

A Literature Review of the Impact of Acid-Alkaline Balance on Health

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ABSTRACT

Objective: To review the literature of the effects of acid-alkaline balance in the body and to inform readers of the health benefits of alkalizing the blood and body through a more alkaline diet.

Methods: Literature was collected from multiple sources; including peer reviewed journal articles, text and reference books and Internet web sites.

Results: Your body operates on a subtle electro-magnetic current. Your brain, your heart, and all of your organs emit fields of electrical impulses. Foods provide value only when they can be converted into the elements necessary for this chemistry to take place. Energizing means avoiding foods that take away more energy then they provide.

Conclusion: Our internal system is made up of a delicate balance of biochemistry; it is this combination that makes a healthy functioning disease free environment possible. Foods that tend to increase the acidity of the blood or urine after are classified as being acid forming foods. Conversely, if foods increases the alkalinity of blood or urine after it has been ingested, it is classified it as an alkaline forming food.

Key Words: Acidity, Alkalinity, health

INTRODUCTION

Let's start off with an area that is affecting sixty percent of our population; and then we will look at an avenue of approaching health with some basic ideas. According to American Heart Association's "recent estimates, nearly one in three U.S. adults have high blood pressure, but because there are no symptoms, nearly one-third of these people don't know they have it. In fact, many people have high blood pressure for years without knowing it. Uncontrolled high blood pressure can lead to stroke, heart attack, heart failure or kidney failure."^[i] High blood pressure can affect your body in many ways. It adds to the workload of your heart and arteries. When your heart has to work over-time to distribute blood throughout the body, it tends to increase in size in hopes to meet the demands of the body. A slightly larger heart will function well; however, if it enlarges too much; it will begin to meet with difficulty as it attempts to meet the body's demands. Well, hold on a minute, why is it that we're talking about the heart? Well, it is imperative that we understand the role of the heart, arteries and arterioles in order to appreciate and comprehend the effects of nutrition to these life-giving pathways.

High blood pressure is the No. 1 modifiable risk factor for stroke.^[ii] It also contributes to heart attacks, heart failure, kidney failure and atherosclerosis (fatty buildups in arteries). In some cases, it can cause blindness. Recent studies show that in adults 40–89, the risk of death from heart disease and stroke begins to rise at blood pressures as low as 115/75. The risk doubles for each increased increment of 20 mmHg in systolic blood pressure or 10 mm Hg in diastolic blood pressure. Elevated systolic blood pressure indicates a more important risk than diastolic blood pressure except in patients younger than 50. The relationship of blood pressure levels to the risk of cardiovascular disease is continuous, consistent and independent of other risk factors. The higher the blood pressure, the greater is the chance for heart attack, heart failure, stroke, and kidney disease.^[iii]

"...When your body's pH is off, your health is off..."^[iv] Health starts at the cellular level. Every area of the body is affected by the cell. Look at these statistics and you can clearly see something has gone terribly wrong with our health. Heart disease is the #1 killer in America. Cancer; 30% of Americans will succumb to it. Stroke is the #3 killer. Alzheimer's; 40% over 85 are suffering. Diabetes increased 600% in the last generation due to the aging population of the "baby boomers." All of these diseases are greatly affected by our diet. New research has validated that diet and lifestyle habits contribute greatly to an overly acidic system, and second that an overly acidic system is a breeding ground for disease. Signs and symptoms of an acidic body include acid reflux, weight gain, diabetes, irritable bowel syndrome (IBS), cardiovascular damage, including the constriction of blood vessels and the reduction of oxygen, premature aging, bladder and kidney conditions, including kidney stones, immune deficiency, acceleration of free radical damage, possibly contributing to cancerous mutations, joint pains, aching muscles and lactic acid buildups. Low energy and chronic fatigue, headaches, sinus problems, irritability, colds and flu are other symptoms of an overly acidic body. pH balance is so important, in fact, "All the body's regulatory mechanisms (including breathing, circulation, digestion, and hormone production) work to balance the delicate internal acid-alkaline balance..."^[v]

The purpose of this literature review is three fold: to educate the reader on the basics of diet, the influence of acid and base throughout the body, and the foods that will complement a more alkaline environment. The ultimate goal of this paper is to offer a better understanding and to inform the reader of the valuable role that he or she can play in their own health care through the influence of their diet. Let us first start with some

basic understanding. For a quick review let's break it down to the basics, for lack of better words we pollute ourselves by creating an imbalance in our internal environment. That is not only from eating too much or too little, but also from all the stresses we create inside ourselves. This, along with exercise or lack thereof, as well as too much or too little sleep create an imbalance that, in time, creates disease or the symptoms there following. "The body's ability to function is based on electrical currents, it is unique system that is working on electrical currents tied with magnetism – electromagnetism is running you." All the nerves of your body send electrical signals, pulses of electricity. A healthy cell is considered to be free of interference allowing it to have hundred percent charge. It is this electrical charge that enables the cell to communicate effectively. Our internal system is made up of a delicate balance of biochemistry and chemistry; it is this combination that makes a healthy functioning disease free environment possible. In reflecting back onto the building blocks of science, anything that interferes with the electrical balance will create some level of disarray, which in turn will impact the healthy cell. It is important to understand that nerve signals are nothing more than electrical pulses. These impulses are affected by the acidic or alkaline charge, which accompanies all foods.

This chapter is a detailed explanation of the methods and procedures used to collect and select the articles, journals, and other materials for this literature review. This chapter will also inform the reader as to how the material has been accepted for application in this literature review, and how it has been eliminated from application in the review.

The literature search has been conducted on two different days, the first search on Thursday, Aug 12, 2004 and the second search on Wednesday, September 2, 2004. The first is a computerized search conducted in Logan College of Chiropractic Learning Resource Center. The search is performed using the PubMed database. The keywords used in this search are "Alkalizing and Acidifying blood." This search produces two articles, of which two of these are printed out for consideration to be used in the literature review. The two articles printed out will be used in the development of this literature review. The second search has been conducted from my home utilizing the Herman Aihara book on Acid Base. The book has a list of 29 references in its bibliography. These references have been added to the search for information pertaining to acid base balance in the blood. The books: Alkalize or Die 10th printing by Theodore A. Baroody, Acid and Alkaline by Herman Aihara, Discovering Wholeness, by Cheryl Townsley as well as multiple references to Get the Edge by Anthony Robbins; these books will be integrated throughout this literature review.

The majority of all articles that are located and printed out have been read and evaluated based on their relevance to the proposal of this literature review. All the articles chosen are done so based on how well the information is presented and all are referred journals. The collected articles represent a mixture of recent, within the last five years, to older works not exceeding ten years. Most of the articles used in this literature review are from the last five years. The articles that have been selected apply to the topic of the Alkalizing and Acidifying the blood based on the impact of personal involvement in diet.

This literature review proposal includes peer reviewed journal articles and textbooks. About 75% of the literature review proposal is made up of peer reviewed journal articles and about 25% comes from textbooks. Of the journal articles used in this proposal, three are referred articles and three are randomized, placebo-controlled clinical trials.

DISCUSSION

What is Acidic or Alkaline?

Acid and Alkaline (pH) are the two characteristic conditions of blood and cell solution. All solutions are either more acid or more alkaline. If acidic characteristics dominate, the solution is acid. However, there is no absolute acid or alkaline. An acid solution always contains some alkaline factors, and an alkaline solution always contains some acid factors. Neutrality is an ideal condition in which the amount of acid and alkalinity is equal. It is an ideal state, and not realistic. In reality, what we eat or drink is always more acid or alkaline.

Acidosis is not in itself a specific disease; it is a general condition of the blood and thus the root of many different diseases such as diabetes, high blood pressure, arthritis, cancer, tumors and many more. Many people today have this blood condition without knowing it. ALKALOSIS is not as common as acidosis, but also indicates an unbalanced condition of the blood.

All natural foods contain both acid and alkaline forming elements. In some, acid forming elements dominate; in others, alkaline forming elements dominate. According to modern biochemistry, the organic matter in food does not leave acid or alkaline residues in the body. The inorganic matter (sulphur, phosphorus, potassium, sodium, magnesium and calcium) determines the acidity or alkalinity of the body fluids. Food comparatively rich in acid forming elements are acid forming foods, those comparatively rich in alkaline forming elements are alkaline forming foods. Alkaline-forming reactions by definition refer to any chemical alteration in the body that produces an increased ability to energize

the system and acid-forming reactions refer to a chemical alteration that produces a decreased ability to energize the system. This explains one of the main causes of fatigue; when acid forming foods increase the acidity of the blood, they in turn decrease the energy level of the body. Fatigue is just one example of the problems created by acidity in the blood. Acid produced by acid-forming reactions also attack the joints, tissues, muscles, organs and glands causing minor to major dysfunction.

Acidic conditions inhibit nerve action; alkalinity stimulates nerve action. One who has a balanced condition can think and act (decide) well. A balanced food plan is a great help in maintaining the pH balance of the blood; however it does not reveal results in a day or two. It takes a longer time to show the effect. Cold showers make the blood alkaline, while hot showers make the blood acid. If the blood develops a more acidic condition, then our body inevitably deposits these excess acidic substances in some area of the body such so that the blood will be able to maintain an alkaline condition. As this tendency continues, such areas increase in acidity and some cells die; then these dead cells themselves turn into acids. Many illnesses are often a function of the body's response to a polluted internal environment created by these dead cells and the body's attempt to clean it up. "The countless names attached to illnesses do not really matter. What does matter is that they all come from the same root cause...too much tissue acid which ends up being waste in the body!"^[vi]

However, some other cells may adapt in an acidic environment. In other words, instead of dying as normal cells do in an acid environment, some cells survive by becoming abnormal cells. These abnormal cells constitute malignant cells. Malignant

cells do not correspond with brain function or with our own DNA memory code.

Therefore, malignant cells grow indefinitely and without order.

This is Cancer, and cancer develops in the following stages:

1. Ingestion of many acid-forming foods, fatty foods, refined foods, carcinogenic substances such as nitrates, and chemically treated foods in general.

X-ray scans contribute even at this stage.

2. Prolonged constipation, an increase of acidity in the blood. This can cause an increase of white cells and a decrease of red cells, which is the beginning of leukemia.

3. Increase of acidity in the extracellular fluids.

4. Increase of acidity into the intracellular fluids.

5. Birth of malignant cells. This is the stage of cancer called initiation.

6. The further consumption of many acid foods. Receiving high levels of radiation, chemical and drug treatment. This stage is called cancer promotion.

The Basics of pH

The abbreviation pH represents a measurement of the number of hydroxyl (OH-) ions, which are negative and alkaline-forming as opposed to the amount of hydrogen (H+) ions that are positive and acid forming; it measures the acidity or alkalinity of a solution. It is also a measurement of how much the negative (alkaline-forming) ions push against the positive (acid-forming) ions. A neutral pH is considered seven, where as a pH above seven is alkaline and a pH below seven is acid. The pH of blood is 7.4. This means that it is slightly alkaline. This alkalinity has to be almost constant; even minor variations are dangerous. If the blood lowers to pH 6.95 (barely over the line of the acid side), a coma and death will result. In addition, if the concentration in the blood changes

from 7.4 to 7.7, tetanic convulsions occur. Although only a blood test can reveal the blood pH, it is possible to monitor the pH of the body with a simple home test kit of litmus or nitrozone paper. Testing the saliva and urine daily average for three days should reveal a pH of between 6.8 and 7.1. Some variation will occur depending on recent type of food and drink intake. The following represent different body pH values are: stomach juice = 1.5, urine=7.0, saliva=7.1 and blood=7.4. *This article was adapted from 'Acid Alkaline by Herman Aihara.'*

There are two types of acid and alkaline foods. The first type is acid or alkaline foods, which means how much acid or alkaline the foods contain. The other is acid or alkaline forming foods, which means the acid or alkaline forming ability of foods to affect the body, or in other words, the pH condition that foods cause in the body after digestion. This one will be the focus in changing the body's pH. It is important for the body to maintain a balance of acidity and alkalinity to allow essential chemical reactions to take place in cells and tissues. However, not all parts of the body are equal in terms of pH. The stomach for example is much more acidic (pH between 2 and 4) than blood, which has a pH at 7.4, and the brain with a pH at 7.1. Although different parts may be unequal, balance is maintained through proteins and minerals and kidney and lung functions. Food and drink can positively or negatively affect pH; even breathing regulates pH. Inhaling brings alkaline oxygen into the body and exhaling releases acidic carbon dioxide. While acid-forming foods block antioxidant enzymes and reduce the ability of the body to digest food into nutrients, alkaline-forming foods release these antioxidant enzymes from adhering to the walls of vessels and allow for proper digestion.

The problem with current literature is that most of the treatments mentioned for alkalizing the body are very little. In fact, most of the research done has not been done. The majority of texts written are mainly from an array of doctors, most of which are not Medical Doctors. However, this review has obtained and references various published works throughout its content.

Another problem stems from the lack of education; people do not readily accept the facts and sometimes because of their uneducated physician. Gabe Mirkin, an M.D., writes in his article *Acid/Alkaline Theory of Disease is Nonsense*: “Anyone who tells you that certain foods or supplements make your stomach or blood acidic does not understand nutrition.”^[vii] Another factor on the lack of education comes from the notion of some people who do not want to change their lifestyle because they may think it is too complicated or a change of diet may be too expensive.

This chapter will examine current clinical trials that will attempt to demonstrate the effectiveness of alkalizing the blood as well as the harmful effects of an acidic environment. A clinical study from the Journal of Trace Elements in Medicine and Biology researches the effects of alkaline supplementation on low back pain. The study suggests that a change in acid-base homeostasis may cause a swelling of connective tissue in the lower back. Furthermore, the study points to increasing evidence that this disturbance in acid base homeostasis may contribute to a wide variety of diseases. Generally, a normal diet contains a surplus of acid, which must be excreted by the kidney; and this becomes increasingly difficult as the body ages leading to a higher concentration of acid.

Chronic acid load due to a high intake of acid producing food in addition to a reduced capacity of the kidney to excrete acids leads to calcium loss from bones

and a secondary wasting of muscular nitrogen. A portion of the acid surplus can be bound to extracellular matrix substances such as glucosaminoglycans, inducing a changed water binding capacity with changed swelling of connective tissue. In addition, it has been shown that a dietary acid load also increases intracellular activity with possible influences on a great variety of cellular processes.^[viii]

The case study rationalizes that it is reasonable to conclude that a disturbance in the acid base metabolism may contribute to the patients with chronic low back pain and that an administration of alkaline minerals may reduce the acidity level and consequently the back pain problems.

The Case Study – Alkalizing Effects on Low Back Pain

The clinical trial treats 82 (52 females, aged 20-75 years and 30 males, aged 28-70 years) patients with chronic low back pain with a lactose based alkaline mineral and trace element supplement (Basica®) in an open study. Basica® has been on the German market since 1930 as a pharmaceutical preparation specifically used for harmonization of chronic acid-base imbalances. The patients receive 30 grams of Basica® over a period of four weeks in addition to their regular medication. A daily dose provides a total of 43 meq of alkaline salts and is given by adding it to water, juice, tea, or yogurt. The patients involved have had low back pain without radicular symptoms for more than three months and exhibit pain with at least two of the five conditions: sitting, standing, lying, walking, or at night. They also have a pain score of at least six on a visualized pain scale of zero to ten with ten being unendurable pain. Patients with known lactose intolerance are excluded from the case study. The patients are advised to maintain their regular diet and no other treatments are provided except analgesics when needed. Arhus low back pain rating scales (ARS) are applied to the patients at the beginning and at the end of the study and consists of questionnaires concerning back and leg pain, use of analgesics, disability,

and physical impairment. A maximum score of 120 represents complete invalidity due to low back pain and zero represents a status completely lacking low back pain problems. Results: The results of the case study are clear-cut and no adverse reactions occur as the supplementation is well tolerated by the patients. The average ARS drops significantly by 49% from 41 to 21 points in four weeks. 76 out of 82 patients experience a reduction in all three areas of the ARS: 53% pain index, 49% disability, and 29% physical impairment. Most of the patients with acute low back pain recover quickly within a few weeks. Even though the patient population in this study does not have extreme pain at the beginning of the study, this is characterized by the use of analgesics and difficulty in performing simple daily tasks.

Case Studies – Metabolic Acidosis Leads to Osteoporosis

Several studies exist showing the link between metabolic acidosis and higher rates of bone fractures, hip fractures, and osteoporosis through animal protein intake. These studies report that people who consume more fruits and vegetables have a higher bone density than those who do not and indicate a three to five fold increase in fractures among teenage girls who regularly consume acidic beverages.

In a particular study of vegetarian and animal protein diets, urinary pH is more acidic and net acid excretion and daily urinary calcium excretion are higher in those consuming animal protein. Another example is a study comparing elderly adults with high and low protein diets.

In another study among the elderly, calcium balance was positive (+40mg/day) on a low protein diet of 0.8 grams of protein per kilogram of body weight (56g/day for a 70kg adult). In contrast, calcium balance was negative (-64mg/day) on a high protein diet of 1.2 grams of protein per kilogram of body weight (84g/day for a 70kg adult). Higher protein intake would lead to even greater losses in calcium, magnesium, and other minerals.^[ix]

Losing 50 to 60mg of calcium daily may not seem like much, however, over a period of 20 years, a daily loss of 50mg turns into a loss of 365 grams, which is one-half of the average of the average female skeletal calcium and one-third of the male. Unfortunately, this is not very uncommon and leads to a possible explanation to the cause of osteoporosis. Even more unfortunate, the fact that such a loss that leads to osteoporosis is easily avoidable but unappreciated in the American culture and witnessed by the fact that it is uncommon in many other cultures. The Maya Indians maintain an alkaline-rich diet and consequently have no sign of bone loss and have been classified "almost immune" to osteoporosis. Similarly, the Chinese are found to have only one-fifth the U.S. fracture rate, despite eating nearly as much protein but from plant sources. In conclusion, a diet that leads to Metabolic Acidosis results in the detriment of basic and well-being.

CONCLUSION

"Your body operates on a subtle electro-magnetic current. Your brain, your heart, and all of your organs emit fields of electrical impulses. Foods provide value only when they can be converted into the elements necessary for this chemistry to take place. Energizing means avoiding foods that take away more energy than they provide." Our internal system is made up of a delicate balance of biochemistry and chemistry; it is this combination that makes a healthy functioning disease free environment possible. Foods that tend to increase the acidity of the blood or urine after ingested are classified as being acid forming foods. Conversely, if foods increases the alkalinity of blood or urine after it has been ingested, it is classified it as an alkaline forming food. "Alkalizing breaks the

cycle of excess acid. It's the difference between life and death it is the key to maintaining balance and allowing the body's natural ability to heal and maintain an optimal level of health. Our environment is disturbed by several factors, from acid diets, emotions, lack of sleep, radiation the list goes on. The key is in making small changes: increase sleep approximately five REM cycles a night, learn to meditate, take a step back from life and relax, with diet learn to integrate some of the basic foods into your diet. As stated above, It's the difference between life and death.

REFERENCES

[i] American Heart Association,

<http://www.americanheart.org/presenter.jhtml?identifier=2114> , High Blood Pressure

[ii] Acid & Alkaline, Herman Aihara, George Ohsawa Macrobiotic Foundation, Oroville, California, Copyright 1980

[iii] American Heart Association,

<http://www.americanheart.org/presenter.jhtml?identifier=2114> , High Blood Pressure

[iv] Alkalize or Die, Dr. Theodore A. Baroody, Holographic Health Press, Waynesville, NC 28786 Copyright 2002

[v] Discovering Wholeness, The Spirit Soul and Body Connection, Dr. Cheryl Townsley, N.D. LFH Publising Littleton, CO

[vi] Alkalize or Die

[vii] Acid/Alkaline Theory of Disease is Nonsense, Dr. Gabe Mirkin, Quackwatch,

<http://www.quackwatch.org/01QuackeryRelatedTopics/DSH/coral2.html>, Copyright February 6, 2003.

[viii] Supplementation with alkaline minerals reduces symptoms in patients with chronic low back pain, Jurgen Vormann, Michael Worlitschek, Thomas Goedecke, and Burton Silver, Journal of Trace Elements in Medicine and Biology, http://www.betterbones.com/alkaline/articles/vormann_2001.pdf, Vol. 15, pp. 179-183, Copyright 2001.

[ix] Acid-Alkaline Balance and Its Effect on Bone Health, Susan E. Brown, Ph.D., CCN, and Russell Jaffe, M.D, Ph.D., CCN, International Journal of Integrative Medicine,

ADDITIONAL READINGS

- Agur, Anne M.R. *Grants's Atlas of Anatomy*. Baltimore: Williams and Wilkins, 1991.
- Aihara, Herman. *Acid and Alkaline*. Oroville, CA: George Ohsawa Macrobiotic Foundation, 1980.
- Baroody, Theodore. *Alkalize or Die*. Waynesville, NC: Holographic Health, 1991.
- Brier, Steven R. *Primary Care Orthopedics*. New York: Mosby, 1999.
- Bickley, Lynn S. *Guide to Physical Examination and History Taking*, Philadelphia: Lippincott Williams and Wilkins, 2003.
- Blaylock, Russell L. *Excitotoxin: The Taste that Kills*. Santa Fe, NM: Health Press, 1997.
- Evans, Ronald C. *Illustrated Orthopedic Physical Assessment*. St. Louis: Mosby, 2001.
- Fuhr, Arlan W., and et. al. *Activator Methods Chiropractic Technique*. New York: Mosby, 1997.
- Goldman, Lee, and J. Claude Bennett. *Textbook of Medicine*. Philadelphia: W. B. Saunders, 2000.
- Guyton, Arthur C., and John E. Hall. *Textbook of Medical Physiology*. 9th Edition. Philadelphia: W.B. Saunders, 1996.
- Kandel, Eric R., and et. al. *Principles of Neural Science*. 3rd Edition. New York: Elsevier, 1991.
- Logan, Hugh B. *Textbook of Logan Basic Methods*. 2nd Edition. Ed. Lawrence J. Hutti. Chesterfield, MO: L.B.M, 1998.
- Mengel, Mark B., and L. Peter Schwiebert. *Family Medicine: Ambulatory Care and Prevention*. 4th Edition. New York: Lange Medical Books/McGraw-Hill, 2005.
- Netter, Frank H. *Atlas of Human Anatomy*. 2nd Edition. East Hanover, NJ: Novartis, 1997.

- Nordin, Margareta, and Victor H. Frankel. *Basics of Biomechanics of Musculoskeletal System*. Philadelphia: Lippincott Williams and Wilkins, 2001.
- Pizzorno, Joseph E., et al. *The Clinician's Handbook of Natural Medicine*. New York: Churchill Livingstone, 2002.
- Reinert, Otto C. *Spina Biomechanics and Specific Adjusting*. Eds. Blair S. Alden et. al. Chesterfield, MO: RTI Incorporated, 2000.
- Souza, Thomas A. *Differential Diagnosis and Management for the Chiropractor: Protocols and Algorithms*. 3rd Edition. Salisbury, MA: Jones and Bartlett, 2005.
- Stedman's Medical Dictionary*. Baltimore: Williams and Wilkins, 1995.
- Thompson, J. Clay. *Analysis and Technique*. Vol. 1. Marietta, GA: Life College Press, n.d.
- Townsley, Cheryl. *Discovering Wholeness: The Spirit, Soul, and Body Connection*. Littleton, CO: LFH, 2000.
- Trudeau, Kevin. *Natural Cures "They" Don't Want You To Know About*. N.p.: Alliance, 2004.
- Vizniak, Nikita A., and Michael A. Carnes. *Quick Reference Clinical Chiropractic Conditions Manual*. N.p.: DC Publishing International, 2004.
- Wardlaw, Gordon M., and Margaret Kessel. *Perspectives in Nutrition*. 5th Edition. New York: McGraw Hill, 2002.
- Waxman, Stephen. *Correlative Neuroanatomy*. 24 Edition. New York: Lange Medical Books, 2000.
- Young, Paul A., and Paul H. Young. *Basic Clinical Neuroanatomy*. Philadelphia: Lippincott Williams and Wilkins, 1997.
