UNIT 3, Part 1:
Clinical Nutrition for Biological Dentistry

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Introduction: Healthy Diet, Healthy Teeth

While most dentists are not trained in nutrition, having a basic understanding of dietary health can assist dentists in teaching patients that poor nutrition invites a decay process to develop within the oral cavity.

Not eating properly and following the Standard American Diet (SAD) promote a condition within the body that usually produces a more acidic environment. To illustrate this point, studies show that on an annual basis, the average person in the United States consumes approximately 2100 lbs. of acid-forming foods compared to 380 lbs. of alkaline-forming foods. This unfortunate imbalance in diet can certainly have a devastating effect on health. In fact, it contributes to a plethora of chronic illnesses and degenerative diseases.

What happens to teeth during this process? Research by Ralph Steinman, DDS, of Loma Linda University, has shown that the metabolism of teeth and the oral cavity in general are extensions of the overall metabolism of the body.[1] Thus, the occurrence of tooth decay, abscessed teeth, and even dental sensitivities are not primarily due to external contamination of the teeth through acid-producing foods and bacteria. Rather, these deteriorating conditions occur as a result of the internal effects of the body's acidic environment because the acidic environment produces a change in the internal action of the fluids flowing within the teeth.

This is essentially because teeth are not solid; they consist of a series of dentin tubules and parallel enamel rods. In a healthy situation, fluids from within the tooth travel from the inside-out, working their way through the dentin, through the enamel, and into the mouth. This is thought to be a self- cleansing mechanism, and the constant flushing of the tooth structure prevents the movement of microbes into the tooth and the destructive effects of acids formed by foods.

However, major problems occur when hormonal imbalances, circulatory problems, and/or poor diet lead to a reverse fluid flow within the dentin tubules. A reverse flow "sucks" bacteria, acids, and other materials from the mouth or surrounding periodontium back into the tooth. Reverse fluid flow triggers a compromised condition otherwise known as decay, infection, or simply tooth pain.

Acid and Alkaline Foods: Balancing the Diet

For over a decade, a number of health care professionals have been encouraging a more balanced acid-alkaline diet as a means of preventing illness. For example, in 1999, Michael J. Porter of the Sedona Health Foundation explained the connection of an acid-alkaline diet to health:

> Our very life and health depends on the ability of the body's physiological power to maintain the stability of blood pH at approximately 7.4. This process is called homeostasis. The acid-base balance of the body is critical to good health. One cannot seriously think about individualizing a diet without considering how the diet affects one's acid-base balance. We are constantly generating acid waste products of metabolism that must be neutralized in some way if life is to be possible. We, therefore, need a continual supply of alkaline food to neutralize this on going acid generation.[2]

Research has confirmed these statements. A 2011 PubMed literature review conducted by Gerry K. Schwalfenberg of the University of Alberta found, "From the evidence outlined above, it would be prudent to consider an alkaline diet to reduce morbidity and mortality of chronic disease that are plaguing our aging population."[3]

Schwalfenberg also described how such a diet relates to survival by citing research from 2007 by Waugh and Grant: "Life on earth depends on appropriate pH levels in and around living organisms and cells. Human life requires a tightly controlled pH level in the serum of about 7.4 (a slightly alkaline range of 7.35 to 7.45) to survive."[4]

My first-hand clinical experiences as a dentist support this concept. In our dental office, we measure saliva pH as an indicator of dental health as well as the body's overall wellness. We check the saliva pH every six months when our patients visit us for their scheduled cleaning appointment. A pH reading of 7.0 (neutral) is good. However, 7.5 (slightly alkaline) is the best. I don't believe I've ever seen any decay when I see a measurement of 7.5. When I see consistent readings of 6.5 and lower, the body's "internal environment" is compromised and the conditions are usually ripe for decay and inflammation within the oral cavity.

The Acid – Alkaline Foods Chart provides a detailed ranking of foods by acid versus alkaline effects, which can help people make healthier food choices.

Alkaline-Producing Foods

For general health, alkaline-producing foods should comprise 60%-70% of overall food consumption, but for therapeutic care, they should be 90%-100%. Unfortunately, the average American consumes approximately only 10%-15% alkaline foods, which means that most people need to eat much more of these foods. The list below identifies some alkaline-producing foods:

agar agar	fruit juices– no added sugar	pears, sweet
alfalfa sprouts	garlic	peas, fresh, sweet
almonds	ginger, fresh	peas less sweet
amaranth	gooseberry	persimmon
apples	grapefruit	pickles, homemade
apples, sour	grapes, less sweet	pineapple

apricots
arrowroot flour
artichoke, globe
artichoke, Jerusalem
asparagus
avocados
bamboo shoots
bananas, ripe
barley malt sweetener- Bronners
beans, dried
beets
bell pepper
berries
blackberries
broccoli
brown rice syrup
brussels sprouts
cabbage
cantaloupe
carrots
cauliflower
cayenne
celery
chard leaves
cherries
cherries, sour
chestnuts, dry roasted
coconut, fresh
corn, sweet, fresh
cucumbers
currants
daikon
dates, dried (avoid sulfured ones)
dates, fresh
egg yolks, soft cooked
eggplant
endive
Essene bread
figs, dried (avoid sulfured ones)
figs, fresh
grapes, sour
green beans, fresh
green peas
guavas
herbs, leafy green
honey, raw
horseradish
kale
kelp, karengo
kiwi
kohlrabi
kudzu root
leeks
lemons
lettuce, leafy green
lettuce, pale green
lima beans, dried
lima beans, green
limes
mango
mayonnaise, homemade
melons
milk, raw goat
millet
miso
mushrooms
muskmelons
nectarines
okra
olives, ripe
onions
oranges
papaya
parsley
parsnips
passion fruit
peaches, less sweet
peaches, sweet
pears
pears, less sweet
pumpkin, less sweet
pumpkin, sweet
quinoa
radish
raisins
raspberry
rhubarb
rutabaga
sapote
sauerkraut
sea salt, vegetable
seaweeds
sesame seeds, whole
soy beans dry
soy cheese
soy milk
spices
spinach, raw
sprouted grains
squash
strawberry
tamari
tangerine
taro
tempeh
tofu
tomato, less sweet
tomato, sweet
turnip
umeboshi plum
vegetable juice
vinegar, apple cider
vinegar, sweet brown rice
water chestnuts
watercress
watermelon
yeast, nutritional flakes

Acid-Producing Foods

For general health, acid-producing foods should comprise 30%-40% of overall food consumption, but for therapeutic care, they should be 0%-10%. Unfortunately, the average American consumes approximately 80%-90% acid foods. The list below identifies some acid-producing foods:

artificial sweeteners
bananas, green
barley
barley malt syrup
beef (all)
beer
blueberries
bran: oat, wheat

breads: refined – corn, oats, rice, rye
buckwheat
butter, salted
carbonated drinks
cashews
cereals, unrefined & refined
cheeses: mild, crumbly, sharp
chicken
chocolate
cigarette tobacco
cigarettes
coconut, dried
coffee
corn, corn syrup
cornmeal
crackers: rice, wheat, unrefined rye
cranberries
cream of wheat, unrefined
currants
custard with white sugar
deer
dried beans
drugs
eggs: whites, whole, hard cooked
fish
flour: white, wheat, whole wheat
fructose
fruit juices with sugar
goat
honey, pasteurized
jams
jellies
ketchup
lamb
lentils
liquor
maple syrup, processed & unprocessed
mayonnaise, store purchased
milk, homogenized & most processed dairy products
milk, homogenized goat
molasses, unsulphured, organic
mustard
nutmeg
nuts: brazil, pecans, macadamias, pistachios, walnuts peanuts
oats, oatmeal
olive oil
olives, pickled
pasta, white & whole grain
pastries, all
peanut butter
peanuts
peas, dried
pickles, commercial
plums
popcorn, with butter & plain
pork, bacon
potatoes with no skin
prunes
rabbit
rice: basmati, brown & white
rye grain
rye bread, organic & sprouted
salt: refined & iodized
seeds: pumpkin, sunflower
semolina flour
shellfish
sodas
soy sauce, commercial
spelt
squash, winter
sugar, brown & white
sunflower seeds
tapioca
tea, black
turkey
veal
vinegar, white & processed
walnuts
wheat bread, sprouted organic
wheat germ
wine
yogurt, sweetened

Sugar: A Sticky Situation and a Danger to Your Health

A discussion about maintaining oral health with positive dietary choices would be incomplete without examining the impact of sugar on teeth, especially because it relates to the acidic conditions previously discussed.

New studies continue to confirm the long-suspected association between sugar and cavities, and researchers of a 2014 systematic review published in the *Journal of Dental Research* found, "Of the studies, 42 out of 50 of those[studies] in children and 5 out of 5 [studies] in adults reported at least one positive association between sugars and caries."[5]

Nutrition Australia has provided a simple description of how sugars result in acid in the mouth and tooth decay:

> The bacteria in plaque use sugars in food and drinks to produce acid. This acid dissolves the tooth's strengthening minerals (calcium and phosphate) from the tooth surface. Saliva is the body's natural defence against dental caries. It helps wash sugars from the mouth and reduces the effect of the acid produced by the plaque bacteria. The calcium and phosphate present in saliva also help to replace the minerals on the surface of your teeth. But if 'acid attacks' occur too often, your saliva won't have enough time to repair the damage done, and a hole will eventually develop in the tooth.[6]

Due to the fact that acid is present in the mouth after sugar consumption for 20 minutes or more,[7] people are advised to consider the *frequency* of sugar intake as opposed to just monitoring the amount of sugar eaten. Notably, the Canadian Dental Association suggests eating sugar-free snacks, avoiding sugar in coffee, soda pop, and fruit drinks, being especially cautious of "sticky" sugar snacks, brushing teeth, and eating fibrous fruit and vegetables.[8]

The British Dental Health Foundation encourages balancing alkaline foods in the diet, while also clarifying how to recognize different types of sugar:

> All sugars can cause decay. Sugar can come in many forms, for example: sucrose, fructose, maltose and glucose. These sugars can all damage your teeth.
>
> Many processed foods have sugar in them, and the higher up it appears in the list of ingredients, the more sugar there is in the product. Always read the list of ingredients on the labels when you are food shopping.
>
> When you are reading the labels remember that 'no added sugar' does not necessarily mean that the product is sugar free. It simply means that no extra sugar has been added.[9]

Research is also establishing that in the United States, socioeconomic status and cultural perspectives can impact diet and tooth decay. A 2009 article published in the journal *Academic Pediatrics* described the situation, "Lack of availability of quality food stores in rural and poor neighborhoods, food insecurity, and changing dietary beliefs resulting from acculturation including changes in traditional ethnic eating behaviors, can further deter healthful eating and increase risk for Early Childhood Caries and obesity."[10]

In other countries, sugar accessibility also plays a role in the issue of dental caries. A World Health Organization Collaborating Centre report by Moynihan and Petersen notes that countries without access to sugar tend to have low rates of dental caries.[11] Specifically, the report mentions an increase in cavities in parts of Africa that have had increased accessibility to sugar. The report also cites data from World War II suggesting that less dental caries occurred in areas that had reduced accessibility to sugar.

Only a few studies about sugar and its ill-effects on teeth have been mentioned here, but research is abundant that restricting sugar intake in one's diet results in better oral health.

Soda Pop: The Tooth and Body Connection

It's probably not surprising that soda pop is the most popular beverage consumed in the U.S. As a matter of fact, American consumption of soft drinks, including carbonated beverages, fruit juice, and sports drinks have increased by 500 percent in the past 50 years.[12]

What's the soft drink attraction? Studies have shown, for both regular and diet soft drinks, the sugar and artificial sweeteners both create a yearning for that sweet taste of sugar. Thus, sugar can become an addiction that our bodies crave on a daily basis. [13]

Is it possible that this "addiction" to sodas may be creating more problems to our overall health and wellness than we ever bargained for? We know that these beverages provide lots of calories, sugars, and caffeine but no significant nutritional value. But how much negative impact do they really have?

As a dentist, I'm certain based on my professional experiences that the constant, topical exposure of sugar, whether from regular soda or other sugar-laced products, creates serious and detrimental effects to the teeth and the periodontium (the specialized tissues that surround and support the teeth). Tooth decay, recurrent decay, gingival inflammation, and periodontal infections are all common side effects of sugar loading.

Some alarming statistics indicate that soda may create ill effects ranging from obesity, osteoporosis, heart disease, tooth decay, and even caffeine addictions. Although the scientific community and special interest groups continue to debate these issues, one particular area of this controversy to consider is that the body's acid/alkaline balance is indicated by pH levels of body fluids, and our extracellular fluids, approximately 86% of total body fluids, should range between 7.0 to 7.5 in healthy conditions. The average pH level of soda is approximately 3.00! If normal body fluids range from 7.0 – 7.5, then drinking a can of soda is approximately 10,000 times more acid. OUCH! Phosphoric acid is usually the culprit found in sodas. However, there are no labeling requirements at this time to indicate the amount used in these beverages.

At any extent, I discovered it takes approximately 32-8oz. cans of water to neutralize one 8oz. can of soda. Thus, common sense tells us that a person is creating a huge imbalance in the body when consuming these soft drinks. Furthermore, metabolic acidosis can result in acidemia, or acid in the blood or body tissue, which creates all sorts of problems with health. For one, it

creates anaerobic metabolism. This, in turn, produces a reduction of energy levels and chronic fatigue, with chronic inflammation, connective tissue breakdown, and oxidative stress (free radical exposure). The immune system continues to break down and deteriorate.

A 2004 review entitled "Diet, nutrition and the prevention of dental diseases" published in *Public Health Nutrition* warns, "Dental erosion is increasing and is associated with dietary acids, a major source of which is soft drinks." [14] The review goes on to evaluate evidence linking the amount and frequency of sugar consumption to tooth decay and cavities.

Three Foods for Healthy Gums and Hearts

Just as certain beverages and foods can negatively impact health, other beverages and foods can positively impact the body. For the record, pure water, a natural and basic staple for life, has a pH of approximately 7.0 and is just what the doctor ordered when it comes to a healthy beverage, healthy body, and healthy teeth.

Interestingly, some foods are now known to improve oral health and the cardiovascular system. Take into account that dental research indicates people with gum disease are two to three times as likely to suffer from heart disease. As a result, doctors who treat gum disease and doctors who treat heart disease are teaming up with a message: Dealing with one problem can help a patient avoid the other. In the summer of 2009, a major heart journal and a major periodontal journal simultaneously published a consensus paper outlining the link between the two diseases (inflammation) and urging both types of doctors to look at the body as a whole rather than a set of unrelated parts.[15]

That being said, it has also been recognized that besides exercising and, of course, getting regular dental checkups, choosing certain beverages and foods can help protect both the gums and the heart:

- Raisins are an excellent antioxidant and can fight the growth of certain bacteria that cause inflammation and gum disease.

- Green tea can significantly lower the risk of developing gum disease. In 2009, scientists found an antioxidant called catechins in green tea that impede the body's inflammatory response to the bacteria that causes gum disease.[16]

- Eating four or more servings of whole grains a day reduces the risk of periodontal disease by 23% in men, according to a study in the *American Journal of Clinical Nutrition.*[17] The researchers discovered that whole grains (oatmeal, brown rice) when compared to refined carbohydrates (white bread, white rice) digest more slowly, causing a steadier and more controlled rise in blood glucose. Avoiding spikes in blood sugar reduces the body's production of inflammatory proteins and lowers the risk of both gum and heart disease.

The concept of using a healthy diet to protect the body is simple, and putting it into practice can have a significant impact on peoples' lives. It's undeniably clear that what people eat and drink today can make a major difference in their overall health and wellness tomorrow.

Supplements: Extra Benefits Waiting to be Discovered

Science has shown that the Standard American Diet fails to provide the adequate nutritional values needed to support good health, and in 2005, researchers who examined this issue concluded, "Although both scientists and lay people alike may frequently identify a single dietary element as the cause of chronic disease (e.g., saturated fat causes heart disease and salt causes high blood pressure), evidence gleaned over the past 3 decades now indicates that virtually all so-called diseases of civilization have multifactorial dietary elements that underlie their etiology, along with other environmental agents and genetic susceptibility."

Since it is known that people with chronic illness tend to have stores of nutrients in their bodies depleted faster than normal, some people use supplements such as vitamins, minerals, and other natural products in an effort to increase the intake of essential nutrients and to obtain a level of health critical for well-being.

Yet, it should be noted here that any supplement should be evaluated for safety. Due to situations that have actually occurred involving illegal and/or misleading sales of supplements, it is necessary for patients and medical professionals to research the distributor and the ingredients in supplements. This is to make sure that the product was manufactured safely and does not contain toxic substances or other dangerous ingredients. Patients should be made aware of this concern, especially since some consumers have reportedly bought supplements online without checking the authenticity of claims made about the product, how it was manufactured, and/or its safety.

With that important consideration in mind, the following supplements are what I consider to be the six basic building blocks for creating a competent, healthy foundation in the body. Although other nutrients could easily be added, we'll keep it as simple as possible for now by discussing these six types of supplements:

- Vitamins
- Minerals
- Essential Fatty Acids
- Probiotics
- Digestive Enzymes
- Amino Acids

1. VITAMINS

Background: There are 13 different known vitamins, each with its own special role. Without them, key body processes would halt. Vitamins and enzymes work together, acting as catalysts that speed up the making or breaking of chemical bonds which join molecules together. They are necessary for human bodily functions, including energy production.

Main Sources:

- Whole natural foods - fruits, vegetables, and grains
- High-quality commercial preparation

Additional information:
Research continues to link Vitamin D deficits to illnesses, and supplementation with Vitamin D has been encouraged to promote well-being.[18] [19] The chart below identifies levels of Vitamin D and doses related to health:[20]

VITAMIN D LEVELS
25 HYDROXY D

Deficient	Optimal	Treat Cancer and Heart Disease	Excess
< 50 ng/ml	50-70 ng/ml	70-100 ng/ml	> 100 ng/ml

Multiply ng/ml by 2.5 to convert to nmol/litre

2. MINERALS
Background: At least 18 minerals are important in human nutrition. Along with vitamins, they function as components of body enzymes. Our bodies need minerals for proper composition of bones and blood and for maintenance of normal cellular function. Minerals are classified into two categories-- major and minor. On a daily basis, our bodies require more than 100 milligrams of major minerals and less than 100 milligrams of minor minerals.

Dr. Richard Anderson, ND, has said that "electrolyte deficiency is the first step in heart disease, cancer, AIDS, and most of the other chronic and degenerative diseases. It is also the first and most important thing to correct. Though the body can compensate for electrolyte deficiencies, it pays a high price. Don't be without a full reserve of electrolytes - ever!"[21]

Main Sources:
- Whole natural foods - fruits, vegetables and grains
- High-quality commercial preparation

Additional Information: As part of the tooth decaying process, Ralph Steinman DDS, of Loma Linda University, identified the early loss of magnesium, copper, iron, and manganese.[22] These minerals are all active in cellular oxidation. They're necessary for the energy production that allows the cleansing flow through the dentin tubules. He also noted that the addition of copper, iron, and manganese to a decay-producing diet almost abolishes the decay rate.

Research has also suggested that iodine[23] and selenium[24] can promote oral health.

3. ESSENTIAL FATTY ACIDS
Background: Essential fatty acids are also known as healthy essential oils or EFA's. They are essential because our bodies cannot produce these on their own; therefore, they must come from the foods that we eat. Essential fatty acids are important to our health because they produce compound structures called prostaglandins which help to regulate the following:
- inflammation, pain, and swelling
- blood pressure heart function

- gastrointestinal function and secretion
- kidney function and fluid balance
- blood clotting and platelet aggregation
- allergic response
- nerve transmission
- steroid production and hormone synthesis

Unfortunately, mass commercial refinement of fats, oil products, and the foods containing them has effectively eliminated fatty acids from our food chain. Omega-3 (alpha linolenic acid) and omega-6 (linoleic acid) are two essential fatty acids. The balance of omega-3 to omega-6 oils is critical to proper prostaglandin metabolism. The optimal ratio of omega-3 to omega-6 fatty acids is 1:2 to 1:4, or four times the amount of omega-6 fatty acids as omega-3 fatty acids.[25] High levels of omega 6's are easily found in the extraction of cooking oils and most processed foods; however, the omega 3's are much harder to acquire. Research has shown that most Americans are deficient in omega-3 fatty acids and that this deficiency in mothers could impact the neurological development of children.[26]

Main Sources: The following omega-3 supplements will help re-establish the proper ratios for the body again:

- Flaxseed oil (this is the best source available)
    - for general health= 1 tbs/day
    - for therapeutic dose= 2tbs/day
- Flaxseed capsules
- Fish oil or marine lipid capsules (gaining more popularity for omega 3's)
- 2-3 servings of fish/week

Additional information: A blood serum test for Fatty Acid Analysis can be ordered to determine an accurate assessment of a person's omega-3 to omega-6 ratio.

4. PROBIOTICS

Background: Probiotics literally means "for life'" and is a term used to signify the health-promoting effects of friendly bacteria. There are at least 400 different species of microflora in the human gastrointestinal tract. The most important friendly bacteria are Lactobacillus acidophilus and Bifidobacterium bifidum; therefore, it makes sense to maintain a high level of these bacteria in our intestines. Probiotic supplements help to support:

- proper intestinal environment
- post-antibiotic therapy
- protection from vaginal infections
- protection from urinary infections
- cancer prevention

Main Sources:

- Yogurt
    - Obtain through foods, such as yogurt at 14 oz./day
    - Check to see if there's friendly bacteria in your yogurt product by leaving it out of the refrigerator overnight. If live bacteria is present, you should see bubbles on top of the yogurt. If there are no bubbles, then there is no friendly bacteria.

- High-quality commercial preparation of L. acidophilus and B. bifidum
    - for general health= 1 - 2 billion cfu/day (colony forming units)
    - during antibiotic usage= 15- 20 billion cfu's for 14 days twice daily (using this supplement at times that are opposite the antibiotic dosages for best effects)
    - after antibiotic usage= 15-20 billion cfu's for 14 days twice daily

5. DIGESTIVE ENZYMES

Background: The process of digestion is dependent on several dozen digestive enzymes that are produced by the body at different sites along the digestive tract in the mouth, stomach, and small intestine. These enzymes break down the foods consumed into particles small enough to pass through the intestinal wall and be absorbed by the cells. It is within the cells that the molecules of food are converted into usable energy.

If digestive-enzyme production is diminished, none of the food that we eat can be properly absorbed and assimilated by the body. This concept is often a surprise to many Americans, who assume that if they eat a lot of food, they'll be well nourished and healthy. However, a full plate doesn't always translate into a healthy body and vital life, particularly if the body is unable to properly use the food due to a lack of adequate digestive enzymes.

Of all the digestive enzymes, pancreatic enzymes are among the most critical for the absorption of food and maintenance of good health. These enzymes are capable of breaking down all types of food-- carbohydrates, protein, and fat.

Main Sources:

- Support healthy digestion with an enzyme-rich diet of fresh fruits, especially melons and papayas (these are low in acid content), and vegetables, along with sprouted seeds (alfalfa sprouts) and legumes (beans)
- High-quality commercial preparation

6. AMINO ACIDS

Background: Amino acids are the chemical units or "building blocks" that make up proteins. They are found in every tissue of the body and play a major role in nearly every chemical process that affects physical and mental function. As a result, amino acids have more diverse functions than other nutrient groups. They contribute to the formation of proteins, muscles, neurotransmitters, enzymes, antibodies, and receptors and are involved in basic cellular energy production.

Main Source:

- High-quality commercial preparation is probably the most effective way to acquire the proper amount of amino acids on a daily basis

The Mediterranean-Type Diet

Overview

Over the last 10-15 years, the Mediterranean- Type Diet has received notable attention as being one of the most healthiest and nutritional type diets in the world. It is considered a "low-carb" diet that not only promotes weight loss, but also helps to balance blood sugar and hormone levels, help with adrenal fatigue (the stressed-out person's lifestyle syndrome), prevent the ups and downs that we commonly experience due to our body's unstable energy supply, and reduce the frequent mood swings that can impact our mental disposition. It is also considered an extremely heart-healthy diet plan.

The following information provides some important guidelines and suggestions to assist in adapting a new dietary plan.

How to Eat

- *Eat every 2-3 hours.* Although many people only eat 2 or 3 times a day, the body's metabolism will become much more efficient if healthier, smaller portions are eaten throughout the entire day. This helps to relieve the stress handling glands from the job of maintaining normal blood sugar levels between meals.

What to Eat

- *Eat real, natural, organic, whole, fresh foods.*

- *Drink plenty of water.* Remember, 70-75% of the body contains water. The body must be hydrated or else the system will continually be stressed. (Filtered water, not tap water, is recommended).

- *Salting your food.* Stress-handling glands need plenty of salt for normal function. Research has challenged the notion that salt consumption causes high blood pressure or heart disease,[27] [28] and using salt in a moderate fashion is considered acceptable by many. However, sea salt is recommended over "regular" salt because it contains the trace minerals that have been refined out of "regular" salt.

- *In the beginning, minimize fruits*. If adrenal fatigue is suspected, have a test for adrenals. Keep in mind that 98% of population has adrenal fatigue!

What NOT to Eat

- *Avoid dead, devitalized, processed, junk foods.* These "foods" CANNOT re-build a healthy body. They are also anti-nutrients which means they rob any remaining nutrient storages from the body.

- *Avoid caffeine, sugar, alcohols.* These will provoke the stress-handling glands into

releasing epinephrine and cortisol to raise blood sugar and release energy. Chronic and habitual use of caffeine, sugars, and alcohols can lead to adrenal fatigue syndrome.

- *Avoid trans-fatty acids (hydrogenated or partially hydrogenated oils) and rancid fats.* These are prevalent in margarine, vegetable shortening, and almost all commercially packaged foods.

- *Do not eat carbohydrates alone.* You want to avoid unnecessary spikes in blood sugar levels; therefore, always add protein to your meals and snacks. It is especially important NOT to eat a carbohydrate-only breakfast.

Celiac Disease and the Oral Cavity

I recently discovered an interesting connection between patients suffering from celiac disease and its effects on the oral cavity. Celiac disease is an autoimmune digestive disease that damages the micro-villi of the small intestine and interferes with absorption of nutrients from food. This means that celiac disease is triggered by consumption of the protein called gluten, which is found in wheat, barley, rye, and oats. When people with celiac disease eat foods containing gluten, their immune system responds by damaging the fingerlike villi of the small intestine. When the villi become damaged, the body is unable to absorb nutrients into the bloodstream, which can lead to malnourishment.

According to the National Foundation for Celiac Awareness, roughly one out of every 133 Americans has celiac disease, but 97% remain undiagnosed.[29] Thus, almost three million Americans have the illness, but only about 100,000 know they have it. The National Foundation for Celiac Awareness warns that if celiac disease is not treated, individuals can end up suffering from other conditions such as autoimmune diseases, osteoporosis, thyroid disease, and cancer. [30]

Symptoms of celiac disease may or may not occur in the digestive system. For example, one person might have diarrhea and abdominal pain, while another person might have irritability or depression. In fact, irritability is one of the most common symptoms in children. Some of the most common symptoms of celiac disease include bloating or gas, diarrhea, constipation, fatigue, joint pains, tingling/numbness, headaches, irritability, and infertility.

Dental symptoms include discolored teeth, loss of enamel, and/or canker sores. I must admit, over the years, I've seen plenty of these symptoms in my patients' mouths but never once made this connection. It's also interesting to note that there are no known etiologies for the causes of canker sores. Remember, the oral cavity is like a window to the rest of the body, and Biological Dentistry offers this unique interpretation to our patients, as we continue to think outside the box and search for these "tooth and body" connections. In our office, a clinical examination of the oral cavity offers more than just a casual evaluation of the teeth and gums. Looking for clues that may suggest systemic imbalances or a compromised condition in general health is our main focus for our patients.

Accurately diagnosing celiac disease can be quite difficult largely because the symptoms often mimic those of other diseases including irritable bowel syndrome, Crohn's disease, ulcerative colitis, diverticulosis, intestinal infections, chronic fatigue syndrome, and depression. Blood tests will usually be ordered to gain a proper diagnosis of celiac disease.

It is important to continue eating a normal, gluten-containing diet before being tested for celiac. If the blood tests and symptoms indicate celiac disease, a physician may suggest a biopsy of the lining of the small intestine to confirm the diagnosis.

As of now, the only treatment for celiac disease is a gluten-free diet eliminating all foods with wheat (including spelt, triticale, and kamut), rye, oats, and barley. [31] Despite these restrictions, people with celiac disease can eat a well-balanced diet with a variety of foods, including bread and pasta. For example, instead of wheat flour, people can use potato, rice, soy, or bean flour. Or, they can buy gluten-free bread, pasta, and other products from specialty food companies. Just keep in mind that some people may also have sensitivities to other foods such as soy.

The gluten-free diet is a lifelong commitment for people with celiac disease. Eating any gluten, no matter how small an amount, can damage the intestine. This is true for anyone with the disease, including people who do not have noticeable symptoms. As with other chronic illness, the immune system is continuously attacked over time, and other more serious illnesses may develop.

Finally, many patients and dentists are not aware that some dental polishes contain gluten.[32] As with other patient allergies, dentists should be familiar with the ingredients in the products they use so they can protect patients from being exposed to allergens.

[1] Roggenkamp C. *Dentinal Fluid Transport*. Loma Linda, Calif.: Loma Linda Univ. Press, 2004.
[2] Porter MJ. Class 1: Understanding the body – the acid/alkaline balance. Sedona Health Foundation. 1999.
[3] Schwalfenberg GK. The alkaline diet: is there evidence that an alkaline pH diet benefits health? *Journal of Environmental and Public Health*, 2012.
[4] Waugh A, Grant A, *Anatomy and Physiology in Health and Illness*. Churchill Livingstone Elsevier: Philadelphia, PA, USA, 10th edition. 2007. Cited in Schwalfenberg GK. The alkaline diet: is there evidence that an alkaline pH diet benefits health? *Journal of Environmental and Public Health*. 2012.
[5] Moynihan PJ, Kelly SAM. Effect on Caries of Restricting Sugars Intake Systematic Review to Inform WHO Guidelines. *Journal of Dental Research*. 2014; 93(1): 8-18.
[6] Nutrition Australia. Resources and fact sheets: Dental Health. Nutrition Australia website. April 2009. Source credited to the Australian Dental Association and Dairy Australia. http://www.nutritionaustralia.org/national/resource/dental-health
[7] American Dental Association. For the dental patient: Diet and tooth decay. JADA. April 2002; 133: 527. http://www.ada.org/sections/scienceAndResearch/pdfs/patient_13.pdf
[8] Canadian Dental Association. Your oral health: Nutrition. Canadian Dental Association website. 2014. http://www.cda-adc.ca/en/oral_health/cfyt/dental_care/nutrition.asp
[9] British Dental Health Foundation and International Dental Health Foundation. Caring for teeth: Diet. The British Dental Health Foundation website. Accessed April 2024. http://www.dentalhealth.org/tell-me-about/topic/caring-for-teeth/diet
[10] Mobley C, Marshall TA, Milgrom P, Coldwell SE. The contribution of dietary factors to dental caries and disparities in caries. *Academic Pediatrics*. 2009; 9(6): 410-414.
[11] Moynihan P, Petersen PE. Diet, nutrition and the prevention of dental diseases. *Public Health Nutrition*. 2004; 7(1a): 201-226.
[12] Putnam JJ, Allshouse JE. Food consumption, prices, and expenditures, 1970–97. Food and Consumers Economics Division, Economic Research Service, US Department of Agriculture; Washington, DC. 1999.
[13] Avena NM, Rada P, Hoebel BG. Evidence for sugar addiction: behavioral and neurochemical effects of intermittent, excessive sugar intake. *Neuroscience & Biobehavioral Reviews*. 2008; 32(1): 20-39.
[14] Moynihan P, Petersen PE. Diet, nutrition and the prevention of dental diseases. *Public Health Nutrition*. 2004; 7(1a): 201-226.
[15] Friedewald VE, Kornman KS et al. The American Journal of Cardiology and Journal of Periodontology Editors' Consensus: Periodontitis and Atherosclerotic Cardiovascular Disease. *Am J Cardiol*. 2009; 104:000–000. Available online at: http://www.ajconline.org/webfiles/images/journals/ajc/AJC16740final.pdf
Friedewald VE, Kornman KS et al. The American Journal of Cardiology and Journal of Periodontology Editors' Consensus: Periodontitis and Atherosclerotic Cardiovascular Disease. *Journal of Periodontology*. 2009; 80(7): 1021-1032.
[16] Kushiyama et al. Relationship between Intake of Green Tea and Periodontal Disease. *Journal of Periodontology*. 2009; 80 (3): 372.
[17] Merchant AT, Pitiphat W, Franz M, Joshipura KJ. Whole-grain and fiber intakes and periodontitis risk in men. *The American Journal of Clinical Nutrition*. 2006; 83(6), 1395-1400.
[18] Anderson JL, May HT, Horne BD, et al. Relation of vitamin D deficiency to cardiovascular risk factors, disease status, and incident events in a general healthcare population. *The American Journal of Cardiology*. 2010; 106(7): 963-968.
[19] Holick MF. Sunlight and vitamin D for bone health and prevention of autoimmune diseases, cancers, and cardiovascular disease. *The American Journal of Clinical Nutrition*. 2004; 80(6): 1678S-1688S.
[20] Holick MF. Calcium and Vitamin D. Diagnostics and Therapeutics. *Clin Lab Med*. 2000; 20(3):569-90 cited in Dr. Mercola. Test Values and Treatment for Vitamin D Deficiency. February 23, 2002. Dr. Mercola website. http://articles.mercola.com/sites/articles/archive/2002/02/23/vitamin-d-deficiency-part-one.aspx
[21] Anderson R. *Cleanse and Purify Thyself. Book 1: The Cleanse*. Medford, OR: Christobe Publishing. 2007.
[22] Roggenkamp C. *Dentinal Fluid Transport*. Loma Linda, Calif.: Loma Linda Univ. Press, 2004.
[23] Venturi S, Venturi M. Iodine in evolution of salivary glands and in oral health. *Nutrition and Health*. 2009; 20(2): 119-134.
[24] Pärkö A. Has the increase in selenium intake led to a decrease in caries among children and the young in Finland. *Proceedings of the Finnish Dental Society. Suomen Hammaslaakariseuran toimituksia*. 1991; 88(1-2), 57-9.
[25] Yehuda S, Carasso RL. Modulation of learning, pain thresholds, and thermoregulation in the rat by preparations of free purified alpha-linolenic and linoleic acids: determination of the optimal omega 3-to-omega 6 ratio. *Proceedings of the National Academy of Sciences*. 1993; 90(21): 10345-10349.
[26] Child & Family Research Institute. (2008, March 11). Typical North American Diet Is Deficient In Omega-3 Fatty Acids. ScienceDaily. Retrieved April 28, 2014 from www.sciencedaily.com/releases/2008/03/080307133659.htm
[27] Taylor RS, Ashton KE, Moxham T, Hooper L, Ebrahim S. Reduced dietary salt for the prevention of cardiovascular disease: a meta-analysis of randomized controlled trials (Cochrane review). *American Journal of Hypertension*. 2011; 24(8): 843-853.
[28] Stolarz-Skrzypek K, Kuznetsova T, Thijs L et al. & European Project on Genes in Hypertension (EPOGH) Investigators. Fatal and nonfatal outcomes, incidence of hypertension, and blood pressure changes in relation to urinary sodium excretion. *JAMA*. 2011; 305(17): 1777-1785.

[29] National Foundation for Celiac Awareness and the American Society of Health-System Pharmacists. What is Celiac Disease? National Foundation for Celiac Awareness website http://www.celiaccentral.org/SiteData/docs/NFCA%20Glute/09662d869bb02629/NFCA%20Gluten%20in%20Medications%20Guide.pdf

[30] National Foundation for Celiac Awareness and the American Society of Health-System Pharmacists. What is Celiac Disease? National Foundation for Celiac Awareness website http://www.celiaccentral.org/SiteData/docs/NFCA%20Glute/09662d869bb02629/NFCA%20Gluten%20in%20Medications%20Guide.pdf

[31] National Foundation for Celiac Awareness and the American Society of Health-System Pharmacists. What is Celiac Disease? National Foundation for Celiac Awareness website http://www.celiaccentral.org/SiteData/docs/NFCA%20Glute/09662d869bb02629/NFCA%20Gluten%20in%20Medications%20Guide.pdf

[32] Fis BS. Avoiding common dental allergens. Living Without's Gluten Free and More website. http://www.livingwithout.com/issues/2_4/dental_details-1180-1.html