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OXYGEN HEALTH SCREENING
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OXYGEN REJUVENATION PROGRAMME

OXYRICH WATER SPRAYS AND DROPS FOR COMPLEMENTARY HYDRATION AND OXYGENATION DURING LONG HAUL FLIGHTS

DR. C.K. VESSELINOVA-JENKINS

SUMMARY

For centuries mankind has been searching for alternative routes and ways to secure more oxygen for maintenance of life in oxygen deprived circumstances. The space missions have helped in improving the body oxygenation to new limits.

The demand of travel by air is increasing and considering the advantages of saving time by air travel this method of transport is second to none at present. However there are two major considerations that the air companies are striving continuously to improve:

To reduce dehydration and improve oxygenation in the passengers cabin.

The adverse effect of high altitude has been recognised in 32-7 BC and some mountains were named the "Great Headache and the Little Headache" mountains.

Paul Bert, the father of altitude physiology stated that breathing air in conditions of reduced barometric pressure as at altitude was associated with hypoxia (lack of oxygen). Breathing supplementary oxygen in these circumstances restored body functions.

Taking oxygen from the water and air has been changing for millions of years.

The human body has adapted itself to take its oxygen mainly from the air and the life itself depends on the oxygen supply via the lungs.

It is possible to rediscover the potential of some old channels utilized by the Animal Kingdom in the fight for survival in poor oxygen environment.

SUMMARY LONG HAUL FLIGHT SUPPLEMENTS
DR. C.K. VESSELINOVA-JENKINS
AUGUST 2001

An engineer from N.A.S.A. developed a new oxygen stabilizing process using high technology electrolysis (decomposition) of water into its constituent molecular elements.

The solution is the first stabilized oxygen supplement with a near neutral pH.

Such stabilized oxyrich water is in fact a saline. Atlantic Salt is added to the water and the product is formed by passing an electric current through demineralised water to generate bioavailable, stabilised dissolved oxygen.

Oxyrich water skin sprays and drops diluted in water or fruit juice are safe natural products to be used during travelling to high Altitude Mountains or during flights. These products can help in the circumstances of a mild hypobaric hypoxia.

IT IS TIME to appreciate the importance of the insensible water loss from the skin in the form of vapour, which is insensible, invisible, intangible but quantifiable.

Supplementary hydration and oxygenation with oxyrich water sprays and oxyrich water drops all in one is a simple and cost effective approach towards further improvement in the cabin environment.

In some of the adverse effects reported lately concerning DVT associated with long haul flights the role of the dehydration and the hypoxia leading to increased viscosity of the blood must be appreciated as another important factor increasing the proneness to this condition.

The oxyrich water sprays and oxyrich water drops are safe and should be added to personal travel necessities.

I wish to publish a review article with this extended presentation of leading articles and my own studies. I intend to supply some evidence and awareness of the dehydration and hypoxia at high altitude. I wish to publish a review article on the subject of supplying the body with oxygen using oxyrich water. I would be happy to show my references wherever necessary but until publication these references will remain confidential.

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OXY-TRAVEL CLINIC

OXYRICH WATER SPRAYS AND DROPS FOR COMPLEMENTARY HYDRATION AND OXYGENATION DURING LONG HAUL FLIGHTS

DR C.K. VESSELINOVA-JENKINS

INTRODUTION

The first documented description of mountain sickness is considered to have been made by "a Chinese official envoy during the time of Emperor Ching-te (32-7 BC) mentioned in his travel notes that on passing the Great headache mountain, the Little headache mountain, the Red Land and the Fever Slope, men's bodies become feverish, they lose colour and are attacked by headaches and vomiting; the asses and cattle being all in like condition." (1)

The physiological problems of altitude are due mainly to hypoxia and cold. With gain in altitude there is reduction in atmospheric and oxygen pressures. The composition of the atmosphere is constant up to an altitude of 11 kilometres. Paul Bert, the father of altitude physiology, was the first to conduct experiments in a decompression chamber and increased barometric pressure in humans and small animals. He stated that breathing air in conditions of reduced barometric pressure as at altitude was associated with hypoxia. Breathing supplementary oxygen under these circumstances restored body functions.

The oxygen concentration in dry air is approximately 20.94% and it is constant up to an altitude of 11 km. The standard atmospheric pressure at sea level is 760 mm Hg at a temperature of + 15°C. A linear decrease in temperature at altitude is observed (laps rate) of 6.5°C km-1. The effects of water vapour on the inspired PO_2 become increasingly important at higher altitudes. The inspired air after being moistened and warmed into the upper bronchial tree becomes saturated with water vapour of 47 mm Hg pressure at 37°C, which is 6% of the total barometric pressure at sea level. The water vapour is independent of altitude, which means that on summit of Mount Everest where the barometric pressure is about 250 mm Hg the water vapour pressure is nearly 19% of the total pressure and the inhaled PO_2 is correspondingly reduced (1). The absolute humidity (the amount of water vapour per unit volume of gas at the prevailing temperature) is extremely low at high altitude because the water vapour pressure is depressed at the reduced temperature. The water vapour pressure at +20° is 17 mm Hg but only 1 mm Hg at –20°C.

Proprietor: The Nikolai Sleep Monitoring Clinic Ltd
REGISTERED NO. 1903744 ENGLAND/WALES. REGISTERED OFFICE: 3 CASTLEGATE, GRANTHAM, LINCOLNSHIRE NG31 6SF

The very low absolute humidity at high altitude causes dehydration. First the insensible water loss caused by ventilation is greater because of the inspired air quality. In addition, the levels of ventilation may be very high, in particular during exercise, which would increase the water loss further. The dehydration resulting from the rapid fluid losses does not produce as strong a sensation of thirst as at a sea level. At an altitude of 6,300m the serum osmolality was found to be significantly increased due to chronic volume depletion. High altitude expedition studies provided evidence for diffusion limitations of oxygen transfer in the lungs at high altitude, with a maximum pulmonary diffusing capacity for oxygen of about 60ml min, 1 mm Hg – 1. Adding oxygen to the ventilation of a room air present the possibility of elimination of hypoxia of high altitude (2). Commercial air travel exposes passengers to hypobaric hypoxia, which can produce significant symptoms for passengers with existing cardio-pulmonary diseases. While the aeroplane ascends, barometric pressure falls, resulting in lower cabin pressure and decreased partial oxygen pressure (PO_2).

Commercial airlines are pressurised mechanically in that the cabin pressure remains higher than the outside atmospheric pressure. At normal cruising altitudes (30,000 to 40,000 ft above sea level) the cabin is kept at a pressure equivalent to 5,000 – 8,000 ft above sea level. Cabin pressures usually range from 565 mm to 690 mm Hg (just under 3,000 m). At such cabin pressures the partial oxygen pressure in the arterial blood (P_aO_2) of normal healthy passengers will drop from approximately 100 mm Hg at sea level to 55-58 mm Hg. A passenger with arterial partial pressure (P_aO_2) of 60 mm Hg at sea level may have an oxyhemoglobin saturation of 90% but since PO_2 decreases with altitude the saturation may drop to 70% at 5,000 ft above sea level (3, 4, 5).

Most healthy travellers tolerate the decrease in P_aO_2 during flight. However a significant hypoxemia and oxyhemoglobin desaturation can develop in passengers with cardiac and respiratory disease, in particular passengers with severe respiratory diseases who are hypoxemic (reduced oxygen in the blood) at ground level as well as those with milder illnesses who become significantly hypoxemic when exposed to the lower PO_2 that occur during air travel and who are unable to exhibit a compensatory tachycardia and tachypnoea (increased heart and respiration rate) for restoration of adequate oxyhemoglobin saturation and oxygen delivery). (5)

Physical exertion, hypoventilation during sleep, drying of respiratory secretions due to low cabin humidity, alcohol consumption effect, sedatives and other medication can worsen the situation. A severe degree of hypoxia can result in headache, nausea, insomnia, and change in the respiratory pattern. The decrease in atmospheric pressure experienced during flight also results in decreased gas density and thus increased gas volume with subsequent middle ear discomfort and abdominal distension. With special arrangements prior to travel and on medical recommendation, some passengers can obtain supplemental oxygen provided during flight. (3, 5, 5A). In-flight personal compressed oxygen systems or canisters are not allowed on board for passenger safety protection.

Japanese scientists utilised a special protocol for evaluation of skin insensible water loss during hyperbaric exposure in humans. They reported that insensible water loss from the skin was reduced in a reciprocal manner with the increase in atmospheric pressure. During the decompression period (moving toward sea level), the rate of the body weight loss increased slowly until the pressure reached ~ 6 atm. abs. and then the rate of body weight loss increased steeply. The water loss from the respiratory tract was almost independent of the pressure and the weight loss from the respiratory tract due to CO_2 expiration and O_2 inspiration was constant (~4g m-2 h-1). Therefore, essentially all of the pressure dependent change in body weight was accounted for by the change in the insensible water loss from the skin.

Insensible water loss is the discharged water in the form of vapour so that it is insensible, invisible, intangible but quantifiable. Insensible water loss from the skin at normal atmospheric abs pressure was reported to be 15.3 + -0.9g.m. – 2.h-2 and it was reduced to 4.2 g.m.-2.h-1 ($p = 0.05$) during saturation period at 18.4 atm.abs. During the high altitude decompression with reduction of the atmospheric pressure, the insensible water loss from the skin would increase further well above the values noted at normal atmospheric pressure (6). Low cabin humidity (10% to 20%) can lead to drying of the cornea and the skin (7). Altitude decompression sickness is the result of inert gas (nitrogen) evolving from tissues during the exposure to reduced atmospheric pressure, which is treated by ground level 100% oxygen or hyperbaric oxygen (8).

Supplementary hydration and oxygenation of the skin and the body during flight utilising the "natural" evolutionary the oldest routes – the skin and the digestive system would have beneficial effect in assisting any possible existing mild hypoxia during routine flights.

About 140 million people live at altitudes above 2,500 m world-wide (WHO 1996) and each year around 40 million travel to similar altitudes. Almost 600 million passengers travelled aboard US airways and this number is expected to continue to rise. Improved airline accommodation would allow more passengers with chronic or serious medical problems to travel by air and the health facilities on board are improving (7).

The physiological effects of the environment in modern commercial passenger aircraft were described over 30 years ago with reference to the reduced atmospheric pressure of the cabin at normal cruising altitudes and the mild degree of hypoxia experienced by passengers on routine flights. It was stated that the mild hypoxia experienced by passengers travelling in modern aircraft being harmless to the healthy passenger, may have an adverse affect to those with pre-existing impairment of their cardiovascular systems.

Commercial airlines are well aware of the dangers of hypoxia to invalid passengers and all aircrafts have emergency oxygen supplies (9, 10).

The air travel factors associated with mild hypoxia, dehydration, physical and mental stress and immobility could have more pronounced effect on patients with heart

conditions. These factors could be more detrimental in patients with a history of recent unstable coronary syndrome. (11). Medical guidelines are available to help physicians evaluate and counsel potential passengers who are at increased risk of in-flight hypoxemia.

Supplemental oxygen may be needed for some passengers to maintain adequate tissue oxygenation and prevent hypoxemic complication (5). In the majority of the larger airlines there are specialist medical officers who have a great deal of experience in problems of the carriage of invalids by air and there is a department which deals with the care and transport of invalid passengers by air. Applications to the airline concerned would involve completing a questionnaire with subsequent provision of special services for the passenger being arranged in advance covering the entire flight. (12)

INTRALUMINAL OXYGENATION OF THE GUT VIA PERFUSION WITH OXYGENATED SALINE, OXYGENATED PERFLUORO-CHEMICALS OR BY DIRECT SUPPLY OF GASEOUS OXYGEN

It has taken centuries of investigations to understand a simple phenomenon of nature and to demonstrate that the intestinal "gas" comes mainly from swallowed air and from the metabolic activity of the gut mucous. It has also been long established that swallowed air "becomes" mostly nitrogen since the oxygen disappears from the bowel because it is consumed by the mucous and that carbon dioxide appears in the intestinal lumen during digestion (13, 14, 15). Filling the gut with oxygen - depleted air might be equally disadvantageous as filling the lung with nitrogen. A species of fish Cobitis Fossilis survives in brackish, stagnant water where others cannot because there is insufficient dissolved oxygen in the water. It adapts by swallowing a bolus of air at the surface, submerging, and having agitated the swallowed air with its intestinal secretions, absorbs the oxygen dissolved in the fluid which is reabsorbed via the mucous. This suggests a role for swallowed air in normal bowel function. Absence of normal bowel aeration is likely to cause bowel dysfunction. Cobitis Fossilis gulps in air at pond surfaces because there is insufficient water movement to dissolve enough oxygen – because the pool is unstirred. In order to satisfy its oxygen demand the fish adapts by creating intense gut peristaltic work on the contained air and fluid and it reabsorbs its reoxygenated intestinal secretions and procures a significant part of its body oxygen needs. It is not suggested that warm-blooded animals can supply much of their total oxygen needs by this means, but they might very well supply the needs of the intestinal epithelial and liver cells in this way (15).

The lungs are outpouchings of the intestinal tract (16) derived from and are intimately associated with the pharynx. The lungs are water lined like the intestine of Cobitis Fossilis and other fish which gulp at the surface of ponds and goldfish bowls.

"The lung of warm blooded animals may therefore be considered as a specialised intestine and the intestine contrariwise as a quasilung" (15)

During experimental bowel inflation it has been observed that there was an increased venous oxygen tension and reduced arterial-venous oxygen difference. (13, 14)

The most reasonable explanation provided was that there was an increased uptake of oxygen via the mucous directly increasing the venous PO_2. The gut appearance was observed to be pink despite a greatly reduced blood flow (at 180 mm Hg intraluminal pressure). An increased oxygen uptake via the mucous accords better with a pink bowel. A further study including injected gaseous oxygen into the intestines of rats whose superior mesenteric arteries were clamped it was observed that the blue bowel became pink after the injection of oxygen. The gut peristalsis recommenced and the venous blood became bright red again. The resumption of muscular activity following intraluminal oxygen administration must mean that the oxygen moves "out" to the muscle layer from the mucous, which in turn must mean that the whole gut tissue may be oxygenated from the lumen and the liver via the portal blood flow. It was concluded that the arterial-venous difference is reduced because oxygen is absorbed from the lumen into the effluent venous blood of the air-inflated intestine (15, 17). Concerning the oxygen supply to the tissues it is a fact that not all tissues are provided with oxygen via the lung and circulation.

Tissues which are as close to fresh air as the lung alveoli such as the cornea has no capillary blood supply and its oxygen supply is continuously provided from the atmosphere by diffusion into tears constantly agitated by the blinking eyelids (15). There is evidence that the skin also procures oxygen direct from the atmosphere. The classical "cold sweat" characteristic of circulatory failure and reduced cardiac output has a compensatory effect in that more oxygen dissolves in cold water then in warm water. A cold moist skin may better procure its own oxygen supply direct from the atmosphere than a warm dry skin.

The skin can provide greater part of its oxygen directly during "shock" (15). The intestinal mucous, like the cornea and the skin, is in direct contact with the atmosphere at all times unless the current of air through the gut is stopped. The intestinal mucous may also at all times procure the oxygen needs of its cells dissolved in the water bathing their surface. "In health we swallow air and mix it with our intestinal secretions by peristalsis: "bowel sounds" are always present except in disease. Sounds are produced only if gas is agitated with liquid; neither, on its own causes "sound" production.

The air observed radiographically as it passes along the gut moving rapidly and diminishing in quantity, as it goes – being de-oxygenated enroute. All these observations confirm that the intestinal mucous consumes oxygen, releases CO_2 into the lumen but does not absorb nitrogen. (15, 18).

The potential therapeutic value of intraluminal oxygenation of the gut during severe intestinal ischaemia has been reported thirty years ago (19).

The aim of this study (19) was to examine the microscopic appearance of the mucosal lesions in the cat and the effects of an intraluminal perfusion with oxygenated or

nitrogenated saline on the musosal lesions and find out whether tissue hypoxia or the intestinal contents were primarily responsible for the mucosal lesions.

The macroscopic and microscopic examinations of the lesions revealed that compared with the control animals intraluminal perfusion with oxygenated saline improved mucosal histology in all cats with no or only slight lesions.

It was concluded that hypoxia in the villi constitutes the key factor in the pathogenesis of the mucosal lesions seen in the cat's intestine after hypotension (19).

Animals having intraluminal perfusion with oxygenated saline had a significantly lower grade of mucosal injury than that grade of injury found in animals perfused with nitrogenated saline or left unperfused during ischemia (17, 20, 21).

It was reported that oxygen provided to the small intestine or the stomach by instillation of oxygenated perfluorochemicals could attenuate intestinal mucosal injury in ischemic loops of animals having superior mesenteric artery occlusion for 2 hours as well as stress ulceration (22).

Intraluminal oxygenation via perfusion with oxygenated saline, oxygenated perfluorochemicals, or intraluminal oxygenation by direct supply of gaseous oxygen, prevents the development and further progress of the gastro intestinal mucosal injury in regional ischemia and in shock (20, 22).

STABLISED OXYGEN
DIETARY SUPPLEMENTS AND SKIN SPRAYS

Dr. E.W. Askew a professor and director of Division of Foods and Nutrition, University of Utah wrote:

"Oxygen? A dietary supplement?" can one "breathe" dietary supplements? "I had not given much consideration to the concept of oxygen as a "nutrient". An essential element for the support of life, certainly, but hardly in the category of "classical" food-borne nutrients such as vitamin C, Iron, Calcium and Protein".

"This is not a gaseous form of oxygen to be inhaled from an oxygen bottle. It was suggested that one can drink it, dissolved in water "Oxygen consumed in this way does seem to approach our traditional definition of an essential nutrient: a chemical organic or inorganic substance present in food and necessary for life which cannot be synthesized in the body in adequate amounts for optimum health or body functions".

"My own interests in full metabolism at high altitudes lead me to ask: what would be the effect on human performance in oxygen-poor environments if significant amounts of stabilized dissolved oxygen were ingested in water?"

"I was intrigued by the concept of providing dissolved oxygen via the digestive tract as a potential means to circumvent the limitations of overtaxed haemoglobin molecules and oxygen-starved tissues especially during exhaustive exercise at higher altitudes. (23 p8).

J.S. Haldane devoted his life to the study of the behaviour of gasses such as oxygen (24).

"Oxygen transport and utilisation are the result of several physiological processes including ventilation, haemoglobin affinity, cardiac output, blood flow, oxygen diffusion and extraction by the tissue such muscle, and ultimately its participation in oxidative metabolism."

"Metabolism is much more efficient in the presence of adequate amounts of oxygen. Increased extraction of oxygen from the blood by tissues during adaptation to hypoxia is one of the major adaptive mechanisms of the human body faced with the difficult task of coping with the breathing of "thin" air."

"The price we lowland natives pay for our indulgence is usually two to three days of headaches, nausea and malaise before some acute adaptation to altitude begin to "kick in" and help us cope with this environment of reduced oxygen tension. Even if we don't experience the effects of acute altitude illness, our oxygen-starved lungs and muscles are likely to notice a significant difference in the level of exertion at altitude whether we are skiing, climbing, backpacking or just hiking in the mountains". "Imagine, (and this is pure conjecture on my part) that you could carry a convenient oxygen supply along with you that could serve the dual purpose of providing both hydration and supplemental oxygen". (23)

OXYRICH WATER
SKIN SPRAY AND OXYRICH WATER DROPS
A DIETARY SUPPLEMENT FOR DRINKING
TO BE CONSUMED DILUTED IN WATER OR FRUIT JUICE

PRODUCT INFORMATION

The oxyrich water sprays and drops are manufactured by Reach For Life Pty Ltd; 2/61 Rushdale Street, Knoxfield, V1C 3180 Australia, an offspring company utilising the identical technology employed by the mother company in USA manufacturing the stabilized oxygen.

The USA manufactured product in its full concentration strength has been issued a certificate of Free Sale by the office of Special Nutritionals, Department of Health & Human Services, US; Food and Drug Administration, Washington D.C. pursuant to the requirements of the Federal Food, Drug and Cosmetic Act (FD & C ACT) and the Fair Packaging and Labelling Act (FPLA)"

This dietary supplement is not intended to diagnose, treat, cure or prevent any diseases or physiological conditions. When taken orally it increases oxygen availability to the cells.

The product is formed by passing an electric current through demineralised water to generate "bioavailable", stabilized dissolved oxygen. Oxyrich is reported to contain not less than 5% $^{v}/_{v}$ oxygen, Atlantic salt (containing essential and trace minerals) and it is buffered to the approximate pH of blood (7.2).

"Several years ago a new generation of stabilized oxygen supplements were released. This new formula was based on dissolved yet completely stable monatomic oxygen molecules in water rather than oxygen molecules bound to various mineral salts." (23, 24)

This new oxygen stabilising process was originally developed by a N.A.S.A. engineer and is considered "break though" high technology electrolysis/decomposition of water into its constituent molecular elements. The original manufactures of stabilized oxygen being Cal Smith Inc., 9614 Amber Lane, Sandy, Utah, USA 84094. This solution is the first stabilized oxygen supplement to claim a nearly balanced pH.

OXYRICH/DI-ATOMIC OXYGEN SUPPLEMENT
NON CHEMICALLY FORMULATED

TOXICITY, ANALYTICAL AND CLINICAL TESTING

The following toxicity tests were conducted in the USA:

Kilman Oral Toxicity Limit; Acute Oral Toxicity Limit; Acute Dermal Toxicity Limit; Eye Irritation; Acute Dermal Irritation/Corrosion; Acute Inhalation Toxicity Limit.

The tested sample of stabilized oxygen in various concentrations was not shown to be a skin irritant, an eye irritant, nor a skin sensitizing agent. The sample, when tested as specified, was not considered to be toxic.

An increased level of 4.5% of the PO_2 venous blood oxygen ($P = 0.06$) was observed in four samples collected within one hour of the intestinal infusion of Oxyrich in males.

The effect of stabilized oxygen on the partial pressure of oxygen in Arterial blood was tested on three healthy males before and after consumption of the solution over a period of 240 minutes. The partial pressure of oxygen peaked 90 to 120 minutes after consumption. In a patient with a particularly low baseline, a significant increase was observed (27).

THE EFFECT OF OXYGEN RICH WATERS – on the oxyhaemoglobin saturation at 5000 m pressurised cabin.

The hypobaric chamber study was carried out on volunteers at the National Bulgarian Aviation Centre (28, 29).

It was aimed to test the effect of drinking mineral water during flight utilising natural mineral water and mineral water enriched with extra dissolved oxygen on the oxyhaemoglobin saturation values. The dissolved oxygen concentration of the waters utilized in our experiment was estimated in advance by the Butterworth Laboratory London UK. The mineral waters were bottled in water bottling factories equipped by the French company Sidel.

The volunteers were ten engineers from the Bulgarian Space Institute who signed informed consent prior to the study.

The Monitoring Equipment employed was the existing in-house equipment (Schiller CM-8 SO2 Switzerland). The oxyhaemoglobin saturation was also measured by employing our new MA-1 pocket size cabin diagnostic monitor with facilities to test $HbSaO_2$, air flow, impedance pneumogramme, ECG lead II, Pulse rate, Respiration rate, Blood pressure.

PROCEDURE

Following the doors closed signal there was a thirty minutes baseline oxyhaemoglobin ($HbSaO_2$) saturation measurement with subsequent start of the slow mineral water drinking protocol. In total 500 ml of water was consumed within 30-40 minutes blindly concerning the oxygen content of the water.

RESULTS

Amongst the ten volunteers one was an altitude acclimatized and the remaining 9 were not altitude acclimatized. The baseline $HbSaO_2$ saturation dropped between 4-10% within 15 – 20 minutes from the beginning of the ascent with the exception of SK the acclimatized gentleman with the dipping of his $HbSaO_2$ being only 3% $HbSaO_2$ from baseline.

The placebo water volunteers' $HbSaO_2$ remained steady at the same lower level of $HbSaO_2$ following the initial drop while the volunteers allocated the enriched waters the $HbSaO_2$ values were characterised with more frequent swings between lower and normal values.

The mean trends' values recorded by the two sets of equipment were similar and there was a mild improvement of the $HbSaO_2$ values noted in the volunteers drinking the oxygenated water.

An eleventh volunteer carried out an individual test during a three hour real flight, utilizing MA-1 equipment for cabin recording of all the above listed parameters and slowly and continuously drinking a water enriched with oxygen (laboratory certified level of dissolved oxygen) until 30 minutes before the descent when the water drinking was stopped. The baseline $HbSaO_2$ dropped from 97% to 85% and lower within 30 minutes within the flight but it climbed back following the water drinking to 95-97% within 15 minutes and stayed stable at normal readings until the oxygenated water drinking stopped, when it went down to the lower value of 85%. The subsequent analysis of the data were made completely blindly by an independent party and the tracings were considered "unusual" (28, 29).

EFFECTS OF OXYGEN ENRICHED WATER SPRAY ON THE SKIN PO_2 MEASUREMENTS

TCM3 radiometer measurements – Copenhagen c/o Radiometer Ltd UK (30).

A total of three well known brands of mineral waters enriched with additional dissolved oxygen and one without any additional oxygen were tested employing the skin area above the wrist. The measurements were taken before application and 10 minutes after application when the remaining water droplets were blotted off the skin with soft tissue.

The results indicated an average increase of PO_2 of the skin by 5.7 kpa for the oxygenated waters and 1.1 kpa for the non-oxygenated waters.

DISCUSSION AND CONCLUSION

The rationale in utilizing the digestive system and the skin for delivery of oxygen locally and into the systemic circulation is based on the fact that the lung develops from the embrional digestive tube. In the circumstances of any severe environmental shortage of oxygen in the air or in cases of very low poor blood oxygen, the oxygen from the water with higher pressure would diffuse into the plasma via the gut mucose membrane. The digestive system should be utilized as a complementary route of delivering oxygen in the circumstances of hypobaric hypoxia.

It has already been stated that the fine tuning of the human lung for transportation of oxygen at normal sea level atmosphere begins to show some deficiency in the severely hypoxic environment, which improves with acclimatization.

The oxygen from the air that we swallow is utilized by the gut epithelial cells and even supplying those cells with the oxygenated water oxygen we can protect them from the hypoxia in long haul flights. The dehydration via the skin is recognised adverse factor during flight. Supplying the body with all in one water and extra oxygen has serious implications in the improvement of the cabin environment where the passengers live for many hours during long haul flights.

The oxyrich water products offered by Reach for Life Australian Company are a major step in the right direction by helping to eliminate some of the mild side effects of long haul flights.

See Appendix I for listed Oxyrich Water analyses results.

Summary of the project is also attached.

APPENDIX 1

CERTIFICATES OF ANALYSIS

1. Laboratory Report 21/07/1998 Oxyrich water.

   Results:

   Equivalent oxygen content

   17.1 ml O_2/100mL

   Method of Analysis

   Idometric

   Consulchem Pty Ltd.

2. Laboratory Report

   Sample

   Oxy-rich process water, past De-ionizing Plant, prior to Electrolysis dated 14/12/2000

   Results:

   Equivalent oxygen content

   0.45 ml O_2/100 ml = 0.45% $^{v}/_{v}$.

3. Laboratory Report

   Oxyrich 19/12/00

   Results:

   Equivalent oxygen content

   12.2 ml O_2/100ml

   12.2% $^{v}/_{v}$

   Method of Analysis:

   Vogel 3rd Edition, Quantitative Inorganic Analysis.

4. Laboratory Report

Oxyrich date of manufacture 14/02/01.

Result Equivalent Oxygen

Content: 14.3 ml O_2/100 ml
14.3% $^{v}/_{v}$

Method of Analysis

Vogel 3rd Edition

Quantitative Inorganic Analysis

Consulchem Pty Ltd. Australia.

5. Certificate of Analysis

Butterworth Laboratories Ltd.
London United Kingdom

Sample Oxyrich Batch 02003
Reach for Life.

BLL reference BL4/0118(01)

Results:

Oxidising substances

Expressed as O

130mg/L

(13 mg/100 ml)

Analysed by iodometric titration (ref Vogel 3rd edition page 363)

Copies of the original certificates of analysis as listed attached.

6. Laboratory Report

Sample

Oxyrich 02/003 scale 12

DOM 14/02/01

Result

(Lmited detection:
0.2 ppm)

Free chlorine: not detected

Method of analysis:

APHA 19th edition, 4500 DPD

Method

Consulchem Pty Ltd
Australia

7. Laboratory Report

Sample "Grander Living Water" prior to any processing.

DOM 02/03/01 for BP 1998 compliance testing. BP 1998 compliance

Results:

Characteristics – Clear Colourless, odourless, tasteless liquid

pH	6.8 @ 20°C	Complies
Ammonium	<0.2 ppm	Complies
Calcium and haguesium	Blue colour produced	Complies
Heavy metals	< 0.1 ppm	Complies
Chloride	No change in 15 min.	Complies
Nitrate	< 0.2 ppm	Complies
Sulphate	No change in 1 hour	Complies
Oxidisable substances:	pink not completely discharged after 5 minutes of boiling	Complies
Residue on evaporation	<0.001%	Complies
Aluminium	<2ppm	Complies

The above results indicate that the sample of "Grander Living Water DOM 02/03/01 complies with the BP 1998 monograph for purified water.

Consulchem Pty Ltd.
Unit 1, 7-11 Rocco Drive,
Scoresby, Vic 3179
Australia