

BUTEYKO

Guide for Doctors

Peter Kolb BSc(Eng),MSc(Med)
BIOMEDICAL ENGINEER

Revision 1.1

October 2001

CONTENTS

INTRODUCTION	2
WHAT PATIENTS ARE TAUGHT	4
MEDICATION & ROLE OF THE DOCTOR IN BUTEYKO THERAPY	5
THEORY AND DISCUSSION	8
REFERENCES	14

INTRODUCTION

The main purpose of this booklet is to explain, in summary, the physiological basis of Buteyko therapy. The physician can greatly enhance the outcome of the therapy for his patient if he understands it and provides the necessary medical support, even if he does not agree with the principles.

What this booklet cannot do is bridge the rift that has existed in medicine on the question of chronic hyperventilation syndrome for nearly the whole of the last century.

In 1975, Lum wrote on this subject:¹³

Some forty years ago Kerr, Dalton and Gliebe wrote "Patients presenting the well known pattern of symptoms haunt the offices of physicians and specialists in every field of

medical practice. They are often shunted from one physician to another, and the sins of commission inflicted upon them fill many black pages in our book of achievement.”

Unfortunately I believe this to be still true today, despite the many and excellent reviews which have appeared in the intervening years.

The millennium has rolled over and the debate continues. This little booklet can do no more than draw attention to Buteyko's contribution to this debate.

Buteyko therapy is a simple education programme aimed at reversing chronic hyperventilation, a disorder which is both poorly understood and inadequately researched^{13,15}. While it was initially developed to treat hypertension, it has become a particularly popular method for dealing with asthma and chronic fatigue syndrome, the implication being that these disorders are secondary to chronic hyperventilation.

As far as asthma is concerned, the therapy does not conflict with conventional management. Benefits of the treatment manifest initially as a reduction in requirement for bronchodilators and a reduction in symptoms.² Reduction in steroids is arranged by the patient's doctor once the symptoms have disappeared.

WHAT PATIENTS ARE TAUGHT

Patients are taught

- The importance of nose breathing.
- A simple nose clearing exercise requiring only a comfortable breath hold.
- How to measure chronic hyperventilation based on comfortable breath hold time. This relies on the observation that hyperventilators have to breathe more to achieve a lower PaCO₂, and, therefore, have less breath holding ability.
- How to reverse chronic hyperventilation by deliberately reducing breathing through relaxation of the respiratory muscles and achieving a feeling of a slight shortage of air over time. (See theory.)
- Lifestyle changes that will help reduce over breathing. These are all generally recognized as promoting health and include recommendations such as eating less and performing more non-stressful exercise.
- Practical, safe and effective tips for keeping the mouth closed at all times.

MEDICATION AND THE ROLE OF THE DOCTOR IN BUTEYKO THERAPY

Buteyko practitioners outside Russia are, in the main, not medically trained. Their role is to perform the time consuming task of teaching the breathing method, help to identify life-style problems that hold back progress and provide support and motivation to the patient.

Occasionally there are medical factors hampering progress. As CO₂ levels rise and the immune system improves, often latent infections flare up. In Professor Buteyko's experience the most frequent problems result from infected teeth, root canal treated teeth, infected gums, unhealthy but not necessarily infected tonsils and fungal infections of the mouth or feet. But other infections can hold back progress too. The patient's prospects are improved with proper medical attention.

Chronic hyperventilation disorders vary not only from person to person, but also over time.^{1,15,23,25} As CO₂ levels progressively decrease, symptoms come and go. When the process is reversed, these symptoms often re-appear in reverse order (*Buteyko*). The healing process may be helped along with some medical intervention, depending on the individual case.

Bronchodilators: In line with current asthma management practices, patients are encouraged to use bronchodilators only when needed. Most patients are weaned within a few days, although they are instructed to continue carrying them at all times. *For this reason long acting bronchodilators are not particularly useful for patients undergoing Buteyko therapy. It is helpful if these are replaced with short acting ones.*

Steroids: Buteyko practitioners have firm instructions to encourage patients to use their steroids as prescribed by their doctors.

The Buteyko view on steroids is that hypocapnia can lead to low adrenal reserve in some people. Supplementing with physiological doses to meet the shortfall enables stress responses to function correctly. This view is consistent with the work done by Mck Jefferies¹⁷ who found no side effects and substantial benefit in many disorders by administering supplementary cortisol in less than replacement doses. This recognition of a systemic need for supplementary cortisol suggests a preference for oral over inhaled administration. From the Buteyko perspective it is not just the anti-inflammatory action that is important, but by meeting the systemic need it greatly assists patients reduce their breathing. In this context it should be noted that steroids have been recognized as being

successful in treating CFS.¹⁷

Cortisol deficit can be recognized by the patients themselves from general malaise, a rapid heart rate and an inability to reduce breathing. Professor Buteyko gets his patients to take half the normal dose by sucking a prednisone pill, or drinking it crushed in warm water. If the condition does not improve within 30 minutes to one hour, they need to take the rest of the dose. Mck. Jefferies gets his patients to increase the dose during times of stress and emphasises a preference for distributed doses of the naturally occurring steroid in the form of cortisol. **Non-medically trained Buteyko practitioners do not give advice on the use of steroids.**

Full adrenal function is usually expected to return, although during particularly stressful periods, small steroid supplements may occasionally still be required in some patients up to 18 months after commencement of Buteyko therapy.

Since Buteyko patients are expected to be weaned from their bronchodilators relatively quickly while the restoration of normal steroid production takes time, *bronchodilator and steroid combination medications are not helpful to patients on Buteyko therapy.*

THEORY AND DISCUSSION

The medical literature on CHVS reveals that:

1. Doctors rarely diagnose the disorder or even look for CHVS as a diagnostic possibility.^{1,13, 15,20,23}
2. Treatment for CHVS is not well developed, consisting of counselling and occasionally mild sedation.
3. Prevalence has been found to be between 6 and 11% in outpatient populations.^{4,13,15,24,25} This excludes patients with organic disease such as asthma.

The following are a few of the symptoms and observations associated with CHVS: Hypophosphatemia, elevated uric acid, elevated sugar levels, loss of CO₂ and base reserve, electrolyte changes, poor oxygenation due to Bohr effect, elevated lipids, elevated calcium ionisation, palpitations, cardiac neurosis, angina pain, mitral prolapse, myocardial infarction, tachycardia, Wolfe-Parkinson-White syndrome, arrhythmias, cerebral vascular constriction, stenosis of coronary artery, failure of coronary bypass grafts, right ventricular ectopy, silent ischaemia, elevated blood pressure, ECG: Flat or inverted T-wave, vasoconstriction, hiatus hernia, duodenal spasm, irritable bowel syndrome, spastic colon, Raynaud's disease, Da Costa's Syndrome, renal colic, genito-urinary disturbances, weakness, burnout, post traumatic stress disorders, influenza-like symptoms, sleep disturbances, chest pains, restlessness, syncope,

excessive sweating, oedema, migraines, aerophagia, failure of transurethral resections, chest tightness, muscle spasm, muscular stiffness and aching, paresthesia, seizures, visual disturbances, panic attacks, phobias, anxiety, EEG abnormalities, auditory disturbances, increased sympathetic tone, dizziness, dyspnea, asthma, shortness of breath....
1,3,5,7,13,14,15,20,23,26

Since chronic hyperventilators can get any (but not necessarily all) of the symptoms, genetic predisposition must influence the way the disorder manifests in an individual.

Buteyko therapy has been brought to the west mainly as a treatment for asthma because of its evident and rapid effectiveness on this disorder. "Anecdotal" evidence supplied by asthmatics trying the method would suggest that the treatment is effective for all asthmatics, an observation which is supported by results published in a paper by Bowler et al.² This paper discusses a double blind controlled clinical trial in which the 19 long term asthmatics in the test group reduced their bronchodilator usage by 96% and steroids by 49% in 12 weeks.

What makes the hyperventilation theory for asthma difficult to accept at first, is that asthma is understood to be primarily an inflammatory disease. But as Lum¹³ points out in relation to CHVS "*Symptoms may show up anywhere, in any organ, in any system; for we are dealing with a **profound biochemical disturbance,***

which is as real as hypoglycaemia and more far reaching in its effects." The biochemical basis for this theory is spelt out by Kazarinov¹² who demonstrates why CO₂ is so crucial to all biosynthetic and regulatory processes. The theory is that this biochemical disturbance deranges the immune system leading to immunological disorders like the allergic hyper-reactivity seen in asthma and autoimmune disorders as seen in arthritis.

Pathophysiology of chronic hyperventilation in asthmatics according to the Buteyko theory:

1. Hypocapnia is the rule in Asthma and is particularly severe during an attack in mild/early stage asthma.^{4,16} As damage to the lungs progresses, a perfusion/ventilation mismatch occurs resulting in an improvement in arterial hypocapnia, but increasing hypoxia. At the same time those portions of the lungs still functioning properly become over ventilated.¹⁶
2. Respiratory alkalosis resulting from over-breathing leads to renal pH compensation through the excretion of bicarbonates. The net result is a depletion of the bicarbonate buffer, low pCO₂ and a disruption of the electrolytic balance resulting from lost electrolytes (particularly magnesium) which accompany the excreted bicarb.^{7,20}
3. Habituation to low CO₂ is brought about by prolonged episodes characterised by factors causing

hyperventilation such as chronic undischarged stress, wearing excessively warm clothing as well as many other bad western lifestyle habits. The accommodation process is set when these episodes span the time taken for bicarbonate to be dumped by the kidneys and the time taken for bicarbonate to equilibrate across the blood-brain barrier.^{10,13}

4. Kazarinov¹² shows how every biosynthetic process in the body is dependent on CO₂ either directly or as a catalyst. Low CO₂, therefore, affects all processes from the regulation of the tricarboxylic acid (Krebs) cycle to the synthesis of proteins and lipids. This is the basis of Buteyko's claim that over-breathing is the cause of many diseases, which is consistent with the large and bizarre number of symptoms seen in CHVS.
5. Low CO₂ in the blood **reduces oxygenation of the tissues through a depressed Bohr effect.** Oxy-haemoglobin dissociation is strongly dependent on CO₂.

Oxy-haemoglobin dissociation is also affected by low 2,3 diphosphoglycerate (2,3 DPG). Production of 2,3 DPG is depressed in CHVS because of hypocapnia induced hypophosphatemia.¹⁵ All this results in an accumulation of acids, such as lactic acid, and high venous oxygen.

Poor oxygenation produces air hunger, which tends to stimulate over-breathing in the form of excessive

sighing and yawning.

6. Low CO₂ produces spasm in the smooth muscle of blood vessels, gut, ducts, glands and bronchioles⁸. Blood vessel spasm together with the depressed Bohr effect produces hypoxia that can account for headaches, migraines and angina pain.^{5,13,15,20,23,25}
7. Bronchioles constrict in response to local conditions rather than to CNS innervation. It makes teleological sense that the bronchioles should shunt air in order to even out ventilation. Since alveolar CO₂ is low in asthmatics,¹⁶ the over ventilated bronchioles are closer to shutting down and are, therefore, seen as "twitchy". This is seen as a normal and healthy response to over breathing. *For this reason, and in the light of the hyperventilation theory of asthma, peak flow monitoring is not considered a helpful indicator of the disease.*
8. Buteyko therapy is an attempt to get the breathing normalised, i.e.: get the individual to physiologically habituate to breathing less by normalising CO₂ levels. Effectively the same processes which make acute episodes of hyperventilation become chronic, are reversed. Once the respiratory centre is reset to a physiologically more normal level through a restoration of normal bicarbonate level in the CSF, the bronchioles will open up in response to more normal alveolar CO₂ levels.

9. According to Professor Buteyko, inflammation and allergic hyper-responsiveness is caused primarily by an immune system which has become deranged due to low CO₂. This is also why chronic stress can leave an individual more vulnerable to colds, flues and other disorders associated with an unhealthy immune system.

In addition the normal regulation and production of all hormones is affected by low CO₂. This includes the normal production of Cortisol which may be impeded by chronically low CO₂. Cortisol shortage contributes to the inflammatory hyper-responsiveness of the lungs.

10. The teleological explanation for mucus build up is that its function is to protect the raw and inflamed tissues. It may become thick and sticky due to the airways drying out as a result of mouth breathing.

11. Finally, what we have considered to be the cause of asthma, viz allergens, anxiety, transient stresses etc, are all just triggers for asthma and not the cause.

12. The Buteyko theory makes sense of all the enigmas that have been confounding our classical understanding of asthma, which according to Buteyko, is a single disease with multiple triggers, rather than a complex diseases with multiple causes.

13. Patients on Buteyko therapy typically report improvements in other CHVS symptoms, corresponding to improvements in their asthma.²

REFERENCES:

1. Bass C, "The hyperventilation syndrome", Respiratory Diseases in Practice, VOL , Oct/Nov 1990, 13-16
2. Bowler S, Green A, Mitchell C, "Buteyko breathing and asthma: a controlled trial", Medical J. of Australia, VOL 169, December 1998, 575-578
3. Brasher RE, "Hyperventilation Syndrome", Lung, VOL 161, 1983, 257-273
4. Clarke PS, Gibson J, "Asthma, hyperventilation and emotion", Australian Family Physician, VOL 9, 1980, 715-719
5. Cluff RA, "Chronic Hyperventilation and its treatment by physiotherapy: discussion paper", J of the Royal Society of Medicine, VOL 77, September 1984, 855- 861
6. DaCosta JM, "On irritable heart: a clinical study of a form of functional cardiac disorder and its consequences.", Am J Med Sci, VOL 61, 1871, 17-53
7. Demeter SL, Cordasco EM, "Hyperventilation syndrome and asthma", The American Journal of Medicine, VOL 81, December 1986, 989-994
8. Donnelly PM, "Exercise induced asthma: The protective role of CO₂ during swimming", The Lancet, VOL 337, 19 January 1991, 179-180
9. Gayrard P, Orhek J, Grimaud C, Charpin J, "Bronchoconstrictor effects of deep inspiration in patients with asthma", Am Rev Respir Dis, VOL 111, 1975, 433-439
10. Guyton AC, Hall JE, "Textbook of medical physiology", Chemical control of respiration, PUBLISHER: WB Saunders; ISBN:0-7216-5944-6; 1996; EDITION: 9;

PAGES: 527-528.

11. Hibbert GA, Pilsbury DJ, "Demonstration and Treatment of Hyperventilation Causing Asthma", British J. of Psychiatry, VOL 153, 1988, 687-689
12. Kazarinov VA, "Buteyko Method: The experience of implementation in medical practice", The biochemical basis of KP Buteyko's theory of the diseases of deep respiration, EDITOR: Buteyko KP; PUBLISHER: Patriot Press Moscow; 1990; PAGES: 198-218. [Translation available from <http://www.wt.com.au/~pkolb/biochem.htm>]
13. Lum LC, "Hyperventilation: The tip and the iceberg", J Psychosom Res, VOL 19, 1975, 375-383
14. Magarian GJ, "Hyperventilation syndrome: infrequently recognized common expressions of anxiety and stress.", Medicine, VOL 61, 1982, 219-36
15. Magarian GJ, Middaugh DA, Linz DH, "Hyperventilation Syndrome: a diagnosis begging for recognition", West J Med, VOL 138, 1983, 733-736
16. McFadden WR, Lyons HA, "Arterial-Blood Gas Tension in Asthma", The New England Journal of Medicine, VOL 278:19, 9 May 1968, 1027-1032
17. Mck Jefferies, MD FACP "Safe uses of Cortisol." PUBLISHER: Charles C. Thomas - Springfield. ISBN:0-398-06621-3; 1996; EDITION: 2;
18. Morgan WP, "Hyperventilation Syndrome: a review", Am Ind Hyg Assoc J, VOL 44:9, 1983, 685-689
19. Neill WA, Hattenhauer M, "Impairment of Myocardial O₂ supply due to Hyperventilation", Circulation, VOL 52, November 1975, 854-858
20. Nixon PGF, "Hyperventilation and cardiac symptoms",

- Internal Medicine, VOL 10:12, December 1989, 67-84
21. Pfeffer JM, "Hyprventilation and the hyperventilation syndrome", Postgrad Med, VOL 60(Sup.2), 1984, 12-15
 22. Pfeffer JM, "The etiology of the hyperventilation syndrome", Psychother Psychosom, VOL 30, 1978, 47-55
 23. Sher TH, "Recurrent chest tightness in a 28-year-old woman", Annals of allergy, VOL 67, September 1991, 310-314
 24. Tavel ME, "Hyperventilation syndromev - Hiding behind pseudonyms?", Chest, VOL 97, 1990, 1285-1288
 25. Waites TF, "Hyperventilation - chronic and acute", Arch Intern Med, VOL 138, 1978, 1700-1701
 26. Wheatley CE, "Hyperventilation syndrome: A frequent cause of chest pain", Chest, VOL 68:2, August 1975, 195-199

Produced by the Late Peter Kolb