Fitness ABCs

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Global Leaders in Fitness Training

Instructor Certification Manual

Fitness ABCs

Certification Manual

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5th Edition

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Published in United States in 2024

By

LuLu

ISBN: 978-1-304-81899-7

Cite: Krautblatt, C., & Krautblatt, N. (2024). *Fitness ABCs* (5th ed.). LuLu.

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Foreword - Important

The information contained in this manual is intended as a fitness guide and is not intended to replace a personal trainer. Remember; please consult your doctor before beginning any type of workout or diet program. Factors unknown to you may have an adverse effect on your physical well-being even including death. You may think you're in physical shape to pursue the activities described in this document; only your doctor is qualified to make that decision. Tell him or her that you are planning to begin an exercise program.

It is important to keep in mind that pain is NOT good especially in joints, bone, and chest. Muscle soreness is normal, but not to the point of not being able to use it. NEVER continue a workout with soreness, give the muscles a chance to repair and build. Working out too many times per week can actually make a muscle smaller and weaker if you don't give it a chance to repair. Remember; nutrition is the fuel for work and repair.

In any event, the **International Fitness Association (IFA)**, the author and their representatives cannot assume any responsibility for negative results regardless of how incidental or severe, whether due to an error in this manual or an omission of information. The responsibility is yours. We are not there to see what you're doing; so, use common sense. In any event, if you have a question that you can't get answered, send us an email from our website at http://www.ifafitness.com. We'll try to answer your question. A local personal trainer might also be able to help. You don't have to hire a trainer for the long term. You can get a trainer to start you out or just meet you at the gym every couple of weeks to check on your progress and technique (very important). Trainer rates vary from $25/hr to $45/hr and on up. It's a good idea to get your workout program started.

This manual is the course material for the following certifications:

Certification	Section of the manual that applies
Personal Trainer & Group Fitness Instructor	Entire manual except Chapter 15
Health & Fitness Coach	Entire manual
Sports Nutritionist	Chapter 1 and client forms
Senior Fitness Instructor	Entire manual except Chapter 15
Aqua Fitness Instructor	Entire manual except Chapter 15

For certification as a Sports Nutritionist, you are expected to read and be tested on the Nutrition section only. You will also need to be familiar with the Client Forms section. For the Aerobics & Trainer certification and the Senior Fitness certification, you are expected to read the entire manual. However, test material will not emphasize the Nutrition section. For Trainer candidates, it is advisable to read the entire manual. A Personal Trainer should be aware of the Nutritional needs of their clients.

After reading this book, you can take the test on the website at http://www.ifafitness.com and it will be instantly and automatically graded. The results will be sent to IFA automatically. If you pass, you can even pay for the certification on the IFA website. If you are planning on sending in your test instead of taking it online, you'll need to download the test from the download page at the website and submit it with your payment to:

International Fitness Association (IFA)
Attn: Certifications
12472 Lake Underhill Rd., #341
Orlando, FL 32828

Chapter One

Nutrition

Nutrients are substances necessary for proper bodily function. Some are required in large quantities (macronutrients) and some are required is small quantities (micronutrients). There are 4 types of macronutrients: Proteins, Carbohydrates, Fats and Water and two types of micronutrients: Vitamins and Minerals.

Macronutrients

Proteins

Proteins are the basic structure of all living cells. Proteins are used in making hormones, blood plasma transport systems, and enzymes. The basic building blocks of proteins are called amino acids. There are two types of proteins complete and incomplete. Amino acids are categorized as essential and non-essential. Of the twenty amino acids that have been identified, nine are considered essential amino acids those that are not manufactured by the body, these must come from dietary intake. The body can manufacture the non-essential amino acids from the by-products of carbohydrate metabolism. Amino Acids are crucial for proper Central Nervous System (CNS) function.

Non-Essential Amino Acids

- **Alanine** - provides energy for muscle tissue, brain and CNS; aids antibody production to enhance the immune system; helps metabolize sugars and organic acids.
- **Arginine** - improves immune response to bacteria, viruses and tumor cells; promotes healing and liver regeneration; aids the release of growth hormones for muscle growth and tissue repair.
- **Aspartic Acid (Asparagine)** - aids in the excretion of ammonia, which is toxic to the CNS; may increase resistance to fatigue and increase endurance.
- **Cysteine** - antioxidant protection against radiation and pollution; slows the aging process; deactivates free radicals; neutralizes toxins; aids in protein synthesis. Crucial for the skin development aiding in the recovery from burns and surgical procedures. Hair and skin are comprised of 10-14% Cysteine.
- **Glycine** - aids in the release of oxygen during the cell-making process. Important for hormone production in strengthening the immune system.

- **Glutamic Acid (Glutamine)** - improves mental capabilities; helps healing of ulcers; reduces fatigue; helps control alcoholism, schizophrenia and sugar cravings.
- **Taurine** - stabilizes membranes excitability in the control of epileptic seizures. Controls biochemical changes responsible for the aging process; aids in the excretion of free radicals.
- **Proline** - promotes proper joint and tendon function; strengthens heart muscles.
- **Serine** - storage source of glucose for the liver and muscles, antibody production enhances the immune system, synthesizes fatty acid covering around nerve fibers (insulator).
- **Tyrosine** - transmission of nerve impulses to the brain; fights depression; improves memory and mental alertness; promotes the proper function of the adrenal, thyroid and pituitary glands.

Essential Amino Acids

- **Histidine** - hemoglobin component; used in the treatment of rheumatoid arthritis, allergic diseases, ulcers & anemia. A deficiency may cause hearing problems.
- **Isoleucine and Leucine** - mental alertness, also provides manufacturing components for other essential biochemical components in the body, which are utilized for the production of energy and upper brain stimulants.
- **Lysine** - Ensures adequate absorption of calcium; helps form collagen (component of bone, cartilage and connective tissues); aids in the production of antibodies, hormones & enzymes. Lysine may be effective against herpes by improving the balance of nutrients that reduce viral growth. A deficiency may result in tiredness, inability to concentrate, irritability, bloodshot eyes, retarded growth, hair loss, anemia & reproductive problems.
- **Methionine** - a sulfur source, which prevents disorders of the hair, skin and nails. Lowers cholesterol by increasing the liver's production of lecithin and reduces liver fat build-up. Protects the kidneys; a natural chelating agent for heavy metals; regulates the formation of ammonia and creates ammonia-free urine thereby reducing bladder irritation; promotes healthy hair growth.
- **Phenylalanine** - allows brain to produce Norepinephrine used for the transmission of signals between nerve cells and the brain; regulates hunger, antidepressant; improves memory and mental alertness.
- **Threonine** - a component of collagen, Elastin, and enamel protein; reduces liver fat build-up; promotes proper digestive system function and metabolism.
- **Tryptophan** - a relaxant, alleviates insomnia, prevents migraine; reduces anxiety and depression; promotes proper immune system function. It reduces the risk of cardiovascular spasms. Works in conjunction with Lysine to lower cholesterol levels.
- **Valine** - Promotes mental health, muscle coordination and tempers emotions.

Other protein comes from the recycling of enzymes and other proteins. Protein is synthesized in all tissues in the body; however, the liver and muscles are the most active. The body synthesizes about 300 grams of protein per day even though average intake is only 70 grams.

Proteins that contain all nine essential amino acids in sufficient quantity to sustain life are called complete proteins. The protein efficiency ratio (PER) is a measurement of protein's completeness. Protein is rated according to various indices. The most common measurement being the Biological Value or BV of the protein. The higher the BV value the more readily the protein is absorbed by the body. Eggs have the highest BV value (100). Whey protein's value is close to 100 while beans have a BV of 49. Ratings of greater than 100 refer to the chemical score of an amino acid pattern in a reference protein to a test protein and not the BV.

Meat, fish, milk, cheese and eggs contain complete proteins. Incomplete proteins such as vegetables, grains, seeds, and nuts are those which do not contain all nine essential amino acids by themselves. However, combinations of incomplete protein foods or mutual supplementation can supply all nine essential amino acids such as beans with rice or peanut butter on wheat bread. Therefore, vegetarians can get all the amino acids required by combining incomplete protein foods. It is not necessary to combine proteins at the same meal as many people believe. Therefore, a breakfast of one incomplete protein and a dinner of another incomplete protein will provide the benefits of eating a complete protein.

Examples of Complete Combinations of Incomplete Proteins

Grains & Legumes	Grains & Nuts/Seeds	Legumes & Nuts/Seeds	Grains & Dairy
peanut butter sandwich	rice cakes/peanut butter	chickpea humus	cereal with milk
rice and beans	roll with sesame seeds	trail mix	macaroni & cheese
vegetable stir-fry & rice	banana-nut bread	bean soup & sesame seeds	yogurt with granola
chili & wheat bread	oat-nut bread		cheese sandwiches
tortillas & beans			rice pudding
pea soup & roll			

Examples of Protein rich foods:

- High Fat - Meat, salmon, eggs, peanut butter, milk, cheese
- Low Fat - Tuna, egg whites, red beans, skim milk, non-fat cheese

Proteins begin digestion in the stomach but are primarily digested in the small intestine and metabolized by the liver for the building of tissue. Proteins not required for building can be utilized as an energy source and can provide 4 calories per gram. About 98% of the protein from animal sources and about 80% of the protein from vegetable sources is absorbed by the body.

Fasting causes the body to use protein as an energy source even to the point of breaking down vital tissues such as organs and muscles to use as an energy source. Excess protein, not utilized for tissue repair or growth or as an energy source is converted by the body to fat and stored.

Protein requirements depend on the individual and daily activity. Tissue growth, whether due to growth, injury, weight training, or pregnancy, can affect protein requirements. During illness, protein is not only required for repair but is generally used as an energy source. According to RDA requirements, an adult should consume approximately 0.36 grams of protein per pound of body weight on a daily basis (0.8 grams of protein per kg of body weight) as a minimum requirement. As an example, a 150-pound person should consume approximately 50 grams of protein daily. This translates to 200 calories of protein daily. As a general rule, for intense weight training, up to 1 gram per pound of body weight may be consumed.

Since protein metabolism produces nitrogen in the body this creates an extra workload for the kidneys and liver to eliminate the excess. Dehydration can occur because the kidneys require increased amounts of water to dilute the nitrogen. Dehydration can impede workout performance. It's therefore important to adequately hydrate when consuming increased levels of protein.

Hair-loss and thinning, as well as, brittle and discolored fingernails can be external manifestations of protein deficiencies. Internal ramifications can be muscle wasting, weak ligaments and cellular dysfunction since amino acids will be in short supply. Muscle growth will also be limited or unavailable due to an insufficient amount of protein.

Carbohydrates

Carbohydrates are utilized for energy, both instant and sustained. When insufficient carbohydrates are taken in, the body must utilize proteins for energy even to the point of catabolizing muscle tissue for energy.

Digestive enzymes in the small intestines break down the carbohydrates into glucose. The glucose can be immediately utilized by the body or stored as glycogen in the muscles and liver. The muscles can store about 20 minutes of glycogen for energy. The bloodstream can hold about an hour of glucose for energy. If glucose levels are maximized and all glycogen storage locations are full then the excess glucose is converted to fat by the liver and stored in adipose tissue or fat cells. There is really no limit to the amount of fat that a body can store. According to studies at the University of

Massachusetts, carbohydrates are generally converted to fat at the rate of 75% where 25% of the carbohydrates are used in the conversion process.

There are three types of carbohydrates Monosaccharides, Disaccharides and Polysaccharides. Monosaccharides are simple sugars and are the basic unit of carbohydrate. Examples of Monosaccharides are glucose and fructose. Disaccharides are composed of two Monosaccharides. Examples of Disaccharides are table sugar (sucrose) which is composed of fructose and glucose also milk sugar (lactose) which is composed of glucose and galactose.

Polysaccharides are composed of multiple Monosaccharides. Examples of Polysaccharides are starches (bread, fruit, grain, pasta, rice). These are also called complex carbohydrates.

Carbohydrates should comprise approximately 60% of the daily caloric intake. Therefore, for a 3000-calorie total daily intake, 1800 of those calories should be carbohydrates.

Fiber is a form of carbohydrate. Approximately 20 grams of dietary fiber is required in our diets. Fiber facilitates elimination and decreases appetite as a bulking agent. Fiber also inhibits the absorption of cholesterol into the blood stream. It has also been shown that fiber slows the absorption of sucrose into the bloodstream. This can be important in the treatment of type II diabetes. Too much fiber in the diet can restrict the absorption of necessary vitamins and minerals. Excess carbohydrates are converted into fat by the liver and stored in adipose tissue.

Sugar is absorbed into the bloodstream within minutes. Consuming large amounts of sugar prior to exercise can actually inhibit performance. This produces a drastic increase in blood sugar. This causes the pancreas to secrete large amounts of insulin to metabolize the sugar. All this insulin inhibits the metabolization of fat by the muscles. Therefore, the muscles rely more on glycogen, which is in limited supply. The insulin reduces blood sugar level, which is already being reduced by the muscle utilization of glycogen stores for energy production. The blood sugar level reduces to a level, which may not only cause fatigue but dizziness as well. Therefore, consumption of excess sugar prior to exercise reduces performance and endurance.

Carbohydrate Loading

Carbohydrate loading is when an athlete depletes and then force-feeds carbohydrates over a period of several days. Carbohydrates are first depleted, for example on a long fast run, then large amounts of carbohydrates eaten. The theory is that the body will overcompensate and store extra glycogen.

Carbohydrate Stacking

This technique requires the consumption of several different kinds of carbohydrates each assimilated by the body at different rates based on their glycemic value. Eating a high glycemic food provides immediate energy while a low glycemic food provides energy at a slower controlled rate. This technique provides greater endurance for athletes.

Fats

Fat is required for the production of cell membranes, blood lipids (body fat), bile (fat emulsifier), steroids and vitamin D. Fats molecules are made up of glycerol and fatty acids.

Body fat is also instrumental in body temperature regulation as insulation. Minimum body fat percentages of 7% for men and 12% for women are recommended. Fats are also utilized for the transport and absorption of fat-soluble vitamins. In addition, fats are the only source of linoleic acid, which is required for skin growth and maintenance. Minimum daily requirement for unsaturated fat is 10 grams and 15 grams is preferred.

Types of Fat	Characteristics	Sources
Saturated	Solid at room temp, raises blood cholesterol	Animal sources, coconut, palm oil
Unsaturated	Liquid at room temperature	Plant sources
Hydrogenated	Unsaturated converted chemically to Saturated	Regular Margarine
Polyunsaturated	Lowers blood cholesterol	Safflower, corn, soy, sunflower, fish
Monosaturated	No effect on blood cholesterol	Canola, olive, peanut oils

Fats are digested by the enzyme lipase in the small intestines with the assistance of bile salts as emulsifiers. They are then transported through the bloodstream with the assistance of lipoproteins (fat + protein coating + phospholipids) and stored as Triglyceride (glycerol + 3 particles of fatty acids) in fat cells. They are then released into the bloodstream as fatty acids when energy is required.

The fatty acids travel through the bloodstream and are combined with glucose to burn the combination as energy. The combination of fatty acids and glucose is necessary for aerobic energy production. The anaerobic system uses mainly glucose and phosphagen, which is limited in its ability to produce energy. Further, lactic acid is one of the byproducts causing the burning sensation after a hard workout. Inadequate carbohydrate availability will result in incomplete fat metabolization producing unused lipids called ketones and leading to a chemical imbalance in the blood known as ketosis. Organ and muscle tissue may be metabolized to provide glucose from the breakdown of

protein. Most of the weight loss that occurs by severe carbohydrate restricted diets are from water loss as the kidneys attempt to rid the body of the ketones.

Fat is essential to survival. A fat-less diet can lead to severe problems. Linoleic acid, an essential fatty acid, is used by the liver to manufacture arachidonic acid. This super polyunsaturated fat is used in cell membranes along with protein. When needed, this fatty acid is converted into a group of chemicals that regulate blood pressure, contractions in childbirth, blood clotting, peristalsis (gut motion), and the immune system. These chemicals are short lived and are manufactured locally as needed.

Cholesterol belongs to the same chemical family as steroids and is related to fat. It is important for the production of cell membranes, myelin sheaths around nerves, sex hormones, bile, and vitamin D.

Dietary cholesterol is the cholesterol consumed from the diet. Blood Serum cholesterol is the amount of cholesterol circulating in the bloodstream. The two are not closely related. Some people consume large quantities of dietary cholesterol and have a low serum cholesterol level. And, conversely, some people have high blood serum levels and consume very little dietary cholesterol. Conversion from dietary to blood serum cholesterol varies for each person and ranges from 20% to 90% of the amount consumed.

Blood serum cholesterol levels should remain below 200 mg per deciliter to be considered "normal" according to recent studies. This number represents only 10% of the total amount of cholesterol in the body. The rest is contained in cell membranes and other body tissues. The National Cholesterol Education Program recommends a dietary cholesterol consumption of no more than 300 mg per day. The body requires no intake of cholesterol but manufactures all the cholesterol it needs from dietary fat and produces about 1000 mg per day.

There are basically two types of Cholesterol transport systems, Low Density Lipoproteins (LDL) and High-Density Lipoproteins (HDL). Each type is a fat carrying protein. LDL, the bad cholesterol carrier, transports cholesterol to the cells and is associated with Arteriosclerosis or hardening of the arterial walls. HDL, the good cholesterol carrier, transports cholesterol to the liver where it is processed for excretion or broken down for other uses. Monosaturated and Polyunsaturated fats lower LDL levels and increase HDL whereas Saturated fats increase LDL levels. The goal is therefore to minimize the LDL cholesterol by reducing the dietary intake of saturated fats. The food label may tout "no cholesterol" but the body manufactures cholesterol from saturated fats.

Arteriosclerosis is a condition where the arteries become occluded. This is caused by a lesion, which develops just under the inner lining of the arterial wall. This swelling, composed of fibrous protein, accumulates LDL carried cholesterol as blood platelets begin to stick to the damaged area. This accumulation reduces the inner diameter of the artery and subsequently leads to a decreased flow

of blood through the artery. The platelets continue to accumulate at the injured site until a clot is formed, blocking all blood flow to the heart. The area of the heart normally being fed by this artery becomes injured. This is known as a heart attack.

Cardiovascular health is a result of proper diet and exercise. Genetics may predispose someone to high blood pressure or heart disease; however, diet, exercise and medication can lessen the impact and improve longevity.

Water

Water is essential for all energy production in the body. Water is also used for temperature regulation and waste elimination and is essential to cell processes. An inadequate supply of water can result in up to a 30% reduction of energy. Between 50% and 70% of the body weight is water. Insufficient water in the body results in a decrease of blood volume thereby reducing the overall oxygen transport ability of the blood to properly supply the muscles during exercise. Since blood is used to regulate body temperature, inadequate cooling of the body occurs. The heart rate increases as the cardiovascular system is stressed and overheating occurs leading to possible heat stroke or heat exhaustion. We can survive without other nutrients for several weeks. However, we can only survive without water for about one week. Water is used to emulsify solutions within the body and transport them to the various tissues including the transport of waste byproducts.

Thirst is not an accurate measure of the body's water requirement. Age and environment alter the thirst mechanism. Therefore, a quantitative schedule must be utilized to adequately hydrate the body. Two hours prior to exercising in a hot environment, the participant should consume 2-3 cups of water and another 1-2 cups about 15 minutes before exercising. During exercise, about 4 ounces of water should be consumed every 15 minutes to replace water lost through sweat and maintain blood volume. As a guide for each pound of body weight lost through sweating while exercising, drink two 8oz. glasses of water. A loss of only two-percent of body weight through sweating can bring on the onset of dehydration. Adults should drink about 2 1/2 quarts of water per day.

Early signs of dehydration include dizziness, fatigue, headache, and loss of appetite. Advanced dehydration is manifested by rapid pulse, shortness of breath, deep yellow urine, blurred vision and hearing loss.

Cold water is absorbed into the body from the stomach faster than warm water. Recent studies suggest that drinks containing up to 10% sugar are almost as readily absorbed from the stomach. These sugary drinks have been shown to improve endurance in events lasting 2 to 3 hours. However, for fat burning purposes, consumption of sugary drinks will provide carbohydrate energy to the exercising muscles and possibly stave off fat metabolization for use as energy.

Therefore, if your intent is performance, then consume sports drinks. However, if the purpose of the exercise session is to burn fat, then drink water only. The glycogen stores in the muscles will run out in about 20 minutes and the body will be forced to metabolize stored fat for continued energy.

Consumption of salt in excess of recommended dietary requirements draws water out of the cells thereby impairing cellular function. Salt depletion may occur during endurance type exercises and when consuming water only. Salt tablets are not recommended because they draw water out of the body and into the stomach. In cold weather, urine production is increased therefore it is just as important to properly hydrate in cold weather environments as it is in hot weather.

Micronutrients

Vitamins

Vitamins are organic compounds not manufactured by the body other than proteins, carbohydrates and fats that are required for growth, maintenance and repair. Vitamins require no digestion and are absorbed directly into the blood stream. The thirteen vitamins identified are divided into two groups, fat-soluble and water-soluble. The fat-soluble vitamins, which include A, D, E, and K are stored in the liver and in body fat. Mega doses of fat-soluble vitamins can produce a toxic effect in the liver and can accumulate in the tissues. Symptoms of toxicity are bone and joint pain, blurred vision, dry skin, and hair and weight loss. The body does not store water-soluble vitamins. The kidneys excrete excess or Mega doses of these vitamins. However, toxicity has been reported with A, niacin, C, D and B6. Recommended Daily Allowances (RDA) are currently being revised.

Examples of Fat-Soluble Vitamins and their purpose and source:

Fat-Soluble Vitamins	RDR	Purpose	Sources
A	1,000 mcg	Vision, skin, hair, growth, mucous membranes	Egg yolk, milk, butter, yellow and dark green vegetables, yellow-orange fruits
D	5 mg	Bone and tooth structure, needed to absorb calcium	Sunshine, milk, eggs, fish
E	10 mg	Red Blood Cells, muscles	Whole grains, oils, fruits, green leafy vegetables
K	80 mcg	Blood Clotting, bone growth	Eggs, green leafy vegetables, cauliflower, tomatoes

Examples of Water-Soluble Vitamins and their purpose and source:

Water-Soluble Vitamins	RDR	Purpose	Sources
C	60 mg	Strengthens blood vessel walls, antihistamine, builds collagen	Citrus, tomatoes, broccoli, potatoes, green peppers, cabbage, strawberries
B1 - Thiamin	1.5 mg	Appetite, digestion, nerve function, carb metabolization	Pork, legumes, whole grains, wheat germ, nuts
B2 - Riboflavin	1.7 mg	Fat, protein and carbohydrate metabolism, mucous membrane	Milk, dairy, whole grain, eggs, fish, green leafy vegetables
B3 - Niacin	19 mg	Appetite, lowers cholesterol, fat, protein and carb metabolism	Meat, fish, poultry, eggs, peanuts, legumes, grains
B6 - Pyridoxine	2 mg	Serotonin (mood regulation), protein metabolism	Meat, poultry, fish, grains, bran, wheat germ, egg yolk, legumes, green leafy vegetables
B12 Cobalamin	2 mcg	Red blood cells, genetic material production, new tissue	Meat, poultry, fish, dairy
Folic Acid	200 mcg	Red blood cells, genetic material production	Meat, eggs, fish, green vegetables, beans, asparagus, yeast
Pantothenic Acid	7 mg	Adrenal function, food metabolization, nerve function	Whole grains, eggs, vegetables, meats
Biotin	100 mcg	Metabolization of glucose	Egg yolk, milk, legumes, peanuts, bananas

Minerals

Minerals, in contrast to vitamins, are inorganic. Minerals also require no digestion. Some minerals are stored in the liver. It is important not to consume Mega doses of minerals on a regular basis above those amounts recommended.

Minerals are divided into two groups, major and trace minerals. Major minerals are those that are required by the body in quantities greater than 100 mg per day and include Calcium, Magnesium, Phosphorous, Chloride and Sodium. Trace minerals are those that are required by the body in quantities less than 100 mg per day. Trace minerals are Iron, Copper, Zinc, Iodine and Selenium. The following table includes recommended daily allowance.

Essential Minerals	**RDR**	**Purpose**	**Source**
Calcium	800 mg	Blood clotting, Bones, Muscles, Nerves	Milk products, Broccoli
Phosphorus	750 mg	Muscles, Nerves, Energy production, Bones	Cereal, Meat, Fish, Legumes, Dairy
Potassium *	2000 mg	Energy, Hair, Skin, Nails, Heart rhythm, muscle contraction, regulation of body fluids	Citrus, Bananas, fish, poultry, dairy
Magnesium *	350 mg	Bone growth, protein and energy production	Egg yolks, dark leafy greens
Sodium *	500 mg	Muscle and nerve function, body fluid balance	Meat, Milk products, fish, salt
Chloride	750 mg	Aids digestion, maintains body fluid balance	Salt
Zinc	15 mg	Insulin production, male prostate function, digestion, metabolism	Shellfish, eggs, meat
Iron	10 mg	Hemoglobin (Blood Oxygen transport), Myoglobin (Muscle Oxygen storage)	Meat, Fish
Chloride *	750 mg	Muscle and nerve function, acid-base balance, digestion	Meat, Milk products, Fish
Fluoride	4 mg	Hardens bones and teeth	Coffee, tea, spinach, gelatin, onion
Iodine	150 mcg	Proper thyroid function	Water, Iodized salt
Copper	3 mg	Red blood cells, connective tissue, nerve fibers	Shellfish, grains, nuts, chocolate
Chromium	200 mcg	Carbohydrate metabolism	Vegetables, grains, Brewer's Yeast
Molybdenum	250 mcg	Nitrogen metabolism	Grains, vegetables
Selenium	70 mcg	Works with Vitamin E to protect cells	Grains, meats, fish, poultry

* Electrolytes provide the proper electrical charge within the body fluids for the transmission of nerve impulses, muscle contraction, and proper body fluid levels and acid-base fluid balance.

Additional Supplements

The following additional supplements are included here because they are the most popular at this time. This section is not intended as an endorsement to take these products, but merely to acquaint the trainer with the effects of that these supplements might have on the client that they are training. The trainer needs to make an assessment as to whether they want to accept clients who are taking controversial supplements. Should something occur, the trainer will certainly have to accept some of the moral if not legal responsibility.

It is not our policy to promote supplements. Even aspirin and acetaminophen taken over long periods of time can affect bodily functions in less desirable ways. Use your brain filter before you use your liver and kidney filters. It is not worth a temporary increase in muscle size as a trade for a permanently blown liver or kidney. A product potent enough to help will be potent enough to cause side effects. Long-term effects of supplements have never been studied.

Would you eat an arbitrary quantity of anything everyday (ice cream, beef, etc.)? The best nutrition plans alternate foods to provide a distribution of various food groups, which provide all the body needs for growth and maintenance. Read the ingredients of all products carefully. Many "Complex Formula" type diet supplements contain various ingredients; some of which may be stimulants or laxatives. Weight loss results may only be temporary and due to the diuretic effect of the supplement.

We provide both the pros and cons here. You are free to make your own informed decision for yourself and your clients. There is no conclusive evidence as to the long-term effects of these supplements nor is there conclusive evidence that they shouldn't be taken. The FDA and USDA leave it up to you as we do.

- Do not take supplements without your doctor’s advice if you are pregnant or could become pregnant.
- Do not take supplements without your doctor’s advice if you are breast-feeding a baby.
- Do not give any supplement to a child without first talking to the child's doctor.
- Do not take supplements if you are taking any prescribed drugs.

Androstenedione (Androstene)

Androstenedione is a hormone that is synthesized into Testosterone. Claims include a temporary boost in Testosterone levels allowing greater performance and enhanced recovery and a heightened sexual function. There is some indication that this supplement may decrease the natural production of testosterone at higher intake levels. It is legal in some countries and not in others without a prescription. For a reference, DHEA, with the assistance of enzymes, is converted to Androstenedione, which is then converted to Testosterone. There is a move to reclassify this

supplement as a drug. Maintaining proper levels of testosterone is vital to overall body growth and maintenance. However, most people's levels are adequate. Too much testosterone can cause a host of problems including kidney, liver, heart failures as well as personality changes. Manufacturers of this supplement recommend a minimum of 1.5 grams of protein per pound of body weight. Androstenedione may decrease natural testosterone production.

Possible Health Hazards: Personality changes, impotence.

Chromium

Chromium helps to lower blood sugar, reduce body fat and cholesterol levels. It is also used to suppress the appetite. In diabetic and overweight individuals, chromium reduces Triglyceride levels by almost 20%, improves glucose tolerance and normalizes insulin levels. Deficiencies can result in insulin resistance. Typical dosage is 50-200 mcg daily. An ounce of brewer's yeast provides approximately 100-200 mcg of chromium.

Possible Health Hazards: In picolinate form, may cause DNA damage, which can result in genetic mutations and cancer. Possible anemia, blood abnormalities, liver dysfunction, and renal failure.

Choline

Choline regulates fat and cholesterol. It aids kidney, liver, and gallbladder function. It also tones muscles. Acetylcholine, a neuromuscular molecule, is also produced. Choline is found in liver, cauliflower, soybeans, spinach, lettuce, nuts, and eggs. The recommended capsule dosage is 550 mg daily or 2.5 grams before an event.

Possible Health Hazards: Possible Diarrhea and Flatulence.

Creatine Monohydrate

The recommended daily dosage of Creatine is 5g. Food sources of Creatine are: Salmon, Pork, Beef, and Tuna. However, you would have to eat about 2 ½ pounds of beef per day in order to meet the recommended dosage of Creatine. Each person’s capacity for Creatine storage is different. Most of the body’s Creatine is stored within the skeletal muscles. The body cannot utilize excess stores and excretes it through urination. If you are genetically predisposed to store larger amounts, then you will not benefit from additional Creatine supplements. The body can synthesize Creatine from Amino Acid stores if needed but not in any appreciable amounts.

Creatine works by assisting in the regeneration of Adenosine Triphosphate (ATP). This allows the muscles to perform contractions for longer periods before becoming fatigued. ATP is used mostly in short burst type muscle contractions. A common practice is called "loading" as recommended by

the manufacturers of Creatine. This involves taking large doses (20 g/day for a about a week) and then reducing the dosage to 2 to 5 g/day.

Possible Health Hazards: Dehydration, muscle cramps and muscles injuries.

DHEA

Dehydroepiandrosterone (DHEA) is a steroid hormone and chemically related to testosterone and estrogen. It is manufactured by the adrenal glands from cholesterol. DHEA production increases up until the mid-20s. A steady decline in DHEA production occurs as a person ages until only about 20% is produced by age 75 as was produced during the peak period in the 20s. There are varying studies with varying results. Some studies show an increase in muscle mass and attribute this supplement to an increased longevity. However, other studies show the opposite results and show an increase in body fat and estrogen levels.

Possible Health Hazards: Increased testosterone level (women), increased estrogen level (men), altered hormone levels, liver dysfunction, increased prostate/breast cancer risk and other steroid-like effects (facial hair, acne, personality changes).

Ephedra (Ma Huang)

Ephedra (Ma Huang) is a decongestant, diuretic, and Central Nervous System (CNS) stimulant. It stimulates the adrenal glands and increases energy level. It is also used to reduce bronchial spasms as in asthma and allergy related illnesses. Claims also include appetite suppressant, weight-loss and anti-depression properties. As a stimulant, it increases the metabolism through thermogenic (heat production) means and thereby burns fat. It contains Ephedrine, a stimulant used in over-the-counter bronchodilators. Promotes urination and reduces edema. Recommended dosage is 100 mg daily one hour before a meal.

FDA has reported over 40 deaths and over 1000 serious side effects linked to Ephedrine. Manufacturers warn against the use of Ephedra if you are under the age of 18 or have a family history of heart disease, thyroid disease, diabetes, high blood pressure, headaches, depression or other psychiatric condition, glaucoma, difficulty urinating, prostate enlargement, or seizure disorder. They also recommend consulting a doctor or licensed healthcare professional before using Ephedra.

It is also warned that exceeding the recommended dose may cause serious adverse health effects including heart attack and stroke. Ephedra should not be used by those with anxiety disorders such as panic attacks, or by those with glaucoma, heart disease, or high blood pressure. Not to be taken with depression drugs, caffeine, decongestants, or other stimulants, monoamine oxidase inhibitor (MOI) or any other dietary supplement, prescription drug or over-the-counter drug containing

ephedrine, pseudoephedrine or phenylpropanolamine (ingredients found in certain allergy, asthma, cough/cold, and weight control products).

Possible Health Hazards: Hypertension, dizziness, shortness of breath, sleeplessness, palpitations, tachycardia, arrhythmia, nerve damage, tremor, headache, seizure, stroke, heart attack, kidney stones

GABA

GABA (Gamma Amino Butyric Acid), a non-essential amino acid, is claimed to decrease body fat levels while increasing lean muscle tissue. GABA functions by crossing the blood-brain barrier and acting as a pituitary stimulant thereby increasing the secretion of the Human Growth Hormone (HgH). It also acts as an inhibitory neurotransmitter in the central nervous system (decreases neuron activity). It is believed that increased levels of HgH promote a decrease in body fat and an increase in muscle growth. The recommended dosage is one or two capsules (200mg) with a meal twice daily. For further reading on this, visit the National Institute on Drug Abuse's website and search for GHB/GABA.

Possible Health Hazards: Bradycardia (slow heart rate), coma, death, nausea, loss of coordination, vomiting.

L-Glutamine

L-Glutamine provides an important contribution in muscle growth through protein synthesis and increased growth hormone levels. In a recent study by the American Journal of Clinical Nutrition, a single 2-gram dose of Glutamine elevated circulating growth hormone (GH) levels by over 430%. GH is responsible for glucose and amino acid uptake within the body, muscle growth due to protein synthesis and the utilization of fat stores for energy. Glutamine, the most abundant amino acid in muscle tissue, is partly responsible for the transport of Nitrogen into the cell for muscle growth and the extraction of ammonia away from the muscle tissue. Glutamine levels drop after a workout and remain at lower levels until after a complete recovery period. The reduction of Glutamine levels in muscle tissue is destructive to muscle tissue or catabolic. The theory is that this Training Paradox is overcome by supplementing the diet with L-Glutamine before and after a workout. Supplementation of L-Glutamine before and after a workout is believed to overcome this Training Paradox. The recommended dosage is one or more capsules (500 mg) with meals.

Possible Health Hazards: None known at this time. Studies continue.

Synephrine

Synephrine is similar to caffeine and ephedrine, it provides an energy boost, suppresses appetite and increasing metabolic rate. It does not appear to have the same negative central nervous effects

of Ma Huang (ephedra). Through its stimulation of specific adrenergic receptors (beta-3), it appears to stimulate fat metabolism without the negative cardiovascular side effects of Ma Huang (which stimulates all beta-adrenergic receptors). In capsule form, the dosage is 4-20 mg of synephrine per day, which is a typical dose found in products providing 200-600 mg of a standardized citrus aurantium extract (3-6% synephrine).

Possible Health Hazards: Until more studies are done, regard it as a stimulant and therefore should not be taken with other stimulants.

Yohimbe

Yohimbe increase levels of the neurotransmitter, Norepinephrine and is a central nervous system stimulator. It may increase energy levels, muscle mass and promote fat oxidation by blocking specific receptors (alpha-2 adrenergic receptors). It also dilates blood vessels and relieves depression. In capsule form, the recommended dosage is 10-30mg daily.

Possible Health Hazards: Headaches, anxiety, high blood pressure, elevated heart rate, heart palpitations, and hallucinations. It should be avoided by those with high blood pressure or kidney disease.

Daily Caloric Requirements

A pound is equivalent to 3500 calories. To over simplify, if you want to lose one pound per week, reduce your caloric consumption by 3500 calories per week. Consuming less than 1500 calories per day on a regular basis reduces the basal metabolic rate. When the metabolic rate is reduced, fewer calories can be consumed. Excess calories will be stored as fat. This is why it's important to combine exercise with diet in order to affect weight loss.

Your basal metabolic rate is the basic minimum number of calories that are required to maintain your body weight based on average body composition. To calculate your basal metabolic rate:

Basal Metabolic Rate (BMR) = 24 * Weight (lb)/2.2

OR

Basal Metabolic Rate (BMR) = 24 * Weight (kg)

The BMR is then multiplied by a number representing the individual's activity level:

Sedentary	Light	Medium	Heavy
BMR * 1.45	BMR * 1.60	BMR * 1.70	BMR * 1.88

Generally, eating more than this number of calories increases weight and less than this number allows weight reduction. However, BMR does not take into account extremes of activity or inactivity. Therefore, BMR should be used as an approximation. Various activities will increase caloric requirements above the BMR. The following table shows the approximate number of calories required for a 135-pound individual performing the following listed activity for 1 hour:

Activity	Calories Expended	Activity	Calories Expended
Cardio	620	Bicycling 12mph	620
Running 5mph	500	Ski Machine	550
Walking 4mph	230	Swimming	470
Soccer	370	Stair Master	350

Protein, Carbohydrate and Fat Dietary Requirements

Proper nutrition requires a balanced intake of Protein, Carbohydrates and Fat. Protein and Carbohydrates are both 4 calories per gram. Fat is 9 calories per gram. An example follows for a daily caloric requirement of 2000 calories. The number of grams of each will vary according to your daily caloric requirement (based on BMR). However, the percentages should remain the same for all. The following example is for a daily caloric requirement of 2000 calories:

- Protein 4 cal/g 30% of total = 600 cal (protein) = 150g
- Carbohydrates 4 cal/g 60% of total = 1200 cal (carbs) = 300g
- Fat 9 cal/g 10% of total = 200 cal (fat) = 22g

USDA MyPyramid Food Table

GRAINS Make half your grains whole	VEGETABLES Vary your veggies	FRUIT Focus on fruits	O I L S	MILK Get your calcium-rich foods	MEAT & BEANS Go lean with protein
Eat at least 3 oz. of whole-grain cereals, breads, crackers, rice, or pasta every day 1 oz. is about 1 slice of bread, about 1 cup of breakfast cereal, or 1/2 cup of cooked rice, cereal, or pasta	Eat more dark-green veggies like broccoli, spinach, and other dark leafy greens Eat more vegetables like carrots and sweet potatoes Eat more dry beans and peas like pinto beans, kidney beans, and lentils	Eat a variety of fruit Choose fresh, frozen, canned, or dried fruit Go easy on fruit juices	⬇ ⬇	Go low-fat, or fat-free when you choose milk, yogurt, and other milk products If you don't or can't consume milk, choose lactose-free products or other calcium sources such as fortified foods and beverages	Choose low-fat or lean meats and poultry Bake it, broil it, or grill it Vary your protein routine - choose more fish, beans, peas, nuts, and seeds
For a 2,000-calorie diet, you need the amounts below for each food group. To find the amounts that are right for you, go to **MyPyramid.gov**.					
Eat 6 oz. every day	Eat 2 1/2 cups every day	Eat 2 cups every day	⬇	3 cups every day; for kids aged 2 to 8, it's 2	Eat 5 1/2 oz. every day

Find your balance between food and physical activity

- Be sure to stay within your daily calorie needs.
- Be physically active for at least 30 minutes most days of the week.
- About 60 minutes a day of physical activity may be needed to prevent weight gain.
- For sustaining weight loss, at least 60 to 90 minutes a day of physical activity may be required.
- Children and teenagers should be physically active for 60 minutes every day, or most days.

Know the limits on fats, sugar, and salt (sodium)

- Make the most of your fat sources from fish, nuts, and vegetable oils.
- Limit solid fats like butter, margarine, shortening, and lard, as well as foods that contain these.
- Check the Nutrition Facts label to keep saturated fats, *trans fats*, and sodium low.
- Choose food and beverages low in added sugars. Added sugars contribute calories with few, if any, nutrients.

Table from the MyPyramid Food Guide - A guide to daily food choices

USDA RDA/DRI

Female Age	**9 - 14**	**15 – 18**	**19 - 24**	**25 - 50**	**51+**	**Pregnant**
Calories	2200 kcal	2200 kcal	2200 kcal	2200 kcal	1900 kcal	+300
Protein	46 g	44 g	46 g	50 g	50 g	60 g
Calcium	1300 mg	1300 mg	1000 mg	1000 mg	1200 mg	same
Iron	15 mg	15 mg	15 mg	15 mg	10 mg	30 mg
Sodium	500 mg	500 mg	500 mg	500 mg	500 mg	569 mg
Phosphorus	1250 mg	1250 mg	700 mg	700 mg	700 mg	same
Vitamin A	2600 IU	2600 IU	2600 IU	2600 IU	2600 IU	same
Vitamin C	50 mg	60 mg	60 mg	60 mg	60 mg	70 mg
Vitamin D	5 ug	5 ug	5 ug	5 ug	10 ug	same
Thiamin	1.1 mg	1.1 mg	1.1 mg	1.1 mg	1.0 mg	1.5 mg
Riboflavin	1.3 mg	1.3 mg	1.3 mg	1.3 mg	1.2 mg	1.6 mg
Niacin	15 mg	15 mg	15 mg	15 mg	13 mg	17 mg

Male Age	**11 - 14**	**15 - 18**	**19 - 24**	**25 - 50**	**51+**
Calories	2500 kcal	3000 kcal	2900 kcal	2900 kcal	2300 kcal
Protein	45 g	59 g	58 g	63 g	63 g
Calcium	1300 mg	1300 mg	1000 mg	1000 mg	1200 mg
Iron	12 mg	12 mg	10 mg	10 mg	10 mg
Sodium	500 mg	500 mg	500 mg	500 mg	500 mg
Phosphorus	1250 mg	1250 mg	700 mg	700 mg	700 mg
Vitamin A	3300 IU	3300 IU	3300 IU	3300 IU	3300 IU
Vitamin C	50 mg	60 mg	60 mg	60 mg	60 mg
Vitamin D	5 ug	5 ug	5 ug	5 ug	5 ug
Thiamin	1.3 mg	1.5 mg	1.5 mg	1.5 mg	1.2 mg
Riboflavin	1.5 mg	1.8 mg	1.7 mg	1.7 mg	1.4 mg
Niacin	17 mg	20 mg	19 mg	19 mg	15 mg

Child Age	**0 - 0.5**	**0.5 - 1**	**1 - 3**	**4 - 6**	**7 - 10**
Calories	650 kcal	850 kcal	1300 kcal	1800 kcal	2000 kcal
Protein	13 g	14 g	16 g	24 g	28 g
Calcium	210 mg	270 mg	500 mg	800 mg	1000 mg
Iron	6 mg	10 mg	10 mg	10 mg	10 mg
Sodium	120 mg	200 mg	300 mg	400 mg	400 mg
Phosphorus	300 mg	500 mg	800 mg	800 mg	800 mg
Vitamin A	1200 IU	1200 IU	1300 IU	1600 IU	2300 IU
Vitamin C	30 mg	35 mg	40 mg	45 mg	45 mg
Vitamin D	5 ug	5 ug	5 ug	5 ug	5 ug
Thiamin	0.3 mg	0.4 mg	0.7 mg	0.9 mg	1 mg
Riboflavin	0.4 mg	0.5 mg	0.8 mg	1.1 mg	1.2 mg
Niacin	5 mg	6 mg	9 mg	12 mg	13 mg

1 microgram (ug) = 3.3 IU Source: US Department of Agriculture

Examples of Low-Fat Foods

Breakfast:

- Non-fat cereal with skim milk and fruit.
- Toast with Jelly - (no butter, no margarine).
- Bagel with Jelly/fat free cream cheese - (no butter, no margarine).
- Egg substitute French Toast (no butter).
- Egg substitute sandwiches (no mayonnaise or no fat mayonnaise).
- Egg substitute omelets (vegetable, no cheese or no fat cheese).
- No Meats, butter, cheeses or egg yolks.
- Even no fat restaurant breakfasts are cooked with butter or oil.

Lunch:

- Turkey sandwich:
  1 slice of 97% fat free turkey
  1 slice of fat free cheese
  mustard, lettuce, tomato
- No chips (fat free chips), potato/macaroni salad or anything with real mayonnaise
- Fat free, no salt pretzels.
- Salad (No croutons, cheese, olives, oil, dressing, eggs, chickpeas).
- Use fat free dressing sparingly and on the side.
- You can include water packed tuna, chicken (white meat), and turkey.
- Bread (no butter or margarine).

Dinner:

- Turkey (less fat than chicken), whole sliced not pressed.
- Vegetables (steamed) cooked without butter.
- Potatoes (baked, no sour cream or butter - try mustard or salsa).
- Bread (no butter or margarine).

Desserts:

- Jell-O, Fresh Fruit, Fat free pudding snacks.
- Fat free cookies and crackers.
- Angel Food Cake (NOT pound cake).
- Bread - Be careful of oil-soaked bread like Italian restaurant bread sticks.
- Coffee/Tea - Use non-fat milk or none.
- Fat free is good but you still have to count calories.
- Use FAT FREE low-calorie protein supplement if needed for weight training.

Alcohol's Effect on Metabolism

Alcohol provides empty calories. No nutritional benefit is derived from alcohol. Alcohol is 7 calories per gram, which is almost as high as fat in caloric content. In addition, alcohol temporarily slows down the metabolism. The effect of this is that less fat is burned (lower BMR). Generally, high fat foods are consumed with alcohol, which makes matters worse. Also, alcohol inhibits the liver from metabolizing fat. As you can see any weight loss programs has to exclude alcohol.

Caffeine's Effect on Metabolism

Caffeine increases the mobilization of free fatty acids in the blood, which are used for prolonged energy requirements as in marathon running. Caffeine has also been shown to decrease fatigue during low to moderate intensity exercise lasting over 2 hours. However, caffeine is a central nervous system and cardiovascular stimulant thereby increasing the basal metabolic rate, heart rate and blood pressure. Rapid heart rate can occur leading to an unusually high heart rate during exercise. However, after approximately 45 minutes from caffeine ingestion, Bradycardia occurs, or a slowing of the heart rate, and lasts for up to an hour thereby decreasing cardiac output. Bradycardia leads to fatigue and an inability to exercise. Long-term effects decrease as the body adjusts to the caffeine intake level. Caffeine is a diuretic and therefore may promote dehydration due to increased urination. Any level of dehydration can decrease energy levels up to 30%.

Eating Disorders

Anorexia Nervosa is characterized by starvation. Bulimia Nervosa is characterized by gorging and then purging by vomiting or ingestion of laxatives. Both disorders have psychological roots and require professional help. In each case the body losses valuable nutrients. The body will then catabolize muscle tissue to provide the nutrients for the basic life functions even to the point of consuming the heart muscle for nutrients resulting in death.

Popular Fad Diets

There are many popular fad diets available. Each one is heavily promoted to achieve the same goal weight loss. Many are unfounded are some are promoted by people without nutrition credentials. Some diets are based on unbalanced dietary intake to “trick” the body into losing fat. In all cases, these diets limit your overall caloric intake, which is essentially what delivers the results. However, some diets promote the exclusion of carbohydrates or fat or even protein. This can lead to deficiencies of certain nutrients that exist in the excluded food. Further, diets composed of mostly protein and fats promote weight loss through a diuretic effect. This may lead a person to believe that the intended results are being achieved, although temporary in nature. Ketosis can be a result of diets composed predominantly of protein. Ketones are a byproduct of protein metabolization in the absence of carbohydrates. The results can be muscle wasting, bad breath, dehydration, personality changes, kidney malfunctions and dizziness. Diets that do not include carbohydrates can

result in low intake of dietary fiber leading to colon problems and constipation. Never participate in any of these diets while pregnant. Doing so can cause serious problems even death.

All diet claims share the same characteristics. They offer to deprive you of a certain food group or groups when in reality it is the reduction of total calories consumed that provides the weight loss. Eat everything but in moderation.

Glycemic Index

The Glycemic Index (GI) was first developed in 1981 by a team headed by Dr. David Jenkins at the University of Toronto. It is a measure of the blood sugar level (not a measure of the blood insulin levels) based on consumption after fasting. As a standard, glucose has a level of 100. If a person consumes food with an index of 60, blood sugar levels would increase over a two-hour period by 60% as compared to eating the same amount of pure glucose.

The Glycemic Index is controversial since it is only valid when sugar alone is consumed. Protein and Fat slow the absorption of Carbohydrates. However, many diet claims reference the Glycemic Index to substantiate their individual claims. The index was developed as a way to determine dietary guidelines for diabetics. The American Diabetes Association has not endorsed the Glycemic Index.

According to this theory, a food with a low glycemic index (55 and below) provides a minimal increase in blood glucose, lipoprotein lipase (an enzyme that promotes fat storage), and insulin. A food is with a high glycemic Index (70 and above), reduces sports performance due to large increases in insulin production and can result in low blood sugar (hypoglycemia).

However, many fruits that are classified as having a high Glycemic Index can stimulate lipoprotein lipase production even though they are low in sugar. According to the Glycemic Index, ice cream is considered a low GI and whole wheat bread is a high GI food. Therefore, whole wheat bread would create a higher spike in blood glucose levels and a greater increase in insulin production than ice cream. So, it is apparent that Glycemic Index should not be used as a single indicator.

The following foods are listed according to their Glycemic Index rating. Most of the high glycemic type carbohydrates are from refined breads and breakfast cereals, white rice, rice cakes, and French fries. Limit your consumption of high glycemic foods, which create a rise in insulin levels and reduce glucagon thereby inhibiting your body from burning body fat. Glucagon is a hormone that is made naturally in the pancreas. It releases glucose from the liver causing blood glucose levels to rise. Eat a minimum amount of high glycemic foods and combine them with proteins and fats. Remember, even low glycemic foods in large quantities can cause weight gain.

Glycemic Food Table

LOW GLYCEMIC FOODS 20-49 PERCENT	
• All bran cereals • Apples • Apple juice • Barley • Berries • Black-eyed peas • Bulgur • Butter beans • Cherries • Grapefruit • Grapes • Ice Cream • Milk	• Muesli cereal • Navy Beans • Oranges • Peaches • Peanuts • Pears • Peas • Plums • Strawberries • Soybeans • Wild rice • Yogurt (no added sugar)
MODERATE GLYCEMIC FOODS 50-69 PERCENT (LIMIT CONSUMPTION)	
• Basmati Rice • Beets • Buckwheat • Carrots • Cereal (low sugar) • Corn on the cob • Lima Beans • Oatmeal • Pasta • Peas	• Potatoes (red, white) • Potato Chips • Pumpernickel bread • Raisins • Spaghetti • Sourdough bread • Sucrose (Table Sugar) • Sweet Potato • Whole wheat bread (100% stone ground)
HIGH GLYCEMIC FOODS 70-100 PERCENT	
• Apricots • Bagels • Bananas (ripe) • Breakfast cereals (refined with added sugar) • Corn chips • Corn Flakes • Corn syrup solids • Crackers • Doughnuts • Glucose and Glucose polymers (maltodextrin) • Hamburger and hotdog buns • Honey • Jelly beans • Maltose • Mango	• Muffins • Pancakes • Papaya • Parsnips • Puffed rice or wheat • Potato (baked) • Rice cakes • Shredded wheat • Soft drinks & sport drinks (added sugars) • Toaster waffles • Watermelon • White bread • White rice • Whole wheat bread

Chapter Two

Physiology

Muscle Fiber Types

There are two types of muscle fibers, fast twitch (FT) and slow twitch (ST). Fast twitch fibers are used for explosive type movements and are easily fatigued. Slow twitch muscle fibers contain more mitochondria than Fast twitch. Mitochondria are cell structures that contain specific enzymes, which are required by the cell in order to use oxygen for energy production.

Fast twitch muscles fibers have less mitochondria and therefore less capacity for oxygen utilization in the production of energy within the muscle. This makes them better suited to anaerobic activities such as weight training, sprinting, jumping and other explosive type activities. FT fibers create energy anaerobically, that is, without oxygen. This system uses glucose as a prime energy source. The by-product of this anaerobic energy production is heat and lactic acid. Lactic acid accumulation in the muscle causes fatigue and soreness. The anaerobic energy system is a limited system for energy production.

Slow twitch fibers are used for endurance type activities and are particularly suited to aerobic type activities. These type fibers contain an increased number of mitochondria and therefore are capable of utilizing oxygen for the production of energy within the muscle. This system uses glucose or fat in combination with oxygen to produce energy. The by-product of this system is carbon dioxide, water and heat.

Each person has a specific ratio of FT to ST fibers. A person with a high ratio of FT fibers may find it easier to train for specific activities that involve explosive movements. Conversely, a person with a higher ratio of ST fibers might find it easier to train and excel at endurance type activities.

There is a third type of muscle fiber that exists only in humans. It is considered a FT fiber of type IIA. These fibers are less powerful than the type IIAB discussed above. What makes these type IIA FT fibers unique is that they can adapt somewhat to aerobic activities. These fibers provide the capability to alter our original genetic FT/ST ratio.

Energy Production

There are basically two types of energy systems that the body utilizes, Aerobic and Anaerobic. Each energy system produces Adenosine Triphosphate (ATP), which is used by the muscles to contract.

The Aerobic System can utilize carbohydrates, proteins or fat to supply an unlimited amount of ATP as long as oxygen is present. The Aerobic system provides medium to very long duration energy production with low to moderate power (less than 85% of maximum output). The by-product of this system is heat, water and carbon dioxide.

The Anaerobic System can only utilize carbohydrates for ATP production. This system does not use oxygen in the metabolization of its fuel source. The Anaerobic System provides short duration (45 - 70 seconds) and high power. The by-product of the metabolization of glucose (glycolysis) in this system is heat and lactic acid, the cause of muscle soreness immediately after exercise. Muscle soreness 24 to 48 hours after exercise is due to torn muscle fibers and connective tissue. This type of soreness can be reduced by adequate warm-up and cool-down stretching exercises.

Aerobic capacity is the ability of the body to collect and transfer oxygen from the air through the lungs and blood to the working muscles. This is related to cardio-respiratory endurance and is referred to as Maximal Oxygen Consumption or VO2 max. Aerobic Capacity reduces at about 10% per decade after 30 years of age.

The Anaerobic Threshold is defined as that point where the body can no longer meet the oxygen demand and its anaerobic metabolism is accelerated. This point varies on an individual basis and is dependent on fitness level. For healthy individuals, this occurs between 50% and 66% of their maximal working capacity. This would be equivalent to running faster than half speed.

Cardiovascular and Respiratory System

Air is inhaled into the lungs where oxygen is exchanged through tiny gas permeable sacs within the lungs for carbon dioxide from the blood. The heart pumps the oxygen rich blood from the left atrium through the arteries then through tiny vessels called capillaries to the tissues of the body. At the cell level, oxygen is given up for metabolism and the carbon dioxide produced by this action is picked up by the blood. The oxygen depleted and carbon dioxide rich blood is then pumped back to the heart, through the veins to the right atrium to the lungs where the process is repeated.

Cardio activity increases the strength of the heart muscle. The result is a greater volume of blood per stroke. This is referred to as Stroke Volume or the amount of blood ejected from each ventricle of the heart during one stroke. Cardiac Output is a measure of the amount of blood pumped through each ventricle in one minute. Vital Capacity is the volume of air that can be forcibly ejected from the lungs in a single expiration. Cardiovascular activity provides a Training Effect on Vital Capacity, Stroke Volume and Cardiac Output. By definition an artery carries blood away from the heart while veins carry blood toward the heart.

Chapter Three

Kinesiology

Anatomy

Bones provide attachment points and support for muscles. Bones are connected together by fibrous tissue called Ligaments. Tendons are also fibrous tissue and attach muscle to bone. Both have some elasticity and do not heal on their own if torn. An inflamed tendon is called tendonitis and is caused by overstretching the tendon. Cartilage is also fibrous tissue but is not elastic. Cartilage is used to cushion the junction of two bones.

The body is divided into three anatomical planes the Frontal, Sagittal and Horizontal. The Frontal plane divides the body from front to back. The Sagittal plane divides the body down the center or vertically. The Horizontal plane divides upper and lower. The table below lists the anatomical term and the corresponding description.

ANATOMICAL TERM	DESCRIPTION
Anterior	front
Posterior	back
Medial	inside
Lateral	outside
Supine	face up
Unilateral	one side
Bilateral	both sides
Prone	face down
Superior	upper
Inferior	lower

Muscle Action

The three types of muscle contraction are Isometric, Isotonic, and Isokinetic. Isometric is defined as that type of contraction where muscle tension and muscle length remain constant. This type of exercise provides muscle strength gains but only at the joint angle held during the exercise. Isotonic contraction is defined as that where the muscle tension remains constant and muscle length varies. Isokinetic contraction is defined as varying tension and length.

In each exercise there are four main functions of the associated muscles, Agonists (prime movers), Antagonists, Stabilizers and Assistors. The Agonists is generally the muscle we are exercising. The Antagonist is the opposing muscle and acts in contrast to the agonist. The Stabilizer muscles are those that hold a joint in place so that the exercise may be performed. The Assistors help the Agonist muscle doing the work. The stabilizer muscles are not necessarily moving during exercise, but provide stationary support.

For example, when doing biceps curls, the biceps are the agonists, the triceps are the antagonists and various muscles including the deltoids are the stabilizer muscles. However, when doing a triceps push down, now the triceps are the agonists and the biceps are the antagonists. Again, the deltoid muscles are the stabilizer muscles. The agonist/antagonist relationship changes depending on which muscle is expected to do the work. However, every muscle group has an opposing muscle group. The following table lists muscles and their opposing counterparts:

AGONIST (Prime Mover)	**ANTAGONIST**
Biceps	Triceps
Deltoids	Latissimus Dorsi
Pectoralis Major	Trapezius/Rhomboids
Rectus Abdominis	Erector Spinae
Iliopsoas	Gluteus Maximus
Quadriceps	Hamstrings
Hip Adductor	Gluteus Medius
Tibialis Anterior	Gastrocnemius

In reference to Agonist and Antagonist, this above list could easily be reversed when exercising the muscles in the right-hand column. Muscle balance is that relationship between the Agonist and Antagonist. It is important to have muscle balance to prevent injury. If the Agonist is much stronger than the Antagonist is, the Agonist can overpower and injure the Antagonist.

Tendons are made up of fibrous tissue and connect muscle to bone. Tendonitis is an inflammation of the tendon due to overuse. A stretching or tearing of the tendon is referred to as a strain. A strain is a muscle or tendon injury.

Ligaments are also fibrous tissue and connect bone to bone. They are less flexible than tendons. The function of ligaments is to restrict the joint movement within normal parameters. When a ligament is over stretched or torn it is called a sprain. Since ligaments don't have a vascular system, they may take a very long time to repair or may never return to their original length. This can cause abnormal joint movement and even cartilage and bone wear due to this unrestricted movement.

Joint Action

Joints provide a fulcrum point for muscles to do work.

There are six types of joint action:

JOINT ACTION	MOVEMENT DESCRIPTION	EXAMPLE MOVEMENT
Flexion	decreasing joint angle	Biceps Curl
Extension	increasing joint angle	Triceps Extension
Abduction	movement away from body centerline	Lateral Raises (Deltoids)
Adduction	movement toward body centerline	Horizontal Flyes (Pectorals)
Rotation	rotation about and axis	Twisting the Arm
Circumduction	360-degree rotation	Arm circle around

Chapter Four

Cardiovascular Training

The mechanics of cardiovascular exercise require that oxygen be brought in by the lungs and transferred to the blood vessels. Oxygen rich blood is then pumped by the heart to the muscles. The muscles utilize oxygen for muscle contraction. Through routine cardio activity, the body becomes more efficient at processing oxygen. Examples of cardio activity include running, jogging, biking, rowing, walking. In fact, any exercise that incorporates large muscle groups, raises the heart rate, breathing rate and body temperature is aerobic in nature.

Benefits

- Increases cardiorespiratory and cardiovascular system outputs
- Strengthens heart
- Decreases resting heart rate
- Improves circulation by clearing out cholesterol buildup
- Body adapts to burn fat as primary fuel source
- Improves psychological disposition and reduces stress levels
- Raises basal metabolic rate
- Decreases blood pressure
- Reduces LDL blood cholesterol level
- Tones muscles
- Improved balance and posture
- Increases Blood Oxygen level
- Increases flexibility, reducing capability for injury

Weekly Requirements and Limitations

Fitness Level gains are determined by Frequency, Intensity and Duration of the Cardio exercise. Each session (duration) should last from 20 to 60 minutes and be performed 3 to 5 days per week (frequency) at an intensity level measured by heart rate (60% - 90%) according to the American College of Sports Medicine (ACSM).

During the first 15 minutes of cardio activity, glycogen or sugar within the muscles is used for energy. Fat metabolism for energy doesn't occur until about 15 to 20 minutes after beginning cardio activity. This is why it's important that cardiovascular exercise duration be at least 30 minutes. Cardio exercise sessions greater than 1 hour continue to burn fat but at not the same rate as during the first hour.

Additionally, sessions greater than 1 hour increase the risk of injury due to fatigue. Increasing cardio training frequency (greater than 5 times per week) does not give the body a chance to fully recover and can even reduce the body's capability to defend itself against illness. It is important to listen to what your body is trying to tell you. Rest, adequate sleep, and proper diet all become more critical when demands are placed on our bodies above the normal everyday physical stress.

Diet Requirements

The type of fuel you put in a vehicle depends on the performance you expect out of it. The same is true of our body. Unlike weight training, cardio training has two main goals. The first is to improve cardiovascular performance, the second to burn fat. Both of these goals can be realized during the same cardio activity session.

If the goal is to simply improve cardiovascular strength, then we need to target performance. Like weight training, we want to consume a complex carbohydrate snack before any cardio session. A sugar snack will not provide the sustained energy and in fact may decrease performance. Excessive sugar intake before cardio activity can work against the participant. When large amounts of sugar are ingested, the pancreas must secrete insulin to metabolize the sugar. Insulin levels in the blood inhibit the liver from metabolizing fat. Therefore, little or no fat burning takes place during exercise. This includes sugary drinks, i.e., sport drinks which, stay in the stomach much longer than ordinary cold water thereby inhibiting quick hydration. Therefore, if the goal is to burn fat, then water only should be consumed before cardio activity.

In addition to their doctor's recommendations:

- Eat a small, easily digestible snack (such as crackers) prior to exercise.
- Drink plenty of water before, during and after exercise to prevent dehydration.
- Older populations lose their sensitivity to thirst and subsequently dehydrate easier.
- Wear loose, comfortable clothes to avoid movement restrictions.

Types of Cardio Activities

Anything that maintains the target heart rate 60% - 90% of the Maximum Heart Rate is considered cardio or aerobic activity. If the heart rate is lower, then aerobic activity levels have not been reached. If the heart rate is higher, then an anaerobic level has been reached. During anaerobic exercise (sprinting) protein is being consumed and energy is being produced without the benefit of oxygen.

High intensity, high impact cardio exercise is not necessary to burn fat. For example, running for 1-mile burns only 20% more fat than brisk walking for 1 mile. It's important to focus on the exercise

and maintain the target heart rate. Watching TV, reading books or other similar activity tends to distract the participant from monitoring the target heart rate. Use music with sufficient beats per minute to intensify the exercise session (120 - 140 bpm).

It is important to provide a period for cool-down. Abruptly stopping cardio excerise activity can cause blood pooling in your lower extremities or making you feel lightheaded.

Pregnancy

During pregnancy, no exercise should be performed in the supine position after the fourth month. Target heart rate should not exceed 140 bpm. Avoid exercises that incorporate extreme flexed or extended joint positions. Joints are looser in the latter part of pregnancy. Also avoid jumping movements due to joint and tissue laxity. It is important to maintain the current fitness levels during pregnancy and not try to increase or improve the fitness level. The time to do this is before pregnancy not during. Keep Aerobic/Step moves basic and simple. High step heights can become dangerous due to the body's change in the center of gravity. Recommended step heights are 4 to 6 inches. Keep strenuous activities down to a duration of 15 minutes at a time. It is also very important to avoid the Valsalva maneuver (holding the breath) during exercise. It robs not only the baby of oxygen but oxygen starved muscles can cramp easily.

Maximum Heart Rate

The Maximum Heart Rate is determined by the participant's age. This is the level that must never be exceeded. Never exercise even near the maximum heart rate. Drugs, illness, coffee, and alcohol can push the heart rate to dangerous levels. The maximum heart rate is determined as follows:

Maximum HR = 220 - Age

Resting Heart Rate

Heart rate is an accurate measure of your performance during the cardio exercise session. However, it is not the only indicator of your fitness level. The Resting Heart Rate (RHR) needs to be determined, particularly if you plan to use the Karvonen method of determining your target heart rate. The resting heart rate is measured for three consecutive mornings before you get out of bed. Keep a watch or clock with a second hand to count the beats and count for 10 seconds then multiply the total 10-second count by 6. The number you get is your resting heart rate. As your cardiovascular system becomes stronger, the resting heart rate will become lower. You will then need to repeat the above measurement.

Target Heart Rate

The Target Heart Rate is the heart rate range that the participant should try to maintain during exercise. The participant's fitness level determines which of the three intensity levels Beginner, Intermediate or Advanced should be maintained. For each category, approximately 4 to 6 weeks should pass before moving to the next level assuming at least three cardio sessions a week.

LEVEL	Beginner	Intermediate	Advanced
Target HR	60% - 70%	70% - 80%	80% - 90%

Heart rate should be measured every 15 to 20 minutes for experienced participants of cardio exercise and every 5 - 10 minutes for beginners. Pulse rate can be measured from one of two anatomical sites, the carotid artery or the anterior wrist. Counting should begin within 5 seconds after exercise stops and begin with zero. Count the number of beats for 10 seconds then multiply by six to get the beats per minute. Beta-Blocker medication lowers the overall heart rate. Raising the arms overhead produces a higher heart rate known as the Pressor response. If the heart rate is too low, use full range of motion and more arm movement. Conversely, if the heart rate is too high, shorten the range of motion and reduce or eliminate arm movement. During pregnancy, heart rates should not exceed 140 bpm.

There are two methods for calculation of the target heart rate. The Standard Method is the quick method and uses an intensity range of 60% to 90% of the maximum heart rate. The Karvonen method incorporates the individuals resting heart rate and is therefore the more accurate method. This method uses an intensity range of 50% to 85%. This is also the preferred method for special populations.

An example calculation using the Standard Method for a 40-year-old for a desired cardio exercise intensity of 75% would be:

Standard Target HR = %Intensity/100 x (Maximum HR)
= 0.75 x (220 - 40)
= 135

An example calculation using the Karvonen Method for a 40-year-old with a resting heart rate of 50 bpm for a desired cardio exercise intensity of 75% would be:

Karvonen Target HR = %intensity/100 x (Maximum HR - Resting HR) + Resting HR
= 0.75 x (220 - 40 - 50) + 50
= 147

Heart Rate Reserve

The Heart Rate Reserve is used to calculate the Karvonen Method:

Heart Rate Reserve (HRR) = Maximum Heart Rate (MHR) – Resting Heart Rate (RHR)

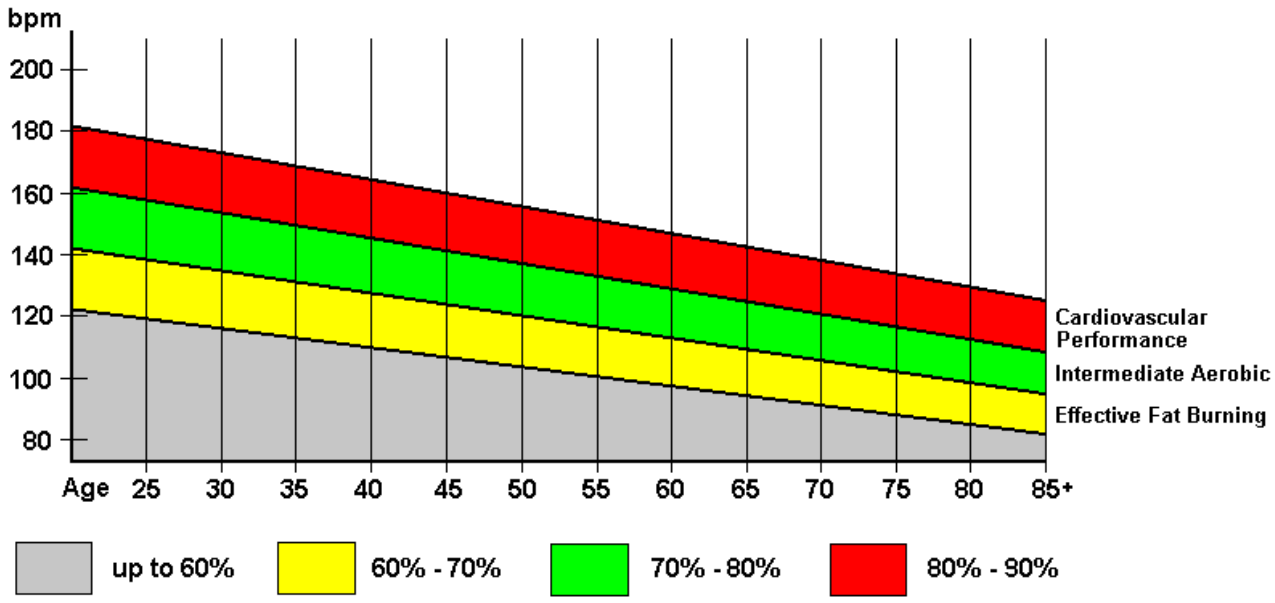
MET

The standard metabolic equivalent, or MET, level. This unit is used to estimate the amount of oxygen used by the body during physical activity.

1 MET = the energy (oxygen) used by the body as you sit quietly, perhaps while talking on the phone or reading a book. The harder your body works during the activity, the higher the MET.

Any activity that burns 3 to 6 METs is considered moderate-intensity physical activity. Any activity that burns > 6 METs is considered vigorous-intensity physical activity**.**

Target Heart Rate Chart



Post this chart in your class or workout area.

Chart courtesy of

INTERNATIONAL FITNESS ASSOCIATION
www.ifafitness.com
407-579-8610

Target Heart Rate Table

AGE	BEGINNER 60% - 70%		INTERMEDIATE 70% - 80%		ADVANCED 80% - 90%	
	Beats/min	Beats/10 sec *	Beats/min	Beats/10 sec *	Beats/min	Beats/10 sec *
to 19	121 - 141	20 - 24	141 - 161	24 - 27	161 - 181	27 - 30
20 - 24	119 - 139	20 - 23	139 - 158	23 - 26	158 - 178	26 - 30
25 - 29	116 - 135	19 - 23	135 - 154	23 - 26	154 - 174	26 - 29
30 - 34	113 - 132	19 - 22	132 - 150	22 - 25	150 - 169	25 - 28
35 - 39	110 - 128	18 - 21	128 - 146	21 - 24	146 - 165	24 - 28
40 - 44	107 - 125	18 - 21	125 - 142	21 - 24	142 - 160	24 - 27
45 - 49	104 - 121	17 - 20	121 - 138	20 - 23	138 - 156	23 - 26
50 - 54	101 - 118	17 - 20	118 - 134	20 - 22	134 - 151	22 - 25
55 - 59	98 - 114	16 - 19	114 - 130	19 - 22	130 - 147	22 - 25
60 - 64	95 - 111	16 - 19	111 - 126	19 - 21	126 - 142	21 - 24
65 - 69	92 - 107	15 - 18	107 - 122	18 - 20	122 - 138	20 - 23
70 - 74	89 - 104	15 - 17	104 - 118	17 - 20	118 - 133	20 - 22
75 - 79	86 - 100	14 - 17	100 - 114	17 - 19	114 - 129	19 - 22
80 - 84	83 - 97	14 - 16	97 - 110	16 - 18	110 - 124	18 - 21
85 +	81 - 95	14 - 16	95 - 108	16 - 18	108 - 122	18 - 20

* To use six-second counts, multiply by 10 to get bpm.

Post this chart in your class or workout area.

Chart courtesy of

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Recovery Heart Rate

The heart rate should be below 120 after 2 to 5 minutes after exercise stops depending on fitness level. If the heart rate is higher, insufficient cool-down or low fitness level may be the cause. Slow heart rate recovery can also be due to illness or exercising too vigorously. If this is the case, reduce the intensity of the exercise thereby adjusting the heart rate. Final heart rate check at the end of the cardio workout should be below 100 bpm.

Rating of Perceived Exertion (RPE)

Generally, if you can't talk during exercise, you're training too hard. However, a more accurate method of measuring exercise intensity is the Rating of Perceived Exertion. To put it simply, imagine a scale of 6 to 20 and try to determine where your intensity level is on that scale. That number will be very close to your heart rate. To simplify further, you can narrow the scale down when exercising to a scale of 10 to 18. This would correspond to a heart rate of 100 to 180. It is beneficial to become familiar with this method so that you are always aware of your heart rate when exercising. This allows you to constantly monitor your heart rate and adjust the intensity of your exercise to remain within the target zone. This method should not replace direct heart rate measurement due to inherent inaccuracy but serve as an adjunct to it.

Blood Pressure

Blood pressure readings consist of two numbers**,** systolic and diastolic pressures. The systolic pressure is a measurement of how forceful the heart is pumping blood when it contracts in the pumping stage. It is the vascular pressure created during the contraction of the left ventricle. If this reading is too high, then the heart is working too hard. The diastolic pressure is the measurement of the force existing within the relaxed arteries between heartbeats. If this number is high, it could be indicative of clogged or constricted blood vessels.

Digital blood pressure monitors are available at many department and drug stores and provide an easy method of taking a reading. When a reading is taken in the doctor's office, he first wraps the cuff around your arm and pumps it up with air effectively cutting off the circulation to the lower arm. As he pumps air into the cuff, a mercury pressure gauge provides an increasing reading of the pressure within the cuff. Listening through a stethoscope, he begins to slowly let the air out and the gauge begins to fall. At the moment he hears the pulse start back up, he records the level on the gauge. This is the systolic pressure. He continues to release air from the cuff. When he can no longer hear your pulse, he records that reading from the gauge. That is your diastolic pressure. A reading of 120/80 or lower is considered good. A reading of 140/90 or above is considered high blood pressure.

It is important to see a doctor to determine if medication is required if high blood pressure is indicated. Exercising with high blood pressure and without medication could cause serious

consequences. Exercise raises the heart rate and associated cardiovascular pressures, which can push a borderline reading to excessive levels. Certain foods can elevate blood pressure by constricting blood vessels or increasing heart rate.

The Valsalva Maneuver or holding the breath while performing an exercise can increase blood pressure to extremely high and dangerous levels. Blood pressures of nearly 400/350 have been recorded during such actions. Existing aneurysms can burst, blood vessels in the eye can rupture and even retinas can tear (Valsalva Retinopathy). This is a common and dangerous practice. It is also the job of the trainer or spotter to recognize when the breath is being held and bring it to the exerciser's attention immediately.

Proper Attire for Specific Activity

Proper attire is just as important as all the other requirements for effective exercise. Running shoes provide the needed heel cushioning but lack in the side-to-side lateral support for required for cardio activities. Aerobic shoes are generally available for women. However, men's aerobic shoes are scarce. A good cross trainer shoe provides all the necessary support for cardiovasular training. Athletic shoes should fit properly. Break in period does not apply to athletic shoes they should fit comfortably from the beginning. Depending on the amount of use they get, insoles may wear out before the shoes show signs of external wear.

It is important to wear clothing that allows the skin to breathe. The body utilizes sweating to regulate temperature. Clothes that restrict the cooling of the skin are not recommended. It's important to wear clothing that allows the body to ventilate. If evaporation does not occur, the wet clothing will continue to help radiate body heat. This can lead to loss of excess body heat after exercise when heat retention is important.

Cotton soaks up sweat readily, but stays wet. Wool, however, continues to provide body warmth even when wet. Nylon doesn't allow water to permeate through. Obviously, layers are important in cold weather environments. Layers allow you to remove and replace outer garments as the need arises. Hats are equally important in cold weather since a considerable amount of body heat can be lost through the head. In warm weather, wear loose clothing that allows sweat evaporation. Again, cotton dries slower than man-made materials. A combination of cotton and polyester combines the absorption and wicking qualities of each material.

Specific Cardio Exercise Activities

Running

- Use a good running shoe.
- Land on the heel and rotate to the toe, except when sprinting, stay on toes.
- Use orthotic inserts if necessary.
- Restrict vertical movement, don't slam down, and glide.

Stair Master

- Use the handrails for balance only, not for support.
- Keep back and head straight up in vertical alignment.
- Using 8 to 10-inch step strokes uses 15% more energy.

Stationary Bicycle

- Restrict side flex movement.
- Assume upper body slightly forward with head upright.
- Adjust seat for near full leg extension.

Teaching Cardio Exercise Classes

Class Preparation

Step height should be dependent on participant's height and fitness level and familiarity with Step Aerobics. Even athletes should limit the step height to the lowest possible height until the coordination is achieved on the step. Under no circumstances should the step height be high enough to require a 90 degree or greater flexion of the knee. A maximum of 60 degrees is sufficient for all higher intensity levels.

Always ask if anyone is new to step. Keep a watchful eye on new people to insure their adherence to safety standards. They may not be aware of their limits yet. We all have a tendency to get complacent over time so always instruct participants in the proper technique, regardless if there are new people present or not.

Instructors should be conscious of the fact that the class will try to follow your intensity level. Therefore, if you use more than one-step riser, the class will follow even if they are not ready. Considering all the classes that we generally do in a week, it's not really necessary to use more than

one riser. The additional stress on your shins, knees and ankles may manifest itself in time. As instructors we sometimes don't get the chance to follow ACSM guidelines for alternate days of cardio activity to heal properly. Proper technique, enough sleep and proper diet are of utmost importance.

Before starting class make sure that all towels, weights or other items are stowed under the board or at the wall so as not to provide a hazard during class. Ensure that each step participant has a minimum of 25 square feet of space. In other words, a 5-foot by 5-foot area with the step positioned in the middle of this area.

Begin with a progressive, limbering warm-up and stretch period followed by stepping with a tap up then basic step-up move. Progressively add arm and then leg changes. Observe the class's response to cueing. This will give you an idea of the overall class experience level. Adjust the class accordingly.

Face the class providing a mirror image of the moves. During such maneuvers as turn step or over the top (not across the top), it may be less confusing to the class and therefore easier for them to follow if you face front. Remain flexible in your teaching style and use common sense guided by the participant's perspective.

Intensity and Complexity

There is a misconception of what constitutes beginner, intermediate and advanced levels of cardio training. Generally, people equate class level with choreographic complexity. It is physical exercise intensity level alone that determines class level and subsequently heart rate. Complex moves, although fine for dance enthusiasts, can be defeating and demoralizing to most of the people who are trying to learn complex dance moves when they are really there to burn fat.

Intensity can be better served by utilizing large muscle groups quantitatively. Complex dance moves can be icing on the cake after the intensity level has been achieved by the aforementioned method. In many cases this may serve as a great cool-down method since intensity and subsequently heart rate generally drops as the participant slows down to learn new steps. Therefore, beginner, intermediate and advanced level classes can be grouped further into two categories, complex and non-complex denoting the choreographic complexity.

Leg muscles and arm movements will also add to intensity level. Intensity level can be reduced by placing hands on the waist while continuing to step, by reducing the height of the step or by reducing the tempo of the music. Step heights of 4 inches provide intensity levels near those of walking briskly. A step height of 12 inches exhibits near the same energy level as jogging at 5 to 7 mph.

Components of a Cardio Exercise Class

Cardio classes are generally one hour in length. The warm-up segment should last about 10 minutes and be composed of limbering type exercises to provide a core body temperature increase. Warming up the muscles is of prime importance in preventing injury due to the fact that they are more elastic. Lower body stretching should then be done for about 5 more minutes.

Begin stepping using simple moves. The cardio segment should last about 25 minutes and should increase gradually in intensity and complexity. All moves should be less than full range until full warm-up is achieved. Heart rate can be checked about half way through the cardio segment and is a good time for a water break. The class should be adjusted according to the results of the heart rate check. A cool-down segment follows the cardio segment lasting about 5 minutes.

Heart rate should then be checked again to assure a rate of less than 120 bpm. Anyone still at a higher level should be instructed to continue marching or walking around the room. Floor work should then begin and continue for the next 10 minutes followed by stretching for the last 5 minutes. None of these times are cast in stone and may be adjusted accordingly. For example, the instructor can reduce the cardio segment to 20 minutes and increase the final stretching segment to 10 minutes.

Types of Classes

1. **HIGH IMPACT CARDIO (135-160 bpm):** Moves that use large muscles to propel the body into the air, with both feet leaving the ground. Examples include jogging, jumping jacks, hops, traveling kicks, etc. This type is good for challenging the cardiovascular system.
2. **LOW IMPACT CARDIO (133-148 bpm):** Moves that stay low to the ground, with one foot remaining on the floor. Examples include walking, marching, lunges, squats, side jacks, heels-up, knees-up, step touches, etc. Offers a high intensity with a reduced the risk of injury.
3. **MID-TEMPO CARDIO (130-140 bpm):** Moves similar to low impact cardio but performed at a slower tempo. In addition to low impact cardio workouts, Mid-Tempo is ideal for slide, aqua or pre-natal workouts and age specific groups.
4. **STEP AEROBICS (120-127 bpm):** Moves that incorporate up and down movements on a platform (step). Step moves include basic steps, lunges, turn steps, V-steps, over-the-top steps, L-steps and knee-lifts.
5. **SUPER STEP AEROBICS (126-138 bpm):** Similar to Step Aerobics but using a faster tempo. Intended for advanced classes, Super Step Aerobics revolves around half-time power moves (squats, forward lunges, isolation holds, etc.), as well as the basic step moves.
6. **INTERVAL (Alternating 123-150 bpm):** Alternates high and low intensity movements, which might alternate, step and cardio combinations to challenge the cardiovascular system.

7. **CIRCUIT (123-126 bpm):** Alternates cardio activity with resistance activity. The general ratio is 3 minutes of cardio to 1.5 minutes of resistance training to improve the cardiovascular system and increase muscular strength.
8. **WARM-UP (120-134 bpm):** Moderate movements performed to prepare the body for vigorous exercise. Warm-up movements typically include simple actions of the large muscle groups, starting small and gradually increasing. A warm-up also includes stretching the muscles that will be used in the activities to follow. A typical warm-up is approximately 10 minutes long.
9. **CARDIO (bpm varies with the type of class):** The portion of the class designed to work the cardiovascular system (see 1-7 above). The cardio segment is approximately 35 minutes long.
10. **POST-CARDIO (bpm varies with the type of class):** Movements performed after the cardio segment of a class. These help the cardiovascular system transition from a high intensity workout to normal activity, and bring breathing and heart rate back to normal levels. This portion of the class also includes resistance activities such as abdominal work, free weights, Resist-A-Balls, etc. This segment of class is typically 10 minutes long.
11. **COOL DOWN (Use slow relaxing music):** Movements designed to lengthen the muscles after exercise return to the cardiovascular system to resting levels. A cool down typically combines stretching with slow, deep breathing, and slow rhythmic arm movements. A cool down is approximately 5 minutes long.

Choreography

A 32-count phrase refers to the numbers of beats or pulses that go by in one "phrase" of music and is therefore a 32-count phrase. Music is naturally divided into phrases, which can be broken into smaller parts called measures, which normally consist of 4 beats of music. If you were to put 8 measures together, you would have 32 beats or counts of music. These 32-count phrases are the building blocks for complete songs. The phrases create patterns that you can follow and use as an instructor. A typical song might have a 32-count phrase which is the introduction, then a 32-count phrase which is the verse, then a 32-count phrase which is the bridge, then a 32-count phrase which is the chorus, and so on.

Music that is phrased in 32 counts makes it possible for instructors to choreograph combinations and routines that end up "on the right beat". Without 32 counts, it will be difficult to follow the music and your routine will finish on the wrong foot. Class participants can detect if you are on the beat or not especially students that are musically inclined.

Moves or combinations should be structured in 32 count blocks so that you begin and end exactly on beat. Create patterns of movement that follow the patterns of the music to add incredible energy to your classes, along with a sense of smoothness and organization.

To build a 32-count combination, choose 4 moves that go together. An example of 4 moves might be:

1. Step - touch
2. Step - hamstring
3. Grapevine
4. Jumping jacks

Now that you have 4 moves that go together, perform each move for 8 counts.

Step 1 would be (do each for one count):

- Step right
- Touch with left
- Step left
- Touch with right
- Step right
- Touch with left
- Step left
- Touch with right

This provides a total of 8 counts. Now you can continue on to Step 2 above and perform it for 8 counts. Then Step 3 and finally Step 4. You now have a 32-count combination.

Injury Prevention and Treatment

Watch for fatigue by keeping a periodic scan on participants. If you observe someone losing coordination, stumbling or appearing red faced and flushed, instruct him or her to stand down and take a few minutes rest. If the severity of fatigue is not as grave, just instruct that person to continue with their hands on the hips to reduce the intensity.

If someone falls and is uninjured, instruct them to discontinue stepping immediately. It is most likely that they have pushed themselves beyond their fitness level. Have them report to the front desk. If they are unable to walk without difficulty or the situation involves cardiovascular or respiratory difficulty, discontinue the class, escort them to the front desk and notify medical personnel. If they are not able to walk, discontinue the class, and send someone to the front desk for help, stay with the injured participant in the event that more serious complications evolve and keep them immobilized. Sprains are treated with Rest, Ice, Compression and Elevation (RICE). Apply ice for no longer than 20 minutes at a time every 2 hours. Apply compression above, on and below the injury. Elevate the injury above the heart.

Shin Splints are caused when the calf muscles are trained and the opposing or antagonist muscle, the Tibialis Anterior, is left under-developed. This causes a muscular imbalance as the calf muscle attempts to tear the Tibialis Anterior away from the bone. RICE is the prescribed treatment and toe raises are the prevention.

Step Aerobics

The Basics

- Bring foot flat up and centered on board to avoid board instability.
- Don't hang heels off the board to avoid straining the Achilles tendon.
- Lower toes to the floor first then heel when coming off board to absorb shock.
- Keep within 12 inches of board when coming to floor, except during lunges.
- Keep heel off the floor when doing lunges, keep weight on the ball of the foot.
- Power up onto to the board only, don't jump off board.
- Lean from the ankles, not the hip.
- Keep abdominals tight to improve muscle tone and balance.
- Continue breathing, never hold the breath.
- Knees should be soft not locked to provide shock absorption and reduce back strain.
- Keep hands on waist until comfortable with leg movements, when learning coordination.

The Class

Warm Up

- Begin with wide stance deep breaths to oxygenate the blood.
- March in place, side step, grapevine.
- Include wide stance toe tapping with reach out and up.
- Extend reach across the centerline of the body.
- Transition from reaching across to reach up, each side.
- Stretch Calves, Hamstrings statically.
- Shin (Tibialis Anterior) dynamic flex.

General Technique

- Step up with whole foot flat on the board.
- Step off board to floor with toe to heel.
- Slight lean forward at the waist.
- Heels stay off floor during lunges.

Safety

- Limit step and cool-down music tempo range from 118 to 122 bpm.
- Limit warm-up tempo range from 120 to 134 bpm.
- Avoid moves that require stepping forward off the board.
- Limit power moves (propulsion) to 1-minute intervals.
- Limit repeater moves to five repeaters at time.
- Use no weights on the board, except where one foot is on the floor.
- Avoid pivoting moves on a loaded knee.
- Never change more than one move at a time (i.e., legs then arms)
- Always provide low impact alternatives to high impact moves.

Discontinue stepping if:

- Legs become fatigued and uncoordinated.
- Any pain becomes evident.
- Dizziness occurs.
- Rapid heart rate.

Basic Step Moves

Basic Left (Reverse for Basic Right)

Start Position

- Centered in front of the bench.

Description

- Step up on the bench with the left foot
- Step up on the bench with the right foot
- Step down left foot, then down right foot.

- Count Breakdown:
  1. Step up on bench with left foot
  2. Step up on bench with right foot
  3. Step down backwards to the floor with left foot
  4. Step down backwards to the floor with right foot

Notes:

- Basic left is one of the simplest and most basic of all step moves

V-Step

Start Position

- Centered in front of the bench.

Description

- Like a basic but step wide on the bench.

- Count Breakdown:
  1. Step up on bench with leading foot as wide as possible
  2. Step up on bench with the other foot as wide as possible
  3. Step down backwards to the floor with lead foot
  4. Step down backwards to the floor with left foot

Notes:

- Feet together on the floor, and spread apart while on the bench

A-Step

Start Position

- In front of the bench, but off to one side.

Description

- This is a modified basic step in the shape of a letter A

- Count Breakdown:
  1. Step up with leading foot at the center of the bench
  2. Step up with the other foot next to the lead foot
  3. Step down backwards to the floor with lead foot
  4. Step down backwards to the floor with left foot

Notes:

- Start and end with feet together on opposite ends of the bench.

Turn Step

Start Position

- In front of the bench, but off to one side.

Description

- Start on side of bench and do a modified basic while turning.

- Count Breakdown:
  1. Step up on the bench with the left foot
  2. Step up on the bench with the right foot while turning to the left
  3. Step off the bench with left foot; turn to the left slightly
  4. Bring the right foot down on the floor next to your left
  5. Step up on the bench with the right foot
  6. Step up on the bench with the left foot while turning to the right
  7. Step off the bench with the right foot, turn to the right slightly
  8. Bring the left foot down on the floor next to the right

Z-Step

Start Position

- Centered in front of the bench.

Description

- Step across the bench, off diagonally, and across the floor to form the letter Z.

- Count Breakdown:
  1. Step onto left side of bench with left foot
  2. Step up with right foot next to the left (feet are together on the left side of the bench)
  3. Step to the right side of the bench with right foot
  4. Step to the right side of bench with left foot (feet are together on the right side of the bench)
  5. Step back diagonally to the ground with left foot (left foot is now in front of the bench on the far left side)
  6. Step back diagonally to the ground with the right foot (feet are together on the left and on the floor)
  7. Step on the floor to the right with right foot
  8. Step on the floor to the right with left foot (feet are together on the left and on the floor)

Notes:

- When left foot leads, counts 3-8 for the letter Z

X-Step

Start Position

- Straddling the bench.

Description

- Start from a straddle position at one end of the bench.

- Count Breakdown:
  1. Step up to center of bench with right foot
  2. Step up to center of bench with left foot
  3. Step down and forward with right foot to the floor on the right side of the bench
  4. Step down and forward with left foot to the floor on the left side of the bench
  5. Step up and backward to the center of the bench with right foot
  6. Step up and backward to the center of the bench with left foot
  7. Step down and backward with right foot to the floor on the right side of the bench
  8. Step down and backward with left foot to the floor on the left side of the bench

Cardio Kickboxing

The Class

Warm Up

- Begin with wide stance deep breaths to oxygenate the blood.
- March in place, side step, grapevine.
- Include wide stance toe tapping with reach out and up.
- Extend reach across the centerline of the body.
- Transition from reaching up and out to jabs to the front and round house punches.

General Technique

- Chin is tucked in and down.
- Don't aim for the target, aim behind the target.
- Always look in the direction of the punch or kick before executing.
- Extend shoulder into the punch.
- Keep abdominals tight to improve muscle tone and balance.
- Keep fists in front of face when not punching. (Defense Position)

Boxer's Stance Technique

- Stay light on the feet to keep impact to a minimum.
- Maintain a rocking back and forth motion.
- Keep heels lightly touching the floor.
- Keep weight on the ball of the foot.
- Keep fists in front of face when not punching. (Defense Position)
- Discontinue is joint pain or discomfort is experienced.
- Stay on Boxer's Stance for no more than 5 minutes at a time.
- Provide lower impact exercise for at least 5 minutes in between.

Safety

- Limit Cardio Kickboxing temp range from 120 - 125 bpm.
- Limit warm-up tempo range from 120 - 134 bpm.
- Limit cool-down music tempo range from 118 - 122 bpm.
- Avoid moves that require back kicks in a crowded class.
- Don't lock knees to provide shock absorption and reduce back strain.
- Limit power moves (propulsion) to 1-minute intervals.
- Limit repeater moves to five repeaters at time.
- The more advanced students can use light weights.
- Instructor should avoid using weights.
- Avoid pivoting moves on a loaded knee.
- Unlike Step multiple moves are permitted. (i.e., legs and arms)
- Always provide low impact alternatives to high impact moves.
- Continue breathing, never hold the breath.
- Instruct class to work at their own pace, not the instructors

Discontinue Cardio Kickboxing if:

- Legs become fatigued and uncoordinated.
- Any pain becomes evident especially joint pain.
- Shin area pain or discomfort.
- Dizziness occurs.
- Rapid heart rate.

Cardio Kickboxing Moves

The Jab Punch

- Front stance to target
- Chin tucked in.
- Aim through the target not at target surface.
- Align the first two knuckles with the target.
- Maintain straight line up the arm to the shoulder.
- Extend shoulder and hips into the punch for power.

TARGETS:

- Just below nose
- Solar Plexus - center of rib cage below chest bone

The Round House Punch

- Front stance to target
- Chin tucked in.
- Aim through the target not at target surface.
- Align the first two knuckles with the target.
- Maintain an arc up the arm to the shoulder.
- Extend shoulder and hips into the punch for power.

TARGETS:

- Side of the head (temple, rear of jaw)
- Side of abdomen near kidneys

The Power Punch

- Oblique stance to target, one foot back
- Chin tucked in.
- Punch with rearward arm.
- Aim through the target not at target surface.
- Align the first two knuckles with the target.
- Maintain straight line up the arm to the shoulder.
- Rotate hips forward and extend shoulder towards target.

TARGETS:

- Just below nose
- Solar Plexus - center of rib cage below chest bone

The Left Hook Punch

- Left leg forward, boxing stance.
- Transfer weight to front leg.
- Arm forms a tight 90-degree angle.
- Twist the whole upper body forward, rotating left foot.
- Extend left arm to punch across the front of body
- Extend punch all the way through to the right side.
- Keep right hand at the defense position.

TARGETS:

- Jaw
- Ribs (opponents' right side)
- Nose

The Front Kick - Forward Leg

- One foot forward, the other 8 - 12 inches behind.
- Feet about shoulder width.
- Transfer weight to the rear leg.
- Look at target.
- Lift knee to highest position.
- Lean back slightly at the waist.
- Extend leg, but do not hyperextend the knee.
- Strike with the ball of the foot.
- Return foot to forward position.

TARGETS:

- Shin
- Just below kneecap
- Groin
- Above waist (hand, face) only for the advanced student

The Front Kick - Rearward Leg

- One foot forward, the other 8 - 12 inches behind.
- Feet about shoulder width.
- Transfer weight to the forward leg.
- Look at target.
- Lift knee to highest position.
- Lean back slightly at the waist.
- Extend leg, but do not hyperextend the knee.
- Strike with the ball of the foot.
- Return foot to behind position.

TARGETS:

- Shin
- Just below kneecap
- Groin
- Above waist (hand, face) only for the advanced student

The Side Kick - Left Kick (do opposite for right kick)

- Feet shoulder width apart or closer.
- Transfer weight to the right leg.
- Look at target to the left.
- Lift left knee up and inward towards body.
- Lean slightly to the right at the waist.
- Rotate right foot pointing toe away from kick (unload knee on turn).
- Maintain front stance.
- Extend left leg outward do not hyperextend the knee.
- Lower right arm to the side (for balance)
- Strike with the blade of the foot (side) and toes pointed down.
- Return left foot to side position.

TARGETS:

- Shin, if target front is facing you
- Side of kneecap if target side is facing you
- Groin if target front is facing you
- Side of thigh if target side is facing you
- Above waist (hand, face) only for the advanced student

The Round House Kick

- Right side facing target, feet shoulder width apart.
- Transfer weight to the right leg, bend front leg.
- Look at target to the right.
- Lift left knee up and inward towards body.
- Begin turning towards target, weight on front leg.
- Unload the knee as turn is executed
- Lean slightly to the right at the waist.
- Rotate right foot pointing toe away from kick.
- Point left bended knee at target
- Extend left leg outward do not hyperextend the knee.
- Lower right arm to the side (for balance)
- Strike with the ball of the foot and toes pointed down.
- Place left foot down wider than shoulder width.
- Should be facing opposite from start (left side to target)

TARGETS:

- Side of kneecap if target side is facing you
- Side of thigh if target side is facing you
- Side of abdomen (kidney area)
- Above waist (hand, face) only for the advanced student

Chapter 5

Plyometric Training

Plyometrics is not a new concept. It has been used for improving performance for years. It is just recently that it has gained wide attention. The word Plyometrics has been in use since the 1960's. Plyometric training is based on using movements that are similar to the type of movement that would be done in a particular sport or activity to improve performance. Several studies have demonstrated that a combination of Plyometrics and weight training is far more effective in improving speed and strength (power).

Benefits

- Improves muscle response time
- Increases muscle performance
- Tones muscles
- Improved balance and posture
- Increases flexibility, reducing capability for injury

Plyometrics, employed to develop power and explosive responsiveness, uses the Stretch-Shorten Cycle (SSC). The whole idea is to develop the most amount of force in the shortest possible time. When a muscle is flexed or shortened, it's under tension and will react with a more powerful and explosive contraction due to stored elastic energy. Unlike most other cardio exercises, gravity becomes a major factor in the workout routine. Strength and flexibility are prerequisites for Plyometric training. The laws of Physics apply. A one-g force is equal to your weight. Two or more g's of force may be exerted by an individual during a jump. For example, a 250-pound (114 kg) individual would subject forces equal to or greater than 500 lbs. (227 kg) of pressure on hip, knee and ankle joints. A 100 (45 kg) pound person would experience force equal to or greater than 200 pounds (91 kg). It's obvious that too much Plyometric training can be damaging to joints, as is the case with all types of exercise.

As is the case in all other types of training, technique is the key. In this case, as they say in piloting, landing is the most important of all. When the body meets the ground is where the potential for damage is highest. Land like a cat. The joints should not be stiff. Allow the legs to act as a shock absorber. The best way to land is to pretend that you are jumping off of a step behind someone and you don't want them to hear you land. This is true for running as well. Use the body's natural ability the absorb shock. If you hear a lot of noise when you run or land from a jump, remember that energy was used to create that noise and your body was the instrument. Keep it quiet. Some people advocate landing on the ball of the foot and some on the full foot. Either way, energy must

smoothly and evenly transfer up the leg. The use of arms in a jump has been shown to contribute up to 10% of the jump results.

When a muscle is eccentrically contracted (stretched or elongated) and then subsequently concentrically contracted (flexed or shortened) the speed of the contraction is increased thereby creating a more powerful contraction similar to a stretched rubber band. In the real world, muscles undergo a more complex movement involving muscle groups and greater neural interaction than what can be achieved in regular weight training.

There is some controversy as to whether Plyometrics are safe. The question is answered by moderation. All types of exercise can be damaging if done to excess or just trying to do too much too soon. Start out small. Use low jumps until your body becomes adapted for balance and timing. Unfortunately, the stories come from people just not willing to give their body a break, rest in between workouts and vary their workouts. Running every day is not good either. Unless you have joint problems, Plyometrics is as safe as any other exercise and provides another area of physical training.

Chapter 6

Aqua Fitness Training

Introduction

Water-based cardio classes follow the same principles of land-based exercises with the exceptions noted in this section. Water based exercise is predominantly for lower body exercise in a low impact, resistance based, environment. Although water-based exercise classes began with an emphasis on the elderly, that is no longer the case. You will find participants with varying levels of fitness and the full spectrum of ages in attendance.

Land vs. Water Exercise

The principles of water-based training are similar to land-based training; however, the techniques are different. The body is uplifted in water by process called buoyancy and since the viscosity or thickness of the water is greater than air, movement of the body through the water provides an increased level of resistance (drag) over land-based exercise. The buoyancy factor provides support for the body, thereby reducing the likelihood of muscle, bone and joint injuries. Buoyancy is defined as the ability of water to support a body's weight. Items float or are buoyant in water because they displace an amount of water that weighs the same as the item itself. To simplify, an item floats when it displaces its own weight in water. This is why heavy iron ships float and small rocks sink and is subject to size, weight and shape or surface area in contact with the water. It was the ancient Greek mathematician, engineer, physicist, and not the least astronomer Archimedes that first stated this principle and we've been using it ever since. If you can't float in water, at least you now know why.

Muscle is not as buoyant in water as fat. Therefore, both the chest and abdomen provide the greatest buoyancy since this is where air and most body fat is located. This becomes more significant in deep water versus shallow water immersion.

Benefits

- Reduced impact on joints
- Reduced stress on joints by decreasing weight bearing
- Tones muscles
- Provides resistance in both eccentric (elongation) and concentric (contraction) muscle movements
- Improved balance and posture
- Increases flexibility, reducing capability for injury
- Allows special populations to exercise easily
- Equivalent calorie burn as land-based exercise

Because of the reduced influence of gravity, joints can easily be moved through the full range of motion without excess joint stress helping to improve flexibility. Deep Water-based running exercises can provide an augmented or alternate training regimen for runners who need to reduce the chronic effects of land-based running due to impact injuries.

Since the effects of gravity are reduced in water, impact is reduced while resistance to the movement is increased due to fluid dynamics. A water-based class can burn more calories than a comparable land-based class due to the increased resistance to movement while providing an increase in muscle strength and endurance. Both cardiovascular and strength training exercises may be part of an aqua fitness program. Strength gains are not as good as weight bearing exercises on land since the weight is reduced by the buoyancy of the water. The speed of body movements through the water will subsequently be slower due to the increase in resistance. The equivalent level of physical fitness can be accomplished in water-based exercises as with land-based exercises.

Water based exercise reduces body weight by about 90% when immersed to the chest level, and 50% when at waist level which alleviates stress on joints and the supporting tissues. At the same time, resistance is increased by a multiple factor depending on the speed of movement due to water's higher density over air, which is about 800 times greater. Exercise in water has an added advantage that it can provide a user selectable resistance to movements. In addition, water pressure on the legs assists in circulation.

Water based exercise classes provide less joint stress not only for healthy individuals, but also for those special populations affected by medical conditions such as arthritis, neck and back problems, strokes and obesity. This type of cardio exercise also may be more acceptable for the self-conscious overweight exerciser. Special populations should acquire a medical clearance before beginning any exercise program including water-based-exercises. It is important to note that since gravity is not as much of a factor in water-based exercise; it will not be as effective as land-based exercise in preserving bone density.

Cautions

Water-based exercise programs should be avoided by individuals who have the following:

- Compromised Respiratory Functions
- Severe Hypotension
- Bladder or vaginal Infections
- Any Infectious Diseases
- Chlorination Allergies
- Open or Unhealed Wounds

In addition, anyone who is apprehensive about being in water or has a fear of drowning should be excluded from water-based exercise programs. The onset of panic can be quite fast and could cause injury. It is important that those individuals who cannot swim be provided with adequate floatation devices.

Aqua Instructor Considerations

Water-based exercise classes may place a greater physical demand on the instructor. Your level of energy expenditure in a water-based environment will certainly depend on how long you are actually instructing while in the water. Chlorinated water, water cleanliness, sunlight (if outdoors) will all provide an additional strain on the instructor over land-based indoor exercise classes. The chlorinated atmosphere can produce an additional strain on the respiratory system and vocal cords of the instructor. This is especially true of the instructor is doing many more classes a week than one would normally attend if just a participant. Since everyone's sensitivities and stamina is different, it will be up to the instructor to determine the maximum number of classes to teach per week to avoid overtraining and environmentally induced abuse.

Teaching Style

There are two different styles used in teaching aqua exercise classes with advantages and disadvantages for both. While some instructors will prefer a particular style, it is recommended that a combination of both styles be used to facilitate the demonstration of the exercises as well as reduce the effective water immersion time for the instructor. As in land-based classes, it is also sometimes advantageous for the instructor to move around the class and provide individual coaching. Remember, the class is intended for the participant's exercise time, not the instructors.

Deck Teaching

This style provides the best instructional view for the participants with the least amount of effort for the instructor. It also provides the instructor with a better view of the class participants and facilitates shorter learning curve for the class participants. Remember that any move demonstrated should be slowed to simulate the increased resistance of the water. Since participants will be

watching the instructor at a higher level, it is important to correct instances of neck hyperextension to avoid excess pressure on the cervical disks. The instructor's position should not be limited to facing the class, but be optimized to facilitate proper instruction.

Instructors should be careful to avoid slipping on slippery decks, which can be minimized by wearing water shoes. Care should also be taken with regard to exposure to heat and humidity to avoid heat exhaustion by drinking plenty of water and occasionally dipping into the pool.

Water Teaching

This style provides the instructor with the same exercise medium as the participant allowing easier simulation of exercise moves. However, it makes it difficult for the instructor to demonstrate the moves since the participant cannot see the instructor's body movements. This precludes the ability to demonstrate the moves and their proper form to new or unfamiliar participants. Again, this may be more fun for the instructor; however, this is not the instructor's exercise time. This may be an effective style with seasoned participants as well as for short periods to demonstrate water specific techniques.

Technique

The intensity of a particular movement in which air is the only resistance will be less as opposed the same movement through the much denser medium of water. Air, although invisible, is a gaseous substance and provides resistance and thereby friction to an object moving through it. Water can be considered similar to air just denser. This medium provides a type of resistance known as Isokinetic resistance. You will remember from the previous chapter on Kinesiology that Isokinetic exercise is that which is defined as changes in muscle length and tension. Most of the exercise that we encounter in the gym is Isotonic; i.e. changes in muscle length with constant tension (the weight resistance doesn't change). In water, the exercise may be Isotonic or Isokinetic.

As an example, if we move an arm at a constant speed, the tension remains constant (resistance of the water). However, if we change the rate of speed (acceleration) of the arm movement from slower to faster, we also change the tension (water resistance). This occurs in air also, but is quite minimal and, therefore, goes unnoticed. This change in resistance is not only dependent on speed through the water but on surface area of the part moving through the water. Wearing webbed gloves or holding foam dumbbells will also increase the standing resistance; while changing the rate of speed will change the moving resistance.

Additional resistance can be achieved using a downward movement of foam devices, which contain air. This air is directly acted on by the increased pressure as the item moving deeper into the water. This is due to water pressure. An item 2 inches below the surface contains the weight of only 2 inches of water above it while an item 2 feet below the surface experiences the weight of 2 feet of

water pressing on it from above. Divers are subjected to much more extreme pressures by having hundreds of feet of water pressing down and all around their body at those depths. Again, it's just not quite as noticeable in a pool, but the forces are the same.

Well, enough of Hydrodynamics. Instructors can utilize this knowledge of speed, direction and depth changes and the corresponding resistance effects to provide both Isotonic as well as Isokinetic exercise water-based programs. So, you can see that water-based exercise programs can provide a greater variance of exercise techniques than land-based exercises when properly utilized.

Just as in land-based exercises, it is important to maintain proper form, which includes posture to avoid injury as well as direct the physical movement to the intended muscle systems. Due to the changes in balance due to the forces of the water, care must be taken to avoid hyperextensions of the neck, back and knees to avoid excess pressure on the joints. Our body is used to reacting with gravity in order to maintain balance and coordination. In water, the effects of gravity are reduced, which alters the interpretation of bodily movements and position. This positional mechanism is called Kinesthesia. From the previous chapter on Stretching, we explored the Proprioceptive Neuromuscular Facilitation (PNF) feedback mechanism that provides muscle position and balance information. In addition to balance, Kinesthesia is defined as our sensation of positional movement. An inner ear infection from a common cold might affect our PNF, but not our Kinesthesia. In other words, we might still be able to walk, but not with our eyes closed since our PNF has been degraded. These two concepts are still being debated at this writing. Both of these feedback mechanisms are dependent on gravity and weight sensations; which are affected by water suspension.

It will also be necessary to provide balanced and counter-balanced movements. Again, physics plays an important role in water dynamics. To paraphrase Newton, any movement causes an equal and opposite movement, which is especially true when an object or person is hanging in water. Without the full effects of gravity (weight), a backward thrust of a leg will propel a body forward. This works well for swimmers. Care must be taken to counter balance movements to maintain proper balance and alignment. Choose movements based on the reactionary force that will be exhibited in the water and the subsequent effects on balance.

As in land-based exercise programs, the frequency, intensity and duration of the workout will have a direct influence on the derived cardiovascular benefits. The Intensity progression provides the application of the properties for regulating resistance levels. Intensity can be varied by increasing or decreasing the speed of a movement or the range of motion or the surface area of the body part.

Water

Temperature

According to Craig and Dvorak (1968), they found that most people at rest will begin to shiver in water temperature of about 75°F - 83°F (24°C - 28°C) while this temperature would be considered comfortable for swimming. So it is important to begin warm up exercises right away to avoid discomfort. If you need to explain procedures to the class, have them engage in some simple arm and leg movements to maintain body heat that will not distract them from your instructions. It is therefore recommended that classes be conducted in water temperature between 75°F - 83°F (24°C - 28°C) or about 80°F (27°C). Temperatures which are above 85°F place an unusual stress on the cardiovascular system and increase the heart rate in an attempt to cool the body. Temperatures colder than 75°F cause a net loss of body heat and can raise blood pressure by restriction blood flow due to vasoconstriction. Actual temperature recommendations vary widely.

According to the Arthritis Foundation, pool temperatures between 83°F and 88°F (28°C - 31°C) are recommended for water exercise. Since it is mostly the older populations that have arthritis, this warmer recommendation may be suitable for older participants who may have more trouble regulating body temperature. Less intensive classes for this group comprised of gentle movements may allow warmer temperatures as well.

The catch here is that older populations may have elevated blood pressure, which may preclude exercising in warmer water. Participants who have untreated low blood pressure or marginal low pressure should be advised not to participate since the warm water will lower the blood pressure further due to vasodilation. This is especially true of hot tub use. The water temperature as well as the class intensity must be targeted for the population. This is also true for land-based classes regarding room temperature and exercise intensity.

Depth

Water based exercises may be performed at one of three different levels: Shallow (waist deep), chest to shoulder depth, or deep water. Deep water classes should only be reserved for accomplished swimmers. Water depth at the chest to shoulder level allows the body to be mostly supported by buoyancy and provides water resistance for the body to work against. Shallower water levels provide mostly body weight to work eliminating the added factor of water resistance. Chest to shoulder depth provides support of 80% to 90% of body weight and allows full suspension (feet off the bottom) for various exercises.

Safety

It is important to be aware of the depth of the water that you are jumping into. Shallower than expected can cause injury; deeper than expected can result in drowning for a non or marginal swimmer. Participants should be aware of the need for sunscreen if the pool is located outdoors. Never allow participants to dive into the pool.

It is not necessary for participants to be swimmers in order to do water-based exercises. Activities are done in shallow water, which will keep the head above the water. It is important to wear water shoes so that traction on the bottom of the pool is maintained for safety. Should a participant slip and become submerged, the instructor is required to stop the class immediately and assist the person who has fallen.

If movements require full submersion (accomplished swimmers only), goggles should be worn to protect the eyes from chemicals and bacteria present in the pool. Ear plugs may also be necessary to keep the same out of the ears. Swim caps can be used to lessen the effect of pool chemicals on the hair. Chlorine will lighten all body hair if sufficient time is spent in the pool. Showers should be encouraged after class to wash off residues of chlorine since these can irritate the skin causing dryness and itching. If classes are to be conducted in an outdoor pool, make sure that all of the participants apply a water-resistant sunscreen with a SPF of 15 or higher. You, as an instructor, are responsible for all aspects of their safety.

Both abdominal and the gluteus muscles should be kept tight with a neutral spine. This requires hips to be slightly forward with a straight (not arched) back. High jumps out of the water should be avoided except for advanced students at a high fitness level. Any type of prone exercise which causes the head to be hyperextended out of the water should also be avoided.

The instructor should be CPR certified. Generally, the employer should have dedicated Lifeguard certified personnel.

Be sure to make an area scan before the participants arrive to ensure that there are no hazards that might cause injury. After they arrive, point out possible hazards and inform them of the slippery nature of the wet areas. Inform them of the location of deeper areas of the pool.

Heart Rates

Heart rate determinations are not the same for land as for exercise in water. Studies have shown that water-based exercise heart rates are lower during water exercise, yet the same benefits are the same as land-based exercise.

Aqua heart rates are approximately 13% lower. This may lead to concern for some people who may feel that they are not working hard enough using a land-based reference. Heart rates will depend on body position in water. When the body is in a vertical position, heart rates will be about 10 beats lower. In the horizontal position, heart rates will be about 17 beats lower. As an example, a land-based training heart rate of 150 bpm would indicate a water-based heart rate of about 140 bpm. It is recommended that a 6 second count be used instead of a 10 second count to account for the increased cooling effect of water, which cools four times faster in water than air.

When performing aquatic exercise, be aware that heart rate may not be the best indicator of the intensity of your workout. Studies have shown that persons who participate in both land and water-based exercise often find their heart rates lower during water exercise, yet they receive the same benefits.

Possible reasons for land-based and water-based heart rate differences are:

- **Compression** - Hydrostatic pressure on the vein's aids in the venous return of blood to the heart.

- **Dive Reflex** - When the face is submerged in water, a natural process lowers the heart rate and blood pressure. This may even occur in chest high water.

- **Gravity** - Blood requires less effort to flow back up to the heart.

- **Partial Pressure** - A gas (oxygen) enters a liquid (blood) more readily under pressure.

- **Temperature** - Since water has a greater cooling effect on the body, there is less effort required of the heart.

Some participants breathe shallow due to the hydrostatic pressure of water exerting external pressure on the chest (top breathing). It is important to recognize that this is occurring and encourage them to execute full breathing to avoid artificially and dangerously increasing the heart rate and blood pressure. Also keep in mind that raising arms high overhead can artificially increase blood pressure and heart rate relative to VO2 requirements.

Equipment

If your workout will include head submersion, participants will need goggles for eye protection against the harsh chemicals and bacteria present in the water. Eyeglasses or contacts may only be worn if submersion is not part of the routine. Swim caps may be useful not only to keep hair out of the face, but to lessen the effects of pool chemicals on the hair. Never use regular land-based weight in the water. The use of flotation devices to increase buoyancy may help to compensate for reduced natural buoyancy. However, using buoyancy devices below the waist can result in an unstable condition. A user with too much buoyancy at the ankle level may find it difficult to maintain an upright position.

Water Barbells (Aqua Blocks) - small foam barbells, which increase the resistance as you move your arms through the water

Aqua Step - used to perform Step Aerobics in the water using a special non-skid surface

Flotation Belts - attached to waist to provide additional buoyancy allowing you to increase your range of motion and work more muscles

Gyro Joggers - two foam rubber circles worn on the wrists or feet to increase water resistance

Hand Webs - webbed gloves used to increase water resistance

Kickboards - used to provide extra buoyancy allowing you to increase your range of motion and work more muscles

Water Noodles (Woggles) - are long cylinders of foam that can provide increased buoyancy and increased resistance

The Class

Preparation

Water level may be anywhere from waist to chest level for beginners and intermediates and deeper water for experienced participants. For deep water classes, the participants should wear flotation devices. Class level and water depth will depend on the skill level of the participants and the class goals. Equivalent class cadence or music tempo is not going to be the same as the same land-based class due to the resistance of water. The cadence will depend on your participant's fitness level and should be in the range of 125-150 bpm for shallow water exercise. Complex movements are to be performed at a slower tempo or every other beat; while simple movements may be performed at tempo. Keep the volume lower than land-based music to compensate for the increased echo effect in the pool area and so as not to mask the instructor's verbal cues.

Exercises should not be too complex especially for beginners. Demonstrate moves, especially proper weight transfer on deck so it is visible to the participants. Conducting the majority of the class from the deck has two advantages. Primarily, it allows the participants to see and hear you clearly. Secondly, it provides the instructor with a better view of the participants for safety concerns. Remember, this is their workout not yours. Have the participants spread out? More space will be needed for each participant than the 5 x 5 foot area recommended for land-based exercises. For water-based exercises, a larger area of about an eight-foot circle (4 ft radius) is needed to accommodate drifting and shifting in the water as well as extended kicks.
A typical class should last about 50 to 60 minutes with a 5 to 10 minute warm up and a similar cool down and stretching period. This will provide a full 30-minute cardio training period. The class should begin with simple moves to allow the participants to become accustomed to the buoyancy of the water.

It is equally important to maintain hydration even in water-based classes. The body continues to perspire, although not as noticeable when it is immersed in water. Thirst triggers may not be as effective when the body is immersed in water. So, it is important to advise the class to bring their water bottles and use them regularly.

Coordinated Movements

Corresponding movements are those where the arm and leg on the same side of the body move together. In opposite movements, the arm on the one side of the body moves in the same direction as the leg on the opposite side of the body.

Double movements are those where both arms move together in the same direction, while in singles, only one arm moves at a time.

- **Corresponding** - refers to same side as in left arm and left leg
- **Opposite** - refers to opposite side as in left arm and right leg
- **Doubles** - refers to opposing arm and leg as in left arm and right leg
- **Singles** - refers to a single side as in left arm only

Class Components

The primary focus of water-based exercises is the legs, which contain the largest muscle mass. Moves include kicks, leg extensions, knee lifts, squats, marching and jogging. The first few classes in any workout generally focus on the moves, proper form, and breathing techniques. As the participant becomes more familiar with the class and instructor, they will be able to increase the intensity of the workout. Start moves slowly and then gradually pick up speed. Always land on the ball of the foot and then roll to the heel with entire foot on the floor. It will not be as easy to maintain coordination with the music, so limit each exercise routine to about 25 repetitions.

Basic Stance - stand with feet facing forward, shoulder width apart and knees relaxed. Arms on hips or at the side

Bob - jump with both feet simultaneously, knees kept soft

Boxer - jump twice with the left and then twice with the right foot, knees kept soft

Bent Leg Jump - jump from one foot to the other and back as in modern dance or ballet

Cross-Country (Aqua Ski) - Alternate arms and legs in wide opposing movements with tightened glutes

Frog Jump - keep toes, knees, and legs pointed outward at 30 to 45 degrees, bring knees up while pushing arms down to side

Heel Lift - jump with heels and knees together while raising heels toward glutes

Hops - hop forward and back or side to side

Jumping Jacks (front) - raise alternating knees waist high

Jumping Jacks (side) - raise legs simultaneously to each side and return

Lunges - forward or backward keeping both knees soft and toes ahead of the knee, point your toes straight ahead

Rocking Horse - moving forward and backward with bent knees, forward knee rising to the chest

Scissor Jump - jump with a move of one leg forward and other back and alternating arms.

Tuck Jump (Straddle) - elbows flexed, bring both knees up to waist level while lowering arms to sides or perform circles

Water Jogging (Jogger) - run in place with legs together or wider than shoulder width apart while swinging arms

Sculling - movement of arms in a side to side and downward waving motion to provide lift
Once you have established the correct stance, a variety of arm and leg movements will be introduced. A complete water-based exercise session is designed to work all of the major muscle groups. Combine a triceps push, biceps curl, shoulder shrugs and other standard arm movements with any of the moves above to extend the variety of the workout. If you are familiar with other activities, you can incorporate those moves into your class such as the jumps used in jumping rope or dance. Cardio Kickboxing moves can also be incorporated into a water-based fitness class. It will be especially important to maintain proper Cardio Kickboxing form to ensure balance. The moves above are only a sample of the moves available. Use your imagination to create stationary as well as travelling moves.

Due to buoyancy, participants may find themselves balancing on their toes. Cue them to press their heels to the floor of the pool to avoid calf cramps (Charlie Horse).

Class Structure

1. Participants should be in water to the chest level
2. Start with Basic Stance - feet facing forward, shoulder-width apart, knees soft and arms at the side
3. Stretch the quadriceps, calf muscles, hip flexors and hamstrings
4. Jog and scull in place, knees raised to waist height at low intensity
5. Jog around an area of the pool, knees raised to waist height at low intensity
6. Perform Lunges - toes pointing forward, either leg extended to the rear with arms extended forward for balance
7. Begin an increased intensity portion of the class with Frog, Tuck and Scissor Jumps
8. Continue an increased intensity portion of the class with Skiing and Rocking Horse moves
9. Begin a decreased intensity portion of the class with Bobbing and Jogging
10. Follow with a stretch of the quadriceps, hamstrings, hip flexors and calves

Chapter 7

Weight Training

Muscle power is the ability of the muscle to do maximum work within the shortest amount of time. Muscle endurance is the ability of the muscle to do moderate work over an extended period of time. Weight Training trains and develops the muscles for power. Spot reduction is not possible; however, adding lean muscle raises the Basal Metabolic Rate and therefore burns more total body fat.

Strength training not only increases bone density but tendon and ligament thickness thereby decreasing the risk of injury by increasing overall structural strength. Muscle atrophies at a rate of about 6.6 pounds per decade of age past 20 years old if not exercised. Strength training can avoid muscle atrophy through the aging process.

Benefits

- Helps control blood pressure
- Reduces body fat
- Improves posture
- Increases muscle strength
- Raises Basal Metabolic Rate
- Increases bone density
- Injury prevention from normal activities
- Physical appearance

Circuit Training

Circuit training is generally set up in gyms to provide a workout to specific muscles in a specific order. Generally, the exercises are done quickly without a great deal of rest in between sets. One set is performed on a machine and followed by a set of different exercises on the next machine. When all the machines in the circuit have been used the round is completed again from the start until three complete sets have been executed.

Circuit Training does not provide an effective cardio workout. Studies evaluating circuit weight training showed an average improvement of only 6% in cardiovascular fitness as measured by VO2 max over a six-week period. Circuit training was described as continuous exercise with moderate weights using 10 - 15 repetitions with 15 - 30 second rest periods.

Overload Principle

Each individual's capabilities are determined by their genetic makeup. Individuals with increased neuromuscular efficiency incorporate greater numbers of muscle fibers during contraction and therefore have the advantage in strength potentials. In general, men have more testosterone than women and therefore have a greater potential for accelerated growth.

Muscles have a tendency to adapt to repeated stimulus, thereby, requiring less energy and effort to execute the same task. This can inhibit muscle growth (hypertrophy) or fat loss that we are trying to achieve. There are two types of overload principles:

- Increasing Weights - increases muscle size.
- Increasing Repetitions - increases muscle strength with less growth in size.

If you over-stimulate the muscle, growth in strength and size will be inhibited. The levels of over-stimulation are dependent on each individual. It would be unreasonable to double the amount of weights. Make sure that you can do at least 4 to 6 repetitions.

Specificity Principle

Muscle training for a specific task is called specificity. Although each person has individual variations in movement for sports related activities, specific training essentially involves working the muscles in the same manner as the expected use.

Muscle design evolves for a specific use. Care must be used when isolating specific muscles not to create an unbalanced condition. Unbalanced muscles may allow a particular muscle to work harder than the supporting and stabilizing muscles, thereby, increases the chances of injury.

Types of Specificity Principles:

- **Resistance** - resistance is identical to or greater than encountered during the activity or sport.
- **Movement** - movement patterns mimic that encountered during the activity or sport.
- **Muscle** - specific muscles are exercised that will be used during the sport or activity.
- **Speed** - movement matches speed used during the activity or sport.

Free Weights vs. Machines

Free weights provide a more complete workout. However, they also require more expertise in their use. When lifting free weights like barbells and dumbbells, not only is the prime mover or Agonist being worked but all the muscles responsible for stabilizing the joint. The result is to increase the strength of the stabilizer muscles. Greater care is required when using free weights. Improper technique can result in injury to the user or bystander if the weights are dropped.

It is important to remember to enlist the aid of a spotter whenever free weights are raised over the head. A spotter's responsibility is to ensure the safety of the user during the execution of the exercise. The spotter must observe the condition of the user and try to anticipate exhaustion. The spotter must also ensure that balance and an even lift is executed, that proper breathing technique is adhered to and that proper form is being executed by the user. A spotter's strength is not as important as his or her vigilance.

Machines provide a safer workout than free weights. Machines also specifically target a particular muscle automatically. It's harder to cheat during an exercise by incorporating unintentional muscle groups. However, since lateral movement is generally restricted, machines do not provide as complete a workout.

When lifting overhead with machines, a spotter is not necessary since the weights are confined to a rack and not directly overhead. Some machines are not adjustable for height or length of limbs on an individual basis. This can cause poor fit and even undue stress on joints when the supporting pressure incorrectly applied. The Biceps Curl and Triceps Concentration machines in many gyms are not adjustable and may cause undue stress on elbow joints instead of applying pressure to the back of the upper arm along the triceps.

In summary, free weights provide the best workout when a spotter is available and proper lifting technique is executed. In contrast, machines provide a better workout than could be safely achieved using free weights when a spotter is not available.

Proper Lifting Technique

The technique incorporated into lifting weights is the most important part of weight training. Improper technique can be responsible for everything from unintentionally exercising the wrong set of muscles to an injury requiring surgery and possibly years of recovery. Tears can occur in muscles, tendons, and ligaments. Joints can be damaged with possible chronic implications. Technique can be learned from reading exercise magazines or books specifically geared to weight room technique. However, in most cases, a few initial trips to the weight room with a Certified Personal Trainer can be extremely helpful to get you started on the proper exercises with respect to your goals and

instruct you on proper technique. Starting a workout program without a trainer is like going to school without a teacher.

The following guidelines should be followed when lifting weights:

- Lift Weights from the floor with legs and not the back.
- Use a smooth full range of motion.
- Don't jerk the weights.
- Don't lock the knees (keep them slightly bent).
- Don't put pressure on the teeth, the enamel can crack.
- Keep back alignment, don't hyper extend or flex the back.
- Don't chat with your buddy, concentrate on the task.
- Unoxygenated muscles can cramp, breathe on exertion.

Sets and Repetitions

A Repetition is referred to as a Rep and is a single lift of the weights. A group of Reps are called a Set. An exercise is generally composed of 3 to 4 Sets.

The amount of weights to use is dependent on the goal of the participant and the fitness level. If the goal is to build muscle at the fastest rate, then 6 to 8 Reps should be done with a heavier weight. If the goal is to simply tone or maintain the existing muscle strength then 12 to 16 Reps should be done with a lighter weight. The table below shows the 8 to 12 intermediate goals:

Participants should never use the heavy weight category if they have not lifted before or if significant amount of time has passed since they have last trained. When initially beginning a training program it is recommended to use the Light category for at least 3 to 4 weeks before progressing to the medium weight level.

There are various methods for determining the amount of weights to incorporate into a training effort (Heavy, Medium, and Light). The 1 Repetition Maximum (1RM) method is determined by the highest weight that one can lift only once and not again. A percentage of this 1RM value is then calculated to use for multiple Reps and Sets. For example, if the participant can bench press 150 lbs. as a maximum effort and only once then the 1RM is 150 lbs. A percentage of this weight is used for the full complement of Reps and Sets. For the Light category, 50% of the 1RM is used.

Another method that can be used to determine the weight to use for a particular exercise is to simply estimate the initial weight. Do as many as you can. If your goal is to build muscle at the fastest rate, then if you can do more than 8 Reps then the weight is too light. If you can't do more than 6 Reps, then the weight is too heavy.

The following table details the number of Reps to use depending on the participant's strength training goals. In each case perform 3 to 4 Sets.

REPS	WEIGHTS	%1RM	RESULTS	REST PERIOD
6 - 8	Heavy	85%-90%	Building at the fastest rate	2 -3 minutes
8 - 12	Medium	70%-80%	Building/Toning	1 minute
12 - 16	Light	50%-65%	Toning	30 seconds

Variations of Sets and Repetitions

All of the following systems are good for promoting muscle strength and endurance. Form is critical in all weight training and particularly for each of the following variations:

- **One Set** - One set for each exercise. One or more exercises may be selected for each body part to be trained. Excellent for beginners and those with limited time.

- **Three Set** - Provides good results for most people regardless of their fitness goals. Most commonly used system.

- **Split Routine** - Alternate training days of specific muscle groups. Never train the same muscle groups two days in a row.

- **Pyramid Set** - Begin with heavy weights and low reps and end with high reps and low weight. Increases stamina.

- **Heavy Set** - Begin with a warm-up set of less than 50% of the intended maximum weight. Continue increasing the weight in each set to near maximum until the weight that can be lifted a maximum of 4 repetitions. Increases peak power.

- **Super Set** - Two exercises for one body part done consecutively with no rest in between. This technique can be applied to opposing muscles, i.e. quadriceps and hamstrings.

- **Tri Set** - Three consecutive exercises for the same body part.

- **Giant Set** - Five or more consecutive exercises.

Weekly Requirements

The recommended minimum weight training according to the ACSM is one set of 8 -12 repetitions of eight to ten exercises that work the major muscle groups at least 2 times per week. Studies have shown that strength training twice per week resulted in a 21% increase in strength. Increasing the training sessions to three times per week resulted in a 28% increase in strength only 7% more than the twice per week group or 75% of what could be accomplished in a three-session week.

Diet Requirements

Muscle protein requirements are exceptionally high for six hours following a weight training exercise. It is therefore a good time to intake a protein rich meal or supplement. Carbohydrates are also necessary after a workout as well as before. Before exercise, carbohydrates provide the energy to sustain the workout. After the workout session, the muscles, as described above, require tissue-building protein. Intake of carbohydrates after the workout raises the insulin level. Increased insulin levels, in turn lift growth-hormone levels and stimulate the production of protein, which is needed for new muscle growth and repair. In addition, protein takes up to 24 hours to move through the digestive system and will be utilized within the next two days for repair. Carbohydrates move through the system within 3 hours.

In summary, take a carbohydrate drink or meal about 2 hours before your workout and during the workout. Afterwards, consume both a protein and carbohydrate snack immediately after the workout. When using sports drinks, try to use drinks that contain a complex carbohydrate like maltodextrin and not one that is simply glucose, fructose or simple sugars, which won't provide sustained energy and can actually cause your workout to be shortened due to fatigue.

Muscle Exercise Cross Reference

Prior to strength training, warm up and flexibility exercises should be performed. Warm up should include at least 5 minutes of cardio activity to provide increased blood oxygen levels and increased body temperature. Both of these factors will increase the effectiveness of the strength-training workout. Exercise sessions should be organized so that the larger muscle groups are exercised first, followed by the smaller muscle groups.

The order of groups should be as follows:

1. Abdomen
2. Hips and lower back
3. Upper Legs
4. Calves
5. Chest
6. Upper Back
7. Shoulders
8. Triceps
9. Biceps
10. Waist
11. Neck

Chest Exercises	**Muscle Group**
Bench Press	Pectorals, Triceps, Anterior Deltoids
Inclined Flye	Outer/Inner Pectorals, Anterior Deltoids
Inclined Press	Upper, Pecs, Triceps, Anterior/Medial Deltoids
Declined Press	Lower/Outer Pectorals, Triceps, Anterior Deltoids Pectorals
Pushup	Triceps, Anterior Deltoids
Cable Crossover	Upper/Lower Pectorals
Pec Deck	Pectorals, Anterior Deltoids

Back Exercises	Muscle Groups
Shrugs	Trapezius
One Arm Row	Trapezius, Latissimus Dorsi
Pull-ups	Biceps, Rhomboids
Back Extension	Erector Spinae
Roman Bench	Erector Spinae
Seated Row	Erector Spinae, Latissimus Dorsi, Biceps
Lateral Pull down	Latissimus Dorsi, Biceps

Shoulder Exercises	Muscle Groups
Overhead (Military) Press	Medial Deltoid, Triceps
Lateral Raises	Anterior/Medial Deltoid
Front Raises	Anterior/Posterior Deltoid
Prone Flye	Posterior Deltoid, Rhomboids

Arm Exercises	Muscle Groups
Barbell Curl	Full Biceps/Forearms
Dumbbell Preacher Curl	Upper/Outer Biceps
Standing Dumbbell/Low Cable	Inner Biceps
Seated Hammer Curls	Outer Biceps/Forearms (Brachialis)
Seated Inclined Dumbbell Curls	Lower Biceps
Triceps Kickback/Dip	Triceps Lateral Head
Triceps Seated Overhead Ext	Triceps Medial Head
Triceps Lying Extension	Triceps Long Head

Lower Body	Muscle Groups
Squat	Gluteus Maximus, Quads, Hamstrings, Erectors
Front Lunge	Gluteus Maximus, Quads, Hamstrings
Calf Heel Raise	Gastrocnemius, Soleus
Hip Extension	Gluteus Maximus
Hip Abduction	Abductors, Outer Thigh
Hip Adduction	Adductor, Inner Thigh
Leg Press	Gluteus Maximus, Quads, Hamstrings
Leg Extension	Quads
Leg Curl	Hamstrings

Abdominal	Muscle Groups
Upper Crunches/Inclined Sit-up	Upper Abdomen
Lower Crunches/Leg Raises	Lower Abdomen
Side Crunches	Outer Obliques
Crunch Machine	Abdomen, Hip Flexor

Sample Workout

Begin each workout with a warm-up. This can be 30 minutes of brisk paced walking or jogging, stair master, etc. Abdominals are done every day using 300 crunches with alternating movements.

Intermediate Workout:

- Do the following exercises in 3 sets of 12 reps.

Advanced Workout:

- Do the following exercises in 4 sets of 12 reps, with increasing weight each set.

Monday ***Legs:*** • Squats • Leg Extensions • Hamstrings • Abductor and Adductor Muscles • Calf Raises ***Biceps:*** • Straight Bar Curls • Dumbbell Curls • Drop Sets	**Tuesday** ***Chest:*** • Incline Dumbbell Press (upper) • Decline Dumbbell Press (lower) • Bench Press • Dumbbell Flyes ***Triceps:*** • Triceps Extensions • Triceps Pull-downs • Triceps Kickbacks • Triceps Press
Wednesday ***Shoulders:*** • Military Press • Dumbbell Rear Deltoid • Dumbbell Lateral Raises • Cable Raises ***Back:*** • Seated Rows • Lat Pull-downs Back • Lat Pull-downs Front • Dumbbell Lat Pulls	**Thursday** ***Trapezius:*** • Shrugs ***Forearms:*** • Forearm Curls • Any grip exercise ***Gluteus Maximus:*** • Cable kick backs

For Friday and Saturday do four (4) sets of twelve (12) reps pyramiding the weight as heavy as you can.

Friday ***Legs, Chest and Triceps:*** • Legs: Sled • Chest: Bench • Triceps: Barbell Extensions	**Saturday** ***Shoulders, Back and Biceps:*** • Shoulders: Military Press • Back: Sit-up Row Machine (rear deltoids) • Biceps: Dumbbell Curls

Chapter 8

Online Client Training

Choose Types of Clients for Online Training

Deciding to go online as a Personal Trainer is an important step in your career. It allows you to maximize your client training experience. Rather than traveling from gym to gym or to each client's location, you can expeditiously train multiple clients at the same time from your location.

Instead of earning individual training fees with travel time in between, you can charge clients based on accumulated time spent online from your business or home. You may devote 15 minutes now to one client putting together a routine or analyzing workout results and come back to that client after you've done the same for other clients. In this way, you may be able to train a number of clients per day. You can hold consultation sessions with your clients and send them PDF workouts via email.

Implementing a training regimen for your clients using videos will be necessary since you won't be actively monitoring their workout. You have two options; you can create videos and publish them on YouTube as a channel or you can direct them to videos that already exist on YouTube. To start out, you might want to do the latter. Make a list of specific videos online that you can direct your clients to for examples of proper workout techniques.

Establish Your Training Fees and Income Target

Generally, training fees vary according to locale. Some areas yield higher fees than others. Online training fees can mirror in-person fees. For new clients, fees should be collected prior to implementing any training sessions. We recommend using a service like PayPal. It's easy to set up and allows the clients to seamlessly use a credit card through the PayPal payment processor. PayPal can be set up as a Subscription Service. This provides automatic billing on a regular basis. For example, if you have a 6-month contract with a client, you can set up a 6-month payment plan done automatically each month. If the contract is long-term, you can set up a monthly subscription that ends when you or your client choose to end your services.

If you have 20 clients and charge each one $50 per one-hour session each week, that would add up to $1000 per week or $52,000 per year. Or, you may decide to charge some clients on a weekly

basis for multiple hours per week. Your options are open. One trainer we know meets with his client once a week for lunch at a restaurant to review his client's progress over the past week. He then assigns him nutritional advice and adjusts his workout routine based on his previous progress. This can easily be done online.

Create a Schema for Each Type of Client

You should put together standard training regimens for weight training, weight loss, and cardiovascular training. These generalized Training Schemas can then be tailored to fit individual clients according to their specific goals, skill level, physical condition, physical limitations and age.

A Training Schema generally should start with the numbers, exercises, and periods. Numbers refers to the number of sets, reps and tempo for cardio workouts. Exercises should include deadlifts, squats, pushups, etc. arranged according to muscle groups. Period would include the number of times each week that the above is to be performed.

Compile a Video Library of Exercises

If you don't want to use other trainer's YouTube video, you can choose to create your own workout videos demonstrating the proper execution of each workout routine. Create a YouTube account and upload each video. This will give you a ready-made library of demonstration videos to train each client.

Each video should emphasize proper form and show three full repetitions. Each video should be less than 30 seconds long. These videos are intended to be demonstrations of exercises and not lengthy tutorials. Make sure you have sufficient lighting and professional background. You do not need a studio setting, but having a simple setting will promote your professionalism.

If you do create your own videos, they should be done in a professional manner and not in your garage or basement. Consider creating a studio using a backdrop in a room. Include clear and concise sound for instructional purposes, no personal chatter. They can watch the video once to gain instructional messages and then use the video to perform the exercise themselves.

Create an Online Personal Training Questionnaire

A training questionnaire not only provides the trainer with specific information, but specifies the goals of the client. Based on the information provided by the client, the trainer can determine if there is a good match. The questionnaire can be sent by email as a PDF. However, a web-based questionnaire form is more professional.

The questionnaire should include:

Personal Information:	age, gender, height, weight
Contact Information:	name, email, and phone number
Health information:	Illnesses, injuries, or physical limitations
Activity Level:	sports activity, weight training, previous trainer
Equipment Access:	gym membership, home equipment
Referral:	Who gave your recommendation?
Payment:	How will you be paying for trainer services?

Getting the Word Out

Talk to your existing clients and see if they are interested in continuing their training online. You could offer them a discount incentive or extra training sessions to continue with you. Referrals are also a major source of clients. Posting helpful information on blogs can also provide visibility for your services. Establish a presence on social media if you don't already have one. Fitness and health related social media pages are an excellent venue to post information. Don't advertise on their pages most page Admins will delete and possibly block you for advertising on their pages.

Instead, you can write pages on your website related to health and fitness and use those pages to post on the social media pages. People who click on your post to access health and fitness content material are directed to your page, where you can include your contact information in the about section.

You can use Online Video Conferencing software such as Zoom Video Conferencing to connect with your clients. Zoom has a 40-minute group session time limit on their free account, but you can purchase a relatively inexpensive plan for additional time and features. However, if you are connecting with one person at a time, there is no time limit at this time. Check their website for current plans.

Qualifications and Certifications

You should be certified as a Personal Trainer. You may also need a business license from your state or local municipality. Insurance is also a requirement if you are working as an independent personal trainer. If you are working for an employer, then you are covered by your employer's insurance.

Although experience is not required, it is a necessary requirement before training individuals. Generally, in the industry, new trainers will begin working with an experience trainer in order to come up to speed. Many gyms will train their new hires as well. So, it would help to get started as a trainer in the in-persona venue and then move into online training.

Chapter 9

Fitness Testing

Flexibility Test

For this field test a measuring tape or 36-inch ruler is required for this test. This test should be done after a short warm-up for the lower back and hamstring muscles. The individual should be seated with shoes removed and with legs outstretched and feet 10 inches apart. Ensure that legs are flat on the floor and not bent. The measuring tape is positioned with the 15-inch mark at the heels and the zero mark towards the body. With the hands crossed and fingers even, the individual under test reaches forward and holds momentarily while measurement is taken. Take three trials and record the highest reading. Consult the table below.

MEN	**20's**	**30's**	**40's**	**50's**	**60's**
Excellent	22+	21+	21+	19+	17+
Good	18 - 21	17 - 20	16 - 20	15 - 18	14 - 16
Average	15 - 17	14 - 16	13 - 15	11 - 14	9 - 13
Below Avg	below 15	below 14	below 13	below 11	below 9

WOMEN	**20's**	**30's**	**40's**	**50's**	**60's**
Excellent	24+	23+	22+	21+	20+
Good	20 - 22	20 - 21	18 - 21	17 - 20	16 - 19
Average	18 - 19	17 - 19	16 - 17	14 - 16	14 - 15
Below Avg	below 18	below 17	below 16	below 14	below 14

Source: Based on YMCA data as reported by the ACSM

One-Minute Sit-Up Test

The individual to be tested should lie on the floor in the supine position with the knees bent at a 45-degree angle. The feet should be placed 12 inches apart and the fingers interlocked behind the head. Hold the individual's ankles to maintain heel contact with the floor. Instruct the individual to breathe out on the way up. Begin the test and have them do as many sit-ups as they can in one minute. Consult the table below.

MEN	teens	20's	30's	40's	50's	60's
Excellent	50+	47+	40+	35+	30+	29+
Good	41 - 48	37 - 44	31 - 38	26 - 32	22 - 28	20 - 27
Average	38 - 40	34 - 36	28 - 30	24 - 25	19 - 21	17 - 19
Below Avg	31 - 37	26 - 33	21 - 27	17 - 23	12 - 18	10 - 16
Poor	below 31	below 26	below 21	below 17	below 12	below 10

WOMEN	teens	20's	30's	40's	50's	60's
Excellent	42+	37+	30+	26+	21+	20+
Good	32 - 39	28 - 35	22 - 27	18 - 23	14 - 19	13 - 18
Average	29 - 31	25 - 27	19 - 21	15 - 17	11 - 13	10 - 12
Below Avg	20 - 27	17 - 24	12 - 18	8 - 14	5 - 11	4 - 9
Poor	below 20	below 17	below 12	below 8	below 5	below 4

Pushup Test

The individual to be tested should lie on the floor in the prone position with the hands pointed forward and immediately under the shoulders. Start with the chin touching the floor then push up by straightening the arms. Instruct the individual to maintain body alignment as they push up.

For males, the legs should be extended out and positioned together using the feet as pivots. For females, the upper leg should be straight out using the knees as pivots. There is no time limit for this test. Instruct the individual to complete as many pushups as they can. Discontinue the test when the individual begins to exhibit straining. Consult the table below.

MEN	teens	20's	30's	40's	50's	60's
Excellent	45+	39+	33+	27+	24+	23+
Good	31 - 41	26 - 35	22 - 29	18 - 25	15 - 22	14 - 20
Average	26 - 29	22 - 25	18 - 21	15 - 17	12 - 14	10 - 13
Below Avg	14 - 24	12 - 21	9 - 17	7 - 14	5 - 11	3 - 9
Poor	below 14	below 12	below 9	below 7	below 5	below 3

WOMEN	teens	20's	30's	40's	50's	60's
Excellent	31+	30+	29+	24+	20+	18+
Good	21 - 28	19 - 26	18 - 26	15 - 22	12 - 18	11 - 16
Average	17 - 20	16 - 18	14 - 17	12 - 14	10 - 12	8 - 10
Below Avg	9 - 16	8 - 15	5 - 13	4 - 11	3 - 9	2 - 7
Poor	below 9	below 8	below 5	below 4	below 3	below 2

Three-Minute Step Test

The purpose of this test is to assess the cardiovascular recovery capability. Assemble a 12-inch-high step, a metronome or music recorded at 96 bpm and a stopwatch. The individual should not talk during this test and be advised to discontinue stepping if pain, dizziness, shortness of breath or nausea is experienced. Begin stepping with right up, left up, right down, left down to each beat or metronome click thereby completing 24 cycles per minute. Continue for 3 minutes. Keep an eye on the participant for signs fatigue, red face or shortness of breath. At the end of the 3-minute period, the individual should sit and the pulse should be located within 5 seconds. The recovery heart rate should be counted for 1 minute. Consult the table below.

3 Minute Step Test (Men)

Age	18-25	26-35	36-45	46-55	56-65	65+
Excellent	<79	<81	<83	<87	<86	<88
Good	79-89	81-89	83-96	87-97	86-97	88-96
Above Average	90-99	90-99	97-103	98-105	98-103	97-103
Average	100-105	100-107	104-112	106-116	104-112	104-113
Below Average	106-116	108-117	113-119	117-122	113-120	114-120
Poor	117-128	118-128	120-130	123-132	121-129	121-130
Very Poor	>128	>128	>130	>132	>129	>130

3 Minute Step Test (Women)

Age	18-25	26-35	36-45	46-55	56-65	65+
Excellent	<85	<88	<90	<94	<95	<90
Good	85-98	88-99	90-102	95-104	86-97	90-102
Above Average	99-108	100-111	103-110	105-115	105-112	103-115
Average	109-117	112-119	111-118	116-120	113-118	116-122
Below Average	118-126	120-126	119-128	121-129	119-128	123-128
Poor	127-140	127-138	129-140	130-135	129-139	129-134
Very Poor	>140	>138	>140	>135	>139	>134

Source: Canadian Public Health Association Project

Body Composition

Obesity is defined as that percentage of body fat that begins to increase the chances for cardiovascular disease. Ideal body fat levels for men are 12% to 17% and 18% to 22% for women. As previously mentioned, body fat is essential for certain bodily functions. Sometimes body type, determined genetically, prevents an individual from achieving unrealistic body shaping goals. There are basically three body types. The Endomorph is characterized by a large block shaped body. The Mesomorph is characterized by a solid muscular structure. The Ectomorph is characterized by a frail, slight build and very little fat.

Body Mass Index (BMI) is an accepted indicator. Originally used by insurance companies as a measure of fitness. It is a ratio of weight to height. However, this method is not accurate for athletic builds. It is difficult to explain to a client why they are considered obese by this method when their body fat level is only 5%. For this reason, we won't include a BMI chart here. However, to calculate your BMI, use the following formula for a 150 lb (68 kg) individual who is 65 inches (165 cm) tall:

BMI (English)	= (Weight x 704) / (Height x Height)	= 25 BMI
BMI (Metric)	= (Weight x 10000) / (Height x Height)	= 25 BMI
BMI (English)	= (150 lb x 704) / (65 in x 65 in) = 105,600 / 4225	= 25 BMI
BMI (Metric)	= (68 kg x 10000) / (165 cm x 165 cm) = 680,000 / 27,225	= 25 BMI

Underweight:	BMI less than 18.5
Healthy weight:	BMI 18.5 to 24.9
Overweight:	BMI 25 to 29.9
Obese:	BMI 30 to 39.9

These BMI interpretations are based On *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults*. NHLBI Obesity Education Initiative, National Institutes of Health, 1998.

There are various other methods for determining the amount of body fat, none are exact. The most accurate is hydrostatic weighing. The individual is weighed in air then weighed in water. The water weight is subtracted from the air weight. The body fat percentage is derived from these two figures. There are electrical impedance, ultrasound and infrared measuring devices also; both are not as accurate. The most common and relatively accurate method is by skin caliper.

There are three methods of interpreting skinfold measurements to body composition. The first is the Durnan Formula based on the four-point method and is based on a standard adult population. The second is the Jackson-Pollack three-point method and is based on a lean athlete. The third is the Slaughter-Lohman two-point method based on a child population of 8 to 18 years of age.

Using the Durnan Method

To determine body fat by the skin caliper method using the Durnan Formula, four points are measured on the right side of the body according to the table below. First, using the thumb and forefinger of the left hand, grasp the skin about 1 cm above the site location. Hold the calipers perpendicular to the site and measure while still grasping the skin. Take three readings and record the average caliper measurement for that site. Now measure the other sites. The four caliper measurements are then summed. This total measurement in millimeters is then matched up with the table on the following page for men or women. Taking readings after exercise will give false readings.

Creative Health Products in Plymouth, Michigan is one source of a very wide variety of skinfold calipers in all price ranges.

SITE	LOCATION
Biceps	Parallel to long axis, midway between shoulder and elbow
Triceps	Parallel to long axis, midway between shoulder and elbow, arm flexed
Subscapular	Diagonally, 1 cm below the inferior angle of the scapula
Suprailiac	Horizontally, just above iliac crest

Percent Body Fat

(Sum of four locations)

Skinfold	MEN (Age in years)							WOMEN (Age in years)						
mm	16-20	21-26	27-32	33-37	33-44	45-49	50+	16-20	21-26	27-32	33-37	38-44	45-49	50+
14								7.1	9.4	11.8	14.1	15.1	16.0	17.0
16								9.0	11.2	13.5	15.7	16.7	17.6	18.6
18								10.5	12.7	14.9	17.1	18.1	19.1	20.1
20	6.1	8.1	10.1	12.1	12.2	12.2	12.5	12.0	14.1	16.3	18.4	19.1	19.8	21.4
22	7.3	9.2	11.1	13.0	13.2	13.4	13.9	13.4	15.4	17.5	19.5	20.5	21.6	22.6
24	8.3	10.2	12.1	14.0	14.2	14.6	15.1	14.5	16.5	18.6	20.6	20.8	21.1	23.7
26	9.6	11.2	12.8	14.4	15.2	15.6	16.3	15.7	17.6	19.6	21.5	22.4	23.3	24.8
28	10.8	12.1	13.4	14.5	16.1	16.8	17.4	16.7	18.6	20.5	22.4	23.2	23.9	25.7
30	11.3	12.9	14.6	16.2	16.9	17.7	18.5	17.6	19.5	21.4	23.3	23.9	24.5	26.6
35	13.2	14.7	16.2	17.7	18.7	19.6	20.8	19.8	21.6	23.4	25.2	25.8	26.4	28.6
40	14.9	16.3	17.8	19.2	20.3	21.3	22.8	21.7	23.4	25.1	26.8	27.5	28.2	30.3
45	16.4	17.7	19.1	20.4	21.8	23.0	24.7	23.4	25.0	26.7	28.3	28.9	29.6	31.9
50	17.8	19.0	20.3	21.5	23.0	24.6	26.3	25.0	26.5	28.1	29.6	30.3	31.0	33.2
55	19.1	20.2	21.4	22.5	24.2	25.9	27.8	26.3	27.8	29.3	30.8	31.4	32.1	34.6
60	20.1	21.2	22.4	23.5	25.3	27.1	29.1	27.7	29.1	30.5	31.9	32.5	33.2	35.7
65	21.2	22.2	23.3	24.3	26.3	28.2	30.4	28.9	30.2	31.6	32.9	33.5	34.1	36.7
70	22.2	23.2	24.2	25.1	27.2	29.3	31.5	29.9	31.2	32.6	33.9	34.4	35.0	37.7
75	23.1	24.0	25.0	25.9	28.0	30.3	32.6	31.0	32.2	33.5	34.7	35.3	35.9	38.6
80	23.9	24.8	25.7	26.6	28.8	31.2	33.7	31.9	33.1	34.4	35.6	36.1	36.7	39.5
85	24.8	25.6	26.4	27.2	29.6	32.1	34.6	32.9	34.0	35.2	36.3	36.9	37.5	40.4
90	25.6	26.3	27.1	27.8	30.3	33.0	35.5	33.6	34.8	36.0	37.1	37.8	38.3	41.1
95	26.3	27.0	27.7	28.4	31.0	33.7	36.5	34.5	35.6	36.7	37.8	38.4	39.0	41.9
100	26.9	27.6	28.3	29.0	31.7	34.4	37.3	35.2	36.3	37.4	38.5	39.1	39.7	42.6
110	28.2	28.8	29.5	30.1	32.9	35.8	38.8	36.7	37.7	38.7	39.7	40.3	41.0	43.9
120	29.3	29.9	30.5	31.1	34.0	37.0	40.2	38.1	39.0	39.9	40.8	41.4	42.0	45.1
130	30.6	31.0	31.5	31.9	35.0	38.2	41.5	39.4	40.2	41.1	41.9	42.4	43.0	46.2
140	31.5	31.9	32.3	32.7	36.0	39.2	42.8	40.5	41.3	42.1	42.9	43.4	44.0	47.3
150	32.5	32.8	33.2	33.5	36.8	40.2	43.9	41.6	42.3	43.1	43.8	44.4	45.0	48.2
160	32.2	33.6	35.0	36.3	37.7	41.4	45.0	42.5	43.2	44.0	44.7	45.2	45.8	49.1
170	33.0	34.4	35.8	37.1	38.5	42.3	46.0	44.2	44.6	45.1	45.5	46.0	46.6	50.0
180	33.9	35.2	36.5	37.9	39.2	43.1	47.0	44.4	45.0	45.6	46.2	46.8	47.4	50.8

Based on the Durnan Formula, four-point method.

Chapter 10

Stretching

Benefits

Most people do not generally give stretching enough consideration. However, stretching reduces the chance of injury. Age stiffens and shortens our tendons and ligaments. The result is limited range of motion, bad posture and painful movements. Stretching can reverse these effects of aging. Exercise can also shorten range of motion. When a muscle is exercised, it becomes shortened and tight. Over a period of time, as the muscle gains strength, it stays in this tight and contracted form reducing range of motion.

Cold muscles should never be stretched; always warm-up the muscles before stretching. Warm muscles and connective tissues are more pliable than cold ones. Stretching reduces the potential for injury by warming up and lengthening the muscles and connective tissue. Stretching after exercise reverses the tightening and shortening effect of exercise on the muscles and connective tissues. Stretching and strength increase together because when the muscle is lengthened is has a longer stroke to full contraction, thereby generating more work. Stretching can also reduce tension. Studies have shown less electrical activity within a muscle after stretching.

Types of Stretching

There are various types of stretching techniques. This text will only consider two. The first is called Proprioceptive Neuromuscular Facilitation (PNF). This technique simply involves the application of resistance along with the stretch. Generally, another person can assist by applying pressure or resistance on the limb in the direction of the stretch. This type of stretching can also be accomplished by using a wall or other object to apply light pressure or resistance to the muscle to be stretched.

The other type of stretching is a two-stage stretch. First stretch the muscle for about 3 seconds. Release the stretch, exhale and stretch again. The second stage of the stretch will allow further range of motion than the first. Hold the second stage of the stretch for 10 - 15 seconds.

Precautions

Never bounce during a stretch or perform any type of ballistic or forceful stretch. When a muscle is stretched forcefully or in a ballistic manner, a reflex action occurs within the muscle to protect the joint. The muscle is sent a signal by the Golgi tendon to contract quickly to protect against an over extension of the joint. Unfortunately, a stretch is still in progress. Tissues can tear based on the conflicting movements.

Chapter 11

Yoga

Yoga Training is beyond the scope of this manual. The following information is intended to inform the prospective trainer of the special requirements of this type of client. Yoga Instructors are specifically trained for years in the subject.

Benefits

- Relaxation
- Increased Flexibility
- Increased Respiration
- Increased Circulation
- Self-Awareness

There are many different yoga styles. Each style has specific guidelines to follow. In general, practicing yoga, whatever the style, on a regular basis is the key to getting the benefits of the practice. Just like any other exercise, you need to devote time to yoga. Setting aside fifteen to thirty minutes a session is an adequate amount of time for beginners. As a beginner you may want to practice at least three to four times a week, then work your way up to a daily practice. As with any other exercises, you should wait at least four hours after a heavy meal before practicing yoga.

Requirements

It is recommended that you choose a clean, flat area where you can practice without be disturbed. You can use specific Yoga mats or any skid proof mat. You must wear comfortable clothing that allows you to move freely. Always practice barefoot.

Guidelines

Breathe slowly and quietly through the nostrils. Never hold your breath when moving into, maintaining, or coming out of any pose. Holding your breath can put a strain on the heart.
Move into each pose with a full awareness. Do not bounce or jerk into a stretch, this will cause the muscle to involuntarily contract and may cause injury. Go as far as you can into the stretch (pose) while maintaining a correct alignment. Maintain correct alignment for safety and effectiveness rather than sacrificing the pose so that you appear to be stretching further. When you are in a pose, you should feel tightness from stretching but never any pain. Only work the muscles that are necessary to hold the pose. Relax any other muscles that may take an extra effort. For example: relax your eyes, face, shoulders, neck and any other muscles that are not necessary.

When you need to adjust a pose, you should make these changes from the ground up. In standing poses, begin adjusting the feet. In sitting poses, begin adjusting your buttocks and the placement of your pelvis. As with inverted poses (advanced), adjust your hands and work your way up.

When practicing yoga, you should always go at your own pace. Never compete with the person next to you or with persons in a book or magazine or even the instructor. Everyone is different and your stretching capacity will change from day to day as you practice your poses. Always enter into the learning of yoga with an open mind. It is best to always use common sense when practicing your poses. If something does not seem right do not do it. Proceed with caution.

Chapter 12

Pregnancy

General Information

Continuing research shows that pregnant women can benefit from safe exercise if they follow certain guidelines. A doctor's checkup and authorization are required, and can help determine which exercise program is best for the mother and the baby. Safety is of paramount importance.

The participant should always maintain control of the body. Movements should be made slowly. Throughout your entire pregnancy maintain a neutral spine position. Exercising during pregnancy will make the workload harder. The participant should not try to maintain the same performance as before. As the pregnancy advances, it will become increasingly difficult to maintain the same workload. Allow the workload to decrease in intensity and duration. The participant should listen to their body and be aware. During pregnancy, the center of gravity, body alignment and balance decreases, joints loosen and may become unstable. Keep moves limited to low impact, basic moves avoiding fast directional changes. Weights and rubber tubing are not recommended for the pregnant class participant.

Cardiovascular Training

Warm up duration should last for 10 to 15 minutes while maintaining good posture, body alignment and a neutral spine position. Heart rate checks should start at 5-minute intervals for the beginner to 10-minute intervals for the more experienced exerciser. Intensity should be limited to 60% of the maximum heart rate for beginners and to 75% for the experienced exerciser. Range of motion should be kept to shorter rather than full range movements followed by static stretches. Pay particular attention to areas such as the shoulders, neck, calves, and hip flexors. Emphasize relaxation more than extension and flexibility for the lower back.

Overhead arm stretches assist in breathing and allow the entry of more oxygen into the lungs opening up the thoracic cavity. Be careful not to over stretch. Concentrate on slow, sustained stretching. Avoid adductor stretches because they put extra strain on the pelvic bone area. Target heart rates and ratings of perceived exertion are reached more quickly than non-pregnant women. This is not the time to challenge the cardiovascular system. Challenge the system before pregnancy to get into shape for the pregnancy.

Weight Training

Abdominal work after the first trimester remains controversial and is not recommended. Train the muscles before pregnancy to help with the pushing stage of labor. The elastic memory of strong abdominal muscles will help speed up your return to the pre-pregnant condition. Upper back exercises will counter the stooping effect of heavier breasts. It is important to remember that during pregnancy is not the time to get into shape. The goal should be to simply stay in shape. Before the pregnancy is when conditioning and strength training should be accomplished. It like training for an event, you wouldn't wait until the race to begin training.

Trimester Specific

During the first trimester, women can usually perform the same abdominal exercises as non-pregnant exercisers. A supine position (lying on the back) is considered safe. It's still best to check with your doctor because understandings change due to ongoing research. In all cases, use common sense and listen to your body.

During second and third trimesters, it is best to limit abdominal work to less than five minutes. Women in the later stages should rest sitting up or lying on their left side for a few minutes while other class member’s complete abdominal work. Again, your doctor should issue the guidelines during all phases of pregnancy. Overall, walking is the best exercise for pregnant women.

Exercises

Pelvic Tilt (first trimester only):

- Start on the hands and knees.
- Head in alignment with the spine.
- Back straight.
- Contract the abdominals and point the tailbone to the floor.
- Hold for a count of three and release.
- Relieves low backaches and strengthens the abdominals by maintaining proper alignment of the pelvis.

Crunches (up to second trimester):

- Crunches with a pillow support (shoulders elevated above the heart).

Let-Backs (up to second trimester):

- Sit with knees bent and hands around the knees for support
- Contract the abdominals and curl the spine while leaning back as far as the arms will allow.
- Alternate with oblique curls using pillow support.

C-Curves (up to third trimester):

- Kneel on the floor on all fours or with elbows on a chair seat for support.
- Inhale and contract the abdominals while creating a "C" shape with the spine.
- Exhale and release.

Side C-Curves (up to third trimester):

- Lie on the left side with the upper hand on the floor for support.
- Contract the abdominals and bring the knees to the chest.
- Exhale and release.

Nutrition

In addition to your doctor's recommendations:

- Eat a small, easily digestible snack (such as crackers) prior to exercise.
- Drink plenty of water before, during and after exercise to prevent dehydration.
- Wear loose; comfortable clothes preferably cotton to help absorb perspiration.
- Wear a supportive cotton bra with wide straps.

Post Pregnancy

Give your body time to heal after the birth regardless of whether the birth was vaginal or cesarean. Some doctors say you can resume exercise after four to six weeks other say when bleeding stops. Make sure you receive clearance from your own doctor before returning.

Chapter 13

Senior Fitness

Introduction

Average life expectancy has gone up and is expected to continue to increase. By 2010, 40% of the population of the US is expected to over 65 years old.

Aging is an inevitable biological process that gradually changes the body structure and function. There are two components of aging, biological and psychological aging. They are not synchronized and may occur at different rates in different people. Both are dictated by chronological age. A regular exercise program can reverse some of the effects of biological age and possibly the psychological age, thereby, increasing longevity. Physical inactivity can increase both age components.

The American College of Sports Medicine (ACSM) stresses the importance of strength training for older people. ACSM recommends that seniors begin an exercise program with strength training before they start a cardio training program.

The purpose of this section is to increase the Fitness Instructor's understanding of the physiological and as well as the psychological changes that occur during the aging process. This will allow the instructor to develop an effective and safe fitness program specifically for the senior population. Senior classification varies according to who you ask. Generally, seniors are considered to be those that are 55 and older.

As in every population group, senior levels of fitness vary. However, with seniors there is a thin line between fitness training and rehabilitation. Unless you are a licensed exercise physiologist, you should not attempt to rehabilitate clients or exercise the frail. The senior candidate must have a doctor's physical exam and a doctor's clearance issued for him or her to participate in an exercise program and to what degree with any limitations noted. As a personal trainer you are responsible for the well-being of your clients. Don't take chances with their lives.

The client may be willing to endure pain in the expectation that it will be required to get in shape again. Careful observation should be made of the senior client to ensure that they are not over loading themselves. The American College of Sports Medicine (ACSM) has set guidelines for Senior Fitness. You can reach them from our website.

There are essentially two types of senior populations those that are reasonably healthy and fit (A-List) and those that are frail and disabled (B-List). This course will target the former group; i.e., the reasonably healthy and fit A-List populations. No attempt will be made to discuss fitness programs for the frail or disabled elderly or B-List populations. The personal trainer will not train anyone who is disabled nor has any pathological conditions that requires special training considerations. These situations are the responsibility of the Physical Therapist under the supervision of a doctor and NOT the personal trainer regardless of the client's age.

Aging has been referred to as a disease. Aging can be the result of lifecycle, environment or lifestyle. Exercise and healthy lifestyle have been shown to delay and even reverse some of the effects of aging. Specific systems that undergo changes during the aging process are:

- Cardiovascular System
- Respiratory System
- Muscular System
- Skeletal System
- Digestive System
- Endocrine System
- Nervous System
- Immune System

Physiological Effects of Aging

Cardiovascular Effects

This Cardiovascular system includes the heart and the blood vessels. Due to an increase in the size of individual heart muscle cells, the heart tends to enlarge resulting in thicker walls, slightly larger chambers and reduced elasticity of the heart muscle resulting in a reduced cardiac output. Heart valves can thicken and not fully seat (murmur). The heart's natural pacemaker cells decrease causing arrhythmias or irregular heartbeats.

The older heart functions at a lower heart rate at rest. However, during exertion, it is not able to increase the amount of blood flow as compared to a younger heart. The heart cannot respond as quickly, or as forcefully, to an increased workload. Blood vessels can become brittle and the passages narrow due to arterial plaque (arteriosclerosis) resulting in a decreased blood flow and higher blood pressures (hypertension). An increased risk of aneurysms can be a result of lost elasticity.

A reduction in blood flow results in a decrease in the amount of oxygen that can be delivered to the other systems. This is measured as VO2 MAX and defined as the maximum amount of oxygen that can be utilized per minute. Reduced blood flow can result in shortness of breath, dizziness and in extreme cases Cyanosis characterized by a bluish discoloration of the skin. Many of these effects can be reduced by exercise.

Higher blood pressures are also a result of the heart's inability to fully relax (diastole) in order to fill with blood before the next contraction (systole). High blood pressure causes the left ventricle to work harder to push blood into narrowed and inflexible pathways. It may enlarge and outgrow its blood supply and thus becomes weaker. Blood pressure is normal during the diastolic phase and high during the systolic phase.

This is common condition in the elderly and is called Isolated Systolic Hypertension. Almost half of all heart failures are due to failure of the heart in the diastolic phase. During diastolic heart failure, heart function appears normal, but the stiffened heart muscle causes excess fluid to build up in the lungs, feet, ankles, and legs. Blood may pool in the veins of the legs because the valves are not able to function correctly. This can also cause swelling of the lower extremities.

Reduction in hematocrit, which is a measure of both the number of red blood cells and the size of red blood cells, which can lead to anemia. Constriction or blockages of peripheral veins can cause the formation of clots, which can then dislodge causing an embolism in the lungs or stopping circulation in extremities. Phlebitis, which is an inflammation of the vein also occurs more often in the elderly. Blood glucose levels increase with age but not because of changes in the blood. Rather, it is the result of age-related insulin changes. Bone marrow decreases with age, causing a decrease in the number of new blood cells. As a result, bleeding will not stop as quickly.

The liver receives a smaller supply of blood due to shrinkage. This reduces the rate of drug detoxification, which can exaggerate the effects of drugs predisposing the elderly to drug overdose. By age 70, the weight of the liver has decreased by roughly 20%.

Specially adapted nerve fibers in the larger blood vessels and heart called beta adrenergic receptors (bAR) become less sensitive and, as a result, cardiovascular adjustments to changes in position are slowed, causing an increase in dizziness and falling. Fluid balance or pH usually remains constant unless there is an incidence of disease or damage to a particular organ.

Respiratory Effects

The Respiratory or Pulmonary system consists of the airway passages, the lungs and the supporting muscles. Due to calcification the airway passages can become less flexible. The muscle fibers, air sacs (alveoli) and connective tissues in the lungs are less able to expand and contract requiring more effort to inhale and exhale. Supporting muscles that assist the expansion and contraction of the lungs including the diaphragm can become hardened and less flexible thereby increasing the breathing effort and reducing Vital Capacity (the maximum amount of air that can be forcibly exhaled after a full inhalation). Generally, Vital Capacity is reduced to sixty-five percent by age 50 and to forty percent of the initial capacity by age 70. Cardiovascular training can reverse the effects of aging by increasing the strength and flexibility of the muscles associated with breathing and strengthens the heart muscle.

Breathing and Vital Capacity is further decreased due to arthritic conditions of the cartilaginous rib joints. A decreased in ciliary action (hair-like fibers that act like cleaning brushes) in the lungs results in an inability to remove mucous in the lungs thereby restricting oxygen intake.

The chronic lack of oxygenation of the alveoli, as is the case in diseases such as emphysema or bronchitis, may lead to pulmonary hypertension. This condition can further result in an overworked right ventricle of the heart. A weakened the left ventricle can lead to congestive heart failure (CHF) and pulmonary edema in which excess fluid collects in the alveoli decreasing gas exchange.

Muscular Effects

Starting at about 40 years of age there is a general atrophy of muscle (Sarcopenia) and an increase in adipose tissue (fat cells). By the age of 80 years old, there is an estimated fifty-percent reduction in muscle mass. The Muscular system includes muscles that are responsible for structure and strength such as the muscles of the shoulders, neck, arms, legs, back and abdomen. As the number and size of the muscle fibers decrease, muscles will reduce in size and strength until they are no longer able to perform their intended function. Tendons become rigid and less elastic and therefore unable to tolerate stress. Muscles continue to atrophy or reduce in size, not so much with age, as with disuse. It just becomes more apparent as one ages. Weight training can increase muscle mass and strength and counter the effects of aging. Skeletal muscle fibers decrease in diameter, particularly in the extensors and flexors, resulting in a curved posture and an abnormal bending of the hips and knees. Muscle growth as a result of exercise (hypertrophy) is slowed by the decrease in blood flow.

Exercise tolerance decreases partly due to fatigue. Thermoregulation is affected, which can lead to rapid overheating. Extreme exercise must be avoided since joints, tendons and ligaments have been compromised. Recovery from injuries will be slower. In the elderly, scar tissue will form faster than tissue repair thereby decreasing mobility. Mitochondrial functionality decreases with age, which reduces the effectiveness of exercise and will therefore slow new muscle tissue growth (hypertrophy). Free weights for the elderly present an additional risk since muscle reflexes have been slowed.

As tendons and ligaments become less flexible, joint range of motion decreases. A thinning of the joint cartilage and calcium deposition contributes to joint stiffness which, if not exercised, will cause permanent immobility.

Bladder control function diminishes as sphincter muscles become lose their tone resulting in incontinence or bladder leakage. This can become problematic during strenuous exercise. Although considered normal, it is important for trainers to be aware and realize the embarrassment that this may cause.

Skeletal Effects

The Skeletal system consists of the bones and therefore the structural strength of the body. Bones are normally dense and comprised mainly of calcium. Throughout the lifecycle, bones are constantly reforming in a process defined as remodeling. Bones absorb and release calcium as the body requires it. By age 30 bones begin to lose mass (Osteoporosis). Bone absorption of calcium is called Osteoblast activity and is required for bone production. When the body requires more calcium than is being taken in from diet, the body will catabolize calcium from the bones. Bone reabsorption or giving up calcium is called Osteoclast activity. This process if continued will leave the bones brittle and porous. This can also result in weakened tooth sockets and eventual tooth loss. In aging, the bones are unable to absorb the same amount of calcium as when they were younger and a negative effect occurs depleting the bones of calcium and reducing tissue.

As bones lose tissue, osteoporosis develops. In the spine, osteoporosis can lead to small fractures of the vertebrae along with the shrinkage of cartilaginous discs results in a curved spine (kyphosis or lordosis) and loss of height. Osteoporosis is also responsible for almost all hip fractures in older men and women. Cartilage also deteriorates, which provides the cushioning between bones. With less cellular water content, the cartilage becomes more brittle and susceptible to stress leading to arthritis.

In addition, the ligaments, which are the connective tissue between bones, become less elastic and reduce in flexibility. Due to deterioration in cartilage and stiffening of tendons and ligaments, the motion of joints becomes more restricted thereby decreasing flexibility. As the cushioning cartilage begins to break down from a lifetime of use, joints become inflamed and arthritic. Stretching can help maintain joint flexibility. Weight training can increase bone density and counter the effects of aging.

For both sexes, bone density, a measure of bone mass per unit volume, decreases at disproportionate rates throughout the body. Bones in the vertebrae, jaw and the heads of the long bones (epiphyses) decrease more rapidly resulting in a curved spine, tooth loss and limb fractures. During growth years, women accumulate less bone density, particularly during puberty, than men, resulting in smaller, narrower, and therefore more fragile bones. In aging, a reduction in sex hormones in men (testosterone) and women (estrogen) results in bone loss.

Bone density is measured in standard deviations from the normal or young adult density. Less than 1 SD is considered normal. Between 1 and 2.5 is considered osteopenia (bone loss). Greater than 2.5 SD is considered Osteoporosis. Roughly 54% of postmenopausal Caucasian women are considered osteopenic and 30% are osteoporotic.

Therefore, the consequences of bone loss as a result of age are greater in women who experience up to three times more fractures than men. Bone mass deterioration may be slowed by calcium supplements and weight bearing exercises.

Digestive System Effects

Intestinal muscle tone decreases, causing a decline in peristaltic contractions causing constipation. Straining to eliminate can stress the walls of blood vessels, causing hemorrhoids. The walls of the colon lose firmness and can produce symptoms of painful and dangerous diverticulitis. Sphincters muscles can reduce functionality leading to esophageal reflux and heartburn. The mucosal lining of the small intestine becomes thinner thereby decreasing the efficiency of nutrient absorption. Digestive enzymes decrease affecting impairing the absorption of vitamins and minerals in particularly B12, iron and calcium. Olfactory senses (smell) are diminished and along with tooth loss gastric sensitivity can lead to dietary changes that affect the entire body.

Nutritional requirements do not necessarily change, caloric requirements do. During each decade after 50, caloric requirements are reduced by ten percent due to changes in metabolic rates, body mass, activity, and exercise. There is still much study going on with regard to elderly nutritional requirements. However, the elderly require Vitamin D supplements for optimal calcium absorption. This is due to changes in the skin, which leads to a decreased tolerance to heat and may cause the elderly avoid the sun. Reduced sun exposure can result in a decrease in the absorption of Vitamin D. Vitamin D is normally converted to the hormone calcitriol, which stimulates calcium absorption in the small intestine. Since the synthesis of proteins and digestive enzymes decreases with age, the elderly should eat more easy-to-digest proteins, i.e., more vegetable proteins and less animal proteins.

Endocrine System Effects

Metabolism is a function of the Endocrine system. The body's metabolic rate (how quickly the body converts food into energy) slows. This can lead to obesity and an increase in LDL "bad" cholesterol levels. Due to aging, changes in the endocrine system result in reduced levels of hormones, which do not normally lead to hormonal deficiencies.

When the thyroid gland makes less thyroxine, the metabolic rate slows down. This is one of the reasons why older people can't stand the cold.

Decreased function of the anterior pituitary produces less of the growth hormone resulting in a decrease in protein synthesis used for developing muscle mass. In addition, growth hormone reductions are responsible for an increase of fat storage and the reduced ability to utilize fat for energy.

Decreases in the levels of adrenal cortical hormones reduce inflammatory responses, protein synthesis and salt balance. However, the levels are usually sufficient to maintain homeostasis (balance) of water, electrolytes, and nutrients. The adrenal glands (atop the kidneys) produce less cortisol, which regulates blood pressure, cardiovascular function and the body's use of proteins, carbohydrates, and fats. The reduction of cortisol affects the body's ability to convert glucose to glycogen by the liver. Norepinephrine is also secreted by the adrenal glands is used for the reverse conversion of glycogen to back to glucose and fats to fatty acids for energy. Both Norepinephrine and Epinephrine (adrenaline) are secreted by the adrenal glands as part of the "fight or flight" response, thereby raising heart rate and blood pressure.

The pancreas produces digestive enzymes and insulin. Insulin production diminishes with age, which limits conversion of glucose to glycogen in liver and muscles for later energy use. In general, insulin acts to reduce levels of glucose. In muscle, insulin assists in protein synthesis, as well as, the cellular uptake of glucose and facilitates its conversion to glycogen used for muscular energy. In adipose (fat) tissue, insulin assists in the cellular uptake of glucose and its conversion to fatty acids as triacylglycerols for storage. In the liver, insulin facilitates glucose conversion to glycogen for energy. Reduction in insulin production can reduce the level of cellular energy since the cells cannot access the calories contained in the glucose.

In general, unless there are pathological conditions, the endocrine system functions near normal levels into aging.

Nervous System Effects

Neurons begin to decrease at around 30 years of age. Luckily, nature has created an over-abundance of brain cells, so mental impairment does not occur. Short-term memory decreases and becomes more difficult to access. A significant decrease in metal functioning is generally the result of a pathological condition such as arteriosclerosis. Reflex response decreases by approximately ten-percent as a result of a reduction in the number of neurotransmitter and receptor sites by age 50. Motor skills and reaction times can become dangerously slow or wholly inaccurate.

Brain size and weight decrease with age. The decrease is mostly in the area of the cerebral cortex, the area associated with higher level functions. Decreased blood flow is usually the result of arterial narrowing, which increases the risk of stroke. An Ischemic Stroke is one in which a blood vessel in the brain becomes blocked as a result of a clot either in the brain or traveling to the brain. A Hemorrhagic Stroke is the result of a burst blood vessel. Both types of strokes result in a loss of blood flow to the affected area of the brain. It is extremely important to follow the recommended breathing recommendation when lifting weights to avoid drastic increases in blood pressure, which can easily bring on a cardiovascular event in the elderly.

There are continued debates and studies to fuel the debates as to whether neurons are replaced in the brain. However, it may still be said that what you use develops, what you do not use atrophies or wastes away.

The sensory system becomes less sensitive with regard to vision, hearing, smell, and taste. At the same time, the senses may become more sensitive to harsh condition such as bright lights and loud noises.

Near vision becomes impaired due to stiffening of the cornea (lens). This can result in potential exercise injury as well due to the inability to judge distances and focus. As a reference, inner limits of vision range from about 3 inches (7.6cm) in children to 32 inches (81.3cm) at age 60. Overall vision may be impaired in the elderly due to macular degeneration (retinal scarring) or cataracts. Color perception may also be affected and care is necessary where color identification of gym equipment is necessary.

Older populations lose the ability to hear high frequency (high pitched) sounds. Certain consonant identification is affected as well; i.e., f, g, s, t, z, ch, sh, and th. To avoid confusion or injury, instructions must be clear and given in a tone that people with hearing loss can easily recognize.

Although exercise has not been proven to increase cognition, it has been shown to reduce depression and improve self-confidence.

Immune System Effects

The Immune System becomes less effective in fighting off infections by roughly fifty-percent. The reduction of T-cell response to infection is due to the reduced functionality of the thymus gland. Reduced antibody production results in a decreased ability to destroy viral and bacterial components. Cancer is another possible result of a deficient immune system, which does not react to and destroy the runaway growth of tumor cells. It is interesting to understand the interaction of lymphocytes and macrophages in the Immune System, although it is recommended study, it is beyond the scope of this course. In many cases, the elderly immune system is compromised by drug therapy, i.e., steroidal arthritis drugs, cancer treatments. Increases in the levels of autoantibodies result in an increased incidence of autoimmune diseases in the elderly.

Fitness Testing

The personal trainer does not have the qualifications to stress test anyone let alone a senior. This is the function of a trained medical person. The following are testing methods to determine if the prospective client is trainable by a personal trainer or should be referred to a physical therapist. These tests are required for all people who are 65 and older. However, they may also be used at the trainer's discretion for younger populations where their trainer deems additional risks may be

present. Clients that perform to the below average level of any section of fitness testing should be referred to a physical therapist before beginning a training program.

Balance Testing

Balance is defined as the ability to maintain the body's center of mass over its base of support against the forces of gravity and acceleration" (Shumway-Cook, 2001). Balance is a function of the interaction of various systems. The brain receives information from the eyes, inner ears, joints and muscles.

Falls in the elderly (65 and older) account for 40 percent of hospital admissions (Stevens, 1999). Between 30% and 40% of 65 and older people are subject to one or more falls annually and even higher for those over 80 years old. For those that have experienced falling, whether injured or not, have an increase in fear of future falls and a reduced activity level.

To be effective and safe, personal trainers need ways to assess a client's risk of falling. Fear of falling, which is a major concern of the elderly along with other factors including dementia, certain medications and physiological or pathological conditions can all have an adverse effect on balance.

There are a number of balance tests that are available for use. Some methods have proven better than others for predictive falling. Only one of the following tests need to be performed to determine a balance assessment of the prospective client. If the client does not pass the administered test, then the trainer should refer the client to a physical therapist prior to beginning a training program.

The **Dynamic Gait Index (DGI)**, developed by Shumway-Cook and Woollacott, is a method of balance assessment which can demonstrate a person's postural stability while changing tasks. The DGI test assesses balance during eight different tasks including walking, changing gait speed, and walking with head turns in the vertical and horizontal planes, stepping over and around an obstacle, and stair ascent and descent. The DGI can be administered in approximately 10 minutes. The best score is 24. Scores of 19 and lower indicate an increased risk of falling. Score results below 19 are more useful to the Physical Therapist in rehabilitation rather than the trainer.

Cardiovascular Testing

Stress testing should be performed by a doctor. Once the doctor has given the written approval with a list of limitations, the trainer must then determine the fitness level of the cardiovascular system by performing fitness testing. Testing should not be performed on clients who have tachycardia. Fitness tests should be performed on an individual basis and not as a group to avoid competitive results.

The **Six-Minute Walk Test** is used to measure cardiovascular endurance. The client will walk at their fastest pace around a rectangular track whose length is 50 yards (45.7m) and width is 5 yards (4.6m). The trainer will use a stopwatch to start and stop at the 6-minute point record laps either on a lap counter or paper. Each full lap would be a total of It is recommended that the trainer provide verbal encouragement as the test progresses. If the client becomes fatigued, they are instructed to rest if necessary but the timer will continue to run up to the 6-minute period. When the 6 minutes have elapsed, the trainer instructs the client to stop where they are. Record the amount of distance that they have covered in the partial last lap and add that to the total. Discontinue the test if discomfort or pain results.

The following table lists average distances based on age. Scores lower than these figures are considered below average. Scores higher than these figures are considered above average.

Distance Traveled in Yards

Age	60-64	65-69	70-74	75-79	80-84	85-89	90-94
Men	610-735	560-700	545-680	470-640	445-605	380-570	305-500
Women	545-660	500-635	480-615	435-585	385-540	340-510	275-440

Distance Traveled in Meters

Age	60-64	65-69	70-74	75-79	80-84	85-89	90-94
Men	558-672	512-640	498-622	430-585	407-553	347-521	279-457
Women	498-604	457-581	439-562	398-535	352-494	311-466	251-402

The **Two-Minute Step Test** is used to determine cardiovascular endurance. The client will step using alternate legs in place as many times as they can in a 2-minute period. Each step must raise the knee to height of the mid-point of the thigh. The trainer will record only the right step using a counter and will only count steps that meet the height requirement. It would be helpful if a chair is place on either side. The chair would be helpful for added stability if it is needed and for a marking point to which they must raise their knee up to. At the end of two-minute period, the trainer instructs the client to stop and records the results. Discontinue the test if discomfort or pain results.

The following table lists average steps based on age. Scores lower than these figures are considered below average. Scores higher than these figures are considered above average.

Steps Performed

Age	60-64	65-69	70-74	75-79	80-84	85-89	90-94
Men	87-115	86-116	80-110	73-109	71-103	59-91	52-86
Women	75-107	73-107	68-101	68-100	60-90	55-85	44-72

Only one of the above tests needs to be performed to determine cardio endurance. In each case monitor the client for signs of over-exertion.

Measure the client pulse while sitting and at rest. Using a treadmill, have the client walk for 5 minutes at 3 mph. If this is too strenuous, then have them walk at a comfortable pace. If they appear to be stressed, stop the test and recommend physical therapy. At the end of the 5-minute period measure the pulse rate. It should be between 60% and 70% of the maximal. Wait 5 minutes and again measure the pulse. It should be below 60% and closer to the pre-measured pulse rate.

Cardiac Limited Clients

According to the ACSM, clients who are taking beta-blockers or have rate-limiting pacemakers will adapt to a program for physical conditioning. However, determining and verifying the target heart rate would be difficult. In this case, it is recommended that the Rate of Perceived Exertion (RPE) method be used.

Strength Testing

The Arm Curl Test measures upper arm strength, which is indicative of upper body strength.

The client is to be seated on a chair. Only one side needs to be tested, preferably the dominant side. A 5-pound (2.3kg) weight is to be used for women and an 8-pound (3.6kg) weight for men. Have the client move slightly toward the side to be tested so that the arm and the weight may be hung straight down at the side clearing the seat of the chair. Start with the arm down and perpendicular to the floor. The palm should be in the natural position facing the side. Have the client slowly raise the weight gradually rotating the weight so that the palm is facing upward as the arm is brought up to full flexion. Using a stopwatch and counter, have them perform as many curls as they can using proper form in 30 seconds. At the end of the 30 second period have them stop and record the results. Discontinue the test if discomfort or pain results.

The following table lists average curls based on age. Scores lower than these figures are considered below average. Scores higher than these figures are considered above average.

Arm Curls Performed

Age	60-64	65-69	70-74	75-79	80-84	85-89	90-94
Men	16-22	15-21	14-21	13-19	13-19	11-17	10-14
Women	13-19	12-18	12-17	11-17	10-16	10-15	8-13

The **Chair Stand Test** measures lower body strength.

The client is to be seated in a chair without side arms. Please the chair on carpet or against an object or wall to prevent slippage. The client will sit squarely on the chair with arms crossed in front of the chest. Better balance may be achieved by crossing the arms at the wrist instead of folding arms. At the start signal, the client will rise from the chair to a standing position and then return to a seated position. Arms are to remain folded throughout the cycle. The trainer will record the number of stand/sit cycles that can be completed in 30 seconds while maintaining proper form and stability. Discontinue the test if discomfort or pain results.

The following table lists average stands based on age. Scores lower than these figures are considered below average. Scores higher than these figures are considered above average.

Chair Stands Performed

Age	60-64	65-69	70-74	75-79	80-84	85-89	90-94
Men	14-19	12-18	12-17	11-17	10-15	8-14	7-12
Women	12-17	11-16	10-15	10-15	9-14	8-13	4-11

Flexibility Testing

Each test should be performed using a couple of practice trials before actually recording scores.

The **Chair Sit and Reach Test** measures hamstring flexibility, which is indicative of lower body flexibility. A chair is preferred with forward extended legs like a folding chair to avoid tipping it over. The client will sit with one knee flexed at 90 degrees (lower leg perpendicular to the floor) and the test leg extended (straight) so that the heel only rests on the floor. Have the client reach with both hands toward the toes of the extended foot. Overlap both hands, one on top of the other and try to touch the toes with the middle fingers of each hand while keeping the leg straight. If the leg begins to bend, have them back off until the leg is able to remain in the straight position. Have them hold this position for two seconds. Have them make two attempts and record the best try of the two. Measure and record the distance from the middle fingers to the toes or tip of the shoe.

The following table lists average distances based on age. Scores lower than these figures are considered below average. Scores higher than these figures are considered above average.

Chair Seat and Reach Distance (inches)

Age	60-64	65-69	70-74	75-79	80-84	85-89	90-94
Men	-2.5 - +4.0	-3.0 - +3.0	-3.0 - +3.0	-4.0 - +2.0	-5.5 - +1.5	-5.5 - +0.5	-6.5 - -0.5
Women	-0.5 - +5.0	-0.5 - +4.5	-1.0 - +4.0	-1.5 - +3.5	-2.0 - +3.0	-2.5 - +2.5	-4.5 - +1.0

Chair Seat and Reach Distance (cm)

Age	60-64	65-69	70-74	75-79	80-84	85-89	90-94
Men	-6.4 - +10	-7.6 - +7.6	-7.6 - +7.6	-10 - +5.1	-14 - +3.8	-14 - +1.3	-16 - -1.3
Women	-1.3 - +13	-1.3 - +11	-2.5 - +10	-3.8 - +8.9	-5.1 - +7.6	-6.4 - +6.4	-11 - +2.5

The **Back-Scratch Test** measures shoulder flexibility, which is indicative of upper body flexibility. The client will stand straight and reach behind the back and try to touch both hands together. On arm reaches from above and the other is wrapped behind the waist reaching up to the other.
The following table lists average distances based on age. Scores lower than these figures are considered below average. Scores higher than these figures are considered above average.

Back Scratch Distance (inches)

Age	60-64	65-69	70-74	75-79	80-84	85-89	90-94
Men	-6.5 - +0.0	-7.5 - -1.0	-8.0 - -1.0	-9.0 - -2.0	-9.5 - +2.0	-9.5 - -3.0	-10.5 - -4.0
Women	-3.0 - +1.5	-3.5 - +1.5	-4.0 - +1.0	-5.0 - +0.5	-5.5 - +0.0	-7.0 - 1.0	-8.0 - -1.0

Back Scratch Distance (cm)

Age	60-64	65-69	70-74	75-79	80-84	85-89	90-94
Men	-16 - +0.0	-19 - -2.5	-20 - -2.5	-23 - -5.1	-24 - +5.1	-24 - -7.6	-26.7 - -10
Women	-7.6 - +3.8	-8.9 - +3.8	-10 - +2.5	-13 - +1.3	-14 - +0.0	-18 – 2.5	-20 - -2.5

Training

Warm-up exercise

Begin with a 10-minute warm-up session. Walking on a treadmill is recommended. It is also recommended to swing the arms while walking. Follow with a 10-minute stretching session for legs and lower back. Perform leg and back stretches on the floor or seated. All exercises should be performed to the extent that the client can still talk while exercising and not to maximal exertion. Clients should be encouraged to breathe through pursed-lips. According to the ACSM, this method provides more control over breathing.

Weight resistance is initially not recommended. It should only be used with the experienced exerciser. Add light resistance rubber exercise bands and then light weight hand weights. Keep in mind that getting up and down for the older population may be difficult. Therefore, floor exercises may be difficult. Develop routines that use a chair or the wall for support. Try single leg raises while seated. Upper body exercises may be done while seated. Arm raises both front and side, leg extension, Biceps flexion and upright row can all be done while seated to avoid stressing the client. Avoid exercises that allow the head to be in extreme positions or move rapidly so as not to invoke dizziness.

Cardiovascular Training

The ACSM recommends a program of cardiovascular activities such as walking, running, cycling or swimming for seniors because they will most likely be familiar with these activities making them easier to do. Walking is an excellent cardio exercise even if done in place. Jogging is high impact and should only be done by the experienced client. Swimming, also an effective cardio exercise, should only be attempted by the experienced client. For older populations, water-based cardio is a great form of exercise. It provides light resistance without impact. Water temperature may be more critical in older populations. Those with arthritis may be more comfortable in 85-degree water. However, the higher temperature results in vasodilation. This lowers the blood pressure while raising the heart rate, which may cause someone who has treated hypertension to be unable to sufficiently maintain adequate blood pressure during vasodilation.

ACSM guidelines recommend a beginning cardiovascular exercise program with a minimum duration of 20 minutes and a frequency of three times per week. It is important to remember that flexibility and bone strength are reduced in the senior client. Low impact exercises are recommended, never high impact. Light to moderate intensity activities can reduce blood pressure and the rate of age-related deterioration. Exercise sessions require a warm-up period that may be equal to or exceed the actual exercise period but should be sufficient to load the cardiovascular, pulmonary, and musculoskeletal systems without straining them. The ACSM recommends an intensity level of 50 to 70% of the maximum heart rate using the Karvonen Method for older adults.

The heart rate must be constantly monitored by electronic means or using the Borg Scale of Perceived Exertion so as not to exceed the training level. ACSM guidelines indicate a frequency of training for older populations of 3 to 5 times a week. Here again, it is not the goal to do a lot each day so long as something is done each day. Increasing exercise duration each day is preferred to increasing exercise intensity.

Since the senior's hearing may be more sensitive to loud noise, music should be kept to a comfortable 60 to 70 dB and low enough for the participants to hear your instructions. Be sure to combine voice instruction with hand signals and in sufficient time for the seniors to make the change. Class tempo should not be the driving force and should match the capabilities of the seniors that you have in class. Environmental conditions are also more critical to the senior participant. Room temperature should be kept no higher than 70 to 75 degrees with a relative humidity of 60%. Choose appropriate genre of music. Hip Hop may appear as simply noise to the senior ears. Traditional dances done at weddings are a good idea. The dances are simple, well known and not strenuous. They also provide a mood-lifting environment that promotes good health.

When conducting group exercise classes, the instructor should maintain a smaller class than normal (no more than 20) to be able to observe each participant for signs of faintness, confusion, weakness or lack of coordination. Classes can be conducted in excess of twenty participants if an assistant is present. For a one-hour class warm-up and cool-down/stretching sessions should be 15 minutes using slow rhythmic limbering type exercises. For less fit seniors, the class should be reduced in length to 30 minutes and consist of mostly warm-up and stretching exercises. The tempo (bpm) of music should match the level of the seniors in class and not the level of the instructor. The class tempo should not be standard as it is for younger population classes. The instructor must set the tempo according to the capabilities of each senior group class. The instructor should not use class time for their own exercise time since the seniors will try to follow what you are doing.

Heart rate checks may be inconclusive since heart response is slowed. Therefore, the Rate of Perceived Exertion (RPE) along with a heart rate check might be a better indicator. The RPE is subjective and may be clouded by the client's willingness to get in shape. In addition, the trainer must use other signs as feedback, i.e., facial expressions, breathing, eye movements, skin color, etc. Perform a pulse check more often than a regular class. If you see that they are becoming fatigued, use the time to do a pulse check and get a drink of water. Bathroom breaks may be required more often. Encourage participants not wait for water or bathroom breaks and leave if necessary. Movements should be smooth and continuous without abrupt changes. Some senior may have had knee or hip replacements. Even with a doctor's approval care must be taken to avoid abrupt changes or twisting movements of the knee and hip. They should be advised by their doctor as to what care needs to be taken to protect the artificial joint. In all cases, avoid joint twisting movements. Seniors also have a more difficult time with lateral moves than forward and back moves.

When doing floor work, be aware that some seniors may need assistance in getting down or up off the floor and are more prone to dizziness when the head is lower than the heart. The prone position may make it more difficult to breathe for some seniors. Small classes are therefore desirable for the instructor's individual attention. Weights are never to be used in a senior cardio portion of class. Weight training should be conducted in the gym environment on a one-to-one basis. Keep the moves simple with changes no sooner than counts of 8 or even 16 depending on the level of the class. Avoid moves that change both arms and legs at the same time. Providing simple and easier exercises will inspire confidence.

Stretching is important and should be kept to less than full range of motion followed by static stretches. Be careful not to over stretch. Concentrate on slow, sustained stretching. Overhead arm stretches assist in breathing and allows the entry of more oxygen into the lungs opening up the thoracic cavity. The atrophication of chest muscles can cause breathing difficulty. These muscles are used to lift and expand the thoracic cavity during inhalation.

Strength Training

A strength training program can reverse bone loss and muscle weakness in seniors. For weaker seniors, rising from a chair with arm rests using the arms for support will work large muscle groups. Repeat these exercises 12 to 15 times. Eventually, increase to three sets. This should be performed every other day to allow muscles to recover. Care needs to be maintained when doing Isometric exercises since there is a greater tendency to hold the breath, which can raise blood pressure to dangerous levels and can even cause eye damage.

ACSM recommends using 60% of the 1 RM as a starting point. To determine the 1 RM, have them choose a weight that they can lift only once. For example, if the heaviest weight they can lift is 10 pounds (1 RM), then the starting weight should be 60% of that or 6 pounds. Another method to determine the working weight is to start with a low single hand weight, 5 pounds if necessary. In a sitting position, have them do a bicep curl lifting the weight as many times as they can. If they can lift it more than 15 times then the weight is too light. If they can lift it less than 10 times, it is too heavy. Choose a weight that can be lifted about 12 times in one set. Observe proper breathing methods and maintain a smooth movement of the weights. Either of these methods can be used for other muscle groups as well.

Twisting movement of the spine should be done without weights to avoid disc compression. It is important to try to incorporate full range of motion in weight training exercises. However, seniors may have a more limited range of motion than a younger person. Do not try to expect a younger person's range of motion. If pain is experienced, then physical therapy may be indicated. The ACSM recommends 8 to 10 exercises that will target all the major muscle groups using 8 to 12 repetitions of each and 1 set each. When able, increase the weights by no more than 10% per week. ACSM recommendations are two sessions per week for the same muscle groups. You can work other

muscle groups on alternate days. However, be aware that seniors may require more time to recover. So, in order to avoid over-training, keep the daily sessions short and spread it out over the week working the same muscle groups still only twice a week. Or, alternately, do only 2 or 3 sessions per week depending on your client's schedule and preference.

Be aware of clients that have arthritis. Exercising through a joint that is painful, swollen or warm is not recommended. Inflamed joints require the attention of a doctor or an exercise program prescribed by a physical therapist or other medical professional.

Seniors who cannot walk well or use assisted walking can still do cardio training using an ergometer. This device is essentially a hand type bicycle. It is imperative that the trainer work closely with the client's doctor to determine any limitations and changes in limitations that may occur over the course of the training program.

Balance Training

To reduce the risk of falls, an exercise program should include balance training, walking, and body weight transfer. Standing with free weights should be used to improve balance and coordination.

Flexibility Training

The ACSM recommends exercises to increase joint range of motion, such as walking, aerobic dance, and stretching.

Some of the stretching exercises that can be performed are:

Lateral Neck Flexion
Neck Rotation
Shoulder Shrugs
Posterior Arm Reach
Spinal Flexion and Extension
Hip Extension and Flexion
Seated Hamstring Extension
Gluteal Flexion and Extension
Foot Rotations
Arm Rotations
Overhead Reach
Shoulder Flexion and Extension
Upper Back Flexion and Extension

Dynamic Gait Index

(Adapted from Shumway-Cook & Woollacott Motor Control: Theory and Practical Applications)

1. Gait level surface _____

Instructions: Walk at your normal speed from here to the next mark (20')

Grading: Mark the lowest category that applies.

(3) Normal: Walks 20', no assistive devices, good speed, no evidence of imbalance, normal gait pattern

(2) Mild Impairment: Walks 20', uses assistive devices, slower speed, mild gait deviations.

(1) Moderate Impairment: Walks 20', slow speed, abnormal gait pattern, evidence for imbalance.

(0) Severe Impairment: Cannot walk 20' without assistance, severe gait deviations or imbalance.

2. Change in gait speed _____

Instructions: Begin walking at your normal pace (for 5'), when I tell you "go," walk as fast as you can (for 5'). When I tell you "slow," walk as slowly as you can (for 5').

Grading: Mark the lowest category that applies.

(3) Normal: Able to smoothly change walking speed without loss of balance or gait deviation. Shows a significant difference in walking speeds between normal, fast and slow speeds.

(2) Mild Impairment: Is able to change speed but demonstrates mild gait deviations, or not gait deviations but unable to achieve a significant change in velocity, or uses an assistive device.
(1) Moderate Impairment: Makes only minor adjustments to walking speed, or accomplishes a change in speed with significant gait deviations, or changes speed but has significant gait deviations, or changes speed but loses balance but is able to recover and continue walking.

(0) Severe Impairment: Cannot change speeds, or loses balance and has to reach for wall or be caught.

3. Gait with horizontal head turns _____

Instructions: Begin walking at your normal pace. When I tell you to “look right,” keep walking straight, but turn your head to the right. Keep looking to the right until I tell you, “look left,” then keep walking straight and turn your head to the left. Keep your head to the left until I tell you “look straight,“ then continue walking straight, but return your head to the center.

Grading: Mark the lowest category that applies.

(3) Normal: Performs head turns smoothly with no change in gait.

(2) Mild Impairment: Performs head turns smoothly with slight change in gait velocity, i.e., minor disruption to smooth gait path or uses walking aid.

(1) Moderate Impairment: Performs head turns with moderate change in gait velocity, slows down, staggers but recovers, can continue to walk.

(0) Severe Impairment: Performs task with severe disruption of gait, i.e., staggers outside 15” path, loses balance, stops, and reaches for wall.

4. Gait with vertical head turns _____

Instructions: Begin walking at your normal pace. When I tell you to “look up,” keep walking straight, but tip your head up. Keep looking up until I tell you, “look down,” then keep walking straight and tip your head down. Keep your head down until I tell you “look straight,“ then keep walking straight, but return your head to the center.

Grading: Mark the lowest category that applies.

(3) Normal: Performs head turns smoothly with no change in gait.

(2) Mild Impairment: Performs head turns smoothly with slight change in gait velocity, i.e., minor disruption to smooth gait path or uses walking aid.

(1) Moderate Impairment: Performs head turns with moderate change in gait velocity, slows down, staggers but recovers, can continue to walk.

(0) Severe Impairment: Performs task with severe disruption of gait, i.e., staggers outside 15” path, loses balance, stops, and reaches for wall.

5. Gait and pivot turn _____

Instructions: Begin walking at your normal pace. When I tell you, “turn and stop,” turn as quickly as you can to face the opposite direction and stop.

Grading: Mark the lowest category that applies.

(3) Normal: Pivot turns safely within 3 seconds and stops quickly with no loss of balance.

(2) Mild Impairment: Pivot turns safely in > 3 seconds and stops with no loss of balance.

(1) Moderate Impairment: Turns slowly, requires verbal cueing, requires several small steps to catch balance following turn and stop.

(0) Severe Impairment: Cannot turn safely, requires assistance to turn and stop.

6. Step over obstacle ____

Instructions: Begin walking at your normal speed. When you come to the shoebox, step over it, not around it, and keep walking.

Grading: Mark the lowest category that applies.

(3) Normal: Is able to step over the box without changing gait speed, no evidence of imbalance.

(2) Mild Impairment: Is able to step over box, but must slow down and adjust steps to clear box safely.

(1) Moderate Impairment: Is able to step over box but must stop, then step over. May require verbal cueing.

(0) Severe Impairment: Cannot perform without assistance.

7. Step around obstacles _____

Instructions: Begin walking at normal speed. When you come to the first cone (about 6' away), walk around the right side of it. When you come to the second cone (6' past first cone), walk around it to the left.

Grading: Mark the lowest category that applies.

(3) Normal: Is able to walk around cones safely without changing gait speed; no evidence of imbalance.

(2) Mild Impairment: Is able to step around both cones, but must slow down and adjust steps to clear cones.

(1) Moderate Impairment: Is able to clear cones but must significantly slow, speed to accomplish task, or requires verbal cueing.

(0) Severe Impairment: Unable to clear cones, walks into one or both cones, or requires physical assistance.

8. Steps _____

Instructions: Walk up these stairs as you would at home, i.e., using the railing if necessary. At the top, turn around and walk down.

Grading: Mark the lowest category that applies.

(3) Normal: Alternating feet, no rail.

(2) Mild Impairment: Alternating feet, must use rail.

(1) Moderate Impairment: Two feet to a stair, must use rail.

(0) Severe Impairment: Cannot do safely.

TOTAL SCORE: ___ / 24

Chapter 14

Exercise Injury

Introduction

This following information is not to be used for self-diagnosis. It's primary intent here is for identification purposes in order to provide first-aid care or to help understand a medical professional's diagnosis. A medical professional always should be consulted in all cases of injury or suspected injury. Symptoms may appear to indicate one type of injury but may in fact be an indication of a more serious injury.

It is important to understand where first-aid and symptomatic relief end and medical diagnosis and treatment begin. The latter can get you prosecuted for practicing medicine without benefit of a license. Wrongful first-aid through negligence can get you involved in a civil suit. They're both bad.

For example, if a client tells you of a specific pain that they're having and you say that they probably have such and such, you've just made a diagnosis. Now, if you further extend yourself by telling them that they should do this exercise or take ibuprofen for 3 days, you have prescribed a treatment (rehabilitative or drug), which should be done by a medical professional. The solution is very simple, tell them not to do the offending exercise and see their doctor if pain persists. Protect yourself legally and your client's physical well-being.

First-aid treatment is designed to provide pain relief and limit further injury immediately after an acute injury in order to limit further injury, swelling, bleeding, etc. until a medical professional can attend to the injury. Don't confuse the two scenarios. First-aid treatment should be encouraged not forced. If a person refuses first-aid and you insist on providing it anyway, you're probably exposing yourself legally again. First-aid should be limited to Rest, Ice, Compression, and Elevation or RICE and advice to see their doctor.

Acute Injury

If you pull a muscle or have a specific pain after exercising, the immediate first-aid treatment is RICE (rest, ice, compression, and elevation). Place ice on the injury every 2 hours for about 10-15 minutes, over a 48-hour period. If injury doesn't respond to RICE in a couple of days, you should see a medical professional.

Chronic Injury

Chronic injuries fall into the "other" category of diagnosis and treatment. See a doctor.

Overuse Injuries

Overuse injuries encompass a broad range of exercise-related injuries. These type injuries are caused by overtraining over a long period of time gradually weakening or irritating an area of the body until exercise becomes difficult or impossible, or other symptoms appear.

Most overuse injuries can be avoided by utilizing proper form and technique, appropriate rest, proper equipment and clothing (especially footwear), and a conservative increase of exercise frequency, intensity, or duration.

Chondromalacia and Patellofemoral Syndrome

Patellofemoral Syndrome (Runner's Knee) is generalized knee pain. Generally caused by improper running form over a period of time and may or may not be due to a pathological condition of chondromalacia.

Chondromalacia is the wearing away of the cartilage on the back surface of the kneecap, manifested as a "clicking" or "grating" sound, and knee pain under the patella (kneecap).

Plantar Fasciitis and Neuromas

Plantar fasciitis is literally an inflammation of the plantar fascia, a web of tough, fibrous connective tissue on the bottom of the foot.

Neuromas are irritated nerve endings, but can cause pain in the foot (or other places, depending on the nerve in question).

Either condition could be caused by poor technique or simple overuse but should be examined by a physician to determine the cause. In the problem is orthopedic in nature, orthotic shoe inserts may be prescribed by a medical professional to alleviate future problems.

Tendonitis, Arthritis, Bursitis

Tendonitis (inflammation of a tendon) and Bursitis (inflammation of the fluid filled cushioning sacs between tendons and bones) are common overuse injuries. Rehabilitation requires rest and the attention of a physician.

Osteoarthritis is caused by worn joint cartilage thereby exposing the joint surfaces swelling and edema (fluid buildup). Rheumatoid arthritis is an autoimmune disorder in which the body's immune system attacks joint tissues.

Shin Splints and Compartment Syndromes

Shin Splints are a common name for pain felt in the anterior portion of the lower leg and can be caused by a muscle imbalance. Shin Splints require rest, ice, compression and elevation (RICE) and strengthening exercises to prevent future occurrences.

Pain can also be caused by a more serious condition known as a compartment syndrome where one of the compartments between the muscles becomes inflamed and swollen, which stresses the blood vessels and nerves in the area. This situation requires immediate medical attention.

Breathing Reactions

Exercise reactions, range from red blotchiness on the neck, face, or arms (urticaria), to exercise-induced asthma or bronchospasm, or even anaphylaxis. Exercise-induced Anaphylaxis is a severe allergic reaction requiring immediate medical attention. A Physician may prescribe carrying a bee-sting kit as treatment.

Exercise-induced asthma may be triggered by exercising in cold, dusty, or excessively humid environments, and can range in severity from mild coughing to severe discomfort. Individuals who suspect that they have exercise-induced asthma are encouraged to seek medical attention.

General recommendations for persons with exercise-induced asthma include an extended warm-up, avoidance of cold, dusty, or extremely humid environments for exercise. A physician may recommend and inhaler.

Hyperventilation is the process of repeated quick and shallow breaths utilizing the top of the chest. This sharply reduces the level of carbon dioxide in the blood, which causes the arteries in the body to constrict thereby reducing the flow of blood throughout the body. This includes the carotid artery to the brain. Lack of blood flow, and subsequently oxygen, trigger the sympathetic nervous system. This may cause the anxiety and irritability.

Hyperventilation can be caused by anxiety, extensive physical injuries or even heart or lung disease. It is important to keep the victim calm. Have everyone step back and give them some "breathing room". A crowd can increase the anxiety level for the victim.

Hyperventilation Procedure:

- Cover the nose and mouth with a small paper bag
- Breath slowly and re-breathe bagged air about 10 times
- Then breathe normally for a few minutes, about one breath every 5 seconds
- Repeat above if symptoms persist.

Environmental Concerns

In hot weather wear light clothing that breathes well, and allows for the evaporation of sweat.

"Sauna suits", "tummy wraps", and other products designed to encourage quick weight loss through sweat are particularly dangerous. The body can reach dangerous (or even fatal) core temperatures in very short periods of time. Any weight lost is simply water and will be regained as soon as water is ingested again.

Exercise at a reduced intensity during high humidity. The body is cooled by blood circulation and the evaporation of sweat. In a high humidity, evaporation becomes less effective at cooling, and the risk of heat-related injury is greater.

Adequate hydration is also key to safe exercise in the heat, as the body will produce large quantities of sweat. Ingest 1-2 cups of water before exercise and 4 oz every 10 to 15 minutes during exercise.

Thirst lags behind the body's need for fluid. By the time thirst is felt dehydration has occurred. Minor dehydration can affect performance, and severe dehydration can be life threatening.

Contrary to popular belief, water consumed during exercise will not contribute to cramping, so "swish and spit" should be avoided in favor of consuming small amounts of water steadily during the exercise session. Dehydration can actually contribute to cramping.

In cold weather, dress in layers that will wick sweat away from the body. Remove outer layers as the body warms and replace during the cool-down to avoid an excessive chill.

Heat Related Injuries

High risk individuals are those who work or exercise outdoors, elderly people, young children, those with medical conditions that cause poor blood circulation, and those who take medications to get rid of water (diuretics).

Heat Index

The likelihood of Heat Disorder with prolonged exposure or strenuous activity is demonstrated in the following chart:

	Temperature (°F)															
Relative Humidity (%)		80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
	40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
	45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	-
	50	81	83	85	88	91	95	99	102	108	113	118	124	131	137	-	-
	55	81	84	86	89	93	97	101	106	112	117	124	130	137	-	-	-
	60	82	84	88	91	95	100	105	110	116	123	129	137	-	-	-	-
	65	82	85	89	93	98	103	108	114	121	128	136	-	-	-	-	-
	70	83	86	90	95	100	106	112	119	126	134	-	-	-	-	-	-
	75	84	88	92	97	103	109	116	124	132	-	-	-	-	-	-	-
	80	84	89	94	100	106	113	121	129	-	-	-	-	-	-	-	-
	85	85	90	96	102	110	117	126	130	-	-	-	-	-	-	-	-
	90	86	91	98	105	113	122	131	-	-	-	-	-	-	-	-	-
	95	86	93	100	108	117	127	-	-	-	-	-	-	-	-	-	-
	100	87	95	103	112	121	132	-	-	-	-	-	-	-	-	-	-

Caution	Extreme Caution	Danger	Extreme Danger

Source: NOAA's National Weather Service

Activities performed in the Caution zone result in premature fatigue and, therefore, the inability to effectively pursue cardiovascular and weight training goals. Activities that are performed in the remaining zones can result in muscle cramps and the more severe Heat Stroke and Heat Exhaustion.

Heat Cramps

Heat Cramps are the least severe and first sign of an impending heat problem and is manifested by painful muscle spasms usually in the legs and abdomen.

Have the victim rest in a cool place. Give them cool water or a commercial sports drink. Lightly stretch and gently massage the area. The victim should NOT take salt tablets or salt water. This can make the situation worse.

Heat Exhaustion and Heat Stroke

Heat Exhaustion is more severe and is symptomized by a cool, moist, pale or flushed skin, headache, nausea, dizziness, weakness, and exhaustion.

Heat Stroke is the most severe heat emergency. The body systems are overwhelmed by heat and begin to stop functioning. Heat Stroke is a serious medical emergency that is manifested by red, hot, dry skin, loss of consciousness, a rapid, weak pulse, and rapid, shallow breathing.

Move the victim out of the heat. Loosen any tight clothing and apply cool, wet cloths. If the victim is conscious, give cool water to drink. Do NOT allow the victim to drink too quickly. Give about one glass (4-ounces) of water every 15 minutes. Let the victim rest in a comfortable position and watch carefully for changes in their condition. The victim should not resume normal activities the same day.

Emergency Response

Call 911 (or emergency services) if the victim refuses water, vomits, or losses consciousness. If the victim vomits, stop giving fluids and position the victim on their left side. Watch for signals of breathing problems. If you have ice packs or cold packs, place them on each of the victim's wrists, ankles, groin, armpit, and neck (a.k.a. pulse points). Do NOT apply rubbing (isopropyl alcohol).

Temperature and Humidity

Heat cramps, or heat exhaustion possible:

* 93 F (34 C), 20% humidity
* 87 F (31 C), 50% humidity
* 82 F (28 C), 100% humidity

Heat cramps or heat exhaustion likely:

* 105 F (41 C), 20% humidity
* 92 F (34 C), 60% humidity
* 87 F (31 C), 100% humidity

Heat Stroke imminent:

* 120 F (49 C), 20% humidity
* 108 F (43 C), 40% humidity
* 91 F (33 C), 100% humidity

Reference, 1993 American Red Cross Standard First Aid Manual

Hypothermia and Frostbite

Frostbite is the freezing of tissue. The skin becomes yellowish, and will be cold to the touch. Provide first aid by warming the affected area using warm water. Do NOT rub the area, as this can cause further tissue damage. A medical professional is required to access the extent of the damage.

Hypothermia is a life-threatening condition wherein the core body temperature has become dangerously low. Many of the same symptoms as heat exhaustion, including dizziness, nausea, loss of appetite, vision problems, etc., may be present. In the case of hypothermia, it is important to call 911 immediately, and use any means present to warm the victim, such as removing wet clothing or putting them in a sleeping bag with an unaffected person who can provide body warmth until help arrives.

Chapter 15

Health & Fitness Coaching

As part of the care team, which may include medical personnel, Health & Fitness Coaches assist the client in implementing lifestyle changes that are related to the management or care of their health. A medical professional must supervise the coaching of pathological physical conditions like diabetes, hypertension, obesity, and cardiac issues. A qualified psychologist should receive referrals for pathological psychological conditions such as anxiety and depression.

Health & Fitness Coaches assist clients in the continuous process of maintaining or enhancing their health by incorporating stress management, recovery and regeneration, sleep, nutrition, and movement into their lifestyle choices. It is essential to reiterate that Health & Fitness Coaching is not dictating to their clients what to do. Rather, they assist their client in evaluating their options independently, guiding them along a personalized and iterative path. Health & Fitness Coaches assist clients in implementing behavioral modifications by means of goal-setting, motivation, education, and support.

A Health & Fitness Coach and a Personal Trainer differ in their comprehension of the motivational needs of clients and the impact of personality types and current lifestyles on the successful achievement of fitness objectives. A coach recognizes the fundamental psychology of motivation, despite not functioning as a psychotherapist.

The primary distinction between a psychotherapist and a Health & Fitness Coach is that psychotherapists are specifically trained to assist individuals who are struggling with mental illnesses, whereas coaches are not. Psychological conditions that are pathological should be referred to a psychologist and should not be within the responsibility or purview of Health & Fitness Coaches. The sole responsibilities of a Health & Fitness Coach do not include the management of pathological physical conditions, as previously described. These conditions should be under the supervision of medical professionals.

Coaches possess the ability to recognize incorrect, irrational, and negative beliefs, and they consistently offer continuous encouragement without necessarily offering solutions or criticism. In addition, the emotional intelligence levels of the Health & Fitness Coach and client are also significant in the development of a healthy relationship. Emotional intelligence, as defined by Goleman (1998; 1995), is the capacity to identify one's own emotions and those of others. This is essential for the purpose of self-motivation and emotional regulation within the relationship.

Defining Good Health

It is essential to acknowledge that excellent health does not necessarily indicate the absence of illness. It is more accurate to define excellent health as a positive quality of life. In 1946, the World Health Organization (WHO) established the definition of health as "a state of complete physical, mental, and social well-being, rather than merely the absence of disease or infirmity."
As a result, health is a collection of positive factors that are associated with optimal health. Is a combination of the following:

- **Social**: Possessing the ability to establish engaging interpersonal relationships.
- **Emotional**: The capacity for conveying emotions in a manner that is both healthy and welcoming
- **Physical**: The capacity to maintain a healthy lifestyle in order to promote one's own well-being
- **Intellectual**: The ability to learn and apply cognitive skills to make informed decisions.
- **Spiritual**: A person's capacity to pursue a purpose and significance in their daily existence.

The Health & Fitness Coach guides their clients to make healthy lifestyle choices that lower their risk of disease and improve their health, such as conducting regular exercise, eating well, and learning to cope with emotional stress in a healthy way.

The Five Pillars of a Healthy Lifestyle

The pillars of health are the many parts that make up health, despite the common perception that it is a singular idea. When all of the pillars are present, the mind and body function at their best, and each pillar is important in and of itself.

Planning and executing small efforts to strengthen each of these pillars is crucial for health, as neglecting even one might have harmful effects. Let's examine the five pillars and rank them in order of importance:

Exercise

Regular physical activity can benefit both physical and mental health. Exercise routines should consist of cardio, weight training, mobility exercises, and leisure pursuits. By prioritizing physical fitness, the quality of sleep can be enhanced, as can heightened energy levels and more self-assurance.

Nutrition

Following a plant-based, whole-foods diet can improve the efficiency with which the body functions. Improved mental and physical health can be achieved through proper eating. Drinking an adequate amount of water on a regular basis and including healthy fats in the diet, such as those found in fish, nuts, or avocados, will help to achieve the greatest possible results. Adding green vegetables and complete protein forms the basis of proper nutrition.

Sleep

Proper sleep is essential for optimal bodily function and immune system defense against disease. Lack of sleep or sleep that doesn't restore can harm mental and physical health. Insomnia can lead to impaired everyday performance, cognitive impairment, being inattentive or falling asleep in hazardous situations.

Stress Management

Discovering techniques to redirect stress can alleviate tension and lower blood pressure. Reducing stress is essential to physical health and a component of overall wellness. The state of the mind has an effect on every bodily system.

Detoxification

Refrain from exposure to harmful substances, including alcohol, tobacco, illegal narcotics, and environmental contaminants. Detoxification has the potential to reverse certain long-term medical conditions and inflammatory disorders.

Emotional Intelligence

The following are the five domains of emotional intelligence as listed by Cherry (2018):

Self-awareness

Self-awareness is the ability of an individual to acknowledge and comprehend their own emotions and how they affect themselves and others. Self-awareness encompasses the understanding that there is a connection between our emotions and actions, as well as being conscious of our individual strengths and weaknesses.

Self-regulation

The appropriate expression of emotion is a component of self-regulation. Self-regulation consists of managing impulses, controlling emotions, adjusting to change, and maintaining commitments. It also relates to understanding how actions taken affect others.

Empathy

The ability to empathize with and understand other people's feelings, wants, and concerns is an essential component of social awareness. People with a strong sense of social awareness should be able to read nonverbal clues about other people's emotions and react accordingly.

Motivation

Intrinsic motivation refers to the internal desire of an individual to fulfill their particular wants and objectives, rather than being influenced by external incentives like money or recognition. They are more likely to be determined, devoted, proactive, and goal-oriented. Those in this group usually possess a strong desire for success and actively seek opportunities for self-improvement.

Social skills

A person with excellent social skills can handle dispute resolution, inspire and influence people, communicate effectively, manage relationships, and work well in a team. A person's social skills encompass their ability to listen attentively, express themselves clearly both orally and nonverbally, take the lead, and collaborate well with others.

Client Personality Types

Knowing the client's personality characteristics is an essential skill for Health & Fitness coaches. Doing so will provide insight into their communication style and allow you to instruct them more effectively. According to the Platinum Rule, we can classify people into four broad personality types. The Platinum Rule allows people to adjust their behavior to suit the specific wants and needs of others, in contrast to the Golden Rule's emphasis on treating others as one would like to be treated.

The "Director" style is the most guarded and direct of the four personality types; the "Socializer" style is the most open and direct; the "Relater" style is the most indirect and open; and the "Thinker" style is the most guarded and indirect. The ability to work with clients with varying behavioral styles will be enhanced by an understanding of these personality types. Having a firm grasp of both your own and your clients' personality types is essential.

The following covers an in-depth examination of each of these personality types and offers guidance on how to effectively collaborate with them.

Socializers

The Socializer excels in displaying excitement, charisma, strength of argument, hospitality, and kindness. They flourish by seeking and receiving external recognition and rewards. They possess an unwavering positive outlook and a great deal of charm, which enables them to effectively inspire enthusiasm in others for their ideas. These attributes enable them to exert influence on individuals and forge alliances in order to achieve their objectives. They exhibit impatience, a dislike for being alone, and a limited ability to focus, leading to rapid boredom. Socializers take risks and tend to make decisions based on intuition, which is not always bad. Socializers have a tendency to draw broad conclusions based on limited information. Exaggerators may not be inclined to complete their follow-up tasks.

Coaching this personality type:

- They rely on external validation to acknowledge their accomplishments and achieve their objectives. Failure to observe or communicate these occurrences will prevent their return.
- Ensure to provide highly detailed directives and emphasize the importance of strictly following your instructions.
- Maintain their concentration, particularly while their colleagues or friends are around. They may want to show you to their acquaintances, which is beneficial for their own motivation.

Directors

Directors are those who are focused on achieving certain objectives and thrive when they influence both people and circumstances. Directors prioritize efficiency and are willing to deviate from the norms. They believe that it is more convenient to seek forgiveness than to seek permission. Directors embrace challenges, assert their authority, and dive into problem-solving with determination. They possess a high level of speed and efficiency, focusing on completing tasks promptly and independently.

Consequently, they grow frustrated by any form of delay. They possess a strong desire and a need to exert control, which can result in them being obstinate, demanding, and lacking empathy towards others.

Coaching this personality type:

- Punctuality is essential, which entails beginning your lesson or session with the client promptly at the designated time.
- Ensure that you provide them with explicit instructions, or they may engage in excessive self-evaluation and drive themselves to extremes.
- Articulate your instructions with conviction and emphasize the reasoning behind them.
- Ensure that you provide a clear and concise explanation of the purpose and advantage of stretching. This type of personality has a reputation for discounting the need to stretch.

Relaters

People who are relatable are kind and caring. Out of the four styles, they are the most concerned with others. Relaters become excellent friends, faithful workers, and attentive listeners. They are friendly because of their easygoing attitude. They establish robust networks of individuals who are dependable, willing to support one another, and outstanding team members. Relators might put up with uncomfortable surroundings instead of taking a chance on change. When faced with change, they become frustrated because they favor situations as they are. They make an effort to keep themselves balanced, steady, and composed. Relaters are polite, amiable, and eager to delegate tasks when they are at work. They are tenacious workers, excellent strategists, and excellent followers. Since they don't want to upset anyone, Relaters follow the crowd even when they disagree. They take longer to make decisions because they want to involve others in the process, seek security, and mitigate risk.

Coaching this personality type:

- This is the optimal personality type for a team training session. They have a strong desire to engage in conversations and actively listen to others.
- They are comfortable with the status quo and thrive when given advance notice about impending format or style changes.
- If expectations are unclear, they will avoid making decisions.

Thinkers

Thinkers are individuals who possess strong analytical skills, exhibit perseverance, and approach tasks in an organized manner. They derive satisfaction from engaging in problem-solving activities. They possess a strong focus on tasks and details, prioritizing content over style. They consistently maintain emotional composure and may feel uneasy in the presence of more extroverted individuals, such as socializers. Intellectual individuals possess elevated standards for themselves and others, leading to a tendency to be excessively judgmental. When their inclination towards perfectionism becomes excessive, it can lead to challenges and delays in decision-making, which is commonly known as "analysis paralysis."

Thinkers exhibit a tendency to make decisions at a measured and leisurely pace. They conduct research, do comparisons, assess challenges, identify limitations, and thereafter proceed with action. Intellectuals are disturbed by unexpected events and problems, hence their conservative choices. Intellectuals are inherently doubtful; therefore, they want to have commitments documented in written form.

Coaching this personality type:

- Make them a part of the plan. Make sure that the client adheres to the plan.
- It's essential to let them know when things are going to be challenging to prevent them from developing a negative self-image.
- Provide them with an outline of the next session's objectives.

Communication

Formal and informal discussions should be the first step in every client engagement, during which the Health & Fitness Coach becomes acquainted with the client's background in activities, skills, and preferences. Health & Fitness Coaches can use this information to pinpoint obstacles and difficulties that may arise when implementing and sustaining activities that are focused on goals. It is more likely that Health & Fitness Coaches will be able to tailor a program to each client's needs and maximize adherence if they have a thorough understanding of those needs from the beginning of the program.

Furthermore, it is imperative that Health & Fitness Coaches become knowledgeable about each client's social support system at the onset of the program and maintain this knowledge throughout. Does the family as a whole engage in any physical activity? Do friends and family encourage the client to start a lifestyle change program? Does the client work in an environment that encourages and supports a healthy lifestyle? Although this information will become apparent eventually, it is crucial to begin collecting as much as possible in the early stages of a client's relationship.

In order to recognize any misunderstandings about what constitutes fitness activity, Health & Fitness Coaches should also try to ascertain the attitudes, beliefs, and sentiments of their clients toward physical activity. Health & Fitness Coaches can begin to develop self-efficacy and replace unhelpful exercise views with ones that represent a more realistic interpretation of a successful and healthy lifestyle through instruction, constructive interactions, and the development of relationships.

Health & Fitness The belief that their clients should be proficient in areas they are not often leads coaches to deal with communication errors and misconceptions.

Finally, it is imperative that Health & Fitness Coaches educate their clients on self-monitoring tactics and goal-setting methodologies. We must equip clients with the necessary knowledge and self-efficacy to succeed, empowering them to take charge of their activity experiences.

Active Listening

One of the most critical skills of a coach is active listening. Crossing one's arms and legs while sitting is a defensive stance that suggests rejection or avoidance to the client. Open arms, pointed legs and feet in the client's direction, and relaxed, extended eye contact are examples of the language of availability and acceptance.

It's essential to pay attention to the client without interrupting or offering suggestions. One of the most important skills the Health & Fitness Coach can have is the ability to show empathy. When interviewing a client, the coach needs to be mindful of the way they conduct themselves.
There are six negative characteristics of poor listening:

- The Interrupter - sends the message to the client that their thoughts are not significant.
- The Stage Hog - a talkative listener who diverts attention from the topic at hand, takes over conversations, interrupts to assert control, or frequently shifts the topic to discuss their own experiences.
- The Pseudo-listener - pretends to listen by making motions with their voice or body while concentrating on other matters.
- The Insensitive Listener - ignores the client's feelings and concentrates entirely on the facts.
- The Defensive Listener - enables the client's concerns to evoke an emotional reaction based on their personal experiences or beliefs.

Interviewing

The primary objective of any interview should consistently be to facilitate the formulation of a secure and efficient fitness regimen that the client will be capable of following. Improperly done interviews can potentially harm clients. The majority of individuals embarking on a new program are aware that they are carrying excess weight and lack physical fitness.

Performing a comprehensive session of body measurements and strength and cardiovascular testing will only serve to confirm this assertion and is likely to result in an unfavorable encounter. Simply put, those who are new to a lifestyle-modification program will essentially fail to meet the requirements of every assessment. Beginning a new program with a session that is filled with "failure" does not contribute positively to one's belief in their own abilities, the relationship with others, or the level of enthusiasm for the program.

Instead, at the beginning of each new program, coaches should gather the essential information needed to create a safe and efficient program, as well as any unique requests made by the client. While physical assessments such as body-fat measurements may be desirable, they are not necessary for program design and may negatively affect the client's emotional preparedness and effectiveness.

Behavioral assessments also follow the same principle. Utilizing an inventory to evaluate individual beliefs is generally not the most advantageous method for collecting information, as it generates a misleading perception of accuracy and absolves the coach of accountability.

Health & Fitness Coaches, who lack training as mental health experts, should refrain from attempting to diagnose or psychologically categorize individuals. The process of behavioral assessment should focus on collecting information in order to develop a program that addresses the distinct requirements of the client.

Motivational Interviewing

The technique of motivational interviewing aims to boost internal motivation, also known as intrinsic motivation. A client who possesses intrinsic motivation may choose to lose weight in order to enhance their comfort, as a personal choice. This desire is distinct from the motivation to lose weight for relationship satisfaction or due to medical advice. Intrinsic motivation might be more permanent than external motivation.

Using this methodology benefits numerous healthcare professionals. Motivational interviewing can be employed when working with clients in the capacity of a Personal Trainer or Sports Nutritionist. Utilizing motivational interviewing as a Health & Fitness Coach primarily involves skillfully providing appropriate open-ended inquiries.

A simple affirmative or negative response cannot adequately answer an open-ended inquiry. A more comprehensive answer is necessary. An example of an open-ended inquiry is "What strategies have you previously employed to achieve your objectives?" This question is significantly distinct from inquiring, "Have you ever attempted to achieve your objectives?" For the former, the client must divulge their prior efforts. This provides you with more details than the latter's one-word response. This information helps you understand your client better. It can also be used to design

more productive coaching sessions. In order to use this motivational interviewing strategy, clients must also be reflective. It compels individuals to draw a link between what they are thinking and doing.

Motivational interviewing employs reflective listening in conjunction with this form of inquiry. Reflective listening entails summarizing the client's statements to guarantee that you accurately comprehend their statements. This affords them the chance to rectify any misconceptions. Reflective listening also demonstrates empathy.

The Health & Fitness Coach must pose questions in a manner that is respectful of the client's choices and less threatening to the client's autonomy. Open-ended questions generate additional inquiries, planning, and action steps. Declarative self-talk and closed-ended queries like "You are required to attend five classes per week" obstruct the discussion.

The Health & Fitness Coach is responsible for anticipating, identifying, and responding to hesitancy toward change, as well as assisting each client in identifying and resolving any obstacles that may impede their ability to achieve their objectives.

Screening

When evaluating the suitability of a potential client, we must evaluate many variables such as motivation, readiness to change, timing, and medical and psychological status. It may be an indication that the client lacks the motivation to start a training session if their work or personal schedules conflict with the coaching schedules. Prior to initiating a program, it is essential for a Health & Fitness Coach to meticulously evaluate, screen, and document the pertinent components of physical and psychological health in all clients.

A Health & Fitness Coach can distinguish between individuals who are likely to benefit from their services and those who are not. The initial screening process accomplishes this. A comprehensive screening and assessment process guarantees that the services of a Health & Fitness Coach can safely satisfy the requirements of a potential client in an appropriate and ethical manner.

Fitness Testing & Assessment

It is strongly recommended that all clients undergo an evaluation of their medical and psychological status, dietary habits, and fitness level. The extent and scope of the assessment will be contingent upon the level of medical attention provided and the program setting. Fitness testing and assessment provides information on the fundamental or minimum requirements of physical and psychological health, fitness parameters, readiness to exercise, and motivation or readiness to change (for a comprehensive review of assessment methodologies, refer to the Fitness Testing section).

Physical Assessment

Fitness evaluation and testing can determine the criteria for a well-balanced program, but only a physician can evaluate an individual's medical condition. The most qualified people to assess a health history and conduct a physical exam in order to identify obesity-related illnesses and determine the appropriateness of a diet and exercise program are physicians, physician assistants, and nurse practitioners.

A significant number of individuals who are substantially overweight frequently regain the weight they have lost. Research has demonstrated that individuals who lose a significant amount of weight regain approximately two-thirds of it within one year and almost all of it within five years (Wing & Phelan, 2005). The pursuit of an optimal weight is no longer the primary focus of guidance in response to such disappointing outcomes.

As an initial objective, obesity specialists have recommended a 10% reduction in body weight over the course of six months (NIH, 1998). Once clients achieve this objective, they may become motivated to focus on maintaining their initial weight loss. On the other hand, individuals who remain motivated may establish an interval goal of losing additional weight, with reevaluation occurring after each successive interval. In many instances, clients will not achieve their ideal weight through modest weight loss.

However, even minor weight loss, such as 10%, can yield significant health benefits and increase the likelihood of long-term maintenance. The results of body-composition testing can also be employed to establish an initial objective or to establish a reasonable weight by reducing the percentage of body fat to a healthier level.

Even when cardio exercise is the sole form of exercise, it is essential to comprehend that muscle weight can increase. Periodically throughout an exercise regimen, it is imperative to evaluate body composition, especially when fat weight reduction appears to have reached equilibrium.

Criteria for Medical Clearance

While it is advisable for all clients to obtain a physician's consent prior to commencing a fitness and weight-management program, it is particularly essential for clients with the following medical conditions:

- BMI greater than 30
- Cardiovascular disease, angina, arrhythmias, and congestive heart failure
- Chronic kidney failure
- Diabetes
- Elevated cholesterol or triglyceride levels
- Extreme obesity
- Hypertension
- Hyperthyroidism or hypothyroidism
- Liver disease
- Pregnancy-present or planned
- Significant emotional problems
- Substance abuse

Basic Health Screening

For clients who appear to be in excellent condition and do not disclose any significant medical issues, it may be enough to gather the following health information as a starting point before implementing a program (National Task Force on the Prevention and Treatment of Obesity, 2000):

- Assessment of obesity-related risk factors
- Blood pressure and resting heart rate
- BMI or body composition (percent body fat)
- Current medical history
- Current medications
- Family health history
- Health habits (e.g., cigarette, alcohol, and recreational drug use)
- History of chronic illnesses
- Waist circumference

Psychological Assessment

It is important to exercise caution when evaluating behavioral and psychological factors, as most Health & Fitness Coaches lack expertise in mental health. The objective of such assessments should be to collect information for the program, rather than diagnose, evaluate, or categorize a client's medical or mental condition.

Understanding the purposes that the current behaviors support is the first step in conducting an effective behavioral assessment, which is essential for program design, acceptance, and long-term program compliance (Groden, 1989). For instance, the first step towards adopting good eating habits is to comprehend the client's present eating patterns and the significance they play in their lives. Advising a client on what foods to consume and what not to eat alone won't cause a long-term behavioral shift. Instead, the health coach must develop a more thorough awareness of the client's behavior, including the locations and times of day when the undesirable behavior is most prevalent.

Habits and behaviors have a purpose for a client, so health coaches should make an effort to comprehend how the client benefits from negative habits (e.g., avoidance or instant gratification) as well as identify the environmental, social, or emotional triggers that cause the bad habits.

Lifestyle Assessment & Modification

Health and fitness coaches often find that their clients are satisfied with following a customized program. Nevertheless, this kind of approach does not address the individual personality types of each client or the rationale behind the program's components.

Following the first evaluations of lifestyle, nutrition, and exercise, Health & Fitness Coaches should collaborate with the client to set behavioral and program goals, such as weight loss and physical activity and diet. In the initial weeks of a new program, it's tempting to overwhelm clients with information and recommendations for motivation. Sometimes clients arrive driven and eager to take on too much. Health & Fitness Coaches need to use caution to prevent their clients from becoming overwhelmed, as this can result in disappointment and dissatisfaction.

Initially, the Health & Fitness Coach should advise clients to keep a daily diet and exercise journal for one week. This record will not only help the Health & Fitness Coach better understand the present behavioral patterns of their clients, but it will also assist clients in setting goals for changing their lifestyle.

Health & Fitness Coaches should review their clients' lifestyle-modification documentation at the beginning of each session to determine if they achieved their behavioral objectives. Clients frequently identify particular triggers that lead to unhealthful dietary decisions. They might talk about circumstances that make them miss a workout. Health & Fitness Coaches need to take

thorough notes in order to assist their clients in creating strategies that will help them reach their fitness goals.

Keeping a log of a client's dietary intake and exercise routines, along with notes on any contributing variables, can provide an unbiased view of their behavior. This will assist the client and the Health & Fitness Coach in identifying the triggers for these harmful behaviors.

Eliminating snacks from the house could prevent this if the client eats because they're bored. It is also possible to switch out unhealthy snack items with healthier ones.

Clients should receive motivational reading materials from Health & Fitness Coaches that give thorough instructions on exercise, diet, and weight management. Curricula for weight management often cover eating out, traveling, cooking, navigating the holidays, shopping for groceries, understanding food labels, stress management, avoiding impulsive eating, and avoiding relapses.

Promoting Health Behavior Change

Client education is an essential element of each stage of the lifestyle-modification process. Fitness professionals must convey information in a consistent, fundamental, friendly, and uncomplicated manner. A common mistake that fitness professionals may make is to provide an excessive amount of information at an early stage in an overly complex manner. The education that Health & Fitness Coaches offer to their clients must be designed to facilitate change and instruct individuals on the necessary steps to achieve their goals.

Lifestyle and Weight-management Groups

Studies indicate that weight-management and lifestyle groups are generally more successful than individual consultations, although some participants' stated preference for individual or group counseling (Renjilian et al., 2001). Experienced Health & Fitness Coaches have observed that when working with groups, group members frequently offer helpful guidance, inspiration, and insight to each other. Coaching groups can optimize a coach's time and generate a larger income by leveraging their expertise.

Typically, members of a group go through a similar sequence of steps, starting with evaluation and goal-setting and then moving on to monitoring themselves and resolving problems. In general, group programs adhere to a predetermined curriculum that consists of weekly assignments and self-monitoring activities centered around topics related to behavioral change.

Health & Fitness Coaches may feel more comfortable facilitating group discussions because the discussions call for strong observation and listening skills. A group leader's responsibility is to make sure that everyone feels at ease, that no one person dominates the conversation, and that everyone

listens to one another with respect. Health & Fitness Coaches, before launching their own weight- and lifestyle-management group, should participate in or assist an established leader-led group.

Relapse Prevention

Following a client's successful implementation of a lifestyle modification program, the Health & Fitness Coach should begin utilizing relapse avoidance techniques. Relapse following prolonged periods of physical exercise is not uncommon, and coaches need to warn their clients about this possibility and prepare them with strategies for when adherence becomes difficult.

Increasing and sustaining social support for leading a healthy lifestyle is an essential relapse prevention technique. The encouragement of clients to be aggressive in order to resist harmful influences is another tactic that can be utilized to assist prevent program relapse. People who lack confidence or who feel vulnerable are usually the ones who lack assertiveness.

The ability of clients to self-regulate their time, schedules, habits, and priorities positively correlates with their adherence to the program. Health & Fitness Coaches must train their clients to monitor their own progress and modify their behavior in order to maximize their achievement.

Recognizing high-risk scenarios can help coaches be better equipped to handle program obstacles and relapses. Holidays, vacations, injuries, and schedule modifications are a few typical circumstances that lead to relapses in many people.

Individuals with demanding schedules, inadequate time management abilities, or an absence of social support are among the most probable candidates for relapse. Fitness & Health Coaches need to give these individuals additional information, encouragement, and direction as they implement their programs and negotiate challenges to maintaining them. Coaches also need to be aware of their clients' psychological states; they should look out for indications of exhaustion and overload. If practitioners educate clients about coping skills, such as time management, it will help them stick to their behavioral programs. Coaches should also continue to be understanding and supportive.

Behavioral Modification

Behavior-modification techniques utilize the concepts of operant and classical conditioning to promote an active lifestyle. Health & Fitness Coaches have the option to either lead group sessions focused on lifestyle and weight control or work individually with specific customers as personal trainers. Studies indicate that for optimal outcomes, programs should have a duration of at least 16 to 26 weeks (Renjilian et al., 2001).

The primary distinction between classical and operant conditioning lies in the fact that classical conditioning entails the formation of a connection between an automatic reaction and a stimulus,

whereas operant conditioning requires the formation of a connection between a voluntary activity and a consequence. Operant conditioning is particularly applicable for coaching purposes as it focuses on promoting voluntary activities.

Because they foster accountability, written agreements can be helpful tools for encouraging people to maintain their activity regimens. In addition to being clear and uncomplicated, a written agreement should outline the client's expectations. Agreements reduce uncertainty and clarify actions, promises, and attitudes that both the client and the coach anticipate from one another.

Health & Fitness Coaches must maintain a favorable attitude and cultivate a positive atmosphere for their clients; otherwise, they may either quit or look for another coach. It is essential to consistently demonstrate empathy and provide assistance to clients, even when assessing their actions. Client behavioral issues can hinder the effectiveness of instruction; therefore, it is essential for coaches to apply behavior modification techniques.

Operant Conditioning

People widely recognize that they learn about health-related behavior from a variety of sources, including interpersonal interactions and the environment around them. Health & Fitness Coaches can enhance their effectiveness in promoting behavioral change by gaining insight into the historical factors that have shaped their clients' existing behaviors as well as understanding the essential elements of acquiring new behaviors.

The essential component of operant conditioning lies in the consequences that follow the execution of an action. Various forms of consequences result in distinct behavioral outcomes, and consequences always entail the introduction, absence, or elimination of a favorable or unpleasant stimulus.

Stimulus Control

Stimulus control is an essential tool for modifying behavior and motivating individuals. It entails modifying the environment to promote healthy habits and facilitate adherence to the modification program. Stimulus control is a concept closely tied to operant conditioning, involving the intentional manipulation of environmental cues to encourage exercise or good eating behaviors. Health & Fitness Coaches might suggest the following stimulus-control tactics to their clients:

- Prepare athletic footwear, socks, and clothing for early morning workouts
- Make a grocery list excluding unacceptable items
- Post signs on pantry and refrigerator doors listing the acceptable foods
- Keep a gym bag in the car with all necessary workout items
- Participate in a group that engages in physical activity (e.g. running, walking)
- Carry or wear comfortable shoes at work to use stairs instead of the elevator

Engaging in social interactions with those who lead healthy lifestyles is another efficient method for controlling stimuli. Through socializing with like-minded individuals, clients will establish networks of support for changing their behavior. One such successful tactic is to join a fitness center near home or work.

Consequences

A behavior has consequences that may be beneficial or detrimental. Positive outcomes can include recognition or a reward, but negative outcomes could result in the forfeiture of resources like leisure time or freedom.

Reinforcement

As per B.F. Skinner, a renowned psychologist and behaviorist, a reinforcer is a result that enhances the probability of a behavior being repeated. Reinforcement can be categorized as either positive or negative.

- **Positive reinforcement** is the act of motivating someone to continue their behavior by providing them with rewards. For example, if a client demonstrates increased effort, the coach may grant them extended rest time between sessions.
- **Negative reinforcement** is the process by which an individual is motivated to modify their behavior due to the removal of something unpleasant. For instance, when a client expends additional effort in order to avoid the assignment of extra work.

Consistency is essential in the implementation of reinforcement. Consequences occur when a client repeatedly responds in a certain way. If the client consistently enforces the consequences, this method will either become a habit for positive behavior or cease to exist for undesirable behavior over time.

Health & Fitness Coaches must ensure they give suitable feedback and consequences for client behaviors. Coaches should provide positive reinforcement for clients' strengths while also addressing areas that require work. Clients must be fully aware of the desired actions, and applying consequences consistently will eliminate any confusion within the program. Moreover, when clients have explicit expectations, they are more likely to achieve success by fulfilling the program's requirements.

Feedback

Feedback is an influential method that engages both the client and the Health & Fitness Coach. When the majority of fitness professionals envision feedback, they typically associate it with delivering positive reinforcement and motivation to their clients. This phenomenon is referred to as extrinsic feedback, and it plays an essential part in the early acceptance and implementation of a program. Nevertheless, the most important style of feedback for maintaining long-term program compliance is intrinsic feedback, which is client-generated. In order to promote the growth of internal feedback in clients, coaches should gradually reduce the quantity of external feedback and collaborate with the client to substitute it with more self-evaluation.

If Health & Fitness Coaches consistently reward each positive action exhibited by their clients, the clients will not develop an incentive to provide internal feedback and will not acquire the ability to self-monitor their own behavior. Health & Fitness Coaches should allow clients to offer their own encouragement and error correction. Excessive extrinsic feedback by coaches may hinder their clients' capacity to maintain long-term commitment and self-reliance.

Determinants of Behavior

Establishing health and fitness objectives is contingent upon behavior, which is influenced by various elements, such as social support, habits, and personality traits. Each of these factors influences an individual’s behavior and their response to various circumstances. The following is a summary of these factors and their potential impact on behavior:

Social Support

Family and friends' social support significantly influences physical exercise habits. Without support from their home or workplace, it is challenging for an individual to sustain a lifestyle modification program. When support is organized into distinct categories, the assistance provided by a spouse or partner is demonstrated to be a significant and dependable indicator of adherence to a program. Support can manifest in several ways, such as through motivation and confidence. Health & Fitness Coaches should be cognizant of the nature of the support a client is receiving and should consistently strive to establish a supportive atmosphere within the exercise setting.

Habit

It's essential to keep in mind that most actions are habits. Health & Fitness Coaches seek to reduce harmful health behaviors and promote beneficial ones. In other words, habits become deeply rooted in an individual's life, often occurring unconsciously or, crucially, without any resistance. The majority of harmful behaviors are deeply ingrained, which presents a difficulty for Health & Fitness coaches trying to break these undesirable habits. Most people find it difficult to simply quit engaging in unhealthy behavior. Instead, if clients replace their bad habits and behaviors with more constructive and positive ones, they have a higher chance of success. By substituting a healthy behavior, one can shorten the transition period involved in phasing out an old habit. For instance, try meditating or listening to music instead of smoking cigarettes.

Personality Traits

Personality traits are fundamental characteristics that individuals possess as part of their psychological makeup. They are responsible for different characteristics in individuals and can be challenging to precisely identify and evaluate. However, studies have demonstrated the association of certain underlying characteristics with health habits. Research has proven a strong association between commitment to physical activity and self-motivation, characterized by the capacity to establish objectives, track progress, and reinforce oneself (Dishman, 1982). The level of self-motivation shown by a client directly impacts the ease with which the Health & Fitness Coach can administer the program and effectively engage the client. A client who is self-motivated demonstrates accountability and actively participates in the program.

Furthermore, conscientiousness is an essential characteristic that indicates a person's propensity for organization and thoroughness. It has been associated with increased levels of fitness and healthy eating habits (Bogg & Roberts, 2004). A conscientious client will be better positioned to adjust and accept their improved lifestyle.

Cognitive Coaching

Cognitive coaching is a style of coaching that centers on enhancing an individual's cognitive and learning processes. Cognitive coaching seeks to assist clients in improving their cognitive abilities, such as confidence, comprehension, and the ability to solve problems.

In this type of personal growth, the coach facilitates an encounter that challenges the client's perspective. The goal of coaching sessions is to assist clients in examining and reframing their thought processes in order to make better choices and take appropriate action. Most coaching styles are customized, so this method is best for people who are ready to improve.

The Health & Fitness Coach will find the following questions beneficial when assisting a client in reassessing unreasonable, erroneous, and faulty thinking. The coach should use these questions to direct the client toward reflective thought:

- Are there any explanations aside from self-blame?
- What advice would you provide to a friend facing the same circumstances?
- What evidence supports and contradicts this line of thinking?
- Is there any other way to perceive this in a positive light?
- What is the most severe outcome that might possibly occur?

The intent is to assist the client in transitioning from an incorrect viewpoint to one grounded in reality through a process of guided exploration. This involves the Health & Fitness Coach presenting a number of queries to the client with the goal of directing their attention towards deductive reasoning.

In the context of weight management, cognitive coaching serves as an essential instrument to assist clients in recognizing and addressing adverse beliefs that impede their efforts towards healthy behavior. Assisting clients in creating sensible counter-responses to their misguided thoughts is an essential aspect of coaching.

It's possible for the client to believe that certain favorable behaviors are awkward. The Health & Fitness Coach can assist the client in realizing that the more an activity is performed, the more natural it will become. Therefore, acquiring the ability to differentiate between hunger and the urge to eat is an essential coaching objective as it helps clients make significant cognitive distinctions.

Cognitive coaching includes some key stages:

- **Reflection:** Analyze the client's cognitive processes to evaluate their current thought and behavior patterns, identifying obstacles, achievements, and opportunities for enhancement.
- **Goal setting:** Assess the current circumstances and determine the desired objectives.
- **Strategy:** A significant portion of the cognitive coaching approach consists of action plans. Find various methods for creating an approach that leads to their objectives.
- **Accountability:** Keep track of the client's weekly progress and hold them responsible for approaching their objectives.

In actuality, cognitive coaching consists of a set of scheduled meetings intended to encourage the client's thought processes and cognitive growth. By asking probing questions and paying close attention, the coach helps the client discover fresh viewpoints and form their own paths to success.

The cognitive coaching methodology ultimately enables individuals to achieve their potential by establishing control over their cognitive processes. It provides individuals with the abilities to

enhance their critical thinking, make more resolute decisions, and effectively handle the difficulties that arise in life with increased self-assurance.

Users of Cognitive Coaching

The primary emphasis of our work is Cognitive Coaching within the realm of Fitness and Health. Nevertheless, this form of coaching is also applicable to different settings. Enhancing metacognition, which refers to our awareness and understanding of our own cognitive processes, directly enhances the performance and effectiveness of these audiences in their respective professions and the individuals they serve.

- **Business executives -** employ cognitive coaching to enhance their decision-making, planning, and capacity for leadership. Enhanced cognition has the potential to revolutionize employment, but its advantages go beyond that. Through this type of coaching, professionals are more likely to achieve an optimum, balanced work-life. They can more effectively regulate cognitive processes associated with anxiety, stress, and fatigue.
- **Educators and teachers -** utilize cognitive coaching to improve their instructional techniques and abilities to run their classrooms effectively. It can assist them in comprehending various learning styles and in effectively communicating with their students. When used effectively, cognitive coaching for educators results in increased student engagement and educational achievements.
- **Athletes -** employ cognitive coaching techniques to optimize their mental performance, concentration, and ability to excel in high-pressure situations. When utilized proficiently, it aids individuals in restructuring their cognitive processes to more effectively handle the difficulties associated with their occupation. The brain's ability to develop, adapt, and change is known as neuroplasticity. Cognitive coaches who specialize in the sports industry exhibit similarities with sports psychologists as they both strive to assist their clients in cultivating greater resilience and mental concentration.

Cognitive Behavior Techniques

Cognitive behavioral approaches, along with behavior-modification measures, are useful in improving program adherence. Cognitive approaches modify behavior by altering individuals' emotions and thoughts. Through the application of cognitive strategies, individuals can effectively recognize and subsequently modify detrimental ideas that hinder their ability to achieve targeted goals. Cognitive approaches can be utilized as standalone intervention tools for modifying behavior or in combination with other tactics for behavior modification.

Cognitive Restructuring

Cognitive Restructuring involves taking a hard look at negative thought patterns. A client may be inclined to overgeneralize, anticipate the worst, or give undue weight to insignificant data. This kind

of thinking can influence the client's actions and possibly turn into a self-fulfilling prophecy. The coach can reframe the flawed beliefs or viewpoints to be more constructive and positive once they are aware of the mental processes. For instance, "I just can't do it, so I completely failed my nutritional goals this past week" can be changed to "That wasn't my best week, but I'm committed to a healthier lifestyle and have succeeded in previous efforts."

Guided Discovery

When engaging in guided discovery, the coach should get to know the client's point of view and pose challenging questions to assist the client in reflecting more critically. The coach should require evidence that confirms and contradicts his or her assumptions. They will have the ability to view things from several angles during the process, particularly ones that may not have been obvious. This will enable the coach to select a more productive course.

Journaling and thought records

The Coach may request that the client compile a record of negative thoughts that arose during the intervals between sessions, along with alternative positive thoughts that can be chosen instead. Documenting thoughts and behaviors implemented since the previous session is another writing exercise. Documenting their progress can assist a client in acknowledging the extent of their personal growth.

Activity scheduling and behavior activation

Scheduling a task that the client tends to procrastinate or avoid due to fear or anxiety can be beneficial. Once the weight of making a decision is lifted, they are more inclined to implement their plans. Engaging in planning activities can facilitate the development of positive routines and create abundant chances to apply acquired knowledge.

Behavioral Experiments

Behavioral studies commonly address anxiety disorders characterized by negative thinking. Prior to undertaking a task that typically induces anxiety in the client, the coach should prompt them to create a prediction about the outcome. Subsequently, discussion can occur about the accuracy of the prediction. Over time, the client may gradually realize that the anticipated event is highly improbable, leading to a decrease in fear. Progressive relaxation strategies, such as employing deep breathing exercises, reducing muscle tension, and using mental imagery, can effectively reduce stress levels.

Successive Approximation

Successive approximation is a strategy that includes dividing complex activities into smaller, more manageable parts in order to make them easier to accomplish. Each subsequent step builds upon the preceding steps, resulting in a gradual increase in confidence.

Goal-setting

Goal-setting is a very efficient and user-friendly cognitive-behavioral strategy. The activity program must consistently incorporate goal-setting to achieve maximum effectiveness. It is essential for clients to maintain constant awareness of their objectives. It is important to refrain from establishing an excessive number of goals. By ensuring that the number of goals is limited and achievable, the coach avoids burdening the client. Setting both short- and long-term goals is critical. To ensure that goal-setting is an effective strategy for behavior change, coaches should regularly monitor and modify the goals to guide efforts and encourage perseverance.

Client Cognition

The way clients view their lives and health conditions influences their emotions and behaviors. When clients see something that contradicts their preconceived notions, they may get disheartened or upset. For example, they may think that exercising and dieting will be simple. Recognizing even small victories could encourage clients to keep going.

Cognitive Distortions

An exaggerated pattern of thinking or viewpoint that isn't supported by facts is known as a cognitive distortion. As a result, perceptions are altered to see things differently or more optimistically than they actually are. Put another way, cognitive distortions are the false beliefs that the mind perceives about the environment. Negative beliefs provide false confidence to undermine achievement setting the stage for failure, such as "I always fail" or "I never finish what I start," etc. Positive but false beliefs, like "I am usually right," hinder success by avoiding necessary assistance. Additionally, coaching can prevent failures caused by grandiose thinking and an exaggerated perception of one's own worth, particularly in relation to others.

How Health & Fitness Coaches react to their clients may be shaped by their own personal views, assumptions, and perspective. Consequently, knowing one's own cognitive biases is essential for being an effective coach.

One way to learn to recognize when thoughts are misleading is to explore cognitive distortions. Once you've identified the source of negative feelings and actions, it is essential to reframe and redirect their thoughts to reduce their effect. Successful people avoid becoming victims of their own success or failure by changing their perspective, in which coaches can provide support.

Coaches can determine the necessary steps to achieve the desired outcomes by using a set of questions. Briefly specify the objective, the current challenges (both emotional and physical), and the desired outcome. The foundation of this approach is guided discovery, in which a Health & Fitness Coach uses a sequence of questions to help their client become more self-aware of their thoughts and, in essence, alter their way of thinking.

Together with a solid foundation of knowledge about behavior-change techniques, coaching for lifestyle and weight control involves empathy, emotional intelligence, and communication skills. First and foremost, the Health & Fitness Coach is a change agent whose main goal is to support clients in their pursuit of a healthier lifestyle, especially with regard to weight management and health-related habits.

Cognitive Factors

Health & Fitness Coaches must be able to communicate to their clients how internal ideas, or perceptions, influence behavior. Rationally emotive behavior therapy was established by Albert Ellis (Ellis, 1994; 1962; Ellis & Harper, 1961). Aaron Beck (1975) and David Burns (1980) later developed the technique. Currently, most people refer to this method of behavioral modification as coaching. Ellis' technique gives the coach the knowledge and hands-on approach needed to utilize a client's thoughts in a way that is immediately useful.

According to Ellis, beliefs—rather than the actual external circumstances people encounter—determine how people feel and act. An external event occurs first. The client then has a thought about that event, which is frequently illogical, distorted, or incorrect. The belief about the occurrence of that event subsequently triggers an emotional reaction, which in turn prompts responsive behavior.

For example, a client has been considering starting a weight-loss program on a doctor’s recommendation. The client believes that it will not be successful because of past failures. This results in feelings of failure and depression. As a result, the client does not attempt to move into the planning or action stages of behavioral change.

Cognitive distortions refer to detrimental or unreasonable habits of thinking. These negative cognitive processes can have a significant impact on reducing motivation, decreasing self-worth, and increasing the incidence of depressive disorders, feelings of anxiety, and substance misuse.

There are 10 cognitive distortions that might contribute to depression, anxiety, or anger. These emotions can hinder the client's success in implementing a healthy behavior-change plan (Burns, 1980).

- ***Discounting the positives*** - a cognitive distortion where one disregards or undermines positive experiences or events that have occurred. Ascribing a favorable result to "luck." It bears resemblance to the concept of mental filtering, however, instead of passively disregarding the positive aspects.
- ***Overgeneralization*** - occurs when a rule is formed based on a single incident or a sequence of coincidences, leading to the frequent use of terms like "always" or "never" as the

foundation for incorrect ideas. Familiarity with a specific event unfolding in a specific manner leads to assumptions that all subsequent events will result in the same outcome.

- ***All-or-nothing thinking*** - often referred to as black-and-white thinking or polarized thinking, is a cognitive pattern characterized by the tendency to view situations in extreme terms without considering any compromises or alternative viewpoints.
- ***A mental filter*** - a cognitive bias that involves selectively focusing on negative aspects of a situation while ignoring positive elements. It is the reverse of overgeneralization, but it can lead to similar bad outcomes. The mental filter selectively ignores any information that contradicts a particular idea, leading to flawed generalizations based only on that incorrect perception.
- ***Magnification or minimization*** - the act of amplifying the significance of flaws and issues while downplaying the relevance of good attributes. This cognitive distortion, comparable to mental filtering and dismissing the positive, entails amplifying negative attributes while downplaying favorable ones.
- ***Labeling*** - a cognitive distortion characterized by forming a judgment about oneself or another person based on their actions rather than recognizing that these actions do not determine their character or identity. Instead of acknowledging an error, it highlights one's shortcomings. The client holds the belief that their lack of skill inevitably leads to making mistakes, rather than just acknowledging when they have made an error.
- ***Jumping to conclusions*** - presuming that others are reacting adversely or arbitrarily making negative predictions about outcomes without any basis for these perceptions.
- ***Should Statements*** - include the word "should," which can elicit feelings of worry or anxiety and lead to a sense of guilt or failure. The sensation of constant obligations produces an ongoing feeling of inadequacy.
- ***Personalization and blame*** - assigning blame for an action for which one was not solely responsible or to others while ignoring the ways in which one's own attitudes and actions may have contributed to an issue.
- ***Emotional reasoning*** - is the process of self-evaluation focusing solely on feelings as an indicator. This line of reasoning presupposes that the presence of a negative emotion implies an accurate representation of reality. If sensations of guilt exist, then emotional reasoning presupposes that those negative qualities are genuine, reasoning that "I perceive myself as a failure, therefore I must be one."

Using techniques developed by Burns (1980), the Health & Fitness Coach may assist the client in challenging illogical beliefs about themselves, exercise, weight loss, or any health or fitness-related plan. These techniques may include the following:

- **Examine the evidence** - Assist the client in looking into the supporting evidence for their illogical thinking rather than taking it at face value.
- **Socratic Method** - Ask the client a series of questions designed to point out the contradictions in their illogical ideas.
- **Technique for the experiment** - Assist the client in designing an experiment that will verify the veracity of his or her illogical belief in a manner similar to how a scientist would verify a hypothesis.

Ask the client what they mean when they say that they are a failure or fail all the time. Inquire as to whether they fail at something or everything. In the event that the client admits that they fail at some things some of the time, the coach might clarify that this is a universal human experience.

Transtheoretical Model (Stages of Behavioral Change)

Despite a considerable deal of study on the elements influencing "change behavior," one model stands out as the change agent. One of the simplest filters to use is understanding human behavior, thanks to the transtheoretical model (TTM) and its simple steps toward change. The TTM phases consist of:

1. Precontemplation
2. Contemplation
3. Preparation
4. Action
5. Maintenance

Stages of Change

There are five stages of behavioral change: Precontemplation, Contemplation, Preparation, Action, and Maintenance.

Precontemplation

At this stage, most people are inactive and have not even thought about starting an activity program. These people may even downplay the significance or usefulness of engaging in physical activity since they do not perceive it as relevant to their lives. Encouraging the client to consider change is the Health & Fitness Coach's primary objective. A suitable strategy might be to ask the client what benefits they perceive from changing.

Contemplation

At this point, people are still sedentary. They are nevertheless beginning to recognize the value of exercise and the consequences of inactivity. They're still not ready to fully accept change, though. The health and fitness coach should encourage the client to weigh the benefits and drawbacks of making a positive behavioral adjustment.

Preparation

At this stage, they emotionally and physically get ready to commit to an exercise program. People in this stage engage in some physical activity. Walking occasionally or even going to the gym can be considered an activity during the preparation stage, but it's still erratic. Individuals that are in the planning phase are prepared to embrace and maintain an active lifestyle. The Health & Fitness Coach should encourage the client and begin to formulate a plan for changing their lifestyle for the better and overcoming obstacles.

Action

People who are in this stage have been physically active on a regular basis for less than six months. At this point, the Health & Fitness Coach's assistance is essential. Setting specific objectives enables the client to track their progress. The Health & Fitness Coach should emphasize long-term benefits, maintain social support, be as encouraging as possible, and keep providing assistance when challenges arise.

Maintenance

Participating in physical activity on a regular basis for more than six months characterizes this stage. In a sense, this is just the action stage repeated. Here, preventing relapse is paramount. It is essential for the client to remain focused on the dangers of regressing. Internal incentives will assist the client in resisting the need to go back to previous patterns. With ongoing support and by investigating the client's potential responses to temptations to find reinforcement in unhealthy behaviors and confront relapse, the Health & Fitness Coach assists the client in maintaining the altered behavior.

Process of Change

The second part of the TTM comprises the methods of change employed to transition from one stage to the next. Particular personal choices and emotional states, such as motivation and preparation, determine each transition's unique set of procedures. Finding out each client's present stage is the first step. If someone is probably not in the precontemplation stage if they are in a fitness facility or have contacted one. A Health & Fitness Coach should be able to determine the stage of change that a person is in at the present and select the best intervention by listening to the questions that people ask and the hesitations that they have. Any intervention should have the overall aim of moving the person to the next phase of change.

Self-efficacy

Self-efficacy, the third element of the TTM, is essential for lifestyle modification since it has a high correlation with program acceptance and continuation.

Albert Bandura, a psychologist, first defined self-efficacy as "an individual's belief in his or her capacity to execute behaviors necessary to produce specific performance attainments" (Carey & Forsyth, 2009). It is believed that self-efficacy beliefs affect behavior and cognitive processes. Furthermore, Bandura (1986) found a favorable correlation between motivation and self-efficacy.

It is essential to remember that prior performance experience is the most significant and potent predictor of self-efficacy. As a result, someone who has previously been successful in implementing and sticking to a regular exercise program will be more effective at being active going forward. The established correlation between self-efficacy and the stage of change suggests that enhancing self-

efficacy could aid the client in moving through the stages. This is particularly crucial for those who are contemplating or preparing because they want to become active and are striving to get to the point where they can become active on a regular basis.

Throughout the stages of transformation, there is an inverse relationship between two characteristics of self-efficacy; i.e., confidence and temptation. That is, when confidence is low, temptations can become overwhelming, whereas when confidence is high, temptations have a lower attraction. The Health & Fitness Coach can tell if a client is progressing through the stages of change by observing positive changes in their decision-making process and self-efficacy, notably in resisting temptation.

People who have a high sense of their own abilities are more likely to persevere through difficulties and complete a program. People who have low self-efficacy are more likely to give up when faced with difficulty.

Bandura identified four sources of self-efficacy:

- **Mastery Experiences** - are the most powerful and efficient means of developing self-efficacy. A proficient Health & Fitness Coach assists their client in recognizing and acknowledging even their most minimal progress. Coaching can assist clients in reframing their tendency to underestimate their own achievements.
- **Vicarious Experience** - also known as role modeling, can be obtained through the observation or collection of knowledge about another person's achievements. Observing someone else who is effectively following a similar program can boost a client's self-efficacy when they begin a new lifestyle-modification program, especially if they believe that person to be similar to themselves.
- **Verbal or Social Persuasion** - refers to the use of feedback or motivational comments to influence an individual. If these comments come from a respected and trustworthy source, they are more likely to influence self-efficacy.
- **Psychological Cues** - refer to a client's evaluation of their own physiological condition in relation to their involvement in a program. This evaluation can sometimes result in inaccurate views. These evaluations prompt individuals to form assessments of their capacity to effectively cooperate. It might be as straightforward as perceiving an increased heart rate or sweating as a poor physiological condition. Engaging in physical activity after a period of inactivity will undoubtedly elicit unusual physiological reactions. Perceiving them in a negative light will result in a drop in self-efficacy. It is essential to observe and instruct clients about the common physiological reactions that take place during physical activity and encourage positive interpretations of these responses.

Decisional Balance

Decisional balance is the concluding element of the TTM, which represents the number of pros and cons that an individual perceives in relation to implementing an activity program (Janis & Mann, 1979). In the process of making any decision, individuals evaluate the advantages and disadvantages of each option. The same is true for physical activity. Health & Fitness Coaches must recognize that the decision to engage in physical activity must be of value to an individual.

Precontemplators and contemplators perceive more disadvantages (e.g., pain, time consumption, and cost) associated with engaging in regular physical activity than advantages.
The balance of advantages and disadvantages changes as individuals advance through the stages of change, resulting in a perception of more pros than cons among those in the action and maintenance stages. This shift in decisional balance is evident in the latter stages.

As people move through the stages of change, there is a natural shift in the balance of their decision-making, which suggests that altering people's views about being active could encourage them to begin an activity program. Health & Fitness Coaches must apply the proper change processes associated with transitioning from one stage to the next when attempting to alter people's decision-making balance. For instance, a coach working with a precontemplator or contemplator should stress the many different and all-encompassing advantages of physical activity and refrain from disputing what the client believes are drawbacks to beginning an exercise program. Misinformation and inexperience are frequently the causes of the drawbacks that people who don't exercise perceive.

Ultimately, it's critical to discuss the immediate and long-term benefits. A Health & Fitness Coach aims to highlight not only the long-term weight-loss advantages of an activity program but also the immediate benefits, such as increased energy levels and an enhanced emotional state.

It is essential to acknowledge that relapse can happen at any point in the TTM, including the maintenance stage. Any alteration in an individual's life, such as relocation, beginning education, changing jobs, or experiencing an injury, has the potential to cause a relapse into a sporadic or complete absence of activity. The dedication of individuals who engage in regular exercise over an extended period of time should not be presumed since their behavior can shift and they may experience a return to previous habits at any moment.

Medical Connection

It is necessary to reiterate that the Health & Fitness Coach lacks formal medical training and is not a licensed physician or psychologist. The Health & Fitness Coach may lack the authority to make judgments typically assigned to these professions. The purpose is to collaborate with and seek guidance from these professions when they encounter individuals with clinical disorders such as depression, obesity, or other medically linked issues.

A prominent trend in the realm of health and fitness is the advancement of the medical fitness discipline. Integrated health and fitness centers are becoming increasingly popular, creating a rapidly expanding field where Health & Fitness Coaches are highly regarded members of the professional team. Physicians are increasingly recommending physical activity and Health & Fitness Coaching to clients who are experiencing chronic conditions, need physical therapy or post-surgery treatment, or have several risk factors such as aging, obesity, and a sedentary lifestyle.

For the Health & Fitness Coach, it is beneficial to form connections with other specialists in the growing field of behavioral health research and application. Initiating the establishment of a network of medical fitness facilities, physicians, physical therapists, and other health professionals is a worthwhile approach. The Health & Fitness Coach must comprehend the sequence of care, commencing with a primary care physician, progressing to a physical therapist, and subsequently transitioning to a post-rehabilitation or post-medical care expert, before ultimately reaching the Health & Fitness Coach.

Participating in regional conferences and seminars, enrolling in auxiliary courses, and actively engaging in health-promotion programs are additional methods for a Health & Fitness Coach to establish connections with medical fitness professionals. Therefore, they establish themselves as an essential component of the referral system.

Initiating contact with schools, local community organizations, hospitals, physicians, physical therapists, and medical fitness facilities in a proactive manner is an effective approach to gaining entry into the healthcare network system. Useful means of initiating communication could be brochures, pamphlets, social media, mail, and personal encounters.

IFA Fitness Forms

Fitness Evaluation – Part 1

Medical History

Test Evaluator:			Test Date:
Client:	Sex: M F	Birthdate:	Age:
Height:	Weight:	Desired Weight:	

Check all that apply:

	Arthritis		Asthma, emphysema, bronchitis
	Back pain		High blood pressure
	Knee or other joint pain		Coronary Disease
	Shin Splints		Heart Disease
	Foot Pain		Any known heart problems
	Muscle Pain		Stroke
	Other Pain		Epilepsy
	Light-headedness or Fainting		Are you diabetic
	Chest pain at rest or exertion		Hypoglycemia
	Shortness of Breath		Are you pregnant
	Hernia		Family history of Coronary disease before 55
	Do you smoke or use tobacco		History of Atherosclerotic disease before 55
	Elevated Triglyceride Levels		Surgeries, Hospitalization
	Elevated Cholesterol, LEVEL:		Doctor's Physical, DATE:

List current medications:
List current supplements:
Additional Notes:

Fitness Evaluation – Part 2

Pulmonary Function

RESTING HR:	Resting BP:	Max HR:

Respiratory Function

Forced expiration vol (1 sec) (Fev.1.0) ml	Forced expiration vital capacity (FVC) ml

Body Composition - Anthropometric Measurements

WOMEN	Measurement (in.)	MEN	Measurement (in.)
Abdomen		Right Upper Arm	
Right Thigh		Abdomen	
Right Forearm		Right Forearm	

Body Composition – Skinfold Test

	Trial 1	Trial 2	Trial 3	AVERAGE	% Body Fat
Chest					
Triceps					
Subscapular					
Suprailiac					
TOTAL					

Flexibility Test

	Trial 1	Trial 2	Trial 3	BEST	RATING
Sit and Reach					

3-Minute Step Test

HR Before	HR After	HR 1 min After	RATING

Fitness Evaluation – Part 3

Muscular Strength Test

EXERCISE	1 RM (lbs)
Bench Press	
Biceps Curl	
Leg Curl	
Leg Extension	
Leg Press	

Postural Assessments

Lordosis - lower back arched inward.	Normal	Y	N
Kyphosis - upper back rounded outward.	Normal	Y	N
Scoliosis - curving of the spine to the side.	Normal	Y	N
	Right shoulder	Y	N
	Left shoulder	Y	N

Leg Length Discrepancy	Even	Y	N
	Less than 1/4 inch	Y	N
	More than 1/4 inch	Y	N

Daily Fitness Inventory

Client Name:	Start Date:

Basal Metabolic Rate (BMR) Calculator

Activity Level	High	Medium	Low
BMR = WT x 10.8	BMR x 1.5	BMR x 1.4	BMR x 1.3
Daily Calories Required			

Daily Caloric Intake

Date							
	Calories	Calories	Calories	Calories	Calories	Calories	Calories
Breakfast							
Lunch							
Dinner							
TOTAL							
Weight (Morning)							
Waist Size (Inches)							
Cardio (Minutes)							
Cardio Pulse							
Resting Pulse							
Blood Pressure							

Cardiovascular Activity Progress

Client:	Age:	Target Heart Rate (HR):

				Before		During Exercise			1 m. after	
Date	Waist	Weight	Resting Heart Rate	BP	HR	H:MM	BP	HR	BP	HR

Workout Room Progress Sheet 1

Client Name:	Trainer:

CHEST

Date												
	WT	Rep	WT	Rep	WT	Rep	WT	Rep	WT	Rep	WT	Rep
Flat Bench Press												
Flat Bench Flye												
Inclined Press												
Inclined Flye												
Pushup												
Hi Cable Crossover												
Lo Cable Crossover												
Pec Deck												

BACK

Date												
	WT	Rep	WT	Rep	WT	Rep	WT	Rep	WT	Rep	WT	Rep
Shrugs												
One Arm Row												
Pull Ups												
Back Extension												
Seated Row												
Lateral Pull Down												
Pec Deck (Rear)												

Workout Room Progress Sheet 1 Continued

SHOULDER

Date												
	WT	Rep	WT	Rep	WT	Rep	WT	Rep	WT	Rep	WT	Rep
Overhead Press												
Lateral Raises												
Front Raises												

ABDOMEN

Date												
	WT	Rep	WT	Rep	WT	Rep	WT	Rep	WT	Rep	WT	Rep
Upper Crunches												
Lower Crunches												
Side Crunches												

Workout Room Progress Sheet 2

Client Name:	Trainer:

ARMS

Date												
	WT	Rep	WT	Rep	WT	Rep	WT	Rep	WT	Rep	WT	Rep
Biceps Curl												
Concentration Curl												
Hammer Curl												
Reverse Curl												
Triceps Kickback												
Triceps Dip												
Lying Triceps Ext												
Cable Push Downs												
Wrist Curls												

Workout Room Progress Sheet 2 Continued

LOWER BODY

Date												
	WT	Rep	WT	Rep	WT	Rep	WT	Rep	WT	Rep	WT	Rep
Squats												
Front Lunges												
Calf Raises												
Hip Abduction												
Hip Adduction												
Cable Hip Ext												
Leg Press												
Leg Extension												
Hamstring Curl												

CARDIOVASCULAR WORKOUT IN MINUTES

Date						
Stair Master						
Bicycle						
Treadmill						
Cardio Class						

Senior Fitness Assessment Results

Client Name:	Trainer:

Date:	Height:	Weight:	Age:	Male___ Female___

FLEXIBILITY TEST

TEST	SCORE	BELOW AVERAGE	AVERAGE	ABOVE AVERAGE
Chair Seat and Reach				
Back Scratch				

BALANCE TEST

TEST	SCORE	BELOW AVERAGE	AVERAGE	ABOVE AVERAGE
Dynamic Gait Index				

CARDIOVASCULAR TESTS

TEST (only one test req'd)	SCORE	BELOW AVERAGE	AVERAGE	ABOVE AVERAGE
Six-Minute Walk				
Two-Minute Step				

STRENGTH TEST

TEST	SCORE	BELOW AVERAGE	AVERAGE	ABOVE AVERAGE
Chair Stand				
Arm Curls				

Client Contract

By signing this document, I acknowledge that I have voluntarily chosen to participate in a program of progressive physical exercise. I also acknowledge that I have been informed of the need to obtain a physician's examination and approval prior to beginning this exercise program. In signing this document, I acknowledge being informed of the strenuous nature of the program and the potential for unusual, but possible, physiological results including but not limited to abnormal blood pressure, fainting, heart attack or even death.

I also understand that I may stop any training session at any time. By signing this document, I assume all risk for my health and well-being and any resultant injury or mishap that may affect my well-being or health in any way and hold harmless of any responsibility, the instructor, facility or persons involved with the program and testing procedures.

Personal Training Terms and Conditions

The client must reschedule or cancel session at least 24 hours in advance. Failure to do so will result in loss of that session, as well as, the cost of that session.

Clients who arrive late will receive only the remaining scheduled session time.

No personal training refunds will be issued for any reason, including but not limited to relocation, illness, and unused sessions.

Program Description and Goals:

Total Cost: _____

Method of Payment: _____

_____
Participant's name (print clearly)

_____ Date: _____
Participant's signature

_____ Date: _____
Parent/Guardian's signature (if required)

Physician's Release Form

I have examined _____
Client's Name

I have found the following:

____ The above named may participate fully in a progressive physical activity program consisting of **cardiovascular, strength** and **flexibility** training without limitation.

or

____ The above named may participate in a progressive physical activity program with the following limitations:

Also,

Please list any medications that your patient is currently taking that may affect heart rate or blood pressure response to exercise (elevating or suppressing). If none, write “NONE".

_____
Physician's Name (print clearly)

_____ Date: _____
Physician's Signature

Physician's Introduction Letter

Dear Dr. _____

I would like to kindly present myself to you for your consideration as a resource for referrals in order to assist your patients who require health and fitness coaching, weight management, or both as part of their overall care. In addition to my accreditation as a Health & Fitness Coach from the International Fitness Association, I recently received my certification as _____

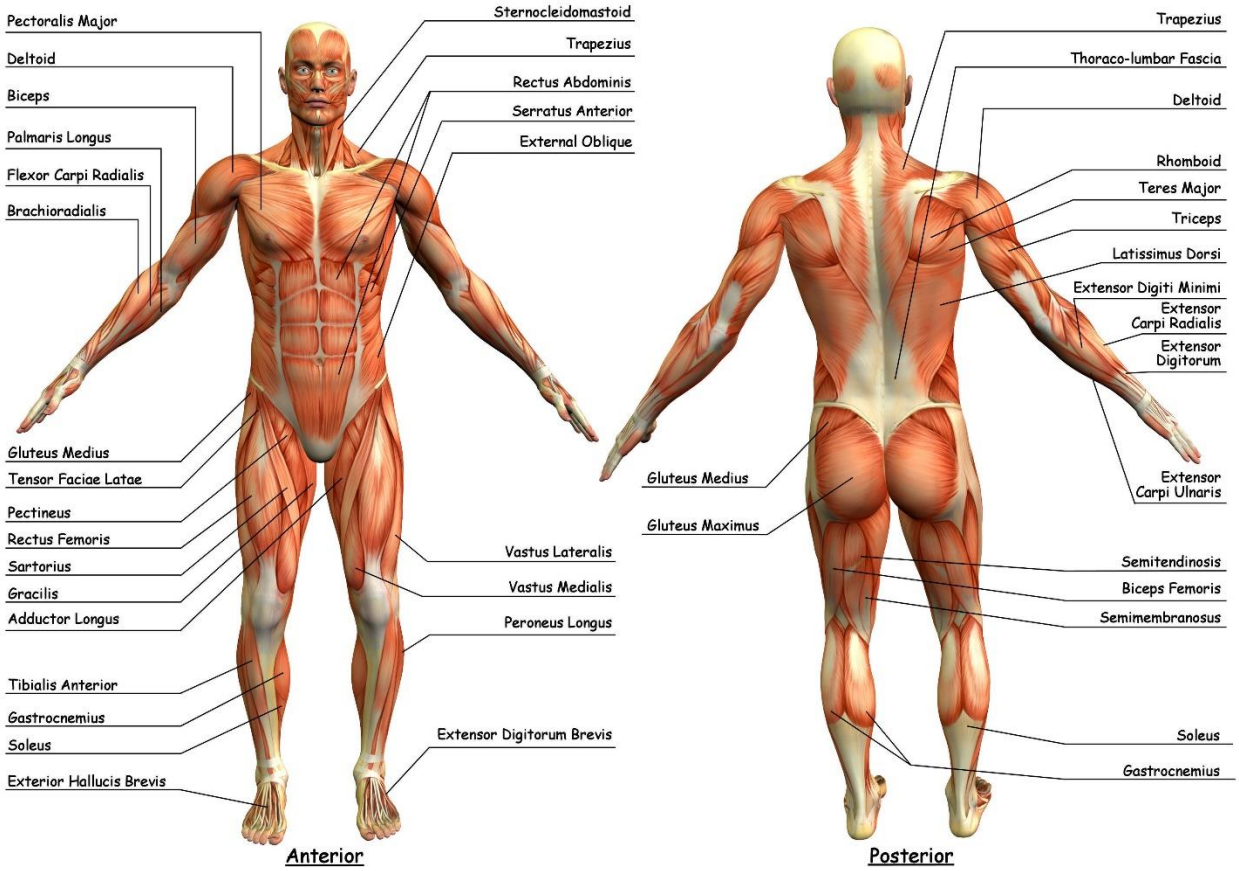
With my specialized training, I am ready to collaborate with you to create effective, well-rounded weight-management plans that incorporate exercise, diet, and lifestyle modifications for your patients. Through my training, I have been able to gain an understanding of the psychological aspects of weight management, the physiological and biomechanical effects of obesity, methods for lifestyle coaching that help with behavior modification, the role that exercise and nutrition play in weight control, and exercise programming and weight-management strategies and progressions.

I'll give your office a call later this week and would like to drop by to introduce myself to you and your team. Please find my business card and a leaflet outlining the support I can provide for your patients' care enclosed.

Thank you very much.

(Your Name), IFA certified Health & Fitness Coach

Anatomy Chart



Charts courtesy of **INTERNATIONAL FITNESS ASSOCIATION**. - www.ifafitness.com

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