CHAPTER 1

1.1 THE NEED FOR QUALITY WATER FOR DRINKING

So many common ailments and illnesses can be prevented and possibly even cured with an increased intake of healthy water. Headaches, hypertension, back pain, arthritis, ulcers, asthma, morning sickness and fatigue can all benefit and in many cases be prevented by regulating the body’s natural fluid levels.

Recently there has been a dramatic swing in medical theory and a long overdue realization about “healing”. The best way to prevent, treat and in many cases cure illness is to give our body the right tools and let it go to work. With the proper intake of healthy water, the right minerals and nutrients our body can overcome almost anything.

Recent studies have confirmed that many of the medications our society has become dependant on, primarily antibiotics and pain relievers, often do more harm than good. Antibiotics can extremely damage the liver and have an adverse effect on our natural immune system. The more often we turn to synthetic medicines to over come infections, the weaker our natural defenses become and the more likely we are to have repeated incidences of infection. An increased intake of water and the proper immune enhancing nutrients combined with a little patience and common sense are by far the best defense against most infections. Allowing our body to over come minor infections with fever, fluids and rest increases our natural resistance and makes us less susceptible to these intruders in the future. Truly the best offence is a good “defense”.

Pain medications and analgesic medicines also work in contrast to the way our body heals itself. In a very informative book called “Your Body’s Many Cries For Water” (very highly recommend) studies by medical experts explain how most of

Fig 1.1 – The composition water in human body

Our body is 70% by weight of
Our brain is water

Our body is 80% by weight of blood is water

Our body is 60% by weight of Our body is water

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the pain sensations we experience are the result of moderate or acute dehydration.

Our brain is over 70% water and when it detects a shortage of available fluids it implements a water rationing process by producing histamines, causing pain and fatigue. This natural process is meant to slow us down and conserve water. Histamines are released as a warning signal that something is wrong. When we take antihistamines or analgesic medicines like acetaminophen or ibuprofen we simply turn off the signal and often allow the problem to progress. Two cups of water and a 20 minute break will overcome most common headache pain.

Back pain is also most often the result of a deficiency in body fluid levels. The disks in our back are in reality little hydraulic shock absorbers. These disks are made up of an outer shell filled with fluid, primarily water. A properly hydrated disk creates a cushion that absorbs the shock of physical activity and supports the weight of the upper body. These discs are self hydrating as long as there is adequate fluid levels and regular movement. Movement that compresses and releases pressure on the disc creates a suction that allows water to be pulled inside the disc keeping it fully hydrated. When a disc is fully hydrated the shell of the disc supports 25% of the weight load and the fluid supports 75%.

When theses discs become dehydrated then the shell has to support a larger portion of the load causing pain, swelling and soreness. Passive activities like standing, or sitting at a desk without regular movement, allow constant pressure on the disks which slowly forces water out. Without sufficient fluid levels, the pressure on the disc increases and results in pain and stiffness. Simply by maintaining a constant and adequate intake of water combined with regular movement such as bending forward and backwards with your head and upper body allowing the disks to hydrate, you can prevent and stop most minor back and neck pain. Try it, you’ll be amazed how easy and effective these natural solutions are.

Hypertension is very often a result of the body adjusting to blood volume loss, as the study suggests. The most common cause of lower blood volume is dehydration. Since our blood is more than 83% water it’s total volume is heavily effected by the level of available water in our body. When the body detects a loss of blood volume it closes off less active capillary beds in order to maintain proper blood flow to the more active areas. These vessel closings cause a rise in tension inside the muscle mass which we’ve come to know as “hypertension”. More water allows proper blood volumes and less tension.

Arthritis pain and stiffness is now understood to be initially a result of increased friction and swelling in the bone joints. Water is what our body uses to lubricate these joints. When our water levels are reduced there is increased friction between the cartilage surfaces resulting in swelling, stiffness and pain. The movements of the joints cause a suction that pulls water from the bone marrow to the joint cavity if there is available water. An increased intake of water and gentle rhythmic movements of the joints can ease and in many cases overcome minor arthritic pain. A more detailed explanation of this natural treatment can be studied in “The Body’s Many Cries for Water” or a recent publication by three very highly respected Medical Doctors called “The Water We Drink”.

Asthma, which affects over 12 million children in North America alone and causes the deaths of several thousand each year, is a direct result of increased histamine production. Dehydration initiates exaggerated histamine production as a water regulating control. It is well known that asthmatics have excessive levels of histamines in their lung tissue causing constriction of the bronchial passages and
increased mucus build up. Water is used in the lungs to keep the tissue moist, but each time we exhale we expel moisture from our lungs. Under normal hydrated conditions the moisture is rapidly replaced. If we are in a dehydrated state then the tissue inside the lungs begins to coat with mucus to prevent drying. It has been demonstrated in many animal studies that an increase in water intake will reduce histamine levels and over a 2 to 3 week period restore normal hydration to lung tissue and reduce mucus build up. Once this occurs the bronchial passages begin to open and normal breathing is restored. The same histamine related effects apply to allergies, and again, significant benefits can result from an increased intake of water.

Even something thought of as normal, like morning sickness is a direct result of dehydration. The fetus lives in a world of water which the body prioritizes above all other needs. Throughout the night, which is the longest period without water intake, the uterus draws water from the mother’s system to maintain it’s internal fluid levels and those of the fetus. In the morning the mother awakens in a state of dehydration, nausea and fatigue, hence the term “morning sickness”. A common hang over produces the same symptoms and has essentially the same cause, dehydration... only with a much less noble purpose. Alcohol is a very strong diuretic and causes the body to excrete water often leading to advanced dehydration. Both of these common ailments can be prevented by drinking plenty of water before and throughout the night.

While water is not an absolute cure-all, it must be recognized as the base and primary ingredient to every preventive and healing process within our body. We are truly a magnificent creation capable of preventing and curing even the worst of disease and illness.

1.2 CONTENTS OF DRINKING WATER

Drinking water, like every other substance, contains small amounts of bacteria. Most of these bacteria are common ones and they are generally not harmful. Chlorine is usually added to drinking water to prevent bacterial growth while the water streams through pipelines. This is why drinking water also contains minimal amounts of chlorine. Water mostly consists of minerals and other inorganic compounds, such as calcium.

1.3 The origin of water source

Drinking water can come from different resources. For one, it can be pumped from the ground through wells. This groundwater is than purified, so that it will contain no more contaminants and is suited to drink. Drinking water can also be prepared directly from surface water resources, such as rivers, lakes and streams. Usually surface water has to undergo many more purification steps than groundwater to become suited to drink. Preparing drinking water out of surface water is much more expensive due to this. Still 66% of all people are served by a water system that uses surface water.

Part of our drinking water is pumped from the ground, usually under sand dunes. In sand dunes water can also be infiltrated. As it sinks into the ground through the dunes it is naturally purified. This costs much less money than the purification of surface water. Part of our drinking water originates from dune water.

1.4 Purification of Drinking water

Treating water to make it suitable to drink is much like wastewater treatment. In areas that depend on surface water it is usually stored in a reservoir for several
days, in order to improve clarity and taste by allowing more oxygen from the air to dissolve in it and allowing suspended matter to settle out. The water is then pumped to a purification plant through pipelines, where it is treated, so that it will meet government treatment standards. Usually the water runs through sand filters first and sometimes through activated charcoal, before it is disinfected. Disinfection can be done by bacteria or by means of adding substances to remove contaminants from the water. The number of purification steps that are taken depend on the quality of the water that enters the purification plant. In areas with very pure sources of groundwater little treatment is needed.

1.5 History of drinking water disinfection

The link between water quality and health has been known since the early ages. Clear water was considered clean water. Swamp areas were associated with fever.

Disinfection has been applied for centuries. Two basic rules dating back to 2000 B.C. state that water must be exposed to sunlight and filtered with charcoal and that impure water must be purified by boiling the water and then dipping a piece of copper in the water seven times, before filtering the water. Descriptions of ancient civilizations were found about boiling water and water storage in silver jugs. To realize water purification copper, silver and electrolysis were applied.

Disinfection has been applied for several decades. However, the mechanism has been known for only one hundred years.

In 1680 Anthony van Leeuwenhoek developed the microscope. His discovery of microorganisms was considered a curiosity. It took scientists another two hundred years before they started using the microscope to distinguish microorganisms and other pathogens.

The first multiple filter was developed in 1685 by the Italian physician Lu Antonio Porzo. The filter consisted of a settling unit and a sand filtration unit. In 1746 the French scientist Joseph Amy received the first patent for a filter design, which was applied in households by 1750. The filters consisted of wool, sponges and charcoal.

For the past centuries humans have suffered from diseases such as cholera and the plague. The origin of these diseases was misinterpreted. It was said that the diseases were a divine punishment or were caused by impure air or the alignment of the planets.
In 1854 a cholera epidemic caused many deaths in the city of London. John Snow, an English doctor (figure 1.2), discovered that the cholera epidemic was caused by a contaminated water pump (figure 1.3). He prevented a spread of the epidemic by closing down the contaminated water pump. After that scientists have performed bacteriological studies to research the development, existence and identification of microorganisms and the removal of microorganisms from drinking water.

In the nineteenth century the effect of disinfectants, such as chlorine, was discovered. Since 1900 disinfectants are largely applied by drinking water companies to prevent the distribution of diseases and to improve water quality.

1.6 Dangers in drinking water

There are several problems that can endanger the quality of drinking water. A number of these problems are summed up here.

Someone can detect coliform bacteria in drinking water. Coliform bacteria are a group of microorganisms that are normally found in the intestinal tract of humans and other warm-blooded animals, and in surface water. When these organisms
are detected in drinking water this suggests contamination from a subsurface source such as barnyard run-off. The presence of these bacteria indicates that disease-causing microorganisms, known as pathogens, may enter the drinking water supply in the same way if one does not take preventive action. Drinking water should be free from coliform.

Yeast and viruses can also endanger the quality of drinking water. They are microbial contaminants that are usually found in surface water. Examples are Giardia and Cryptosporidium. Giardia is a single cell organism that causes gastrointestinal symptoms. Cryptosporidium is a parasite that is considered to be one of the most significant causes of diarrheal disease in humans. In individuals with a normal immune system the disease lasts for several days causing diarrhea, vomiting, stomach cramps and fever. People with weakened immune systems can suffer from far worse symptoms, caused by cryptosporidium, such as cholera-like illnesses.

Nitrate in drinking water can cause cyanosis, a reduction of the oxygen carrying capacity of the blood. This is particularly dangerous to infants under six months of age.

Lead can enter the water supply as it leaches from copper pipelines. As the water streams through the pipes, small amounts of lead will dissolve in the water, so that it becomes contaminated. Lead is a toxic substance that can be quickly absorbed in the human systems, particularly those of small children. It causes lead poisoning.

Legionella is a bacterium that grows rapidly when water is maintained at a temperature between 30 and 40 degrees for a longer period of time. This bacterium can be inhaled when water evaporates as it enters the human body with aerosols. The bacteria can cause a sort of flue, known as Pontiac fever, but it can also cause the more serious deathly illness known as legionellosis.