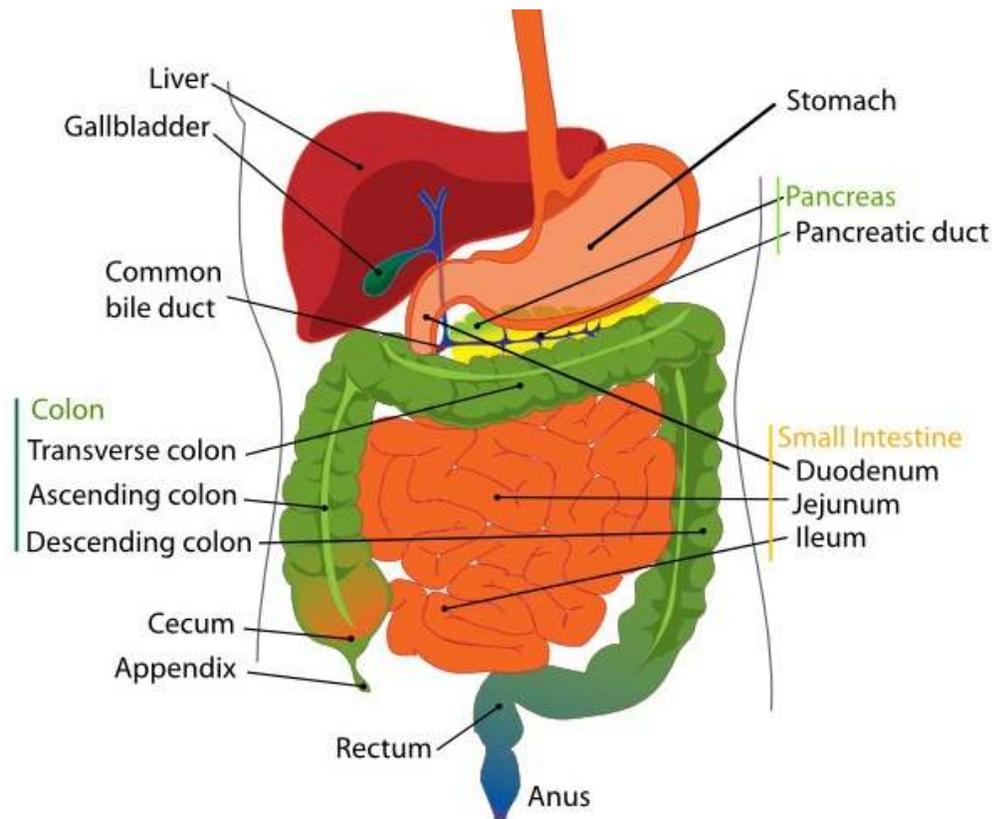


## Digestive System - Outline

Session # 6: 2015 Feb 10



### We will explore:

- Role and Functions of Digestive System
- Structure of the Digestive System
- Absorption of Nutrients from the food
- Accessory Organs to the GI System

GI = gastro Intestine

### Role: Digestive System

- *Convert Food into useable Fuel and then expel*
- *What it cannot use as waste.*
- Breaks up food physically and chemically.
- Stores food for a short period of time.
- Absorbs the digested foods and passes them into the circulatory system.
- Stores and eliminates undigested food from the body.

### Complex Network

Consists of: Organs, Glands, Muscle, Nerves, and Chemicals

### Digestive System Interact with many Systems:

- Circulatory
- Lymphatic
- Brain
- Musculoskeletal

- More ...

## Your Second Brain!

- Largest Blood Supply System in the body
- Huge Nerve System
- The *Vagus Nerve* is one of 12 cranial nerves. It extends from the brain stem to the abdomen, via various organs including the heart, esophagus and lungs.

## Concept: Mini-Ecosystem

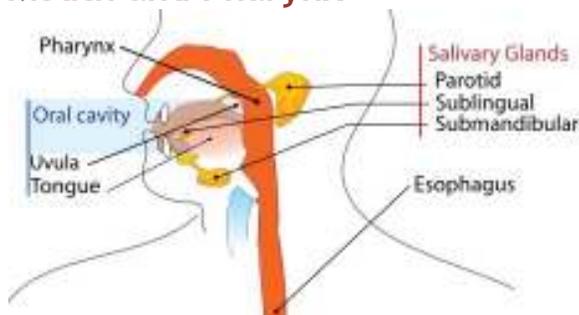
Everything is Interconnected and Interdependent:

- What you see, feel, eat.
- How you think, move, breath
- What you eat
- Virtually everything you do affects you physically as a whole and everything that affects you physically affect your digestion

## Organs of GI Tract

1. The Mouth & Pharynx
2. Esophagus
3. Stomach
4. Small Intestine/Small Bowel
5. Large Intestine/Large Bowel/Colon
6. Rectum
7. Anus

## Mouth and Pharynx



## Saliva

- Sensory - Thought, sight and smell can make your mouth water
- Mostly water, less than 1% made up of enzymes, salts and minerals
- Break down carb, kills bacteria, and maintains pH balance
- A small amount of Saliva is always present in a healthy mouth (while awake)

## The Tongue

- Starts out with 10,000 taste buds that gradually diminishes with age
- Buds send nerve impulses to the brain that we experience as taste
- Sweet buds are at the tip
- Salty in the middle
- Sour on the sides
- Bitter at the back
- They all tell the stomach to start releasing digestive juices

## The Teeth & Chewing

- Chewing tells the brain to produce the appropriate amount of digestive juice
- Not Chewing enough/thoroughly is a cause of undigested food in the gut, causing fermentation, gas and bloating
- Eating too fast and taking large bites contribute to his problem
- Good dental hygiene is an important factor

## The Esophagus

- 10 in. long
- Connecting the throat and the stomach
- Lined with rings of muscles, it propels a BOLUS of food by sequentially contracting and relaxing them in a wave-like action called **peristalsis**
- The last voluntary act of swallowing is performed by the back of your tongue through the upper relaxed **sphincter** muscle
- From that point on digestion is all automatic
  
- Pressure from BOLUS at the bottom of the Esophagus triggers LES (Lower sphincter) muscle to open, dropping the food into the stomach (LES act as a one-way valve, it promptly snaps shut)
- Eating too quickly may not give LES enough time to reset (**ACID REFLUX/GERD**), allowing acid from stomach to
- Reflux into the throat)

## The Stomach

- Muscular sac 10 in long
- Shaped like a fat letter "J"  
Like Accordion it can expand to hold  $\approx$  1 gal of food (and liquid), when empty, it can fold in on itself.
- When saliva is released in the mouth, the stomach is signalled to first coat its walls with a 1 in. thick **MUCUS** protection, then to release a potent Gastric Juice of **DIGESTIVE ENZYMES & HYDROCHLORIC ACID**
- **Acid** in the stomach kills bacteria (any live organisms)
- Gastric Juice helps to dissolve the food into a very thin soup called **CHYME**.
- Brain signals to release a chemical, **ACETYLCHOLINE**, in the stomach walls which begins a powerful churning action driven by 3 layers of muscles.
- This crushing action can continue for 2-4 hr. depending on the content. Fat & gristly meat take the longest time.
- Once the stomach has completed its Job, powerful muscles push the chyme down to another sphincter called **PYLORIC VALVE** which allows  $\sim$  1/8 oz. into the upper intestine at a time.
- The remaining food continues to be mixed.

Note: Damaged sphincter or weakened (due to age) can be a source of disease and require medical attention

## The Small Bowel System (SBS)/Small Intestine

Consists of three distinct functional sections ( $\sim$  22 in long)

1. Duodenum
2. Jejunum
3. Ileum.

### Absorbs:

- 80% ingested water
- Vitamins
- Minerals
- Carbohydrates
- Proteins
- Lipids

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Secretes digestive enzymes

## Accessory Organs

Not part of the GI tract, but play a critical role.

1. Pancreas
2. Liver
3. Gallbladder

### Pancreas

- Produces digestive enzymes to digest fats, carbohydrates and proteins
- Regulates blood sugar by producing two hormones: insulin and glucagon

### The Liver

- Largest organ
- Like a chemical factory that performs ~ 500 functions,
- Directly affects digestion by producing bile (stored in the Gallbladder)
- Filters out toxins and waste including drugs and alcohol

### Gall Bladder

- Stores bile from the liver, releases it into the small intestine.
- Fatty diets can cause gallstones

### Absorption of Nutrients from Food

- Small Intestine is lined with Tiny projections called **VILLI**.
- If flattened out, would resemble a Shag Carpet.
- Each **Villus** is covered with 3000 to 6000 **Microvilli** that absorb the nutrients from your digested food.
- In this way the area for absorption is increased about 600 times more than if the walls were smooth.

### The Colon/Large Intestine

- Cecum is the start of the colon where small intestine joins colon
- Consists of four sections, extending from 6 ft. - 10 ft. long.
  1. Transverse
  2. Ascending
  3. Descending
  4. Sigmoid

### The Rectum & Anus

- Only part of your GI tract with sensitivity.
- Passing of waste bring movement and gentle urge for bowel movement.
- If stool not released through Anus, rectum will absorb water from the stool.

### Conclusion

- Be forewarned, when you get a gentle urge to go, GO.
- Health of your digestion depends on your food and life style
- GI can adjust to may abuses, hurried meal, life style but chronic situation will make it worse.
- GI system can be cause of many diseases.
- Most important is Stress, so manage your stress.
- Avoid tobacco, alcohol.
- Use medication cautiously including antacid, antidiarrheal, NSAID (occasional use is OK)

## Further Exploration

- WebMD explains how your *digestive system* works  
<http://www.webmd.com/heartburn-gerd/your-digestive-system>
- How your *digestive system* works on Mayo Clinic  
<http://www.mayoclinic.org/digestive-system/sls-20076373>
- Animation of Digestive System  
<https://www.youtube.com/watch?v=ZeUlh9Cou38>
- <https://www.youtube.com/watch?v=-Zyk0H1HmjA>
- <https://www.youtube.com/watch?v=XxvRbxhqoZk>
- Anatomy of Digestion by Model  
<https://www.youtube.com/watch?v=l8aLmomDPU>

## Handout of this and other Presentations

This presentation

- Digestive System (B5): <http://tiny.cc/digestives>

Previous his presentations

- Managing Stress (B6): <http://tiny.cc/managingstress>
- Healthy Thinking (B7): This presentation <http://tiny.cc/healthythinking>

## Resources

**Life Transformation Institute's website** <http://tiny.cc/healthresources>

- Glossaries (Heath, Heart. Heart Diseases)
- List of Health Magazines, Books
- Articles
- Presentations

## Holistic Dental Health:

**Appendices of "7 Steps to Dental Health"** <http://7stepsdentalhealth.com>

- Health Websites
- Health Organizations
- Glossary of Holistic and Dental Terms
- Dental Knowledge Test

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