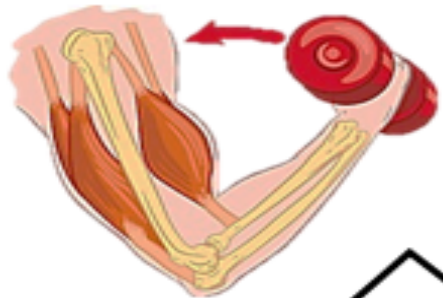
Paper 1: Movement at a joint

Lifting the dumbbell:

Antagonist = triceps

Agonist = biceps



The biceps contracts and shortens to cause flexion of the elbow. This is **isotonic concentric contraction.**

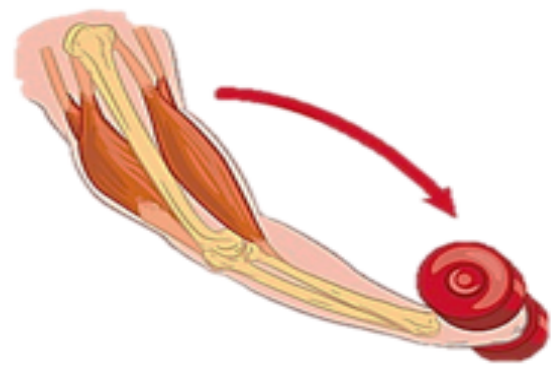
Isometric contraction would occur if the dumbbell was held at a midway point. The biceps would be contracting but not changing length.

Lowering the dumbbell:

Antagonist = triceps

Agonist = biceps

The biceps is still contracting to lower the weight, but this time is lengthening as it contracts. This is **isotonic eccentric contraction.**



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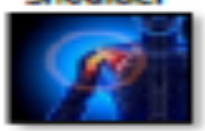
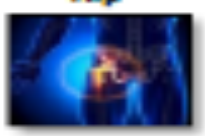
Movement at Different Joints

Different joints allow for different movements. The table below outlines the movements possible at different joints and the bones and muscles located at each joint.

Joint	Joint type	Bones of the joint	Movement possible	Main muscles contracting to cause movement
Knee 	Hinge	Femur, tibia, fibula and patella	Flexion	Hamstrings
			Extension	Quadriceps
Elbow 	Hinge	Humerus, radius and ulna	Flexion	Biceps
			Extension	Triceps
Ankle 	Hinge	Tibia, fibula and talus	Plantar flexion	Soleus
			Dorsiflexion	Tibialis anterior
Shoulder 	Ball-and-socket	Clavicle, scapula and humerus	Abduction	Deltoid
			Adduction	Latissimus dorsi, Pectorals
			Rotation	Rotator cuff
			Flexion	Pectorals, Deltoid
			Extension	Latissimus Dorsi, Deltoid
Hip 	Ball-and-socket	Pelvis and femur	Abduction	Gluteals
			Adduction	Hip flexor
			Rotation	Gluteals
			Flexion	Hip flexor
			Extension	Gluteals

Ball-and-socket joint:
- Has the largest range of motion
- Movement can occur in all planes

Hinge joint:
- Has a limited range of motion
- Movement can only occur in one plane