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AF Q&A

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DOES STRENGTH TRAINING IMPROVE BALANCE?

It certainly stands to reason that if the strength of the muscles can be increased, there's a greater potential for improved stability. And improved stability could make it easier to maintain balance. In particular, this would be of significance for older individuals who are more susceptible to falls. But is there any scientific support for this contention?

Researchers at the University of Sydney, Australia, and Tufts University in Boston did a comprehensive review of the literature. They considered all randomized controlled trials that investigated the effects of strength training with a variety of equipment on any type of balance (such as static and dynamic) using healthy subjects who were more than 50 years old. On average, the studies lasted 22.7 weeks with sessions done two to three times per week for 58.8 minutes per session.

The 29 studies that met their criteria involved 2,174 subjects and used 68 tests of balance. Strength training produced significant improvements in balance in 14 of the 29 studies and only 15 of the 68 tests.

Maintaining balance is a complex process. Although strength training is important, it appears as if it alone isn't effective at improving balance.

DOES THE SIDE LUNGE PRODUCE MORE STRESS IN THE KNEE JOINT THAN THE FRONT LUNGE?

The lunge is a popular exercise in strength-training programs, group fitness classes and rehab prescriptions. It can be done to the front and side as well as with and without a stride (that is, in a stationary position).

In one study, 18 healthy subjects did 12 repetitions with their 12-repetition maximum in the forward lunge and side lunge with a stride and without. The researchers calculated compressive force in the knee at various joint angles (from 0 to 90 degrees in 10-degree increments).

In general, the side lunge produced significantly greater compressive force than the forward lunge from 80 to 90 degrees during knee flexion and at 90 degrees during knee extension. Also, doing the lunge with a stride produced significantly greater compressive force than doing the lunge without a stride from 10 to 50 degrees during knee flexion and 20 to 50 degrees during knee extension.

Bottom line: The compressive force encountered by the knee during the forward and side lunges is similar, except at greater joint angles.

IS ROTATING THE TORSO WHILE HOLDING A STICK ACROSS THE SHOULDERS AN EFFECTIVE EXERCISE?

Many exercisers sit on a bench, place a wooden stick (or sometimes a barbell) across their shoulders and rotate their torso from side to side. Is this exercise good for training the obliques?

In order for an exercise to be as effective as possible, the lifter must apply a force that opposes the resistance by 180 degrees. In other words, the applied force must be exactly opposite the direction of the resistance. If the resistance is from the south, the force must be applied north; if the resistance is from the east, the force must be applied west.

Gravity is a force that always pulls straight down. Because of the effects of gravity, the force that's applied to any "dead weight" (such as a barbell or dumbbell) must be in a vertical plane. When a lifter pushes or pulls a barbell or dumbbell (or similar object) straight up while gravity acts straight down, the application of force is absolutely perfect.

From this, it can be seen that rotating the torso with a stick or similar object held across the shoulders is an incorrect—and ineffective—application of force. No matter how much the object weighs, the resistance is always straight down. But here, the lifter is applying force parallel to the floor, not perpendicular to it.

An effective way to do torso rotation is on a machine. Here, the resistance is consistent with the direction of the applied force.

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REFERENCES:

ESCAMILLA, R.F., ET AL. "PATELLOFEMORAL COMPRESSIVE FORCE AND STRESS DURING THE FORWARD AND SIDE LUNGES WITH AND WITHOUT A STRIDE." *CLINICAL BIOMECHANICS*, 23, NO.8 (2008): 1026-1037.

ORR, R., ET AL. "EFFICACY OF PROGRESSIVE RESISTANCE TRAINING ON BALANCE PERFORMANCE IN OLDER ADULTS: A SYSTEMATIC REVIEW OF RANDOMIZED CONTROLLED TRIALS." *SPORTS MEDICINE*, 38 (2008): 317-343.