

# “Round the World” on Foot Hippocrates [460-370 BC]: Walking is Man's Best Medicine

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**Abstract:-** As a pensioner vascular surgeon, I tried to adopt an active life style. Physical inactivity causes approximately 17% of premature mortality in the UK<sup>1</sup>. I began walking 10.000 metres every day in three sessions for 11 years making a total distance of 40.150 kilometres and covering a distance longer than the circumference of the Earth's Equator, making our great planet looking small. I burned while walking nearly 160 kilos of fat and more than 2 million kcal. Big things have small beginnings. The beneficial effects of walking are proved to be significant on human systems (respiratory, cardiovascular, skeletal, muscular, gastrointestinal, genital, nervous system), quality of life, life expectancy and cognitive vitality. The last with its perception, memory, judgment and reasoning will help us to further understand, among others, the “medical aspects” of Fyodor Dostoevsky's writings, his acute explorative psychology down to the “basement” of human nature.

Free time is freedom. Pensioners in their golden age and after knowing themselves, their potential and weaknesses, they are free to choose, sense and adapt fast enough to any useful availability – as our cells sense and adapt to oxygen availability [Nobel Prize 2019 to Sir Ratchliffe, Kaelin, Semenza]. They are free to follow a walking program, tailored on each individual case, a program “singularis” and not always “universalis”.

We are wise to doubt, but the presented world experience along with my own unusual one of 40.150 kilometres of beneficial walking – covering a distance longer than the circumference of the Earth's Equator and consuming 160 kilos of fat and 2 million kcal – are they sufficient evidence to conclude that the Hippocratic advice, as appeared in the title, remains a timeless, non-pharmacological prescription of well-being and longevity?

## I. INTRODUCTION

I present the personal experience of walking a distance of 40.150 kilometres while burning, at the same time, nearly 160 kilos of fat and more than 2 million kcal. I refer to relevant international literature and draw attention to the beneficial effects of walking on biological systems, cognitive vitality, life quality and life expectancy.

Furthermore, walking a distance longer than the periphery of the Earth's Equator, revealed a new, simple and reliable way to realize the limits and the small size of our great planet.

## II. METHOD

In the outskirts of Athens, in the district of historic Marathon, with combined spirit of scientific realism and lyricism, as a pensioner vascular surgeon I tried to adopt an active lifestyle. Physical inactivity causes approximately 17% of premature mortality in the UK<sup>1</sup>.

Instead of remaining sedentary and inactive with the shadows of aging, for a period of 11 years, I made a total distance of 40.150 kilometres by walking 10.000 meters every day in three sessions: morning, noon, evening. At the same time, I burned nearly 160 kilos of fat and more than 2 million kcal.

I refer to scientific facts from international literature and add my personal experience from walking a distance longer than the circumference the Earth's Equator.

The digital activity monitor, Jog Style, Omron was used for the measurements. In family, my wife and three children were tolerant and kind to me. My diet was the usual Mediterranean with the exception of western food I had for 8 years in Britain during my surgical practice in NHS hospitals, including Hammersmith with unforgettable Peter Martin, Crawford Jamieson and all the wonderful people I met. Western food I had also in the United States while visiting leading in therapy, teaching and research hospitals in Houston, Atlanta and San Francisco. In the busy hospital life, the doctor's main principles apply with strict hierarchy: first, help the patient, second, protect the validity of the hospital he works in and, third, cover himself. In the years of development, where my traveling bag was, there was my country. In our ecumenical world, traveling facilitated mainly by the efforts of pioneer daring countries, which although limited in land, they appeared unlimited in sea waves, where the sun was never to set.

I never smoked and was never fond of salt. My blood pressure and blood test are normal with a body weight of 68 kilos and a height of 1,7 metres. Heart functioning is also normal, following balloon dilatation and stent application in

two coronary arteries in January 2012. The intervention was decided for the prevention of a cardiac episode after a routine check-up, including coronary angiography.

I enjoy coffee, sugar and mild alcoholic drinks, trying to keep in mind the classic principle *nothing in excess* [“μηδένάγαν”], to lead a life with no strict rules and to live easy as a normal human being.

### III. DATA

I present my personal walking experience and study its effects on human systems: respiratory, cardiovascular, skeletal, muscular, gastrointestinal, urinary, genital and nervous system. Exercise forces these systems – which are involved in stress response – to communicate a lot more than usual.

Respiration rate is increased during walking since the increased carbon dioxide stimulates brain's response by sending signals and, at the same time, the increased amount of oxygen converts the stores into fuel for the workout. The more intense the exercise the faster the breathing rate to keep up with oxygen demands and carbon dioxide exchange. While walking, I squeeze the air from the lungs until they are emptied, leaving a vacuum. Automatically, fresh air rushes in the lungs refilling them<sup>2</sup>. Walking also helps those, who suffer from chronic airflow limitation diseases<sup>3</sup>. Man is adequately protected against enemies usually monocellular or multicellular, but now he is in panic and feeling trapped, because the new enemy, the covid-19, is acellular (without cell configuration) and protection is not available. At the end, we hope, the intelligent victim will find the way to exodus.

Heart rate increases during walking because the heart's job is to pump more blood to the muscles. The heart gets stronger and gradually sends more blood with each beat and as a result decreases the exercise heart rate. The heart becomes a more efficient and stronger pump, increasing blood flow, reduces inflammation in arteries and prevents atherosclerosis<sup>4</sup>. In the long term, walking develops new capillaries for additional supply to muscles and to about 100 trillion body cells. Walking can also improve the heart health by controlling the metabolic syndrome, a cluster of conditions including increased blood pressure, high blood sugar, excess of body fat around the waist and abnormal cholesterol or triglyceride levels<sup>5</sup>.

The skeletal system includes bones, ligaments and cartilages. Walking stimulates the production of synovial fluid, which acts as a lubricant helping the joints move and becoming hydrated and flexible. In the long term, it stimulates the bone to produce osteoblasts, which in their turn build new bone, and makes the existing bones stronger and denser<sup>6</sup>.

The muscle system engages a number of muscles during walking: gluteus, hamstrings [semitendinosus, semimembranosus, biceps femoris], adductor magnus, quadriceps, sartorius, iliopsoas, tensor fascia late, pectineus,

adductor longus and brevis, gastrocnemius, soleus, plantaris, tibialis posterior and anterior, flexor hallucis posterior, flexor digitorum longus, extensor digitorum longus, hallucis longus, oblique muscles, quadratus lumborum, multifidus muscles, erector spinae. If a muscle is missing I do apologise, even from infinity the end is missing. Engaging these muscles with regular walk every day will reduce the chances of suffering pulls and strains<sup>7</sup>. Increased muscle size and strength improve back pain, bones, joints, osteoporosis and arthritis<sup>8</sup>. Even after exercise the organism burns, reducing body fat and weight.

According to “Anavasis” of Alexander by Lucius Flavius Arrianus<sup>9</sup>, Alexander started his campaign with 5.000 horsemen and 30.000 footmen, who remained undefeated for 10 years. The soldiers walked a distance of about 38.000 kilometres from Greece to Africa, then to Asia as far as India and back, as described by British historian and broadcaster Michael Wood in his series “On the footsteps of Alexander the Great”<sup>10</sup>. Although they made a distance shorter than I did, their dynamic and laborious walking through plains, deserts, mountains and rivers overshadowed my own “civilised” way of walking and emphasised the benefits of keeping the human machine walking and going. In India however, the home sick and tired soldiers refused to follow the King's further visions. Not rarely dreamers exhaust us. Later at the age of 33, Alexander died in Babylon leaving no successor; dreams are not inherited. As for the obedient and loyal horses they suffered a lot as in many other similar enterprises. Fortunately, even for a short time, they overthrew the exploitative human masters in the anti-utopian novel “Animal Farm” by George Orwell<sup>11</sup>.

The gastrointestinal system consists of digestive tract [mouth, oesophagus, stomach, small and large intestine, anus] along with other organs that help digestion such as the tongue, pancreas and liver. Walking increases the blood flow and enhances overall body functioning. The sweat relieves stress and according to Harvard Health Publishing walking reduces levels of body stress hormones, adrenaline and cortisol<sup>12</sup> while stimulating endorphins, the body's natural pain killers and mood elevators.

A study published in the journal of PLoS One<sup>13</sup> revealed that constipation can be prevented. The walking speeds up the body's metabolism, burns kcal faster and the digestive system works overtime.

The urinary system consists of kidneys, ureters, bladder and urethra. When walking in summer, the sweat of the skin we inhabit and the decrease of blood flow to the kidneys lead to a decrease in urine production. The kidneys tend to filter out more protein and, with intense walking, they excrete some lactic acid making the urine more acidic<sup>14</sup>.

The genital system is affected by walking. Inactive life, sitting many hours during work in office or at home increases scrotal temperature and reduces semen quality<sup>15</sup>. Walking can lower blood pressure, blood glucose,

cholesterol levels and reduce body weight; all of which help preventing atherosclerosis and improve circulation. More blood flows through the body including the gonadal arteries arising from aorta a little below the renal arteries. I began the ninth decade of my life and I continue to walk. Even in my age, I enjoy the benefits. Besides, it is difficult to get older, if you are already old.

The nervous system is also affected. Bearing the Epicurean principles of tranquillity and “ataraxia” in the back of my mind, I tried, while walking, to achieve peacefulness, relaxation and breath meditation. As I walk, from time to time, I count four paces with exhalation and four paces with inhalation. Automatically, the mind synchronises with the body and breath. Oxygen and carbon dioxide exchange are made at a high level, the body maintains equilibrium, which helps reducing anxiety, stress, depression, while increasing mental health, mood, self-esteem thus contributing to cognitive vitality. The last with its perception, memory, judgment and reasoning will help us to further understand, among others, the “medical aspects” of Fyodor Dostoevsky’s writings, his acute explorative psychology down to the “basement” of human nature<sup>16</sup>.

Endorphins [Morpheus god of dreams] are produced by the central nervous system and pituitary gland. Their principle action is to inhibit the communication of pain signals and to produce a feeling of euphoria<sup>17</sup>; with no purpose, however, of dreaming the utopic society of Thomas More<sup>18</sup> or the ideal society of Plato<sup>19</sup>, but of enjoying, as passengers of the planet Earth, a free journey around the sun every year.

#### IV. DISCUSSION

As a young man, I used to drive a lot. With my car I made the distance London-Athens and vice versa ten times, passing the Alps through different pathways with a GPS in my brain. Years later, the Norwegians May-Britt Moser and Edward Moser as well as the Anglo-American John O’Keefe were honoured with Nobel Prize in 2014 for the discovery of nerve cells in the area of hippocampus, constituting a positioning system in the brain, an “inner GPS”. As a pensioner now, I walk a lot. My effort is not a dull and harmful state of loneliness, as some people may think. On the contrary, solitude is my deliberate choice for walking and looking myriads benefits, including opportunity for thought. “Men acquire a particular quality by constantly acting in a particular way”<sup>20</sup>. Bearing Aristotle’s quotation in my mind and a note-book in my pocket, while walking, I used to organise my vascular surgery interests, readings, writings, publications, gardening, every day family and personal needs and, of course, “conditio sine qua non” I had my mobile phone for information and casual talking. Among others, I try to understand the ancient Greeks, who realised a full life for the individual as Sir Maurice Bowra, Professor in Oxford, wrote in his brilliant book “Classical Greece”<sup>21</sup>.

As I mentioned above, I am not fond of salt. Salt consists 40% of sodium, 60% of chloride and we need no more than six grams of salt daily. Salt flavours food and is

added when cooking at home or is always available on the table during a meal. Excessive intake increases blood pressure by causing water retention and leads to high risk of heart disease, stroke, osteoporosis, kidney problems, weight gain, cancer and vascular dementia<sup>22</sup>. Some consider salty meals as guilty enjoyments. To transform a world habit is very difficult, especially when it comes to salt and its long-lasting history, appearing even in the Bible, where Jesus Christ says to his apostles “you are to the world what salt is do”<sup>23</sup>.

I never smoked, many others do with risks yielding to dark euphoria, to an unnecessary necessity. There is “no paradise for sinners”. Smokers with complications and amputated limbs with self-pity and our sympathy for their gloomy life, only better from lepers with self-pity in the moonlight, continue to smoke. “No prosthetics are available for an amputated spirit”. Many people have the ambition to change the world, but few accept to change themselves. Running the risk of coronary disease, stroke, lung cancer, peripheral vascular disease and others, they insist on staring at the abyss, and the abyss turns to look at them with bottomless problems. Nicotine addiction seems strong. Smokers suffer and still insist to argue, but “you cannot reason with the tiger when your head is in its mouth”<sup>24</sup>. Smoking kills more than 15.000 people a day. Fortunately, is a preventable cause of death. Quitting can reverse many effects. Smart power is needed to escape from the dark side of the moon.

Free time is freedom. Free bees make honey. Pensioners in their golden age and after knowing themselves<sup>25</sup>, their potential and weaknesses, they are free to choose, sense and adapt fast enough to any useful availability – as our cells sense and adapt to oxygen availability [Nobel Prize 2019 to Sir Ratcliffe, Kaelin, Semenza]. They are free to follow a walking program, tailored on each individual case, a program “singularis” and not always “universalis”. To make the twilight of their life longer and graceful.

We are all responsible for our health. In my case, I found agreeable and feasible to walk 40.150 kilometres and, at the same time, burn nearly 160 kilos of fat and more than 2 million kcal. Covering a distance longer than the circumference of the Earth’s Equator, I realised the limits and the small size of our great planet. Other ordinary people did more extraordinary things. Though mine was an interesting adventure, I remain a humble admirer of the colossal one planned by Homer to render Ulysses a fulfilled mortal, far away from the shadows of routine house inactive life, which turns man into a premature mortal<sup>1</sup>. If adventure is dangerous, routine is lethal. As for the latter, I recall William Shakespeare’s words from the *King Lear* play: “you’re not supposed to get old until you’re wise”<sup>26</sup>. Exercise is associated with myriads of health benefits<sup>27</sup> and helps avoiding premature entropy, the inevitable and steady decline of the living matter. “We are all in the gutter, but some of us are looking at the stars”, Oscar Wilde quoted<sup>28</sup>.

The beneficial effects of walking are proved to be significant on the human system, cognitive vitality, quality of life and life expectancy. How embarrassing though for man, striving to improve life expectancy, that a jelly fish, called the *turritopsis dohrnii*, has already achieved immortality. We managed to elongate life, but not youth. Youth expectancy remains an inaccessible ideal from the Middle Ages alchemists, searching among others for the secret of eternal youth.

As for the human dreams for space and galaxy expectancy, who knows, billions uninhabited stars wait unsuspecting to accept a future star walker, the man with his exceptional immortal force and brilliant brain, though obscured by shadows and black spots left from his poor moral records. In his long career, man failed to escape from Plato's cave of shadows to an ideal world, which is yet to be discovered.<sup>19</sup>

Philosophy is asking for truth, science needs facts. We are wise to doubt, but the presented world experience as well as my own unusual one of 40.150 kilometres of beneficial walking – covering a distance longer than the circumference of the Earth's Equator and consuming 160 kilos of fat and 2 million kcal – are they sufficient evidence to conclude that the Hippocratic advice, as appeared in the title, remains a timeless, non-pharmacological prescription of well-being and longevity?

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