

The CFES Fitness Knowledge Course Student Resource Manual

10th Edition



Advancing the Standards in Fitness Leadership Training Since 1980.



Canadian Fitness
Education Services



The CFES Fitness Knowledge Course



Welcome to the CFES Fitness Knowledge program and resources. Our primary learning objective is to provide the reader sufficient knowledge about how your body functions; the importance of an active lifestyle; and how to develop a progressive exercise program for a lifetime. Your learning will cover:

- An Introduction to the Fitness and Active Health Industry
- Bones, Joints and Skeletal Muscles
- How to Analyse Muscles in Movement
- How to Design an Active Daily Lifestyle and Progressive Exercise Regime
- Exercise Effectiveness and Safety for a Variety of Ages and Stages
- Training Principles and Application for Cardiorespiratory Fitness, Muscular Strength, Endurance and Flexibility
- Energy Systems and their Application to Movement
- Nutrition Basics and How to Maintain a Healthy Body Composition
- An Introduction to Becoming a Leader

We have designed this program for the young to mature adult. Some readers will take this program for personal advancement, some will be teachers absorbing this information into a curriculum course for high school, college or university students, while others will be taking it as the first step in becoming a national certified fitness instructor. This course meets National and International leadership certification standards.

Whatever your intended purpose, some readers may feel a little overwhelmed with all the information presented. Please relax — you will be amazed how much of this content you already know. This resource has been written in a progressive fashion, designed to build your knowledge and skill step by step. Take it one chapter at a time and be patient with your learning results. Consider this resource a handy lifetime reference — one you can grow into over the years.

Your enrolment indicates you have made an important step in your personal health and well being — congratulations! By accomplishing this program you are giving yourself a lifetime gift of priceless knowledge and skill. As you gain confidence in its application you will naturally be able to assist others. Share what you learn! Your enthusiasm and assistance could well save and extend someone's life.

Employment predictions indicate career opportunities for health and fitness leaders will grow substantially in the next decade. Some of you will be motivated to become a leader of others — there is certainly a great need. Keep in touch along the way and let us know if you would be interested in becoming a CFES Educator. We would welcome your presence.

I would like to sincerely thank with great appreciation the numerous individuals (listed on the inside cover) who have assisted in the production of The CFES Fitness Knowledge resources. Without your diligence, persistent wisdom and enthusiasm these resources would not have been possible. Secondly I would like to thank my family — Morrie, Max and Michael Zaitlin and numerous friends, for all of their patience and encouragement along the way.

In closing I would like to thank you the reader and student of our program. I anticipate by your personal example you will be an inspiration and a motivator for many in your life. All the very best with your learning journey and for a healthy, productive and peaceful life!

Yours sincerely,

Maggie

Margaret Hewitt-Zaitlin, BA/BPE
Executive Director, CFES

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Chapter 1



Active Health and Fitness

Learning Objectives:

- 📖 Fitness, Wellness and Active Living
- 📖 Physical Fitness
- 📖 Benefits of Fitness
- 📖 Barriers to Fitness
- 📖 Promoting Lifestyle Change
- 📖 Health Initiatives
- 📖 Trends in Fitness and Active Living

Active Living

What is Active Living ?

“A way of life in which physical, social, mental, emotional and spiritual activities are valued and are integrated into daily living.” (Active Living Coalition for Older Adults)

Wellness

Wellness is a state of overall health, where all the dimensions of fitness are being attended to and functioning well. It involves a holistic approach to one's health and is achievable through active living.

Wellness — the Dimensions of Fitness

Physical

The physical dimension includes the five components of fitness and it represents how well the body's systems are functioning. Physical fitness is affected by level of activity, diet and rest. This dimension is the main focus of this manual.

Emotional

The emotional dimension includes an awareness and understanding of ourselves and our emotions. It is affected by our life experiences, our ability to cope with stress and our level of self-awareness, self-acceptance and self-esteem.

Spiritual

The spiritual dimension involves our sense of connection with ourselves and our life purpose. It can also be a connection within a religious community or with a higher power. Spiritual fitness includes self-acceptance, love, compassion, a willingness to give, inner joy and peacefulness and it is affected by lifestyle, religious background and beliefs.

Mental

The mental dimension involves our intellectual activities, thoughts, opinions and attitudes. It requires an ability to concentrate and is affected by our lifestyle and environmental surroundings.

Social

The social dimension involves our sense of connection with others, with groups or communities. It includes healthy relationships with family and friends and loved ones and it is affected by our experiences, our culture and our lifestyle.

To affect these dimensions in a meaningful way, we need to first become aware of them and then strive to make the changes necessary to ensure a healthy balance between them. Being totally fit and well isn't possible if we neglect any one main dimension. Balance is the key. When balance is achieved, improved total fitness, or wellness will result.

Promoting Healthy Lifestyles

We all have a responsibility to take care of ourselves, each other and the environment. Individuals need to develop healthier lifestyle habits and skills. Program administrators and fitness leaders need to develop and market the right programs to encourage participation and government, non-profit and private institutions must collaborate on large scale health initiatives to help motivate and activate the nation.

Healthy Lifestyle Habits

Each individual, no matter what age or stage, is capable of learning and practicing healthy habits which would include:

- Emotionally, mentally and physically managing daily stress
- Communicating assertively
- Setting goals
- Learning about how the body functions
- Following a safe, effective exercise program
- Cooking healthy, balanced meals
- Getting enough rest

Promoting Lifestyle Change

It is difficult for people to make significant changes to their lifestyle. It requires first of all the desire to change, then the inspiration to take the initial steps. Once started, it's easier to continue with support from others and direction from a personal plan. According to Corbin and Lindsey the following factors can help make behaviour change successful.

Self Management Skills

- a) goal setting (targeting realistic, specific results)
- b) program planning (choosing the right activities that suit the individual)
- c) time management (scheduling the time for exercise)
- d) personal contracts (making the commitment to change)

Self Awareness

In planning and embarking on an exercise program it's helpful to consider one's age, health status and personal preferences for activities. We are more likely to continue a program if it suits our needs and interests.

Support

We are much more likely to succeed if we have support from family and friends, if we have a workout partner or group to participate with, and if there are some rewards built into the plan.

Tolerance

Understanding and accepting the fact that there will be setbacks is important. Planning how to handle these times is important in reducing the likelihood that a set back will cause the person to quit.

Step One: Educate and Activate

Fitness Leaders can play a key role in helping people become more active. If people are unaware of the problem, then the first step is to teach them about fitness and active living and how to apply this knowledge to their own situation. This should be done with compassion and

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Chapter 2



The Skeletal System

Learning Objectives:

- 📖 **An Introduction to the Human Body**
- 📖 **The Structure and Function of Bones**
- 📖 **The Skeletal System**
- 📖 **Bones of the Body**
- 📖 **The Structure and Function of Joints**
- 📖 **Joints and Their Actions**



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An Introduction to the Human Body

Welcome to the world of human anatomy, and physiology. You are quickly going to discover how phenomenal your body really is and how much there is to know about the physical house you were born in and live in every day.

Anatomy: The science and relationships of the body's structures.

Physiology: The science of how the body functions.

Exercise Physiology: The study of how the body responds to exercise.

Organizational Levels of the Body

The body is comprised of six interconnecting levels of organization.

Chemical: Chemicals are atoms and molecules involved in various reactions in the body (e.g. water, hemoglobin).

Cellular: Cells are combinations of molecules with a common purpose (e.g. fat cells, red blood cells).

Tissue: Tissues are groups of cells with a common purpose or function (e.g. skin, muscle, connective tissue).

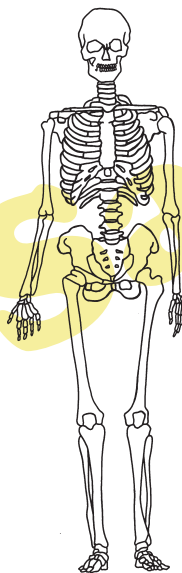
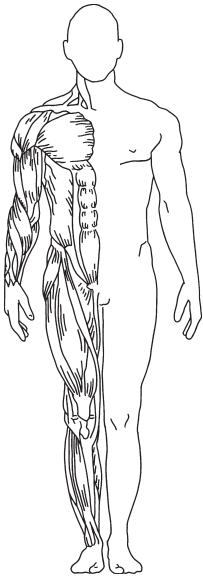
Organ: Organs are made of two or more tissues which work together to perform various functions in the body (e.g. lungs, liver, intestine).

System: Systems are groups of organs working together for specific purpose (e.g. respiratory system, digestive system, nervous system).

Organism: Organism refers to the whole body, where all levels work together to create a relatively stable environment, a state of homeostasis, which is necessary for life.

Anatomical Position

When discussing the anatomy, or parts of the body, it is important to understand the anatomical position and the terminology used to describe the body and how it moves. The anatomical position is the universally recognized reference position when discussing the body. It is an upright standing position with the palms open and facing forward.



The Skeletal System

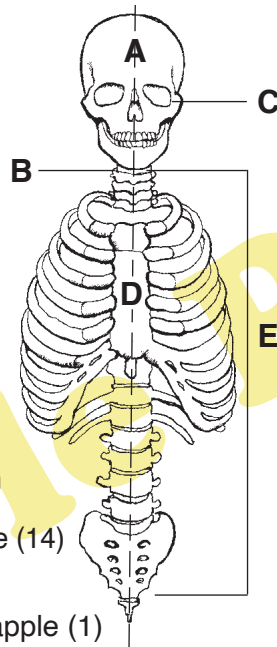
Classification of the Skeleton

There are two types of skeleton in the body, the axial and the appendicular.

A. Axial Skeleton — The bones arranged along the longitudinal axis of the body are called the axial skeleton. It is the primary support structure of the body and consists of 80 bones.

B. Appendicular Skeleton — The appendicular skeleton contains the bones of the appendages or limbs. It allows for movement of the body and consists of 126 bones.

The Axial Skeleton



Axial Skeleton

A. Skull
cranium (8), face (14)

B. Hyoid
above Adams apple (1)

C. Auditory Ossicles
ear bones (6)

D. Thorax
sternum (manubrium, body, xiphoid process) (1),
ribs (24)

E. Vertebral Column
cervical, thoracic, lumbar, sacrum, coccyx (26)

Appendicular Skeleton

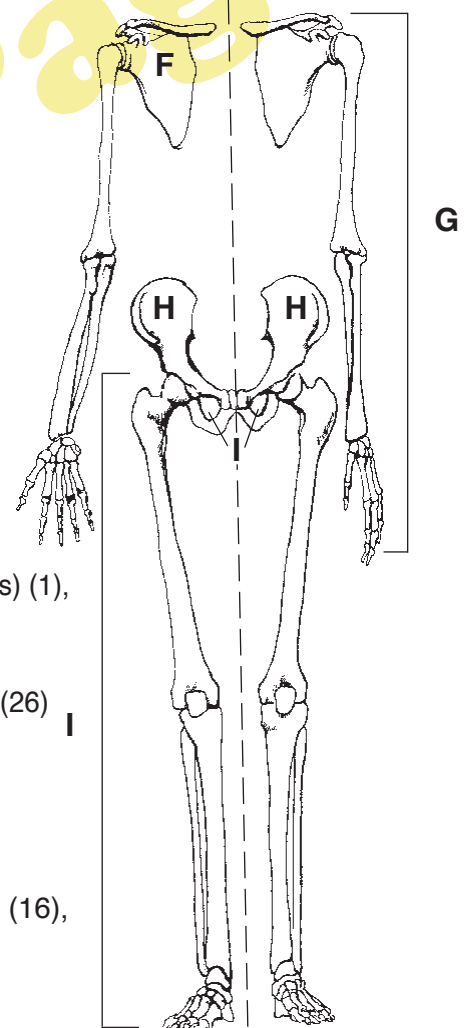
F. Shoulder Girdle (Pectoral Girdle)
clavicle (2), scapulae (2)

G. Upper Extremities
humerus (2), ulna (2), radius (2), carpals (16),
metacarpals (10), phalanges (28)

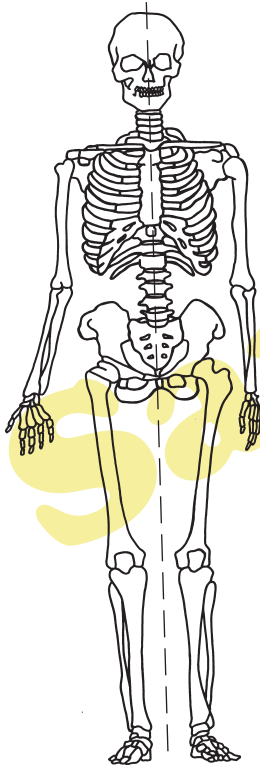
H. Pelvic Girdle
hip, pelvic or coxal bone (2)

I. Lower Extremities
femur (2), tibia (2), fibula (2), tarsals (14),
metatarsals (10), phalanges (28)

The Appendicular Skeleton



Anterior view



Axis:

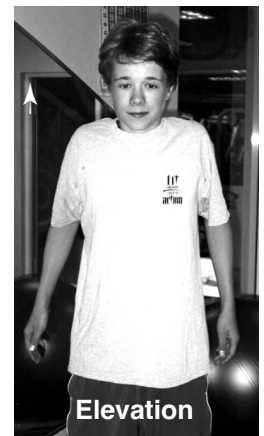
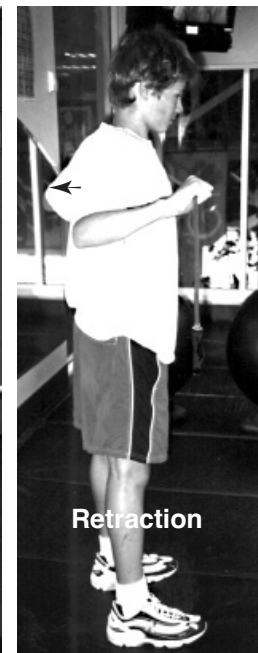
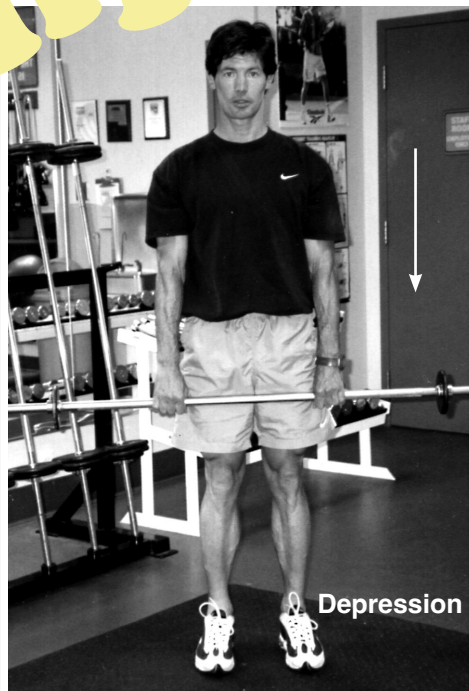
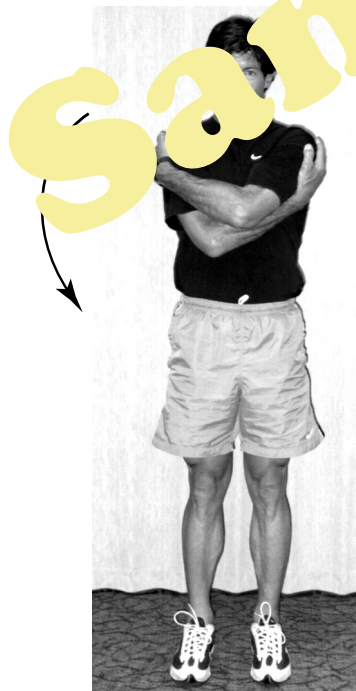
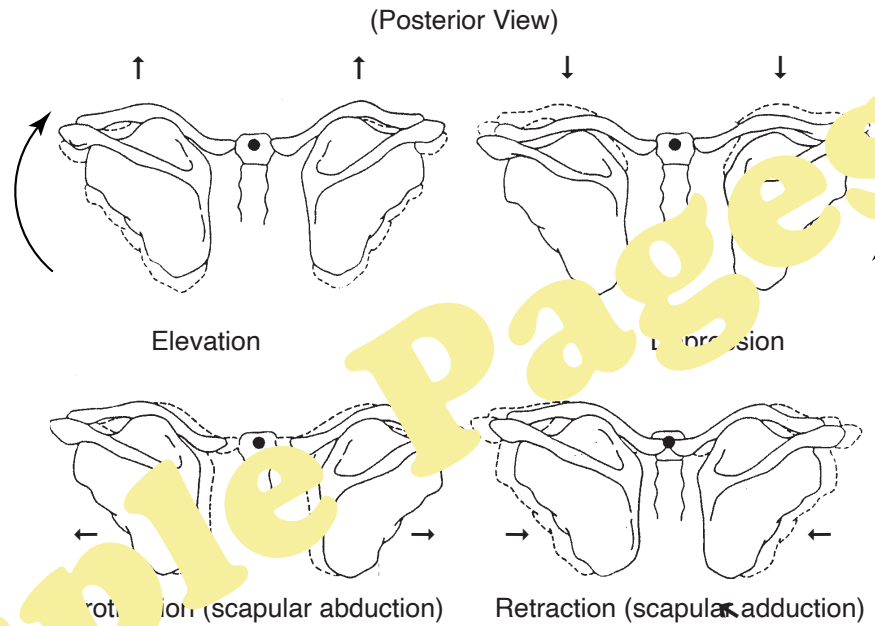
Is a vertical line that runs from the top of the head to the space between the feet, through the body's centre of gravity.

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Main Joints of the Upper Body			Table 2.2
Joint	Type	Action	
Neck	Condylloid between the occipital and atlas (first cervical vertebrae)	Flexion - Extension Lateral Flexion	
	Pivot between the atlas and axis (second cervical vertebrae)	Rotation	
Spine	Cartilaginous between the bodies of the vertebrae	Slight movement between vertebrae	
	Gliding between the articular processes of the vertebrae	Flexion - Extension Lateral Flexion Rotation	
Shoulder Girdle	Saddle between the clavicle and sternum	Elevation - Depression Protraction - Retraction Circumduction	
	Gliding between the clavicle and scapula		
Shoulder	Ball and Socket between the humerus and scapula	Flexion - Extension Abduction - Adduction Transverse Abduction - Adduction Circumduction Rotation	
Elbow	Hinge between the humerus - radius - ulna	Flexion - Extension	
Radioulnar	Pivot between the radius and ulna	Pronation Supination	
Wrist	Condylloid between the radius and carpals	Flexion - Extension Abduction - Adduction	
Main Joints of the Lower Body			
Joint	Type	Action	
Hip	Ball and Socket between the coxal bone and femur	Flexion - Extension Abduction - Adduction Transverse Abduction - Adduction Circumduction Rotation	
Pelvis	Cartilaginous Gliding between the lumbar and sacrum (lumbosacral)	Posterior + Anterior Pelvic Tilt	
	Gliding between sacrum and coxal bones (sacroiliac)	None or slight	
Knee	Modified Hinge between the femur and tibia	Flexion - Extension Slight rotation	
Ankle	Hinge between the tibia - fibula and talus	Plantar flexion Dorsiflexion	
	Gliding between the tarsals	Inversion Eversion	

Actions of the Shoulder Girdle

- Elevation
- Depression
- Protraction (abduction)
- Retraction (adduction)
- Upward or superior rotation
- Downward or inferior rotation
- Circumduction



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Chapter 3



The Muscular System

Learning Objectives:

- 📖 **An Introduction to Muscles**
- 📖 **Principles of Muscle and Joint Action**
- 📖 **Anterior Skeletal Muscles**
- 📖 **Posterior Skeletal Muscles**
- 📖 **Detailed Muscle Charts**
- 📖 **Know What's Moving**
- 📖 **Major Muscle Pairs**

Introduction to Muscles

There are over 650 muscles in the body, which make up approximately 36 per cent of body weight for women and 42 per cent for men. Voluntary muscles are under conscious control (you lift your arm when you want to), whereas involuntary muscles (like the heart muscle) contract without any conscious effort.

There are three main types of muscle; smooth, cardiac and skeletal. Humans rely on 430 voluntary skeletal muscles for control of body movement and 220 involuntary muscles for control of bodily functions.

Function of Muscle

Motion — Skeletal muscles control the main movements of the body and they require nervous stimulation to contract. Some movements take days or months to coordinate (e.g. learning to swim front crawl) whereas others occur without any conscious thought (breathing).

Stabilization — Postural skeletal muscles are constantly contracting to stabilize the body either in stationary positions (sitting or standing) or in motion (walking or running). The deepest layers of muscle (those closest to the spine) play a key role in this function.

Heat Production — Muscles contribute to one half of the body's energy use at rest and they produce most of the body's heat. Since heat is a by-product of muscular contraction, we produce more heat when exercising and less heat when sleeping. Shivering is the contraction of many muscles and is the body's natural method of producing more heat to keep warm.

Regulation and Transportation — Smooth muscles help control the transportation of substances through the body. Circular smooth muscle tissue called sphincters can open and close outlets to various organs, regulating the volume of material entering and exiting. Blood flow is regulated by blood vessels which enlarge (vaso-dilation) and shrink (vaso-constriction).

Types of Muscle Tissue

Smooth Muscle

Smooth muscle is so named because of its smooth appearance (no cross-striations) under a microscope. Smooth muscle is usually located in the walls of hollow organs such as the urinary, digestive, respiratory and reproductive ducts, blood vessels and gastro-intestinal tract. It functions to help move materials (urine, food, feces, blood etc.) through these organs. Smooth muscle is under involuntary nervous control.

Cardiac Muscle

Cardiac muscle, as its name suggests, is the muscle tissue of the heart. It is striated, meaning it has many cross-striations which are observable under a microscope. It functions to control the rhythmic beating of the heart (which forces blood to the lungs and to the rest of the body). Cardiac muscle is under involuntary nervous control and it beats at an average rate of approximately 70 beats per minute. If removed from the body and bathed in a specific chemical solution, cardiac muscle fibres will continue to contract independently.

Skeletal Muscle

Skeletal muscle is composed of hundreds to thousands of cells called fibres. Skeletal muscles shape the body and lie in layers identified as superficial

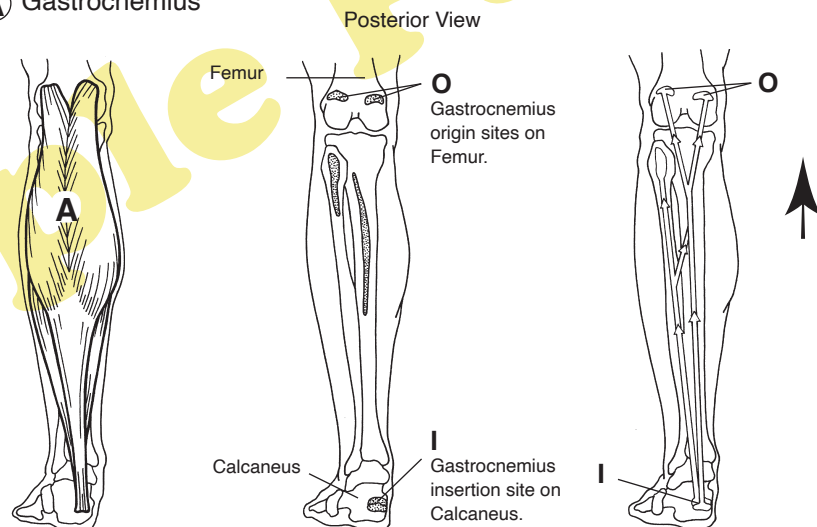
(closer to the skin) and deep (closer to the skeleton). This tissue is striated and is under both voluntary and involuntary nervous control. Skeletal muscle contractions are rapid and strong compared to cardiac and smooth muscle contractions (which are slower and less forceful).

Principles of Muscle and Joint Action

Muscles attach to the skeleton by way of tendons. For each muscle, there are two main attachment sites. The proximal attachment (closer to the midline) is called the point of origin and the distal attachment (further from the midline) is called the point of insertion. Muscles can cross one or more joints. When they contract, they shorten to pull the point of insertion towards the point of origin (in most cases), thus causing movement at the joint (or joints). When they are stretched, the insertion moves away from the origin.

Figure 3.1

A Gastrocnemius

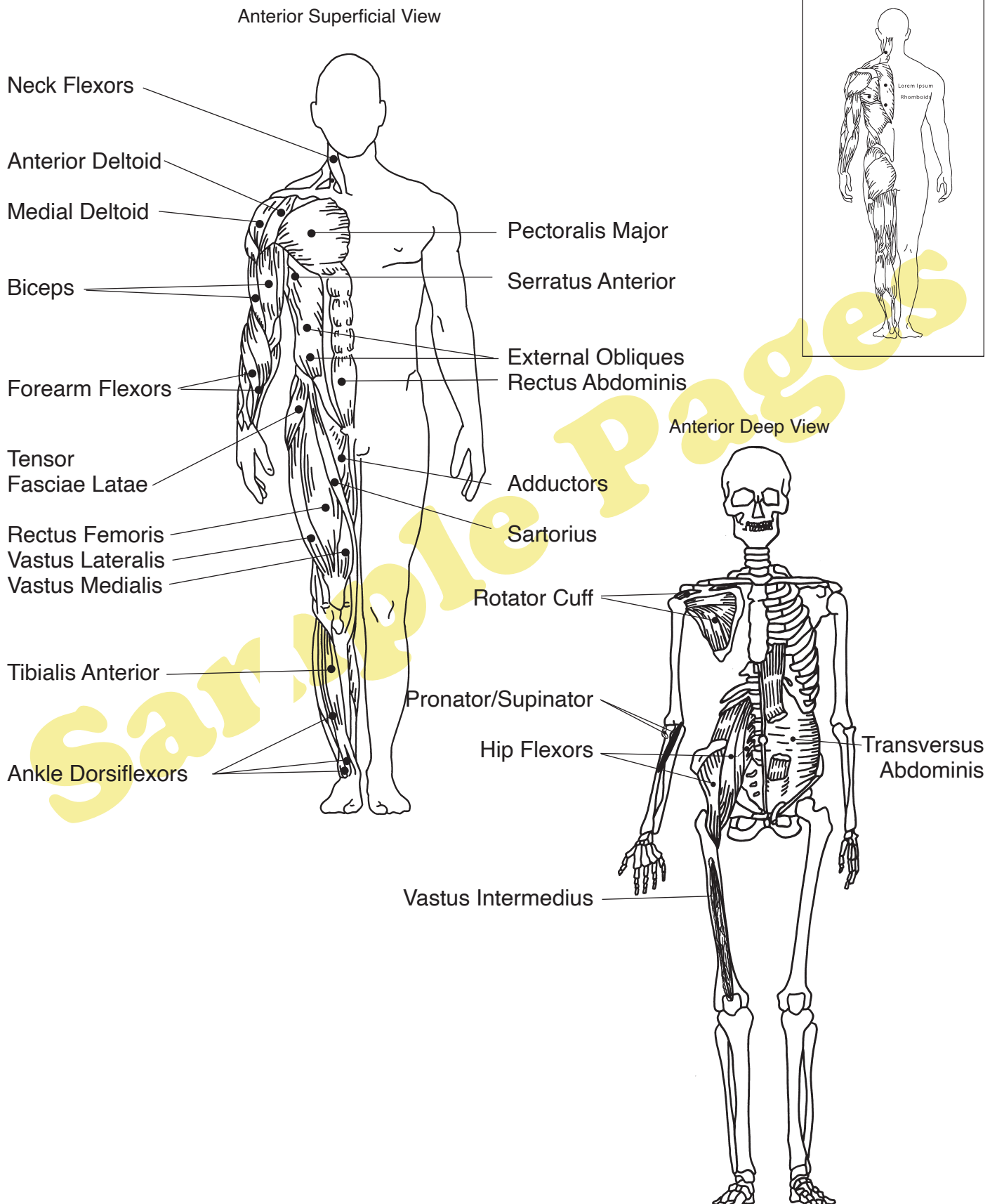


The first illustration is of the gastrocnemius (calf) muscle.

The second illustration shows the origin, “O”, which is above the knee on the femur, and insertion, “I”, which is on the calcaneus, or heel.

The arrows in the third illustration show the direction of movement when the muscle contracts. The heel is pulled upwards towards the knee. If the movement occurs at the knee, it will be knee flexion. If the movement occurs at the ankle, it will be *plantar flexion*.

The Anterior Skeletal Muscles



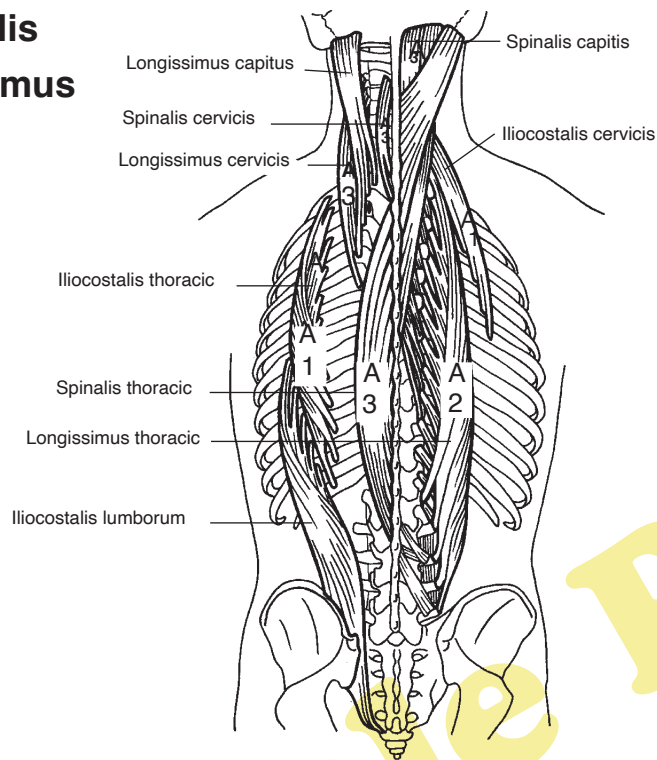
Muscles that Act on the Spine

A *Erector Spinae Group

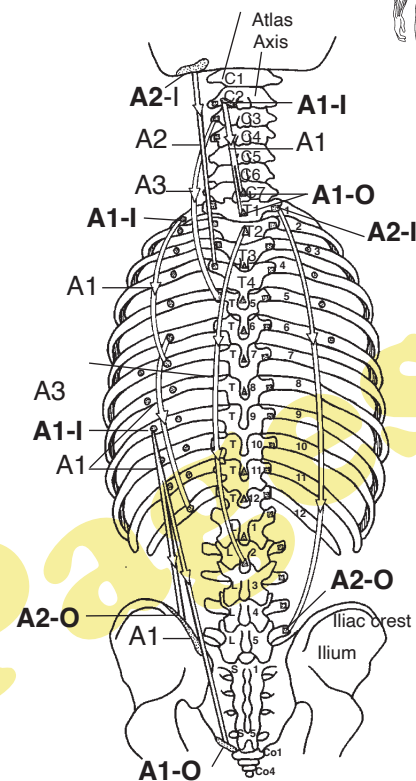
① Iliocostalis

② Longissimus

③ Spinalis



Posterior View



Muscle	Origin	Insertion	Action of Contraction	Exercise
A. Erector Spinae Group 1. Iliocostalis Group • Iliocostalis Cervicis • Iliocostalis Thoracic • Iliocostalis Lumborum	Upper six ribs, Lower six ribs, Iliac crest	Fourth to sixth cervical vertebrae Upper six ribs, Lower six ribs	Extension, hyperextension and lateral flexion of spine	Contract
2. Longissimus Group • Longissimus Capitis • Longissimus cervicis • Longissimus Thoracis	Lower four cervical vertebrae and first four thoracic vertebrae Fourth and fifth thoracic vertebrae Lumbar vertebrae	Mastoid process of temporal bone Second to sixth cervical vertebrae Thoracic vertebrae, lumbar vertebrae and ribs		Stretch
3. Spinalis Group • Spinalis Capitis • Spinalis Cervicis • Spinalis Thoracis	Sixth or seventh thoracic vertebrae and lower cervical vertebrae Seventh cervical vertebrae Upper lumbar, superior and lower thoracic vertebrae	Occipital bone Axis Upper thoracic vertebrae		

Major Muscle Pairs

Table 3.2

Joint Area	Flexors	Extensors	Abductors	Adductors
Neck	Sternocleidomastoid	Upper Erector Spinae Splenius		
Spine	Rectus Abdominis *Obliques	Erector Spinae		
Shoulder	Pectoralis Major Anterior Deltoid	Latissimus Dorsi Posterior Deltoid	Medial Deltoid	Latissimus Dorsi Pectoralis Major
Elbow	Biceps Brachii Brachialis Brachioradialis	Triceps Brachii		
Hip	Iliopsoas Sartorius *Rectus Femoris	Gluteus Maximus *Hamstrings	Tensor Fasciae Latae Gluteus Minimus Gluteus Medius	Adductors (5 muscles)
Knee	Hamstrings *Gastrocnemius	Quadriceps		
Ankle	Tibialis Anterior (Dorsiflexion)	Gastrocnemius and Soleus (Plantar flexion)	Peroneals (Eversion)	Tibialis Anterior Tibialis Posterior (Inversion)

*These muscles are assisting.

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Chapter 4



Muscle Structure and Function

Learning Objectives:

- 🍷 **Structure of Skeletal Muscle — A Microscopic View**
- 🍷 **Muscle Fibre Characteristics**
- 🍷 **The Neuromuscular Connection**
- 🍷 **The Sliding Filament Mechanism of Muscular Contraction**
- 🍷 **Types of Muscular Contraction**
- 🍷 **Types of Muscle Fibre**
- 🍷 **Factors Affecting Muscle Performance**
- 🍷 **Muscle Fibre Adaptations to Training**

Structure of Skeletal Muscle

In Chapter 3, we learned about the different types of muscles in the body, including their location and basic function. Next we will take a closer look at skeletal muscle fibres, to learn how they actually contract and the factors affecting the amount of force they can generate.

We will begin, therefore, with a look at the structure of muscle fibres and the connection between the muscle and the nerves.

Skeletal muscle can be analysed by looking at the muscle as a whole and then breaking it down into its' smaller components or layers. Each layer of muscle tissue is surrounded by a wrapping of connective tissue, or fascia, much like a wrapping of cellophane. These many layers of fascia come together at the ends of the muscle and extend beyond to form the tendon sheaths, or tendons (A), which attach the muscle to the periosteum of the bone.

The main bulk of the muscle is called the muscle belly (C) and it is wrapped in connective tissue called the epimysium (B). Within the muscle belly are smaller bundles of muscle fibres, called fasciculi (D), and these are wrapped in the perimysium. The individual muscle fibres or muscle cells (E) are no larger than strands of hair and are surrounded by the endomysium and sarcolemma. Each muscle fibre is made up of smaller myofibrils (F) which extend the entire length of the fibre.

The myofibrils contain the contractile components of the muscle, the myosin (G) and actin (H) protein filaments or myofilaments. Actin is thin and light in colour while myosin is thick and dark. They interlink repeatedly along the myofibril, giving the muscle a striated look. Each actin filament contains a Z-disc, (dense connective tissue regions shaped like pancakes) which divide the myofibril into compartments known as *sarcomeres* (the area between two Z-discs).

It is within the sarcomeres that the contraction or shortening occurs, so the sarcomere is known as the main *contractile unit* of muscle fibre.

Muscle Fibre Characteristics

Muscle fibres share four common characteristics:

Excitability — they can be stimulated by nerves

Contractility — they can contract or shorten

Extensibility — they can be stretched or lengthened

Elasticity — they can return to their resting length after they've been stretched

Zones and Bands in Skeletal Muscle

Sliding Filament Mechanism of Muscular Contraction

When a motor nerve is stimulated by the brain, the electrical impulse travels to the motor units, spreading into the muscle fibres. This causes a release of calcium ions into the sarcomere, the contractile unit. The calcium ions stimulate the myosin filaments to release ATP energy and it is this energy that allows the myosin cross-bridges to bind with the actin (repeatedly binding, pulling and releasing in a stroking action) to pull the actin and Z-discs towards the centre of the sarcomere. This *shortening* of the sarcomeres occurs throughout the myofibrils and the entire muscle fibre contracts. In a maximal contraction the distance between the Z discs can decrease 50 per cent.

At rest and in the absence of electrical stimulation, the myosin cannot bind with the actin and the muscle returns to its normal resting state.

Figure 4.3

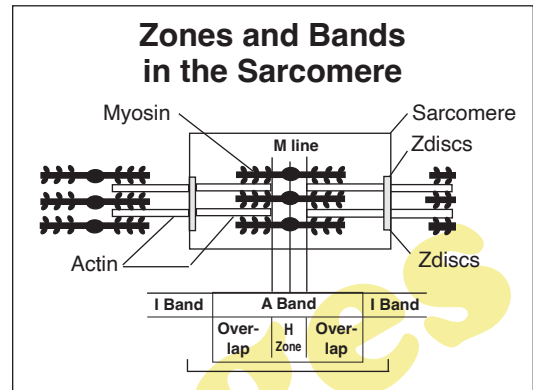
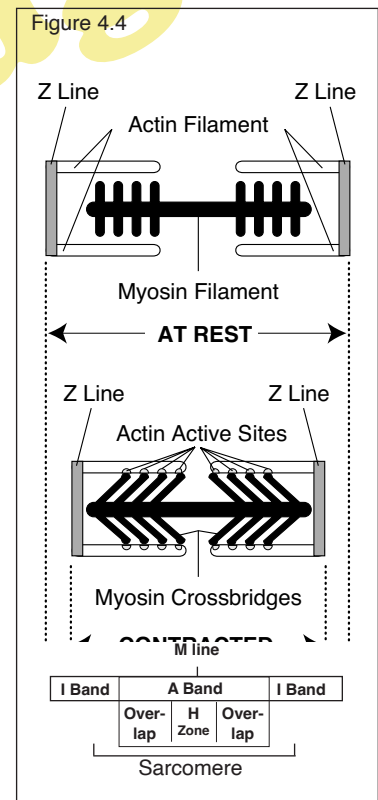


Figure 4.4



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Chapter 5



Principles of Human Movement

Learning Objectives:

📌 Movement Analysis

- Prime Mover, Assisting, Opposing, Stabilizer
- Single Joint/Multi-Joint Movements

📌 Biomechanical Principles

- Force
- Resistance
- Velocity
- Levers
- Gravity
- Stability

📌 Posture

- Postural Analysis
- Correcting Common Postural Problems
- Postural Stabilization



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Analyzing Movement

Analyzing Multi-Joint Movements

There are two basic approaches to analysing compound movement.

Method One:

In this approach, the joint movements are identified and the muscles which control these movements are considered the prime movers of the exercise. See the following example.

Analyzing a Lower Body Multi-Joint Exercise

1. Draw a picture or perform the movement (*e.g. a squat*).
2. Identify the working phase and releasing phase.
 - (a) working phase (positive or concentric phase) — *raising up from the squat.*
 - (b) releasing phase (negative or eccentric phase) — *lowering the body into the squat.*
3. Identify the joint movements in the working phase — *hip extension and knee extension.*
The muscles that cause these joint movements, *the gluteus maximum and the quadriceps, are the prime movers.*
4. Identify any other muscles that assist these joint movements.
The other muscle that performs hip extension, *the hamstrings, would be considered an assisting muscle.*
5. Identify the joint movement opposite to the primary joint movement — *hip flexion.* The muscles that cause this movement, *the hip flexors, are the opposing muscles.*
6. The stabilizers are those muscles which contract to hold the working limb still (*the gluteus medius and minimus*) and/or the body still (*the abdominals and erector spinae*) during the exercise.



Squats

Method Two:

In this approach, the more proximal joint movement is considered *primary* and the more distal movement is considered *secondary*. The muscle causing the primary joint movement is considered the prime mover while the muscle causing the secondary joint movement is considered the assisting muscle. See the following example.

Deep Spinal Stabilizers

Transversus Abdominis

Internal Obliques

Multifidus

Quadratus Lumborum

Postural Stabilization

The idea behind postural stabilization is that one consciously sets the body into proper (neutral) alignment and then actively contracts the body's core muscles to maintain that alignment. These are isometric contractions which hold the spine still and stable while the body or limbs are moving.

Core Muscles Involved in Postural Stabilization

The deepest muscles, those closest to the spine, are the ones most involved in stabilizing the spine. They include the Transversus Abdominis and the Internal Obliques on the anterior side and the Multifidus and Quadratus Lumborum on the posterior side. These muscles stabilize the pelvis, low back and spine and they provide support to the internal organs by pulling the belly in.

The next layer of muscles are more superficial. They are important for both stabilization and movement and they include:

Neck Flexors and Extensors — which hold the head and neck in a neutral position.

Erector Spinae and Rectus Abdominis — which hold the spine in a neutral position.

Lower and Mid Trapezius, Rhomboids and Serratus Anterior — which stabilize the shoulder girdle.

Postural Stabilization Training

Training the core muscles requires an ability to isolate and control their contraction. This is fairly easily done with the superficial muscles, but more difficult with the deeper layer. The first step in stabilization training, therefore, is to practice finding and contracting these deep muscles while sitting, standing and lying.

The transversus is found by placing the hands on the belly and then extending the exhalation, pulling the belly towards the spine. Then it's important to learn to consciously contract this in isolation from other muscles.

The multifidus is found by standing and placing the thumbs close to the spine in the low back. Then contract the transversus abdominis and try to contract the multifidus at the same time. If this is difficult, hold one arm straight out in front of the body and perform a gentle bouncing with this arm. The other hand should be able to feel the contraction of the multifidus on the opposite side of the low back. Then practice consciously contracting this muscle.

Stabilization training can be done by reducing the base of support in any exercise, for example doing a balancing exercise or using an unstable surface like an exercise ball. It can also be done by consciously lengthening the spine and contracting the deep layer of stabilization muscles during more traditional abdominal and back exercises.

On the following pages are some examples of effective postural stabilization exercises.

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Chapter 6



Training Principles and Program Design

Learning Objectives:

- 📖 **Exercise Physiology**
 - Energy Metabolism
 - Energy Systems
 - Fuel for ATP Production
 - Steady State, Oxygen Debt and Deficit
 - Recovery from Exercise
 - Training the Energy Systems
- 📖 **Master Training Principles**
 - S.A.I.D.
 - Specificity
 - Progressive Overload
 - Recuperation
 - Training Threshold
 - Target Training Zones
 - F.I.T.T (Frequency, Intensity, Time and Type)
- 📖 **Training Cycles and Adaptations**
 - Training Cycle
 - Ceiling Effect
 - Maintenance
 - De-Training
- 📖 **Program Design**

Energy for Exercise

This chapter will cover the physiological processes that occur during exercise and the fundamental principles that apply to all training programs. First, a look at energy metabolism and the various systems that provide the energy for exercise. Then, the process of training and the guidelines that can be used to create programs that are specific to the energy systems and the components of fitness being targeted.

Exercise Physiology

During exercise, there is an increase in demand for oxygen. The body responds by increasing the rate of breathing (to bring more oxygen into the body) and by increasing the heart rate (to bring more blood to the muscles).

To keep the muscles contracting during exercise requires ATP. A small amount, about ten percent of what the body uses, is stored and immediately available for use in the muscles. The rest, however, must be produced or *metabolized* by the breakdown of nutrients (primarily fats and carbohydrates) that are consumed in the diet. These nutrients are broken down into their smallest structures during digestion and circulated in the blood as free fatty acids (fats) and glucose (carbohydrates). These nutrients are transferred into the muscles through the walls of the capillaries (the smallest blood vessels in the circulatory system) which surround each fiber. Once in the muscle fiber, these nutrients can be used to produce ATP.

Energy Metabolism

The production of ATP is called *energy metabolism*. It occurs in the muscle fibre through chemical reactions which transfer food energy into chemical energy. The amount and rate of ATP required depends on the activity being performed. Slower, less intense activities (walking, playing the piano) require smaller amounts and a slower rate of ATP while faster, more intense activities (running, playing water polo) require larger amounts and a faster rate of ATP. It is the amount and rate of ATP that determines whether the body will produce ATP aerobically (with oxygen) or anaerobically (without oxygen).

Aerobic Metabolism:

Aerobic metabolism is the production of ATP in the presence of oxygen. Most of the ATP in the body is produced this way.

Anaerobic Metabolism:

Anaerobic metabolism is the production of ATP without oxygen. This occurs when the body needs a rapid burst of ATP for higher intensity exercise.

Master Training Principles

Master Training Principles are guidelines that apply to all forms of physical training, regardless of the component of fitness being focused on. These principles provide a framework for determining what kind of activity to do, how often to do it, at what intensity and for how long. The more one adheres to these principles, the better the quality and potential results of the program.

Specific Adaptation to Imposed Demand (S.A.I.D.)

The body will react and respond to a specific type of stress imposed on it. If an individual performs regular aerobic exercise over a period of time his/her cardiorespiratory system will respond by becoming more efficient (more fit). Similarly, if an individual performs a regular stretching program over a period of time, his/her flexibility will improve. The various systems of the body will adapt, but the adaptations are always dependent on the specific type of training undertaken.

Specificity

As mentioned above, the improvements gained are specific to the activity or training by which they were incurred. Training must therefore be relevant to the activity and take into consideration many factors, such as:

- the type of exercise or activity
- the energy systems involved
- neuromuscular pathways/system (muscles and nerves required)
- speed of movement
- range of motion (ROM)

Progressive Overload

As the body adapts to an imposed physical stress, it eventually reaches a plateau. To experience further improvements, the intensity of training must be progressively increased (e.g. the stair effect). If the intensity of the stress is gradually increased, the body adapts in a positive way. If the intensity is increased too abruptly, the body will react negatively and tissue damage or injury may occur. Increases should be gradual, therefore, by no more than 10 percent at a time and should involve only one variable at a time (intensity, duration, load). It's important that volume (days per week) and duration (time of each session) be increased before intensity (how hard the training is).

F.I.T.T.

F.I.T.T. is the foundation of program design. It is the formula that guides the direction of your workouts from beginning to advanced levels. It is often referred to as the prescription for fitness and we apply it to all parts of the program design. F.I.T.T. stands for:

F = Frequency; I = Intensity; T = Time; T = Type

Frequency: The number of workouts per week.

Intensity: The degree of effort required. It is expressed differently for each component of fitness.

Cardiorespiratory Exercise: Intensity is expressed as a percentage of the estimated maximum heart rate (how fast the heart is beating)

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Chapter 7



Muscular Strength and Endurance

Learning Objectives:

- 🍷 **Muscular Strength and Endurance Defined**
- 🍷 **Benefits of Muscular Strength and Endurance**
- 🍷 **Resistance Training**
- 🍷 **Types of Resistance**
- 🍷 **Exercise Ideas**
- 🍷 **Training Guidelines**
- 🍷 **Program Design**



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Resistance Training

There are many different methods and formats of resistance training, some requiring specialized weight training equipment and some that can be done at home with no equipment at all.

Equipment-Based Training

This type of training involves lifting, pushing or pulling an object to generate force in the muscles. The resistance is adjusted by increasing the amount of tension or by adjusting the amount of weight being lifted, pushed or pulled.

Resistance equipment is generally classified as either free weights (dumbbells, barbells, medicine balls, rubberized tubing or bands) or weight training machines (pulley and weight stack, computerized, electronic, or hydraulic). Free weights tend to be more functional involving more postural stabilization, whereas machines are easy to use and capable of isolating muscle groups quite effectively.



Body Weight (Manual Resistance) Training

This type of resistance is created manually by moving the body or holding the body still against gravity or in a position of workload. Push-ups, chin-ups, planks and abdominal curl-ups are examples of manual resistance. In these exercises the resistance is adjusted by changing the body position to make the exercise harder or easier. Manual resistance training requires effective postural stabilizing to maintain alignment and ensure proper technique.



Stability Training Equipment

If the focus of training is to improve the body's core strength and stability, equipment such as exercise balls, foam rollers, discs and wobble boards can be used (although one must first be trained in their proper use).

Stability training is based on the concept that by reducing the stability of the training surface (base of support), the body learns to stabilize itself internally. Some equipment like exercise balls, are very adaptable and can be incorporated into regular weight training exercises (doing a dumbbell shoulder press while sitting on the ball) or they can be used to provide direct resistance (squeezing the ball between the legs) or they can be used as a surface for manual exercises (doing an abdominal curl up supine over the ball).



Training Formats

Whole Body

Whole body programs are ideal for clients who can train two or three days a week, working all the major muscle groups each session. Emphasis should be on compound movements, with isolation exercises providing balance to the program. The number of exercises may vary between 6-12, depending on the client. Remember, especially for beginners, it is always better to start with fewer exercises and gradually increase the volume.

Sample Whole Body Program

1. Shoulder Press (shoulders and triceps)
2. Leg Press (hips and knee extensors)
3. Lat Pull Down (back and biceps)
4. Leg Curl (knee flexors)
5. Bench Press (chest and triceps)
6. Seated Row (midback and biceps)
7. Abdominal curls on mat
8. Back extensions on mat

Additional isolation exercises could be added to this program following a few weeks of training in the target zone.

Circuit Program

Circuit programs are also ideal for clients who can train two or three days a week and they're ideal for clients who want to combine cardio exercise with weight training. In circuit training the exercises are performed in sequence, one after the other, with little to no rest between stations. Generally multi-joint exercises are used, alternating between upper and lower body. The repetition

Simple Circuit Program

- | | |
|------------------|-------------------|
| 4. Leg curls | 5. Overhead press |
| 3. Lat pulldowns | 6. Calf raises |
| 2. Squats | 7. Seated row |
| 1. Bench press | 8. Back extension |



Start
Finish

range should reflect the goal of endurance and be based on the level of the participants. Therefore beginners may complete 10-15 repetitions and if they are at the intermediate level, they may complete 12-20 repetitions. Due to the continuous movement between

stations, there will be an increase in heart rate and therefore an accompanying cardiovascular training effect.

Cardio Circuit Training – Circuits can also include timed cardiovascular intervals (usually 45-90 seconds in duration) between each weight training exercise to increase the cardiovascular training effect. These are called super-circuits, cardio-circuits or aerobic circuits.

Time is provided for the client to move between exercises (10-15 seconds) and perform each exercise. Typical cardio stations would be biking, stair climbing, stepping, treadmill running, skipping, rowing, or fitness to music.

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Chapter 8



Flexibility

Learning Objectives:

- 📖 Definition of Flexibility
- 📖 Factors Affecting Flexibility
- 📖 Benefits of Flexibility
- 📖 Physiology of Flexibility
- 📖 Flexibility Training
- 📖 Stretching Methods and Exercises

Methods of Stretching

The Inverse Myotatic Stretch Reflex

This reflex prevents muscle or joint injury when excessive forces are applied through the tendons. The golgi tendon organs (GTO's) are the proprioceptors located in the tendon of skeletal muscle. During forceful contractions or extreme stretches, they fire sending information to the CNS about the degree of tension in the tendon. The brain responds by initiating a relaxation effect on the muscle to decrease that degree of tension.

The Methods of Stretching

The two most common methods of stretching include dynamic (moving), and static (stationary) stretching. Stretching can be done either actively or passively and all forms of stretching are enhanced when preceded with a proper warm-up.

Active Stretching

Active stretching is self-imposed, meaning the participant moves him/herself into the position of stretch. This involves contracting the opposing (antagonist) muscle group to stretch the target muscle group. For example, to stretch the hamstrings and gluts actively, one can lie in a supine position and lift one leg (towards a 90 degree angle at the hip) by contracting the hip flexors (See page 8-9 and 8-10). Active stretching incorporates strengthening around the joint.

Passive Stretching

Passive stretching is externally-imposed, meaning an external force is used to move the body into a position of stretch, this generally results in a deeper position of stretch compared to what would be achieved in an active stretch. This external force could be a partner, an object or surface (wall, chair), gravity, or another part of the body (the arms). To stretch the hamstrings passively, one can lie in a supine position and use the arms to lift the leg into the position of stretch. It is important in passive stretching that the target muscles are relaxed during application of the external force and that the muscles aren't pulled too far into the stretch.

a) Dynamic Stretching

This form of stretching involves movement and is therefore ideal for warm-up and for sport-specific preparation. It could involve steady, rhythmic range of motion (like hip circles, shoulder circles) or more active movements (like kicks and twists) which start of small and become progressively bigger. Dynamic stretching should be specific to the sport or activity and should not be so intense as to fatigue the muscle.

b) Static Stretching

This form of stretching involves a slow controlled stretch where the participant holds the position for a period of time (15-30 seconds). It can be done actively or passively and is highly recommended as an effective stretching method because it doesn't tend to stimulate the stretch reflex, but rather, allows for a gradual increase in tissue length and this increase appears to be more permanent (especially if the muscle is warm).



Summary

Flexibility: Range of motion around a joint

Factors Affecting Flexibility:

Inherent (unchangeable)

- Bony structure of the joint
- Length, pliability and structure of the joint capsule and surrounding ligaments

Non-inherent (changeable)

- Activity
- Injuries
- Muscle extensibility
- muscle temperature
- blood flow to muscle

Benefits of Stretching

- reduced risk of injury
- reduced muscular tension
- reduced low back pain
- improved posture
- improved circulation
- improved performance
- improved mental and spiritual health
- personal enjoyment and gratification

Proprioceptors: Sensory organs, such as muscle spindles and golgi tendon organs, which allow the body's kinesthetic sense to function

Muscle Spindles: Proprioceptors found in the belly of skeletal muscle which provide sensory data to the CNS as to the degree of stretch in the muscle fibres.

Golgi Tendon Organs (GTO's): Proprioceptors found in the tendon of skeletal muscle which provide sensory data to the CNS as to the degree of tension in the tendon.

Myotatic Stretch Reflex: A safety mechanism designed to prevent over-stretching and tearing of muscle fibres. It is initiated by the muscle spindles and involves contraction of a muscle in response to a stretch. The stronger or faster the stretch, the stronger the counterbalancing contraction.

Inverse Myotatic Stretch Reflex: A safety mechanism designed to prevent exposing the tendon to too much tension. It is initiated by the GTO's and involves relaxation of contracted muscle fibres in response to an extreme contraction or extreme stretch.

Flexibility Training Requirements: Adequate frequency, adequate duration, appropriate intensity, adequate increase in muscle temperature

Methods of Stretching:

Active Stretch — self- imposed stretch, usually involving contraction of the opposite muscle group to achieve the desired stretch

Passive Stretch — involves an external force (other body part, partner, wall or gravity) to achieve the desired stretch

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Chapter 9



Cardiorespiratory Fitness

Learning Objectives:

- ❧ **Structure and Function of the Respiratory System**
- ❧ **Structure and Function of the Cardiovascular System**
- ❧ **Cardiac Output, Stroke Volume, Blood Pressure, Valsalva Manoeuvre**
- ❧ **Training the Cardiorespiratory System**
- ❧ **Monitoring Target Heart Rate**
- ❧ **Cardiorespiratory Training Effects**



Anatomy of Heart and Blood Flow Sequence

1a. **Superior Vena Cava:** the major vein which receives deoxygenated blood from the upper body and carries it to the right atrium of the heart.

1b. **Inferior Vena Cava:** the major vein which receives deoxygenated blood from the lower body and carries it to the right atrium of the heart.

2. **Right Atrium:** receives deoxygenated blood from the superior and inferior vena cava; the blood then flows into the right ventricle filling it 70 percent, then the right atrium contracts forcing in the remaining 30 percent.

3. **Right Ventricle:** receives deoxygenated blood from the right atrium and then pumps it to the pulmonary artery.

4. **Pulmonary Artery:** receives deoxygenated blood from the right ventricle and carries it to the lungs for oxygenation.

5. **Pulmonary Vein:** receives oxygenated blood from the lungs and carries it to the heart's left atrium.

6. **Left Atrium:** receives oxygenated blood from the pulmonary vein; the blood then flows into the left ventricle filling it 70 percent, then the left atrium contracts forcing in the remaining 30 percent.

7. **Left Ventricle:** receives oxygenated blood from the left atrium and pumps it to the aorta.

8. **Aorta:** the largest main artery of the body which receives oxygenated blood from the left ventricle and carries it into the arterial system to be distributed through the body.

The Heart

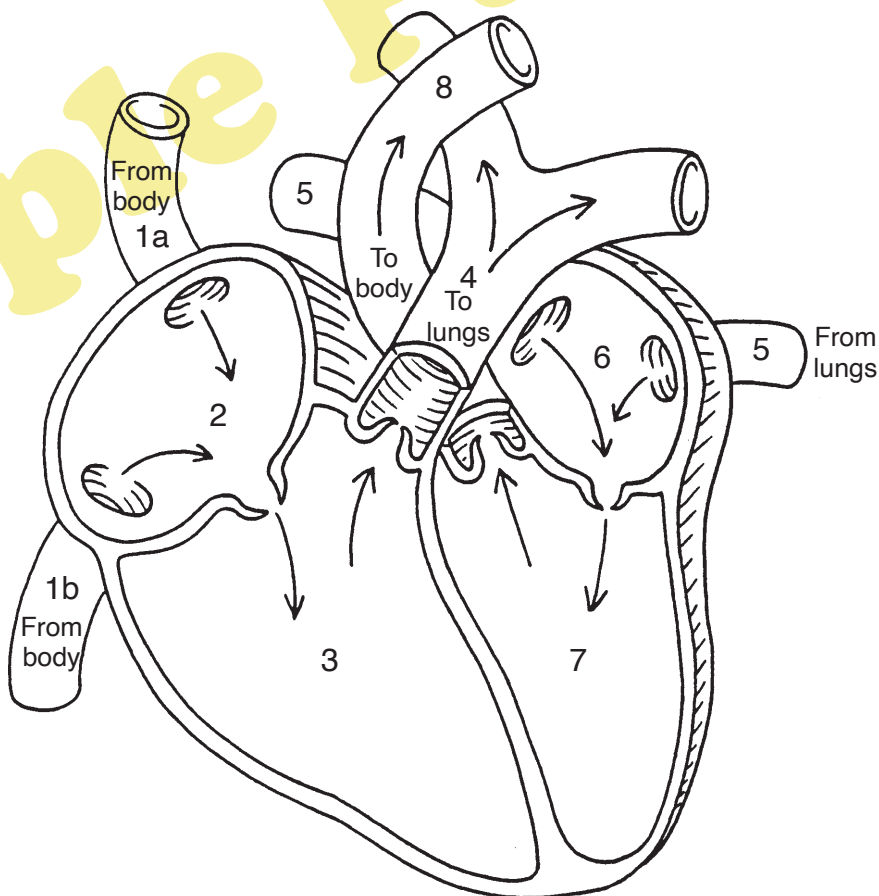
The heart is comprised of cardiac muscle tissue. It is approximately the size of a fist and is located slightly left of the mid-sternum. It has four chambers, the left and right atria and the left and right ventricles. The atria collect the blood and pump it into the ventricles. The ventricles collect the blood and pump it to the lungs and to the rest of the body. This double pumping action is what makes the “thump bump” sound of the heart beat.

The heart pumps an average of 70 beats per minute which translates to over 40 million beats per year. With long-term endurance training, the heart enlarges and thickens (cardiac hypertrophy) and this allows it to pump more blood with each beat.

Anatomy of Heart and Blood Flow Sequence

The diagram illustrates the blood flow sequence through the heart.

Figure A



Training the Cardio- respiratory System

Target Training for Cardiorespiratory Fitness

Table 9.4

	Starting Zone	Target Zone
F	3 x/week	3-5 x/week
I	Elevate Heart Rate to 50-60% MHR	Elevate Heart Rate to 60-90% MHR
T	12-15 minutes	15-60 minutes plus
T	continuous submaximal exercise	continuous submaximal exercise
* This prescription applies to healthy adults only		

Cardiorespiratory fitness can be improved by performing activities which increase the body's demand for oxygen, thereby challenging the heart and lungs. This can either be done by doing continuous activities such as cycling, repetitive intermittent activities such as sprinting, or combination activities such as soccer. The two main classifications of cardiovascular activity are Aerobic and Anaerobic exercise.

Aerobic Exercise

Aerobic exercise is generally continuous and sub-maximal, performed over long periods of time. *LSD*, or long slow distance training, is a form of aerobic exercise which involves high volume, or high mileage, performed at low to moderate intensity. It helps establish a strong aerobic base or aerobic fitness level because the body consumes large volumes of oxygen during training. Aerobic exercise requires 15-60 minutes of continuous activity and should be performed three to five times a week.

Aerobic exercise can also involve intermittent bouts of exercise performed at slightly higher intensity. This *aerobic interval training* consists of shorter distances (less volume) performed at moderately high (but still sub-maximal) intensity. In these longer intervals, a work to rest ratio of 1:1 is recommended. For example, alternating three to five minutes of running (at a good pace) followed by three to five minutes of walking or easy jogging. This higher intensity puts a little more stress on the cardiorespiratory system and helps improve aerobic power, muscular strength and speed.

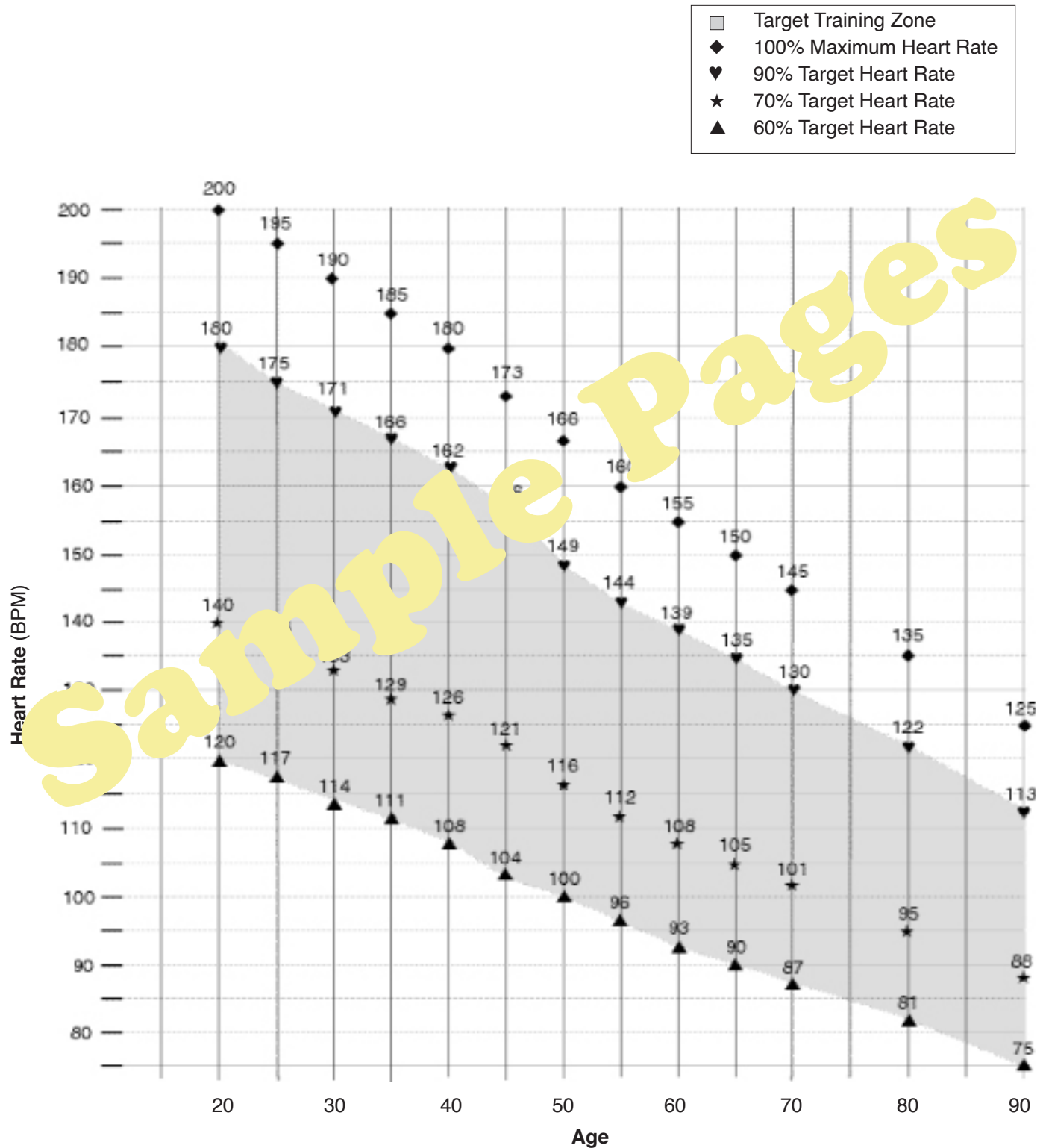
Anaerobic Exercise

Anaerobic exercise is intermittent, short duration activity that is near-maximal in intensity. In this type of training, the exercise intervals are usually performed in 90 seconds or less with *recovery* being handled by the aerobic energy system. This high intensity training should only be incorporated once the individual has a strong aerobic base and is fit enough to handle such efforts ... and it should only be done once or twice per week.

Anaerobic intervals can be shorter or longer. Shorter intervals are performed at *maximal* effort and generally involve 10-15 seconds of effort with a work to rest ratio of 1:3. For example, swim hard for 15 seconds, recover for 45 seconds, and repeat this 8-10 times. The ATP-CP energy system will provide most of the ATP for this type of training which is appropriate for events requiring maximal effort.

Longer anaerobic intervals are performed at near-maximal effort and generally involve 30-90 seconds of work and a work to rest ratio of 1:2. For example, 45 seconds of hill running followed by 90 seconds of easy jogging, repeated 8-10 times. The glycolytic energy system will provide most of the ATP for this type of training, therefore, lactic acid will be produced, causing a burning sensation in the working muscles. Active rest, or continuous sub-maximal movement is recommended to enhance the body's ability to remove the lactic acid quickly from the muscles. This type of training is ideal for events such as soccer or hockey which require intermittent bursts of speed and power.

Target Heart Rate Training Zone



The CFES Fitness Knowledge Course

Chapter 10



Nutrition and Body Weight Management

Learning Objectives:

- 🍏 Nutrition Basics
- 🍏 Canada Food Guide
- 🍏 Healthy Eating Recommendations
- 🍏 Energy for Exercise
- 🍏 The Six Main Nutrients
- 🍏 Body Composition
- 🍏 Body Weight Management
- 🍏 Eating Disorders
- 🍏 Nutrition for Women
- 🍏 Supplements



Canadian Fitness
Education Services

Nutrition Basics

The Six Nutrients

Staying healthy and having adequate energy for activity requires proper nutrition. The type and amount of food we eat will either enhance or inhibit our health, wellness and physical performance.

The body has three basic needs for food:

1. Energy;
2. Tissue growth and repair;
3. Regulation and maintenance of cellular functions.

Nutrients

The food we eat contains six main groups of nutrients, or substances, that the body needs to stay healthy. These are:

Carbohydrates (CHO)	Vitamins
Fats	Minerals
Proteins	Water

Each of these nutrients plays a different role or function (sometimes more than one) in the body. Fats and Carbohydrates are the primary sources of fuel for energy production, while Proteins, Vitamins, Minerals and Water are primarily responsible for tissue growth and repair and the regulation and maintenance of cellular functions.

Energy for Exercise

The nutrients which are primarily used for energy production are carbohydrates and fats. The percentage of each will depend on the amount of nutrient stored in the body and on the intensity and duration of activity. At rest we burn approximately 70 per cent fats and 30 per cent carbohydrates. As exercise intensity increases, the percentage of carbohydrates burned will increase. As exercise intensity decreases and as duration increases the percentage of fat burned will increase.

We have plenty of fat stores in the body, but can only store limited amounts of carbohydrate. The *fuel mix* (percentage of each fuel burned) will be affected by the following:

- the duration and intensity of activity being done
- the individual's fitness level
- the amount of nutrient stored in the body

At rest, we burn approximately 70 per cent fats and 30 per cent carbohydrates. As activity level (exercise intensity) increases, the percentage of carbohydrates burned will increase. As duration increases the percentage of fats burned will increase.

The body can store plenty of fat but only a limited amount of carbohydrate; enough to fuel about 90 minutes of moderate activity or 30 minutes of intense activity. As the carbohydrate supply depletes, the body will begin to burn more fats for fuel. If the glycogen stores are depleted for prolonged periods of time, the body will begin to break down muscle protein to burn for fuel. It's apparent that one needs to eat a high carbohydrate diet to continue replenishing the body's glycogen supply.

Figure 10.1

Recommended Number of Food Guide Servings per Day

Age in Years Sex	Children			Teens		Adults			
	2-3	4-8	9-13	14-18		19-50		51+	
	Girls and Boys			Females	Males	Females	Males	Females	Males
Vegetables and Fruit	4	5	6	7	8	7-8	8-10	7	7
Grain Products	3	4	6	6	7	6-7	8	7	7
Milk and Alternatives	2	2	3-4	3	3-4	2	2	3	3
Meat and Alternatives	1	1	1-2	2	3	2	3	2	3

Eating Well with Canada's Food Guide

The chart above shows how many Food Guide Servings you need from each of the four food groups every day.

Having the amount and type of food recommended and following the tips in *Canada's Food Guide* will help:

- Meet your needs for vitamins, minerals and other nutrients.
- Reduce your risk of obesity, type 2 diabetes, heart disease, certain types of cancer and osteoporosis.
- Contribute to your overall health and vitality.

Source: Health Canada, Eating Well with Canada's Food Guide, 2007. For more information, interactive tools, or full copies of the new guide visit Canada's Food Guide on-line at: www.healthcanada.gc.ca/foodguide

The CFES Fitness Knowledge Course

Chapter 11



Exercise Safety

Learning Objectives:

- ♥ **Health Screening and Liability Release**
- ♥ **Exercise and Injury**
 - **Causes and Mechanisms of Injury**
 - **High Risk Exercises**
 - **Guidelines for Joint Safety**
 - **Injuries and their treatment (classifications of injury, musculoskeletal injuries, neurological conditions, circulatory conditions, hot and cold conditions, altitude)**
- ♥ **Facility Safety**
 - **Reducing the Risk of Injuries**

Causes and Mechanisms of Injury

There are numerous reasons why injuries occur: overuse (too much), lack of progression (too much too soon), unrealistic goals, predisposing factors, and poor training techniques to name a few. Understanding these causes can help prevent an injury before it happens.

Overtraining

Overtraining is a condition which results from insufficient recuperation time in the training program. The more intense the training, the more rest required. Overtraining may result from poor coaching, poor program planning, compulsive behaviour, or a belief that *“If a little is good, then a lot must be better.”* Regardless of the cause, overtraining or excessive training is very likely to cause injuries and it is important for coaches, trainers and instructors to watch for the following signs and symptoms.

Symptoms of Overtraining:

- poor performance
- increased resting heart rate and/or blood pressure
- eating and sleeping problems
- general fatigue, and fatigue during workouts
- aching muscles
- weight loss
- psychological problems (difficulty concentrating, restlessness, irritability, anxiety, depression)
- susceptibility to illness, colds, etc.

When overtraining is suspected, the immediate response should be more rest, even several days of rest to allow the body time to recover. Adequate nutrition, hydration and extra sleep can contribute to recovery from overtraining. When training resumes, it should be at a reduced intensity and the individual should be monitored closely.

High Expectations and Unrealistic Goals

People often place expectations on themselves that far exceed both their physical and psychological capabilities. Striving to lose 10 kilograms by the end of the month, to double one's repetition maximum in two weeks, or to run a marathon with two months of training are examples of unreasonable expectations which can force individuals to seriously overload their systems. Wanting *immediate* results is a common desire, however, this can ultimately lead to injury.

Predisposing Factors

Individuals are more susceptible to injuries when they have predisposing factors such as:

- poor health or a general lack of physical fitness
- muscular strength imbalances in and around joints
- joints which are either too stiff (inflexible) or too mobile (unstable)
- postural problems in the spine, hips, knees or feet, etc.
- history of injuries

The CFES Fitness Knowledge Course

Chapter 12



Fitness Leadership

Learning Objectives:

- 📖 **Role of a Fitness Leader**
- 📖 **Leadership Development (The Four P's)**
- 📖 **Leadership Styles**
- 📖 **Participant — Centered Leadership**
- 📖 **Communication**
- 📖 **Adult Learners**
- 📖 **Age Group Characteristics**
- 📖 **Exercise Adherence**

Role of the Fitness Leader

A fitness leader is a leader, role model, teacher and supporter. The primary role of a fitness leader is to provide safe, effective fitness programs for a variety of participants. This involves assessing the needs of the individual(s), planning the appropriate program, teaching the program, providing corrective feedback and assistance, providing encouragement and support, evaluating the program's effectiveness and making adaptations as necessary.

To handle health-related questions or goals, fitness leaders need to stay abreast of current information and they need to understand the limits of their knowledge and be able to refer clients to specialists or health-care providers.

Leaders also need to be able to work with a variety of individuals, including special populations such as children and adolescents, older adults, pregnant women, and people with medical or health conditions. This requires on-going education and a safe, professional approach.

Another important role is the ability to instruct new skills to participants. This requires being able to perform (or have someone else perform) the skills, being able to clearly describe the skills, and being able to provide helpful feedback to an individual learning those skills. For many, these instructional skills take a great deal of practice and preparation.

Fitness leaders who wish to be respected and successful in their field should also strive to adhere to a basic code of ethics:

- provide safe and effective exercise instruction;
- provide equal and fair treatment to all clients;
- understand the current research and latest techniques in exercise;
- be knowledgeable in the prevention and management of injuries and first aid emergencies;
- uphold and enhance public appreciation and trust for the fitness industry;
- maintain the confidentiality of all client information;
- refer clients to more qualified fitness, medical or health professionals when appropriate.

Fitness leaders who accept these roles and responsibilities, including regular study, careful preparation, development of excellent instructional skills and a professional approach to their work, will no doubt be successful. Helping people improve their health, achieve their fitness goals, or even just get started, is a great challenge, and a great reward!

Striving for excellence as a leader requires a high level of self-awareness, a willingness to prepare and practice skills, and an ability to deliver a product or service that is of value to the client, customer or participant. We can call these the four P's of professional development — Personal Awareness, Preparation, Presentation and Practice.

Leadership Styles

There are three main leadership styles: laissez-faire, autocratic and democratic.

1. **Laissez-faire:** unstructured; free flowing; anything goes; each person decides what to do with minimal guidance. This approach is useful for experiential learning and for individuals or groups who are already quite skilled, highly motivated and capable of directing themselves.

2. **Autocratic:** highly structured; one person leads all the time; military style; task oriented; leader instructs and participants follow; formal style. This approach can be useful for specific skill instruction and for individuals or groups who are less motivated, less capable or for those who prefer a more structured learning environment.

3. **Democratic:** shared leadership with participant(s) and instructor; instructor participates both as leader and member of group; goals are set together; semi-formal; group forms final decision. This approach can be used in a variety of settings and is useful for group/team development, for leadership development and for ensuring that participants are contributing to their learning experience.

All approaches can be appropriate, depending on the situation. Instructors tend to favour one or two of these styles when teaching. Their preference is often based on their personality, experience level and personal learning style. It is critical, however, that instructors/leaders assess the learner's needs and then apply the best approach to use in each learning situation.

Participant-Centered Leadership

Instructors who focus their energy on the needs and interests of participants are described as participant-centred. This focus is respectful, encouraging, and especially important for adult learners.

1. **The instructor is responsible for setting a caring, safe and stimulating learning experience:**

- be available before and after program delivery to answer questions
- allow for two way communication in your classes, programs
- educate, provide handouts and fit-tips; apply principles of safe exercise
- be loving, enthusiastic, sincere, honest and friendly; include everyone with eye contact

2. **The instructor respects participants as individuals and, as a result, the participant feels accepted and treated as a unique and important individual:**

- be supportive of individuals and encourage adaptations to meet their own needs
- ask and assist in educating individuals in their personal fitness needs and concerns
- get to know your participants and encourage their input and sharing of knowledge
- acknowledge anyone for any new ideas or tips you have incorporated
- ask about peoples lives, remember activities they are doing, acknowledge their accomplishments