as heart rate or as a percent of a maximum heart rate number (example 170 beats per minute or 90% of 220 BPM).

**Aerobic Metabolism:** The catabolism of energy substrates with the utilization of oxygen. The energy transfer resulting from involvement of electron transport and oxidative phosphorylation.

**Anaerobic Threshold:** The work rate at which blood lactate concentration starts to increase dramatically during graded exercise. Also known as lactate threshold or the onset of blood lactate accumulation (OBLA).

**Blood Pressure:** is expressed by two numbers. The top number (systolic pressure) is the peak pressure exerted by blood on the walls of the arteries during a heart beat. The lower number (diastolic pressure) is the pressure within the arteries between heart beats when the heart is filling with blood. Lower numbers are desirable. Blood pressure is normal if systolic pressure is less than 140 and diastolic is less than 90. (E.G. 120/80).

**Catabolism:** The process in which living tissue is changed into waste products or a simpler composition.

**Diuresis-** increased discharge of urine.

**Excess Post-exercise Oxygen Consumption:** the amount of extra oxygen that your body needs to recover after exercise.

**Exercise:** Activity for the purpose of training or developing the body or mind.

**Fit:** Proper, suitable ready, prepared, in top condition.

**Fitness:** Suitableness; appropriateness.

**Flexibility:** The range of motion possible in a joint or series of joints.

**Force:** A push or a pull.

**Glycogen:** The storage form of carbohydrate located in a muscle and liver.

**Glycolysis:** The anaerobic degradation of carbohydrate (glycogen or glucose) to pyruvate or lactic acid yielding a net generation of 2 ATP.

**Health:** Physical and mental well-being; normality of mental and physical functions; a condition of body or mind.

**Hypertension:** When the resting blood pressure is greater than 140/90 mm Hg.

**Hypertrophy:** An increase in the size of a tissue or organ independent of the general growth of the body.

**Imbibition.** Imbibition is the absorption of liquid by a solid or gel, which in the body, occurs from the compression and release of pressure.

**Kilocalorie:** The amount of heat required to raise the temperature of one kg of water one degree Celsius.

**Law of Facilitation:** When an impulse passes once through a given set of neurons to the exclusion of others, it will tend to do so again, and each time it transverses this path, the resistance will be smaller.

**Mass:** weight/acceleration.

**Metabolism:** The chemical and physical processes going on in the living body.

**Mitochondria:** Located in the muscle in slow twitch fibers, where fat is metabolized for energy. It is considered the factory of the cell.

**Muscle Fiber:** A cylindrical cell that has repeating light and dark bands, giving it the name striated muscle. The striations are due to the basic structural component called the myofibril.

**Myofibril:** Found inside muscle fibers and composed of the long string or sarcomeres.

**Momentum:** The quantity of motion of a moving object equal to its mass and velocity.

**Newton's Laws:**

1. **Law of Inertia:** An object will remain at rest or in uniform motion unless acted upon by an unbalanced force.
2. **Law of Acceleration:** The acceleration of an object is proportional to the unbalanced forces acting on it and inversely proportional to the mass of the object.
3. **Law of Reaction:** For every action there is an equal and opposite reaction.

**OBLA:** Onset of blood lactate accumulation.

**Pes Anserinus:** Latin for "gooses foot." The attachment or insertion of the semitendinosus, gracilis and sartorius.

**Power:** (force x distance)/time.

**Repetition:** The act of repeating.

**Reciprocal Inhibition or Innervation:** This results when the stretch reflex occurs and the antagonist (opposite) muscle is inhibited. Muscles most commonly work in pairs so that when one set of muscles

(agonist) is contracting, the opposing (antagonist) muscles are relaxing. The grouping of coordinated and opposing agonist and antagonist muscles is called reciprocal innervation. When one of the pair receives an impulse to contract, the other relaxes because it does not receive the impulse to cause contraction.

**Resting Heart Rate:** The lowest rate recorded during the day. Usually recorded before arising from bed in the morning. The trained heart pumps slower and pumps a larger volume of blood with each heart beat. Most endurance athletes have resting heart rates of 40–50 beats per minute. People who are untrained have heart rates above the 40–50 bpm. Normal for men is 60 bpm and women 72 bpm.

**Sarcomere:** The basic units of muscle contraction containing the proteins actin and myosin.

**Set:** A collection or grouping of repetitions to achieve an exercise-related goal.

1–6 repetitions for strength.

6–12 repetitions for hypertrophy.

12 or greater for endurance.

**Shape:** The characteristic form of a particular person or thing.

**Sprain:** An injury due to overstretching or overtearing of a ligament resulting in pain or swelling. Ligaments are non-elastic tissue designed to connect bone to bone. Once stretched, the ligaments allow greater joint motion, therefore necessitating increased strengthening of surrounding muscle tissue.

**Strain:** An injury to areas where muscle and tendons connect and are usually the result of over stretching, overloading or overusing the muscle or tendon. Strains are classified as mild, moderate and severe. A severe strain can be called a “rupture” or a “complete tear.” The injuries heal with scar tissue known as collagen tissue that is not elastic. Tendons connect muscle to bone. The tendon area of a muscle is supplied with less blood (ischemia) than the belly of the muscle. These injuries tend to heal more slowly because of this anatomical difference.

**Strength:** The greatest inherent force which the particles of a material can exert in opposition to stress.

**Stress:** Force exerted upon a body that tends to strain or deform it’s shape.

**Target Heart Rate:** Heart rate level to remain within while performing exercise. This is usually a range, for example; 120–140 beats per minute.

**Triceps Surae:** The two heads of the gastrocnemius and the soleus.

**Triglycerides:** Blood fats which also increase the risk of heart disease. A level below 150 is considered normal but a level below 100 is desirable.

**VO<sub>2</sub> Max:** Maximum oxygen consumption. The amount of oxygen the body uses during maximal exercise. This number is expressed in milliliters of oxygen per kilogram of body weight per minute (102ml/kg/min). This indicates exercise potential. The higher the number, the greater the potential. Example: 65ml/kg/min. This is a very high value. Above 60 has the potential to make a national team in an aerobic sport.

**Warm-up:** Low intensity exercise prior to your main exercise bout. This activity is used to “warm up” and stretch muscles and tendons to prepare for exercise, thus preventing injury.

**Watts:** This is a measurement of power output. It is rate of exercise measured by multiplying force by velocity. An example would be: he was able to pedal his bicycle at 350 watts.

**Weight:**  $\text{mass} \times \text{acceleration}$ .

**Work:**  $(\text{force} \times \text{distance}) / \text{acceleration}$ .