Movement & Training Models

The Foundation

Innate Movement

- Newborn reflexive / rudimentary movement forms foundation for later voluntary movements
- Some reflexes offers survival advantages with regards to nourishment and protection
- Generally reflexes serve as an indicator of general neurological status
  - Note: infant reflexes usually disappear within ~10 months after birth

Innate Movement – Primitive Reflexes

Rooting Reflex

Innate Movement – Primitive Reflexes

Sucking Reflex

Innate Movement – Primitive Reflexes

Moro(Startle) Reflex

Innate Movement – Primitive Reflexes

Babinski Reflex

Innate Movement – Primitive Reflexes

Grasping Reflex

Innate Movement – Primitive Reflexes

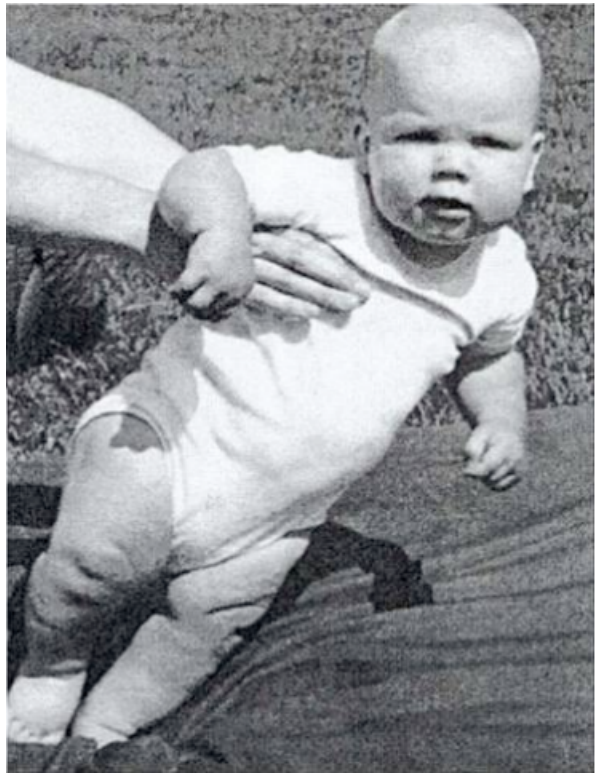
Tonic Neck Reflex

Innate Movement – Postural Reflexes

Head and body righting

Innate Movement – Postural Reflexes

Labyrinthine righting

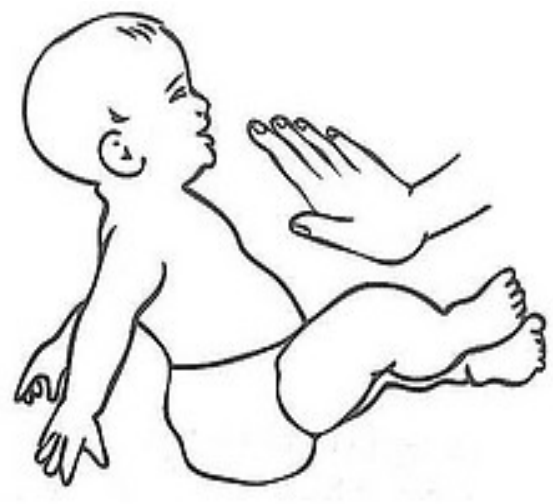


Innate Movement – Postural Reflexes

Pull-up

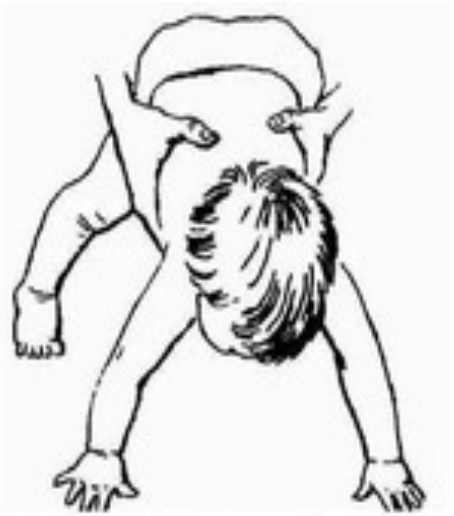
Innate Movement – Postural Reflexes

Parachute



Backward Parachute Reflex

(Protective Extension Reaction Backward)



Forward Parachute Reflex

(Protective Extension Reaction Forward)

Innate Movement – Locomotor Reflexes

Crawling

Innate Movement – Locomotor Reflexes

Stepping (walking)

Innate Movement – Locomotor Reflexes

Swimming

Understanding Motor Development

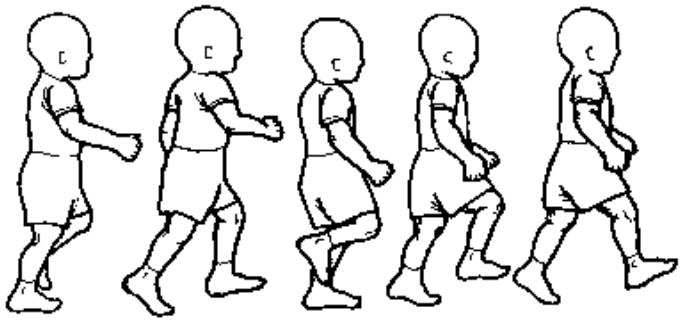
WHY ARE FUNDAMENTAL MOTOR SKILLS IMPORTANT?

Importance of Fundamental Motor Skills

FMS is a set of basic skills that make up the skills for sports, games & lifetime activities

The ability to move easily in various combinations of FMS is compromised if basic motor competency is not achieved

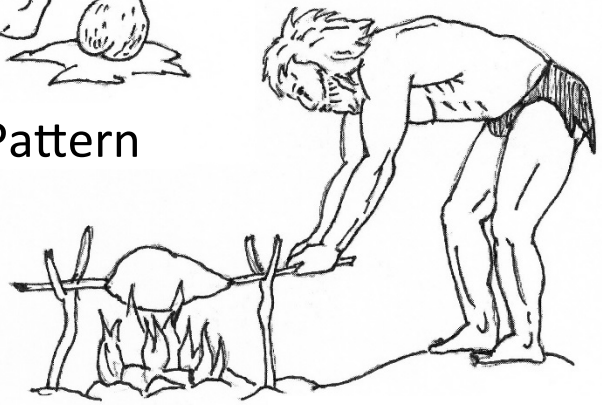
The field of Motor Development has largely focused on locomotive and manipulative skills



Importance of Fundamental Motor Skills

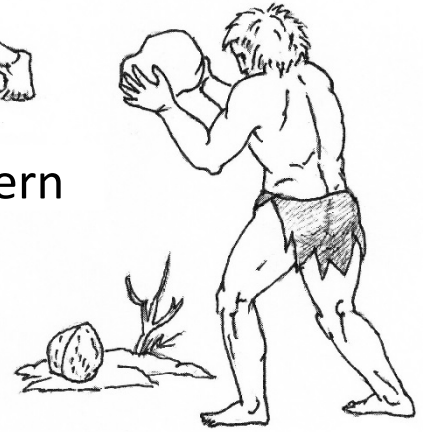
PHAC 3040 will focus on the following fundamental movement patterns

Squat Pattern

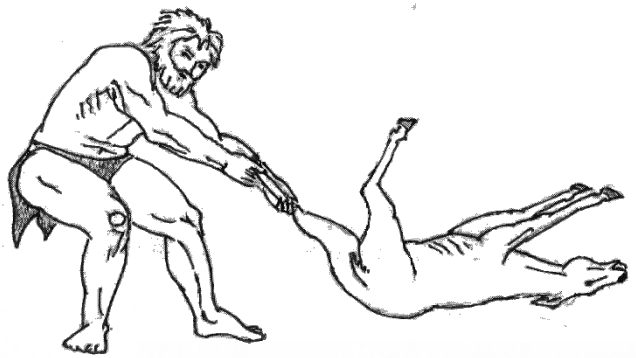


Bend Pattern

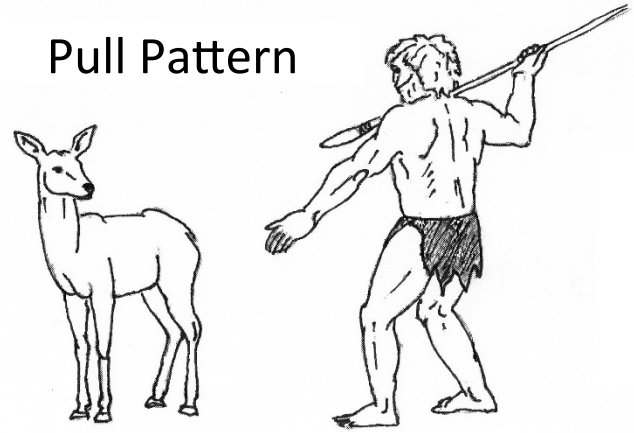
Lunge Pattern



Push Pattern



Pull Pattern



Twist Pattern

PHAC 3040 Selected Motor Patterns

Squat | Bend | Lunge | Push | Pull | Twist

Competency in these patterns establishes a movement repertoire to draw from during everyday activities and sport participation

Fitness should only be addressed once competency in the movement patterns has been established

Developmental Theories of FMS

DEVELOPMENTAL SEQUENCES OF FMS

Most common approach

Focuses on orderly process of movement quality instead of quantitative outcomes

Approach:

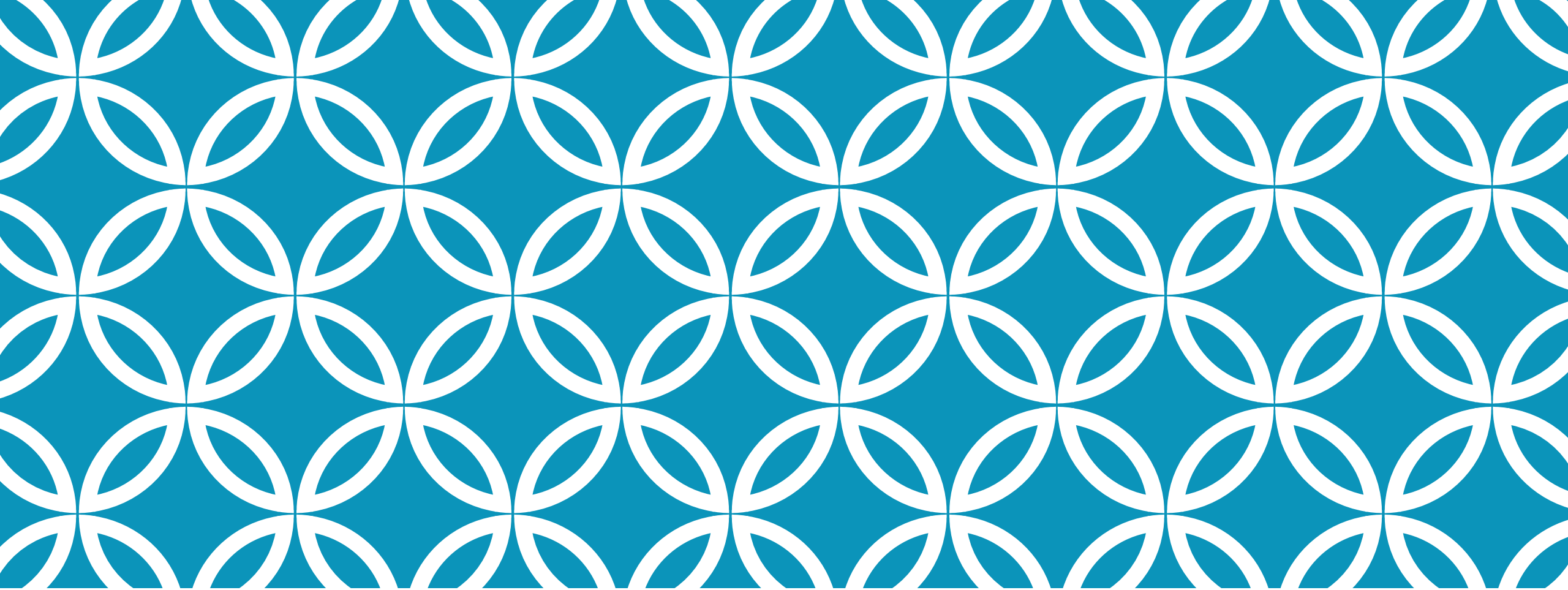
- Total body sequences
- Component sequences

DYNAMIC SYSTEMS THEORY OF FMS

Do not follow predefined developmental order, instead individuals select the most appropriate pattern to achieve the task

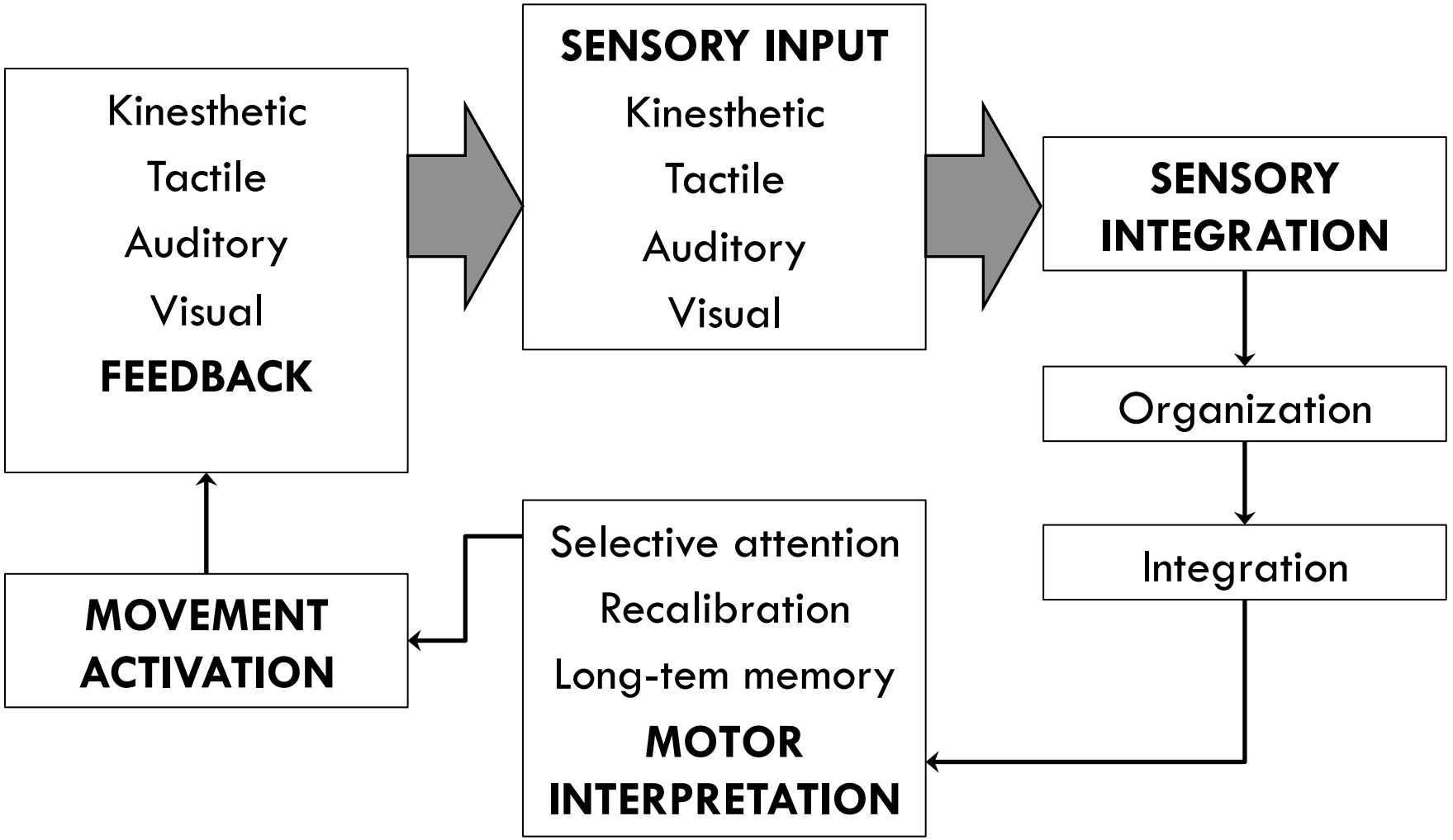
Patterns are selected from behavioral attractors (common, stable, patterns of movement seen in specific situations that can be altered)

- Strong attractors are difficult to change
- Weak attractors are more readily changed by task constraints



PERCEPTUAL DEVELOPMENT

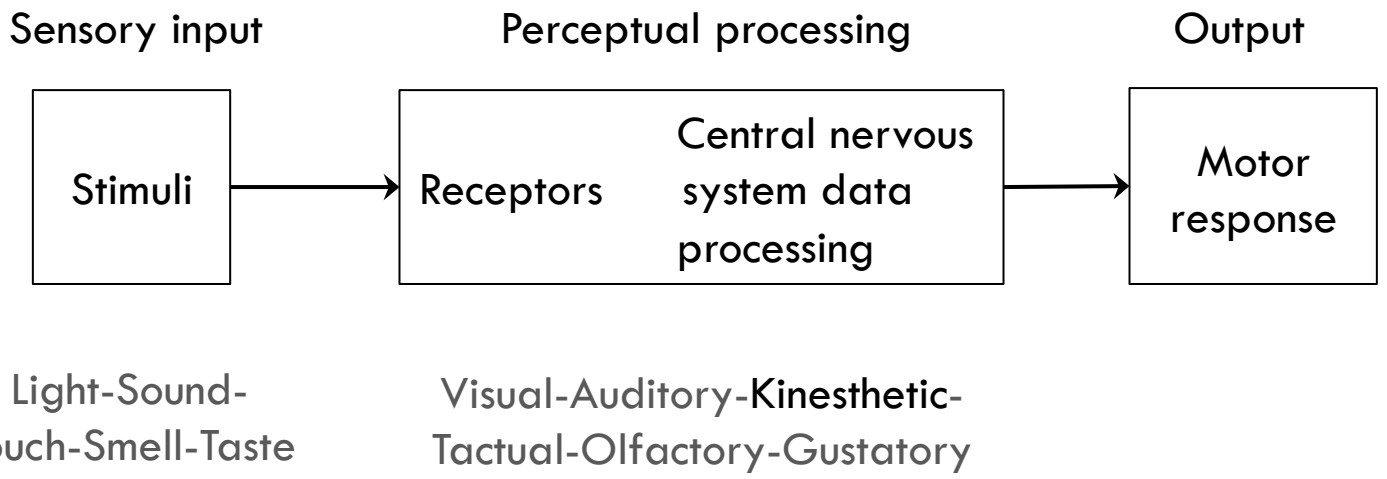
PERCEPTUAL-MOTOR PROCESS



MOVEMENT

Perception drives Action (motor response)

Figure: The General Information-Processing (perceptual-motor) model



KINESTHETIC PERCEPTION

Kinesthesis derived from two Greek words meaning “to move” and “sensation”

Sensory information from the skin, muscles, tendons, joints, and the vestibular system are integral in the way movement patterns are organized and dominates the learning and acquisition of motor skills

DEVELOPMENT OF KINESTHETIC PERCEPTION

1. Kinesthetic (discrimination) acuity

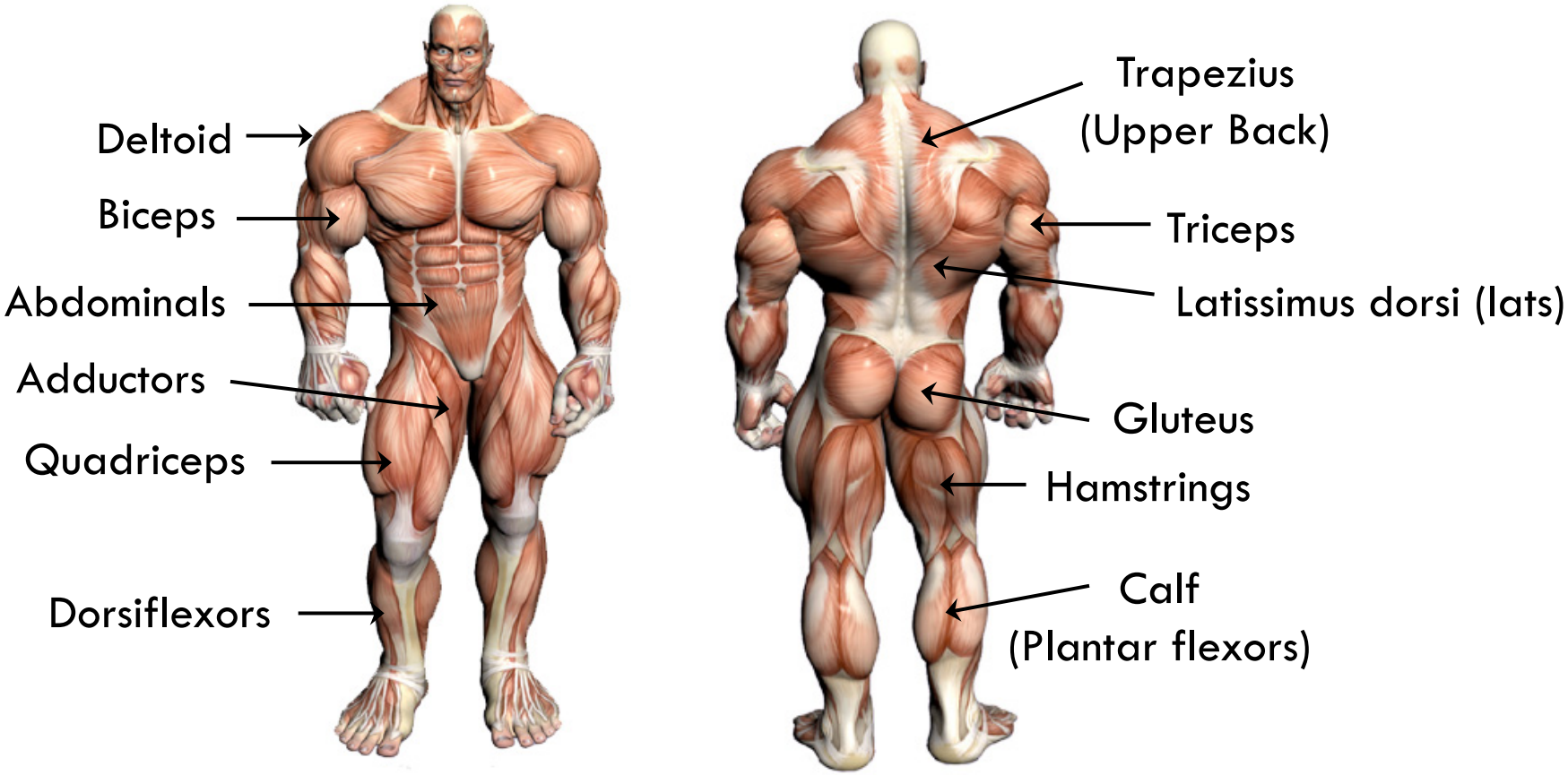
2. Kinesthetic memory

Components of basic movement awareness:

- Body | Spatial | Directional | Vestibular | Rhythmic (temporal) | Tactile

COMPONENTS OF BASIC MOVEMENT AWARENESS

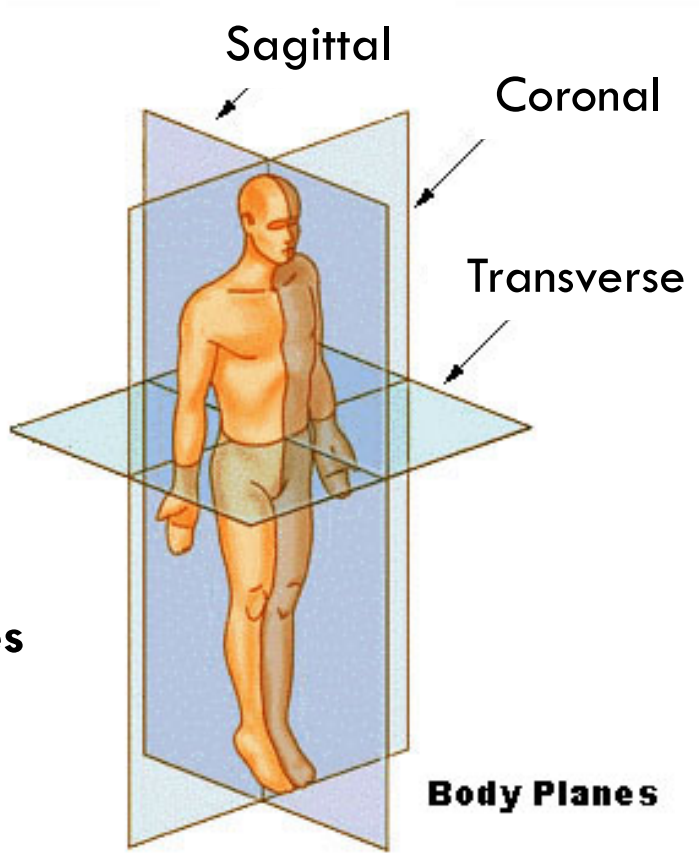
Body Awareness: knowledge of body parts by name and location



COMPONENTS OF BASIC MOVEMENT AWARENESS

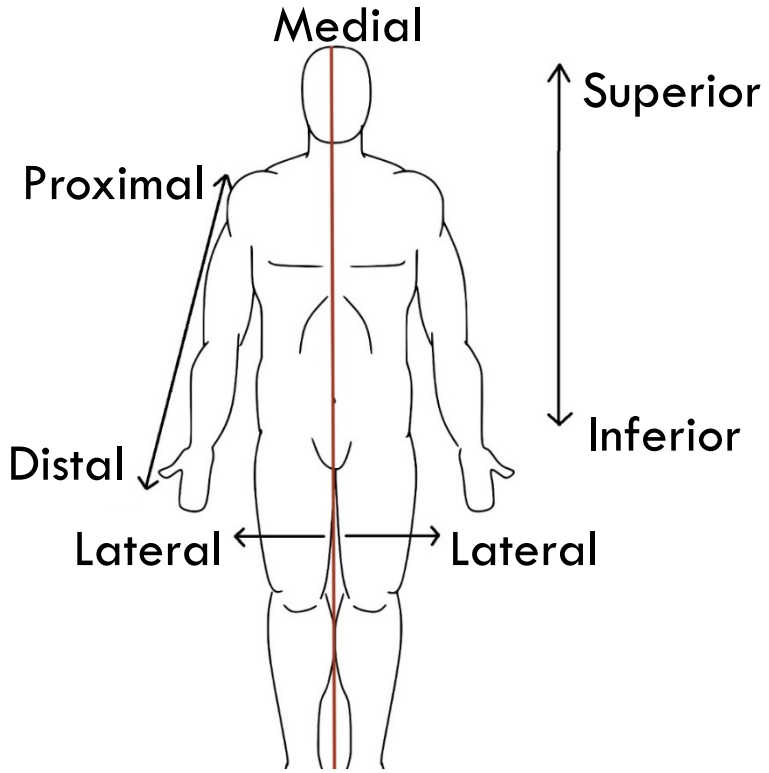
Spatial Awareness:

Cardinal Planes of the Body



COMPONENTS OF BASIC MOVEMENT AWARENESS

Directional Awareness:



Not Shown:

Anterior – front of body

Posterior – back of body

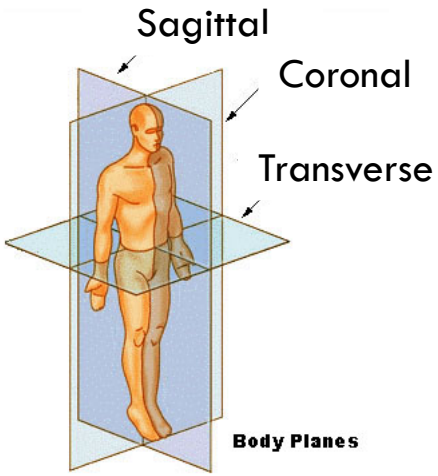
COMPONENTS OF BASIC MOVEMENT AWARENESS

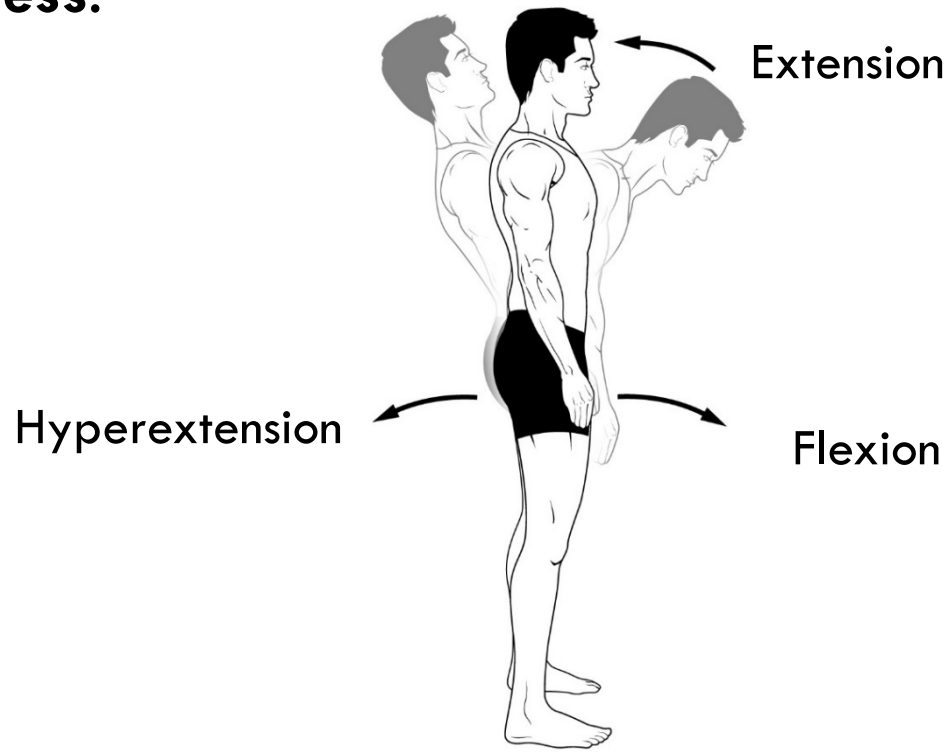
Joint movement Exercise

1. What does FLEXION/EXTENSION mean?
2. What does ABDUCTION/ADDUCTION mean?
3. What does MEDIAL/LATERAL ROTATION mean?
4. Review:
    1. Shoulder
    2. Elbow
    3. Hip
    4. Knee
    5. Ankle

COMPONENTS OF BASIC MOVEMENT AWARENESS

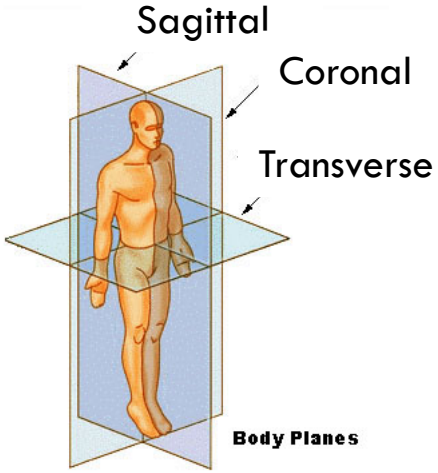
Directional Awareness:

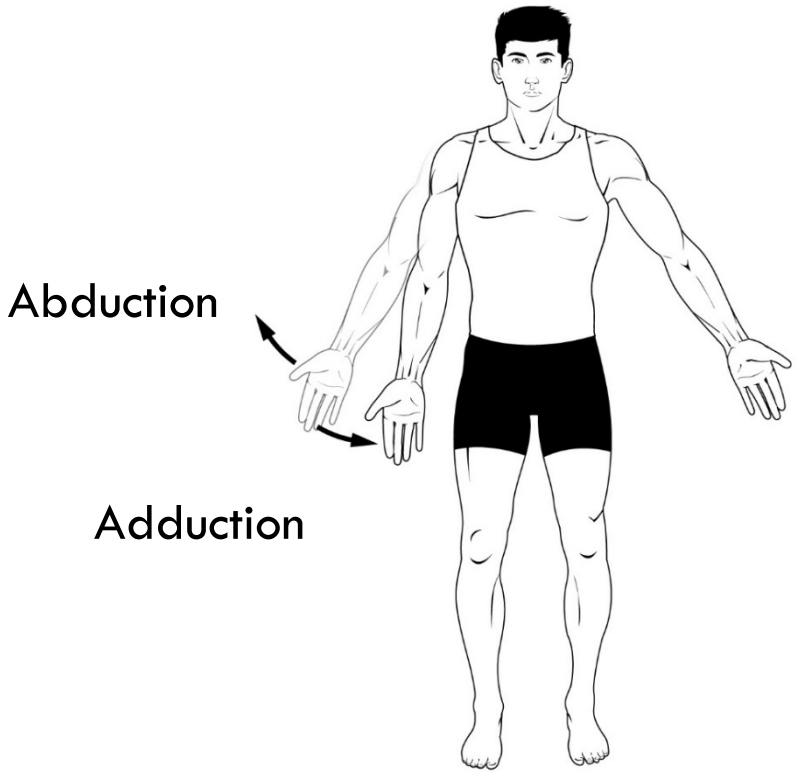




COMPONENTS OF BASIC MOVEMENT AWARENESS

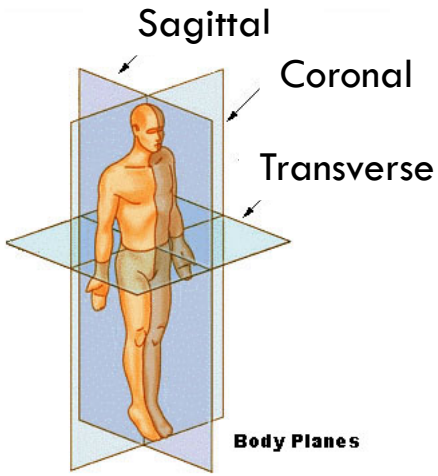
Directional Awareness:

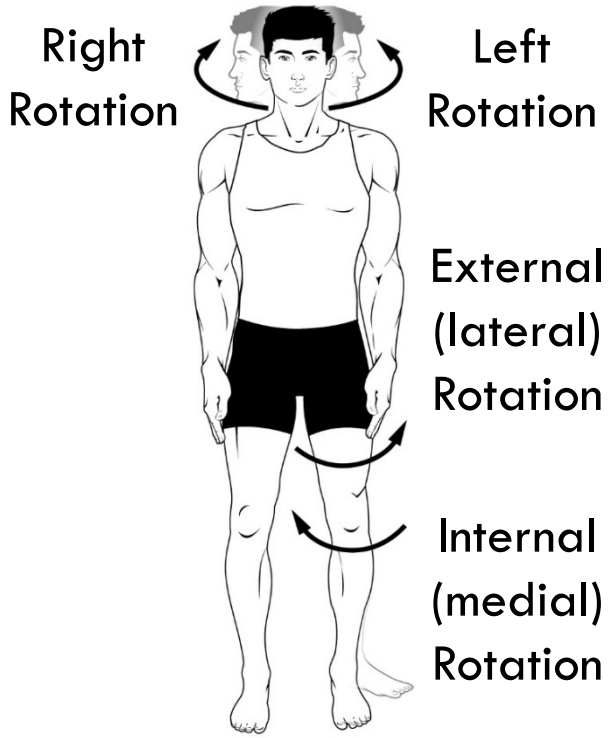




COMPONENTS OF BASIC MOVEMENT AWARENESS

Directional Awareness:





COMPONENTS OF BASIC MOVEMENT AWARENESS

Vestibular Awareness:

Subdivided into 3 types:

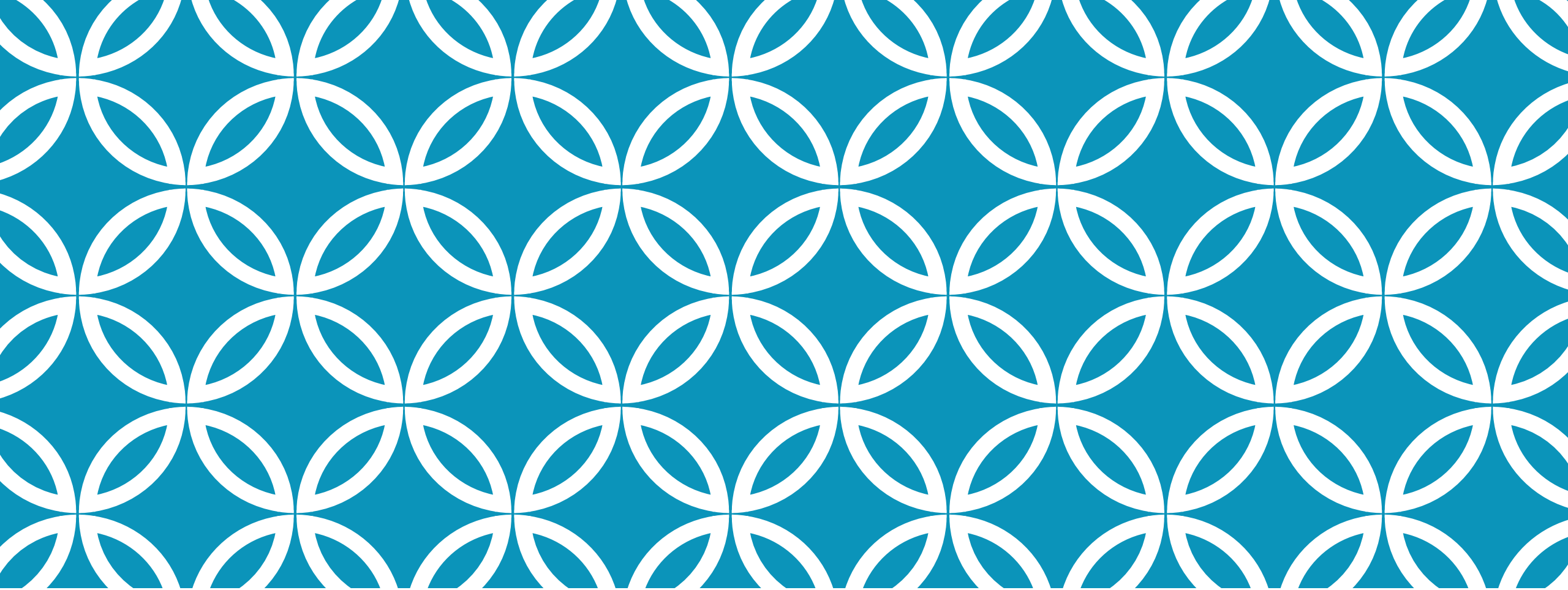
- Postural Balance:
- Static Balance:
- Dynamic Balance:

COMPONENTS OF BASIC MOVEMENT AWARENESS

Rhythmic (Temporal) Awareness:

COMPONENTS OF BASIC MOVEMENT AWARENESS

Tactile Awareness:



TRAINING MODELS

THERAPEUTIC APPROACH

Stuart McGill, PhD (University of Waterloo)

Stage 1 – Groove motion patterns, motor patterns

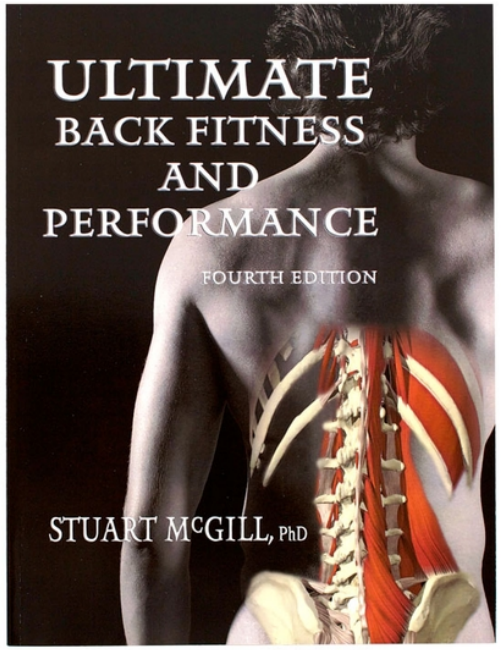
- Basic movement patterns through to complex activity specific patterns
- Basic balance challenges through to complex balance specific environment

Stage 2 – Build whole body and joint stability

- Build stability while sparing the joints
- Ensure sufficient stability commensurate for the demands of the task

Stage 3 – Increase endurance

- Basic endurance training to build the foundation for eventual strength
- Activity specific endurance (duration, intensity)



THERAPEUTIC APPROACH

Stuart McGill, PhD (University of Waterloo)

Stage 4 – Build strength

- Spare the joints while maximizing neuromuscular compartment challenge
- Speed strength and multi-articular functional strength
- Optimal timing and “steering” of strength

Stage 5 – Develop power, agility

- Develop ultimate performance with the foundation laid in stages 1-4

Overlay for all stages:

- The position of performance
- The balance environment

NASM OPT™ MODEL

National Academy of Sports Medicine, Optimum Performance Training

Based on the observation of ever increasing incidences of structural imbalances and susceptibility to injury in general population

Aims to develop well rounded physiological, physical and performance adaptations

Each stage has a designated purpose with a systematic approach for progressing towards an individual goal

The model is divided into 3 building blocks each containing specific phases of training …

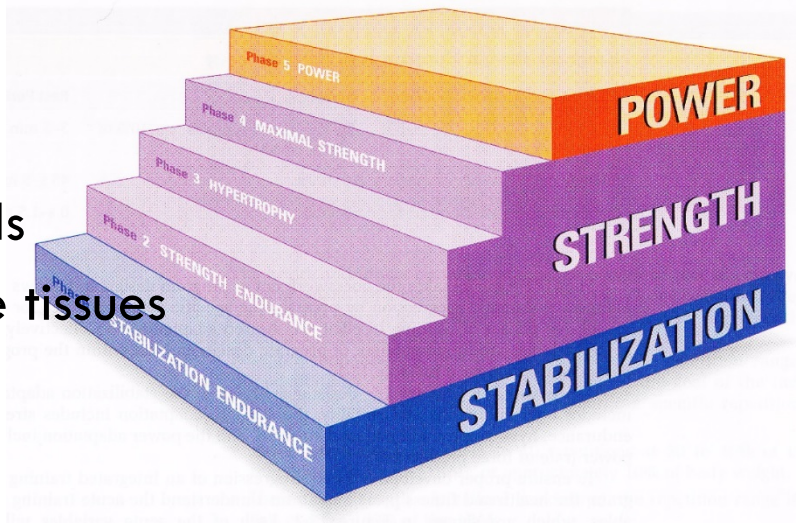
NASM OPT™ MODEL

Phase 1 – Stabilization Endurance

- Correct muscle imbalances
- Improve stabilization of core musculature
- Prepare muscles and connective tissues for upcoming demands of training
- Establish proper movement patterns or exercise technique

Phase 2 – Strength Endurance

- Increase ability to stabilize pelvis and spine under heavier loads
- Increase loading bearing capabilities of muscles and connective tissues
- Increase volume and intensity of training



NASM OPT™ MODEL

Phase 3 – Hypertrophy

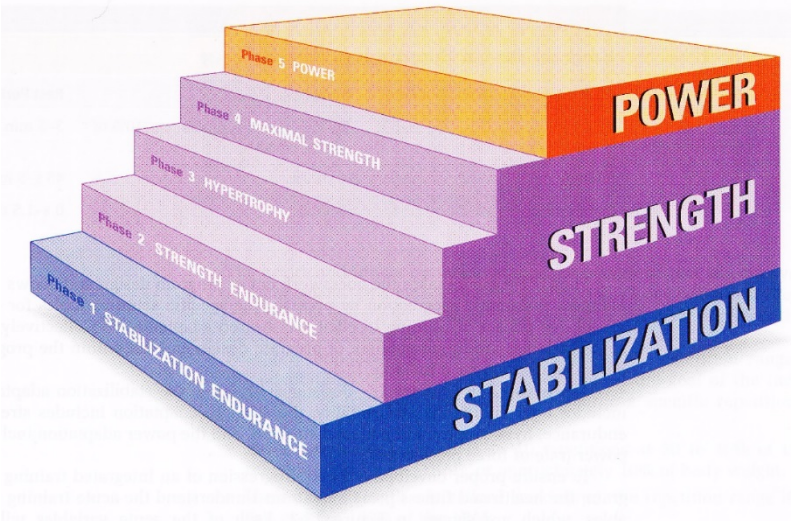
- Specific to the adaptation of muscle growth
- High levels of volume with minimal rest

Phase 4 – Maximal Strength

- Improve neuromuscular control
- Improve muscle recruitment

Phase 5 – Power

- Increase rate of force development
- Make use of stabilization and strength adaptations from previous phases and applies them to more realistic speeds and forces that the body will encounter in everyday life and sports



TRAINING MODELS

Therapeutic (McGill)

Stage 1 – Groove motor patterns

Stage 2 – Build stability

Stage 3 – Increase endurance

Stage 4 – Strength

Stage 5 – Power & agility

NASM OPT™

Stage 1 – Stabilization endurance

Stage 2 – Strength endurance

Stage 3 – Hypertrophy

Stage 4 – Max strength

Stage 5 – Power

ACE IFT

Stage 1 – Stability and Mobility Training

Stage 2 – Movement Training

Stage 3 – Load Training

Stage 4 – Performance Training

PHAC 3040 MODEL

Flexibility | Mobility | Stability

- Joint-by-joint & whole body range of motion
- Core static & dynamic stabilization

Screen Movement Patterns

- Basic corrective measures

Goal Oriented Training

- Size | Strength | Power | Agility

Training Plan

FLEXIBILITY

Defined as a measure of **joint** range of motion

An important health-related component of fitness that can enhance movement performance

Optimal levels of flexibility exist for every activity/sport

What are 2 types of flexibility?

TYPES OF FLEXIBILITY

1. Static flexibility
   - relates to ROM with no emphasis on speed; it is a controlled movement taken to the point of resistance

2. Dynamic flexibility
   - refers to the ability to use ROM to execute physical activity at either normal or rapid speed
     - aka Functional | Ballistic flexibility or
     - Mobility: defined as a measure of **movement** range of motion

STABILITY

Defined as the ability to maintain or control individual joint movement or position and whole body posture during all movements

Stability is achieved by the coordinating actions of surrounding tissues and the neuromuscular system

During movement, some joints need to be mobile, others more stable

- Michael Boyle and Gray Cook's *joint-by-joint* view of the body

JOINT-BY-JOINT VIEW OF THE BODY