



Performance Enhancement Specialist Online Manual

I. THE ESSENTIALS OF INTEGRATED TRAINING

A. Section I. Introduction

1. The health and fitness industry is overwhelmed with information on training, fitness, nutrition and rehabilitation.¹⁻⁹
2. In the face of this information, how does the Performance Enhancement Specialist tell the difference between gym science and sound scientific training principles?
 - a) The answer is simple: ***Integrated Training***.
3. Integrated training enables the Performance Enhancement Specialist to make intelligent choices with regard to training, reconditioning and rehabilitation.^{2,3,8}
4. The purpose of this initial chapter is to provide the reader with a foundational overview of the following integrated training concepts and principles.

Section I.	Introduction
Section II.	The Kinetic Chain
Section III.	Integrated Training Concepts
Section IV.	Integrated Training Principles
Section V.	Integrated Training
Section VI.	Chapter Summary

5. Across the country, there is a shift toward functional training.
 - a) In fact, functional training has become a buzzword in clinics, gyms and academic institutions.^{4,5,10-21}
6. To stay on the cutting edge of research, sports science and practical application, the Performance Enhancement Specialist must understand function.

Function:

An integrated, multiplanar movement that involves acceleration, deceleration, stabilization and occurs at multiple speeds in varying body positions.

7. Typically, most strength and conditioning programs involve uni-planar (sagittal plane) force production.



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8. Very little time is dedicated to balance training, core stabilization training and eccentric training in all three planes of motion (sagittal, frontal and transverse).^{4,6,10,11,13,16,-19,21-23}
9. Most people perform strength training programs on machines that have been designed based on a lack of understanding of functional anatomy, functional biomechanics and motor behavior.
 - a) Machines provide artificial stabilization and only allow isolated, uni-planar training.
 - b) This form of training is effective for hypertrophy, but does very little to improve function and prevent injury.^{5,24}
10. **Who is Today's Athlete? (The Present)**²⁵⁻²⁸
 - a) More people today are spending time in office-related jobs and more hours at work.
 - (1) More jobs today, as opposed to 15 or 20 years ago, are augmented with automation.
 - (2) This leads to the development of muscle imbalances and decreases the overall work capacity.
 - b) Today approximately one third (33.4%) of adults are estimated to be obese.
 - c) There is a significant decrease in physical activity (PE) in schools today.
 - (1) Children are not establishing appropriate neuromuscular efficiency, dynamic flexibility and functional strength.
11. **Why the Concern?**²⁹⁻⁴¹
 - a) Evidence of dysfunction and increased injury:
 - (1) Low back pain is one of the major forms of musculoskeletal pain affecting nearly 85% of all adults.
 - b) Research has demonstrated hip weakness (gluteus maximus & gluteus medius) following ankle sprains
 - (1) Over 2 million ankle sprains occur annually (50+% are severe in nature).



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- (2) Females had 25% greater chance of ankle injury in 2000 study of 11,780 male & female high school & collegiate athletes.
- (3) Ankle sprains are the most common acute sports-related injury:
 - (a) 45% Basketball
 - (b) 31% Soccer
 - (c) 25% Volleyball
- c) It has been estimated that 80,000-150,000 ACL injuries occur annually in the general population.
 - (a) 70% are non-contact in nature
 - (b) Most occur in the transverse plane during eccentric deceleration
 - (c) Prime age group: 15-25
- (2) It has been suggested that this high incidence of non-contact injuries may be alleviated by enhancing neuromuscular control.
- d) Current research has identified that there is a significant number of people who are getting injured while participating in sporting activities.
 - **Age 5-24** (1 out of 4 visits to hospital emergency rooms are sport-related)
 - **Age 25 +** (1 out of 3 visits to hospital emergency rooms are sport-related)
- e) More people are participating in recreational activities; however sedentary lifestyles and inadequate training programs are not preparing them for the imposed demands of the activity.

12. The Future...

- a) The Performance Enhancement Specialist must recognize the trend toward **NON-FUNCTIONAL** living and take measures to stay one step ahead!
- b) The performance enhancement program must be designed with consideration toward the athlete, environment and tasks to be performed.
- c) Remember that "Performance Enhancement" is not limited to athletics.



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- (1) Many motions in every day life require dynamic postural control through multiple planes of motion and at different speeds of motion.
13. Integrated training is a comprehensive training approach that strives to improve all components necessary to allow an athlete to achieve optimum performance.⁴
- These components include:

INTEGRATED TRAINING COMPONENTS:

- Integrated Flexibility Training
- Core Stabilization Training
- Balance Training
- Reactive Training
- Integrated Speed Training
- Integrated Resistance Training
- Nutrition and Sports Supplementation

Figure I-1. Integrated Training Components

14. The Performance Enhancement Specialist must thoroughly understand assessment of the Kinetic Chain,^{42, 43} human movement science (functional anatomy,⁴⁴ functional biomechanics & motor control/learning) and integrated training principles.^{4,6,16-19,21-23}

INTEGRATED TRAINING PRINCIPLES:

- Integrated Training Paradigm
- Integrated Training Continuum
- Multiplanar Training
- Training with Optimum Posture
- Training for Optimum Muscle Balance
- Training for Optimum Muscle Function
- Training the Complete Muscle Contraction Spectrum^{4-6,15-19,21,23,24}
- Training the Velocity Contraction Spectrum

Figure I-2. Integrated Training Principles

B. Section II. The Kinetic Chain

1. The Kinetic Chain operates as an integrated functional unit.
2. The Kinetic Chain is made up of the soft tissue system (muscle, ligament, tendon and fascia), neural system and articular system^{42,45-49}

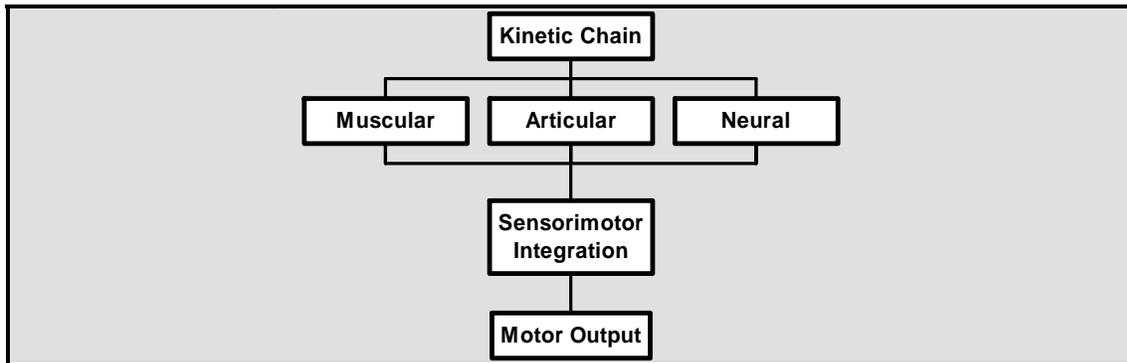


Figure I-3. The Kinetic Chain

3. Each of these systems works interdependently to allow structural and functional efficiency.
4. If any of the systems do not work efficiently, compensations and adaptations occur in the other systems.
 - a) These compensations and adaptations lead to tissue overload, decreased performance and predictable patterns of injury.^{42,45,46,48}
5. Performance Enhancement Specialists must understand the integration and synergy of the Kinetic Chain in order to develop an effective integrated training program.^{42,44,45,46,48}

C. Section III. Integrated Training Concepts

1. Integrated training is a comprehensive approach to training, reconditioning and rehabilitation that involves several fundamental concepts:



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INTEGRATED TRAINING COMPONENTS:

- Kinetic Chain Assessment / Integrated Performance Profile
- Integrated Flexibility Training
- Core Stabilization Training
- Balance Training
- Reactive Training (Power)
- Integrated Speed Training
- Integrated Resistance Training
- Nutrition and Sports Supplementation
- Recovery and Regeneration

2. Kinetic Chain Assessment / Performance Profile

- a) Any imbalance in the Kinetic Chain will increase the risk of injury and decrease overall performance.
- b) The Performance Enhancement Specialist must recognize factors that contribute to decreased performance in order to create a comprehensive Integrated Training program.
- c) A comprehensive Kinetic Chain Assessment will identify current levels of:
 - (1) Postural control
 - (2) Core stabilization
 - (3) Balance
 - (4) Power
 - (5) Functional strength
 - (6) Functional flexibility
 - (7) Deceleration abilities
- d) A comprehensive Integrated Performance Profile (Kinetic Chain Assessment) includes:
 - (1) Static assessments
 - (a) Posture
 - (b) Serial distortion patterns
 - (c) Muscle-length imbalances
 - (2) Transitional assessments
 - (a) Overhead squat test



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- (b) Single-leg squat test
- (c) Single-leg balance excursion test
- (3) Dynamic assessments
 - (a) Sport specific movements
 - (b) Agility tests
 - (c) Gait assessment
 - (d) Reaction time tests

3. Integrated Flexibility Training

- a) Muscle imbalances and poor flexibility decrease performance and lead to injury.
- b) **Flexibility** is the ability of the neuromuscular system to allow optimum extensibility of the appropriate tissues in the right range of motion, while providing optimum neuromuscular control through that range of motion.
- c) Flexibility training is a key component to any integrated training program.
- d) Optimum flexibility and muscle balance ensures optimum performance and decreases the chance for injury.
- e) All functional movement occurs in all three planes of motion.
 - (1) Therefore, flexibility must be established in all three planes of motion to ensure optimum tissue extensibility during functional movements.^{4,5,48,50}
 - (2) Neuromuscular control must be established concomitantly in the new range of motion to prevent injury.¹⁷
- f) Integrated Flexibility Training occurs on a continuum.

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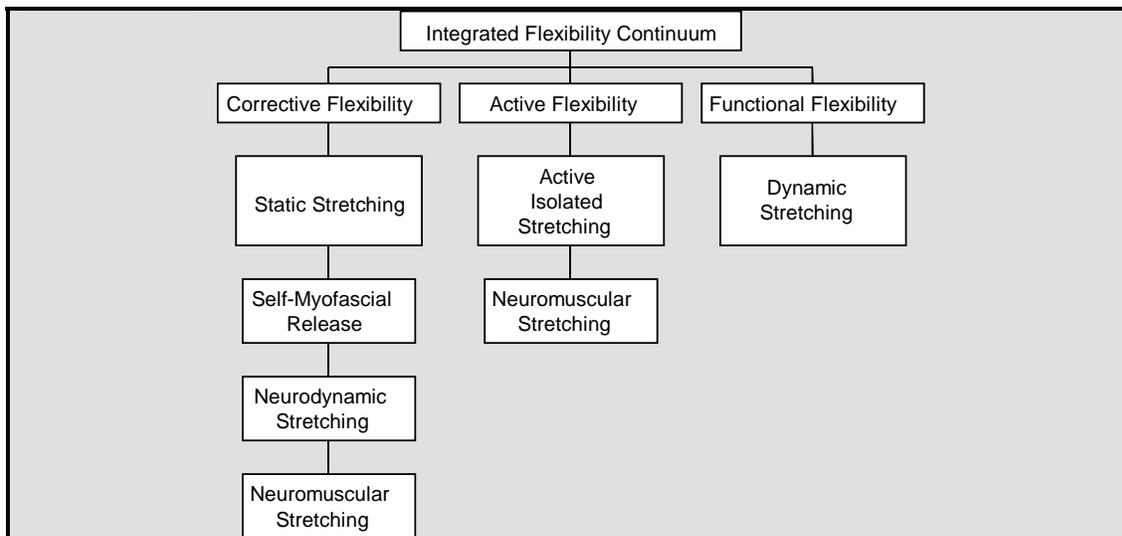


Figure I-4. Integrated Flexibility Continuum

- (1) Each type of flexibility training is discussed in Chapter 5.

4. Core Stabilization

- a) Core stabilization is the foundation upon which all other aspects of integrated training are based.^{10,11,13,15,16}
- b) The core is considered the lumbo-pelvic-hip complex, thoracic spine and cervical spine.

WHAT IS THE “CORE?”

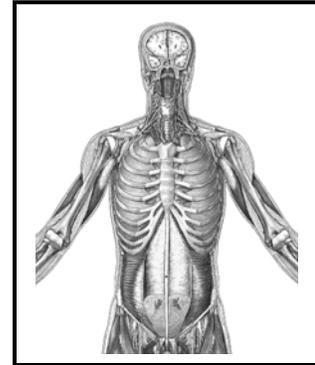
- Lumbo-Pelvic-Hip Complex
- Thoracic Spine
- Cervical Spine

- c) The core operates as an **integrated functional unit** to dynamically stabilize the Kinetic Chain during functional movements.

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- d) Many athletes have developed strength, power, neuromuscular control and endurance in their prime movers,

(1) However, few individuals have developed adequate core stabilization to allow optimum performance and injury prevention.⁴²

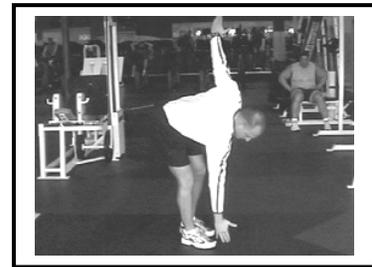


- e) The Kinetic Chain's stabilization system has to function optimally to effectively utilize the strength and power in the prime movers.¹⁶

- f) A strong and stable core enables your athlete to train with heavier loads, which increases gains in the rest of their body.¹¹

5. Balance Training

- a) **Neuromuscular efficiency** is the ability of the neuromuscular system to work synergistically to reduce force, dynamically stabilize and produce force throughout the entire Kinetic Chain in all three planes of motion.^{4,16-19}



- b) When designing a training program, the Performance Enhancement Specialist typically thinks of developing morphological changes in the muscle (muscle hypertrophy).^{2,3,7}

(1) However, integrated training (in a proprioceptively enriched environment) enables optimum neural adaptations.

- c) These neural adaptations include intra-muscular coordination and inter-muscular coordination.

(1) **Intra-muscular coordination** is the ability of an individual muscle to have improved motor unit recruitment, rate coding and motor unit synchronization.^{4,7}



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(2) **Inter-muscular coordination** is the ability of the neuromuscular system to allow improved integrated movement efficiency by allowing agonists, antagonists, synergists, stabilizers and neutralizers to work together efficiently.^{4,7}

(a) This process improves muscle hypertrophy and function more effectively than isolated training alone.

d) High levels of neuromuscular efficiency yield greater recruitment of the agonist and less neural inhibition from the antagonist.

(1) This results in greater force production and greater hypertrophy.

6. Reactive Training (Power)

a) The imposed demands during training must reflect those incurred during functional activities.

b) Enhanced performance in most activities is directly related to the rate of force production.

c) The speed of muscular exertion during functional movements is limited by the neuromuscular system.⁵¹

(1) This means that the Kinetic Chain will only move within a set range of speed set by the Central Nervous System (CNS).⁵¹

d) The neuromuscular system must react quickly following an eccentric contraction to produce a concentric contraction and impart the necessary force and acceleration in the proper direction.

e) Reactive training utilizes the stretch-shortening cycle to enhance neuromuscular efficiency, rate of force production and reduced neuromuscular inhibition.

f) Reactive training heightens the excitability of the Central Nervous System, which improves performance.^{51,52}



7. Integrated Resistance Training

a) **Strength** is the ability of the neuromuscular system to exert force against resistance.^{2,3,4,7-9}



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- b) There are many types of strength including
- c) Each type of strength is explained in more detail in Chapter 10.

TYPES OF STRENGTH:

- Maximal Strength
- Endurance Strength
- Speed Strength
- Stabilization Strength

Figure I-5. Types of Strength

- d) An integrated resistance training program utilizes the principles of integrated training to develop a comprehensive approach that ensures each individual achieves their optimum performance.

8. Integrated Speed Training

- a) One of the greatest concerns in athletics today is improving “playing speed”.
- b) Playing speed is a combination of:
 - (1) Starting speed
 - (2) Acceleration speed
 - (3) Top-end speed
 - (4) Change-of-direction speed
 - (5) Stopping speed
 - (6) Closing speed
- c) Improving playing speed focuses on:
 - (1) **Straight-Ahead Speed**
 - (a) Speed is a biomotor ability that can be learned and improved by achieving proper muscle balance, core strength, neuromuscular control, reactive neuromuscular efficiency and technical proficiency.
 - (2) **Lateral Speed & Agility**
 - (a) Focuses on the ability to decelerate, stabilize, accelerate and change direction dynamically without the loss of



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proper posture, speed, strength, balance and body control.

(3) **Quickness** (reaction time)

- (a) Focuses on the ability to react to visual, auditory and kinesthetic feedback without hesitation.

9. Nutrition and Sports Supplementation

- a) Chapter 12 will discuss nutrition and sports supplementation and related research in addition to individual supplement purposes, potential users, dosages and ratings.

D. Section IV. Integrated Training Principles

1. The Integrated Performance Paradigm™

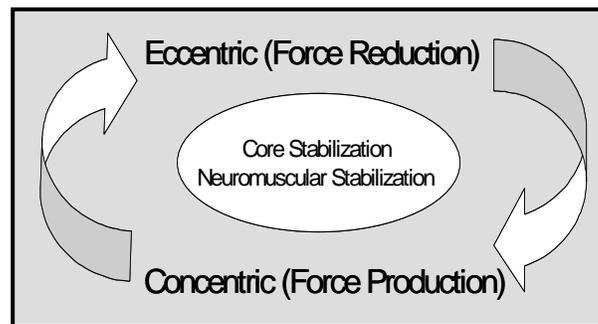


Figure I-6. Integrated Performance Paradigm

- a) *The Integrated Performance Paradigm™*^{6,21,22} explains the concept that force reduction precedes all force production.
- (1) For example, when taking a step, all of our muscles must eccentrically contract to decelerate gravity, ground reaction forces and momentum.
- b) Stabilization strength, core strength and neuromuscular efficiency^{15,19} control the time between the eccentric contraction and the subsequent concentric contraction.
- (1) **Amortization Phase**
- c) The greater your athlete's eccentric strength, neuromuscular efficiency and stabilization strength, the



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greater their concentric force production will be without any increase in hypertrophy (morphological changes).^{4,10,19}

- d) If the Performance Enhancement Specialist fully understands this concept, eccentric neuromuscular control and stabilization strength exercises will begin to make up a larger portion of their athlete's training program.^{4,16-18}
- e) Improving your athlete's eccentric strength provides the ability to handle heavier loads without creating overuse in the connective tissue.
- f) If your athlete can handle heavier loads for a prescribed intensity and repetition spectrum, they will improve their muscle hypertrophy and improve their performance.^{2,3,7-9}

2. The Integrated Training Continuum

- a) Most strength and conditioning programs focus on isolated, uni-planar exercises to elicit maximum morphological changes (muscle hypertrophy).^{19,21}
- b) However, the Central Nervous System is designed to optimize the selection of muscle synergies to perform integrated movement patterns in all three planes of motion and at different speeds of motion.^{44,45-48}
- c) Therefore, if the body is designed to move in all three planes of motion in an integrated environment, then isolated training does little to improve functional ability.
- d) Isolated training involves primarily open Kinetic Chain movements.^{14,53,54}
 - (1) These exercises are primarily uniplanar (sagittal plane).⁵⁴
 - (2) They have a very low neuromuscular demand because they are performed primarily with the Kinetic Chain artificially stabilized on stable pieces of equipment.

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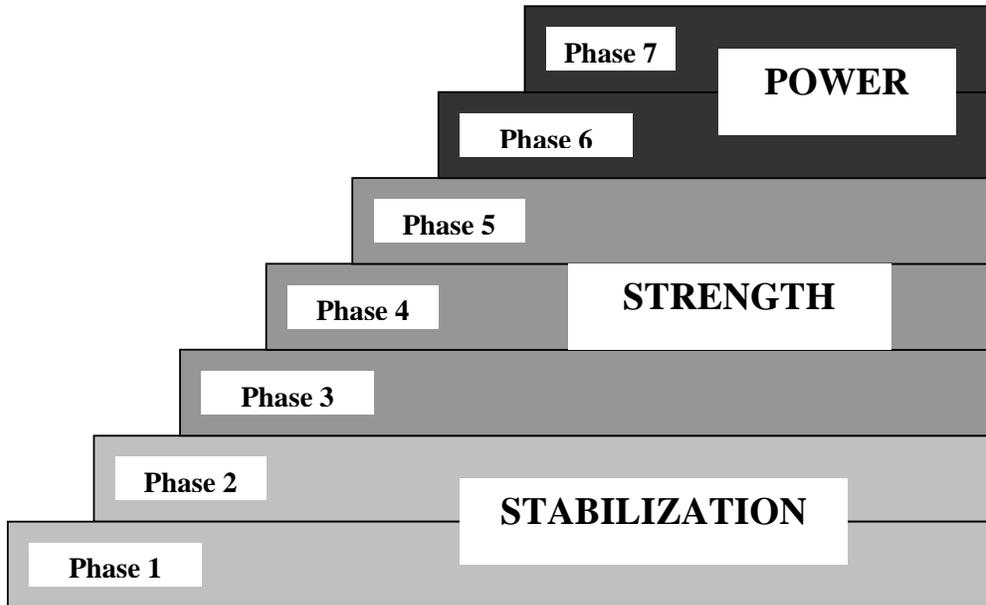


Figure I-7. Optimum Performance Training™ Model

- (3) When training in an isolated, uniplanar, artificially stabilized environment the Kinetic Chain is not being prepared to deal with the imposed demands of normal daily activities (walking up/down stairs, getting groceries out of the trunk, etc).
- e) When your athletes utilize functional movement patterns, they develop high levels of core strength, neuromuscular control, dynamic flexibility and functional strength.^{4-6,10,11,13,15-19,21-23}
 - (1) In addition, your athletes can develop similar or higher levels of hypertrophy.
 - (2) This is secondary to improved motor unit recruitment.
- f) Training integrated, functional movement patterns targets synergistic muscles to reduce force, dynamically stabilize and reduce force in all three planes of motion.^{19,21,44}
 - (1) This creates maximal motor unit recruitment, which facilitates a greater overall training response.

3. Multiplanar Training

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- a) Functional activities occur in all three planes of motion (sagittal, frontal and transverse),^{6,19,21,23,42-43} however, an activity may be one plane dominant (walking → sagittal plane), but the other two planes of motion must be stable to perform the activity efficiently.²³
- b) Research demonstrates that most injuries occur in the transverse plane during eccentric muscle contractions.^{45,53}
- c) However, most exercises are sagittal plane dominant and concentrate primarily on force production.
- d) With this in mind, it is clear that Performance Enhancement Specialists must train their athletes in all planes of motion and utilize the entire muscle contraction spectrum (concentric, eccentric and isometric contractions) to most efficiently improve function.^{4,19}
- e) Eccentric contractions produce the greatest tension development in the muscle, followed by isometric contractions, then concentric contractions.^{7,9}

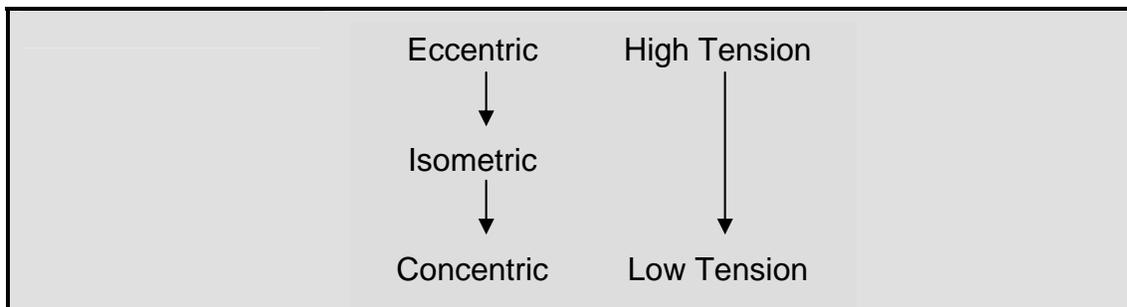


Figure I-8. Muscle Tension Development

- f) If eccentric and isometric contractions increase tension development greater than concentric contractions, they should be incorporated in training programs more often to enhance performance.
- g) Training in multiple planes of motion elicits greater motor unit recruitment from agonists, synergists and stabilizers.^{55,56}

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- h) Also, if a muscle is primarily one plane dominant (gluteus maximus → transverse plane) and other muscles (gluteus medius → frontal plane) are dominant in other planes of motion, the Performance Enhancement Specialist must then develop a multiplanar training program.^{4,6,19,21,42}
- i) This ensures optimum development of all muscles of the Kinetic Chain.
- j) Training primarily in the sagittal plane may not allow complete recruitment of certain muscles that are frontal or transverse plane dominant.

4. Training with Optimum Posture

- a) Posture is a dynamic controlling quality.
- b) Optimum alignment of each segment of the Kinetic Chain is a cornerstone to any integrated training program.^{5,45,46,49}
- c) If one component of the Kinetic Chain is out of alignment, other components must compensate.^{5,24,48}
 - (1) This decreases neuromuscular efficiency and increases the chance of injury.

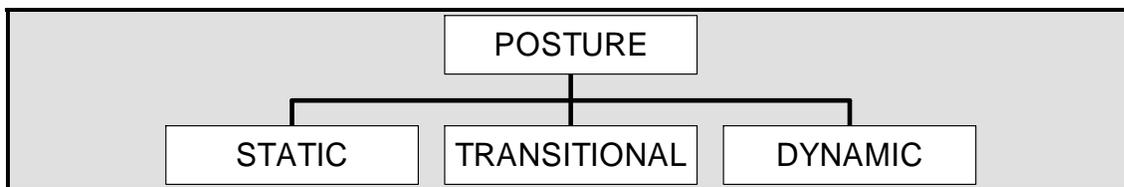
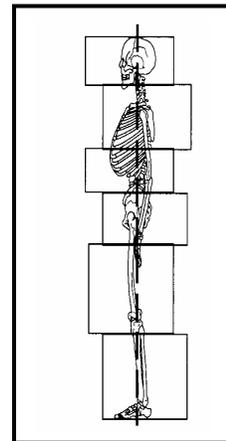


Figure I-9. Posture

- d) Poor posture during training and activities of daily living such as sitting, standing, sleeping and driving lead to muscle imbalances, joint dysfunctions and postural distortion patterns.^{5,42,47,48}
 - (1) **Postural (Serial) Distortion Patterns** are the state in which the functional and structural integrity of the Kinetic Chain is altered and in which compensations and adaptations occur.⁵



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COMMON POSTURAL (SERIAL) DISTORTION PATTERNS

- Upper-Extremity Postural Distortion Pattern (or, Upper Crossed Syndrome)
- Lumbo-Pelvic-Hip Postural Distortion Pattern (or, Lower Crossed Syndrome)
- Lower-Extremity Postural Distortion Pattern (or, Pronation Distortion Syndrome)

- (2) This process is explained more thoroughly in Chapter 3.
- (3) Training with proper posture ensures optimum results and decreases the risk of developing muscle imbalances, joint dysfunctions and tissue overload.
 - (a) For example, allowing an individual to perform overhead lifting with poor cervical and lumbar posture will result in the development of muscle imbalances and possible injury.
- (4) The integrated training program requires an athlete to perform exercises correctly while executing proper postural control throughout the entire movement.
- (5) This will ensure maintenance of structural integrity throughout the Kinetic Chain.

5. Training for Optimum Muscle Balance

- a) Muscles function optimally from a pre-determined length, thus an optimum length-tension relationship.^{7,9}
 - (1) If a muscle is too short or too long, then the length-tension relationships are altered.
 - (2) This decreases force production and alters force couple relationships and joint kinematics.^{42,47,48,57}
 - (3) Muscle imbalances result from poor posture, pattern overload (same exercise performed repetitively in the same plane of motion, with the



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- same weight, at the same speed, with the same ROM), injury and decreased neuromuscular efficiency.⁴²
- (4) Muscle tightness can cause altered reciprocal inhibition and synergistic dominance.^{42,44-49,58}
- b) **Altered Reciprocal inhibition** is the process whereby a tight muscle, the psoas for example, causes decreased neural drive in its functional antagonist (gluteus maximus).^{42,47,48}
- (1) This process results in decreased force production by the prime mover and leads to compensations by the synergists (synergistic dominance).
- c) **Synergistic dominance** is the process whereby synergists compensate for a weak or inhibited prime mover in attempts to maintain force production and functional movement patterns.^{5,42,47,48}
- (1) This process leads to altered movement patterns and decreased neuromuscular control.
- d) Therefore, all integrated training programs should be well-balanced to ensure the development of optimum muscle balance.
- (1) This will, in turn, ensure maintenance of the structural integrity of the Kinetic Chain.
- e) These concepts will be explained in more detail in Chapter 3 (Postural Considerations).



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SUMMARY OF KINETIC CHAIN CONCEPTS

Length-Tension Relationship

- Muscles can only produce optimal force from its optimal length.

Force-Couple Relationship

- Muscles work in synergies to reduce force, dynamically stabilize and produce force.

Altered Reciprocal Inhibition

- The process whereby a tight or overactive agonist inhibits its functional antagonist.

Synergistic Dominance

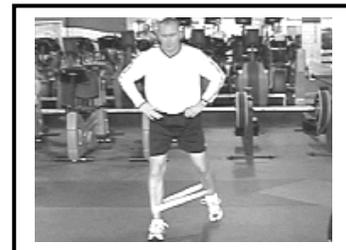
- The process whereby synergists compensate for a weak or inhibited prime mover in attempts to maintain force production and functional movement patterns.

Figure I-10. Kinetic Chain Concepts

6. Training for Optimum Muscle Function

- a) Understanding functional anatomy is crucial.
- b) Since muscles function eccentrically, isometrically and concentrically in all three planes of motion,^{19,44} it is imperative for the Performance Enhancement Specialist to completely understand functional anatomy.
- c) The greater the understanding of functional anatomy, the better the Performance Enhancement Specialist can design a functional training program.

- (1) For example, the hamstring works eccentrically to decelerate knee extension, hip flexion and tibial internal rotation.



- (2) The hamstring also works concentrically to assist in hip extension.⁴⁴

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- (3) Typically, to strengthen the hamstring, Performance Enhancement Specialists will lay athletes prone on the hamstring curl machine and perform isolated, stabilized contractions without integration from the rest of the Kinetic Chain.
- d) It is important to remember that when training an isolated muscle, the Performance Enhancement Specialist must completely integrate the entire Kinetic Chain for improved function.⁴

- (1) Integrated Isolation

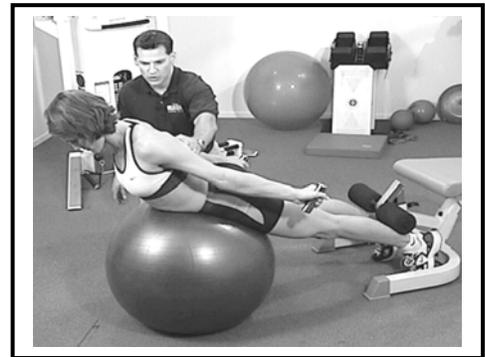
- (a) Isolating a weak segment while integrating the entire Kinetic Chain.

e) Muscles have anatomical individuality, but they lack functional individuality.^{44,46}

f) Movement is a complex event that is controlled by the Central Nervous System.

g) The Central Nervous System calls for pre-programmed patterns of movements that can be modified in countless ways to react appropriately to gravity, ground reaction forces and momentum.^{19,46}

h) Functional anatomy will be reviewed thoroughly in Chapter 2.



7. Training the Complete Muscle Contraction Spectrum

- a) All muscles function eccentrically to decelerate the Kinetic Chain, isometrically to dynamically stabilize the Kinetic Chain and concentrically to accelerate the Kinetic Chain.
- b) ***Therefore, an integrated training program must focus on all types of muscle contractions.***
- c) Different methods of training are utilized to maximally train each type of muscle action.
- d) This will be discussed in more detail in Chapter 11.



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8. Training the Complete Velocity Contraction Spectrum

- a) Functional activities occur at various speeds
- b) Therefore and integrated training program must focus on activity specific training that occurs at various speeds

ALL INTEGRATED, FUNCTIONAL TRAINING PROGRAMS MUST BE:

- Multiplanar
- Multi-Joint
- Multi-Dimensional
- Proprioceptively Enriched
- Activity Specific

(1) Walking → Jogging → Sprinting

- c) Rate of force production is one of the most indicative components of performance

E. Section V. Integrated Training

1. Integrated Performance Training

- a) The Performance Enhancement Specialist must follow an organized, systematic approach when designing an integrated training program.^{2-4,7}

GOAL OF INTEGRATED TRAINING

- Prevent Injury
- Decrease Body Fat
- Increase Lean Muscle Mass
- Increase Strength
- Increase Endurance
- Increase Flexibility
- Increase Performance

Figure I-11. Goals of Integrated Training

- b) The Performance Enhancement Specialist must develop an Integrated Performance Profile⁴³



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<p>INTEGRATED PERFORMANCE PROFILE</p> <ul style="list-style-type: none"> ▪ Activity Demand Analysis Profile ▪ Postural Assessment ▪ Flexibility Assessment ▪ Core Strength Assessment ▪ Neuromuscular Control Assessment ▪ Functional Movement Assessment ▪ Functional Strength Assessment ▪ Body Fat Assessment ▪ Nutritional Assessment

c) It is imperative to have baseline information on your athlete to determine how to most efficiently assist your athlete in achieving their goals.

2. Integrated Training Guidelines

<p>Each training program must be based on:</p> <ul style="list-style-type: none"> ▪ Current research ▪ Basic science ▪ Empirical results 	<p>All integrated training programs must be:</p> <ul style="list-style-type: none"> ▪ Progressive ▪ Systematic ▪ Challenging ▪ Dynamic 	<p>All programs should focus on:</p> <ul style="list-style-type: none"> ▪ Neural adaptations before morphological adaptations to ensure long term training success.⁴
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3. Training Variation

- a) The training program should be varied regularly to force constant adaptation.
- b) Exercise variables that can be changed include the following: plane of motion, body position, base of support, lower extremity symmetry, upper extremity symmetry, external resistance, balance modality and acute variables (plane of motion, body position, base of support, lower



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extremity symmetry, upper extremity symmetry, external resistance, balance modality).^{4,6,21,23}

EXERCISE TRAINING VARIABLES						
Plane of Motion	Body Position	Base of Support	Lower Extremity Symmetry	Upper Extremity Symmetry	External Resistance	Balance Modality
<ul style="list-style-type: none"> ▪ Sagittal ▪ Frontal ▪ Transverse ▪ Combination 	<ul style="list-style-type: none"> ▪ Supine ▪ Prone ▪ Sidelying ▪ Sitting ▪ Kneeling ▪ ½ Kneeling ▪ Standing 	<ul style="list-style-type: none"> ▪ Exercise Bench ▪ Stability Ball ▪ Balance Modality ▪ Other 	<ul style="list-style-type: none"> ▪ 2-Legs ▪ Staggered Stance ▪ 1-Leg ▪ 2-Leg Unstable ▪ Staggered Stance Unstable ▪ 1-Leg Unstable 	<ul style="list-style-type: none"> ▪ 2-Arms ▪ Alternate Arms ▪ 1-Arm ▪ 1-Arm w/ Rotation 	<ul style="list-style-type: none"> ▪ Barbell ▪ Dumbbell ▪ Cable Machines ▪ Tubing ▪ Medicine Balls ▪ Power Balls ▪ Bodyblade ▪ Other 	<ul style="list-style-type: none"> ▪ Floor ▪ Sport Beam ▪ ½ Foam Roll ▪ Airex Pad ▪ Dyna Disc ▪ BOSU ▪ Proprio Shoes ▪ Sand

Figure I-12. Integrated Training Variables

F. Section VI. Chapter Summary

1. The balance of this performance enhancement course provides a detailed examination of the concepts and principles involved in integrated training.
2. As you continue through this performance enhancement course, keep an open mind and most importantly...
3. **...FOCUS ON FUNCTION!**



Performance Enhancement Specialist Online Manual

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