

The Use of Osteopathic Manipulative Treatment (OMT) in the Enhancement of Pulmonary Function in an Impoverished Urban Sector of Duran, Ecuador

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Background



Duran, Ecuador

- ▶ About 80% of Ecuadorians go without quality or routine health care. [\[1\]](#)
- ▶ Duran is the 3rd largest city in Ecuador and is home to some of the poorest Ecuadorians.
- ▶ Many homes of Duran feature hard packed dirt floors, while dusty streets and polluted air place unwanted strain on the lungs.

Background

- ▶ Standard approaches to respiratory disease prevention focuses on providing clean water and air
- ▶ The osteopathic standard also emphasizes adding the RESPIRATORY-CIRCULATORY MODEL to enhance host response against pulmonary related disease.
- ▶ If the environment is not conducive to healing and the body is already compromised, an individual's impaired medical condition can be exacerbated.
 - If the ribs are restricted, the breathing will then be reduced.
 - If the diaphragm does not move well because rib motion is constrained, lymphatic drainage will also be compromised.
- ▶ Inefficient lymphatic flow can also result in acute or chronic respiratory infections, or other chronic respiratory diseases such as asthma.

Background

- ▶ Studies show that the use of OMT to treat patients in the 1918 Flu Epidemic cut mortality rates to 0.25%, as compared with 5% for those not treated with OMT. [\[i\]](#)
- ▶ Wheatly found that rib raising improved the pulmonary function of all patients, but most significantly the asthmatic patient. [\[ii\]](#)
- ▶ Bradbury also found that OMT to the diaphragm decreases the residual volume of the lungs, [\[iii\]](#) thereby enhancing overall lung function, a key component to maintaining homeostasis.

Hypothesis

- ▶ We hypothesized that a single treatment with OMT would likely
 - Improve Pulmonary Function Tests
 - Decrease somatic changes that result from pulmonary dysfunction
 - Enhance patient's subjective assessment of breathing quality.

Materials & Methods:

MATERIALS AND METHODS:

- ▶ Patients received routine H&P
- ▶ A thorough Osteopathic Structural Exam (performed by an osteopathic medical student or resident)
- ▶ Pulmonary function tests pre and post OMT
- ▶ Questionnaires from the World Bank pertaining to environmental health risks that can be modified to improve overall health.

ENVIRONMENTAL RISK	TOTAL POINTS:
Ventilation and gas use: -No ventilation (i.e. no windows) -Gas <ul style="list-style-type: none"> •Unclean fuel •Stove in poor condition 	Add 2 points Add 1 point for each
Household location: -House located on a dirt road (<i>exposed to dust on a daily basis</i>) -House located in a swampy area (<i>exposed to mold on a daily basis</i>) <i>*May be both categories</i>	Add 2 points Add 2 points
Living Conditions: -More than three people per bed -More than five people per bed	Add 1 point Add 2 points
Children: -1 Child in primary school/daycare -2 or more Children in primary school/daycare	Add 1 point Add 2 points
Transportation: -Walk or ride bike on dusty road to work, school, store, etc -Take a bus, cab or driven by friend	Add 2 points Add 0 points
Smoking: -Patient smokes -Other members of household smoke	Add 2 points Add 1 point

Point system from the World Bank for determining environmentally-linked pulmonary health risks

Possible points: 0-16
Low risk: 0-5
Medium risk: 6-10
High risk: 11-16

Point system from the World Bank for determining environmentally-linked pulmonary health risks

ENVIRONMENTAL RISK	TOTAL POINTS:
Ventilation and gas use: -No ventilation (i.e. no windows) -Gas <ul style="list-style-type: none"> •Unclean fuel •Stove in poor condition 	Add 2 points Add 1 point for each
Household location: -House located on a dirt road (<i>exposed to dust on a daily basis</i>) -House located in a swampy area (<i>exposed to mold on a daily basis</i>) * <i>May be both categories</i>	Add 2 points Add 2 points
-Total Points	4 point = Low Risk

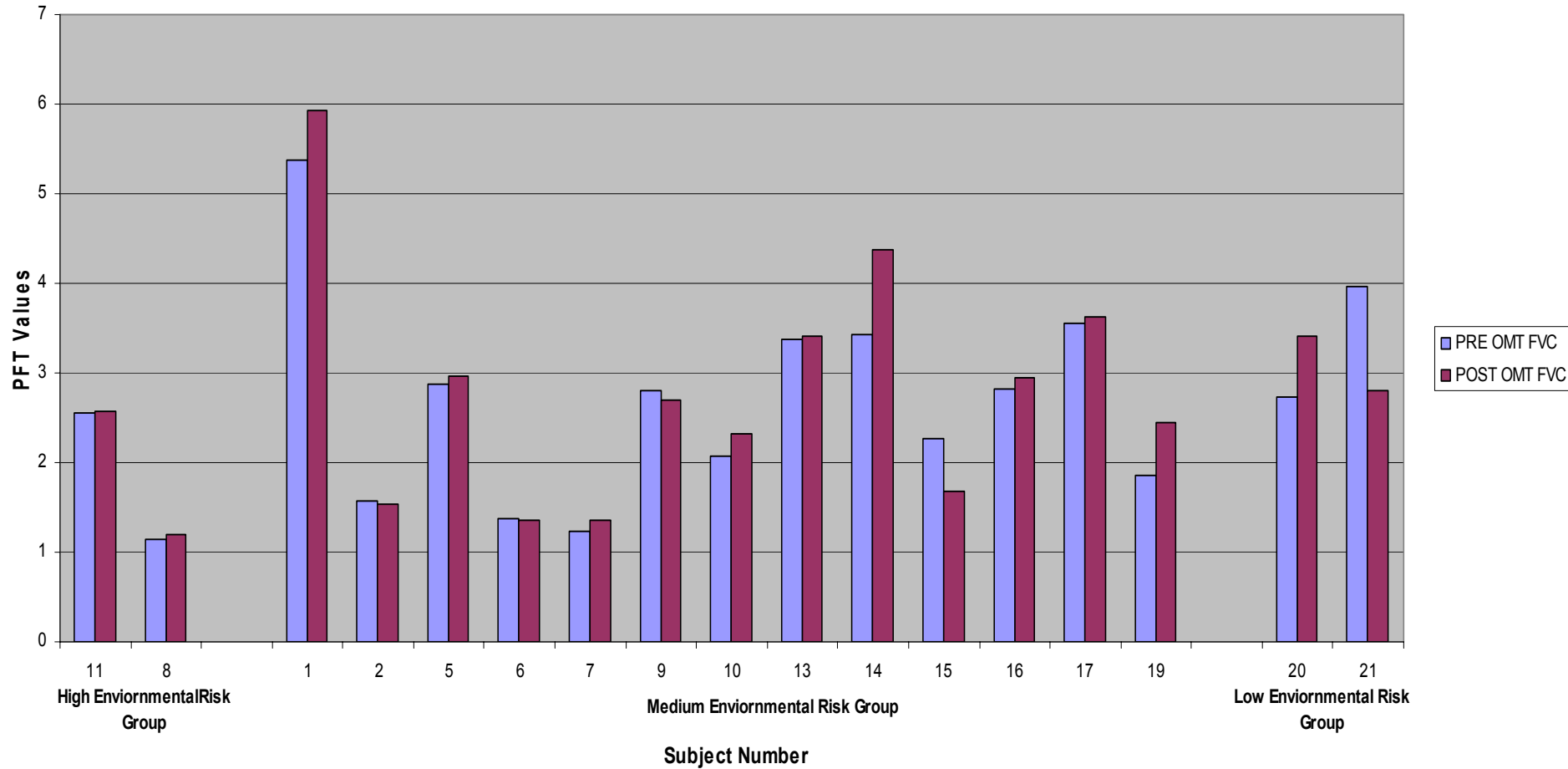
Pulmonary OMT Exam

- ▶ Quality of respiration: if pt was not breathing down to pubic symphysis and/or accessory muscle use = ↓ quality
- ▶ Chapman's points
 - sympathetics for lungs (T1-T6);
 - intercostal spaces 2-4 (lungs),
 - C3-C5 (phrenic nerve innervations),
 - Zink pattern (to assess possible lymphatic flow obstruction),
 - rib cage/sternal was palpated for somatic dysfunction and visual or palpable evidence of tissue texture change.
- ▶ Standard protocol for Osteopathic treatment of respiratory patients at PCOM routinely focuses on correcting the Zink pattern, balancing parasympathetics and sympathetics, maximizing the thoraco-abdomino-pelvic respiratory/circulatory pump, and augmenting physiologic pumps by rib raising, pectoral traction, and Miller or pedal pump.

Results

- ▶ A total of 21 charts met the inclusion criteria for this study, but following chart analysis, five patient charts were discounted due to faulty pulmonary function measurement. Therefore a total of 16 charts were used to assess the evaluation of OMT on pulmonary function testing, and a total of 21 charts were used for the evaluation of somatic changes relating to pulmonary dysfunction.
- ▶ Environmental risk calculations showed:
 - SD patients evaluation = 3 low-risk, 15 medium-risk, and, 3 high-risk
 - PFT patients evaluation = 2 low-risk, 12 medium-risk, and 2 high-risk
- ▶ All patients with pulmonary complaints demonstrated some level of SD that corresponded to pulmonary dysfunction.
- ▶ The high-risk patients had the greatest number of somatic dysfunctions.

FVC Pre and Post OMT



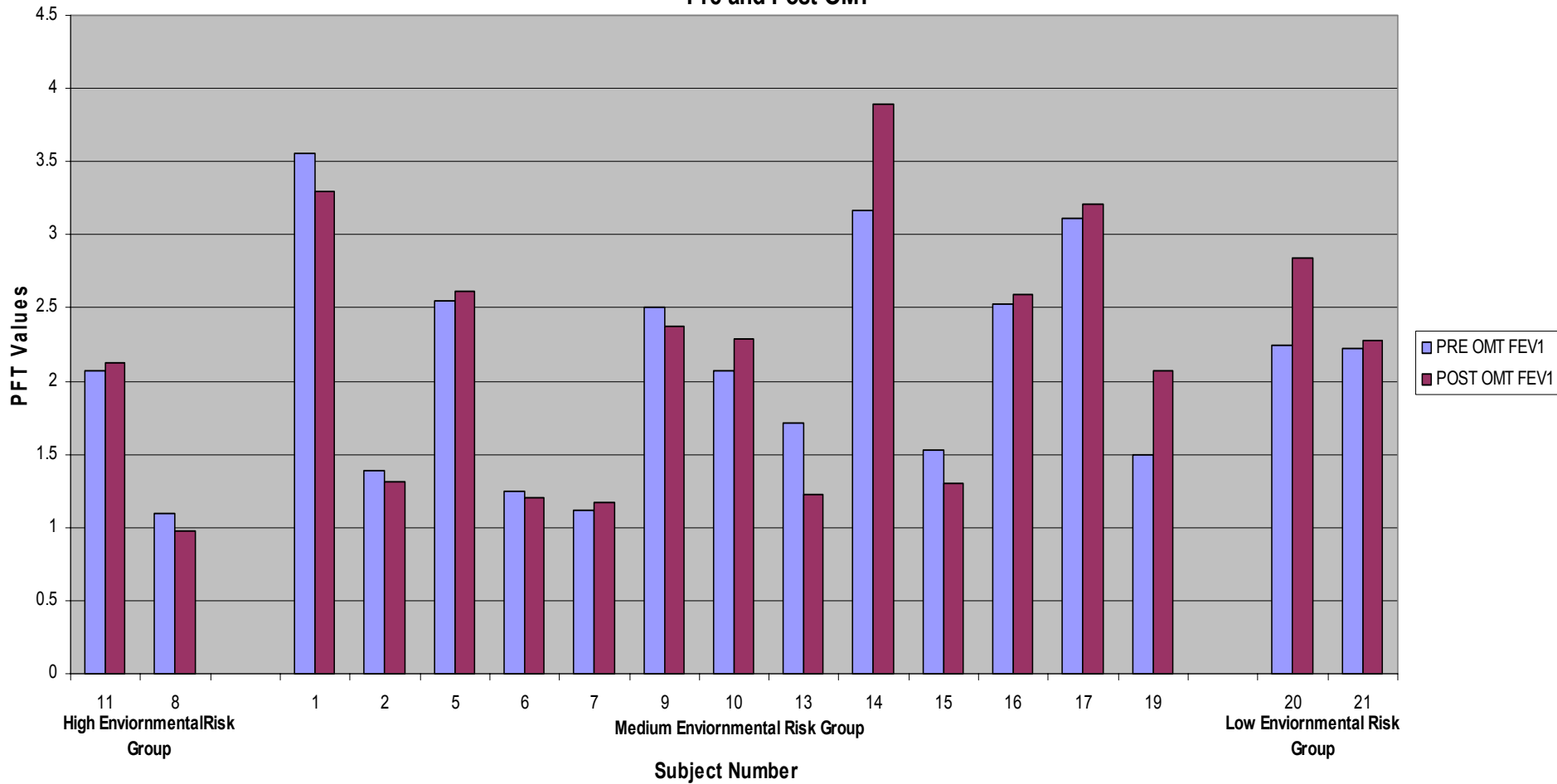
► Significant improvement in 5 patients

■ 1, 10, 14, 19, 20

► Decrease in 2 patients

■ 15, 21

FEV 1 Pre and Post OMT



► Significant improvement in 4 patients

■ 10, 14, 19, 20

► Decrease in 3 other patients

■ 1, 13, 15

Results

- ▶ Only 5 of 16 patients demonstrated significant improvement in pulmonary function testing following OMT
- ▶ 20 of 21 total patients noted a significant subjective overall improvement in how well they felt and in their ability to breathe.
- ▶ OMT corrected SD interpreted as Chapman's reflexes in 21 of 21 cases
- ▶ A trend suggesting restrictive processes respond better to OMT
- ▶ Those with significant improvement in PFT's were all under 20 years old

Discussion

- ▶ Of the 5 patients who demonstrated improvement,
 - 1 = low risk & 4 = medium risk.
 - No high-risk patients demonstrated improvement.
 - ▶ *This may suggest that more treatments are needed in high-risk patients as a result of increased exposure to environmental pulmonary hazards.*

Discussion

- ▶ Patients with normal spirometry varied in presentation but had a variety of pulmonary SD.
- ▶ The majority of these patients presented with a cough or shortness of breath along with corresponding SD between C3-C5.
- ▶ Although the chart review did not indicate a direct relationship between restoration of the Zink pattern and immediate improvement of PFT's, the Zink pattern normalized in those with improved PFT's
 - *Which could imply that pulmonary function may improve by removing lymphatic flow obstructions, in conjunction with autonomic balancing, biomechanical restoration, and lymphatic treatments*

Conclusion

- ▶ Chart analysis reveals that pulmonary complaints are strongly linked to somatic dysfunction (SD) that manifests as
 - Pulmonary Chapman's points
 - Decreased quality of respiration (failure of the breath to travel to the pubes)
 - Uncompensated Zink patterns (representing blocked lymphatic flow)
 - Thoracic cage dysfunctions (which may lead to a restrictive or obstructive pattern depending on if the ribs are inhaled or exhaled)

Conclusion

- ▶ It is possible that more subjects may be supportive of a trend indicating that a single OMT session in a younger, non-obstructed population will improve pulmonary function more so than in older populations.
- ▶ More tests are required to determine if the drop in FEV1 is temporary due to fatigue or is it a physiological change.

Conclusion

- ▶ All people with pulmonary complaints had some form of pulmonary-related somatic dysfunction.
- ▶ This data adds to the literature to support the use of osteopathic evaluation in the treatment and management of patients with pulmonary dysfunctions.

Conclusion

- ▶ The Osteopathic Skills that we have learned has afforded us this unique opportunity to provide care to the people of Duran as well as share this information our host doctors.
- ▶ The people of Duran love OMT
- ▶ The doctor has requested that we teach them more techniques to improve their practice.

Acknowledgment

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