

Muscles and Joint Actions of the Crunch & Back Extension Video Transcript

Welcome to the AFLCA Exercise Theory video series supplementing Chapter 7, basics of anatomy. In this video, we're looking at the abdominal crunch exercise and the prone back extension exercise, sorting out what muscles are working during the concentric and eccentric phases in relation to gravity.

To make discussion easier, we're going to get the floor out of the way and do both exercises using a large stability ball.

Ok, here we are ready for an **abdominal crunch**. The body is in a supine (or face up) position in relation to gravity. The spine is extended.

The joint action during the concentric phase of a crunch is spine flexion. Torso flexion and vertebral flexion are mean the same thing. Agonist or prime mover is the rectus abdominus muscle. The rectus abdominis attaches to the ribs and pelvis and crosses over the front of the abdomen. During the crunch, rectus abdominis generates force, shortens, pulls on bones, pulling the ribcage toward the pelvis.

The joint action during the **eccentric phase** (or down phase) is spine extension.

Again, the rectus abdominis, generating force, controlling the torso as it moves back to an extended position.

This is because whatever muscles are used for the concentric phase of an exercise at a joint are the same muscles being used during the eccentric phase of that exercise.

Let's flip this over.

Here we are ready for a **prone back extension** exercise. The body is in a prone (or face down) position in relation to gravity. The spine is flexed.

The joint action during the concentric phase of this exercise is spine extension. The agonist (or prime mover) is the erector spinae. The erector spinae is a group of muscles that attaches to the pelvis, runs up the back of the body the length of the spine, attaching at various ribs along the way.

During the prone back extension exercise, the erector spinae generates force, shortens, pulls on bones, and lifts the torso against gravity.

The joint action during the eccentric phase (or down phase) is spine flexion. Agonist is still the erector spinae, generating force, controlling the torso as it moves back to its starting position.

And again, this is because the muscles that work concentrically are the same muscles that work eccentrically during that same exercise at the same joint.

So the joint action and muscles used for spine flexion and extension depend on how the body is oriented to gravity, either supine or prone.

This idea of different muscles being used when the body is oriented in different positions to gravity can be tricky, with this crunch and back extension exercise. Try to think of other exercises where you can figure out what muscles are working during the concentric and eccentric phases, up and down against gravity respectively. Such as a triceps kickback exercise, a one-arm row exercise, and even a supine chest press exercise.

Thanks for watching!