

## Seventh Lecture

### 7. Digestive System

#### *Summary of previous lectures*

*In the previous lectures we talked about the basic elements of the medical word: word root, combining form, suffix, and prefix. The meaning of a word is determined by how these elements are combined. Detailed information about suffixes is mentioned. Suffix linking and suffix types are explained in detail and many examples related to the surgical, diagnostic, pathological, grammatical and plural suffixes are also provided. Detailed information about prefixes is also mentioned. Prefix linking and prefix types are explained in detail and many examples related to different types of prefixes are provided.*

*The basic structural and functional organization of the body from the cellular level to the organism level is also presented. Additionally, terms used to describe planes of the body, body cavities, quadrants and regions of the abdominal cavity, and divisions of the spinal column are presented. These terms are considered as an essential part of medical terminology and are used in all body systems.*

#### 7.1. Anatomy and physiology<sup>136</sup>

The digestive system, also called the gastrointestinal (GI) system, consists of a digestive tube called the GI tract or alimentary canal<sup>137</sup>, and several accessory organs whose primary function is to break down food, prepare it for absorption, and eliminate waste. The GI tract, extending from the mouth to the anus<sup>138</sup>, varies in size and structure in several distinct regions:

– mouth

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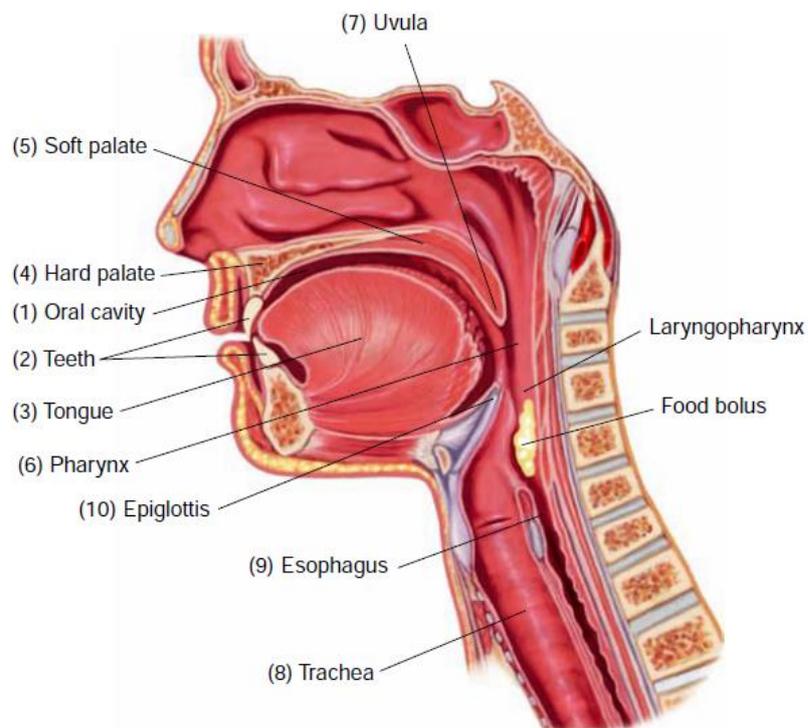
<sup>136</sup> Medical Terminology Systems - A Body Systems Approach: Digestive System - Anatomy and Physiology p. 106

<sup>137</sup> Alimentary canal: /ˌæɪlɪməntəri kəˈnæl/ the passage in the body that carries food from the mouth to the anus

<sup>138</sup> Anus: /ˈeɪnəs/ the opening in a person's bottom through which solid waste leaves the body

- pharynx<sup>139</sup> (throat)
- oesophagus<sup>140</sup>
- stomach
- small intestine
- large intestine
- rectum<sup>141</sup>
- anus.

Food passing along the GI tract is mixed with digestive enzymes and broken down into nutrient molecules, which are absorbed in the bloodstream. Undigested waste materials not absorbed by the blood are then eliminated from the body through defecation. Included in the digestive system are the accessory organs of digestion: the liver, gallbladder, and pancreas. (See *Figure 7-1*).



*Figure 7-1: Sagittal view of the head showing oral, nasal, and pharyngeal components of the digestive system*

<sup>139</sup> Pharynx: /'færɪŋks/

<sup>140</sup> Oesophagus: /i:'sɒfəgəs/

<sup>141</sup> rectum: /'rektəm/ the end section of the tube where food waste collects before leaving the body through the anus

### 7.1.1. Mouth

The process of digestion begins in the mouth. The mouth, also known as the (1) oral cavity or buccal cavity, is a receptacle<sup>142</sup> for food. It is formed by the cheeks (bucca<sup>143</sup>), lips, teeth, tongue, and hard and soft palates<sup>144</sup>. Located around the oral cavity are three pairs of salivary glands, which secrete saliva<sup>145</sup>. Saliva contains important digestive enzymes that help begin the chemical breakdown of food. In the mouth, food is broken down mechanically (by the teeth) and chemically (by saliva), and then formed into a bolus<sup>146</sup>.

#### 7.1.1.1. Teeth

The (2) teeth play an important role in initial stages of digestion by mechanically breaking down food (mastication<sup>147</sup>) into smaller pieces as they mix it with saliva. Teeth are covered by a hard enamel<sup>148</sup>, giving them a smooth, white appearance. Beneath the enamel is dentin, the main structure of the tooth. The innermost<sup>149</sup> part of the tooth is the pulp<sup>150</sup>, which contains nerves and blood vessels. The teeth are embedded in pink, fleshy tissue known as gums (gingiva<sup>151</sup>).

#### 7.1.1.2. Tongue

The (3) tongue assists in the chewing process by manipulating the bolus of food during chewing and moving it to the back of the mouth for swallowing (deglutition). The tongue also aids in speech production and taste. Rough projections on the surface of the tongue called papillae contain taste buds. The four basic taste sensations registered by chemical stimulation of the taste buds are sweet, sour<sup>152</sup>, salty, and bitter. All other taste perceptions<sup>153</sup> are combinations of these four basic flavours. In addition, sense of taste is intricately<sup>154</sup> linked with sense of smell, making taste perception very complex.

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<sup>142</sup> Receptacle: /rɪ'septəkl/ a container for putting sth in

<sup>143</sup> Bucca: /'bʌkə/ (buccal /'bʌkəl/ adj) the cheek

<sup>144</sup> Palate: /'pælət/ the top part of the inside of the mouth

<sup>145</sup> Saliva: /sə'laɪvə/ the liquid that is produced in your mouth that helps you to swallow food

<sup>146</sup> Bolus: /'bɒləs/ a small round mass of substance, especially chewed food that is swallowed

<sup>147</sup> Masticate: /'mæstɪkeɪt/ to chew food

<sup>148</sup> Enamel: /ɪ'næml/ a substance that is melted onto metal, pots, etc. and forms a hard shiny surface to protect or decorate them; an object made from enamel

<sup>149</sup> Innermost: /'ɪnəməʊst/ nearest to the centre or inside of sth

<sup>150</sup> Pulp: /pʌlp/ the soft part inside some fruit and vegetables

<sup>151</sup> Gingiva: /'dʒɪndʒɪvə/

<sup>152</sup> Sour: /'saʊə(r)/ having a taste like that of a lemon or of fruit that is not ready to eat

<sup>153</sup> Perception: /pə'sepʃn/ the way you notice things, especially with the senses

<sup>154</sup> Intricate: /'ɪntrɪkət/ (intricately /'ɪntrɪkətli/ adv) having a lot of different parts and small details that fit together

### 7.1.1.3. Hard and Soft Palates

The two structures forming the roof of the mouth are the (4) hard palate (anterior portion) and the (5) soft palate (posterior portion). The soft palate, which forms a partition<sup>155</sup> between the mouth and the nasopharynx, is continuous with the hard palate. The entire oral cavity, like the rest of the GI tract, is lined with mucous<sup>156</sup> membranes.

### 7.1.2. Pharynx, Oesophagus, and Stomach

As the bolus is pushed by the tongue into the (6) pharynx (throat), it is guided by the soft, fleshy, V-shaped structure called the (7) uvula<sup>157</sup>. The funnel-shaped pharynx serves as a passageway to the respiratory and GI tracts and provides a resonating chamber for speech sounds. The lowest portion of the pharynx divides into two tubes: one that leads to the lungs, called the (8) trachea<sup>158</sup>, and one that leads to the stomach, called the (9) oesophagus. A small flap of cartilage<sup>159</sup>, called the (10) epiglottis<sup>160</sup>, folds back to cover the trachea during swallowing, forcing food to enter the oesophagus. At all other times, the epiglottis remains upright, allowing air to freely pass through the respiratory structures.

### 7.1.3. Small Intestine

The small intestine is a coiled, 20-foot long tube that begins at the pyloric<sup>161</sup> sphincter<sup>162</sup> and extends to the large intestine. (See *Figure 7-2*). It consists of three parts:

- (1) duodenum<sup>163</sup>, the uppermost segment, which is about 10 inches long
- (2) jejunum<sup>164</sup>, which is approximately 8 feet long
- (3) ileum<sup>165</sup>, which is about 12 feet long

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<sup>155</sup> Partition: /pɑ:'tɪʃn/ a wall or screen that separates one part of a room from another

<sup>156</sup> Mucus: /'mju:kəs/ a thick liquid that is produced in parts of the body, such as the nose, by a mucous membrane

<sup>157</sup> Uvula: /'ju:vjələ/ a small piece of flesh that hangs from the top of the inside of the mouth just above the throat

<sup>158</sup> Trachea: /trə'ki:ə/ (pl. tracheas or tracheae /trə'ki:i:/) the tube in the throat that carries air to the lungs

<sup>159</sup> Cartilage: /'kɑ:tɪlɪdʒ/ the strong white tissue that is important in support and especially in joints to prevent the bones rubbing against each other

<sup>160</sup> Epiglottis: /,epɪ'glɒtɪs/ a thin piece of tissue behind the tongue that prevents food or drink from entering the lungs

<sup>161</sup> Pylorus: /paɪ'lɔ:rəs/ (pl. Pylori /paɪ'lɔ:rɪ/; Pyloric /paɪ'lɔ:rɪk/ adj) the passage at the lower end of the stomach that opens into the duodenum

<sup>162</sup> Sphincter: /'sfɪŋktə(r)/ a ring of muscle that surrounds an opening in the body and can contract to close it

<sup>163</sup> Duodenum: /,dju:ə'di:nəm/ the first part of the small intestine, next to the stomach

<sup>164</sup> Jejunum: /dʒɪ'dʒu:nəm/ the second part of the small intestine

<sup>165</sup> Ileum: /'ɪliəm/ (pl. ilea /'ɪliə/; ileal /'ɪliəl/ adj) the third part of the small intestine

### 7.1.4. Large Intestine

The large intestine is about 5 feet long. It begins at the end of the ileum and extends to the anus. No digestion takes place in the large intestine. The only secretion is mucus in the colon, which lubricates faecal material so it can pass from the body. The large intestine has three main components: cecum, colon, and rectum. The first 2 or 3 inches of the large intestine is called the (6) cecum<sup>166</sup>, a small pouch<sup>167</sup> that hangs inferior to the ileocecal valve. Projecting downward from the cecum is a wormlike structures called the (7) appendix. The function of the appendix is unknown; however, problems arise if it becomes infected or inflamed. The cecum merges with the colon<sup>168</sup>. The main functions of the colon are to absorb water and minerals and eliminate undigested material. The colon is divided into (8) ascending, (10) transverse, (13) descending, and (14) sigmoid<sup>169</sup> portions. The (15) rectum, the last part of the GI tract, terminates at the (16) anus.

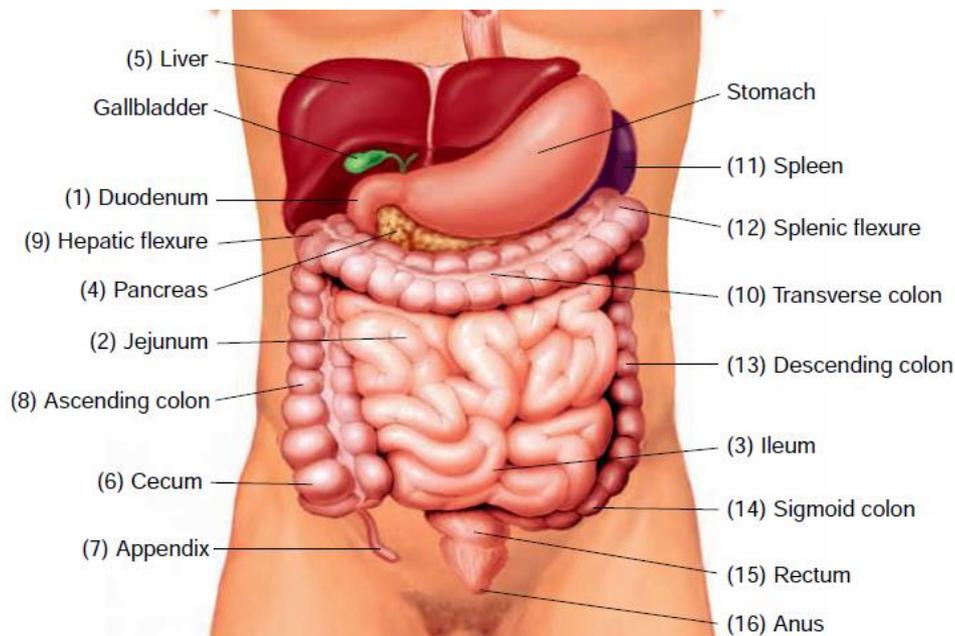


Figure 7-2: Anterior view of the trunk and digestive organs

<sup>166</sup> Cecum: /'si:kəm/ (pl. ceca /'si:kə/) a small bag which is part of the intestine, between the small and the large intestine

<sup>167</sup> Pouch: /paʊtʃ/ a small bag, usually made of leather, and often carried in a pocket or attached to a belt

<sup>168</sup> Colon: /'kəʊlən/ the main part of the large intestine (= part of the bowels)

<sup>169</sup> Sigmoid colon: /'sɪgmɔɪd 'kəʊlən/ the S-shaped section of the colon between the pelvic brim (the upper edge of a bowl-like structure) and the third sacral (sacrum: /'seɪkrəm/ a bone in the lower back, between the two hip bones of the pelvis) segment, continuous with the rectum. Also called sigmoid flexure /'flekʃə/

## 7.2. Anatomy and Physiology Key Terms<sup>170</sup>

This section introduces important terms, along with their definitions and pronunciations. Word analyses for selected terms are also provided.

Term	Pronunciation <sup>171</sup>	Arabic <sup>172</sup>	Meaning
bilirubin	'bɪlɪ'ru:bɪn	بيليروبين	Orange-coloured or yellowish pigment in bile Bilirubin is formed principally by the breakdown of haemoglobin in red blood cells after termination of their normal lifespan.
bolus	'bəʊləs	بُلْعَة	Mass of masticated food ready to be swallowed
exocrine exo-: outside, outward -crine: secrete	'eksəʊkraɪn	خارجي الإفراز	Denotes a gland that secretes its products through excretory ducts to the surface of an organ or tissue or into a vessel
sphincter	'sfɪŋktə(r)	مَصْرَة	Circular band of muscle fibres that constricts a passage or closes a natural opening of the body An example of a sphincter is the lower oesophageal (cardiac) sphincter that constricts once food has passed into the stomach.

<sup>170</sup> Medical Terminology Systems - A Body Systems Approach: Digestive System - Anatomy and Physiology Key Terms p. 107

<sup>171</sup> Oxford Advanced Learner's Dictionary, 8<sup>th</sup> ed. or: <http://dictionary.reference.com/>

<sup>172</sup> <http://www.emro.who.int/Unified-Medical-Dictionary.html>