

PFTA SCHOOLS



Personal Trainer Manual

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Table of Contents

Definitions	
Joint Actions	
Featured Muscles.....	
Featured Exercises	
Body Composition – Muscle and Fat	
Skeletal system	
Connective Tissue	
Nervous System	
Endocrine system.....	
Physical Activity and Disease.....	
Pre-exercise Screening.....	
Fitness assessment	
Weight loss goals	
Resistance Training	
Cardiovascular Training.....	
Successful Trainers.....	
APPENDIX	

Definitions

1. Agonist
 - a. AKA the primary mover
 - b. The muscle you are targeting
 - i. I.e., biceps during dumbbell curls
 - ii. I.e., the quad during leg extensions
2. Antagonist
 - a. The opposing muscle
 - b. Should be relaxed and elongating passively
 - c. I.e., the tricep during dumbbell curls
 - d. I.e., the hamstring during leg extensions
3. Exercise spine or neutral spine
 - a. Keeping your back straight when performing squats, deadlifts, rows, etc.
 - b. Almost all exercises should be performed with a neutral spine except abdominal crunches
4. Tibial translation
 - a. Excessive stress on the knee ligaments
 - b. Occurs when the knee extends past the toes during a lunge or step-up
 - i. Push from the heel to the balls of your feet
 - ii. Do NOT push from the toes
5. Supination or supine
 - a. "Supine is on your spine"
 - b. I.e., laying on your back for crunches
 - c. Supine grip is also underhand grip
6. Pronation or prone
 - a. Laying on your stomach or face down
 - b. I.e., prone leg curls
 - c. Prone grip is overhand grip
7. Flexion
 - a. Angle between two bones getting smaller
 - i. Bicep curls = elbow flexion
 - ii. Leg curls = knee flexion
8. Extension
 - a. Angle between two bones getting larger
 - i. Triceps pushdowns = elbow extension
 - ii. Leg extensions = knee extension
9. Abduction
 - a. Movement away from the midline
 - i. Dumbbell lateral raise = shoulder abduction
 - ii. Side-lying leg raise = hip abduction
10. Adduction
 - a. Movement toward the midline
 - i. Hip adduction machine = hip adduction
 - ii. Lat pulldowns = shoulder adduction
11. Rotation
 - a. Movement about an axis
 - i. Roman twists = trunk rotation

ii. Cable external rotation = shoulder external rotation

12. Protraction

a. Separation of two bones

i. Cable cross-overs = scapular protraction

13. Retraction

a. Two bones moving closer together

i. Reverse pec deck = scapular retraction

14. Dorsi flexion

a. Foot moving toward shin

i. Toe taps = dorsi flexion

15. Plantar flexion

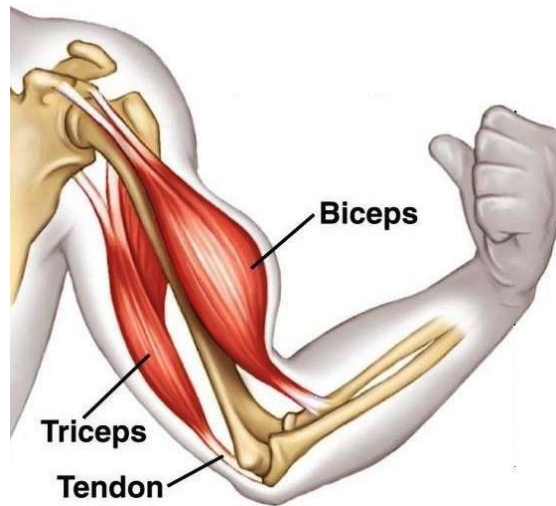
a. Foot moving away from shin

i. Calf raises = plantar flexion

16. Many more definitions to come...

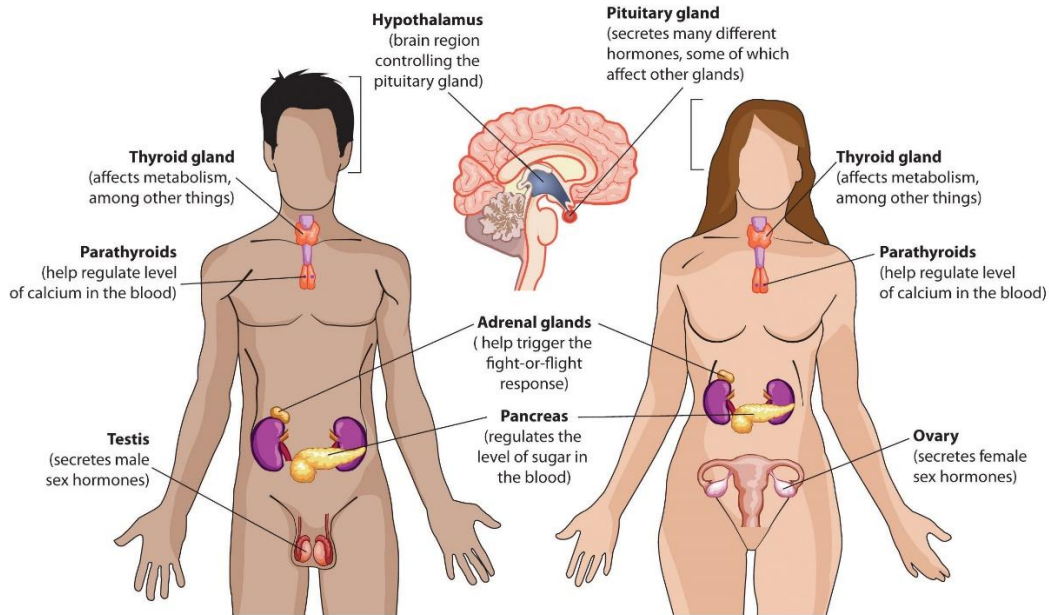
Body Composition – Muscle and Fat

1. Body composition
 - a. Defined as a ratio of fat mass to fat free mass
 - b. Linked to:
 - i. Metabolic fitness
 - ii. Disease
 - c. Elevated risk for disease and classified as obese at:
 - i. 25% body fat for males
 - ii. 32% body fat for females
 - d. Morbidly obese at
 - i. 30% body fat for males
 - ii. 40% body fat for females
2. Muscular system
 - a. Cardiac muscle
 - i. Muscle cells of the heart
 - ii. Involuntary – heart beats on its own
 - b. Smooth muscle
 - i. Internal organs, arteries, veins, etc.
 - ii. Involuntary - digestion muscles, arteries, veins, etc.
 - c. Skeletal muscle
 - i. The third type of muscle and the primary focus for personal trainers
 - ii. Pulls on tendons which pulls on bones to produce movement
 - iii. Examples include glutes, quads, pecs, biceps, etc.
 - iv. Also assists in maintaining posture
 1. I.e., core muscles and calf muscles when standing or planking



- d. Muscle contractions
 - i. Concentric contraction
 1. Positive work
 2. Shortening of a muscle
 3. Muscle force overcomes resistance
 4. I.e., upward phase of a barbell squat, bench press, curls, etc.

Endocrine system



1. Anabolic hormones

a. Anabolic is defined as increasing in size

- i. Fat, muscle, and/or glycogen cells
- ii. Four main anabolic hormones

1. Testosterone

- a. Stimulates muscle growth
- b. Hormone excretion matches intensity
 - i. I.e., deadlifts and squats cause more testosterone excretion
- c. Testosterone also limits fat storage

2. Growth hormone

- a. Stimulates muscle growth and the release of IGF-1

3. IGF-1

- a. Insulin Growth-like Factor 1
- b. Increases muscle growth

4. Insulin

- a. Promotes glucose uptake into cells
 - i. Including fat cells for conversion into fat
- b. Great for athletes after workouts
- c. But limits fat burning therefore high insulin is not good for sedentary people
 - i. High insulin and high sugar without exercise will increase fat storage

2. Catabolic hormones

a. Catabolic is defined as decreasing in size

- i. Fat, muscle, or glycogen cells
- ii. Three main catabolic hormones

1. Epinephrine/norepinephrine

- a. AKA adrenaline
- b. Breaks down sugar for energy