

Upper Cervical Chiropractic Care And Pulmonary Function: A Case Study

P R Schalow

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Abstract

Background: This report features an elderly female patient with low back pain and COPD Grade 3, who received upper cervical chiropractic care.

Case report: The patient's entering complaint with the chiropractor was low back pain. The COPD was being treated by a medical pulmonologist. The patient was examined and adjusted in the upper cervical spine as indicated.

Results: The patient received 7 adjustments over a 2 month period for atlas subluxation. The low back pain resolved soon after the first adjustment. Pre-adjustment Health Status Questionnaire-12 (HSQ-12) score was 54% disability versus follow-up of 36% (improvement of 18%). Forced expiratory volume (FEV) increased (improved from a pre-adjustment value of 1.1 to post adjustment 1.5, and forced expiratory flow 25-75% (FEF) increased from .61 L/sec to .95 L/sec.

Conclusion: This patient's low back and pulmonary function improved following the administration of upper cervical chiropractic care, however uncertain the causation. Further research into upper cervical chiropractic care and COPD involving other research designs (e.g., a clinical trial) is warranted.

INTRODUCTION

Chiropractic care is considered by many as a treatment for low back and neck pain, and maybe headaches. (1) There is a limited amount of research exploring other possible outcomes in regard to manual care of the spine. One of these outcomes is pulmonary conditions and function. Some studies on manual spinal care and asthma for example, found no effect. (2-3) Other research has indicated that there may be a benefit, at least for children, following the adjustment of vertebral subluxation. (4) Still other research found no change in lung function but improvement in childhood asthma. (5) In regard to pulmonary function (as opposed to a condition such as asthma), manual (osteopathic) care was found to improve pulmonary function. (6) Even remedial movement education has been shown to improve pulmonary function. (7)

CASE REPORT

The patient signed a consent form for this case study. The patient is a semi-retired 80 year old female, who was a 40 year former smoker with right lower back pain. She rated it 7

out of 10 on the 1-10 VAS. This ache is aggravated with walking. She also reports tingling of the hands while sitting at the computer. There is no history of trauma, but had two cancer events in life; cervical cancer at 34 yoa, and breast cancer at 60 yoa. She had an appendectomy about 25 years ago involving peritonitis. She is currently on 13 different medications for hypertension, bronchospasm, anxiety, and overactive bladder, joint pain and muscle spasms.

She was diagnosed with COPD (grade 3) at the time of initiating care. She stopped smoking two months before coming to my office (February, 2017, she stopped smoking).

Before consulting with the doctor, the patient completed the SF-12 health outcome measure, which revealed a 54% disability. Postural tests using inclinometer indicated a low right shoulder 1 degree, pelvic un-leveling tested negative, supine leg length inequality (LLI) left functional short leg ¼", coming even with right head turn. Orthopedic tests revealed moderate restriction of right lateral neck flexion, severe restriction of left lateral neck flexion, moderate restriction of right head turn, and no restriction of left head

turn. Tests were negative for facet syndrome. Palpation tests revealed left neck muscle spasm, left trapezius and rhomboid muscle spasm, right erector spinae muscle spasm, T1 and L2 joint motion restriction. With these indicators I made a diagnosis of atlas subluxation complex.

Initial radiographs taken on April 5, 2017, using protocols established by National Upper Cervical Chiropractic Association (NUCCA) revealed misalignment details of the atlas subluxation. The cervical spine was misaligned from vertical axis 3.8 degrees left, the atlas 4.8 degrees left and anterior 8 degrees. (8)

INTERVENTION

Before adjusting, the patient took note of her O₂ saturation level with her own fingertip instrument. It read 97 bilaterally, pulse at 63. The correction was performed with the patient lying on her right side, head supported on a stable flat headpiece. The chin was brought out (as though the patient would be looking up if she were standing) and access to the front of the transverse process of atlas was obtained with a narrowed stylus 1/8" above the palpable tip of the mastoid. The Laney KH2 instrument was used at the lowest force setting to administer the adjusting impulse. (9)

OUTCOME

The initial correction was performed on April 7, 2017. Post-adjustment tests were all negative; leg length inequality cleared, muscle spasms cleared, T1 and L2 joint motion restrictions cleared. Post-adjustment radiographs according to NUCCA and Orthospinology protocols demonstrated a return to the vertical axis. Other measurements of atlas position did not reduce. Thus, the analysis and adjustment procedures were using orthogonal procedures; NUCCA analysis and Orthospinology instrument adjusting.

Immediately afterward, the O₂ levels read 95 on the right, 97 on the left, and pulse went down to 52. There were no adverse events. The schedule of adjustments is provided in Table 1. In the patient's normal sequence of care with the pulmonologist, testing was performed again three weeks later. When the pulmonologist saw an improvement in spirometry outcome measures, the diagnosis was changed to "mild" COPD, along with the statement "This doesn't happen!" SF-12 outcome measure was repeated in my office four weeks after the initial correction showing improvement in general health measures of 18%.

DISCUSSION

There are two components of COPD; restrictive disease is

something outside the lungs restricting the ability to take a deep breath reflected in Forced Vital Capacity (FVC), and obstructive disease creating obstruction of internal airway tissues reflected in Forced Expiratory Volume (FEV) and Forced Expiratory Flow (FEF). Forced vital capacity (FVC) is the total amount of air forcefully exhaled after the largest inspiration possible. FVC testing was performed on 2-18-17 by her pulmonologist and is considered as a pre-adjustment lung function test. Here, the FVC score was 1.8. Forced expiratory volume 1 (FEV1) is the amount of air forcefully exhaled during the first second of the exhalation. FEV1 also tested on the pre-adjustment date of 2-18-17 revealed a score of 1.1. Spirometry testing on 4-26-17 is considered as post-adjustment and revealed an improved FVC score of 2.2 and an improved FEV1 score of 1.5 The forced expiratory flow (FEF) on 2-8-17 was 0.61 L/ second. With the administration of a bronchodilator on the same visit, FEF remained at 0.61 L/ second. On 4-26-17, 16 days following the first adjustment, FEF had increased to 0.95 L/second without administration of bronchodilator. (Table 2). The normal range for 80 yoa females is 70-130% of the predicted outcome. This patient's outcome falls within that normal range. (10) It is expected that smoking cessation will slow but not rapidly reverse the rate of pulmonary function decline. (11)

Table 1

Visit description regarding atlas adjustment (Yes or No).

<u>Date</u>	<u>Adjustment</u>
4-10-17	Y
4-12-17	N
4-17-17	Y
4-20-17	N
4-24-17	N
4-27-14	Y
5-1-17	Y
5-8-17	N
5-15-17	Y
5-22-17	Y
5-31-17	N
6-19-17	Y

Table 2

Pulmonary function tests.

Test date	FVC	FEV1	FEV1/FVC (%)	FEF _(25%-75%)
2-18-17 (pre-adjustment)	1.8	1.1	61.1	
4-26-17 (post adjustment)	2.2	1.5	68.2	.95

FVC = forced vital capacity. FEV1 = forced expiratory volume during the first second of exhalation. FEV1/FVC < 70% indicates mild COPD. Post adjustment percent still indicates mild COPD (Stage 1) (12) but the percentage is nonetheless improved, from 61.1% to 68.2%.

Chiropractic care is typically considered by many as a remedy for neck and back pain. Cases like this one suggest that chiropractic care has a deeper reach into human anatomy and physiology. In a multi-nation survey of chiropractic patients, the most common reported improvement in non-musculoskeletal symptoms was in breathing. (13) Elevated sympathetic nervous system (SNS) tone has been associated with COPD. One role of the brainstem is to dampen overactive sympathetic activity, which has been associated with airway smooth muscle tone. The SNS has a direct connection only to the vasculature of the airway and could restrict capillary diameter. It can influence smooth muscle of the airway only through indirect chemical connections. (14) Previous studies have focused on manipulation of thoracic segments and soft tissue therapy as

a way to increase thoracic mobility, which correlates with improved FVC and FEV1. This reflects an influence of thoracic manipulation on both types of COPD disease – restrictive and obstructive. (15) Skilled hands-on guidance of the head and neck relation in motion (the FM Alexander technique) has been associated with statistical improvement in peak expiratory flow (PEF), maximum voluntary ventilation (MVV), maximum inspiratory pressure (MIP), and Maximum expiratory pressure (MEP) in normal subjects, other measures of pulmonary function that can be associated with the upper cervical spine. (7,16) The net outcome is a sense of lightness and decrease of tension. (17) With that experience in mind, it may suggest that reduction of resting level of tension throughout the head, neck and torso may be generally accessible through the upper cervical spine, whether by hands-on education or by chiropractic intervention. This report suggests that the cervical spine gives access to a different mechanism for improving lung function. Through dampening of the SNS it is conceivable that influence on the airway smooth muscles or neurotransmitters can improve airway restriction. Through restoring spinal balance directly and ribcage balance indirectly it is also conceivable that improved ribcage motion reduced external restrictions. (1)

A limitation to this research is that it has an observational design, which does not allow a claim of cause and effect. Still, the observational design is a good start for groundwork in regard to future research. Another limitation is that the type of chiropractic care used is unique in that only one vertebra was adjusted, the atlas. If future research shows this approach can be generalized to other patients, another limitation would be that the generalization should be made to this type of care (adjustment of atlas subluxation using orthogonal procedures). Clinical trials using technology that tracks not only lung function but sympathetic nerve function and vascular perfusion could shed more light on mechanisms involved.

CONCLUSION

The patient in this case study experienced not only relief from her presenting complaint, back pain, but also experienced improvement in her HSQ-12 self-reporting and lung function testing. Further research is indicated to determine more definitively what effect orthogonal upper cervical chiropractic care might have on pulmonary function.

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Author Information

Philip R. Schalow

Upper Cervical Care Center-Rockford a division of 1st Step Chiropractic, S.C.
Rockford, Illinois, USA