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Clinical Trial of Spinal Stabilization Training

By Craig Liebenson, DC

A recent randomized, controlled clinical trial evaluated the effectiveness of a specific exercise program aimed at training the transverse abdominus and multifidus muscles.[1] 62 subject were studied with a follow-up period of 3, 6 and 30 months.

Subjects: chronic low back patients with a radiologic diagnosis of spondylolythesis.

Intervention: The control group (CG) was given a general exercise prescription for swimming, walking or gym work for 10 weeks. The specific exercise group (SEG) included supervised training in the abdominal drawing-in manoeuvre and co-activation of deep abdominal and multifidus muscles. Training was submaximal, but daily.

Outcomes: McGill pain questionnaire; weekly medication intake; Oswestry questionnaire; lumbar and hip ROM; surface EMG of IO and rectus abdominus activation during the abdominal drawing-in manoeuvre.

Conclusion: Statistical analysis revealed no significant differences between groups on entry to the trial. Both groups' pain descriptor scores improved. Only the SEG demonstrated significant decreases in pain intensity, pain descriptor scores, functional disability levels and medication usage, and significantly increased hip flexion and extension ROM. No difference within or between groups was noted in lumbar spine ROM.

Final Clinical Points: It took many in the SEG 4-5 weeks to learn how to activate the targeted local muscles (multifidus, internal oblique, transverse abdominus) without substitution by larger global muscles (iliocostalis lumborum, rectus abdominus, external oblique). Also, difficulty controlling breathing was encountered. Exercises were progressed slowly with low load. Once the patients could correctly perform the coactivation pattern without synergist substitution and hold it for 10 seconds with 10 repetitions, then load was added to the limbs (i.e., dead-bug). Patients were encouraged to perform the co-contractions throughout the day, "particularly in situations where they experienced or anticipated pain or felt 'unstable.'"

Reference

1. O'Sullivan P, Twomey L, Allison G. Evaluation of specific stabilizing exercise in the treatment of chronic low back pain with radiologic diagnosis of spondylolysis or spondylolisthesis. Spine 1997;24:2959-2967.

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Editor's note: In the April 6 issue, a portion of the third paragraph in Dr. Liebenson's article was accidentally left out. The paragraph should read:

> Once the patient has good kinaesthetic awareness of their "neutral spine position or range" they can be progressed to more challenging exercises. Initial progressions include resisted trunk rotation or distal upper and lower limb exercises. Richardson et al., showed that co-contraction of transverse abdominus and multifidi is maximized during isometric resisted rotation of the trunk. It has also been demonstrated that slow curl-ups increase the isometric, static ability function of the abdominals better than faster curl-ups. Usually, a static hold of up to 10 seconds is held, and about 5-10 repetitions are performed.

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