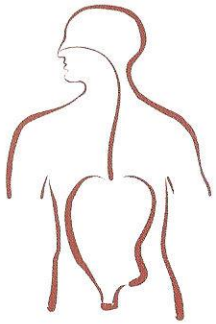
STEPS TO WELLNESS – LESSON 5

Healthful Digestion

BEAUTIFULLY DESIGNED

Many Americans suffer from digestive problems of one kind or another. These problems could be largely reduced and often eliminated by an understanding of the principles of digestion. After God first created us He gave us a diet: "Then God said, 'I give you every seed-bearing plant on the face of the whole earth and every tree that has fruit with seed in it. They will be yours for food.'" (Genesis 1:29 NIV) We were created with a fantastic ability to appreciate the taste or flavor of foods, their distinctive aromas, their various textures. Food obviously was made by a Creator who intended for us to enjoy the many wonderful varieties of foods. Unfortunately, mankind has become caught up in such a hurried lifestyle that many have developed the habit of gulping down their food at mealtimes with very little time for savoring it and truly enjoying it to the fullest. What actually happens to the 100,000 pounds of food that the average American consumes in a lifetime, after it goes into the mouth?[1]

LONG JOURNEY



When food enters the mouth it begins a journey of some 27 feet through the alimentary canal. It begins in the mouth and throat, then down the esophagus into the stomach, into the small intestine where most of the absorption takes place, then into the large intestine, and finally the residues are excreted. This process for most Americans and western Europeans may take up to 70 hours.

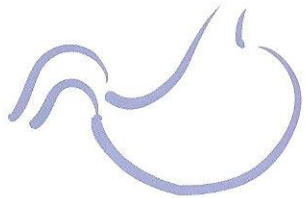
To understand how to have the best quality of digestion, we should look at the digestive process. Food must undergo a series of physical and chemical changes, breaking down complex chemical compounds into simple, usable molecules, before it can be used by the body's cells and tissue.

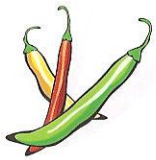
When we consider the space it takes to include six glands in the face area, we conclude that by size and design, these six salivary glands are important. Saliva from the glands immediately begins the breakdown of carbohydrates. Salivary amylase is an enzyme in the saliva which breaks down the starch from the food into smaller molecules of "simple sugar" which the body uses for energy. It is important to eat slowly and chew the food thoroughly, mixing the food with the enzymes, to help digestion.

Taste buds on the surface of the tongue help us to enjoy the flavor of foods, but they can only detect flavor when food is dissolved in saliva. Our taste buds are located on the sides of what appears to be mountain peaks (papillae), of which we have about 10,000. In order for the food substances to be tasted, they must enter the open space around the papilla (moat), to come in contact with the taste buds.

Once we chew and crush our food, once it is mingled with the saliva, tasted and formed into a sticky mass by the tongue, it's ready to be swallowed and journey down the 10 inches of mucus-lined esophagus to the stomach. The mucosa of the esophagus is specialized to resist the abrasion of coarse food material.

The stomach is a J-shaped organ about ten inches long. Food enters the stomach by passing through the cardiac sphincter at the end of the esophagus (sphincters are rings of muscles tissue). The cardiac sphincter keeps food from re-entering the esophagus when the stomach contracts. Once food reaches the stomach, like when in the mouth, it faces both mechanical and chemical forces. Contraction of the stomach's muscular walls mixes the food thoroughly with the gastric juice and breaks it down into what is called chyme. Gastric juices contain both hydrochloric acid and enzymes that function in the digestive process. This is why it is not good to drink a lot of fluid with meals because it will dilute the hydrochloric acid and digestive enzymes. When they are at a weaker concentration the digestion of the food can be deterred.





STOMACH'S WEAK SPOT

Although the digestive organs are strong and accomplish a lot of food digestion every day, there are some things that are harmful to the system. If your stomach is normal, it is a tough organ not affected by food, unless it is extremely hot, cold, or spicy. Hot spicy foods such as black pepper and chili pepper irritates the lining of the stomach, and studies show that the use of pepper may lead to ulcer formation.[2]

The stomach is also affected by our emotions. Anger will produce violent churning in the stomach and fiery red areas in the walls. If the anger is prolonged or intense enough, these areas will actually bleed. On the other hand, if we are frightened our stomach lies still and the inner lining becomes pale. Emotional tension, fear, anger, and frustration increase secretion of acid and also decrease the supply

of blood by constriction of the blood vessels. The stomach may then digest part of itself and form what we know as a peptic ulcer. It is important to avoid harmful emotions. One study showed that people who were relaxed while they ate had higher pH levels of the saliva, and higher enzyme levels, which aid digestion.[3] Unfortunately most Americans are so busy at meal time that it becomes a "quick bite to eat," and then stomach problems develop. Plan your meal time so that you will enjoy an unhurried pleasant occasion.

DIGESTION TIME

The stomach is capable of expanding after a large meal to hold a little over a quart of food. When it is empty it shrinks to a capacity of less than two cups. The average stomach-emptying time for a normal mixed meal is about 3.5-4 hours. However, it depends on the content of the food. Eating patterns may also influence the amount of time it takes the stomach to empty. It is best to have regular set times to eat and have no snacks in between. When a snack is eaten after a meal, the new food delays the digesting of the food from the previous meal. The delay from the stomach emptying may result in improper digestion, or the food may ferment from the long time in the stomach causing bad breath, stomach discomfort, or headaches. Snacking may also lead to constipation.[4]

SNACKING STUDIES

Normal Breakfast	Two Hours Later	Results
Person #1	No snack	Stomach empty in 4-1/2 hours
Person #2	Ice cream cone (two hours after meal)	Residue in the stomach after 6 hours
Person #3	Peanut butter sandwich (two hours after meal)	Residue in stomach after 9 hours
Person #4	Pumpkin pie and glass of milk	Residue in stomach after 9 hours
Person #5	Half slice of bread and butter repeated every one and one-half hour interval with no dinner	More than half of breakfast in stomach after 9 hours
Person 6	Twice in the morning and twice in the afternoon a bit of chocolate	13-1/2 hours later more than one-half the morning meal was still in the stomach

BEYOND THE STOMACH

When the food particles leave the stomach in the chyme form, they enter the small intestine. From the small intestine all the vital nutrients pass into the bloodstream in their final molecular forms. Because of the complexity, the small intestine is assisted by chemicals secreted by two glands, the liver and the pancreas. The liver assists in the digestive process by manufacturing bile, a fluid that helps prepare fat for digestion. The pancreas contributes digestive enzymes that help finish the breaking down of proteins, carbohydrates, and fats. By the end of five hours, if all is normal, carbohydrates are changed to simple sugars known as glucose which is used for energy, proteins are changed to simple amino acids, and fats become fatty acids and glycerol.

If digestion is normal and the digestive system has completed its work, the nutrients will pass from the small intestines to the blood stream where they undergo further preparation before they are used by individual body cells. The liver is the main organ responsible for the processing of absorbed materials. Amino acids from protein pass through the liver and are picked up in the blood for delivery to other organs. A small percent of the fatty acids and glycerol in the intestine also passes through the liver, which changes them to fatty substances called lipids – cholesterol for example, which is found in almost every cell in the body. The simple sugars (glucose) that come from carbohydrates are taken from the small intestine and stored by the liver in a different form called glycogen. Glycogen can be broken down to release glucose into the blood when it is needed for energy by the cells.

BREAKFAST ADVANTAGE

The best meal of the day is breakfast. Although contrary to the common practice of Americans, the breakfast should be the biggest meal and supper should be the lightest. The reason for this is that the calories that are taken in earlier in the day are more likely to be burned for energy throughout the day. If one eats a large meal in the evening, the body is ready for rest and many of those calories will be used as excess weight. Eating before going to bed is one of the reasons that many people do not sleep well at night – although the person may be sleeping the stomach is still working to digest the late meal or snack. This is also why most people are not hungry at breakfast time. If supper were lighter then there would be a greater appetite for breakfast. When going on a trip with a car, we commonly fill up the gas tank before instead of after we are there. Our bodies do best with their fuel first thing in the day as well.

Many of us never realize the complicated process that goes on every time we eat. With stomach cancer a serious problem today along with ulcers and diverticular disease, it is good to understand more about what we can do to prevent these diseases. Here are some simple practical steps to help your digestion improve.

HEALTHFUL DIGESTION TIPS

1. Have regular times for meals, and avoid snacking between.

2. Make breakfast the biggest and best meal.

3. Enjoy the food and chew it well.

4. Avoid spicy foods that damage the stomach.

5. Drink plenty of water between meals, but not with them.

When we study physiology we learn more of how we can cooperate with our body and have the most healthful digestion and most healthful lifestyle overall. Becoming better acquainted with the digestive system can help us to develop respect for the marvelous system that we are born with. Understanding the digestive system may also help us take better care of the remarkable organs that work with us, and as a result live with a better-nourished and healthier body. In the words of the Psalmist, "I will praise thee; for I am fearfully and wonderfully made..." Ps. 139:14

References

1 The Encyclopedia of Health, The Healthy Body, The Digestive System, Avraham, R., Garell, D.C., ed., 1989, Chelsea House Publishers, New York, p.14.
2 Baldwin, Marjorie, M.D., Baldwin, Bernell Ph.D., Nutrition for the Nineties,
3 Golden Harvest Books, Eau Claire, Michigan, 1992, p 216, 219
4 American Journal of Clinical Nutrition 49:97-105, 1985
5 Thrash, Agatha, Nutrition for Vegetarians, New Lifestyle Books, 1982 p. 46,81,

REVIEW QUESTIONS

T F (True or False)

___ ___ 1. Digestion begins in the mouth, with the saliva.

___ ___ 2. The hydrochloric acid and enzymes in the stomach are not affected by liquid with meals.

___ ___ 3. Our emotions play a significant role in digestion.

___ ___ 4. It is important to take time to eat and not be rushed.

Multiple Choice Questions

Indicate your answer by checking the letter you think is most correct

5. The stomach digests meals best when:
___ A. snacks are eaten between meals.
___ B. spicy and rich foods are eaten.
___ C. simple food eaten at regular times.
___ D. none of the above.

6. The healthiest meal pattern is:
___ A. a big breakfast, normal lunch and light supper.
___ B. a big breakfast and supper, and no lunch.
___ C. no breakfast, a light lunch and a big supper.
___ D. none of the above.

Comments _____

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