

GROUP ACTIONS OF MUSCLES

In almost all cases muscles work in groups to produce movement. In a single action at one joint, muscles may function as

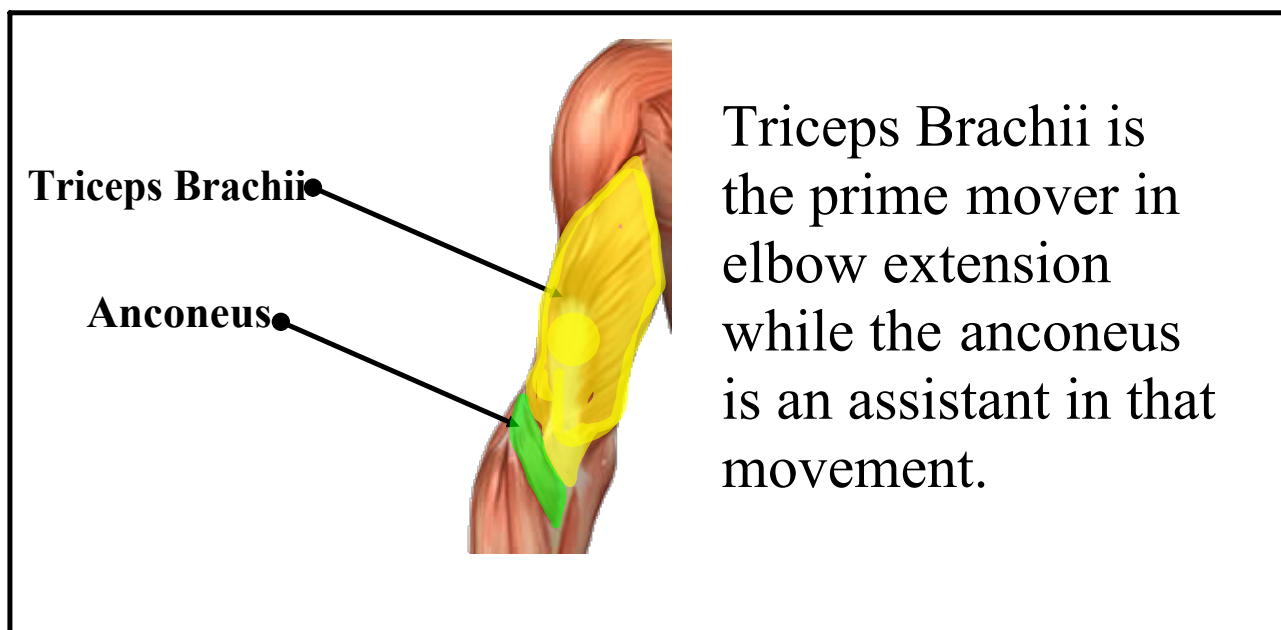
- AGONISTS
- ANTAGONISTS
- FIXATORS
- SYNERGISTS

PAGE #45

Different muscles attached around the joint cooperate to produce a smooth efficient movement.

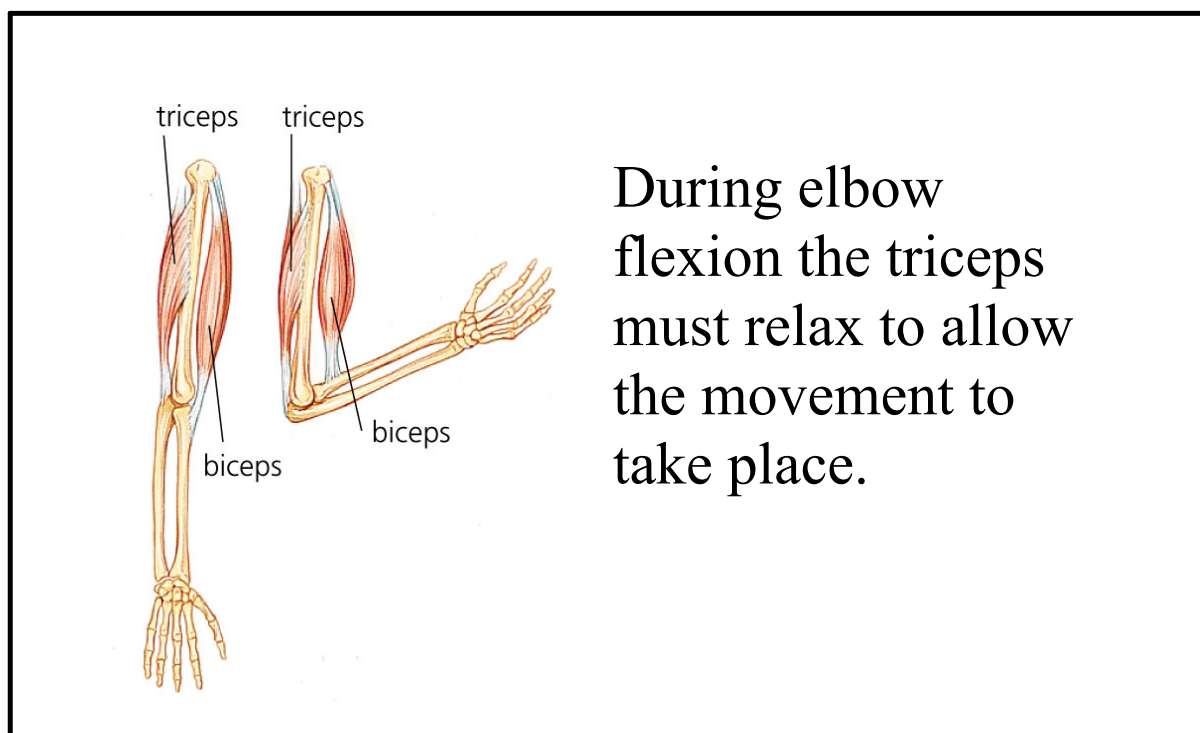
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An **AGONIST** is a muscle which contracts to produce the movement. Agonists may be **prime movers** or assisting muscles.



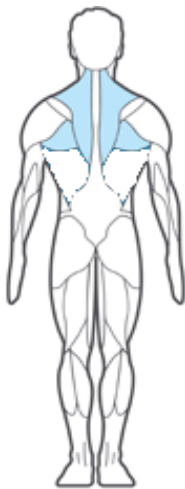
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An **ANTAGONIST** is a muscle which opposes the movement.



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A **FIXATOR** is a muscle which stabilizes more proximal joints during movement of more distal body parts.



For example, the trapezius and the rhomboids contract to immobilize the scapula during arm movement.

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When undertaking a desired motion, undesired motions are resisted by **SYNERGISTS** (neutralizers). These muscles eliminate unwanted secondary motion to more efficiently apply the full force of the desired motion.



For example the forearm extensors lock the wrist in a neutral position to allow the flexors in the forearm to apply their action in a strong grip.

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The innervation process which produces exactly the amount of relaxation in the antagonist to balance the amount of contraction generated in the agonist is known as **RECIPROCAL INNERVATION**. Failure of the central nervous system to coordinate agonist and antagonist may manifest itself as jerky, imprecise movement lacking the smoothness we take so much for granted.

PAGE #45