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## **Safe-Back Workouts, Part II: Troubleshooting**

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Safe-back workouts are designed for any individual at risk of spinal pain. Even sedentary people can be prescribed these exercises, and reasonable compliance can be achieved. Three training levels were described in my last article (see the October 19th issue of DC). The aim of these exercises is to teach patients how to exercise "weak links" without irritating their spines. Certain key points are worth considering when integrating exercise into your office. Facilitation strategies, such as the use of manipulation to a key joint to relax an overactive muscle and prevent unwanted substitution by that muscle for the "weak link," is one example.

Muscle imbalances lead to substitution of overactive muscles for inhibited ones. This occurs when there is joint hypomobility and is a cause of secondary hypermobility. Edgerton et al. found that findings of synergist substitution correlated with chronic pain in whiplash patients with 88% predictive validity.<sup>1</sup> O'Sullivan et al. found that synergist substitution of the rectus abdominus for the agonist transverse abdominus during an abdominal "drawing in" manoeuvre strongly correlated with chronic back pain.<sup>2</sup> As a rule, overactive muscles are relaxed before strengthening routines are initiated.

Any difficulty encountered with progressive exercise training should be addressed systematically. Activities of daily living or job demands may be sources of repetitive overstrain. Thus, activity modification advice to improve biomechanics and ergonomic efficiency is often necessary. This is so important that it should generally be considered first.

An excellent example of postural advice is Brugger's relief position. Manual therapy of manipulation of any peripheral somatic dysfunctions that are linked to the patient's pain should be a second step.<sup>3</sup> This would include not only adjustment of joints, but mobilization of skin, fascia and muscle. Sometimes stability requires an external stabilizing force, such as a foot orthosis, patellar taping or a sacral belt.<sup>4</sup>

Table I: Facilitation strategies -- troubleshooting

1. activity modification or ergonomic advice;
2. manual therapy or manipulation of key joints, soft tissues or muscles; and
3. external supports.

The first level of safe-back training involves re-educating motor control of spinal/pelvic position. This starts with creating an awareness of how to move the base of the spine into extension and flexion. This may be accompanied by nutation/counternutation kinaesthetic awareness training. This should be explored in a variety of postures: supine, sitting, standing, quadruped, etc. In each posture the patient should demonstrate that they can produce movement through a full range and identify a midpoint or neutral position. The selling point of this training for the patient is that appropriate spinal positioning is necessary for sitting, lifting or exercise training (e.g., situps, leg raises). For instance, during sitting and lifting the back should be pre-positioned in lordosis to protect the discs. On the contrary, during situps and leg raises the back should be biased toward a more "neutral position" to protect the joints.

Once the kinaesthetic awareness of how to move and position the spine/pelvis is attained, then the patient is ready for the second level of safe-back training. The patient learns to maintain a "neutral position" when an external load is added through the limbs. Examples include "dead bug" and quadruped exercises. Exercises are trained with endurance, not strength, as the goal. Therefore, submaximal load is used with prolonged hold times up to 10 seconds.

The third and final stage of safe back-stabilization training occurs when trunk motion is allowed. Examples include trunk curls or back extension. Once again, endurance -- not strength -- is the goal.

When following safe back principles, patients learn to stabilize their "core" when performing exercises. Usually within just 4-6 weeks of training, an individual can progress from level 1 to level 3 exercises. Successful performance of level 3 exercises means that they have developed the cortical control necessary to perform trunk movements while maintaining the spine in a stable range. With practice and the use of labile surfaces, this will become more and more automatic. When it becomes a habit to pre-position the back properly and maintain it there during load handling, it has achieved an involuntary state. This is crucial because the primary stabilizers of the spine are deep intrinsic muscles whose activity is needed quickly even when load is merely anticipated.

There is a great deal of educational and motivational material now available to increase patient adherence with exercise recommendations.<sup>5-11</sup> Exercise is a powerful tool in teaching patients to develop an internal locus of control for managing their pain. Lack of an internal locus of control is a significant risk factor of acute pain becoming chronic.<sup>12</sup>

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