

Managing Motor-Vehicle Trauma: A 2011 Status Report, Part 2 by Dr. Arthur Croft

Lack of Evidence-Based Support

Another practice that has not received much scrutiny is spinal surgery. Who needs it? How effective is it? Which is the best procedure for disc herniation versus spondylolisthesis; versus severe spondylosis; versus spinal stenosis; versus AS; and so on? Should plates and screws be used? Are PEEK cages better than tricortical plugs or titanium cages? The state of this literature is surprisingly uncertain about nearly all of these questions. Even more important are questions of relative safety, and how surgery compares with non-surgical approaches.

Several studies have shown that for some back conditions, there is no important clinical difference in the long-term outcome. Of course, the 1 percent who die during such procedures might disagree, if they could, as might the 14-25 percent (depending on the paper you read) who have serious complications from spine surgery. Of interest is [a recent study of such complications](#) of spine surgery.⁸ The researchers found only 25 published papers on complications of cervical spine surgery. This is approximately the number of papers that have been published on complications attributed to chiropractic manipulation.

The complication rate in published studies may be underreported for a variety of reasons, although I am only speculating here. It is common to include as participants in studies those who are considered good risks for surgery. Thus, older individuals with more advanced degenerative changes, and those with prior spinal surgeries or who have other risks for poor outcome, are often excluded, even though surgeons do operate on these people on a daily basis.

Some of these reported studies have follow-up periods that defy logical explanation (six days in one, 10 days in another and 30 days in still another). It can be expected that some adverse effects, such as construct (i.e., plate) failure, screw loosening, migration of cages or bone plugs, etc., will become evident only after these brief periods. In fact, the surgical literature in general is highly problematic and is plagued with selection bias (cherry picking), lack of randomization, lack of controls, unstated hypotheses, questionable outcome assessments (including assessments by the surgeons themselves), surrogate end points (e.g., measuring ability to walk around the block or whether the patients has returned to work rather than rating pain or other tangible functional performance criteria). It is rarely clear if these unorthodox outcome measures were part of the original study design vs. serving as *post hoc* modifications designed to salvage unanticipated results.

Many of the large-scale studies of complications are retrospective based on searches of hospital registries and depend heavily on the accuracy of the initial data and the completeness of databases. In the study by [Nasser, et al.](#),⁸ although the mean complication rate for the cervical studies they looked at was 22.9 percent by my arithmetic calculation, the authors applied an interesting weighting to the data and reported a complication rate of only 8.9 percent. In another paper by some of the same authors, they quoted the first paper as reporting a "pooled" complication incidence rate, but did not mention the weighting.

Transforaminal epidural steroid injections (TESI) had been thought to be relatively safe and effective as a management for intractable spinal pain in cases of cervical spine trauma. This procedure is considered safe with up to three injections over the course of a year. A recent study, however, raised a flag of alarm in the PM&R and anesthesiology communities. [Scanlon, et al.](#), reported a surprisingly large number of severe complications in a survey of practitioners.⁹ These included 30 cases of brain or spinal cord infarct: 16 vertebrobasilar brain infarcts, 12 cervical spinal cord infarcts and two combined cord and brain infarcts. Another 24 complications included death of unspecified etiology (n=5), high spinal anesthesia (n=3), transient ischemic attack (n=3), seizure (n=2), severe headache (n=2), spinal cord edema (n=2), brain edema with reversible ischemic neurologic deficit (RIND) (n=1), cortical blindness from air embolus

(n=1), cervical epidural hematoma (n=1), paraspinal hematoma (n=1), peripheral neuropraxia (n=1), and vasovagal response (n=1). There were 13 fatal outcomes.

Note that these were reported, rather than confirmed, cases of *transforaminal* injections and we have no data on their actual incidence, but these reports are nonetheless cause for concern. It has been my experience, as well as some of my orthopaedic surgeon colleagues, that **ESI is not particularly effective in cases of trauma**.¹⁰

In 2009, a study that tracked patients with lumbar discograms for 10 years revealed that subjects had a greater progression of degenerative changes and disc herniation as compared to controls.¹¹ Thus, the early assurances that puncture of the disc with a skinny needle was harmless appear to have been in error.

Your patients are watching the drug product ads on TV, including the ones telling them how trusted acetaminophen is. Some of them will be scheduled for TESI or discography, and some may eventually submit to surgery. A little honest discussion of the inherent risks is never a bad idea.

The Stroke Controversy

In the *worst of times* this controversy nearly cost chiropractors everywhere their ability to manipulate the cervical spine. In some places it did. Why do I call it a controversy? Because it began many years ago on the basis of a few poorly documented case reports, some of which were lacking an unmistakable link between cause and effect. In one case, vertebral artery dissection occurred five days after a manipulation that had actually relieved the patient's neck pain. In several cases, the "chiropractic manipulation" was actually performed by non-DCs including a medical pediatrician, a spouse, a barber, a massage therapist and in one case, a truck driver manipulating his own neck.

While **these papers have been discussed** in an academic forum,¹² a couple of larger case-control studies were undertaken in Canada which seemed to provide more concrete evidence of a true stroke risk with cervical manipulation. But they were subtly flawed. The definitive study, of course, was published by **Cassidy, et al., in 2008**.¹³ They rather peremptorily disabused the stroke concern (but I dare not add *once and for all* in case the age of foolishness hasn't run its course).

Limited Scope of Testimony

One can never predict what a judge might decide to allow in terms of testimony in the light of pre-trial motions *in limine* or 402 (*voir dire*) hearings on the day of trial. In the *worst of times* judges often placed fairly severe limits on the testimony of DCs, barring them from discussing the forces exerted by a collision or going into discussions of biomechanics. In these *best of times*, a well-versed practitioner will anticipate these common objections and know how to most effectively deal with them.

Do not expect the lawyer calling you to have all of the best responses. Most of the time they won't. But here is another way your input can be crucial. My graduates have been qualified as experts in biomechanics in numerous cases and states; the notion that DCs are a disaster to a case has been disproved in courtrooms around the country. The MD may enjoy more general cachet with jurors, but unless they were specially trained in whiplash traumatology, they won't be as familiar with many of the most important features of the case.

Circle the Wagons

My parting comment is that success breeds success. One of the curious circularities I have seen is the attorney who tried a few cases and lost them all. Instead of learning why and making necessary changes, they simply wrote the type of case off as unwinnable. Winning, of course, inspires attorneys to stay the course and hone their skills. So, when you examine the cases you manage, here are the most common points of failure. They are areas exploited - usually deceptively - by the defense team.

- Failing to make the connection between the cause of the injury and the treatment or impairment. The defense will leverage this attack using the ACR.
- Failing to connect the physical injury to the traumatic event. A biomechanist will be used to make this attack.
- Failing to effectively counter the junk science and baseless theories put forth by defense medical experts.

All of this is truly simple to do, but like I said, failure to do it can become a major problem. I like the old axiom: Information leads to knowledge; knowledge leads to wisdom; and wisdom leads to enlightenment.

References

1. Giles LGF, Muller R. **Chronic spine pain: a randomized clinical trial comparing medication, acupuncture, and spinal manipulation.** *Spine*, 2003;28(14):1490-1502.
2. Muller R, Giles LG. Long-term follow-up of a randomized clinical trial assessing the efficacy of medication, acupuncture, and spinal manipulation for chronic mechanical spinal pain syndromes. *J Manipulative Physiol Ther*, 2005;28(1):3-11.
3. Gross AR, Goldsmith C, Hoving JL, et al. Cervical Overview Group. **Conservative management of mechanical neck disorders: a systematic review.** *J Rheumatol*, 2007;34(3):1083-1102.
4. Croft AC, D'Antoni AV, Terzulli SL. Update on the antibacterial resistance crisis *Medical Science Monitor*, 2007;13(6):RA103-118.
5. Lazarou J, Pomeranz BH, Corey PN. **Incidence of adverse drug reactions in hospitalized patients: a meta-analysis of prospective studies.** *JAMA*, 1998;279(15):1200-1205.
6. Moore TJ, Cohen MR, Furberg C, D. Serious adverse drug events reported to the Food and Drug Administration, 1998-2005. *Arch Int Med*, 2007;167(16):1752-1759.
7. Frosch DL, Krueger PM, Hornik RC, Cronholm PF, Barg FK. Creating demand for prescription drugs: a content analysis of television direct-to-consumer advertising. *Annals of Family Medicine*, 2007;5(1):6-13.
8. Nasser R, Yadla S, Maltenfort G, et al. **Complications in spine surgery.** *J Neurosurg Spine*, 2010;13:144-157.
9. Scanlon GC, Moeller-Bertram T, Romanowsky SM, Wallace MS. **Cervical transforaminal epidural steroid injections: more dangerous than we think?** *Spine*, 2007;32(11):1249-1236.
10. Schofferman J, Bogduk N, Slosar P. **Chronic whiplash and whiplash-associated disorders: an evidence-based approach.** *J Am Acad Ortho Surg*, 2007;15:596-606.
11. Carragee EJ, Don AS, Hurwitz, E.L., Cuellar JM, Carrino J, Herzog R. **Does discography cause accelerated progression of degenerative changes in the lumbar disc?** A ten-year matched cohort study. *Spine*, 2009;34(21):2338-2345.
12. Haneline MT, Croft AC, Frishberg BM. **The association of internal carotid artery dissection and chiropractic manipulation.** *Neurologist*, 2003;9(1):35-44.
13. Cassidy JD, Boyle E, Cote P, et al. **Risk of vertebrobasilar stroke and chiropractic care: results of a population-based case-control and case-crossover study.** *Spine*, 2008;33(45):S176-S183.