Effect of the Chiropractic Adjustment on an Underrecognized Risk Factor for Stroke

By Charles Masarsky, DC, FICC

Some risk factors for stroke are well-known to the lay public and the health care practitioner community, and as we all know, even the potential association between cervical manipulation and stroke incidence has been magnified ad nauseum by the media and others. Let’s consider a risk factor that is less widely recognized, even though a significant body of evidence supports its importance – reduced lung volumes.

Reduced Lung Volumes and Stroke Risk

Two lung volumes are of particular interest. One is forced vital capacity (FVC), which is the amount of air expelled in one complete forceful expiration. The other is forced expiratory volume in one second (FEV1), which is the amount of air expelled in the first second of a forced expiration.

Wannamethee, Shaper and Ebrahim\(^1\) reported a relationship between lung volumes and stroke. A group of 7,735 men ages 40 to 59 years were followed over a mean of 14.8 years. By the end of the follow-up period, 277 members of this cohort had suffered major strokes, 63 of which were fatal. There was an inverse relationship between incidence of stroke and FVC among smokers and non-smokers alike. A similar relationship was observed with FEV1.

The Reykjavik Study is a cardiovascular epidemiological study begun in 1967. Agnarsson, et al., reported on 4,484 men without a history of stroke who underwent FVC and FEV1 measurement.\(^2\) An average of 10.6 years post-measurement, a total of 249 men had suffered a stroke. Both FVC and FEV1 at intake were inversely correlated with stroke at follow-up. These relationships were statistically significant.

In a study by Guo, et al., at Göteborg University, an association was found between reduced FVC and FEV1 and lesions of the cerebral white matter and other areas of the brain visualized on computerized tomography (CT).\(^3\) CT scans were utilized to examine 379 women for white-matter lesions (WMLs) in 2000. These women ranged from 70 to 92 years of age in that year. WMLs are low-density areas in the periventricular white matter of the cerebrum, usually associated with long-term hypoxia.
CT scans were also evaluated for lacunar infarcts. These are small infarcts affecting structures inferior to the cerebrum. Previous research has related WMLs and lacunar infarcts to dementia, depression, gait disorders and major stroke.

Twenty years earlier, FVC and FEV1 had been measured on these same women. A statistically significant inverse relationship was found between FVC and FEV1 measured in 1980, and WML and lacunar infarcts observed in 2000. This relationship remained significant after potentially confounding factors such as smoking, sedentary lifestyle and hypertension were taken into account.

**The Chiropractic Connection**

Despite substantial agreement in the biomedical research literature that reduced FVC and FEV1 are risk factors for stroke, there seems to be a paucity of suggestions concerning how to modify this risk factor. This being the case, evidence suggesting that the chiropractic adjustment improves these lung volumes should be of interest.

In a retrospective study by Weber, et al., FVC and FEV1 improved in a sample of 50 consecutive new chiropractic patients after one to three chiropractic adjustments (diversified technique). The change from initial examination to progress examination was statistically significant for the group as a whole, even though most of these patients exhibited initial FVC and FEV1 within normal limits.

A study by Kessinger demonstrated similar results. A sample of 55 consecutive new patients received chiropractic care for the correction of upper cervical subluxation. Improvements in FVC and FEV1 were statistically significant for the group as a whole after two weeks of care. The results were also statistically significant for the subset of 33 patients with depressed lung volumes at the initial visit and for 22 patients with initially normal lung volumes.

In a case study, a middle-aged man with chronic obstructive pulmonary disease (COPD) agreed to a trial of chiropractic care lasting more than 14 months. The patient was seen three times per week during this period; spirometry was performed prior to each session. After a two-week baseline period, chiropractic adjustments (diversified technique) were administered at various levels, usually including the upper cervical and upper thoracic regions. Motorized intersegmental traction, vitamin C supplementation, cranial adjusting, and neurolymphatic stimulation for the lungs and diaphragm were also included in the patient’s regimen.
Mean scores for the last seven months of this study were compared with mean baseline scores. FVC increased by more than 1 liter and FEV1 increased by more than 0.3 liters. These improvements were statistically significant.

A series of six cases primarily focused on changes in the subjective symptom of dyspnea following adjustments using diversified and applied kinesiology protocols. FVC and FEV1 measurements were reported as well. Two patients demonstrated almost no change when pre-adjustment and post-adjustment lung volumes were compared. One patient exhibited an increase in FVC of more than 0.1 liter, with no change in FEV1. Two patients exhibited increases of more than 0.5 liters in both lung volumes. All five of these patients complained of dyspnea prior to the adjustment, and reported improvement afterward. Relief from dyspnea was confirmed one month post-adjustment in all of the patients.

The sixth patient suffered from chronic obstructive pulmonary disease, and had previously been under care as reported above. He visited after spending 18 months out of the country. Previous improvements in FVC, FEV1 and ease of breathing had been retained.

None of the patients in this study suffered a decrease in lung volume. All six enjoyed relief from dyspnea.

The frequently observed beneficial effect of the chiropractic adjustment on breathing has been cited in one paper as a reason to consider spirometry usable as a chiropractic outcome measure. Four brief cases were presented in this paper, one of which included spirometric response to chiropractic adjustments. A 46-year-old woman complained of neck pain radiating into the left shoulder, arm and breast. Chiropractic adjustments were administered according to diversified and applied kinesiology protocols. At the fifth visit, the neck, shoulder, and arm pain were reduced, and the breast pain was absent. Compared to initial examination measurements, FVC and FEV1 both increased by more than 0.25 liters.

Improvement in respiratory function is a well-recognized benefit of exercise. Interestingly, a study by Engel and Vemulpad suggests that spinal manipulation – alone or in combination with exercise – may produce results superior to those of exercise alone. Healthy, non-smoking volunteers at the Macquarie University chiropractic outpatient clinic were randomly assigned to one of four groups: control, exercise, manual therapy, and manual therapy plus exercise. Spirometry was performed one minute before and one minute after each intervention. For subjects in the manual therapy plus exercise group, spirometry was performed one minute before and after manual therapy, then one minute before and after exercise. Six sessions were carried out over a four-week period.
There was a statistically significant decrease in both FVC and FEV1 for the exercise group, whereas the manual therapy group showed a statistically significant increase in both lung volumes. There was no change in the lung volumes among controls. The authors speculate that the short-term reflex effects of exercise on bronchial tone may produce transient respiratory distress immediately after exercise.

The manual therapy plus exercise group showed improved lung volumes after manipulation, followed by a further improvement after exercise. The authors speculate that manipulation not only makes breathing easier, but also mitigates short-term respiratory distress following exercise.

**Implications for the Profession**

Taken as a whole, the best evidence to date suggests that the chiropractic adjustment has a beneficial effect on FVC and FEV1, thereby ameliorating a risk factor for stroke. In general, a consideration of risk factors can play a significant role in several arenas touching the chiropractic stroke issue. For example:

*Continuing education:* Participating doctors should leave seminars on this topic completely prepared to discuss the chiropractic implications of reduced FVC and FEV1, arterial hypertension, sedentary lifestyle, and other stroke risk factors with concerned patients. This preparation adds a new, robust component to the traditional risk-management approach.

*The courtroom:* When a doctor of chiropractic is sued for allegedly causing a stroke, the plaintiff’s clinical record should be scrutinized for indications of improved breathing, increased activity levels (at work and at leisure), improved blood pressure, and any other signs that stroke risk factors have been ameliorated under chiropractic care. Uncovering such facts may help a jury appreciate the likelihood that the defendant doctor did not cause a stroke, and did not hasten the arrival of an inevitable stroke. Any reversal of stroke risk factors in such a case suggests that the defendant doctor may in fact have delayed the inevitable stroke, thereby allowing the plaintiff to enjoy additional weeks, months or years of stroke-free existence.

*Public discourse:* When a health reporter publishes a story warning that the chiropractic adjustment increases the risk of stroke, the quality of the reporter’s evidence needs to be contrasted with the quality of evidence indicating that chiropractic adjustments ameliorate the risk factors for stroke.

*Interprofessional discourse:* A better understanding of the effect of chiropractic care on reduced lung volumes, arterial hypertension, sedentary lifestyle, and other modifiable risk factors may improve the interprofessional atmosphere on the stroke issue. This improved atmosphere would be most welcome in the
biomedical literature, a significant sector of which has characterized the chiropractic adjustment as a risk factor for stroke from as early as 1934 to as recently as 2010.\textsuperscript{10-14}

Research: Obviously, further research into the effects of the chiropractic adjustment on risk factors for stroke offers fertile ground for the profession’s scientific investigators.

References

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