Buteyko's Book

Contents

Foreword

Thirty seven years passed since I managed to discover a cause of some so-called "diseases of civilisation" (broncho- and vascular spasms, allergy, etc.) The only cause of them is alveolar hyperventilation, or deep breathing. The idea which came to my mind was that by decreasing the depth of breathing, or in other words, by the normalisation of breathing, we can cure that range of illnesses. The idea was based on the fundamental laws of physiology, biochemistry, biology and so on, and the correctness of that assumption was confirmed by experiments and tests.

The main postulates of my theory are:

1. It is known that while breathing deeply the organism exhales too much CO_2 and, therefore, its content in lungs, blood and cells decreases.

   The lack of CO_2, caused by deep breathing, changes blood pH into the alkaline direction.

   Such a change of blood pH influences badly activities of all enzymes (there are about 1000) and vitamins (there are about 20). As a result, the whole metabolism suffers. And, when blood pH reaches 8, the metabolism becomes improper to the extent that the organism dies.

2. It is also known that the lack of CO_2 leads to spasms of bronchial smooth muscles, brain vessels, heart, intestines, gall ducts and other organs. At the end of the 19th century the Russian scientist Mr. Verigo, from the town of Perm, discovered a seemingly weird law. According to him, as a result of a fall of CO_2 in the blood, the bond between oxygen and haemoglobin becomes stronger. This creates difficulties in the oxygen transition from blood to brain cells, heart, kidney and other organs. In other words, the deeper the breathing, the lesser amount of oxygen is available for brain, heart and kidney cells. This particular law, not very well known so far, underlies our discovery. As the Verigo law was left under wraps, the same discovery was much later made by a Swedish [ed: Danish] scientist and named the Bohr effect. Being unfamiliar with this law would have resulted in great difficulties in understanding and accepting the theory offered by us.

3. The lack of oxygen in the brain (hypoxia), caused by deep breathing, is aggravated by broncho- and angiospasms. Organism's attempts to compensate for hypoxia of vital organs results in high blood pressure (arterial hypertension). Consequently, the blood flow increases and b!ood supply to the organs improves. Along with the lungs hyperventilaton, hypoxia creates a false feeling of lack of air, accompanied by intensified breathing. This leads to an inevitable progression of the disease. CO_2 deficiency in nerve cells stimulates the whole nervous system and that makes the organism breathe even deeper.

   Hence, nerve cell hypoxia along with upset metabolism and overexcitation of the nervous system causes weakness of the intellect and destroys the nervous system (brain vessel sclerosis). That finally leads to a mentality dysfunction.

4. Destruction produced by deep breathing is aggravated by poisoning of the environment and food with chemicals, herbicides and medications. If it is so, then all of Western medicine's main principles (that) are based on methods of prevention and treatment, consisting of teaching people deep breathing techniques, only assist increating those diseases. At the same time, deep breathing exercises and bronchovasodilatory medications that increase the rate of

CO_2 removal from the body, do not improve but worsen the state of already ill patients. That is why so-called "diseases of the civilisation" are not yielding to the treatment but spreading even further. The discovery of the fact that deep breathing is the main cause of those illnesses allows us to prove scientifically and experimentally that existing principles and methods of treatment are faulty.

The hyperventilation test, offered by us, represents incontestable evidence of the correctness of our discovery. The idea of the test is to ask a patient to deepen his breath and check how the widespread recommendation "Breath deeper!" affects that person. In a few seconds or minutes the hyperventilation test provokes or intensifies symptoms while the lessening of the depth of breathing quickly stops them. This means that the only scientifically explained principle for prevention and treatment of the illnesses of the century is a decrease of the depth of breathing in order to normalise its physiological function.

Based on this idea, the method of the intentional normalisation of breathing, or in other words, the deliberate volitional breathing method (DVBM) was developed. The principle of it is the decrease of the depth of breathing by deliberate efforts made by the patient to relax respiratory muscles until the feeling of some shortage of air. All mentally sound adults and children from the age of three are able to learn the method.

Our ideas can be used on a broader scale — starting from antenatal training of prospective mothers, caring for infants, teaching children some physiological norms and finishing by the implementation of the general health improvement program for the entire population. The ideas also can be used widely in space medicine, surgical practice (as a part of the preparation to complex surgeries), pedagogy, singers' training and sport.

In common opinion, medicine (similar to many other sciences) needs to be radically reshaped. We are seeing our ideas — along with other progressive but previously rejected ideas — as a foundation of the future medicine.

We believe the first and foremost task is to give people the information about our discovery in order to stop the deep breathing propaganda by radio, TV and mass- media and to cancel deep breathing exercises at the hospitals and clinics.

The complete victory will come when the whole civilised world realises: the deep breathing principle of greed is the worst of the human vices. That is the source of almost all troubles, the main cause of diseases and death for overwhelming majority of human beings.

K. P. Buteyko

Part 1

The theory of the pathogenesis of diabetes mellitus. Basic principles of hormone therapy.

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My theory of the pathogenesis of diabetes mellitus was firstly published in the "Inventor and Efficiency Expert" magazine, 1962, #5. Strictly speaking, in that article the whole theory of deep breathing was presented, and you should learn and pass on to your patients its basic clauses.

The theory of the deep breathing disease is based on the principles of physiology. However, our opponents holding higher positions in our medicine, are still not able to grasp the fundamental idea stating that the deep breathing causes hypoxia.

Let me get back to the laws which underlie the theory of the deep breathing disease.

1. Hyperventilat ion, or deep breathing, does not add oxygen to arterial blood. Under normal breathing the blood contains the maximum amount of O_2 (normoxia) and is simply not able to absorb more.

   It is known that regardless of how long one will breathe pure oxygen, the level of oxygen in their haemoglobin increases insignificantly, at 1 - 1.5% only. With that, the 02 partial pressure in plasma increases and spasms of the bronchi and vessels occur. That is why pure oxygen supply to the patients suffering from asthma and vessel pathology causes increased hypoxia. Thus, to inhale more pure oxygen means to pump 02 into an organism without taking into consideration the mechanism of hypoxia.

2. Hyperventilation does not intensify metabolism. In other words, the organism is not a furnace: the more one blows into it, the better it works. On the contrary, the deeper and more intensely the organism breathes, the less oxygen goes into blood. As a result, hypoxia develops, metabolism products become underoxidized. That is the way our body works. Next, the metabolism deteriorates, blood pH increases in the alkaline direction and the blood itself begins to accumulate underoxidized products. This is how metabolic acidosis occurs.

1st stage of hyperventilation is respiratory, or gaseous, alkalosis caused by CO_2 deficiency.

2nd stage is the development of metabolic acidosis. It is caused by the accumulation of underoxidized products which happens due to hypoxia and represents a compensatory reaction against gaseous alkalosis.

Our opponents are still not able to understand the reason for deep breathing of asthmatics, to comprehend what was studied and explained by us a long time ago. Confusion about the acid-alkaline balance continues. But we have sorted it out: such patients have got both gaseous alkalosis and metabolic acidosis. They compensate each other (a dynamic process for a short period of time). However, both gaseous alkalosis and metabolic acidosis can be liquidated by normalising breathing.

While reducing the depth of breathing some oxidizing occurs due to gaseous acidosis. When lactic and pyruvic acids along with other underoxidized products get oxidized, non-gaseous metabolic acidosis decreases. That means everything goes back to normal with the normalisation of breathing. However, we have got an impression that nobody looked into the matter except us.

3rd stage states: in consequence of changes caused by 1st and 2nd laws, all enzymes and vitamin activities become erratic. That leads to destruction of all types of metabolism. Consequently, diabetes mellitus develops. So, diabetes mellitus is nothing else but a destruction of carbohydrate metabolism. Thereby, I offer the theory that diabetes mellitus is caused by CO_2 deficiency.

CO_2 deficiency causes a whole range of destruction of the metabolism at all levels of the organism right up to the level of the cell. What is happening during those processes? All body organs and systems are getting depressed. I consider that deep breathing is a body stress.

Any stress, whichever you are going through, inevitably leads to deepening of breath. That is an ancient body reaction. Its role is to avoid CO_2 deficiency in the organism. [Ed: Query?] The point is that in cases of positive or negative emotions, an intensive CO_2 exhalation from the body occurs. As a result, the central nervous system becomes overreactive and the breathing deepens. Because of deep breathing the oxygen content in lungs slightly increases. Finally the strong tension develops which is necessary to mobilise physical strength to attend the stress - in the form of fighting, attacking, defending, fleeing, etc. We have to view the increase in CO_2 exhaling, the boost of energy and the intensification of metabolism as compensatory factors. That is why any emotion must be discharged physically. That is our point of view. I.P. Pavlov failed to explain why undischarged emotions are so bad for the organism. We did it.

I want to emphasize once again that we consider deep breathing to be a stress. It means that during stressful situations, in order to eliminate stress, one has to lessen his depth of breathing, in other words, to use our method and by doing that to calm the nervous system down.

During a stress some psychotropic substances - such as adrenaline, noradrenaline and others - are produced. They stimulate our defence and attack reactions, enhance our muscle strength, and so on. At the same time the production of insulin goes down and its concentration in blood drops. Deep breathing causes some body reactions leading to the increase of sugar content in blood which helps the body to cope with the energy upsurge. The increase of blood sugar is useful when there is enough insulin in the body because it enhances the gaseous substances flow into muscles, brain and cells and consequently normalises their functions. However, if deep breathing lasts longer, the compensatory mechanism turns into a pathological one as with time an insulin deficiency develops. Together with CO_2 deficiency it leads to all kinds of metabolism destruction. For example, due to stress and deep breathing, arthritis patients have got an increased cholesterol content. We have confirmed by experiments that by decreasing the depth of breathing the cholesterol content in blood returns to normal.

Coming back to the diabetes, it is important to stress that the deep breathing leads to increasing production of some substances such as glucagon which assist in increasing blood sugar content. The Krebs cycle changes direction, other chemical processes also alter aiming to reduce sugar decomposition and to increase its concentration in blood. The whole system of biochemical reactions comes to work in order to increase blood sugar content. That is why hyperglycemia along with insulin deficiency should be viewed as a defence reaction against energy deficiency.

So far Western medicine believes that nature is stupid and one can interfere and recast it with impunity. Now you have learnt why nature is doing certain things and how sensibly we have to act towards it.

We consider bronchospasm, vessel spasm, high blood pressure and other body reactions to be useful defence mechanisms to compensate to some defects of the organism. Exactly from that point of view we analyse hypoglycemia. Now you understand that apart from insulin deficiency, a number of other processes also increase blood sugar content. Hence, the conclusion: one can't estimate insulin concentration in blood by looking at the sugar level although coincidentally they can agree. We are convinced that the increase of sugar level is not a pathologically damaging factor. Sometimes we observe a tenfold rise of blood sugar, and so what? Nobody died from such a hyperglycemia. Sugar is not poisonous. That is clear for everybody.

In common practice the main criteria for choosing the insulin dosage is the sugar level. In leading Moscow clinics insulin doses are regulated by blood sugar in spite of the fact that it is absurd and a great mistake. To define an insulin dose we need to find some true evaluating criteria for insulin deficiency. This is a very difficult task.

In this respect, it appears to be necessary to define the principles of hormone. replacement therapy. Working on the task we were acting in accordance with the fundamental laws of nature as applied to the human body.

How does western medicine act? It is based on blind empiricism. It will stop short of nothing in order to find the way to conquer the illnesses which can be cured by our method. They use the most elaborate methods and medications with no avail!

However, to eliminate diabetes mellitus pathogenic factors, it was necessary to find what was causing the insulin deficiency, and to remove that cause and consequently the hormone deficiency itself.

The following are the fundamental principles of the hormonotherapy which we adhere to and which are usually broken or not recognised by the existing medical practice.

The main principle is as follow: if there is some hormone deficiency in the body, one has to define its cause and eliminate it.

We believe the main cause of hormone deficiency illnesses is deep breathing. Why? The deep breathing upsets metabolism in those systems.which are responsible for proper regulation of the activity of hormone systems such as hypothalamus and pituitary gland.

CO_2 deficiency caused by deep breathing leads to:

- biosynthesis disturbances with respect to aminoacids, purines, pyrimidines, fatty acids and carbohydrates;
- oxystructure stabilisation (Verigo-Bohr reaction moves left);
- discharge of cell transmembrane potential;
- depletion of blood plasma buffer system;
- pH alteration in blood plasma and cells.

Consequently, the following effects occur:

biosynthesis disturbances with respect to proteins as well as enzymes, antibodies, nucleic acids, lipids and polysaccharides;

tissue oxygen deprivation;

changes in cell stimulation and interaction patterns;

change in enzyme activity and decrease in antibody-antigen affinity. That manifests itself in the form of disorders of cardiovascular, humoral, immune, hormone, digestive and nervous systems. As a result, metabolism in hormone cells gets also upset.

In accordance with our data, deep breathing people have always got practically all kinds of hormone deficiency. Even their sexual hormones, especially female hormones, are low. Obviously, hormone deficiency could be caused not only by deep breathing. But, in any case, the deep breathing always aggravates the process. For example, under the radiation the sexual organs suffer more severely and hormone secretion decreases. If that is happening in combination with deep breathing, pathologic changes in the body grow bigger and faster.

Patients with some upset hormone functions, especially those with diabetes, show clearly noticeable hyperventilaton. Our data shows that the control pause produced by diabetes sufferers is 5-10, maximum 15 seconds. Correlated with those figures CO_2 level is equal approximately to 32-34 mm of mercury which means it is twice lower than normal. That allows me once again to declare the main cause of diabetes mellitus is CO_2 deficiency provoked by deep breathing. If the diabetes patient has got both deep breathing and CO_2 deficiency, our theory can explain all pathologic changes in his body.

As it is known, the majority of diabetes patients develop atherosclerosis resulting in heart attack, stroke, thrombophlebitis complicated with gangrene, etc. The correlation between those diseases and deep breathing is proven by scientific research.

What is our medical tactic?

We believe first of all it is necessary to use hormone replacement therapy, i.e. to give a patient hormones as much as the shortage of it occurs in his body. The question is the quantity: to overdose or underdose?

That one is an important and significant question. With respect to it, medicine has reached a deadlock and it is common to overdose hormones. How do such doses affect the organism? They affect it in a way when the functions of one or another hormone producing organs become lowered and suppressed, and then, down the line - if hormone medications intake continue to increase - the hormone producing organs can become fully disabled. Moreover, ideal hormone medications are not available yet. A hormone extracted from one individual contains antigens to that one extracted from another. An introduced hormone will always be worse than that produced by the body. Obviously, the introduced hormone is more harmful than ours. And what if we do overdose it?

So what is the best solution for the situation?

1. We suggest to completely turn down those existing dangerous schemes of treatment based on hormone overdose.

2. We suggest to define hormone dosage using three parameters: a pulse, control pause and general feeling of well being. The hormone dosage should be changed daily, again - in accordance to the pulse, control pause and the general feeling of well being.

The daily dosage may be increased or decreased by 25% or even 50%. The base daily dosage is the dosage when the patient feels well and when asthma attacks can be stopped easily with the use of an inhalator or our DVBM method.

The detailed instructions on hormone therapy is enclosed as an attachment to DVBM instructions.

We wish to emphasize that the hormone therapy tactics offered by us can be very effective only in conjunction with DVBM. Only under this condition the gradual decrease of hormone dosage along with the adrenal gland tissue restoration becomes possible. According to our data, those patients who increased their control pause up to 30-40 seconds, with a pulse rate of 65-70 beat/min., have stopped taking hormone medications because they did not need them any more.

Naturally, we have arrived at the following conclusion: it is compulsory to drastically alter the existing approach to hormone therapy, to make it coherent with the scientific data which have been offered to your attention at the current conference.

DVBM for treatment of Diabetes mellitus

A. N. SAMOTESOVA
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Up to 70 % of patients monitored by an endocrinologist are diabetes mellitus sufferers. In the Krasnoyarsky Region 29,000 patients have some sort of endocrinopathy. With respect to the entire population of the region it means that one in six people is affected by some endocrine disease. This is huge. Keep in mind that there are only four healthy people against each diabetes sufferer, as every fifth person has got a hidden type of diabetes and is not aware of the condition.

Since 1971 our endocrinologists are involved in the State Program of Diabetes Research.

The main cause of diabetes is a complete or relative insulin deficiency. During recent years the problem of diabetes attracts a great deal of attention. Scientists around the globe are investigating pathogenesis of the disease because the treatment based on the pathogenic approach is the most effective one. If we are able to prove that CO_2 deficiency is really a main factor causing all pathological processes associated with diabetes, we will consider this to be a genuine revolution. According to Dr. Buteyko, we don't have the facilities to cure all diabetes patients, doing it would take about 300 years. However, if all the doctors practicing DVBM method teach their patients and make them change their breathing pattern, that alone will get us some positive results.

Being an endocrinologist with a 25 year experience, I can say that even if we don't manage to completely cure diabetes, but succeed in preventing at least vascular complications, lives and ability to work of millions of people will be saved.

Our experience of using DVBM is not that big but we consider it important and wish to share our observations with you.

Two types of diabetes mellitus are known: Type 1 — insulin dependent; and Type 2— insulin independent. We are mainly using DVBM for patients with Type 1 diabetes. Type 2 diabetics are yielding successfully to drugs and the treatment can be stopped when their compensatory mechanisms become satisfactory. But those patients on insulin need our help.

As a rule, we use DVBM with children, teenagers, younger people even when they are on very large insulin dosage.

To treat patients with DVBM is a very complex task. Many diabetics already developed some vascular pathology and other complications. According to V. A. Genina and K. P. Buteyko, every reaction of the organism must be accounted for. At first, cleansing does not target diabetes mellitus. It starts from the restoration of all other types of metabolism as all of them are disturbed. This includes protein, lipid and carbohydrate metabolisms. The vitamin balance is also broken and microelement content is altered (magnesium, cobalt, zinc, etc.). Under the circumstances we can not expect a quick recovery and cancellation of insulin. Therefore, during first sessions we aim to compensate these effects in the patient. Then, we start using DVBM.

For many years we had a tendency to overdose insulin. We knew that the quality of insulin was not very good. its activity level was labeled 40 units/ml, but in reality it was much lower.

Sometimes the whole series were produced with decreased activity. A patient could have been receiving insulin with an increasing dosage year by year, then, when he switched to another brand with the normal activity, all of a sudden he develops hypoglycemia due to the occurring overdose, and that is far more dangerous than high blood sugar. There is a syndrome indicating the chronic insulin overdose. In our region we consider it to be normal when the blood sugar of diabetics receiving insulin is 10-12 mmol/l. If this figure drops to 5 mmol/l (which is normal for healthy people), we define it as hypoglycemia...

While using DVBM method for diabetics we need the patients to be monitored by an endocrinologist. There were cases when patients doing DVBM without a proper control kept increasing the control pause to a very high reading. Such an extremely long control pause used to lead to hypoglycemia, the utterly threatening state. Besides, during initial sessions hypoglycemia could have developed from muscles being overworked.

As part of the preparations to DVBM sessions patients could be advised to bring food with them. They have to eat before sessions or in one hour from the beginning. Then these sessions run smoothly and insulin production is regulated naturally.

Professor A. G. Mazovetsky pays a lot of attention to self-control. That is a must when one specialist has to be responsible for 1,500 diabetics. He can not be able to control so many patients especially to monitor their daily insulin level in the blood and its fluctuation. Such task can be performed only by a special device - artificial adrenal gland [Ed.: pancreas]. This helps promptly to bring patients out of ketoacidosis coma by allowing to inject the precise insulin dose in response to each sugar rise. However, this monitor is not available in our region.

Realistically speaking we have to work with what we have at our disposal and use the insulin that we can get. That is why in our circumstances DVBM is very valuable.

The most frequent hormone therapy complication are diabetes, obesity and Icenko-Cushing syndrome. Nobody knows more about hormones than endocrinologists, and nobody is afraid of them more than us. We prescribe hormones sensibly. And we often have patients coming to us with asthma in combination with adrenal insufficiency, Icenko-Cushing syndrome, iatrogenic diabetes mellitus. That is when it is very hard to succeed with treatment.

In my view, DVBM will turn the world over. Diabetes mellitus is a plague of 20th century. It is known that as long ago as hundreds of years past some carbon dioxide baths were used for the respiratory system improvement. The positive effect was reached due to the rise of carbon dioxide content in the body. G. A Ryabov in his book "Hypoxia at crisis conditions" noted that one can deliberately accumulate carbon dioxide and alter gas exchange in your own body. This results in metabolic processes improvement.

Nowadays the Buteyko method attracts a lot of interest. We have to actively put it into practice. This matter was on the agenda in the Therapists' Society of Krasnoyarsky Region.

Traditional medical treatment requests us to use an enormous amount of drugs which means allergies and other consequences. That is the reason why I am in favour of active introduction of DVBM. I think in one year I will be able to present our results. And I hope to hear what results are to be received in other regions of our country.

A. N. Samotesova's answers to the questions

As known there are insulin dependent and insulin independent types of diabetes. We were presented here with the case when a woman with diabetes had cured herself by jogging. Obviously it was type 2 insulin independent diabetes. If we would start treating such diabetes with insulin from the very beginning, not finding out to which type it belonged, it would only be possible to define whether the dosage was excessive by checking it after physical exercises. There is enough insulin in organism with type 2 diabetes but it is bonded with protein. With the above mentioned case, it looks like the type of diabetes for that woman was defined after she had increased her physical activities and her state of health was compensated.

Switching to DVBM we have to mention a compensation. By putting a patient on DVBM we decrease his blood sugar level under the circumstances when his muscles do an intensive work, the strict sugar diet is fulfilled and the insulin overdose is corrected. So, before starting DVBM a complete compensation is necessary and excessive insulin should be canceled. We should never decide on the insulin dosage or drugs intake by single blood sugar test. To define a correct insulin dosage we have to check blood sugar level every three hours throughout the day. That is absolutely necessary. The organism produces hormones unevenly during the day and night cycle: some of them are produced in larger quantities at nights, others - in the morning or afternoon. When injected, insulin begins working in half an hour, it reaches its maximum in one hour and a half, decreasing within 5-6 hours, sometimes it works up to 8 hours.

Starting DVBM we begin to reduce a patient's insulin intake very slowly and only after the initial signs of hyperglycemia are shown. We have to do this - if this is necessary at all - very carefully, not to allow bigger leaps as diabetics' state of health becomes worse from blood sugar level fluctuation, from very high to very low figures. Such fluctuations were noticed when the Buteyko method was used.

Diabetes mellitus develops when 0.9 of adrenal gland cells [Ed: Pancreas] lose their ability to produce insulin. It is not known so far in which way DVBM affects adrenal gland [Ed: Pancreas] cells but we hope that the vascular-cellular system restores itself thanks to those biochemical processes that have been discussed here.

How to treat a patient with ketoacidosis, with high sugar reading - 30 mmol/l? These are extremely high figures. You can not help a patient with such figures. We can explain some rise of ketonic bodies or some slight reaction to acetone in urine. But if acetone emerges in urine suddenly and the amount of ketonic bodies rises high 5 it means that the fat metabolism is not reaching its final stage, that is underoxidation of fat metabolism products occurs.

What is easier - hypo- or hyperglycemic coma? If hypoglycemic coma develops when the blood sugar content decreases rapidly, in this case, some compensatory mechanisms can take actions and a patient will manage to come out of coma on his own. But genuine hypoglycemic coma develops when blood sugar content is very low, and in case of not receiving treatment on time, the fatal outcome is a possibility. To help a patient with a hypoglycemic coma is very easy. All it takes is to urgently give him something sweet to eat. The intravenous injection of glucose takes him out of coma within a day and he will feel OK.

In case of the developing of ketoacidic coma there are plenty of underoxidized products in the organism. That is a really serious situation, and it takes a lot of actions to restore the upset fat

metabolism. With this the cerebral cortex suffers first of all as carbohydrates are the main nutrients for the brain.

Before the insulin discovery the level of fatalities due to diabetes was very high and people died young. Now diabetics live until a very old age and die from different causes. We believe that people should not concentrate their attention on being diabetics. They have to keep it under control and get on with their lives as other healthy people do.

How do we run our DVBM sessions and treatment? We keep those patients under special control. We work with them individually, explaining things face by face. One can not reach the same result with them in a group session. Our clinic and endocrinology department are situated on the same floor at the regional hospital No. 1. If some patient's would urgently need our help we are able to attend to them immediately and then we go on with DVBM session. As an example I will describe to you the case with a female diabetic from the city Alma-Ata. There is a trained nurse there who sent that patient to us and who can confirm that she is fine now. When that woman arrived her control pause was 4 seconds. She stayed there a month having a session every day. She also had some tests done daily. That included blood insulin content, biochemical parameters - such as cholesterol, proteins, sugar, ketonic bodies and acetone in urine. Such control was a necessary measure to prevent the patient from hypoglycemic coma. In general, no single practitioner should treat diabetics without an endocrinologist's support in order to avoid serious consequences. There were some hypoglycemic episodes with that patient due to her reinforced muscle work and DVBM sessions. She had also some hyperglycemic occasions.

That patient left us with a control pause of 20-25 seconds. She informed us about her state on a regular basis and came back in a half a year for observations. When she left us that time her insulin level was slightly lower but I can not say right now what caused that decrease. At the next conference I will give you a more detailed report on that patient.

K. P. BUTEYKO COMMENTS ON A. N. SAMOTESOVA'S REPORT

A. N. Samotesova is a first endocrinologist who is using DVBM. Other endocrinologists including those from Moscow are blockading the method and nobody is trying actively to implement it. So, I recommend some diabetics, especially children, to go to Krasnoyarsk.

We consider diabetics to be seriously ill when they have complications or when they are on the insulin dosage of more than 60 units per day. It is very dangerous to treat such patients without having them properly monitored.

During all previous conferences dedicated to diabetes mellitus the leading specialists declared that in the whole world there isn't a single known case of diabetes having been cured. So, we have nothing to lose: what if we can manage at least to reduce insulin intake? We have such patients. They are the 14 people who have undergone treatment in Krasnoyarsk.

I wish to express my gratitude to A. N. Samotesova for her active efforts. For 36 years I have been looking for an endocrinologist willing to use DVBM. Now you can see absolutely clearly the changes in diabetes treatment.

We believe - in accordance with our experience - that the dosage of a hormone should be decreased by 1/4 of the initial dose, no more. And we should not stick to a dose: it has to be changed depending on the patient's well being.

Diabetics' reaction to recovery is no different to the pattern of the illness itself, in particular manifesting itself by shifts in insulin production. Hypo- and hyperglycemia are easy to regulate. Treatment of diabetics is not as complex as that of patients with some other diseases. However the process of clearing in diabetics is not very noticeable unless a patient has an infection focus. That is the reason why their treatment requires precautions with respect to breathing training. So far there were no serious complications noticed during clearing.

We recommend to select for our treatment people with complicated types of diabetes. The more complicated and grave their diabetes is, the better the patients concentrate on achieving the best results. Consequently, the effect of using our method is more obvious.

We have to keep in mind that the increase of sugar is a useful factor. That is why we should not let it reach the norm neither in blood nor in urine. If a patient initially had a high level of hyperglycemia, then we have to keep his blood sugar at a comparatively high level during his DVBM treatment. In cases when patients did not have a high sugar level during hyperglycemic comas, his individual sugar norm should be lowered. In general we have to keep patients' sugar level two-three times higher than the norm. If the sugar drops below that level, the insulin intake must be cancelled immediately.

There is no statistics on fatalities caused by hypo- or hyperglycemic coma but I believe that hypoglycemia can lead to lethal outcomes more often. It should be explained to patients, and it should be kept in our minds while we deal with diabetics. If chemical metabolic reactions go through changes and the level of CO_2 rises from 4.5 to 5%, then at such moments the insulin production may decrease which means we would have to add some insulin to the treatment. The supervision tactics during these changes regarding diabetics are much simpler than that regarding asthmatics when it is really hard to foresee what could happen during the process of reconstruction related to the regulation of bronchial tension and metabolism. In cases of diabetes mellitus we are aware that the reconstruction is in tune with the metabolic changes in the adrenal gland [Ed.: pancreas]. As a result the latter does not produce enough insulin which dictates us to increase the hormone dose.

Reconstruction of the organism manifests itself mainly through coma. We can manage it if we have insulin and good nourishment at hand. We always recommend to our patients to carry with them some sort of pure glucose with vitamin C, because it could be absorbed by the body faster then sugar.

As a rule, diabetes mellitus sufferers are informed poorly about their illness. They feel frightened by high sugar readings and are scared of developing hyperglycemia. During the period of convalescence they usually have some hypoglycemic symptoms. It is related to the fact that during the first stage of our treatment the depth of breathing decreases, metabolism improves, adrenal gland [Ed.: pancreas] functioning gets better, and - consequently, more insulin is being produced. As a result of all of that, the blood sugar level falls, and some signs of hypoglycemia emerge. The patient should be informed in detail what the symptoms of both the overproduction and lack of insulin are. It is a good idea for him to write those symptoms down in his diary and keep them in mind.

Now we are going to ask endocrinologists to develop the theory which has been offered to your attention as a summary. We need it as I am not an endocrinologist myself. Fortunately, we have got with us A. N. Samotesova who became interested in my ideas.

Other important problems are alcoholism, smoking and narcotics. In my opinion smoking is more dangerous than alcoholism. Especially harmful it is for youngsters, not to mention girls as future mothers. This is the greatest crime for the humanity because nicotine poisons the whole organism and its nervous system in the first place. Alcohol is more harmful with respect to intellect. Two narcologists are present here, at our conference. One of them is S. N. Zinatulin, who has done an exceptional job by performing very elaborate biochemical research regarding the issue and collected a great deal of information and data. I would like to attract his attention to some form of concrete and specific therapy in relation to patients in narcological clinics. Also, I would ask all the practitioners to find out who of your patients are smokers, drinkers and drug addicts and to keep records on them. Such sort of information can help us to confirm that the decrease of the depth of breathing and the increase of the control pause are of assistance for patients in developing an aversion to nicotine and alcohol.

I fully agree with A. N. Samotesova that DVBM has to be conducted by practitioners, not necessarily by doctors who are often too busy to make time for sessions. Also, practitioners do not have to have medical qualifications. For example, we have got a wonderful practitioner who has shown us unbelievable results and she is a child - two and a half year old Masha. She is very seriously ill suffering from a coughing type of asthma. Such a type is very difficult to treat because there exist no broncholitics which can stop asthma attacks of that nature. We recognise a coughing type of asthma as a most difficult for our treatment because coughing interrupts breathing.

Thus, doctors can recruit their own patients who went through our method and mastered it well. For instance, we give our practitioners certificates stating that they are allowed to teach DVBM to the healthy and the sick. However, a practitioner is not a doctor. He has got the rights to teach and treat patients only under the supervision of a specialist or GP. Nevertheless, practitioners are a great practical help as we do not have enough doctors who have been taught how to use DVBM.

The specific approach to the patients' supervision while using DVBM for treatment

KP Buteyko

There are some peculiarities in using DVBM for diseases related to deep breathing. So, there should be a specific approach to supervision of the patients who belong to this category. This specific approach is about the intensity of treatment. The question is how intensively the method may be used for each individual patient.

As for the patients with arterial hypertension and a tendency to vascular spasms, forcing the breathing pause must be prohibited. The danger is that the pause can cause the patients' breathing to interrupt, and consequently, to deepen. Because of deepening of breathing the patient feels unwell. Ironically he thinks that his problem is caused by the pause itself. However, it is impossible to reduce breathing too much and that is why DVBM can not be dangerous. We supervised two patients who were decreasing their breathing until they got lips and nails' cyanosis. Initially both suffered from very serious angina pectoris. The effect of the treatment was instantaneous. Two or three days, and all symptoms were gone. Fantastic results!

Our current conference is not a workshop. One can learn DVBM at special courses. Let me only introduce the main points of the method.

I would like to emphasize that the maximum pause must measured prior to any explanation in order not to affect breathing. Measuring the initial maximal pause has to be done in such a way that will not provoke deep breathing afterwards.

It is very important to conduct respiratory tests properly.

Now we will talk about how to teach patients DVBM.

At the beginning of the sessions we should engage our patients into the exploration of their individual breathing pattern. They have to try to detect how it is going and analyse their sensations. Everybody has different sensations: one feels the air movement through his nasal passage, another is able to trace its way along bronchi, third person can pick up diaphragm swaying, the forth perceives it as a chest movement, others feel nothing which is very bad.

We have to help each patient to find his way to feeling his breath. If people have no sensations, we should ask them to take their clothes off, stand in front of a mirror and let them see their stomach and chest movements. Then they can put their hands on the stomach and chest and feel their breath.

We can move to the next stage of teaching our method only after being convinced that the patients are able to feel their breath.

Next stage is about relaxation. We have to demonstrate to the patient the tension in the whole body, including all muscles, especially that of the stomach area. Ask a patient to strain his whole body and stomach muscles to the maximum, then gradually relax until the total relaxation. Repeat this a few times in order to let the patient sense the difference between tension and relaxation.

Then we have to determine which patients are able to relax their diaphragms. Inform them beforehand what a diaphragm is - a muscle dividing a chest from abdominal cavity, and that there is no way to touch it. Ask patients to completely relax their stomachs and diaphragms. You can see when the complete relaxation is reached: there is no movement in these patients' chests, no breathing. Divide patients into two groups: those who were able to stop breathing and others who were not. For the first group learning our method will be easier.

Now we can start training patients to reduce the depth of breathing. Ask them to relax stomach and diaphragm and feel how the air movement through nose and bronchi is lessening, how diaphragm movements are getting smaller. At that stage patients do not feel a lack of air as the depth of breathing has been reduced insignificantly. However their CO_2 went up a bit, and negative symptoms of deep breathing went down. As a result, their hands became warmer, eyes began to shine, cheeks grew pink, which indicates shallow breathing. This is the first, easy stage of training.

The intermediate stage of breathing training is the stage when the patient has to reduce the depth of breathing until he begins to feel the lack of air. This is when explanations should be given with respect to what the control pause is and how to measure it. The period between the points when the patient begins to reduce the depth of breathing and when the feeling of the lack of air occurs is very important. I assert that within that period the cerebral cortex partakes in regulating the breathing function. When the cerebral cortex is taking a part in regulation, the function is strengthened. This is a fascinating discovery that we are going to investigate further. Even though the notion has a broad physiological meaning, it still plays an important role in our work. We need to know to what extent the feeling of the lack of air intensifies the breathing. At the beginning of the training it definitely works that way, but with time patients are getting used to the sensation and their response to it weakens.

The highest stage of training is reached when the patient, using a relaxation technique, makes the depth of his breathing as shallow as his maximum pause and he is actually breathing on the verge of interrupting his breathing rhythm. At this stage we re-define individual amount of training according to the patient's strength. Whereas earlier we regulated it so that unpleasant sensations might be avoided.

Some practitioners believe that during the first stage of training (no feeling of the lack of air) we can succeed better than when we reduce the breathing dramatically. This point of view will be confirmed or rejected in the future. Bearing this in mind, we ask you to observe what level of reducing of breath is most effective, especially in terms of delayed results. However, it is clear already that if we teach our patients only to reduce their breathing slightly (first stage), we can not be sure they won't be forgetting to do training at home, at work or while commuting, not to mention sparing some special time for exercising. When they are trained to the higher levels it gives us assurance that their breathing really becomes more shallow. Keeping in mind all the problems emerging during the training we forbid self- training without supervision of specially trained practitioners. We have to do our job with excellence as the medical world is watching us. The most important criterion for us is quality, not quantity.

When learning DVBM our patients always have to follow the so-called "right. hand law" - it is important to be comfortable while lying, sitting or standing. Being comfortable provides for muscular relaxation. Naturally, patients assume comfortable positions according to their choice.

The correct posture is also playing a very significant role. Usually patients are seated while training. The most important thing is to put a diaphragm into the right starting position. This can be achieved only by setting the abdominal wall and the organs of the abdominal cavity in their correct positions. Posture of an average 20th century person is seen as a stooping back, open mouth and a protruding stomach To assume the proper posture it is necessary to pull in [*Ed: needs re-translation*] and relax the stomach, as well as to keep the back, head and neck straight. All these details will be included into the methodology that I am now working upon and further developed at our research and training centres.

Prescriptions and contradictions in relation to DVBM

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DVBM was approbated at the Pediatric Clinic of the First Moscow Institute of Medicine named after I. M. Setchenov. During the approbation some functional parameters - such as acid-alkaline balance (AAB) and spirography - have been researched. At present we have got under our supervision 137 children with asthma at the age of four and older. They were receiving the treatment involving reducing the depth of breath. For 47 children we started to use the traditional DVBM method offered by K. P. Buteyko. However, the majority of children soon were transferred to the milder modification of the method which is still used at the clinic. The modification means that the breathing limitations are not that imperative and much more attention is paid to the relaxation. For this modified method the control pause does not last longer than one minute. We were forced to modify the method because of complications due to stressful effects produced during the reaction to convalescence. We discussed it six years ago when V. A. Genina was approbating the method at our clinic.

As mentioned above, all children had undergone AAB and CO_2 measurements, with blood samples taken from their warmed up fingers, as well as spirography. Eighty patients had undergone kapnography of exhaled air. The ventilatory reaction with respect to CO_2 was estimated in 20 patients by the method of breath recirculating.

We have compared two groups: those who were treated by the Buteyko method and those treated by its softer modification.

The control pause was longer and the frequency of breathing was lower in the group practicing DVBM. Other parameters were statistically the same in both groups, and now we mainly use the softer modification.

The approbation has not shown 100% positive effect. Asthma attacks have ceased in 20% of patients without medications. In 18% of cases attacks were cupped short without medications. 29% of patients were able to reduce their medication intake in half. 33% of children, who did not show any improvement, consisted of those with very severe types of the disease and those who rejected the treatment.

Clinical results were a bit better than functional. Even amongst the children whose asthma attacks have ceased (the first group), often the effects did not extend to complete normalisation of lung functionality, i.e. lung emphysema and some signs of breath obstruction remained..

Before the treatment, readings of AAB and results of blood tests occupied a broad range among the patients. For instance, CO_2 in all groups fluctuated from 27 to 44 mm of mercury. 23% of patients from the first group (with best results) had hypokapnia (CO_2 content of exhaled air was less than 31 mm of mercury which indicated hyperventilation); 5% had a medium level of hyperkapnia (CO_2 was higher than 40 mm of mercury). Deviations in the direction of the CO_2 decrease were observed in 2nd and 3rd groups, correspondingly in 16 and 6% of patients.

Children in the last group (with the worst results) had a tendency to hyperkapnia which peaked during attacks suffered by more serious patients.

In general functional results showed improvements (although clinical results were better than functional).

Readings of CO_2 increased, in average by 2-4 mm of mercury in all patients, whereas that of pO_2 decreased, in average also by 2-4 mm of mercury, in other words, hypoxemia intensified, which was seen from the ECG.

We also noticed some slight but statistically significant growth of pH which we found to be of interest.

Other group consisting of 42 children was observed and checked up. They had been treated by the method based on biological reverse connection,. This method is popular in the West. The essence of such methods is to teach patients to control their respiratory function by using a monitor. Similar methods are used to correct arrhythmia, to treat epilepsy and some other diseases as well.

We were using a pneumograph and a capnograph to evaluate the treatment by the method based on biological reverse connection. As it is known, a capnograph registers not only CO_2 content in exhaled air but also allows to estimate how strong the bronchi resistance is grown. Under the capnograph's control our patients decreased the depth of their breathing. We also tried to teach them to relax bronchi but did not succeed in that. In general, the method has something in common with DVBM however it pays more attention to the neurorelaxation which we controlled with the cardiomonitor as the neurorelaxation can be accompanied by tachycardia.

The results of the biological inverse connection method turned out to be similar to both - the orthodox Buteyko method and its modified version: 1/3 of patients showed some positive effect, 1/3 did not show any effect.

lnterestingly enough that the correlation analysis of the clinical data with respect to the functional improvements shows the better correlation in cases when DVBM was used. The pH growth was on the first place, CO_2 growth - on the second, followed by the decrease of pO_2. As for the method of biological inverse connection, the first place belonged to the pH growth as well, but the second place - to the increase of pO_2.

Bronchial asthma is considered a psychosomatic disease. One of the important parts of treatment of such diseases is the psychotherapy (suggestion). However, above described methods are based on physiological changes such as pH growth with respect to CO_2. We explain the pH growth as a consequence of the peripheral gasoregulation in response to even minimal CO_2 growth. However it is not true for all patients. We observed the minimal pH growth more often in the group with the best clinical results. It is known that one can stop an asti~ma attack in a child simply by reading him an interesting book. Or, send a child with a mild asthma attack to school, and for the majority of cases that will end the attack.

Of course, the important role plays the decrease of the strength of forced exhalation. It is known that while coughing, forced inhalation produces more coughing. That is similar to eczema: the more you scratch, the more you want to. I.e. when you reduce the depth of breathing, you spare your reflexogenic zones. It is well known that the asthma attack can be provoked by cooling and

drying of respiratory passages resulting from deep breathing. If we conduct a hyperventilation test in a room where the air is humid and warm, it is much harder and sometimes impossible to provoke an asthma attack. On the contrary, the

hyperventilation test in a close space with a higher CO_2 content in the air leads to an attack. The patient breathes deeply, inhaling the air with a higher CO_2 content, therefore an attack occurs.

Seemingly it is impossible to claim that DVBM can produce 100% result for nearly all kinds of illnesses. All methods, including DVBM, are useful to some extent while applied to suitable contingent of patients.

In our opinion, as presented in the summary of DVBM testing conducted by V. A. Genina, the above mentioned method is sufficient mainly for mild and not too serious types of bronchial asthma. In very serious cases which are often accompanied not by hyperventilation but, on the contrary, by the CO_2 content increase, it is dangerous to employ DVBM. .

K. P. BUTEYKO COMMENTS ON THE PROFESSOR M. I. ANOCHIN REPORT

KP Buteyko

First of all, let me emphasize that professor M. I. Anochin' report is a serious attempt. to criticize our work that had been performed in association with the Siberian branch of the Academy of Medical Science, USSR, from 1958 to 1968. Unfortunately, in his report no conclusive figures were presented, no comparisons was done, no regularities were derived. Therefore, not a single point from our work "Physiology and pathology of respiration and blood circulation" published in 1968, has been refuted. We have heard only science-like unsubstantiated something which we are going to try to analyse.

Let's go back to the scientific conference in 1980 at the Department of Pediatrics of the First Moscow Institute of Medicine named after I. M. Setchenov, where professor M. I. Anochin is working. At that conference a doctor from town Omsk said that, in her opinion, the Department had failed to learn DVBM properly. Professor M. I. Anochin still has no knowledge of the method, he never learned it. We have no idea how our method was applied over there. They were doing it without our consent. We used to stress that DVBM can be used only by doctors and practitioners who had received a special training with us. After an approbation in 1980 the Department did not send to us even a single person to learn how to use DVBM properly. Nobody has my or my colleagues' permission to use the method. Now I wish to declare officially that I forbid to use the method in the above mentioned Department because they have no specialists who know how to do it.

Here I have got a conclusion regarding the approbation of DVBM. The approbation was conducted under the instruction of the State Science and Technology Committee by my disciple V. A. Genina at the Department of Pediatrics Of the First Moscow Institute of Medicine named after I. M. Setchenov at the period from March to May 1980. The conclusion was signed by a member of the Academy of Medical Science, USSR L. A. Isaeva and submitted to the Central Committee of the Communist Party.

I will read it. That does not take much time as it consists of only one page. (K. P. Buteyko reads). As you can see there is no figures at all throughout the paper. It creates an impression that something has been hidden from us. Therefore I would like to ask you, dear professor, to complement your report with those facts and figures which are absent in the conclusion. What I mean are such parameters as maximal breathing volume (MBV), lung ventilation per minute, average content of CO_2 in exhaled air, and a kapnogram in correlation with the state of illness. Only under that condition an accurate analysis of your report could be done. But the one what was done today can only be an example of the confused mentality and the poor state of official medicine situated in a deadlock.

What can I say in relation with the situation? Many years our medical science and practice are in a critical condition. New ideas and progressive methods of treatment are bound not to be accepted. I believe it is happening because of some medical officials' blindness and deafness.

I would like to read one more document. This is the conclusion from the Department of Pediatrics of the First Moscow Institute of Medicine named by I. M. Setchenov, signed by the head of the Department on 2nd May 1982.

I have to mention that V. A. Genina together with me and other specialists wrote a report which included 52 children' parameters in figures and mathematically worked up data. The Department disregarded them while preparing the above mentioned conclusion.. Instead, it misrepresented a real picture. (K. P. Buteyko reads the text).

As follows from the Department's conclusion, children with all types of asthma, mostly medium (38 patients) and serious (14 patients) underwent the treatment. All patients - I emphasize - all of them - obtained some positive effect in response to DVBM treatment. What does it show if not a 100% improvement due to the treatment used? Children stopped having such things as asphyxia, hypoxemia, cyanosis. Also it was noticed that they did not have vasomotor rhinitis and signs of arrhythmia. The general well being improved along with the significant decrease or complete stoppage of medications' intake. That is what was described and signed by the head of the Department.

Spirography, kapnography and other functional tests were performed. However, as it was mentioned in the conclusion, there were no direct correlation revealed due to the small number of patients. In this case the simple logic suggests that the research should be carried on until the statistically sufficient data will be collected. That leads to the suggestion: either the instrumental research was not satisfactory or the data were completely wrong. The clinical improvement did not get an instrumental confirmation, no correlation were revealed.

Nevertheless, it was recorded the majority of patients demonstrated a significant increase of the inhalation speed, a slight extension of respiratory capacity. Some other parameters characterising an obstructive syndrome improved as well.

In general, our opponents' conclusion was once again unsupported by evidence. That conclusion contained some recommendations about combined treatment. But why shall we talk about combined treatment when the majority of patients does not need medications anymore? By the way, we are generally against any combined treatment. We had an experience of using DVBM in combination with other methods what turned to diminish significantly DVBM efficiency. It fell down to 60%.

Next I would like to draw your attention to some the most difficult matters in comprehending those medical mechanisms underlying pathological changes in the organism. We believe that we managed to find the sought explanation during our scientific, experimental and practical research.

In our reports on bronchial asthma the main regularity is shown, i.e. when the disease is moving from one stage to another, the reinforcement of lung ventilation occurs. In periods without attacks, the lung ventilation in asthmatics is two times higher than normal. During the attack it is rising even three or four times higher. In other words, there is a direct link between the lung ventilation and a stage of the disease: the higher ventilation, the more serious the disease is. This regularity was confirmed in Leningrad, during the first approbation of DVBM in the Pulmonology Institute, and in Moscow during the second approbation as well. Indeed, this regularity explains the cause of the decrease of the average CO_2 level in exhaled air.

As lung hyperventilation does not lead to more intensive metabolism, CO_2 production is not increasing. Regardless of the patient's state - whether he is having an asthma attack or a remission - the intensity of CO_2 production is the same. That is why with the increase of lung ventilation the average CO_2 level in exhaled air decreases. This is the second regularity.

The third one is about the CO_2 content in blood. Earlier, before we started our research, nobody measured the blood CO_2. Our task was made easier when an infrared analysator and kapnograph became available. Those devices are designed with a purpose to register a CO_2 curve with each exhalation. Our laboratory of the functional diagnostics had received similar apparatus in 1958. We modified our equipment and created in our laboratory the physiological complexator which allowed us to perform a broad range of research. Unfortunately, the laboratory was shut down by the decree of former Health Minister B. V. Petrovsky, and the equipment was destroyed.

Speaking of our main ideas I would like to stress that the comprehension of discussed problems is in difficulties because our opponents are using a lot of pseudo-scientific terminology. We have to get rid of it. The truth is always simple although so hard to reach. As a result the truth can be not intelligible to many doctors but easily understood for non-experts.

We have stopped at the point that when the disease is changing from one stage to another, the lung ventilation increases. Various lung lesions (emphysema, pneumosclerosis) and pulmonary circulation irregularities develop. Correspondingly, two different mechanisms come to work, both leading to a decrease of blood O_2 and increase of CO_2.

The first, functional, mechanism acts through bronchospasm: the deeper a breath is, the stronger bronchospasm. However, not all alveoli react the same way: some get closed completely, others - stay only half closed. How is that possibly happening? During an-inhalation bronchi expand, the pressure grows, a bronchiole opens a bit and the air partially fills an alveolus. During an exhalation lungs become squeezed and a bronchiole closes. With each inhalation some air goes into an alveolus. Finally, it swells and bursts. With the aggravated situation the spontaneous pneumothorax occurs. Then the atelectasis develops. All of this can happen due to CO_2 deficiency. That is important to understand.

The second mechanism damages the lung in a different way. When an alveolus gets desolated, capillaries separate. That creates a shunt resulting in percolation of venous blood which - as known - is not ventilated.

Those two mechanisms lead to a certain situation. When the disease is altering from one stage to another, all blood is ventilated poorly. The lung ventilation is on the increase while the gas exchange in blood deteriorates and lungs suffer. In other words, CO_2 content in lungs decreases, oxygen level increases. We observe a reverse picture in blood: CO_2 content is on a rise while oxygen content falls. In the light of what has been just discussed, we can define three stages of asthma:

1st stage. Lungs are not damaged. Hyperventilation leads to the low CO_2 content in blood and to the slight increase of oxygen.

2nd stage. A medium level of lungs damage. CO_2 in blood increases to normal while oxygen drops below the norm.

3rd stage. The patient experiences a shortage of breath. The lung ventilation 4-5 times higher than normal. Although it looks like the patient has 100% ventilation however he is developing cyanosis. The point is that as a result of the organic shunt action, blood is percolating and the functional bronchospasm develops. Reaching into the venous system of pulmonary circulation, unventilated blood alters its colour, and the cyanosis occurs. Besides, the patient has got some complications in the right ventricle of the heart as the latter has a lower functional capacity in comparison with the left one.

That is the way the patient dies, in accordance to our research.

How shall we estimate the state of the patient, whose test results show that blood CO_2 is normal but the level of oxygen is low? The conclusion would be: the patient's lungs are mildly damaged. At the later stages we can discover marked hypoxia, cyanosis, higher CO_2 against a background of four times higher than normal ventilation.

For many years we discussed this matter with the late professor Mr. Shick. Only in 1972 he had recognised his mistake and agreed that to measure blood CO_2 without measuring the lung CO_2 content could lead to a delusion. Now professor M. I. Anochin is repeating the same error.

To see in detail why blood hypoxia can agree with blood hyperkapnia we have to observe how lung hypoventilation is taking cyanosis off. Because the cause of this event is lung hyperventilation.

Unfortunately, instead of using creatively our results, our opponents prefer making sarcastic comments: "...by Buteyko, all diseases are originated from deep breathing". I am answering: no. In my opinion, not all diseases happen from deep breathing but just a small part of them. 30 thousand illnesses are known. Deep breathing is a cause of about 150 of them, but those are the most widespread diseases and the majority of the population suffer because of them. That is why the theory and DVBM offered by us are so important.

Why did we start DVBM approbation with asthma and not with hypertension or something else, for example, a heart attack? Simply because we can check our ideas out without using any apparatus. If the patient admitted has got cyanosis and heavy noisy breathing, we begin to work with him on the reducing of the depth of his breathing (but not on the limiting his breathing as our opponents claim absurdly). The patient decreases his lung ventilation, and if he is doing it properly we can guarantee a positive result. That had been proven during above mentioned approbation and earlier in our work (1968) more than 20 years ago. The patient decreases lung ventilation, makes her next to normal. Blood hypoxia also decreases. That is visually noticeable. However, our opponents, looking at technical devices, prefer to see whatever they wish but the reality.

My earnest request is to put all your patients through the hyperventilation test, especially those with cyanosis. You can see with your own eyes how this single measure - the decreasing of lung hypoventilation [Ed: Query?] - takes cyanosis off. I would like to emphasize once again: we have chosen asthma for our initial research because with asthmatics it is easier to observe and to prove the correctness of our ideas. We can see how blood and tissue hypoxia decreases simultaneously with the lessening of the depth of breathing; how the blood circulation in lungs is getting better as a result of the decreasing of ventilation which, in turn, is happening because of the bronchioli and then bronchi expand; how cyanosis disappears due to the normalisation of blood and then tissue oxygen saturation.

What is the proper way to conduct the hyperventilation (deep breathing) test?

Start from ordering to the patient: "Breathe deeper!" He has to breathe 2-3 times deeper than usual. In five-ten such inhalations an attack develops and the patient grows blue. Now ask him to reduce the depth of breathing. In 3-5 minutes the attack is over.

Now I wish to ask our opponents a couple of questions. Are they familiar with our scientific papers, in particular, with the article "Ventilation test" published in the "Doctor's affair" magazine, No. 4, 1968? Did they try to repeat the experiment done by us which had proven the direct correlation between bronchospasm and an increase of ventilation? Did they have any figures that reflected different stages of the disease?

We heard here a comment that there is nothing new in our work. If that is so, why are deep breathing exercises currently in use everywhere and why asthmatics are forced to deepen their breath during attacks? The question to the professor: why your Department does not forbid doing that? If the disease is not caused by deep breathing, why do not you indicate to us another cause? If it does not depend on CO_2 deficiency, then why do you not tell us what the disease depends on? We hear only some fantasy about the fermentation of absorption. What kind of absorption? There was no clear answer delivered. We are only watching some attempts to misrepresent the matter by any means and to talk about anything but the real point.

Everybody knows: we have claimed from the very beginning that the essence of our method is the decrease of the depth of breathing by means of respiratory muscles relaxation. The idea of this kind of relaxation is the one which our opponents are trying to misappropriate. But what was remained from our method? "The limitation of reflexes" - that is how they call it. Are we really talking about "limitation"? We are talking about how to eliminate hyperventilation, i.e. how to bring the breathing process back to normal. We are speaking strictly about the norm, about the necessity to normalise the function. Who had given them rights to change the title of our method?

However, we better come back to the definition of the disease stages, to the investigation of lung ventilation in asthmatics. By the way, we had investigated that in detail as long ago as in 1968, but the report isstill laying on.the shelf not called for.

As our research confirms the most important parameter to determine the stage of asthma is a kapnogram.

How to record a kapnogram correctly? If you measure it when the patient breathes hurriedly CO_2 does not appear at the plateau. The common method offers to use a prolonged exhalation. With the prolonged exhalation CO_2 is inevitably increasing and reaching its maximum, i.e. the level which will always be higher than normal. That serves as an evidence that CO_2 in asthmatics is higher than normal. But that is not true. The point is if one does not know some peculiarities of what is happening in the organism, he can easily fall into a delusion. For example, professor Fedoseev from Leningrad has received the curve: CO_2 in patients with very serious asthma complemented with profoundly developed cyanosis (functional or organic) and constant attacks, turn out to be higher than the norm. We believe the kapnogram was taken wrongly. Due to those kapnograms, anyone can think of Buteyko ideas negatively as it looks like Buteyko is in favour of increasing CO_2 level in patients with the serious types of asthma while they already have got a very high reading of CO_2. But lets analyse an example.

Imagine we have the patient with a serious type of asthma. My opponents believe his lung ventilation is low. Following their logic, during the attack and having cyanosis, this patient is in

need to increase his lung ventilation, i.e. all they have to do is to ask him to deepen his breath. Why don't my opponents do that? Discovering lung hypoventilation with a high level of CO_2 in this patient, why don't they recommend deep breathing exercises? The answer is simple: they know that they can make the patient's condition worse. And here we are - instead of trying to sort the situation out, my opponents deny completely the role of the CO_2 level in the bronchospasm development. At the same time, in our works, in particular in M. P. Odinzova's thesis (1970), the mathematical formula was presented which was received at our combined apparatus and which demonstrated the dependency of the bronchiospasm stage on the CO_2 level. Other researchers have got similar results.

Lets try to complete our discussion logically.

As a product of the cell metabolism, CO_2 works as an immediate regulator of physiogical processes in tissue. The higher brain tissue metabolism, the higher CO_2 content in it and the more blood is passing through expanding brain vessels. That means CO_2 assists in the vessel dilatation. Imagine now the organism where the increase of CO_2 does not result in vessel dilatation, for example, in cases of bronchospasm or brain vessel spasm. In this case the formula would be: the more CO_2, the stronger the spasm. What will happen to that organism? It will die instantly. It is not viable.

Fortunately to us, the time for open discussion has come and now the main criterion of the scientific ideas' correctness may become an experiment and practical evidence but not a fantasy.

Our data went through thrice-repeated verification. Firstly, in our laboratory in Siberia, then during two official approbation. That is why I feel confident not to agree with the professor M. I. Anochin conclusion. I believe, his conclusion is in need of elaboration, and also additional data which I have mentioned above already. Nevertheless, I wish to express our gratitude to the professor for taking part in our conference. Lets combine our efforts and continue our work until final results.

We should not forget that the doctor has the ability to watch and observe the patient thoroughly and scrupulously not only relying on the instrumental data. As a clinicist I belong to the school of academician E. M. Tareev and M. P. Konchalovsky. They consider visual observation the most important thing. Such an approach helps me indeed to discover in asthmatics the strict bronchospasm dependency on hyperventilation. We have not found a single patient with this pathology whose breath would be not visible and audible. I will be very grateful to anyone who manages to find such a patient. That is why I appeal to you again with a request to concentrate on clinical data, trustworthy experiments and tests.

And one more remark. So far we are receiving just criticism and accusations in all sorts of sins, however, the useful work stands still.

Dear colleagues! Please follow our method with a. precision and do not make corrections. That is very important to our common task.

The Theory And Practice Of DVBM

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The access to information is a very important matter in relation to DVBM development. I could not find any significant home source offering a meaningful and complete explanation of the role of CO_2 and the hyperventilation effect in norm and pathology.

We have to keep in mind.that the first physiologist who was studying the CO_2 respiratory function, was I. M. Setchenov - "father of Russian physiology". Setchenov's biographers sometimes get puzzled why he was so persistent in his CO_2 investigation. Nowadays, in the light of the theory and practice of DVBM, it has become clear. That was really a flight of a brilliant thought equal to Setchenov' ideas underlying his research of reflexes and bioelectrical processes in the human brain.

I wish to remind you, especially narcologists, that I. M. Setchenov dedicated his Doctor's thesis to the influence of acute alcohol intoxication on respiration and body temperature.

In their monograph {1988) A. M. Vein & I. V. Moldavanu emphasize: "the total lack of. information in our medical society" in regards of hyperventilation problems. In a review on this problem they mentioned more than twenty foreign authors and only two of ours. K P. Buteyko is also missing out - that illustrates indeed "the total lack of information". I would have called the problem differently: "the total lack of information about the importance of CO_2 and carbonic acid for the organism".

In accordance to many sources, the importance of CO_2 for the organism means the following,.

1. The Verigo- Bohr effect.

As it is known, the change of CO_2 concentration plays a main role in those processes under normal conditions. With that, not only the oxygen ions' concentration makes certain sense but also some specific properties of CO_2 reacting with N-groups and, possibly, with haemoglobin molecules as well. That is why the affinity of haemoglobin to oxygen is decreasing along with the increase of CO_2 tension in blood, - to greater degree than it can be expected by the corresponding decrease of pH.

In normal conditions, a period of haemoglobin semideoxygenation is 0.034- 0.038 see., a period of haemoglobin semioxygenation is not shorter than 0.003 sec.

2. The pH figure is defined as a correlation between carbonic acid and bicarbonate. The change in pH at 0.01 correlates to 1.6 mm of mercury, 0.23% pCO_2 in alveolar air. Blood pH starts to rise in 5-20 seconds after hyperventilation begins.

HCO_3^- diffusion in and out of erythrocytes is accompanied by CO_2 ions' diffusion in the opposite direction (chloride substitution, the Hamburger's effect). CO_2 plays a significant role in the Ca^{++} ions' distribution between intracellular and extracellular fluid exerting influence over the nervous cell excitation.

In case of the decrease of CO_2 tension and the change of pH in alkaline direction it is possible that the calcium ions' content will drop in blood and increase in cells.

3. The increase of carbonic acid tension slows down blood coagulation and increases blood viscosity.

4. CO_2 is a natural regulator of the tonus of bronchi, vessel, urinary tract and other organs' smooth muscles.

5. Carbonic acid stimulates the vasomotoric centre causing central vascular stenosis, and also stimulates vagus nerve nuclei which inhibits heart activity. When CO_2 tension rises the vein tonus also increases.

The arterial pressure fluctuations depend on the combination of central and peripheral mechanisms along with the variations of CO_2 tension.

6. "Fixation" is a term for a very ancient universal process underlying the essence of metabolism in all living organisms which was formed in the course of evolution. It means CO_2 molecules utilisation in metabolic processes.

Gluconeogenesis begins from pyruvate carboxylation.

Lipogenesis begins from acetyl carboxylation - ACO. This process regulates and restricts fatty acid synthesis.

Asparaginic and glutaminic aminoacids can be synthesised in the organism only with the presence of CO_2.

The same can be applied to the formation of urea, purine and pyrimidine nucleotides.

13 reactions of biosynthesis were found where CO_2 participates in carboxylation. Threecarbon acids' reactions totally depend on carbon dioxide. Four out of nine of its intermediate members are formed and transformed with CO_2 involvement. Stimulation or inhibition of carboxylation reactions are accompanied by corresponding activation or inhibition of biosynthesis.

7. Biotin - vitamin N - takes part in carboxylation and transcarboxylation reactions. The human body transforms complex enzymes and apoenzimes' system, essential for the effective utilisation of biotin, into biotinidase which chips off biotin from carboxylases. Free biotin is utilised again.

Avidin, egg protein, making a bond with biotin, forms an insoluble composition.

8. There is a significant amount of gases, especially CO_2, in saliva. Pancreatic juice contains 98.7% of alkaline water. Its pH depends on the bicarbonate sodium content.

In fresh milk CO_2 and O_2 make 60-70% of the volume. Vegetable products contain a great deal of carbonic acid forming in the process of carbohydrate oxygenation.

While fasting (when fasting is compensated), the volume of breathing pause increases two-three times without any training.

A direct correlation between the carbon acid concentration in blood and the intensity of digestive (salivary, adrenal, liver) glands and also a mucous membrane of the stomach (producing hydrochloric acid) glands' functioning has been found. Carbon acid affects cell membrane

permeability, numerous enzymes activity, the intensity of many hormones production and their physiological activity, the protein complementation of calcium and iron ions.

9. At the periods of menstruation and pregnancy, women develop hypokapnia due to hyperventilation. In the course of pregnancy p CO_2 in arterial blood and alveolar gas decreases. With the toxicosis of pregnancy hyperventilation also develops and hypokapnia increases.

10. The CO_2 tension in arterial blood defines primarily the level of lung ventilation. The role of CO_2 in a breath control consists of the influence of CO_2 on arterial CO_2 chemoreceptors and also of the N^+ ions' influence on *medulla oblongata* receptors.

The breath control is performed by two gears *[Ed: mechanisms??]*responsible for breathing and gas exchange.

The hypoxic gear is carotid body receptors, with pO_2 threshold 160-180 mm of mercury (normal pO_2 is 100 mm of mercury). They are always, even in normal state, excited, constantly stimulated. This gear provides 10-18% MBV&&&&&& *[ED: ?????]*

The hyperkapnic gear is the main mechanism of breathing control. Responding to the increase of CO_2 tension, hyperkapnic receptors provide breathing control through pCO_2. Hyperkapnic gear works for normo- and hyperkapnia. Arterial chemoreceptors become stimulated in 5 sec., modular ones - in 30 sec., with more prolonged.effect.

The main buffer system of liquor *[Ed: Body fluid?]* is the bicarbonate-carbon dioxide one. There are known two acid-alkaline balance (AAB) components: pCO_2, or respiratory one, and HCO_3, or metabolic one. In healthy people liquor's pH is higher than arterial blood pH, pCO_2 is also a bit higher, but the bicarbonate concentration is almost the same.

Various central nervous system illnesses can be accompanied by the primary liquor acidosis, especially in cases of serious subarachnoidal and brain hemorrhages, craniocerebral traumas, brain infarct, purulent meningitis, epilepsy and brain metastasis. Changes in liquor AAB are not necessarily accompanied by similar changes in blood. However, hyperventilation develops - due to liquor acidosis.

While doing research on twins, V. A. Beresovsky and his colleagues discovered that the breath rate and oxygen consuming in correlation with a body mass are strictly determined genetically.

The ventilationary sensitivity of man to the absolute changes of CO_2 concentration is 20 times higher in comparison with O_2.

T. V. Serebryakovskaya has found that the magnitude of ventilatory response to hyperkapnic stimulus has got the highest index of research (0.94) amongst all parameters of the cardiorespiratory system.

The depth of breathing influences on the alveolar dead space (direct co- dependency).

As a whole the level of lung ventilation depends mainly on a hyperkapnic stimulus which links the breath with the intensity of metabolism. Under other constant conditions, the respiratory centre rhythmogenesis stops as soon as CO_2 tension becomes lower than some critical level, and starts again when CO_2 tension reaches the threshold level.

11. As a natural stimulator supporting the non-specific activating structures' tonus, carbon dioxide stimulates the brain reticular formation. The latter exerts positive dynamic influence on the blood circulation in cerebral cortex. With hypokapnia the excitability of cerebral cortex and vasomotoric centre rises, and the threshold of respiratory centre excitability decreases. As a natural regulator of nervous cells' excitability, CO_2 determines the course of metabolism in neurons and influences over the membrane electrogenesis. The dissolubility of CO_2 in fluid of structured elements of tissues (especially, brain tissue) is much higher than the same parameter for blood plasma.

In accordance to Richardson's law, CO_2 is on a first place in a homologous series of narcotics. Smaller concentrations of CO_2 - similar to smaller concentrations of narcotics - stimulate supreme sections of the central nervous system.

The respiratory enzymes' concentration in brain is higher than that is necessary for the maximal breathing. The cytochrome oxidase activity of the phylogenetically new brain structures is also higher. This parameter is 80 times higher in brain neurons than in glia cells. The brain consumes oxygen 10 times more intensively than the organism on average. Grey substance of brain consumes on average 5-10 ml/sec. for 100 grams, white substance - 1 ml/min. for 100 grams.

Carboanhydrase is an enzyme catalysing the reverse reaction of non-hydrolytic separation of water molecule from carbon dioxide. To the moment of birth no carboanhydrase in the infant brain is discovered but this enzyme is very active in a spinal cord of a newly born baby. Such an activity is gradually decreasing towards rostral direction and becomes very low in cerebral hemispheres. The nervous impulse moves through the cell membrane with a speed significantly depending on pH stability. Hence, carbohydrase plays a very important role in nervous activity as the enzyme responsible for the pH level in neurons. The carbohydrase activity reaches its higher magnitude in the front sections of brain where the most complex functions work. There is some information that the period of the ontogenetic change of the enzyme activity and the period of brain functions' formation are fully correlated.

Therefore, CO_2 is a product of cell metabolism which is responsible for the basic biochemical and physiological processes. May be the role of CO_2 in those processes is not so obvious. But we have to keep in mind that CO_2 regulates biosynthesis of proteins, carbohydrates, nucleotides, nucleic acids, lipids, cycle of threecarbon acids reactions. This way it determines the course of metabolic processes. CO_2 is a natural regulator of respiration, blood circulation, lung, vessel and cell membranes' permeability, nervous cells and smooth muscle tonus' excitability..

Diversity and complexity of processes where carbon dioxide is involved, indicate that a constant CO_2 content monitoring and prevention of hypokapnia (decrease of pCO_2) in the organism are needed.

Amongst home monographs a few of interest are those, written by A. M. Vein and I. V. Moldavanu, on the subject of neurogenic hyperventilation, and L. H. Garkavi et al investigating the influence of different factors including some gaseous mixture with a higher CO_2 content, on animals.

Speaking of plagiarism and the method perversion, I have to mention the manual "Remedial gymnastics for rehabilitation of patients with lung problems" (A. M. Kokosov, E. V. Streltzova, 1987) and especially the reference-book "'Remedial gymnastics" under the supervision of

professor V. A. Epifanov (M., 1987) in which the method DVBM was actually described without mentioning the author of the method - K. P. Buteyko.

The teaching of sanogenesis was created more than 20 years ago by professor S. M. Pavlenko. He wrote: "Sanogenesis is the least specific process which involves the whole range of protective-adaptogenic mechanisms and some metabolic, excretory, immunogenic, reproductory and other reactions to defend the body against illnesses. Usually, hyperkapnia is of pathogenic character, however, when it stimulates the respiratory centre, hyperkapnia plays a sanogenetic role as well. The leading role in sanogenetic activity of the organism belongs to the central nervous system and cerebral cortex which are responsible for selecting adaptogenic and defence reactions, the way how they start and stop, a level and length of their functioning, and also their assembling into the one dynamically active complex".

We can apply I. V. Davydovsky's definition: "New health obtained through a disease" to the state of a person after the sanogenetic reaction in his body in response to DVBM.

Taking into consideration the N. P. Bechtereva theory of the stability of the pathologic state and its matrix in long-lasting memory, we have arrived at the conclusions:

1. The stable pathologic state and its matrix in long-lasting memory are formed against the developing hypokapnia.

2. When DVBM is used, the destabilisation of the matrix of the stable pathologic state towards normalisation of functioning occurs as a part of sanogenesis.

Some mild increase of CO_2 tension in blood and tissues, "the relative hyperkapnia", activates nucleic acids and nucleotides synthesis. These processes in neurons and glia influence profoundly on the functional capacity of brain and central nervous system as a whole what determines the course of sanogenesis.

In the teaching of sanogenesis the theory and practice of DVBM did not get the proper recognition. Under this condition, that is of great importance to include DVBM as a fundamental doctrine into the newly established science - "valeology", the science of health.

DVBM treats and sanitises not only body and brain but the personality as well. It brings up some changes, a sort of "personality sanogenesis" which needs to be researched.

I. P. Pavlov wrote: "A man is obviously a system but a unique one in its highest ability to self-regulation". That is true but our system is also self-supportive, self-reconstructive, self-guiding and even self-improving. In his works dedicated to the functional systems, P. K. Anochin wrote too about their self-regulatory capacity, in particular, of the respiratory-system. However, we have to remember, that the hyperkapnic stimulus, i.e. CO_2 chemoreceptors' stimulation, works under hyperkapnia and normokapnia conditions which means that a man as a biological system has no defence against hyperventilation and hypokapnia unless he knows how to use DVBM. It explains, in particular, a phenomenon of "non-stop breathing" after the hyperventilation test.

It is known that the biological needs' structure divides into food, water, sleep, temperature, sexual and other requirements. K. V. Sudakov details also "gas needs". I believe that we have to define the biological need in breathing as a fundamental one.

It corresponds with P. V. Simonov's definition: "The need is a specific power of living beings. That provides the link with environment aiming self-preservation and self-development which is the source of living system's activity in surrounding world".

The peculiarity of the need of breathing is invisibility of this need. The organism requires both at the same time - oxygen obtained from the atmosphere during inhalation and CO_2 produced by body cells, eliminated during exhalation. To fulfil the need of breathing in a normal situation is so easy. And the need appears many times even within a minute.

When we accept the idea of the biological need of breathing, it becomes obvious that DVBM is an essential method of measurement, regulation and limitation of that need, it's sensible satisfaction. We do not realise or sense hyperventilation and we do not have a mechanism to slow it down - like the one we have for hypoventilation.

The biological need of breathing is a topic of my Ph.D. thesis. I believe we have to find a physiological explanation of the idea of control and maximal pauses. I doubt whether we have to restrict a volition pause to the level of a maximal pause as every hold of the breath is achieved with a wilful effort.

The more concrete description of the hyperventilation test not only in regards of the depth but the rate as well is essential. Perhaps it would make sense to measure and compare control and maximal pauses before and after this test.

The standardisation of the method is very important. I believe we have to define four regimes for the training without a load and to produce standards for the training with a load. Normalisation, optimisation and recovery can be achieved best of all with the aid of minimal stimuli. Too many changable factors can be involved in this process, plus the fact that each oraganism has its own level of biological adaptability to pCO2 and pH fluctuations.

We have to take into account, that carotid body cells contain acetylcholine and dopamine, and they secrete peptides (substance P, enkephaline, vasoactive intestine peptide). Carotid chemoreceptors' stimulation is accompanied by the rise of secretion of adrenaline, insulin, antidiuretic and glucocorticoid hormones.

In order to monitor patients' state during DVBM treatment I suggest to use criteria of reactions of training and activation offered by L. H. Garkavi, E. B. Kvakina, M. A. Ukolova. While researching the mechanism of how the organism resistance to various illnesses is increasing (including tumoral process), these authors were using carbon dioxide - among other factors - as a stimulus for the respiratory centre, reticular formation and introreceptors. The latter play an important role in regulation of the organism's internal medium.

Long ago the syndrome of hyperventilation and hypokapnia was discovered in alcoholics. By S. I. Belyaeva (1966), patients with alcoholism managed to hold the breath at inhalation on 42.5±1.21 sec., at exhalation - on 19.04±0.43 sec.; by V. T. Kondrashenko (1974), the rate of breath was 18.6±1.2; by U. M. Saarma, H. Y. Vyare (1984), the CO_2 partial pressure in alveolar air was 35.1 mm of mercury which was for certain lower than in a control group - 38.9 mm of mercury.

Hypoxia is one of the problems. There is an opinion that the irregularity of external respiration functions and the lack of oxygen in the organism play a significant role in the clinical picture and pathogenesis of alcoholism.

The broad range of metabolic and endocrinic functions' abnormalities is observed in patients with chronic alcoholism: a hypermetabolic state similar to toxicosis, hypoglycemia, ketoacidosis, water-electrolyte balance disturbance.

Ethanol influence is accompanied by the fall of oxygen consuming and the decrease of utilisation of macroenergetic combinations in nervous cells; the lessening of glycolysis intensity; the deceleration of Krebs cycle reactions. The gluconeogenesis inhibition, the decrease of CO_2 production and the fall of threecarbon acid cycle enzyme activity were noticed together with the accumulation of lactate in liver. That creates hypoxia. After a long drinking-bout as a rule ketoacidosis occurs and HCO_3^- concentration goes down.

No single opinion on how alcohol influences over the respiratory centre exists. Seemingly, after an alcohol intake either the speed of CO_2 accumulation in blood is slowing down for a while (CO_2 is the most active chemical stimulus for the respiratory centre), or a sensibility of the respiratory centre itself is falling in correlation to the decrease of metabolism. The hold of breath at the relaxed exhalation under influence of alcohol increases significantly reaching the maximum in 30-60 minutes after the alcohol intake.

I believe that the possible formation of endogenic ethanol in the organism of healthy people and alcoholics is a consequence of hypokapnia occurring due to the interruption of pyruvic acid oxidising decarboxilation. In remission, hypoxia is caused by hypokapnia while in intoxication and abstinence it aggravates by the toxic effect of ethanol and acetaldehyde.

In my opinion, in order to overcome the double effect of alcohol and hyperventilation, we have to use some individual and group psychotherapy for alcoholics. Without psychotherapy DVBM would be the method to treat hypokapnia in alcoholics but not the alcoholism itself. In narcology DVBM is a rehabilitating system in its most complete form, a system of remedial self-education. The idea is not simply teach those patients to stay sober but live a healthy life without any psychological and physical dependency on alcohol, nicotine, narcotics, stimulants, chemicals.

We have to view DVBM as a treatment and - most importantly -' as a preventive method of any types of narcomania and possibly some other pathological addictions.

Physical factors in DVBM treatment

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The idea of DVBM can be expressed in a condensed form as a "five fingers' rule": the first one is the decrease, the second - of the depth, the third - of breathing, the fourth - by a diaphragm relaxation, and the fifth - until the feeling of the lack of air.

Patients learn the method gradually. At the beginning they learn how to stop their complaints by reducing the depth of breathing. That convinces them that their complaints are bound up with deep breathing. At the next stage patients begin to continuously monitor their breath. The decrease of breathing could be achieved by proper relaxation of respiratory and skeleton muscles, and by the mild lessening of the depth of breathing. The exhalation should be always passive. The stomach must be relaxed and not pulled in, otherwise the main rule - the diaphragm relaxation - would be breached.

By the lessening of the depth of breathing we increase the CO_2 partial pressure in alveoli and blood. Due to the constant breath monitoring we are able to hold the new level for a certain time - until our respiratory centre adapt to the new, higher CO_2 partial pressure. When the regime of the respiratory centre is changed, the next step in lessening of the depth of breathing becomes possible. This way, by continuous lessening of the depth of breathing, we are gradually achieving the higher CO_2 level in the organism.

DVBM is a leading method for the elimination of haemohypocarbia caused by hyperventilation. Apart of DVBM, there is a range of other factors providing the decrease of the depth of breathing and helping to increase CO_2 content in the organism. They are: dosed physical exercises, tempering and hydrotherapeutic procedures, barefoot walking, sauna, massage, chest bandaging, etc. These factors can be of assistance to DVBM but only under the certain control pause magnitude and when the body is prepared to accept them - otherwise they will act into opposite direction.

We have to remember that with sanitation a special attention should be paid to factors lessening the breath. But if we choose the wrong time for using them, the results could be unstable or unsatisfactory.

The following are the main recommendations on how to use physical factors to complement DVBM.-They were developed by K. P. Buteyko and used by me in my practice.

THE DOSED PHYSICAL EXERCISE

A physical exercise is the main tool to extract CO_2 from tissues. The intensity of the exercise is dosed up strictly by nasal breathing and the feeling of well being. If a desire to breathe with a mouth emerges that means the exercise should be reduced and the breath - calmed down. This factor can be added to DVBM at its second stage - when the patient knows how to constantly monitor his breathing. A compulsory condition for using physical exercises is a good muscle relaxation, especially of respiratory muscles.

At initial stages the best choice of the motor activity is walking. When the shortness of breath decreases and the patient feels better the intensity of exercises can be increased. Also we have to take into account a feeling of well being: the exercise should be pleasant. While overworked, the control pause decreases, a pulse rate grows, general well being gets worse: weakness, sleepiness, shortage of breath and a desire for mouth breathing appear.

To start exercises before the right time will only lead to deeper breathing and derangement of the training which, in turn, will stop the growth of the control pause (CP).

The experience shows the better therapeutic effect comes from muscular work in the open air. At the beginning we should not try to reduce a breath while moving. Just hold to a free nasal breathing. Physical activities should last until the body warms up, or better - until the sweating breaks. At first we achieve that for the expense of the exercise duration, then - for the expense of the exercise intensity.

We can switch to jogging when CP reaches 20-30 see., i.e. when the main symptoms come to halt. If one begins jogging by CP equal 10-15 sec., instead of remedial effect we can get hyperventilation and exhaustion of the organism resources.

For morning exercises we recommend to breathe only through the nose which means that the intensity and complexity of exercises should not interrupt the breathing. It is absolutely prohibited to start sanitation in the morning with intense physical exercises and jogging.

The physical exercise, started at the right time and dosed up properly, will lead to the rapid growth of CP and to the well being improvement. The regular and lengthy physical load stabilises respiratory parameters achieved previously.

Methods of jogging is described in the manual (1982) by K. P. Buteyko.

WATER PROCEDURES. TEMPERING.

DVBM is altering the breath by making it more shallow. That leads to substantially lower loss of warmth, circulation improvement, oxydizing processes activation and eventually to the general feeling of warmth and comfort. Limbs stop freezing and the need in extra clothes reduces.

DVBM makes breathing more shallow, which noticeably reduces the loss of heat, improves micro-circulation, speeds up oxidation and results in getting warm overall, sensations of comfort in the body. Limbs stop feeling cold and the need for extra clothing reduces. Air baths and water procedures can be utilised confidently when limbs stop feeling cold and when the sensation of warmth in the body is more discernible than before. This condition is usually reached when the control pause has been increased two- or threefold.

An air bath can be defined as having minimum amount of clothes on the whole body or on the limps. Dosage of air baths is defined strictly depending upon how the patient is feeling. In case the patient feels cold, it is necessary to get dressed quickly or take a warm bath.

People tending to continuously wear a lot of warm clothes may develop a rash caused to being in contact with air during their first air baths. The effect will pass and does not require treatment.

Any over-cooling lowers partial CO_2 pressure in tissue, and as a result, actively gets in the way of normalisation of breathing. That is why tempering should be taken very easy when patients in serious conditions are concerned.

The organism can be greatly affected by dousing with cold water. In patients with control pause under 10-15 seconds (usually we get serious, neglected cases) momentary cold douches cause aggravation of inflammatory processes, make the patient shiver and feel worse, and result in disgust towards tempering. That is why momentary cold water dousing should begin after the control pause has reached 20-25 seconds and when the patient feels well. Cold dousing may be preceded by physical exercises to warm up, or by hot dousing. A well prepared person can usually undergo the procedure without any preparation. The final objective of tempering should be regarded as cold water dousing outside. This sort of dousing is usually accompanied by a great influx of energy and warmth.

Adaptation to cold water may be carried out continuously and more energetically than recommended in the popular literature. One should start from cold sponging down and dousing of limbs with subsequent rubbing oneself briskly with a towel. The organism is ready for cold water if after dousing there is a sensation of an influx of warmth.

To compensate the effects of cooling upon the organism, heat-producing processes are sped up, depth of breathing decreases, skin capillaries narrow down thus widening the vessels in internal organs. As a result, C02 level increases.

Regular douches with cold water (by showering or by pouring water from a bucket), as well as running, can stabilise breathing indices achieved by the patient and further the progress.

Warm showering can be recommended to anyone, even to seriously ill patients, starting from the first days of using DVBM for hygiene and healing purposes. Duration may vary from an instantaneous dousing to 2-3 minutes of showering. We recommend on a wide scale to take warm showers to reduce high temperature. They are to be repeated every 2-3 hours. A warm shower can make the patient feel better during sanogenesis reactions. We often use warm showers as supplementary means in cases when the patients can not tackle the symptoms by reducing the depth of breathing.

When symptoms of shivering and fever are present, the first dousing should be with hot water to stop shivering, and then with lukewarm water.

The effects of contrast showering upon the organism fall between that of warm shower and cold dousing. Contrast showering (alternating hot and cold water) should be included into the healing program after the patient has understood the method and doubled or tripled the initial indices and felt better. Contrast showering is used to exercise blood vessels and to adapt to cold water, especially in cases when the patient has disturbed micro-circulation and reacts profoundly to even mild draught or over- cooling. Duration is determined individually. According to the patient's resilience, it is necessary to alternate once hot water with cold (or lukewarm) water, and optionally repeat this cycle a few times.

BATH - SAUNA

According to the published data, going through the "bath-sauna" procedure once is an equivalent of running a distance 3 km long. This implies that if the patient is able to walk or run a 3 km distance strictly adhering to breathing through the nose, then he can undertake the bath-sauna procedure causing no harm to his health. Undertaking a bath-sauna has a strong effect upon the organism, accompanied by an increase in CO_2 level. That is why undertaking a bath-sauna by patients with hyperventilation of V-VI degree and with low partial pressure of CO_2 in alveoli results in stirring up of their breathing centres and deepening of breathing.

Bath-sauna is not recommended for patients with control pause under 10-15 seconds. In such case, the effect will be negative, including draining of the patients reserves, making them feel worse and preventing from lengthening the control pause further. Positive effects in terms of healing and exercising start to appear when the patient reaches a 20 second control pause.

Breathing with the mouth inside the bath-sauna is unacceptable, as this leads to contractions of bronchi accompanied by deepening of breathing due to the nerve ending getting more active. !

Readiness of the organism to undertake a bath-sauna can be determined post- factum, in a while after completing a bath-sauna procedure, by looking at improvements in pulse rate and control pause indices and considering if the patient continues to feel as good and has no fatigue.

During a bath-sauna procedure, condition of the patient should be monitored continuously. When passive sweating does not seem to be sufficient, bathing aids may be used, for example, whipping with a bunch of (birch) twigs.

WALKING BAREFOOT

Exudation of body heat occurs more intensively through lungs, as well as palm surfaces of hands and feet. In order to reduce lung ventilation, we should try and cool skin and limps. This will reduce heat exudation through lungs. A greater amount of heat is exuded through lower surfaces of feet. That is why walking barefoot reduces breathing.

To compensate for excessively warm footwear and clothes, greater body heat exudation occurs through lungs, that is, over-heating results in deepening of breathing, and as a result, leads to reduction of CO_2 level in the organism. Apart from this, feet are connected (through reflex and energy channels) to the whole body, that is why mechanical or physical handling of feet has a positive influence upon the whole organism. In case when over-heating is the major factor responsible for deepening of breathing, removing excessive clothing and footwear may be used to tackle acute symptoms together with DVBM.

Unprepared persons should not suddenly contact the floor with bare feet. Adaptation can begin from wearing open footwear with no socks or stockings. In case feet get cold, socks should be put on and feet warmed up through physical means or by using hot baths for feet. For best results, it is desirable to douse the lower limbs 1- 2 times a day alternating hot and cold water with subsequent wiping and rubbing with a towel till feet feel warm.

There is a saying: "keep your head cool, stomach hungry, and feet warm". This does not mean that we-should always try and warm up feet. The more shallow the breathing, the warmer the feet. That is why DVBM combined with physical. exercise provide warm feet, even when one walks barefoot upon snow or ground. But, remember not to over-cool feet.

Wearing stockings indoors when it is warm is very harmful for children's breathing.

RESTRICTING LUNG VENTILATION THROUGH MECHANICAL MEANS.

Restricting lung ventilation mechanically is achieved by corseting the chest with an elastic bandage, stays or elastic belt. We use such restrictions during early stages of DVBM as well as during a later crisis and sanogenesis reactions. Start bandaging from women's breasts or from men's nipples and continue till the navel, in such a way as to prevent deep inhalation but to allow minimum even breathing. The patient should feel only mild contraction around the lower part of lungs and the higher part of stomach. Set aside time during the day to take a break from wearing the bandage, corset or belt.

Mechanical restrictions should be used no longer than 2-3 weeks. They can be worn throughout day and night, or during either daytime or nighttime.

Wearing mechanical restrictions during night time is aimed at reducing lung ventilation through mechanical means. Whereas during the daytime it can assist in concentrating upon relaxation and breathing depth reduction, especially when patients with poor memory or hectic jobs are concerned.

MASSAGE AND SELF-MASSAGE

Effects of massage upon the organism are very complicated. Massage reduces breathing depth mainly due to its reflex influence. Massage can be used when the patient has learnt DVBM well and achieved certain indices. In addition, massage is recommended during an acute crisis or to soothe the pain. Passive medical benefits are received from massage which distract patients from actively taking care of their own health.

In the course of my work, I use massage to soothe the pain during osteochondrosis, to tackle sanogenesis reaction, and to relax tense muscles when patients are unable to relax muscles themselves.

SEALING UP THE MOUTH

Sealing up the mouth can be regarded as one of the factors responsible for breath reduction, because breathing through the mouth provides greater ventilation than through the nose. It may be difficult for patients with hyperventilation and coughing to breathe normally through the nose, thus sealing up the mouth with a band-aid-like adhesive tape is recommended. Let me clarify that this is not a part of DVBM. It is an invention of our patients.

When sealing up the mouth, wrap the red part of the lips inside and glue to skin. Prior to sealing up the mouth, to ensure easier removal and less irritation, it is recommended to lubricate skin slightly with some lotion. Mouth sealing can be used for older and seriously ill patients during their

physical exercises, because they are less able to control themselves, as well as when patients can not cope with coughing on their own.

Exhaling through the mouth is also damaging for the coughing zone inside the throat, which sustains coughing. Coughing increases greatly hyperventilation, damages bronchi, makes alveoli swell, increases pressure inside brain, chest and stomach, and makes the patient pay the consequences. It may be difficult to quell coughing, so we are very cautious about recommending walking outside to coughing patients during the cold season.

However, experience proves that breathing through the nose with freezing air and coughing through the nose (with the mouth sealed) can have distinctive anti- coughing effects, thus leading to reducing the depth of breathing. In addition, cold air breathed through the nose reduces lung ventilation.

DVBM combined with night time mouth sealing is a great remedy for snoring. However, seriously ill or mouth breathing patients should not sleep all night long with sealed mouths, because the volume of air passing through the nose of a lying person may fall below the normal levels. Therefore, it is recommended that sleep should be interrupted 2-3 times a night in order to reduce the depth of breathing without unsealing the mouth, and to catch one's breath and go to sleep again.

There is no need to interrupt sleeping any more provided that upon waking up breath does not get deeper and there are no complaints. At the stage when the patient wakes up not short of breath and with no complaints, mouth sealing is no longer required. That is why the length of mouth sealing periods at night can vary and is determined individually.

It is especially important that patients who recently started practicing DVBM should control their breath and interrupt their sleep from 3 am to 6 am. In addition to DVBM, we can recommend nocturnal walking, hot feet baths, massage, but only when the patient is unable to tackle the symptoms by reducing the depth of breathing.

In conclusion, it should be noted that the above mentioned factors (physical exercises, especially running; bath-sauna, cold water tempering, waking barefoot) can have either positive or negative effects according to the condition of. the patient and the degree of breathing dysfunction. The use of the above mentioned factors is not recommended in intermediate and severe cases, as they can lead to further worsening of the patient's condition. In contrast, at the time of using DVBM and improving patient's condition, use of the supplemental factors can contribute to significant growth of the functional indices of the breathing system as well as have a positive effect upon all organs and systems of the organism.

Using DVBM To Treat Patients With Focused Chronic Infections

S. S. SOULIAGIN

Silent latent focused infection can give rise to functional changes in reactivity of all the systems (nervous, endocrinous, metabolic, etc.). Focused infection can affect the organism not necessarily directly, by producing toxins, but also indirectly through autoantigens, which are produced due to the work of microbe toxins by the organism itself. Sensitizing role of focus infection is still being underestimated. Scant clinical symptoms and rare acute attacks can blunt the doctor's vigilance.

Tactics for taking care of patients with focused infection while practicing DVBM, were developed by Dr. K. P. Buteyko, the author of the method, and refined through a lot of clinical practical experience.

This paper looks at tactics to treat lung pathology combined with focused chronic infections (e.g. chronic tonsillitis, chronic periodontitis, foot mycosis) by DVBM using a sample of 120 adult and 51 child patients who have undergone treatment for bronchial asthma, obstructive bronchitis, and chronic pneumonia with obstructive syndrome. All of the patients had previously been through unsuccessful medical treatment.

The patients' mouth and throat cavities were thoroughly inspected, signs of fungus foot infections were looked for.

During rhinopharynx inspection much attention was paid to the condition of the rear wall of the rhinopharynx, to the thickness of under-mucous layer, and to detection of inflammations. Hyperplasia of rhinopharynx rear wall tissue can be an indication of chronic phar)/ngitis, which is common among people who breathe deeply and through their mouth.

Cyanosis of arches of soft palate can serve as a very accurate sign of chronic tonsillitis.

During chronic tonsillitis, tonsils become hypertrophic, atrophic, often infiltrated, stagnated, merged with arches, and saturated with pus. Most danger can be expected from atrophic tonsils hidden behind arches with pus and scars in their lacunae. Tonsils in their normal state are charactirised by being slightly visible from behind the arches and by having soft elastic texture and light pink colour.

Long conservative treatment of tonsillitis by tonsil dubbing, can make lacunae clogged and turn tonsils into pus containers.

Most patients suffering from chronic tonsillitis have no complaints and do not want their tonsils inspected as they think it is not necessary. Tonsils were inspected in the bimanual mode - one spatula was used to hold the root of the tongue, another to extract tonsil contents by pressing upon the tonsil from below or upon the arch to push it into the mouth cavity. Natural lighting was utilised during examination.

Buteyko school teaches that focused infection deepens breathing. Thus, apart from reducing intoxication, contemporary radical disinfecting of the loci can speed up the breathing normalisation.

When the patient's history points towards chronic tonsillitis and the examination confirms it, the patient. is offered to have tonsils removed prior to starting practicing DVBM.

In case the patient arrived having an attack or being in a serious condition, when tonsillectomy was not an option, a Course of conservative treatment was prescribed. The patients were taught DVBM, and when they felt better the operation was performed.

It should be noted that the majority of patients had had neither aggravations of tonsillitis nor manifestations of tooth infections prior to being treated by DVBM. As the patients got better and symptoms disappear, they developed angina and aggravated periodontitis.

Aggravation of focused infection worsens the patient's condition, prevents from achieving greater progress with DVBM, and sometimes even reverses the progress till the initial condition. Precise diagnostics and timely disinfection of the foci can assist in avoiding such effects.

In case of older than 50 year old patients, when the doctor can not recommend tonsils be removed, conservatiye treatment was done by treating tonsils with antiseptic solutions and gargling over a long period of time. Gargling works better when combined with assuming the lion pose from yogi gymnastics. We teach patient to use their fingers with their tonsils: a piece of bandage is wrapped around the finger three times, the finger is dipped in antiseptic solution, and then tonsils are wiped with massaging movements.

After. a two week period of treatment, a break was taken and examination conducted. As necessary or in case of recurrence of inflammatory processes, or in case of pus discharge, the course of treatment was extended or prescribed to be repeated. Further treatment tactics were to be selected on the individual basis.

Alcohol tinctures used for treatment included that of eucalyptus, black radish, naphthalan, compound iodine, etc. If long-term conservative treatment of. tonsillitis did not give good results, tonsils were monitored further during the course of treatment.

Improvement can manifest itself through changes in tonsil colour indicating the absence of cyanosis. But this should not lull your vigilance: even though tonsils - get smaller, aggravations and pus discharge go on, especially during sanogenesis

reactions. Control pause increase can be observed before and after. sanogenesis reaction. But if the reaction is accompanied by aggravation of tonsillitis, or if there exist other foci of infection, then no control pause increase can be observed, there may even be a decrease. This is a diagnostic sign.

Patients with not very discernible symptoms, like the lack of inflammatory process, should have their tonsils examined, especially during the sanogenesis reaction and when their control pause would have reached 30-40 seconds. Operation is to be prescribed in cases when there are aggravations, no control pause growth, or worsening of the patient's condition in general.

It is common for pharyngitis aggravations to occur during sanogenesis reaction, which can manifest themselves through acute pain while swallowing, or through catarrhal occurrences often accompanied by fibrous coating on the rear wall of throat. In this case, sulfanilamide or sulfaethidole can be prescribed according to the age of the patient for symptomatic relief.

The majority of patients after tonsillectomy operation feel better, their control pause gets longer, children stop having bronchial spasms. In cases when tonsillitis is combined with focused tooth infection or parasitosis, there is no significant improvement after the operation.

In case of seriously ill patients with steroid-dependent forms of the disease, the presence of tonsillitis often does not allow to stop prescribing hormone medications. Then, we resort to tonsillectomy keeping the patient on a sustaining dose of steroids.

In the case when the patients practice DVBM properly, but can not achieve any control pause growth, and at the same time their chronic tonsillitis has distinctive clinical symptoms, tonsil!ectomy is to be prescribed. Prior to the operation, parasitosis had been expelled, because massive intoxication resulting from, for example, giardiasis, can stop any control pause growth. We have observed cases of combined tonsillitis, periodontitis and giardiasis.

Tonsillitis related complications are more likely to happen when the 20-30 second control pause is reached. During this period clinical symptoms of the major disease are insignificant or absent, where reactivity is noticeably improved. Apart from this, occurrences of various autoimmune diseases i's possible, which are developed in the time of sensitization of the organism by bacterial antigens (V. A. Valdman, 1972).

In 1984, we observed some complications in an 11 year old girl with mild asthma. At that time her control pause reached 30-40 seconds, her general well-being was good, no symptoms of asthma were noticed. Against such a background after her first tonsillitis attack she developed'tonsilogenic sepsis. During five months she suffered from tonsilogenic intoxication and massive purulent discharge from tonsils. That made it impossible to cancel her steroid medication intake. They were prescribed due to sepsis which showed symptoms of the steroid deficiency. Keeping the patient on a supportive dose of steroids the tonsillectomy had been performed. Soon after a further intake of steroids proved not to be necessary.

It would not be recommended to exceed a control pause above 25--30 seconds for older patients with tooth infections, chronic tonsillitis and when a radical sanitation was not possible.

In our practice we did not get a desirable result while treating tonsillitis by intratonsils antibiotics blocks. When a control pause was on the rise, i.e. when the breath returned to normal, the pathologic process aggravated again. Using blocks for treatment created complications during and after surgeries due to commissures and bleeding. That is why we would recommend to use blocks only for older patients who have got contraindications against tonsillectomy. Dr. A. Y. Yalovoy's method of faucis and tonsil irrigation with 1% formalin steam decreases a frequency of exacerbation and acute conditions but does not cure tonsillitis.

The tactics of dealing with infections in children is identical to that with adults. Operations are allowed from the age of 4-6. At earlier age some conservative treatment can be conducted regularly as often as it is .necessary with dependency on the strength of inflammation and purelent discharge amount.

Correlation between the level of intoxication and alveolar hyperventilation is more visible in children. When infectious foci get removed, the .shortness of breath decreases significantly, general well-being improves, a control pause rises, paleness disappears.

The majority of patients are admitted without any information on chronic tonsillitis (what they actually have) in spite of the fact that they are checked up yearly by otolaryngologists. Those specialists neglect some symptoms only paying their attention to patients' complaints and external observation of tonsils which is not appropriate for patients with a lower level of reactivity. Those

doctors do not look at the substance from tonsils probed by spatula and seldom able to notice the link between an infectious focus with the major illness symptoms.

The important infectious foci are dental diseases: caries (superficial, mild, profound, multiple), chronic pulpitis, chronic granular periodontitis, parodontosis. The dental treatment of above mentioned diseases was established long ago and consisted mainly of conservative measures.

The majority of dentists are not sufficiently alert towards sluggish odontogenic chronic intoxication. When patients are having such a sluggish condition, in particular those with multiple latent foci without clear symptoms, to cure them with DVBM is almost impossible. In similar situations a dentist should rely on active radical treatment coordinating his efforts with a DVBM practitioner accordingly to patients' dynamics.

DVBM provokes exacerbation of the majority of chronic infectious foci, such as periodontitis, that forces us to use more.-radical treatment. That is why, before starting DVBM, we examine without fail our patients' dental problems in order not to miss caries, acute inflammations, alveolar fistulas, parodontosis, etc. Then we forward them to specialists to sanitize and treat their dental problems.

If a patient, practicing DVBM, has no locally noticeable inflammations and no complaints but a clear visible on the x-ray granuloma and his control pause does not rise any more, that means he needs a radical treatment.

When a DVBM practitioner examines a patient looking for infectious foci, he needs to pay his attention, in a first place, to multiple caries, teeth with a changed colour, crowns, extracted teeth. One of the methods of discovering parodontitis is pencil or wooden stick biting: that will create a pain reaction in a sick tooth.16

Isolated or multiple caries and chronic pulpitis are .ea. sy to treat with conservative methods. DVBM leads to the significant decrease of caries. Chronic granular or granulamatous periodontitis in seriously ill patients, especially with cardiovascular and autoimmune diseases (rheumatism, rheumatoid arthritis, glomerulonephritis, etc.) are the indications. for teeth extraction. In milder cases conservative treatment under a dynamic control is an option.

With parodontitis (parodontosis) some conservative methods are also appropriate. By K. P. Buteyko, in such cases teeth must be removed as they are sources of infection. Dentists believe teeth should be removed if they have - as a result of parodontosis - a mobility of 2-4 degree, or if a patient suffers from an atrophic form of parodontitis when a tooth root is uncovered more than 2/3 of its length. DVBM treatment makes moving teeth to fall out and the conservative treatment not always can be satisfactory.

The following regularity of the' interaction between chronic tonsillitis and chronic parodontosis was discovered. When infection in tonsils blossoms, similar infectious foci in teeth are latent and show themselves during DVBM treatment - a few months later after tonsillectomy has been performed. And the other way round, when teeth infection is clear visible, symptoms of inflammation in tonsils are silent and can be seen only after the majority of ill teeth are removed. It means, while using DVBM with such category of patients, their focal infections should be monitored continuously.

When children with focal infection in their primary teeth (those are darker) start DVBM treatment, the inflammation around .ill teeth can be developed very fast. At first some aching pain irradiating into jaws appears. Then that becomes more frequent and lasts longer (can be in several teeth at once). Later, teeth are painful while biting and an inflammation is noticeable. Conservative treatment in such cases is more likely to bring only a temporary effect.

We have to always keep an eye on the general state of patient's health, his symptoms and control pause's dynamics and remember that against DVBM treatment and health improvement as a background, the organism is in a constant conflict with its chronic intoxication foci. There are cases when the only way to stop an intoxication progress is to remove all teeth.

Clinically, the connection between a focal intoxication and hyperplastic (hypertrophic rhinitis, polypous rhinosinusopathy, concha hypertrophy, adenoids) and atrophic processes is often observed.

A stuffed nose and hyperplastic processes in the rhinopharynx are protective mechanisms working on the decrease of the depth of breathing and reduction of hyperventilation. That is why the removal of polyps and .adenoids, conchotomy, hypertrophic mucous membrane cautery are harmful procedures leading to a breath deepening. When an asthmatic has got his nasal polyps removed, the bronchospasm, which is another protective mechanism against hyperventilation, goes into work at once. Therefore, similar intrusions are far from desirable for asthmatics.

A removal of the intoxicating source (chronic tonsillitis and odontogenous foci) as the breath deepening factors in conjunction with DVBM assist in the reverse development of any hyperplastic and atrophic processes in rhinopharynx..

Otolaryngologists are practicing the opposite. As a result, an adenoids removal leads to the increase of alveolar ventilation and decrease of C02 partial pressure followed by the fall of the 'organism's reactivity and its immune system weakening. Local symptoms of tonsillitis become less obvious but its toxic influence stays and can even grow higher. In such situations a real source of the damage can escape our attention.

In our view the tonsillectomy is useless. We have to send all our DVBM patients for total elimination of infectious foci which is now more difficult to do technically.

Chronic infection foci are factors damaging all functional systems and deepening the breath. Therefore, a doctor is bound to find the way to free the patient's organism from infection as soon as possible taking into consideration clinical indications.

To succeed in DVBM treatment, we need to have otolaringologists and dentists study the Buteyko method. A clinical doctor should monitor infectious foci in dynamics and give his recommendations for the radical sanitation. But it is up to a specialist to elaborate a diagnosis and choose a particular method of the radical sanitation.

Another factor spoiling the organism's reactivity, sensitizing it, deepening the breath is foot mycosis (epidermophytosis, etc.). its symptoms are: cracks and erosions between toes, bad foot smell, little vesicles filled with dull fluid on a sole. Mycosis has to be treated by a dermatologist and the disinfection of shoes is a must.

The following is our data of two groups of patients: 1st - 120 adults, 2nd - 51 children.

17 patients from the 1st group had got chronic tonsillitis recorded.. In the other 65 cases were revealed at our primary examination. 7 more patients showed some symptoms of it when they started practicing DVBM.

17 patients had got their tonsils removed earlier, 21 did it during DVBM treatment. Another 31 patients were sent to have the tonsillectomy. 41 patients went through a conservative treatment. 7 were restricted from the tonsillectomy due to their older age. After the tonsillectomy, patients were recommended to take sulfanilamide for 3-4 days (dosage depended on their age).

53 teeth with odontogenic foci were extracted from 22 patients, 'seven more patients were recommended to remove some teeth.

27 patients from the 2nd group were diagnosed primarily with chronic tonsillitis. 12 of them were operated on during DVBM treatment, 11 were recommended to have surgery. Three patients had their tonsils removed earlier. 16 stayed under the observation.

Conclusion:

1. Focal infection is a factor interfering with the normalisation of breathing.

2. Focal infection in patients who often and long are sick, is present in a latent

3. By increasing the organism's reactivity DVBM allows to reveal latent infectious loci.

4. Timely radical sanitation of infectious foci helps to accelerate the normalisation of breathing.

Common Mistakes Observed When Using DVBM

S. S. SOULIAGIN

The effectiveness of DVBM for various pathology treatment has already been proven by many works. And when a higher positioned person declares in front of the big gathering that DVBM can be used only for asthma or lung conditions that reveals his huge incompetence in respiratory physiology and lack of knowledge about a role of CO_2 in metabolic regulations.

A man breathes by chest while both - vascular and respiratory systems - are functional ones designated to keep a certain gaseous content in a cell, supporting a cell breathing. Indications to DVBM could be received not only from the list of some nosologic forms of illnesses but also from a presence of symptoms of hyperventilation and CO_2 deficiency in the organism. Such symptoms as a pathologic need of sweets, meat and caffeine containing products do not have any link with a particular disease but they are a consequence of hyperventilation and irregularities connected to CO_2 deficiency. Hence, they can be successfully normalised by DVBM. Those symptoms are always confirmed by the lower control pause which, in turn, is directly correlated with the CO_2 level in alveoli and blood.

The main objective of DVBM is to give a patient his health back by teaching him to use a self-control and self-regulation, or, in other words, to teach him how to normalise his breathing as a basic function of the organism.

K. P. Buteyko was the first one who has offered a concept of the ideally healthy man. Such a person breathes quietly: no sound or movement are noticeable. His control pause is 1 minute which means that the CO_2 level in his blood is 6.5%.

Through normalisation of breathing we can achieve perfect health, and it also gives us quantity and quality criteria to estimate a state of health in stages.

In spite of the seeming simplicity of the method, in practice doctors, practitioners and patients often make a variety of mistakes.

We consider a serious mistake when a doctor or practitioner start to treat patients by DVBM if they did not first treat themselves. The point is that practitioners can usually lead their patients only up to the level which has been reached by them personally. One must experience on oneself an effect of the method and go through sanogenesis reactions in order to be able to treat others properly. As a rule, a practitioner recommends only those factors of reducing the breath which he successfully tried on himself.

At a first appointment a doctor must demonstrate to a patient how his illness is linked to the depth of his breathing. The way to do that is to conduct the hyperventilation test, sometimes doing it repeatedly. A misunderstanding of the matter can hinder the recovery.

I believe an individual teaching is a mistake. Because of the peculiarity of the method, it is much better understood at the group sessions where we can visually demonstrate, with a help of group members, how it works. However, some individual sessions with patients are also necessary as additional means.

Before learning how to decrease the depth of breathing, a patient must learn how to sense his breath and relax his skeletal and respiratory muscles especially a diaphragm. A free volitional exhalation means a diaphragm is relaxed and that should not be restricted. A gasping exhalation indicates a diaphragm is stressed which does not belong to DVBM. A patient has no chance to change the depth of breathing when his diaphragm is under stress. The decrease of the depth of breathing can be achieved at the expense of the decrease of each inhalation while an exhalation is not counting. In volume both - inhalation and exhalation - are equal, and one breathes out and in exactly the same amount of air.

A typical for beginners mistake is their attempts to restrict the depth of breathing not by relaxation but tension which as a rule aggravates their condition. And if some improvement occasionally happens that is only due to normalisation of nasal breathing. Any skeletal muscles tension leads to the breath deepening. When asthmatics have got an acute shortness of breath condition against the general improvement and the frequency of asthma attacks falls, that is a specific symptom of forceful restriction of the depth of breathing. Such kind of attacks can be stopped only by using bronchlithics.

There is a recommendation in the DVBM brochure explaining how one can achieve a correct posture by drawing a Stomach in and then relaxing it. Very often the second part of that is neglected by patients. A practitioner should keep his eye on that point and, in order to check it up, he can ask some provocative questions such as "At the expense of what muscles are you straining your breath, limiting your inhalation and exhalation?" That helps in finding out whether a patient understands the procedure properly.

During their half an hour breathing training sessions patients allow themselves to overdo pauses which leads to the deepening of breath and also they do not stick to 3-5 minutes intervals between pauses. Often sessions are conducted for 40 minutes without a break. But you shall not forget that longer than 30 minutes sessions make patients tired and their parameters go down.

Factors preventing a control pause growing to its first stage, which is 10-15 seconds, are: lack of skills to relax their skeletal and respiratory muscles, absence of a proper breathing control days and nights, lack of skills to decrease the depth of breathing, a serious protracted condition of a patient, a combination of massive focal intoxication with parasitosis. Lack of proper control and activity during the night time is also holding parameters from growing: to break a sleep is a must. Giving examples at the group sessions can help to eliminate a fright of sealing up a mouth. At the first stage some physical factors can be sensibly used to support the method.

Factors preventing achieving a stable control pause, which is 20-30 seconds, are to less extend those mentioned above, but mainly they are: a focal infectious intoxication (teeth, tonsils), parasitosis, mycosis on feet, lack of physical load, stress at home or at work, inability to behave under stress, absence of tempering procedures.

The lessening of the depth of breathing, leading to the decrease of shortness of breath, allows - from the first week of training - to increase physical activities especially walking.

For pushing a control pause above 30 seconds it would not be enough only to practice breathing sessions and to control a breath. At this period such decreasing a breath factors as jogging,

sauna, cold water dousing, relieved days (diet), etc. should be actively used. That stabilises the parameters reached and creates some perspectives for future normalisation of CO2 level in the organism. Those factors can be added only with respect to individual state of patients' health, their age, gender, occupation. And, more importantly, the organism itself should be prepared physiologically to start above mentioned physical activities.

To be successful in working with the method means to be its skillful and attentive conductor. A DVBM practitioner does not treat a patient but teaches him an art of controlling his body, he provides him with a knowledge of basic organism's functions, physiological norms and deviations from them. A practitioner corrects patient's mistake in the process of learning and helps him to overcome sanogenesis reactions. All attention must be concentrated on a main point which is the normalisation of breathing that defines and regulates the workings of other body functions. The normalisation of breathing leads rapidly to various symptoms' disappearing, even against a control pause of 10-15 seconds. This is a satisfactory result from the point of view of health officials. However, a DVBM practitioner aims to encourage a patient to strive for higher parameters of health.

A lessening of the depth of breathing reduces a loss of warmth, and a rise of the CO_2 level in the organism stimulates its strength and relieves vascular spasms. Instead of feeling cold, patients begin to sense warmth, even heat in the body. When it starts a practitioner should recommend to take off some excessive clothing, otherwise overheating can become a breath deepening factor.

In first weeks of training patients are losing an appetite. It should be discovered and explained. If we do not do that, patients begin to force themselves to eat which can lead to deterioration of their general well-being and to a breath deepening. Sometimes that kind of aggravation can be falsely mixed up with a sanogenesis reaction.

In our opinion, a necessity of strictly regular meals promoted by the official medicine has no sufficient ground. In our practice we touch a theme of nutrition only when a patient gets well acquainted DVBM and is able to achieve a significant improvement of his health. K. P. Buteyko believes that we have to eat only when we are really hungry and eat in moderation.

The lessening of lung ventilation decreases a loss of warmth, and a rise of CO_2 with every 0.5% (10 seconds of the control pause) influences significantly on metabolism and, consequently, it forms new body requirements in food. Our experience shows that a choice of diet is a very individual one and it depends on the CO_2 level in the organism or on the control pause. I begin to talk about food and diet in my group sessions only when the majority of patients have already changed their attitude to food. A type of nutrition can tell us approximately what is a patient's control pause at the moment and vice versa. To correct patients' nutritional habits from the day one is a big mistake.

Many of our patients were more or less familiar with the issue of diet and nutrition long before they started DVBM. However, breathing is a fresh and difficult novelty for them requiring a lot of efforts. Therefore, too much attention to food can put back the main goal of our work. That is a volitional remake of patient's respiratory pattern with a view to help him out of his critical condition as soon as possible. At the same time, we can't completely avoid a question of nutrition as our patients usually do not have enough knowledge on that.

Let's analyse a patient's need in sugar as an example of the reorganisation of nutrition.

Refined sugar affects the body the same way as food narcotics. When consumed frequently, it creates dependency in the organism. If such a dependency is already formed, to restrict a person from sugar becomes almost impossible. A carbonic acid deficiency in the body breaks a process of glucose assimilation in cell, destroys a membrane permeability, suppresses oxidizing processes which leads to a sugar level growth in blood as a compensatory action. Not sorting out real causes of the increase of sugar level in blood, we hurry to decrease that with insulin. The fall of sugar leads to further glucose deficiency in cell, creates some general tension, aggravates a patient's state, doesn't allow the body to get relaxed and to decrease the depth of breathing. All of that is eventually forcing a patient to drop out of the treatment.

By using DVBM with a purpose to eliminate CO_2 deficiency, we are getting rid of above mentioned pathogenic mechanisms. As a result sugar craving reduces and its content in blood goes down. As DVBM treatment includes some theoretical education of our patients, we explain to them, in simple words, all what was said.

When our patients approach a control pause's measurement of 20-30 seconds, they already have not got any complaints,and feel well and active. At that stage we recommend them to start physical activities such as sport, exercises and physical work. They have to do more walking, avoiding using a transport wherever possible, to start jogging by Buteyko, to enjoy more physical work like gardening.

When our patients have achieved 20-25 second stable control pause, many of them haven't got their clinical symptoms anymore, their efficiency restores and grows. At that period we begin to work with patients on psychological level trying to help them to become new personalities, persuading them that they need to be healthy not for the sake of health itself but because better health can help them to achieve new goals in their private and social life.

Starting from 15-20 second control pause, many patients can work out what factors assist in lessening or'deepening of the breath. In other words, the restoration of metabolic and physiological processes helps a patient to start "listening" to his organism and they learn how to fulfil natural body needs. It turned out to be true for the social life as well. Patient's interests come to change; same with his circle of friends. We recommend our patients to join people, close to them spiritually. Therefore, the whole life of a person is changing. His old stereotypes collapse and new ones emerge - those that help him to secure and support his higher standard of health achieved through our training.

A control pause of the ideally healthy person is 40-60 seconds which corresponds with 6.5% of CO_2 in alveoli. A control pause magnitude indicates a state of patient's health and reveals factors which assist in lessening of breathing at that particular stage. For instance, a sauna is contraindicated with a control pause equal 5-10 seconds, but useful when it comes to 20-30. The same can be said about jogging, cold water dousing, etc. All of that is to confirm a leading role of breathing in the recovery process once again.

A patient achieved 40-60 second control pause becomes his own antipode, a person, healthy physically and spiritually. However, to reach such a higher level is far from easy for a person who

was "yesterday" seriously ill. Only a practitioner, who has cured himself by DVBM and gained a sufficient professional experience in that, is really capable to help another person to achieve this similar effect.

A significant influence, spoiling the efficiency of the method, is produced upon the treatment and its remote results by members of the patient's family not willing to, accept the novelty. When someone begins to change due to practicing DVBM, his loved ones often react in negative way. That is why a good idea is to attract the whole family to learn DVBM. An experienced doctor-practitioner can work with a group of people of any age - from a new born baby to a very old person, i.e. with all members of families. Thus, he can be named a family doctor indeed!

A number of doctor's and patient's mistakes occur during sanogenesis reactions. However, we should begin to analyse them only when a group has already assimilated the method and its members show a tendency to double their initial control pause. Otherwise, a thought about possible complications can push patients away from the method. But when a patient gains some positive effect from the treatment, we can start talking openly about sanogenesis reactions. Don't concentrate patients' attention at first on heaviest ones. On the contrary, try to emphasize some positive results and general' improvement of patient's health. Some practitioners believe that it is better not to talk to patients about sanogenesis reactions at all. However, the experience shows that there is a particular category of patients who react negatively and, due to their psychologically preconceived opinion, are unable to comprehend causes and meaning of complications. They tend to refuse to continue the treatment and go back to their habitual medications and doctors.

In accordance with an established practice, it is better to start DVBM treatment at the acute stage of illness. If a patient begins the treatment in remission he is likely to estimate developing sanogenesis reactions as an aggravation caused by the method and he drops the treatment.

When an initial control pause is doubled or tripled, the first sanogenesis reaction occurs. It has a number of distinctions from patient's familiar acute conditions and from the acute respiratory viral infection (ARVI). People, chronically sick, continue to be sick with ARVI during first two-three months because DVBM assist's not in the short term but in a gradual increase and normalisation of immunodeficiency. That is why patients can still have frequent ARVI but each time it goes easier, shorter and not so often until it stops completely.

Such acute conditions or ARVI sometimes can be taken mistakenly for a sanogenesis reaction, especially in children. However, the whole range of symptoms exist which reveal a difference between sanogenesis reaction and aggravation of the disease. We have to clearly see that while working with DVBM.

Quite often a salt deficiency is not compensated during a sanogenesis reaction. In this case, if a patient is unable to relieve the symptom by DVBM, some medications can be used.

In seriously ill people with a protracted history of illness some steroid deficiency can be also expected during a sanogenesis reaction. And this symptom is usually quite an acute one. The steroid deficiency has clear clinical signs and it should be compensated regardless of whether a patient received hormones in his past or not. I used to work with 40 hormone deficient asthmatics. To eight of them steroids were prescribed during DVBM as those symptoms of

hormone deficiency did not let us to normalise their breath at the beginning of treatment and at the period of sanogenesis reactions.

Sanogenesis reactions appear with each rise of CO_2 at 0.5%, which corresponds with a 10 second control pause. Such rises can last several months and they can manifest themselves by aggravation of old diseases, even against an improving general well-being. Some not fully informed people can perceive this as a return of his illness. At these times a patient considers himself incurable and jumps to a wrong conclusion about the non-effectiveness of DVBM. Falling back again into conventional medicine arms such a patient becomes a "living example" of the method's failure. That is the reason why we have to ask our patients to keep a diary and have control check-ups. Local people should come for an examination once every one or two years. Monitoring of patients should be conducted until their full recovery and not less than 3-5 years.

The most important period of DVBM treatment is its first month. That is the time when patients are required to be under control and get plenty of advice from our doctors. During that period some sanogenesis reactions in patients happen once or twice and the most serious mistakes of the treatment are revealed. This needs to be taken into account as in recent times crash courses, consisting of 5 sessions, have became popular. However, a practice has shown it is not possible to assimilate the method and to get through sanogenesis reactions for such a short period of time. That is only enough for patients to acquire some skills of self-control and to learn how to deal with some symptoms without taking medications.

The main contingent of our patients are people arriving from other towns with a long history of their illnesses. After having a crash course they go home where sanogenesis reactions begin taking place very soon. Without any control from a DVBM practitioner, many of those people get confused. Not being able to cope they are admitted themselves to hospitals where they are given again lots of medications. Traditional therapy, especially overdoses of spasmo- and broncholithics as well as antibiotics is aggravating a patient's state of health during a period of sanogenesis reactions. All together that can lead to an unfavourable outcome. Such patients usually do not repeat DVBM treatment and discredit it in the doctor's eyes. We saw that once again at the All-Union Conference (Moscow, 1987) dedicated to nonmedication methods of treatments for asthmatics.

Short cycles are not appropriate for those seriously ill. The course duration must be not less than a month!

When a patient has reached 15-30 second control pause, some negative consequences of focal infection's intoxication (teeth and tonsils) begin to emerge. At this time the health parameters' growth stops and a general well-being of a patient becomes aggravate greatly. Patients often take such exacerbation for a sanogenesis reaction. During initial examination it is not always possible to notice the focal pathology which exists very often in a latent concealed form, especially in teeth.

When a patient has not got practically any symptoms of his major disease and his control pause has reached 20-30 seconds those latent foci begin to clearly show themselves. The overwhelming majority of failure, frustration and exacerbation happening in a remote period are caused not by the fact that patients stop doing DVBM but by focal infection's aggravation. A doctor practicing

DVBM can hardly expect to get reliable stable results with his patients if he is not taking the most serious measures towards focal infections elimination.

Primary teaching of not very seriously ill patients can be conducted by a practitioner under doctor's supervision. But further work with a patient and prescription of hormones is exclusively the doctor's duty.

In our co-operative "Sanitation" we run DVBM sessions 2-3 times a week, the course duration is one month. Then our patients have repeated sessions once a month and in case of emergency they can attend any class with any of our doctors.

At the repeated sessions we analyse our patients' self-training results, discuss and correct some mistakes, examine infectious foci, sort out more profoundly such issues as nutrition, tempering, physical loads, etc.

It is very important not to let escape our attention the accordance between figure and parameters of health When looking into a patient's state of health the very important and complex' thing is the compliance between parameters of health and factual symptoms. Don't let them escape your attention.

To learn DVBM does not take long. However, to turn a patient into a healthy person by the method is a protracted and elaborate job. I truly believe this can be achieved by the elevation of professionalism of doctor-practitioners and by further comprehensive study and broad introduction of DVBM into medical practice.

Some Features Of Using DVBM For Children

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To run DVBM sessions with children is a kind of professional exam on how well one knows the method as doctor-practitioner and also it is a serious test for parents. This is creative and interesting work, promising even with very sick children. They have a great capacity to acquire new information, their bodies contain less toxins, their compensatory function is not completely destroyed, metabolism is flexible and a ability to regenerate is high.

Working with children means to care about future generations as they will become parents themselves in the future.

Unlike adults children are not very familiar with traditional medical views. They are more intuitive, their inborn reflexes are correct, and that explains why alternative medicine notions are more in tune with children's needs and wishes. Children do not want to cough phlegm out but they are forced to do that. Many of them do not want to drink after meals,and they do not like sandwiches. They prefer natural vegetables to salads but gradually get trained to eat them. I have never met children who dont cry at doctor's rooms or while some tests are taken. But they are very happy with non-medication treatment especially when some physical or water activities are included.

A doctor working with children has to be able to give them a clear and easy to understand explanation on the theory and practice of DVBM, or that which is causing the disease and how they can become free of it. Don't convert your teaching method into cliche and stereotypes. Make it different for each individual!

It's very important to help parents to understand that the process of sanitation and keeping children healthy will last their whole lifetime. Remind them children are individuals requiring respect and having their own desires.

The most serious damaging factors leading to uncontrollable growth of the depth of breathing are over- feeding of kids, over-heating and a lack of physical activity. Children's development depends greatly on their environment. The smaller they are, the bigger the dependency. That is why they often copy a character, views, habits of their parents, including their attitude to health. If mother and father do nothing to improve their health, any attempts to do something for children in this respect are taken by them as unjust and a constraint. The best encouraging motivation for kids is an example from parents, a competition with them. That means rehabilitation must be a family business.

During our sessions we tried to explain to both parents and children that health is a real treasure and to achieve it takes a great deal of effort. A child should comprehend what is a cause of his illness and how DVBM works. Otherwise, our teaching will become a set of cliches: sealing up a mouth at night, training is just 10 control pauses, attack cupping is 5 breathing cycles, etc. For better motivation and consolidation of the method you can offer a kid to share his knowledge with newcomers, encouraging him to use examples from his personal experience.

Both parents and children have to learn a fresh approach to life. And in case they forget about something like nasal breathing, walking, proper nutrition, then it is up to a doctor to remind them gently.

In accordance to the particular features we can divide children into three age groups: up to one year old, from one to three, older than three year old.

First group.

It is necessary to start training children with the DVBM from the day they have been born. Don't wait until a child will begin to understand your theory and recommendations. Parents have to expose their will power, patience and love in order to conquer their child's illness. Elimination of deep breathing can be performed on kids of that age by using a range of factors decreasing a breath and normalising nasal breathing. This includes tight swaddling, mouth fixation by a dummy or patch, water and tempering procedures, physical exercises and rational nutrition. Also we can use - as a variation of DVBM training- I. B. Charkovsky method: diving in a bathtub, showering, teaching babies to swim. This is a wonderful method. Every diving is a control pause. Their number should be gradually increased up to 100-200 times a day.

Second group.

This group is the most complex one with respect to the method's recommendations. To this time all children are admitted to creche where they are fed constantly with sweet porridge with milk. They are wearing shoes all the time and they spend a lot of time in stuffy rooms. But even under this condition parents and doctors have to control their nasal breathing day and night. If necessary, you have to seal child's mouth up with a plaster at night. Children must sleep on their tummies on the hard bed.

It is recommended to conduct DVBM sessions with children using some elements of games:

1. Sitting in front of the mirror we are breathing "like mice" - one can't see or hear us.

2. The "Rabbits - wolves" game. After running around for 2-3 minutes we stop and hold our breath. Children are "rabbits" and a doctor or a parent or one of the kids is "a wolf". The wolf is walking around and listening for rabbits' breathing. If he can hear this then he "eats" that rabbit.

3. To cover a distance between two balls on the floor keeping a control pause, to climb a gymnastic ladder holding a breath, etc.

4. Sitting after a control pause we become "as soft as a cloth" and breathe "like mice" (a doctor checks an ability to relax).

For kids at the age of 1 to 3 a leading role in adaptation to nasal breathing and a constant growth of CO_2 belongs to physical loading. We have to remember that at that age the ability to copy and imitate especially their parents is developed utmost. Therefore, sessions should be conducted together with parents who can participate in measuring a control pause, running around breathing through the nose, dousing with cold water. It helps a lot if we seal child's mouth up with a plaster while running or doing physical exercises. Exercise complexes can vary but I prefer yoga as each exercise in yoga is accompanied with a breath holding, many of them are performed with a significant relaxation of muscles-retractors which produces some general relaxing effect.

In my view, at this age a control pause does not play a role of a health index as it does for adults and does not reflect the disease seriousness. The longer a control pause in a kid, the better he comprehended your requirements. Certainly, their control pause can fluctuate greatly - from 2 to 20 and even to 60 and back. Thus, at that age we have to rely more on keeping nasal breathing up and child's adaptability to a load. On that ground, I believe that to teach children DVBM without physical activities during the sessions, putting them in seated position as it is recommended by some practitioners, is a mistake.

Third group.

At the age of three and above children begin to behave consciously and capable to acquire the method sometimes even better than their parents.

We give children the following explanation. This is: 1 - the continuous (day and night); 2- decrease (holding still chest and stomach); 3 - of the depth of breathing (breath so quietly nobody can notice nothing); 4 - along with a relaxation (be soft "as a cloth"); 5 - until slight shortness of breath is felt (desire to inhale deeper).

We always measure a control pause after physical activities (walking, jogging, marching, squatting, etc.). Parents are taking part in our training sessions where we teach children to be relaxed walking and jogging, to keep a beautiful posture with shoulders lowered, chest and stomach "soft", movements light and free. its a good idea to organise competitions between children and parents: the bigger someone's control pause and a number of those pauses, the better marks one obtains. Some tests examining the knowledge related to DVBM and readiness to work independently on it also can be held in the middle and to the end of a session. In K. P. Buteyko recommendations there are specific questions for such exams. For parents special attention should be paid to role plays.

Examples: 1. Seven year old child with bronchial asthma is using DVBM for two weeks; his control pause is 6-8 seconds, pulse 100-120 beat/min., shortness of breath occurs up to 4 times a day. The DVBM method helps to stop half of those attacks. What are your actions? 2. Four year old child with dysbacteriosis is practicing DVBM for 10 days. His control pause has been doubled. He has the following symptoms: groundless diarrhea, vomits once, temperature rose to 39C. Your actions?

During sessions parents should control their children and vice versa. Children should observe their parents at training, correct their mistakes, explain to them why, for example, overholding of control pause is dangerous.

Duration of the course for kids is from two weeks to one month, better daily, 30-60 minutes each followed by water procedures.

An example of the session with children aged from 2 to 7.

1. Sit, shut the mouth, check posture, lower shoulders, make a breath quiet, relax chest and stomach. Count a pulse and a breath frequency, define a control pause. Check nasal breathing. If it does not work properly start DVBM or physical activities.

2. Measure a control pause, then breathe only through the nose "like mice". Remember that a mouth is for eating and talking, eyes for seeing, ears for listening, and a nose for breathing. How shall we be breathing? Only through the nose and quietly.

3. Divide into groups of 2-3. Each group is measuring their control pauses. Children from other groups observe that and offer their comments. Then parents are measuring their control pauses and children are checking their breath after the pause.

4. Children with parents are walking in a circle slowly, watching their posture, breathing quietly through the nose. Gradually they are switching to sporting walking and jogging. 2-3 minutes-run keeping nasal breathing. Then all came to stop and start playing "rabbits and wolves".

5. Measure a control pause while walking, running, squatting, jumping up in . turn on right and left legs. During breaks breathe quietly and unnoticeably.

6. Several yoga exercises: "swing", "bow", "snake", "perfection", "fish", etc. Control your breath.

7. Exercises with dumb-bells. Control your breath.

8. Cold water sponging down.

9. Manual therapy or cups massage if required.

10. End of session: sit down and measure a control pause, pulse, respiratory

rate.

11. 10-15 minutes of theory.

The Principles of Tactics in using DVBM

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We believe that we have to treat not a disease but a patient. We accept everyone as a conscious personality. Each person must find his own way to be healthy. In this case he will be an active helper to the doctor - not a passive observer, "a rabbit" expecting to gain health from the doctor's arms and counting on medications.

We educate people how to become healthy, and that is the reason why we consider our duty to spread a great deal of knowledge about the deep breathing disease - a cause of many ailments - through mass media, radio, TV, lectures, etc.

Respiratory homeostasis is maintained by two vital constants - pCO_2 and pO_2. Oxygen does not carry any regulatory function; the body needs it for the oxidizing of other substances. Another story is with carbonic acid. That is an informative humoral vital constant which regulates without exceptions all body functions. This constant has influences upon cerebral cortex, respiratory and vascular centres, reticular formation, vascular and bronchi tension, metabolism, hormone secretion, blood and tissue electrolyte content, blood and tissue pH. In turn, it regulates without exceptions all:enzymes activity and almost all biochemical reactions velocity. CO_2 itself is a catalyst of biochemical reactions in the organism.

P. M. Albitsky was the first one who expressed the idea that CO_2 along with O_2 is the main element of a living system ensuring the workings of processes of vital importance.

The theory offered by A. I. Oparin (1957) says that CO_2 fixation is the universal ancient process underlying the very fundament of metabolism in all living beings. This is confirmed in experiments. In recent years the direct correlation between the level of metabolism and carboxilation reactions' velocity has been revealed (Guly M. F., 1968, 1976).

At present 13 reactions are known where the organism utilizes CO_2 in biosynthesis by carboxilasing corresponding metabolites, in particular, asparic and glutaminic aminoacids. Also the role of CO_2 in biosynthesis of lipids and fatty acids is confirmed. Carbohydrates can be received from fatty acids and aminoacids if CO_2 is a part of the process.

Blood O_2 volume with respect to 1 kg of body mass is 0.025-0.03 litre/kg, CO_2 is 1.7-1.8 litre/kg.

What is the way to find out how deep our breath is? By measuring the breath!

It is recommended to measure the depth of breathing using a stop-watch. A. control pause in norm is 60 seconds which corresponds to 6.5% of CO_2 content in alveoli, blood, tissues. If a control pause is 5 seconds that means a person breathes 12 times deeper than normal.

That is necessary to teach every sick and every healthy person how to measure the depth of their breathing. A man must know it the same as he knows how to measure his pulse and temperature. That is the only way to avoid the deep breathing disease or to stop it at some stage.

We use the deep breathing test as:

- diagnostic test;

- educational factor;

- convincing factor;

- demonstration of interrelation between the depth of breathing and a patient's current condition.

During the test a patient gets convinced that he feels worse from the deeper breathing. Lessening the depth of breathing he achieves a significant improvement. Thus, the test is at the same time a teaching tool as a patient experiences himself what is the method about - the decrease of breathing by volitional efforts as it really takes efforts to hold the breath. That is why the method is called:

the deliberate volitional breathing method.

DVBM allows:

from the first days to reduce a medication intake at 1/2 or 1/3, or even stop it completely;

to cut short any symptoms without medications;

to prevent the deep breathing disease;

to become practically healthy;

to become perfectly healthy;

to become a person of greatest endurance.

While teaching DVBM we use the 5 point system of marking stages of the method assimilation: theory; practice and skills in measuring the depth of breathing; understanding of the very core of the method; studiousness and quickness of wit.

We recommend teaching in groups of 8-10 people where the smartest of them should be selected as an assistant for a doctor and practitioner.

1-1.5 hour sessions are to be run daily (except weekends) during two weeks. After that patients stay under observation by filling up questionnaires or visiting a doctor.

DVBM principles:

sessions' gradualness;

moderation in learning;

individual approach to patient's routine.

Our huge experience in working with DVBM (more than 20 years) allows us to assert: children from the age of one year and a half and older are capable to learn the method better than adults.

Children are taught through games and constant competition between participants. Like for adults, children's success is marked at the 5 point system and some prizes are also used. Simultaneously we educate parents who study the DVBM theory while watching their children practical sessions. We provide parents with recommendations on how to prevent or cut short negative symptoms, on nutrition, hygiene, regime, which are different from those traditional. We draw parents attention

to the major task - how to decrease the depth of breathing directly by using DVBM or indirectly (tight stomach swaddling, a dummy in the mouth, sleeping on the stomach, etc.).

For patients with hormone dependent forms of disease we use the following tactics. We believe that it is necessary:

to help a patient not to fear steroid hormones;

to persuade a patient that hormones are not toxic and prescribed by necessity;

to explain that DVBM eliminates hormone deficiency even in Itsenko-Cushing syndrome when a patient reaches 30-40 second control pause;

to convince a patient to refuse using an inhalator if he takes it 3-4 times a day to stop an attack but to increase temporarily a hormone dosage;

to vary his hormone dose on 1/4 in both directions (up and down) keeping the pulse 76-86 beat/min.;

the control pause growth should go faster than a hormone dose reduction.

It is necessary to know that a control pause doubling against its initial reading, cuts short patients' symptoms. If the initial control pause was 7 seconds, then with its increase to 14-15 a patient feels a lot better.

Some patients do not actually increase their control pause but they allegedly increase the amount of their endogenic CO_2 just for the purpose to maintain its certain level in the organism.

In people breathing deeply their sensitivity to the cold is lowered. That is why some slow protracted cooling provokes an acute exarcebation of their well-being. Especially dangerous in such case is a cooling of the head.

When we treat patients with focal infections (chronic tonsillitis, caries, parodontosis, foot mycosis) we have to keep in mind that infectious foci slow down a recovery, and for many patients that prevents them from-achieving of higher level of health, and that also leads to the breath interruptions and recurrence of illnesses. Therefore, it is necessary to eliminate infectious foci by conservative treatment or surgery if indicated, before we start DVBM treatment.

In order to help every patient to obtain good health and reach active longevity we have to be precise in teaching DVBM.

The Symptoms Dynamics In Adults And Children Before And After DVBM Treatment

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The symptoms and syndromes dynamics (status) were monitored in 46 patients suffering from bronchial asthma. Before the treatment each of them in average had up to 29 symptoms and syndromes.

Table 1 shows that after the DVBM treatment in 35% of cases all negative symptoms and syndromes have vanished, in 60% they have decreased, and only 40% did not experience any changes. Also some positive dynamics was observed in accompanying ailments (arterial hypertension gets normalised, gouts, lipomas, fibroid mastopathy resolved, etc.). 104 children before the treatment had got in average up to 16 symptoms and syndromes.

Table 1. Results of the DVBM treatment for 46 adults.

Symptoms and syndromes	Number before the treatment	Disappeared	Decreased	No changes
1	2	3	4	5
Asphyxia attacks: Asthmatic status or more than 5 attacks per day	14	8	6	
3-5 attacks per day	19	12	7	
1 attack a day, hard breathing	13	7	6	
Allergy: vasomotoric rhinitis	41	37	4	
neurodermatitis, eczema	20	15	5	
nettle rash	7		7	
Quincke's edema	20		20	
medicamental allergy	17		17	
Shortness of breath:	46			
at rest	27	20	7	
during physical load	19	19		
Dry or mucousy cough	46	27	19	
Habit of mouth breathing	46	17	29	
Hurried breathing with lacertus muscles involvement	45	33	10	2
Feeling of lack of air	45	31	13	1
Chest pain	45		44	1
Undue fatiguability	44		41	3
Fear of stuffy air	43	2	39	2
Apathy	43	32	10	1
Irritability	42		38	4
Posture deprivation	42		39	3
Sleep disturbance	41	26	13	2
Headaches	41	33	6	2
Muscle weakness	40		40	
Heart pain	39	8	31	
Skin paleness	36	10	17	9
Feeling of being too cold or hot	35	20	14	1
Deterioration of memory	34		34	
Dizziness	33	29	4	
Flickering in eyes	33	27	4	2
Heartburn, sickness, burps	31	5	26	
Tachycardia, extrasystolia	30	2	26	2
Dryness in mouth and rhinopharynx	29		29	
Noise in ears	25		25	
Muscles and joints pain	25		25	
Sense of smell loss	23	1	21	1
Liver pain	23		23	
Constipation	22	22		
Flatulence, bloating	20	20		
Legs swelling	20		20	
Deterioration of vision.	18	2		16
Loss of appetite	16		14	2
Larynx spasms	14	4	10	
Parasthesia (change of sensitivity)	14	3	11	
Injection infiltrates	12	12		
Subclavian area distention	11	11		

Calves muscles cramps	11	11		
Hemorrhoid	11	3	8	
Hands tremor	10	3	7	
Hypersalivation	10	4	6	
Pustular eruption	9		8	1
Syncopes	8	4	4	
Hypertension (above 140/90)	8	5	3	
Sweating	6		5	1
Protein in urine	4		4	
Foot dry calluses	4	4		
Obesity	4		3	1
Lipomas	4		1	3
Gout	3		2	1
Raynaud's disease	3	3		
Pathologic menopause signs	2	1		1
Hypotension (below 100/65)	2	2		
Psoriasis	1		1	
Anemia	1		1	
Fibroid mastopathy	1		1	
Varicosis	1		1	

Table 2. Results of the D VBM treatment for 104 children.

Symptoms and syndromes	Number before the treatment	Disappeared	Decreased	No changes
1	2	3	4	5
Asphyxia attacks:asthmatic status or more than 5 attacks a day	40	32	8	
3-5 attacks a day	41	41		
1 attack a day, hard breathing	23	23		
A!lergy: vasomotoric rhinitis	65	65		
food and smell a!lergy	53	40	13	
diathesis, neurodermatitis, eczema	35	30	5	
medicamental allergy	34		34	
Quincke's edema	12	12		
Shonness of breath: at rest	39	35	4	
during physical load	65	65		
Dry or mucousy cough	103	83	20	
Tachycardia	104	104		
Easy to catch cold	103	103		
Stoop, chest deformation	102	83	19	
Irritability	90	75	15	
Meteolability	90	75	15	
Habit of mouth breathing	98	98		
Chronic pneumonia	87	72	15	
Sleep disturbance	82	82		
Headaches, dizziness	72	65	7	
Undue fatiguability	67	67		
Cold arms, feet, back	62	45	17	
Wheezes in lungs during aggravations	62	62		
Sweating	46	40	6	
Loss of appetite	46	44	2	
Constipation	45	45		
Gums and nasal bleeding	44	30	14	
Constant wheezes in lungs	41	39	2	
Heart pain (often along with asphyxia)	40	35	5	
Unstable body temperature	26	26		
Syncopes	17	15	2	
Sinusitis	16	16		
Rise of appetite	12	12		
Bronchiectasia	10		10	
Intestinal colic	10	10		

Table 2 shows that after the DVBM treatment children suffering from asthma demonstrated impressive positive dynamics - similar to adults. In 87% of cases all negative symptoms and syndromes have vanished, in 12% they have decreased.

The main contingent of patients (72%) were treated in the outpatient department. From the first days they experienced some general well-being improvement and positive dynamics not only for asthma but also for accompanying ailments.

Example:

Payel, 6 years old, was admitted for the outpatient DVBM treatment on 29th November, 1979. Diagnosis: atopic bronchial asthma of a serious condition, asthmatic status, stage 2 of lung and heart deficiency, vasomotoric rhinopathy, multiple allergy.

Complaints about constant asthmatic condition, 6-7 heavy asphyxia attacks daily, mainly at nights and after the slightest physical load; heavy cough with difficulties in spitting phlegm out which sometimes led to vomiting; shortness of breath from physical load; sneezing; weakness; bad sleep; irritability; tearfulness; itchy skin; constipation.

Heavy attacks of asphyxia started at the age of three months and asthmatic conditions lasted from several. days to several weeks. Within six years of his life Pavel was admitted to hospitals for treatment 18 times, 5 of them - to intensive care wards. 10 bronchoscopies were done. Last time, after having halothane narcosis, due to his critical condition the boy was put on controlled respiration unit. The whole 1979 (until 28.09.79) Pavel was receiving treatment in the hospital. However, suggested therapy including hormones did not resolve in stable improvement and remission. To suppress an attack the boy was using uncontrollably - part of prescribed therapy - every 15-20 minutes, four types of inhalators (novodrine, euspiran, alupent, salbutamol). He showed intolerance to interferon, sulbacetamide, halothane, hotel dust, fir-tree smell, grapes, apples, tomato, some fish and other products.

During our examination Pavel's condition was at its medium level. He was breathing noisily through the mouth, lacertus muscles were involved, no nasal breathing was noticed. He was pale. On his left elbow a large scar from the trophic ulcer (the result of infectious infiltrate) was seen. His chest was expanded especially its lower parts. While performing a percussion, we heard bandbox sound, and lots of dry and moist wheezes along the total lung area, respiratory rate - 30 per minute, control pause - 3 seconds, pulse- 118 beat/min, full and even. Also tachycardia was registered, heart sounds were muffled. Other symptoms were: geographical tongue, mild stomach flatulence, tenderness in epigastric and right subcostal areas.

Pavel grasped the idea of DVBM from the first explanation and in 10-15 minutes he relieved his asthmatic state. Deep breathing (12 inhalations for 30-40 seconds) provoked his cough, stuffiness of his nose, asphyxia attack, tachycardia. Those caused by hyperventilation symptoms disappeared after 5-7 minutes of. the DVBM treatment. That was the way to demonstrate dependency of bronchospasm, coughing, stuffy nose and tachycardia on hyperventilation.

From the first day of treatment this boy has learnt how to cut short coughing fits, asphyxia and sneezing. Asthma attacks became easier and these incidents ceased to 1-2 daily. Medication intake went down significantly. On the sixth day asthma attacks completely stopped and there

was no need in medicational therapy anymore. The patient became much more active. For the first time in his life he walked freely around the room, climbed the stairs up to the 3rd floor, strolled along the street. His control pause increased from 3 to 9-10 seconds and pCO_2A level in alveoli rose from 27.3 to 31.8 mm/mercury. On that day his first sanogenesis reactions began. Their symptoms were: weakness, headache, loss of appetite, increasing thirst, bitter smelly saliva, vomiting, frequent urination and stool. Plenty of thick viscous phlegm was coughed up. All that lasted only one day. Then his state improved.. He did not need any additional therapy. His sleep and appetite were normalised, shortness of breath, sweating and weakness disappeared.

On 14th day of DVBM when the patient's control pause reached 20 seconds and pCO_2A level rose from 31.8 to 35.6 mm mercury, the second sanogenesis reactions came. The symptoms were: muscle pain all over the body, lots of nasal discharge, rise of temperature to 37.6-39.7C. Again, up to 50-100 ml of phlegm, similar to the first reaction consistency, was coughed up. Those symptoms lasted about seven days.

When control pause rose to 30-40 seconds allergy symptoms disappeared including allergy to smell. For the first time in the six year old boy's life he enjoyed having at home a New Year fir-tree as earlier he could not stand its smell. Before DVBM treatment the boy was rarely allowed to go outdoors or to have a bath because of fear of catching cold. After the treatment he began to spend a few hours outside regardless of weather conditions and received water procedures. Since then Payel stayed under our supervision. No asthma attacks, allergies or colds were registered.

The dynamics of Lung Function parameters at rest before and after three weeks of using DVBM.

Increased: Vital capacity +1.2 litre - from 0.3 to 1.5 litre (20.8 - 104% of predicted); $FEV^1$of exhalation +1.8 litre/sec. - from 0.2 to 2 litre/sec. (13.8 - 104% of predicted); pCO_2A +8.3 mm/mercury - from 27.3 to 35.6 mm mercury; control pause +37 seconds - from 3 to 40 seconds.

Decreased: pCO_2A ratio +12 mm/mercury - from 23 to 11 mm mercury; Tulou index +5 mm mercury - from 12 to 7 mm/mercury.

Total blood count:

	Before the treatment	**After the treatment**
leukocytes	9.2×10^9m/L	7.2×10^9m/L
eosinophils	23%	3%
immature neutrophils	1%	5%
mature neutrophils	40%	54%
lymphocytes	31%	37%
monocytes	5%	1%
ESR	9mm/hr	9mm/hr

At the chest x-ray lower parts of lung fields were of increasing transparency, band roots of the lung were consolidated, infiltrates and focal changes were not found. Heart had no peculiarity.

Conclusion. As hyperventilation and deficiency of CO_2 partial pressure in alveoli were filling and these parameters of external breathing function were approaching the norm, the general well-being of the patient improved, asthma attacks subsided and then stopped-completely. Also his allergic reactions to some foods and other factors vanished. Remission lasts more than 9 years.

Example:

Patient M., 13 years old, resident of Nalchik. Diagnosis: bronchial asthma, vasomotoric rhinitis, multiple allergy. Sick for 8 years. The patient was forced to live away from home (in mountains) as he could not stay home more than 1-2 hours: due to the heavy asthma attacks he used to be taken by ambulance to a hospital. Each time after the hospital he was urgently transported to the mountain area (Prielbrusye).

From 12th August 1987 the boy was on DVBM treatment in Novosibirsk. To parents' surprise, no aggravation of his state of health happened. His initial control pause was 3-5 seconds, in two weeks - 30-40 seconds. Asthma attacks were not repeated. Happy parents took him home. Since then one year passed without recurrence of the disease.

With DVBM treatment people of all age groups achieve - along with their disease's symptoms disappearing- some positive changes in their general well-being. After two weeks on DVBM we conducted dynamometry test for our patients. Right arms' strength in men of the 30-45 age group (15 men were tested) grew in average 12% up, left arms' strength - 10% up. In women of the 25-66 age group (33 were tested) right arms' strength grew in average 18% up, left arms' strength - 20% up. In children of the 7-12 age group right arms' strength grew in average 12% up, left arms' strength - 13% up. Isn't it a conclusive proof that with DVBM treatment a person becomes physically stronger regardless of his age? Moreover, our experience confirms that with DVBM treatment even 1 and 2 level invalids are becoming perfectly healthy. They work, play sports, serve in the Army. In many cases their remission lasts already 15-20 years.

Using DVBM For Menses Restoration

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At the Institute of Medical Problems in the North from 1st April 1987 to 1st April 1988 the DVBM method was used for treating 46 patients. Those were selected in accordance with their symptoms which were: infertility and menstrual cycles interference. They were women of reproductive age: 18- 34. An average period of infertility was 6 ± 1.2 years.

Depending on their infertility genesis women divided:

Neuroendocronic syndrome	10
Amenorrhea of central genesis	2
Hyperandrogynism	2
Hypothalamohypophysial dysfunction	12
Endometriosis	10
Amenorrhea against chromosomal aberrations	1
Hypofunction of ovary	8
Hyperplasia of endometrium	1

Patients were divided for treatment into three groups. Duration of observation was: 1 year - for 20 women, 6 months - for 15, 4 months - for 11.

Lectures on the theory and practice of DVBM and also on nutrition, self- massage and tempering (40 hours in total) were given for participants.

The most obvious effect of the treatment was-observed in women having neuroendocronic syndrome. That was seen through restoration of the menstrual function and connections in the hypothalamohypophysial system. Menses was restored in full in seven women out of 10 although for three of them their cycles remained to be anovular. Cycles restored themselves spontaneously in parallel with a loss of weight.

The effect of the menses restoration in patients with the central form of normogonadotropic amenorrhea was really amazing. Both women developed spontaneous cycles, however, their rhythm was postponing and phase 2 was reduced, according to functional diagnostics tests.

In the group of patients with hyperandrogynism the result depended on character and source of the pathology. In women with the adrenal form of the pathology their cycles got restored in full, their hirsutism decreased, facial and back acne disappeared, i.e. signs of adrenal hyperfunctioning went down. There was no similar effect registered for a patient with the ovarian-adrenal form. Her control pause stopped at 31 seconds and did not grow higher in spite of lots of training provided.

DVBM cured the hypothalamohypophysial dysfunction in 40% patients, however, that was a slow and difficult process. To get a proper effect those women needed to raise their control pause to a very high level.

As to endometriosis at present we can't make any conclusions due to the short period of observation. However, using DVBM in conjunction with some traditional therapy is seemingly speeding up the endometrial heterotrophy resolution in the small pelvis. Simultaneous intake of hormones (oral synthetic progestines) did not reduce control pause and did not disturb general condition.

Amenorrhea caused by chromosomal aberration was not cured by DVBM in spite of the fact that plenty of clones were destroyed.

The restoration of the ovarian function in women with its hypofunction depended completely on the initial background. Tests did not show any improvements when inflammation was underlying the hypofunction. The final conclusion can be made only when the patients' control pause reaches 50-60 seconds as by the 40 seconds control pause those patients ovarian function does not redstore itself.

A part of the main disease which was analyzed (infertility and menstrual cycles interference) all women suffered from various somatic pathologies and they had got from two to five chronic illnesses. We found that all of them, except one, had some chronic infectious foci which had been sanitized in a process of training.

It pays to emphasize that the patients did not complain about sore throat before they started DVBM. Although 50% of them did not have aggravation of chronic tonsillitis their control pause did not rise above 20-25 seconds. Before and after sanitation of the infectious foci all women developed their control pause very slowly, especially above 30 seconds, but we did not notice in them sanogenesis reactions. In all patients their general well-being was improved; their intestine, stomach, kidney and other organs functions restored.

There was no disappointment in the method. However, not all patients were able to manage this long "marathon" as in order to restore a cycle and to fall pregnant a very high control pause magnitude was required. And because of this they could not get a fast result, 30% of our patients dropped their DVBM training and got stuck on the background or initially achieved level. We have to admit that the initial control pause of the observed contingent was very low - 5-8 seconds, maximum - 10 seconds, which reflected the depth of their pathological state.

With the help of DVBM three women fully recovered from their major illness and fell pregnant. We could join to them four more women who did not fall pregnant because of defects in their tubes but their cycles were restored in full and there were no trace of pathology after the treatment. 20 women demonstrated significant improvement: spontaneous menses occurrence, loss of weight, lessening of signs of mastopathy, etc. In 19 women general health and sleep improvement were registered. Everybody showed some positive effect after using DVBM, however, two women were unable to raise their control pause above 31 seconds, and one woman had a heart pain during the training.

Conclusion:

1. DVBM is the unique method of treatment for patients with endocrinal interference of menses.

2. The most perspective patients to succeed with the treatment are those with neuroendocrinic syndrome and normogonadotrophic amenorrhea (which is amazing!)

3. The most difficult patients for DVBM are those with the associative form of hyperandrogynism and inflammatory processes in uterine appendages.

4. DVBM is not indicated for patients with a broken genome and menstrual cycle disturbances.

5. Patients with endocrinal forms of infertility are the difficult contingent for DVBM treatment and their cases require protracted elaborate work.

The Theory And Practice Of DVBM In Gynecology

L. S. DAVIDYANZ
Moscow

Problems in the gynaecological area mirror the problems in the endocrinal system of the organism. Although gynecological illnesses do not belong to "diseases of civilisation" they, nevertheless, can be successfully cured by DVBM.

Etiopathogenesis of many gynecological diseases is practically the same but not understood in detail. Almost all authors consider them as an interruption in correlative activity of the following system: cerebral cortex - hypothalamus - pituitary body - ovaries - uterus, with a reverse connection to the central nervous system. It is hard to prove which part of this chain is broken in each individual situation. That is why treatment offered by modern medicine targets towards the elimination of symptoms: in case of myoma it would be the removal of the uterus or - as the best scenario - enucleation of nodes, in case of heavy bleeding - the removal of uterus as well. However, removing the uterus because of the non-stop bleeding we are fully aware of the fact that we are destroying ovarian function, which leads to certain aftermath up to and including hormone dysfunction of the pituitary body. If myoma develops against dysfunction and doctors choose not the operatic approach to the treatment then hormone therapy would be chosen. With that a selection of hormone medications is often performed blindly which sometimes distorts cycles not producing at the same time any stable therapeutic effect.

Some patients reject hormone therapy fearing its side effects. That category of patients are often seeking help from DVBM.

Until a doctor has knowledge about the essence of Buteyko method, he would have said puzzling: what breathing has in common with gynecology?

Let me briefly outline the classical pathogenesis of gynecological diseases in the light of the Buteyko theory. Imagine how negative environmental influence, in particular stress, affecting a woman, makes her breath deeper which leads to carbonic acid deficiency. The logical conclusion based on three Buteyko evidences proclaims that hypoxia, caused by the deep breathing, interrupts acidic-alkaline balance and - simultaneously - metabolism of all systems, in particular of hypothalamohypophysial system. That disturbs hypothalamus function which is to produce neurosecretion. Normally neurosecretion induces the pituitary body to produce three important hormones which in conjunction with oxytocine govern the workings of ovaries. The disturbance of the pituitary body function leads to the interruption in amount of those three hormones production. That affects ovaries and the symptoms are irregularities of cyclic changes in endometrium. Our research has revealed that the patients with ovarian dysfunction as a rule suffer from vascular problems such as tachycardia and vegetovascular complications.

As we know deep breathing along with constant deficiency of CO_2 interrupts blood circulation creating so-called chronic oxygen deficiency in particular in the pituitary body. That explains why patients with vascular problems have got as a rule some gynecological pathology. Hence, we can draw the conclusion that the starting point of gynecological irregularities supposed to be irregularities of blood circulation in brain vessels: suffering from that the pituitary body interrupts a function of the next weak part of the chain which are genitals. With protracted interruptions linked

to hyperventilation functional derangement of organs (ovaries) finally become degenerative organic lesions.

It is described in literature that dysfunction is accompanied by the increase of Calcium ions in blood but an abundance of Ca leads to atherosclerosis. That is correct with respect to patients with hypertension which explains why their menopause proceed prematurely and with difficulties. In other to normalise distorted salt reaction, i.e. to take out the excess of Ca and to calm down nervous system of gynecological patients they are in need of taking in a pinch of Mg once a day during some protracted period of time. To increase carbonic acid level and consequently to recover sooner it is recommended to cleanse, from time to time, large intestine thoroughly.

Some role in ovarian dysfunction pathology is played by thyroid pathology. It is understandable as under hypoxia of pituitary body different parts of it are suffering including that responsible for thyrotropic hormone production. That is the way how thyroid lesion occurs along with ovarian dysfunction. For instance, pronounced hypothyroidism leads to ovarian dysfunction and bleedings between periods. If we take into consideration that hypothyroidism is curable by DVBM the way to threat dysfunctional condition can be anticipated. (In modern medicine when thyroid disease is treated by conventional methods spontaneous cure of ovarian dysfunction simultaneously occurs.)

With the beginning of DVBM for gynecological patients any hormone and any other medications are canceled unlike it is done for patients with other diagnosis who often continue to use hormone therapy for some time.

For a year and a half we carry on the observation of gynecological patients which have produced a clearly positive results of DVBM treatment. Their diagnosis were as follows:

1. mastopathy;
2. erosions, cervicitis;
3. ovarian dysfunction with amenorrhea or poor menstruation, bleeding with prolonged menstruation from 7-12 day to one month, bleedings in between periods, acyclic bleedings which is Stein-Leventhal syndrome;
4. endometriosis;
5. bleeding as leading symptom of myoma;
6. asymptomatic fast growing myoma;
7. infertility 1 and 2 of hormonal origin;
8. toxicosis of second half of pregnancy;
9. thrush.

Women visited the clinic once a month or once in 5-6 months depending on their diagnosis. Vaginal examinations were performed at their local clinics.

Some improvement with enumerated above illnesses began soon after the beginning of the treatment but full recovery depended on the duration of suffering and a level of commitment of women in practicing DVBM.

Mastopathy is fully resolved when a control pause is reaching 40 seconds.

Ovarian dysfunction with amenorrhea or poor menstruation. In the process of treatment periods could be missing from 3 to 6 months, sometimes up to one year. Then the function returns due to hormone correction being completed. That is what sanogenesis is all about. Similar hormone correction works in cases of early menopause which happens against the background of some major disease. That is why DVBM treatment of some disease simultaneously helps with menopausal symptoms and sometimes even restores period-alike reactions after menopause which rejuvenates sexual organs.

Dysfunctional bleedings with prolonged menstruation. With control pause reaching 20 seconds their duration decreases greatly. With further growth of control pause each next period is getting shorter compared with a previous one and becomes normal in average in three menstrual cycles.

Bleedings in between periods with a control pause of 20 seconds stop and does not return.

I wish to emphasize the efficiency of DVBM in treatment of such serious illness as endometriosis which is precancerious condition. The prolonged hormone therapy does not bring positive results and as a rule it ends up with an operation. But even in this case there is no guarantee that some fresh endometriosis spot will not emerge. With DVBM patients feel literally born again. Their condition improves instantly. The first period coming after they start practicing DVBM is almost not painful while before the treatment those patients had to spend menses days in bed due to a lot of pain. Besides, some specific smear appearing before and after periods decreases or disappears and a matter of operation is now taken off.

At present we monitor a woman whose ovary was removed because of endometriosis. After the operation she was still having painful periods. Laparoscopy shows that she has got fresh endometriosis spots: one on a stump, another - a new one. So, operation did not bring her a cure. The same woman is infertile. Her menstrual cycle condition was reflected in her basal temperature: 2nd stage of her cycle was completely absent. With DVBM the amount of her 2nd stage of cycle days began to grow from month to month. Now it reached 10 days. That means her menstrual cycle is in a process of restoring which eventually should lead to the woman's recovery from primary and secondary infertility.

Speaking of pregnancy pathology, we recommend to introduce DVBM to pregnant women after 16 weeks of pregnancy. It reduced to a minimum some risk of miscarriage influenced by sanogenesis. At early stages (6-10 weeks) against the background of very low initial control pause quite severe sanogenesis can be expected. A fetus is getting attached after 6 weeks of pregnancy. Strong sanogenesis reactions prevent a fetus to build itself up in proper way which leads as a rule to a miscarriage. That explains why during the first half of pregnancy DVBM can be only used for suppressing of dragging pain in low stomach (analgesic effect of CO_2). Much better for the future mothers to rise their level of CO_2 before pregnancy (to eliminate deep breathing habit) because in accordance to the biological law fetus cells inherit all information of mother cells.

Securing pregnancy during its second half while using DVBM is an individual task. If a woman can manage to save her pregnancy, sanogenesis is characterised by typical cleansing reactions which take off nephropathy symptoms: high blood pressure is going down; pulse becomes less

frequent; swelling disappears without medications, in spite of various salts which we recommend to take even during pregnancy; only a trace of protein can be noticed in urine.

It is not recommended to intensify the DVBM training during sanogenesis period in pregnant women (both mother and fetus pass through cleansing). In general we have not to overload pregnant women. By the way, DVBM eliminates acetone causing nausea.

We did not have too many pregnant women during our work with DVBM. But we noticed that if a woman with a normal pregnancy has a relatively high level of CO_2, she breathes quietly. Another interesting fact: DVBM reduces successfully the quickened heart beat of fetus. By the classical obstetrics, the quickening of fetus heart beat was considered a sign of oxygen deficiency. Consequently, lessening of the depth of breathing in a pregnant woman assists in saturating fetus with oxygen. That is one more time to confirm one of Buteyko statements: the decrease of the depth of breathing leads to saturation of blood with oxygen. *[Ed.: presumably fetal blood]*

Recovery of myoma (reverse development of expanded uterus and myomic nodes resolution) starts with its preliminary softening and some increase in size with its further reduction up to complete disappearance. That is typical for mastopathy as well. All sources say about myoma: "Etiopathogenesis remains unclear, however, it has been noticed that the increase of estrogen level plays a big role in this disease". Taking this into account and keeping in mind that DVBM effectively corrects hormones, we can explain why, while taking off hyperestrogenia, we also take off a leading symptom of bleeding (menorrhagia). Same way asymptomatic fibromyoma. can be resolute. If a patient is not old (up to 40-45) and she has not got any accompanied pathology, by having DVBM training for 3 to 6 months a regress of fibromyoma estimated as two weeks in size (similar to pregnancy) down can be achieved.

We also monitored a patient admitted to the hospital with a diagnosis: myoma of 6 weeks, initial stage of necrosis of the subserous node. With DVBM her pain was decreasing each day. The woman was discharged from the hospital in satisfactory condition without pain in 7 days. Two months later her node sized as a bean decreased with the decrease of uterus.

We have many cases proving that DVBM is sufficient method in gynecology and we believe that further research in clinics is necessary.

A few words about a patient whom I demonstrated at two previous conferences and whom I have monitored more than a year and a half. Her diagnosis before DVBM was introduced: multiple myoma of uterus, poliposis of endometrium and cervical canal, a nodal form of adenomyosis, anemia 2. At present the woman feels healthy: there are no protracted painful periods (earlier lasted up to 12 days, now - 3-4); no discharge in between periods which has led the patient to anemia (was 9%, now 12%). Gynecological examinations confirms that everything is normal except a uterus size which is equal to 5 weeks of pregnancy. Hence, the patient who was offered an operation - supravaginal amputation of uterus with appendages - has avoided surgery due to the Buteyko method and by this she was able to save the hormonal organ which is most important for women.

Part Three

USSR MINISTRY OF HEALTH

ORDER

30 April 1985 #591

MOSCOW

ON MEASURES OF IMPLEMENTATION OF THE DELIBERATE VOLITIONAL BREATHING METHOD FOR TREATING BRONCHIAL ASTHMA

In the last few years non-medicational therapy methods are used more and more often when treating patients suffering from bronchial asthma. Research, conducted by a number of scientific-research institutions have proved the effectiveness of the volitional breathing regulation method (invented by K. P. Buteyko, patent # 1067640 dated 15 September 1983, entitled "Method of treating hemihypocarbia") while treating for bronchial asthma conditions both adults and children in conjunction with the medicational and physiotherapeutic methods.

In order to develop further methods of non-medicational treatment of bronchial asthma and to implement the method of the deliberate volitional breathing method for treating ronchial asthma conditions, I hereby ORDER to:

1. The USSR Ministry of Health's First Moscow Medical Institution named after I. S. Setchenov (comrade Petrov V. I.) to continue studying the deliberate volitional breathing method for treating children and youth, suffering from bronchial asthma and to work out an instruction for the doctors and to submit it to the USSR Ministry of Health before the 1st of December 1985 for official consideration and approval.

2. The USSR Ministry of Health Central Scientific Research Institution for Tuberculoses (comrade Khomenko A. G.), All-Union Scientific Research Institution for Pulmanology (comrade Putov N. V.) and Medical Scientific Research Institution of the Russian Federation Ministry of Health (comrade Priymak A. A.), to carry out during the year of 1985 a research of the deliberate volitional breathing method for treating adults, suffering from bronchial asthma, to work out practical recommendations and to submit it to the USSR Ministry of Health before the 1st of January 1986 for official consideration and approval.

3. The Institute of Physiology and Pathology of Breathing of the Siberian branch of the USSR Academy of Medical Science (comrade Lutsenko M. T.), The Institute Clinical and Experimental Medicine of the Siberian branch of the USSR Academy of Medical Science (comrade Kaznacheev V. P.), The Institute of Therapy of the Siberian branch of the USSR Academy of Medical Science (comrade Nikitin Y. P.), to carry out in 1985-1986, a research studying the deliberate volitional breathing method and its effect on patients, suffering from different kind of internal organs pathologies, to work out practical recommendations and to submit it to the USSR Ministry of Health before the 1st of December 1987 for official consideration and approval.

4. The Medical Scientific Council of the USSR Ministry of Health (comrade Gavrilov O. K.) in collaboration with the USSR Ministry of Health Main Directorate for treatment-and-prophylactic of children and mothers (comrade Grebeshera I. I.) and the USSR Ministry of Health Main Directorate for treatment-and-prophylactic (comrade Moskvichev A. M.) to carry out a scientific-practical conference entitled "Non-medicational methods of treating bronchial asthma".

5. The Siberian branch of the USSR Academy of Medical Science (comrade- Borodin Y. I..) to apply prior to 15 June 1985 to the RSFSR Ministry of Health for additional financing for creating a group of researches with the status of scientific- medical centre with the main function of research studying the volitional breathing regulation method and its application to different pathologies.

6. The USSR Ministry of Health's 1st Moscow Medical Institution named after I. S. Setchenov (comrade Petroy V. I.) to apply prior to 1st of June 1985 to the USSR Ministry of Health for additional financing allocated to the Department of therapeutic physical exercises (Prof. Siluyanova V. A.) for further studying the deliberate volitional breathing method.

7. The Chairman of the All-Union Scientific-Technical Program 0.69.08 Coordinative Council (comrade Khomenko A. G.) to include prior to 1st of June 1985 into the Program for the 12th five year plan an additional program for further studying of non-medicational methods of treating bronchial asthma and the deliberate volitional breathing method.

8. The task of overseeing this Order is placed on the Medical Scientific Council of the USSR Ministry of Health (comrade Gavrilov O. K.), the USSR Ministry of Health Main Directorate for treatment-and-prophylactic of children and mothers (comrade Grebeshera I. I.) and the USSR Ministry of Health Main Directorate for treatment-and-prophylactic (comrade Moskvichev A. M.).

Minister S. Burenkov

The Ventilation Test For Patients With Bronchial Asthma

K. P. BUTEYKO,
M. P. ODINTZOVA,
N. S. NASONKINA

The influence of CO_2, contained in inhaled air, over the bronchial tension was shown in experiment on animals (Brown, 1885; Lore, 1924; Teanse, 1929; Peters, 1955, etc.). Lloyd (1963) discovered the negative dependency between the level of bronchostenosis and the CO_2 content in alveoli in healthy people.

Accordingly to a number of researchers, lung ventilation increases in asthma sufferers during acute periods (A. I. Dzuba, 1963; P. K. Bulatov, 1964 and others). The increase of lung ventilation along with unchanged basal metabolism should lead to the decrease of pCO_2 in alveoli. That is why we consider interesting the study of the bronchial tension dependency on a lung ventilation magnitude and a partial CO_2 pressure in alveoli (pCO_2A) in asthmatics.

44 patients with asthma have been checked during acute periods and in remission. They were 15 men and 29 women at the age from 10 to 70 years old suffering from asthma within 3 to 20 years.

They were asked to take part in a test of the volitional lung ventilation increase which lasted for 1-3 minutes until some of the negative symptoms emerged. Then the patients began to decrease the respiratory depth and rate until the negative symptoms disappeared. During the test the continuous recording of carbopneumogram (pCO_2A) and pneumotachogram were performed for 22 patients. (The carbopneumogram was recorded by the kapnograph "Godart"). Every 10 seconds we took measurements of pCO_2A, the rise per 1 sec. of pCO_2A by the kapnogram's alveolar plateau (ΔCO_2A mm of mercury/sec, which could produce a characteristics of the alveolar ventilation irregularity depended on bronchioli stenosis in separate fragments), respiration rate, respiration volume, breath volume per minute. Subjective symptoms and time of their appearance in all patients were also taken into consideration.

Breathing parameters	**Units of measurement**	**Initial Readings**	**Readings for hyperventilation**	**Readings for reduced ventilation**
Rate	cycles/min	16	22	13.5
Volume	litres	0.523	0.764	0.430
Volume per minute	litres/min	8.324	23.220	5.620
pCO_2A	mm Hg	36.3	26	29
ΔpCO_2A	mm Hg/s	5.9	6.4	4.84

Table 1 Dynamics of external breathing parameters and pCO_2A

The original data: pCO_2A=36.3 mm of mercury, respiration rate=16 per minute, respiratory volume=0.523 litre, breath volume per minute=8.324 litre/min, ΔCO_2A=5.9 mm of mercury/see.

As a result of hyperventilation (medium length of the test was 1 min 45 see.) pCO_2A decreased up to 26 mm of mercury, respiration rate increased up to 22 per minute, respiratory volume rose to 0.764 litre, breath volume per minute reached 23.22 litre/min., ΔCO_2A - 6.4 mm of mercury/see. In average, in 105 sec. after the beginning of hyperventilation 32 out of 44 patients showed some signs of bronchospasm (asphyxia, lung rales, shortness of breath, coughing). Apart from that, 11 patients had got headaches, 10 - dizziness, 5 - heart pain, 2 - tachycardia, 1 - fingers' numbness.

When the patients decreased their lung ventilation, pCO_2A rose to 29 mm of mercury, respiratory rate dropped to 13.5 per minute, respiratory volume altered to 0.43 litre, breath volume per minute - 5.62 litre/min, ΔCO_2A - 4.84 mm of mercury/sec. Those signs of bronchospasm disappeared in all patients on average in 105 sec.

Apart from above mentioned data, the bronchial resistance was measured in 18 patients. For this measurement the pneumotachgraph was used and the parameter was defined by the air flow stoppage at the high points of inhalation and exhalation. The bronchial tree resistance R was defined by the formula P/V, where P was the pressure in bronchi at the moment of the stoppage, V was the air movement speed at the same moment.

The crosscorrelative analysis was done (K. P. Buteyko, D. V. Demin, 1963) for each participant, showing the interdependence between pCO_2A and ΔCO_2A mm of mercury/sec. on one hand and R at the inhalation and exhalation on the other hand.

Crosscorrelation between pCO_2A and R at the inhalation was calculated for 11 patients. Four of them demonstrated the positive correlation. The average correlation factor (r) was equal to 0.67 (from 0.32 to 0.75), the time of bronchial resistance reaction in response to the CO_2 change (t) was equal on average to 45 sec. (from 30 to 70 sec.). The negative correlation was found in six patients: r= -0.49 (from -0.36 to -0.8), t=73 sec. (from 20 to 210 sec.). One patient did not show any clear correlation.

Crosscorrelation between pCO_2A and R at the exhalation was calculated for 17 patients. Nine of them demonstrated the positive correlation: r=0.53 (from 0.11 to 0.87); t=57.7 sec. (from 20 to 120 sec.). The negative correlation was found in eight patients: r= -0.4 (from -0.08 to 0.89), t=98.7 sec. (from 30 to 220 see.).

Crosscorrelation between CO_2A and ΔCO_2A was calculated for 16 people. Six of them demonstrated the positive correlation: r=0.5 (from 0.15 to 0.78), t=75 sec. (from 20 to 230 see.). The negative correlation was: found in nine patients: r= -.043 (from -0.16 to -0.92), t=44.4 sec. (from 20 to 90 sec.). Two patients did not show any correlation.

Therefore, hyperventilation, responsible for the decrease of pCO_2 in alveoli, has led to the increase of irregularities in lung ventilation (ΔCO_2A) and to the development of some signs of bronchospasm in the majority of patients. When lung ventilation began to decrease, those irregularities (ΔCO_2A) in all patients also went down and bronchospasm symptoms, emerging during hyperventilation, disappeared.

In the majority of patients (6 against 9) a clear negative correlation was shown between pCO_2A and R (bronchial tree resistance) at the inhalation, and also between the level of irregularity in ventilation (ΔCO_2A) and pCO_2A (in 10 out of 15 patients). That confirmed that bronchospasm was growing in the majority of patients when pCO_2A was falling during hyperventilation.

Conclusion:

1. By reducing pCO_2 in alveolar air, hyperventilation in patients with acute asthma period causes irregularities in alveolar ventilation and bronchospasm -for the majority of patients.

2. The decrease of lung ventilation reduces irregularities in alveolar ventilation and assists in elimination of bronchospasm symptoms occurring due to hyperventilation.

3. In the majority of patients with clear crosscorrelation the negative dependency between the CO_2 partial pressure level in alveoli and the bronchial tree resistance at inhalation as well as between the CO_2 partial pressure level in alveoli and irregularities of lung ventilation (ΔCO_2A) were found.

M. P. ODINTZOVA

The influence of the CO_2 partial pressure in alveolar air on the peripheral arteries tension in patients with coronary insufficiency and hypertension

Numerous researchs show that the arterial vascular tension depends on the CO_2 partial pressure in the alveolar air and arterial blood. It was noticed long ago not only by physiologists but also by clinicists (L. F. Dmitrienko, 1933; D. L. Shtivel, 1941; Z. S. Barkagan, 1050, etc.).

Changes in the CO_2 partial pressure in the alveolar air (pCO_2A) and arterial blood can trigger various reactions in arterial vessels depending on the location of the affected area as well as on the metabolism intensity in the studying organ or tissue.

Both direct and reflex influence of the higher CO_2 concentration upon the vasomotoric centre increases its activity that leads to the peripheral arteries' stenosis and to the rise of arterial blood pressure (L. Thiry, 1964; G. C. Mathison, 1911; S. Itami, 1912; A. M. Blinova, K. E. Serebryanik, 1948; N. V. Sanotzkaya, 1961, 1962, etc.). By the local influence upon the vascular walls of arteries their expansion occur (L. Severini, 1848; W. M. Bayliss, 1893; A. Fleisch, 1918; V. S. Brandgendler, 1927, etc.).

The final effect in the integral organism depends on what kind of the influence predominates — central or local. In organs with more intensive metabolism the central vasodilative effect appears to be weak and mainly the local vasodilatory reaction is observed {A. M. Blinova, K. E. Serebryanik, 1948; L. S. Gkodman, A. G. LLman, 1955; M. E. Marshak, 1959). Brain and hearts vessels submit to the central vasoconstrictive CO_2 influence less of all other organs (H. Price, 1960; A. M. Blinova, N. M. Ryzhova, 1961). Such an influence is stronger for kidney vessels, and the strongest - for skin and especially muscle vessels.

It is likely that the vessels' caliber also plays an important role. It was shown (B. Folkow, 1955; I. D. Gedevanishvili, 1962, 1964) that the local regulation is definitely involved in smaller arteries and arterioli tension maintenance.

The prevalence of central or local CO_2 influence depends also on CO_2 concentration, the speed of its accumulation and a period of influence. For instance, the inhalation of CO_2 with rather high concentration (higher than pCO_2 in the alveolar air and arterial blood) should produce the central

vasoconstrictive effect especially if that influence was brief. When CO_2 is rising slowly and the period of its influence is long enough, the local effects prevail over central ones and the general vascular resistance tends to be reduced (W. G. Lennox, E. L. Gibbs, 1932; D. A. Abramson, 1944; H. Price, 1960, etc.). In this case the ability of vasomotoric centre to adapt to the gradually rising CO_2 concentration is playing seemingly a significant role (A. V. Rikkl, 1961).

In experiments on animals and research on people were shown that CO_2 concentration in inhaled air and in the perfusing solution was increasing as a rule promptly (the system with higher CO_2 concentration was joining in instantly). Also the CO_2 concentration itself was very high like never seen in normal physiological conditions (more than 7-8%), and that greatly exceeded the CO_2 partial pressure in alveolar air and arterial blood. Such conditions produced often the central vasoconstrictive effect which prevailed over the local vasodilatory effect. Obviously by the smooth and slow increase of CO_2 in inhaled air and arterial blood it would be possible to adapt the vasomotoric centre to CO_2 and to decrease the arterial vessels' tension.

The decrease of the CO_2 content in alveolar air and arterial blood occurring due to hyperventilation leads to the increase of the arterial vessels tension and aggravates blood circulation and the brain, heart, kidney and skin oxygenation (F. Henderson, 1907; H. H. Dale, C. L. Evans, 1922; C. F. Schmidt, 1934; E. L. Gidds et al, 1942; S. W. Stanbury et al, 1952; K. Supioca et al, 1960; N. V. Sanotzkaya, 1964, 1966; M. Locket, 1967, etc.). The significant hyperventilation is followed by the arterial pressure fall due to the decrease of the vasomotoric centre activity (A. Ewald, 1873; J. Henderson, 1907; H. H. Dale et al, 1922, etc.).

The increase of CO_2 in arterial blood intensifies vasodilatory reflexes and suppresses vasoconstrictive ones. Hyperventilation influences in opposite way (A. M. Blinova, 1957).

As the influence of CO_2 on the vascular tension has been proven, it makes interesting to observe the influence of CO_2 on blood vessels in people suffering from illnesses accompanied by the vascular tension distortions, in particular, in those with hypertension and atherosclerotic coronarocardiosclerosis complicated with coronary insufficiency symptoms.

In accordance to some authors, about 12% people at the age after 30 suffer and die from atherosclerosis while hypertension is reaching 50% among the "fifty plus" group of the population (I. V. Davydovsky, 1956). M. Plotz, 1957, established that atherosclerosis and hypertension all together were responsible for 312.6 death cases against 100,000 people per annum.

It is typical for hypertension to intensify tonic contractions in major arteries and their tendency to spastic reactions (I. Pal, 1922; L. I. Myasnikov, 1925; G. F. Lang, 1928, 1944, 1945; E. I. Tareev, 1948; Y. U. Schpirt, 1948, 1950; L. F. Dmitrenko, 1949; B. Y. Agronovich et al, 1950, etc.). In patients with coronary insufficiency symptoms those reactions are limited mainly by coronary vessels, although the tendency to general pressure reactions in response to various stimulants was observed (G. A. Gleser, 1955, 1957; R. M. Zaslavskaya, 1956).

At the same time, in accordance to numerous researchers, in such patients were noticed the intensification of lung ventilation and the decrease of pCO_2 in alveoli and arterial blood. For instance, as N. S. Zanozdra (1951), A. E. Frolkis (1951), N. I. Ekisenina (1955), F. N. Primak (1952) pointed out, from the very beginning of hypertension some shortness of breath and the lung ventilation increase could be seen. Those shortness of breath and the lung ventilation increase were often not followed by coronary insufficiency symptoms (A. E. Frolkis, 1951). Some authors

explained those symptoms could appear due to the central distortion of the respiratory regulation (A. E. Frolkis, 195 1), respiratory centre dysfunction (F. N. Primak, 1952), or its hypersensitivity to CO_2 (N. I. Ekisenina, 1955). The lung ventilation increase could lead, with the progress of the disease, to the CO_2 decrease in inhaled and alveolar air (V. P. Bezugly, 1951, 1952; N. S. Zanozdra, 1952, 1958; F. N. Primak, 1952) as well as in arterial blood (G. S. Aysen, 1951; N. S. Zanozdra, 1952), especially in the disease at its 3rd stage (T. I. Mazurenko, 1956; G. P. Zhivotova, 1959).

In patients with coronary insufficiency symptoms also were recorded some shortness of breath and a feeling of the lack of air (M. Plotz, 1957; N. H. Grigoryan, 1962), quickening and change of rhythm and nature of breathing, and the lung ventilation increase (N. H. Grigoryan, 1962).

Arteries' hypertonus in patients with hypertension and coronary insufficiency symptoms as well as hyperventilation along with the decrease of pCO_2 in alveoli and arterial blood, discovered by many researchers, make advisable to study the influence of alterations in CO_2 partial pressure in alveolar air (and, consequently, in arterial blood) on the vascular tonus in above mentioned categories of patients. It would be of interest to conduct the research, in which CO_2 in alveoli would be changed as slow as possible — within the parameters close to the physiological ones.

The objective of the current work was to study arterial vessels reactions in response to the changes of CO_2 partial pressure in alveolar air in patients with hypertension and atherosclerotic coronarocardiosclerosis accompanied by coronary insufficiency symptoms under conditions as similar as possible to real physiological conditions.

METHODS OF RESEARCH

For this research we have chosen the methods not producing in patients any pain or fear as they could have influenced on the nature of the vascular reactions.

The recording of CO_2 content in inhaled and alveolar air was carried out continuously by the infrared gasoanalyser- kapnograph "Godart".

We can estimate the dynamics of CO_2 changes in arterial blood by the dynamics of CO_2 in alveolar air as, in accordance to numerous researchers, the CO_2 partial pressure almost the same in alveoli and in arterial blood (J. P. Peters et al 1921; J. Campbell et al, 1920; R. L. Riley et al, 1964, etc.). Numerous parallel measurements of the CO_2 content in alveolar air by the infrared analysis and in arterial blood by the direct estimation have shown the satisfactory coincidence of results. The discrepancy does not exceed 0.34±2.85 mm of mercury (A. Koziorowski et al, 1962) or 0.9±1.8 mm of mercury (C. R. Collier et al, 1955).

The content of oxygen in inhaled air was controlled visually by the analyser "Oxymat" ("Godart")/

Vessels' tonus changes were observed with the aid of:

a) the plethysmogram registered from the second, third and fourth right hand fingers by the piezoelectric sensors "Elema". The pulsative waves of plethysmogram - waves of the 1st order - were recorded;

b) the arterial oscillogram registered at compression and decompression every 2 minutes by the Buteyko oscillograph (Oscillatory index, maximal, side systolic, average dynamic and minimal arterial pressure were defined);

One can not compare the size of the pulsative waves of the plethysmograms and the oscillatory index in different people as they depend on many factor such as systoli, cardiac output, circulated blood volume, specific features of soft tissue where the sensor was applied, and the way that it was done. However, the task could be made much easier if the research conducted with one patient when the sensor was in use continuously within the not very long period. In that case the changes of the pulsative waves magnitude in plethysmogram and the oscillatory index would depend mainly on magnitude of systolic output, pulse rate and peripheral vessels condition. The decrease of pulsative waves and oscillatory index - while other things being equal (constancy of pulse rate, arterial pressure and especially pulse pressure) - would be caused by the increase of the arterial vessel tonus, and the increase of pulsative Waves and oscillatory index - by the decrease of the arterial vessel tonus (M.. V. Kudenko, 1947; S. M. Markuse, 1950; L. D. Karpilovsky, 1956; M. G. Yanovitzky, 1958, 1959; V. V. Orlov, 1961, et al).

We measured plethysmogram amplitude and oscillatory index (OI) in relative units where the initial magnitude was defined as 100%.

Apart from those data, we observed conditions of our experiments' participants by recording:

a) the oxyhemogram using the ear sensor and oxymeter "Elema" for monitoring of changes in the level of O_2 saturation in arterial blood;

b) the electrocardiogram in 3 standard, 3 intensified from limbs and 6 chest leads at "Mingograph" V-42, "Elema" (data were registered every 2 minutes);

c) the pneumotachogram to monitor changes in lung ventilation registered by the pneumotachographic box, tensiometer and "Elema" amplifier.

Tests were conducted in the morning, in 2-3 hours after meals. The participant spent 30 minutes resting in the horizontal position, then 10-12 minutes before the experiment sensors were applied and the closed system was connected. That was done in order to allow the participant to get used to the situation. Then the participant was asked to breathe through the mouthpiece of the pneumotachograph. When a pulse, breathing and arterial pressure appeared to get stabilized, initial test data were registered.

The pCO_2 changes in alveoli were achieved by the following modes:

a) by inhaled of CO_2 in smaller concentrations (average partial pressure was 18.5 mm of mercury). At this stage the CO_2 content in the inhaled air was rising with a speed of 3.6 mm of mercury/min., while pCO_2 in alveoli was increasing with a speed of 1.8 mm of mercury/min. Such a smooth gradual increase of pCO_2 in inhaled and alveolar air pursued to reduce a centrogenic CO_2 influence on vessels as, by A. V. Rikkl (1961), the vasomotoric centre has a capacity to adapt well to gradually increasing CO_2 concentration. Possibly, vascular channel receptors are also adaptable to CO_2;

b) by increasing of hyperventilation when pCO_2A was decreasing gradually with a speed of about 2.8 mm of mercury/min., what was monitored by the CO_2 gasoanalyser. Straight after finishing the hyperventilation test the patients were asked to change a breathing pattern to a shallow sparse

breathing (hypoventilation) in order to eliminate negative reactions which could have appeared during hyperventilation.

During the latter test patients were breathing, through a mouthpiece of the pneumotachograph, atmospheric air. Changes of CO_2 content throughout the whole test were very similar to those physiological changes which naturally occur in the organism. Every test lasted until the vascular reaction became stable (monitored by the plethysmogram and OI. An average time for the tests was: with CO_2 inhalation 7.5 min., with hyperventilation 5 min. An average time for the smooth alteration from hyper- to hypoventilation was 6 min. The test with hyperventilation with the consequent decrease of ventilation was repeated in a few minutes of resting for the part of the participants.

The collected data were mathematically processed by the computer at the Siberian branch of the Academy of Science, USSR...

RESULTS

112 patients at the age from 29 to 72, were subjected to testing.

First group (45 people, with normal blood pressure). The nosological. group structure: angioneurosis with coronary arteries spasm symptoms - 8; atherosclerotic coronarocardiosclerosis with chronic coronary insufficiency symptoms -37.

Second group (67 people, with hypertension). The nosological group structure: hypertension, 1 and 2A stages - 21; hypertension, 2B and 3 stages, atherosclerotic coronarocardiosclerosis with chronic coronary insufficiency symptoms -46.

The initial parameters and its dynamics during the whole research period can be found in Tables 1 and 2.

Measured Parameters	Units	**Initial readings** χ±	Readings of CO_2			Hyperventilation					Reduction in ventilation				
			χ±	Compared to initial reading		χ±	Compared to initial reading		Compared to CO_2		χ±	Compared to initial reading		Compared to hyper-ventilation	
				Ä	ñ		Ä	ñ	Ä	ñ		Ä	ñ	Ä	ñ
pCO_2A	mmHg	42.0±0.84	44.3±0.56	+2.3	>0.98	31.2±0.85	-10.8	>0.999	-13.1	>0.999	40.6±0.78	-1.4	<0.9	+9.4	>0.999
HBO_2 in arterial blood	%	96±0.07	96.6±0.41	+6	<0.9	95.9±0.34	-0.1	<0.9	-0.7	<0.9	94.3±0.39	-1.7	>0.999	-1.6	>0.999
Pulse Rate	cyc./min	71±1.6	69±1.6	-2	<0.9	73±1.8	+2	>0.999	+4	>0.999	69±1.7	-2	<0.9	-4	<0.9
Pulse wave amplitude (plethysmogram)	%	100	125±9.46	+25	>0.99	69±2.9	-31		-56		132±9.52	+32	>0.999	+63	>0.999
Arterial Pressure:	mmHg														
minimum		76±1.3	78±2.4	+2	<0.9	78±1.7	+2	<0.9	n/a	<0.9	80±1.3	+4	>0.95	+2	<0.9
average dynamic		96±1.6	98±2.1	+2	<0.9	98±1.5	+2	<0.9	n/a	<0.9	98±1.5	+2	<0.9	n/a	<0.9
side, systolic		116±1.8	117±2.2	+1	<0.9	119±1.7	+3	<0.9	+2	<0.9	119±1.7	+3	<0.9	n/a	<0.9
maximum		129±1.8	132±2.4	+3	<0.9	130±1.7	+1	<0.9	-2	<0.9	132±1.8	+3	<0.9	+2	<0.9
pulse	per min	54±2.5	54±2.2	n/a	<0.9	52±1.4	-2	<0.9	-2	<0.9	53±1.8	-1	<0.9	+1	<0.9
Oscillation Index	%	100	98±2.3	-2	<0.9	91±2.0	-9	>0.999	-7	>0.999	95±2.3	-5	>0.95	+4	<0.9

Table 1 Dynamics of parameters during the whole research period for persons from **Group 1**
Symbols: χ – average; -error; Ä – discrepancy between compared numbers; ñ – probability that difference exists

Measured Parameters	Units	**Initial readings** χ±	Readings of CO_2			Hyperventilation					Reduction in ventilation				
			χ±	Compared to initial reading		χ±	Compared to initial reading		Compared to CO_2		χ±	Compared to initial reading		Compared to hyper-ventilation	
				Ä	ñ		Ä	ñ	Ä	ñ		Ä	ñ	Ä	ñ
pCO_2A	mmHg	39.2±0.98	43.5±0.8	+4.3	>0.999	28.2±0.71	-11	>0.999	-15.3	>0.999	39.2±0.78	n/a	>0.999	+11.0	>0.999
HBO_2 in arterial blood	%	96±,0.07	96.0±0.38	n/a	<0.9	95.6±0.29	-0.4	<0.9	-0.4	<0.9	93.8±0.35	-2.2	<0.9	-1.8	>0.998
Pulse Rate	cyc./min	72±1.4	72±2.5	n/a	<0.9	71±1.7	-1	<0.9	-1	<0.9	70±1.5	-2	<0.9	-1	<0.9
Pulse wave amplitude (plethysmogram)	%	100	123±3.59	+23	>0.99	74±3.2	-26	>0.999	-49	>0.999	126±6.1	+26	>0.999	+50	>0.999
Arterial Pressure:	mmHg														
minimum		96±2.6	96±2.6	-3	<0.9	98±1.4	-1	<0.9	+2	<0.9	96±1.6	-3	>0.9	-2	<0.9
average dynamic		121±1.6	118±2.7	-3	<0.9	118±1.7	-3	<0.9	n/a	<0.9	119±1.6	-2	<0.9	+1	<0.9
side, systolic		145±2.3	142±2.8	-3	<0.9	139±2.5	-6	>0.9	-3	<0.9	142±2.7	-3	<0.9	+3	<0.9
maximum		160±3.7	151±2.4	-9	>0.95	157±3.3	-3	<0.9	+6	<0.9	159±3.4	-1	<0.9	-1	<0.9
pulse	per min	63±2.9	58±2.2	-5	<0.9	58±2.2	-5	<0.9	n/a	<0.9	57±2.6	-6	<0.9	-1	<0.9
Oscillation Index	%	100	100±2.9	n/a	<0.9	96±1.9	-4	>0.95	-4	>0.9	98±1.7	-2	>0.9	+2	<0.9

Table 1 Dynamics of parameters during the whole research period for persons from **Group 2**
Symbols: χ – average; -error; Ä – discrepancy between compared numbers; ñ – probability that difference exists

While exploring the initial parameters, the significant discrepancy in pCO_2 in alveolar air was found: in the first group pCO_2 was 2.8 mm of mercury higher than in the second group. Positive correlation between arterial pressure (peripheral systolic, maximal and pulsative) and the age was shown as well as negative correlation between arterial pressure (minimal and medium dynamic) and pCO_2 in alveoli. Therefore, the magnitude of minimal and medium dynamic arterial pressure might be partly caused by the level of pCO_2 in alveoli...

Conclusion:

1. When the partial pressure of CO_2 in alveolar air decreases due to hyperventilation, in patients with coronary insufficiency and hypertension the increase of peripheral arteries' tonus occurs.

2. When the partial pressure of CO_2 in alveolar air increases smoothly due to inhalation of a gaseous mixture with a higher CO_2 content or as a result of hypoventilation, in patients with coronary insufficiency and hypertension the decrease of peripheral arteries' tonus occurs.

3. Above mentioned changes of vascular tonus are seemingly caused mainly by corresponding changes of the partial pressure of CO_2 in alveolar air.

4. Positive correlation between CO_2 in alveolar air and an amplitude of pulsative waves in plethysmogram during the hyperventilation and by combined regimes (CO_2 inhalation - hyperventilation, hyperventilation - decrease of ventilation) was established. Therefore, the quantitative estimation of the peripheral tonus dependency on the partial pressure of CO_2, in alveolar air magnitude was obtained.

5. With the decrease of the partial pressure of CO_2 in alveolar air, ECG irregularities indicating the increase of myocardium hypoxia, were discovered in some of the participants. Those patients had got negative subjective symptoms (dizziness, unpleasant sensations in a heart region).

6. As a response to the increase of the partial pressure of CO_2 in alveolar air occurring due to CO_2 inhalation or the decrease of lung ventilation, ECG irregularities indicating the decrease of myocardium hypoxia, were discovered in some of the participants. Simultaneously, all negative subjective symptoms, caused by the decrease of CO_2 in alveolar air due to hyperventilation, disappeared completely.

7. Negative correlation between the partial pressure of CO_2 in alveolar air and minimal and medium dynamic arterial pressure were established for all 112 participants.

8. There were the average "critical" levels of pCO_2 in alveolar air defined in which the change of small peripheral arteries' tonus occurred. The average "critical" level of pCO_2 was: for the test with the CO_2 inhalation - 42.1 ± 0.16 mm of mercury, for the hyperventilation test - 31.7 ± 0.1, for the test with the decrease of lung ventilation - 38.5 ± 0.1 mm of mercury.

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