The Role of Muscles at the Joint

- Muscles connect to bones via tendons.
- When muscles contract, tendons pull on the bone and cause it to move at the joint.
- Muscles work together (in pairs) at joints to cause movement. Each pair of muscles is called an antagonistic pair:
  - ★ The agonist (prime mover) contracts, pulling on the bone to cause movement.
  - ★ The antagonist relaxes, so as not to impede the movement.

Muscles contract in two ways:

1. **Isotonic contractions**: when muscles change length as they contract. These can be either:
   - ★ **Concentric** – shorten as they contract

   OR

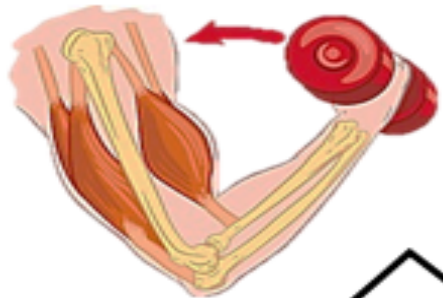
   - ★ **Eccentric** – lengthen as they contract
2. **Isometric contractions**: when muscles stay the same length as they contract.

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.**