



Dynamic Chiropractic – December 14, 1998, Vol. 16, Issue 26

The Back Pain Revolution, Part One: The Biopsychosocial and Biomechanical Models

By Craig Liebenson, DC

The health care system problem of back pain is due to the epidemic costs of chronic disability. The chiropractic problem within the health care system is that we are getting paid less but being asked to do more (documentation, rehabilitation, etc.). The learning objectives for this article are to discuss chiropractic as the benchmark profession for managing neuromusculoskeletal conditions; the biomechanics of soft-tissue injury; the biopsychosocial aspects of pain and disability; and how to integrate simple advice, manipulation and exercise into a goal-oriented clinical approach.

The Biopsychosocial Model

A major cost problem is that a small minority of patients who become chronically disabled cost the vast majority of dollars. A solution is to shift resources from chronic cases to the subacute ones. Here's a road map of how to accomplish this:

1. Assure that there are no "**red flags**" of serious disease.
2. Identify activity intolerances and key functional deficit.
3. Rule out "**yellow flags**" of psychosocial risk of chronicity.
4. Establish goals:

- a) decrease activity intolerances;
- b) improve internal locus of control;
- c) decrease pain-related anxiety;
- d) improve function.

5. Provide activity modification advice to prevent further injury.

6. Use manipulation as the "key link."

7. Give appropriate exercise to improve motor control.

Resources should be concentrated on those subacute patients who have "yellow flags" that they are at increased risk of becoming chronic. The Mercy guidelines advise: "All episodes of symptoms that remain unchanged for 2-3 weeks should be evaluated for risk factors of pending chronicity. Patients at risk for becoming chronic should have treatment plans altered to de-emphasize passive care and refocus on active care approaches."(p. 125:16)¹

Various aspects of psychological deconditioning are:

- abnormal illness behavior
- affective (emotional)
- anxiety
- depression
- cognitive (coping)
- fear-avoidance
- locus of control

Biomechanical Model

The clinician has to identify the source of repetitive strain responsible for pain and injury, and seek a better understanding of the etiology of soft tissue injury and the components of the spinal stabilization system. Repetitive lifting, exposure to whole body vibration and sudden, unexpected movements or loads have been demonstrated to cause spinal problems.¹

A common myth about back injury is that it results from a single, specific event, but it is the "straw that breaks the camel's back" syndrome. McGill states that back injury is usually a result of "a history of excessive loading which gradually but progressively reduces the tissue failure tolerance."²

Bogduk and Twomney add: "After prolonged strain, ligaments, capsules and IV discs of the lumbar spine may creep, and they may be liable to injury if sudden forces are unexpectedly applied during the vulnerable recovery phase."³

What exactly is the injury mechanism of the low back? Simply put, it is too much of any one thing; in particular, end range loading. Disc problems usually result from repetitive end-range flexion: facet problems of repetitive end range extension. Knowledge of the mechanism of injury can influence our management by focusing us on the importance of educating patients about how to maintain a "neutral spine" when performing tasks.

"Avoiding spine end-range of motion during activity can reduce the risk of several types of injury," McGill says.

Is there a spinal stabilization system? According to Panjabi, these subsystems work together to promote stability: central nervous subsystem (control); osteoligamentous subsystem (passive); and muscle subsystem (active).⁴ The stabilization system works by tensing the muscles, like rigging on a ship to make the sails taut, to support the spine and prevent it from buckling under strain. This system works surprisingly well when large forces are involved because the muscles automatically contract, but when light forces are involved, the muscles are often relaxed and the spine is not stiffened. A trivial trauma thus can surprise the patient and cause an unexpected low back injury.

References

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Craig Liebenson, DC
Los Angeles, California
cldc@flash.net

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