

The Role of Manipulation in Rehabilitation

Craig Liebenson, DC

According to Lewit, segmental dysfunction is the key reflex change associated with pain.¹ Thus, assessing and treating joint dysfunction is the first line of treatment. Unfortunately, many times relapse occurs due to the sources of joint overstrain having gone undiagnosed. By far the most important such perpetuating factor is the presence of faulty movement patterns. Thus, remedial exercise and activity modification advice are the second line of treatment after manipulation.

In recurrent or chronic cases, Lewit says the key is to identify the faulty pattern (gait, lifting, respiration, spinal statics, etc.), then find the "key link" that is "chained up" to the pattern.^{1,2} Many of these patterns can be assessed through simple tests of key movement stereotypes developed by Janda (hip extension, hip abduction, trunk flexion).² Recent evidence showing the relationship between key stabilizers, such as the multifidus and transverse abdominus and back pain, lends credence to this approach.³⁻⁸

Rehabilitation of the Motor System

The goal of treatment is to improve performance of the movement pattern first cortically and then subcortically. This is important because most injuries occur following exposure to unexpected perturbations. Bogduk says, "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."⁹

A continuum of care incorporating a gradual transition from passive to active care approaches can be used to facilitate a "weak link." Passive, semi-active, and active approaches might include:

- Joint manipulation -- passive
- Trigger point therapy -- passive
- Post-isometric relaxation (PIR) of an overactive antagonist muscle -- semi-active
- Reflex activation of intrinsic stabilizers by proprioceptive training -- active

Once the "weak link" is facilitated the patient can be educated to isolate the muscle during specific training exercises. These exercises are always performed in a "functional range" which minimizes joint strain and maintains coordination and proximal stability. Such exercises should be progressed towards activities which closely resemble the patients activities of daily living (ADLs) or demands of employment (DE).

Rehabilitation involves a comprehensive prescription of advice, manipulation and exercise.² The goal of advice is to reduce strain on the locomotor system. The goal of manipulation is to restore function in a "key link" (i.e., segmental movement restriction) which is "chained up" with the pain generating structure (i.e., myofascial trigger point). The goal of exercise is to stabilize the osteoligamentous

system: in other words, to reduce stress at key joints/discs that is caused by abnormal movement patterns. Abnormal movement patterns should be viewed as the main perpetuating factor of both segmental movement restriction and myofascial trigger points.

Faulty movement patterns are common in our modern society with the prolonged time spent in constrained postures. This static overload causes predictable muscle imbalances and joint overstrain. For instance, we have all observed tight upper trapezius, pectorals, and suboccipital muscles in our patients. At the same time, we have observed head forward, round shouldered, and stiff upper thoracic kyphosis frequently. That these are tied together is obvious. Manipulation of the stiff upper thoracic kyphosis is needed. But, in many cases there will be relapse. Thus, it is also necessary to retrain static posture (i.e., Bruegger advice) and restore muscle balance.^{1,2}

The Place of Manipulation

Manipulation is the quickest and simplest tool for restoring function in the locomotor system. Its reach extends well beyond the joints to include muscles, fascia and even skin. What is its aim? To normalize a "bind" or resistance to motion which is interfering with normal function. This "bind" is what Sandoz called the pathological barrier. This barrier phenomena is very poorly understood, yet it is the very basis for chiropractic's most fundamental technique, the high-velocity short-amplitude thrust. Additionally, if we don't develop our understanding of manipulation to include other "release" techniques such as PIR, we are at risk of falling behind other professions as manipulation develops world-wide.

Palpation of the barrier in joints, muscles, fascia and skin is fraught with uncertainty. Notoriously poor interobserver reliability is considered the norm with our palpation. Fortunately, intraobserver reliability and thus responsiveness of motion palpation has been shown to be more promising. Nonetheless, in rehabilitation, since measurable improvements in function, especially reduction in activity intolerances is our goal, manipulation has a vital role to play: in particular, manipulation of some "key link" which has been determined to be related to faulty function in our patients activities of daily living or job demand.

A classic example is a movement restriction of the sacroiliac joint impairing forward bending movements. Identification of a joint restriction must precede manipulative therapy or else treatment is "blind." Also, palpation must feel the "release" that occurs when manipulation has been successful. In thrust techniques we hear the cavitation and can perform a post-treatment palpation to confirm the improvement. However, palpation of release becomes a sensitive ally in PIR, fascial and skin techniques as well. For example, in PIR or muscle energy techniques for joint restrictions we first take up the slack and engage the barrier. Then we ask the patient to gently contract against our resistance away from the barrier. After a brief isometric effort, usually combined with synkinetic breathing and eye movements, the patient is asked to relax and we wait. We wait for a release of the barrier; when we feel it, we follow by taking up the slack to the new barrier.

Manipulation is essential to rehabilitation of the motor system. "Remedial exercise is time consuming and time should not be wasted." It is the manipulation of some "key link" which is related to the activity intolerance that is the most economical and often efficacious treatment. Obviously, if abnormal movement patterns are "programmed," relapse may occur and remedial exercise aimed at restoring muscle balance and healthy movement patterns in one's ADLs and DE will be necessary.

References

1. Lewit K. Manipulative Therapy in Rehabilitation of the Motor System, 2nd edition. London: Butterworths, 1991.
2. Liebenson C. Rehabilitation of the Spine: a Practitioner's Manual. Williams & Wilkins, 1996.
3. Hodges PW, Richardson CA. Inefficient muscular stabilization of the lumbar spine associated with low back pain. Spine 1996;21:2640-2650.
4. Biering-Sorensen F. Physical measurements as risk indicators for low back trouble over a one-year period. Spine 1984;9:106-119.
5. Luuto S, Heliovaara M, Hurri H, Alaranta H. Static back endurance and the risk of low-back pain. Clin Biomech 1995;10:323-324.
6. Ng J, Richardson C. Reliability of EMG power spectral analysis of back muscle endurance in healthy subjects. Arch Phys Med Rehabil Vol 77, March 1996, 259-264.
7. Hides JA, Richardson CA, Jull GA. Multifidus muscle recovery is not automatic after resolution of acute, first-episode of low back pain. Spine 1996;21(23):2763-2769.
8. Hides JA, Stokes MJ, Saide M, Jull GA, Cooper DH. Evidence of lumbar multifidus muscle wasting ipsilateral to symptoms in patients with acute/subacute low back pain. Spine 1993;19(2):165-172.
9. Bogduk N, Twomey L. Clinical Anatomy of the Lumbar Spine. Churchill Livingstone.

Craig Liebenson, DC
Los Angeles, California

JULY 1997