

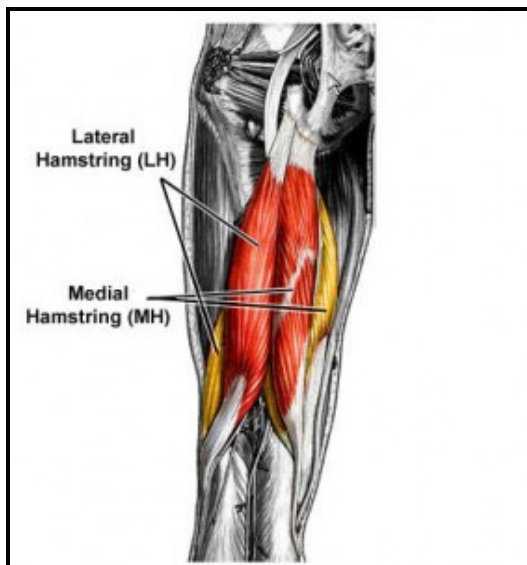


### *Functional Movement*

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All muscles function in three planes of motion: the sagittal (forward/backward), frontal (side to side), and transverse (rotational). However, most individuals train strictly in the sagittal plane. For example seated rows, leg press, leg curl/extension, bicep curls, and chest press are all sagittal plane dominate exercises.

Let us look at the hamstring to illustrate this point:



When you take a look at the hamstring its easy see that muscles work on all three planes motion. You can clearly see how the hamstring raps around the leg inserting into the tibia and fibula (lower leg). The attachments are not in a direct line. The hamstring muscles are not only designed to flex the knee in the sagittal plane, as most individuals believe (including trainers, PTs, and strength coaches). Instead, they work to control the lower half of the body during

movements in all three planes of motion. They play a huge role in decelerating the body when moving and changing direction - which takes place in all planes of motion. Decelerating the lower body also takes place during squatting; therefore, the hamstrings muscles are crucial during the eccentric phase of a squat. In addition, the hamstrings work to help assist the glutes during hip extension (concentric phase of the squat).

### Training strategies for the hamstring:

Let me start out with illustrating the limitations associated with incorporating the hamstring curl machine in a training program designed to improve functional sports movements. The hamstring curl is designed for an individual to lie on a machine while flexing their leg in the sagittal plane. It is a great exercise if you are trying to isolate the muscle independently to make it larger or stronger.

Drawbacks to the hamstring (leg) curl machine:

- In sport (such as during sprinting), the hamstring does not concentrically flex the knee without movement at the hip at the same time.
- I have never seen a sports movement where you lay on your stomach and flex your knee.
- The hamstring does not work independently of other muscles in the body.
- The hamstring works in all planes of motion, but the hamstring curl is strictly a sagittal plane movement. Therefore, the leg curl machine is a bad choice for improving functional hamstring strength.

Now let's discuss what the hamstring does during functional movements. The knee will bend if you allow it because gravity is always pulling you down to the ground. The hamstring muscles are not responsible for concentrically bending your knee to lower yourself into a squat. Instead, hamstring helps decelerate the body during squatting and lunging movements. I just named two great exercises to target the hamstrings - squats and lunges are extremely functional exercises. Deadlift variations would also be a great choice to enhance hamstring strength. In addition, the hamstrings help assist with hip extension - hip extension takes place during squatting, lunging, deadlift movements. To make your training more functional I recommend doing squatting and lunging movements in the frontal and transverse plane to compliment traditional sagittal plane exercises.

Take home message:

When designing a workout routine try to train movements and not individual muscles (deadlifts, squats, and lunges instead of hamstring curls and leg extensions). Also, incorporate exercises that address all three planes of motion. If you examine those two factors when putting together your strength training routine you will ensure that your program is more functional.