

Attachment 4

EXERCISE SELECTION AND MOVEMENT TERMINOLOGY

As a fitness trainer it is imperative to understand the terminology when breaking down a resistance exercise. This knowledge and skill enables the trainer to modify exercises to either regress or progress the difficulty or select similar exercises that target the same muscles (group).

In this resource a movement analysis will assist in learning the joints involved, joints movements and muscles involved in a series of common resistance exercises. This will be a great basis to expand your knowledge into other exercises and take the process learnt in this resource and apply

Definitions

Movement	Definition
Flexion	To decrease the angle at a joint
Extension	To increase the angle at a joint
Lateral/External rotation	Rotate a limb outwards around the long axis of the bone
Medial/Internal rotation	To rotate a limb inwards, around the long axis of a bone
Abduction	To increase the angle of a limb away from the body in a frontal plane
Adduction	To decrease the angle of a limb away from the body in a frontal plane
Circumduction	To allow a joint to perform movement through all possible axes
Inversion	To turn the sole of the foot medially
Eversion	To turn the sole of the foot laterally
Pronation	To turn the palm posterior
Supination	To turn the palm anterior
Horizontal flexion	To decrease the angle at the joint, moving the limb in the horizontal plane
Horizontal extension	To increase the angle at the joint, moving the limb in the horizontal plane
Retraction	Movement towards the midline on the same plane
Protraction	Going away from the midline on the same plane

Along with understanding joint actions, a further understanding of the muscles that contributes to those joint actions and the order of contribution to the movements, will assist in understanding the variations to each exercise and the predominate muscles the exercise targets.

Agonist/ Prime mover

- This is the muscle that is responsible for the movement (known as the prime mover). An example of a prime mover would be the pectoralis major whilst performing a bench press.

Synergists

- This is the muscle that assists the prime mover, either helping with the movement or stabilising the joint.
- Example of synergist muscles include the rotator cuff complex which works to stabilise the shoulder joint when the humerus is moving.

Antagonist

- This is the muscle that opposes the prime mover (agonist). When the prime mover contracts, the antagonist relaxes to allow free movement at the joint. This is due to a process known as reciprocal inhibition. An example of an antagonist muscle would be the triceps during a biceps curl

Fixator

- The fixator in a movement is the muscle/s that stabilises the origin of the agonist and the joint that the origin spans (moves over) in order to help the agonist function most effectively.

Now let's take these definitions above and place them into specific exercises and analyse all the factors involved.

N.B All analysis is based upon the concentric phase of the exercises.

Deadlift

Joint/s	Joint actions	Muscle/s	Term
Hip/Pelvis	Hip extension	Gluteals	Agonist/ mover Prime
- Knee - Hip	N/A	Hip Flexors	Antagonist
Knee	Hip extension	Hamstrings	Synergist
- Trunk/ Spine - Hips	All stabilise the trunk/Spine and hips	- Quadratus Lumborum - Abdominals - Erector spinae	Fixator
Joint Movements in each phase	Concentric (lifting/shortening phase)	Eccentric (lowering/lengthening phase)	
Hip	Extension	Flexion	
Knee	Extension	Flexion	

Seated Row

Joint/s	Joint actions	Muscle/s	Term
Shoulder	Shoulder extension	Latissimus Dorsi	Prime mover
Shoulder	N/A	Pectoralis major	Antagonist
- Shoulder/scapula - Elbow - Shoulder	- Shoulder retraction - Elbow flexion - Shoulder extension - Shoulder retraction	- Trapezius - Biceps Brachii - Posterior Deltoid - Rhomboids	Synergist
Shoulder	Stabilises deep shoulder and scapula	- Rotator cuff - Erector spinae	Fixator
Joint Movements in each phase	Concentric (lifting/shortening phase)	Eccentric (lowering/lengthening phase)	
Shoulder	Extension	Flexion	
Elbow	Flexion	Extension	

Shoulder Press

Joint/s	Joint actions	Muscle/s	Term
Shoulder	Shoulder abduction	Deltoids	Prime mover
Shoulder	N/A	Latissimus Dorsi	Antagonist
- Elbow - Shoulder - Scapula	- Elbow extension - Scapula upward rotation	- Triceps Brachii - Trapezius - Serratus Anterior	Synergist
Shoulder	Stabilises shoulder during movement	- Rotator cuff - Pec minor	Fixator
Joint Movements in each phase	Concentric (lifting/shortening phase)	Eccentric (lowering/lengthening phase)	
Shoulder	Abduction	Adduction	
Elbow	Extension	Flexion	

Squat

Joint/s	Joint actions	Muscle/s	Term
Knee and hip/pelvis	• Knee extension	Quadriceps	Prime mover
Knee and hip/pelvis	N/A	Hamstrings	Antagonist
Hip/pelvis	Hip extension	• Gluteals	Synergist
Trunk/Spine/Back	Stabilises trunk/Spine/Core	Abdominals Erector spinae	Fixator
Joint Movements in each phase	Concentric (lifting/shortening phase)	Eccentric (lowering/lengthening phase)	
Ankle	Plantar flexion	Dorsiflexion	
Knee	Extension	Flexion	
Hip	Extension	Flexion	

Chest Press

Joint/s	Joint actions	Muscle/s	Term
Shoulder	Shoulder Flexion	Pectoralis major	Prime mover
Shoulder	N/A	Latissimus Dorsi	Antagonist
• Shoulder • Elbow	• Shoulder flexion • Elbow extension	• Deltoids • Serratus anterior • Triceps brachii	Synergist
Shoulder	Stabilises deep shoulder and scapula	Rotator cuff	Fixator
Joint Movements in each phase	Concentric (lifting/shortening phase)	Eccentric (lowering/lengthening phase)	
Shoulder	Horizontal flexion	Horizontal extension	
Elbow	Extension	Flexion	