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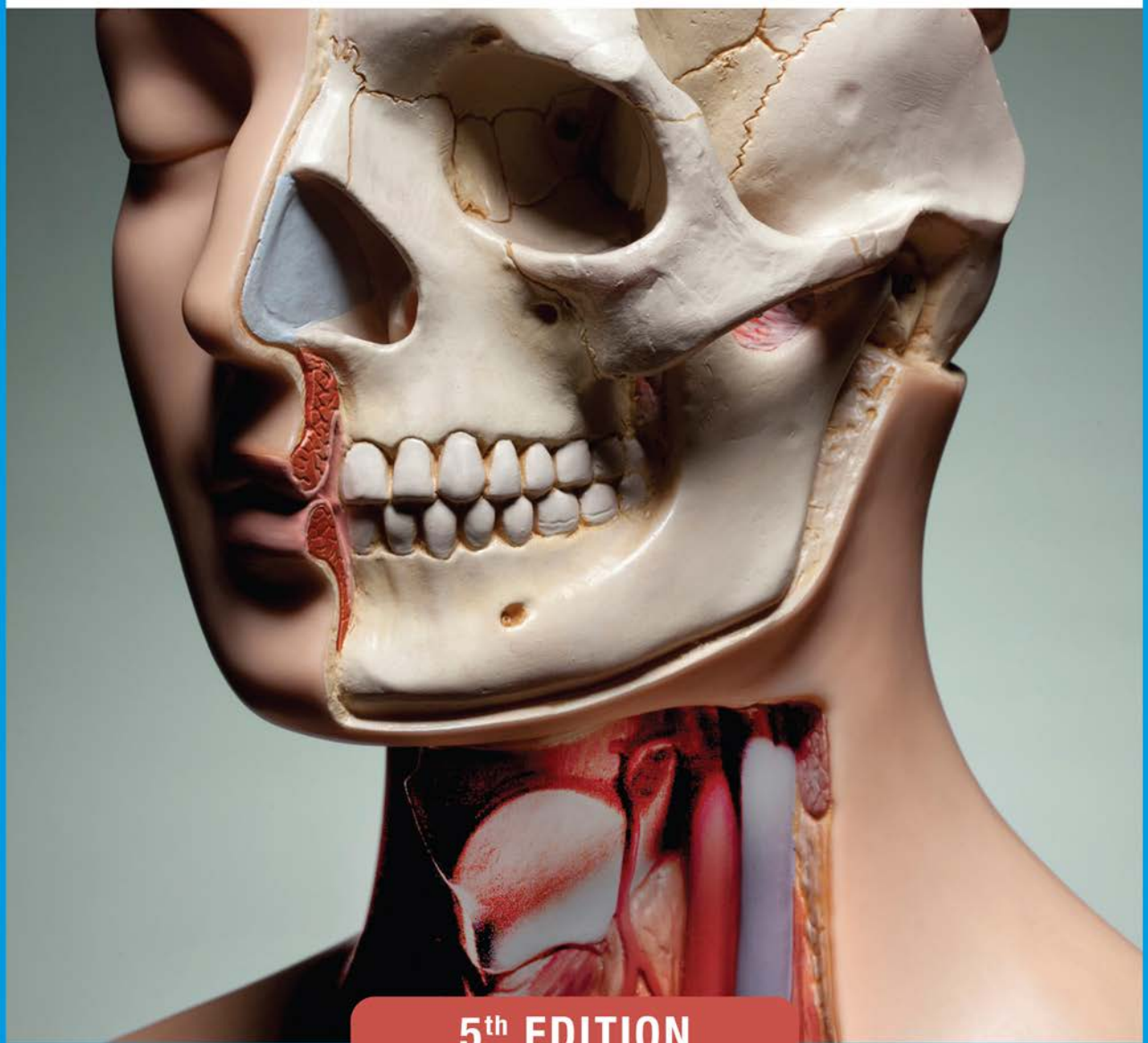

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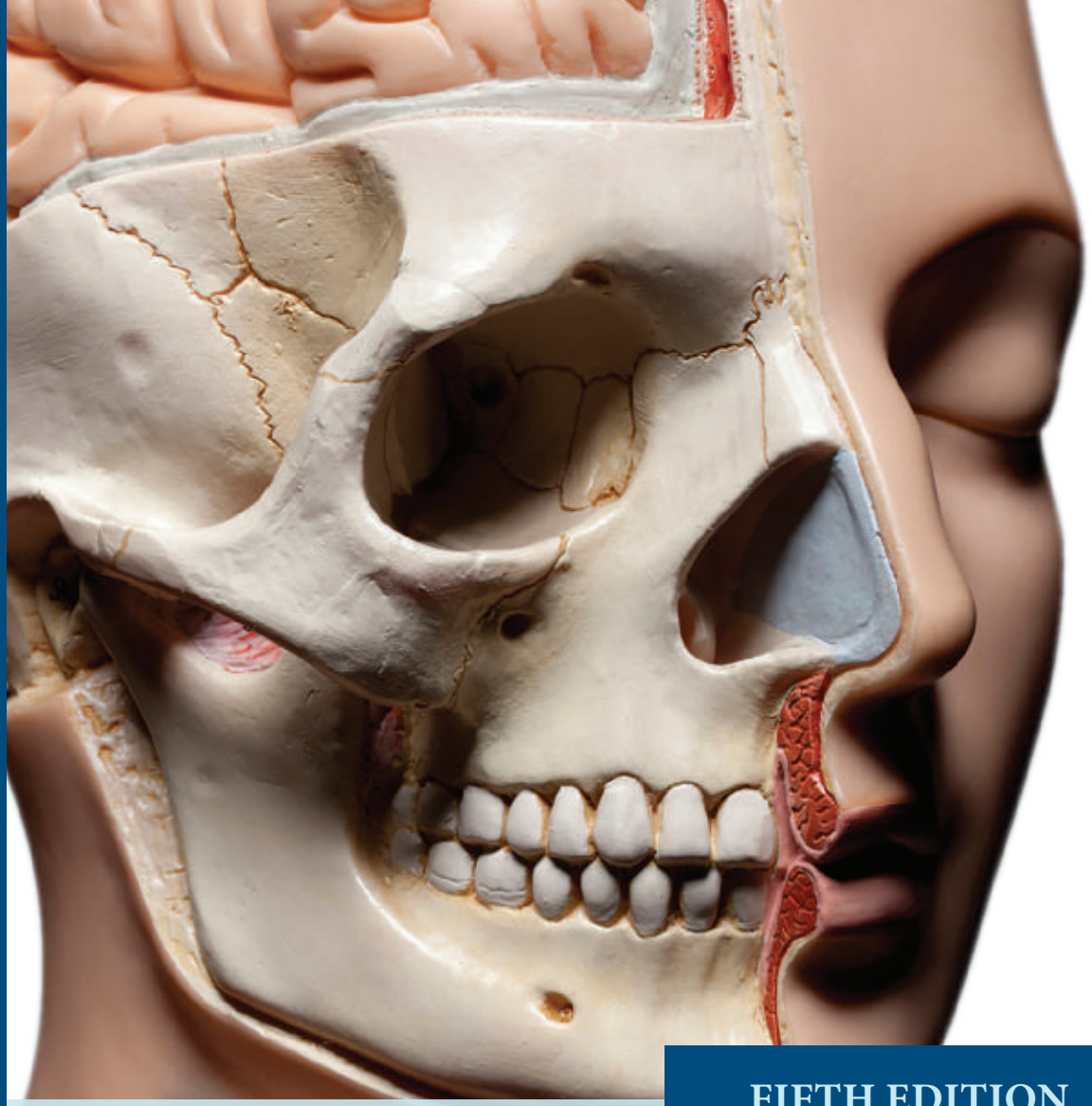

FIFTH EDITION

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Head, Neck & Dental Anatomy, Fifth Edition
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Cover Image Source: istock.com/malerapaso

Library of Congress Control Number: 2021936907
Student Edition ISBN: 978-0-357-45712-2
Loose-leaf Edition ISBN: 978-0-357-45713-9

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Printed in the United States of America
Print Number: 01 Print Year: 2021

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Preface

INTRODUCTION

Head, Neck & Dental Anatomy, Fifth Edition is written for dental auxiliary students as an introduction to the study of anatomy of the teeth, head, and neck. As a required course in the study of dental science, knowledge of and familiarity with the head, neck, and dental anatomy are of utmost importance to a successful and fulfilling career as a dental auxiliary. Thus, this textbook is an excellent teaching tool and reference manual for both students and professionals.

With excellent coverage of specific terminology, appropriate anatomical illustrations, including anatomical descriptions of tooth, head, and neck structures, and so much more, the fifth edition will be an invaluable source for classroom and professional study.

WHY WE WROTE THIS TEXT

This textbook is written and continually revised in order to fulfil our commitment to students and their instructors; it is the most comprehensive and easy-to-understand textbook providing the intricate details of head, neck, and dental anatomy. Success and future career fulfillment of dental professionals are the objectives in revising this textbook, including finding new and better ways to improve the content and its layout.

ORGANIZATION OF THE TEXT

Head, Neck & Dental Anatomy is organized into five sections, with the most advantageous progression for learning all aspects of head anatomy for dental auxiliaries.

Section I: Introduction to the Oral Cavity consists of four introductory chapters to teach students the foundations of anatomical terminology and the basics of dental structures. *Chapter 1: Nomenclature* covers the primary and permanent dentitions, their differences, arrangements, and functions. *Chapter 2: Structures of the Oral Cavity* discusses surrounding anatomy of the oral cavity beyond dentition, including the tongue and oral vestibule, among others, and their functions. *Chapter 3: The Tooth and Its Surrounding Structures* is a detailed introduction to the surfaces, tissues, and other structures in the oral cavity. Last in Section I is *Chapter 4: Tooth Identification Systems*, which describes the various numbering systems used to chart teeth in offices and dental practice today.

Section II: Permanent Anterior Teeth provides a brief description of the anatomy and vocabulary used in the following chapters, including pulp canal, fossa, and root depressions or furrows. *Chapter 5: Maxillary Incisors, Chapter 6: Mandibular Incisors,* and *Chapter 7: Canines* are all organized in the same layout for ease of understanding the topics. Each chapter begins with a description of the tooth, including all its surfaces—labial, lingual, proximal surfaces, and incisal view, as well as additional details where necessary—and worksheets for students to review the material.

Section III: Permanent Posterior Teeth begins with an introduction to the specific structures, anatomical vocabulary, and detailed descriptions, followed by specific chapters about the teeth. *Chapter 8: Maxillary Premolars, Chapter 9: Mandibular Premolars, Chapter 10: Maxillary First and Second Molars,* and *Chapter 11: Mandibular First and Second Molars* are organized similarly and in the same order for easy understanding. Each chapter begins with the description of the specific tooth and includes details about the buccal, lingual, mesial, distal, and occlusal surfaces, and additional details where applicable. *Chapter 12: Third Molars* is the last chapter in Section III. All chapters include worksheets and multiple-choice questions to assure student understanding.

Section IV: Related Topics includes important chapters to assist in understanding development and occlusion of the permanent and primary dentitions, essential areas of knowledge for any dental professional. *Chapter 13: Primary Dentition* is an in-depth coverage of the primary dentition and its

differences from permanent teeth, including descriptions of primary incisors, molars, and canines. *Chapter 14: Tooth Development* covers the growth and development of teeth including the stages from beginning of formation to eruption. *Chapter 15: Occlusion* discusses the different types of occlusion, including its classes and divisions. *Chapter 16: Form and Function* provides information about contact areas, embrasures, and interdental spaces.

Section V: Head and Neck Anatomy delves into the specific content areas that emphasize the importance of recognizing and applying knowledge of head and neck anatomy and how it impacts dental anatomy. The chapters in the section are *Chapter 17: Bones of the Head and Neck*, *Chapter 18: Muscles of the Head and Neck*, *Chapter 19: Nerves of the Head and Neck, Chapter 20: Arteries of the Head and Neck, Chapter 21: Salivary Glands,* and *Chapter 22: Temporomandibular Joint.*

NEW TO THE FIFTH EDITION

In this edition, the design and art program have been revised and improved to enhance the learning experience. Anatomic illustrations and diagrams have been updated to represent, as closely as possible, the actual human structures. A new text design presents the content and accompanying illustrations in a very effective and user-friendly layout. Multiple-choice questions have been added to or updated in the end-of-chapter worksheets as well.

ANCILLARY PACKAGE

Accompanying Teaching and Learning Resources

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Acknowledgments

We would like to thank the reviewers for the fifth edition who vastly improved the new edition with their precise knowledge and valuable feedback.

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SECTION I

Introduction to the Oral Cavity

Chapter 1 Nomenclature

Chapter 2 Structures of the Oral Cavity

Chapter 3 The Tooth and Its Surrounding Structures

Chapter 4 Tooth Identification Systems

CHAPTER 1

Nomenclature

The Dentition
The Names and Functions of the Teeth
The Arrangement of the Teeth
The Eruption Sequence

This section of the text introduces you to dental anatomy, a specific field of anatomy dedicated to the study of human teeth. It is concerned with the naming of the teeth, the description of their structure, and their function. The understanding of this material is important because each tooth is interdependent on the surrounding teeth so that it can effectively masticate (chew) food in preparation for digestion.

Objectives

At the completion of this chapter, you will use the worksheet and be able to:

1. Identify the names of the teeth, the two dental arches, the permanent teeth, the primary teeth, and the anterior and posterior teeth.
2. Name the order of the teeth in which they are positioned in the dental arch, and identify the function of each tooth and the eruption sequence of both the primary and permanent teeth.
3. Define the key terms noted in boldface.

Key Terms

Abrasion
Active eruption
Anterior
Attrition
Dentition
Diphyodont
Eruption
Exfoliate
Heterodont
Mastication
Mixed dentition
Passive eruption
Permanent
Polyphyodont
Posterior
Primary (Deciduous)
Succedaneous

THE DENTITION

Teeth are arranged in the jaws to form two dental arches. Each arch is named to correspond with the bone from which it is composed. The maxilla forms the maxillary or upper arch; the mandible forms the mandibular or lower arch. Together, the two arches comprise one **dentition**, or set of teeth. During the life span, each person normally will have two dentitions, the **primary** or **deciduous,** meaning they shed, and the **permanent**. (See **Figure 1–1**.)

Primary or Deciduous Dentition

The first or primary set of teeth, the deciduous dentition, begins to emerge into the mouth between 6 and 8 months of age. These primary teeth continue to emerge periodically, following a developmental schedule, until 20 teeth, 10 maxillary and 10 mandibular, have emerged by the age of 2½–3 years. (See **Table 1–1**.) These 20 primary teeth are small, but they fulfill the needs of a child. As the child grows, the primary teeth eventually **exfoliate**, or shed, and are replaced by permanent teeth. When all the permanent teeth have emerged by the ages of 17 through 21, permanent dentition is complete. (See **Table 1–2**.)

Permanent Dentition

There are 32 permanent teeth, 16 maxillary and 16 mandibular. Until the child is 5 years old, only primary teeth are present in the mouth.

Between 5 and 6 years of age, the first permanent tooth, the mandibular first molar, erupts posterior to the second or last primary molar. No primary tooth has exfoliated to provide space for the first permanent molar; however, the mandible has grown in length in order to replace or succeed any primary teeth.

Shortly after the permanent first molars erupt, primary incisors, the front teeth, begin to exfoliate. This occurs as a result of a physiologic process that causes their roots to resorb as the permanent teeth form in the bone directly beneath them. Eventually, every primary tooth should exfoliate and be succeeded by a permanent tooth.

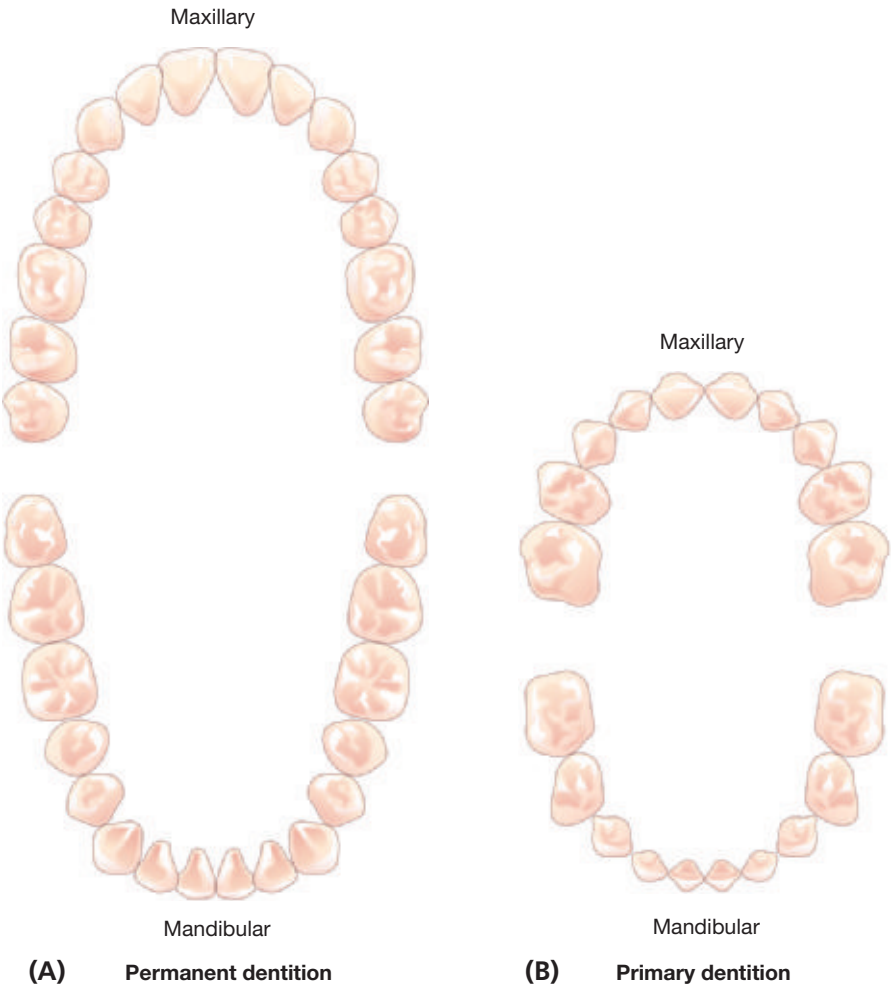


Figure 1–1. (A) Maxillary and mandibular dentition of an adult (permanent dentition). (B) Maxillary and mandibular dentition of a child (primary dentition).

Between the ages of 5 and 12, some primary and some permanent teeth are present in the oral cavity or mouth at the same time; this is referred to as a **mixed dentition**. Permanent teeth that replace or succeed primary teeth are called **succedaneous** teeth and include incisors, canines, and premolars. Permanent molars are not succedaneous teeth because they do not replace any primary teeth.

Because human beings have two successive sets of teeth, or dentitions, during their lives (a primary and a permanent dentition), they are considered **diphyodonts**. If there were several sets of teeth throughout life, as certain reptiles have, the species would be identified as a **polyphyodont**.

NAMES AND FUNCTIONS OF THE TEETH

Each dentition includes several types of teeth shaped to perform specific functions. People are **heterodonts** because they have different *types* of teeth called incisors, canines, premolars, and molars. The types of teeth in the maxillary arch are the same as those in the mandibular arch. If an imaginary line is drawn between the right and left halves of the dental arches, both the right and left arches will be identical.

Primary or Deciduous Teeth

The primary dentition has 20 teeth—10 maxillary and 10 mandibular teeth. They are smaller but similar in shape and function to the sequential permanent teeth. They are described in the following section.

TYPES OF TEETH

Use **Figure 1–2.** This list of primary tooth types is per arch:

Number on each arch
4 incisors
2 canines
4 molars
10 teeth per arch

Incisors—two central and two lateral
Canines—one in each corner of the arch
Molars—two first molars, two second molars

Each primary tooth is eventually replaced by a permanent tooth. Note, however, that there are no primary premolars. Primary molars are succeeded by permanent premolars. Permanent molars erupt posterior to the primary molars without replacing any primary molars. As mentioned previously, permanent molars are not succedaneous teeth. (See **Figure 1–2A.**)

Permanent Teeth

The permanent dentition has 32 teeth—16 maxillary and 16 mandibular teeth. (See **Figure 1–2B**.)

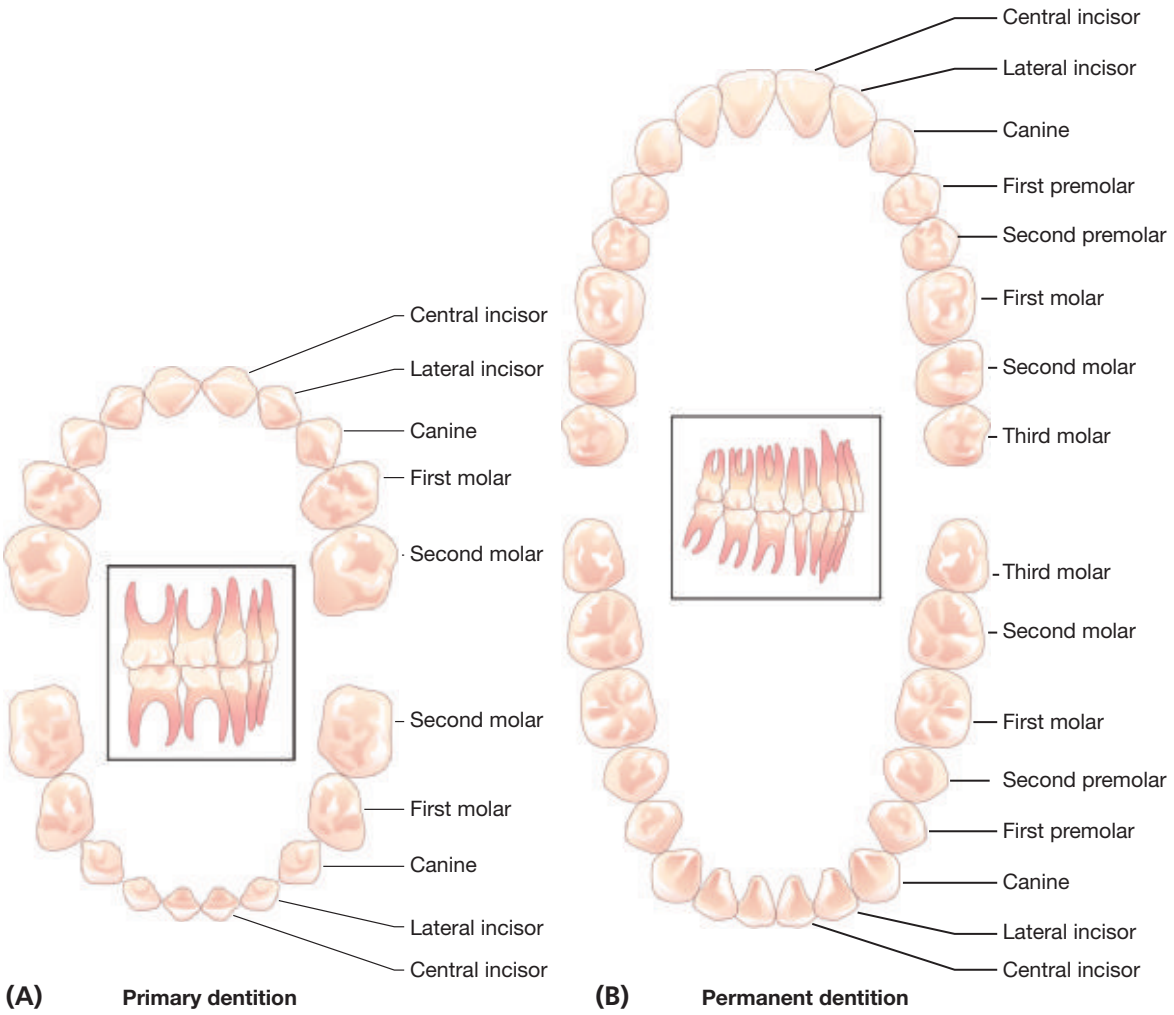


Figure 1–2. Development of the human dentition.

TYPES OF TEETH

- *Incisors* are the four front teeth in each arch that have sharp biting edges for incising, or cutting, food. The two in the middle of the arch are central incisors; those on each side of them are lateral incisors.
- *Canines*, also called cuspids, are the corner teeth and have one pointed cusp used to hold and tear food.
- *Premolars*, also called bicuspids, are posterior teeth having two major cusps adapted to crush and tear food. Premolars are named by the sequence in the arch from front to back as "first premolar" and "second premolar."

- *Molars* are broad back teeth having several cusps adapted to chew, crush, and grind food. They, too, are named by their sequence from the front to the back of the arch as "first molar," "second molar," and "third molar."
- Each tooth performs its individual function in the process of **mastication**, or chewing. By working together, the teeth prepare food for swallowing and digestion.

Number of teeth in each permanent arch:
4 incisors
2 canines
4 premolars
6 molars
16 teeth per arch

THE ARRANGEMENT OF THE TEETH

Figure 1–2 shows the arrangement of the permanent teeth in the dental arches. The **anterior** teeth are those in the front of the mouth and include incisors and canines. **Posterior** teeth, those in the back of the mouth, include premolars and molars.

Tooth Description

To identify a tooth correctly, note that it is designated not only by its name and arch, but also by the quadrant.in which it is located. A quadrant is equal to the central incisor to the last molar in each arch. Each quadrant is specified according to the patient's right or left side. To completely identify a tooth, information is designated in the following sequence:

	DENTITION	ARCH	QUADRANT	TOOTH
Example	Permanent	Mandibular	Right	Central incisor

THE ERUPTION SEQUENCE

Although teeth begin to form in utero, eruptions occur at approximately 6–8 months of age. **Eruption** dates vary from person to person by a few months, just as individual growth rate varies. **Table 1–1** lists the eruption sequence for **primary teeth**. Note that mandibular teeth generally precede maxillary teeth in eruption.

By the age of 2½–3 years, all primary teeth have erupted; at about 6 years of age, the permanent teeth start to erupt. Refer to Figure 1–2 for the growth pattern of the teeth. A chronology of this growth pattern is given in Appendix A.

The first molars are the first permanent teeth to emerge into the mouth. They erupt posterior to the primary second molar without replacing any primary teeth. The eruption sequence of the permanent dentition is shown in **Table 1–2**.

TABLE 1–1. Eruption and Exfoliation Dates for Primary Teeth

TOOTH	ERUPTION DATE	EXFOLIATION DATE	MAXILLARY ORDER
Central incisor	6–10 months	6–7 years	#1
Lateral incisor	9–12 months	7–8 years	#2
First molar	12–18 months	9–11 years	#3
Canine	16–22 months	10–12 years	#4
Second molar	24–32 months	10–12 years	#5
TOOTH	**ERUPTION DATE**	**EXFOLIATION DATE**	**MANDIBULAR ORDER**
Central incisor	6–10 months	6–7 years	#1
Lateral incisor	7–10 months	7–8 years	#2
Canine	16–22 months	9–12 years	#4
First molar	12–18 months	9–11 years	#3
Second molar	20–32 months	10–12 years	#5

TABLE 1–2. Eruption Dates for Permanent Teeth

TOOTH	ERUPTION DATE	ORDER OF ERUPTION (MAXILLARY)
Central incisor	7–8 years	#2
Lateral incisor	8–9 years	#3
Canine	11–12 years	#6
First premolar	10–11 years	#4
Second premolar	11–12 years	#5
First molar	6–7 years	#1
Second molar	12–13 years	#7
Third molar	17–21 years	#8
TOOTH	**ERUPTION DATE**	**ORDER OF ERUPTION (MANDIBULAR)**
Central incisor	6–7 years	#2
Lateral incisor	7–8 years	#3
Cuspid	9–10 years	#4
First premolar	10–11 years	#5
Second premolar	11–12 years	#6
First molar	6–7 years	#1
Second molar	11–13 years	#7
Third molar	17–21 years	#8

The initial eruption period, called **active eruption,** continues until the crown is almost completely exposed and the tooth is in its proper alignment. In later life, the gingival (gum) line may recede, exposing more of the tooth. This process is referred to as **passive eruption**.

Continual use of the teeth throughout life can cause a slight wearing away of the biting and/or chewing surfaces and hence a decrease in the height of the tooth. This wearing away is called **attrition**. Grinding of the teeth (bruxism) also causes attrition. **Abrasion** of the tooth surfaces can be caused by mechanical wear, such as continual biting on an object or brushing too vigorously.

SUMMARY

During a person's life span, there will be two sets of teeth. The first set, the primary or primary dentition, consists of 20 teeth. It eventually exfoliates and is replaced by the permanent dentition, which has 32 teeth.

Each dentition has several types of teeth shaped to perform a specific function; they work in conjunction with one another to prepare the food for digestion.

Primary teeth begin to emerge during the sixth month of infancy but they are not completely erupted as a full dentition until the third year of life. Permanent teeth begin to emerge between 5 and 6 years of age, and all but the third molars have usually emerged by the twelfth year. Permanent teeth are expected to last a lifetime.

WORKSHEET

Define the following words

Active eruption _____

Anterior _____

Attrition _____

Deciduous _____

Dentition _____

Diphyodont _____

Exfoliate _____

Gingival _____

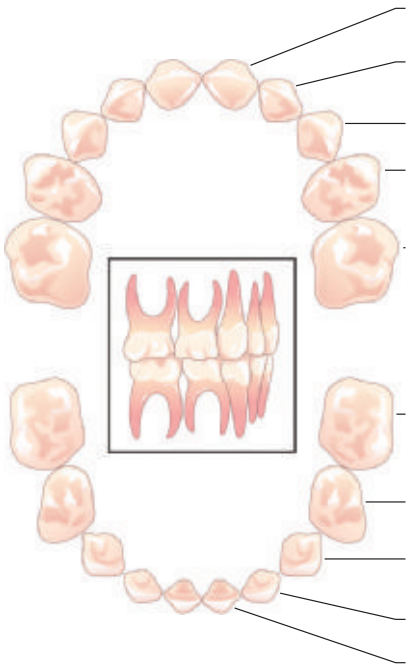
Mastication _____

Polyphyodont _____

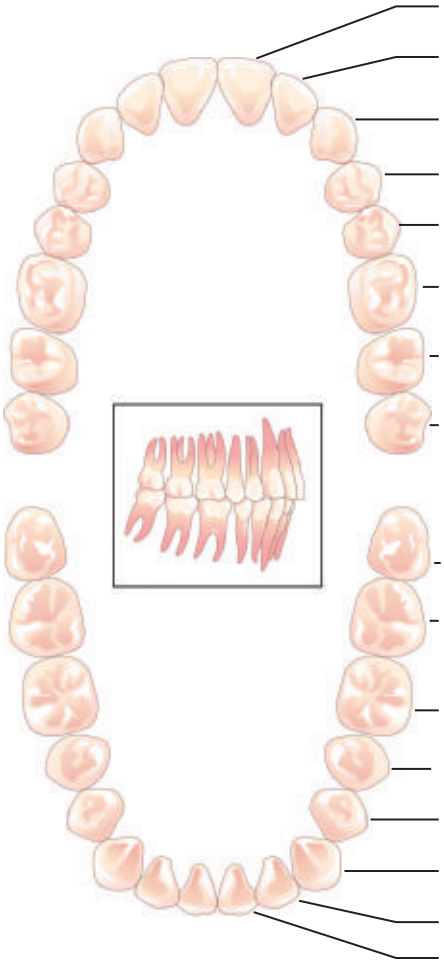
Posterior _____

Succedaneous _____

Number the deciduous/primary teeth on the diagram in the order of emergence



Number the permanent teeth on the diagram in the order of emergence



Answer the following multiple-choice questions

1. The total number of primary teeth is:

a. 32

b. 20

c. 28

d. 22

2. All primary teeth have erupted by age:

a. 6 months–1 year

b. 1–2 years

c. 2½–3 years

3. The number of permanent anterior teeth in a quadrant is:

a. 2

b. 3

c. 4

d. 5

4. The fifth tooth from the midline in the permanent dentition is the:

a. first premolar

b. second premolar

c. first molar

d. second molar

5. The number of premolars in a primary dentition is:

a. 1

b. 2

c. 3

d. 0

CHAPTER 2

Structures of the Oral Cavity

- Related Terminology
- The Oral Cavity
- Structures External to the Oral Cavity
- Structures of the Oral Vestibule
- Structures of the Oral Cavity Proper

The names of oral structures identified in this chapter are important because they surround the teeth or are in the oral cavity where they are in contact with instruments used while examining or treating the teeth. The terms are also used in the records when citing or discussing the details of a dental visit.

Objectives

At the completion of this chapter, you will be able to:

1. Identify, clinically, two areas of the oral cavity, the boundaries of the oral vestibule and the oral cavity proper.
2. Describe each structure of the oral cavity as to location, color, size, and/or shape.
3. Define the Key Terms as noted, as follows, and in boldface within the chapter.
4. Complete the worksheet at the end of the chapter.

Key Terms

Anterior tonsillar pillar
Buccal
Circumvallate
Filiform
Foliate
Foramen caecum
Fordyce granules
Fovea palatinus
Frenum
Fungiform
Gingiva
Hard palate
Incisive papilla
Labial
Labial commissure
Labial tubercle
Labiomental groove
Linea alba
Lingual frenum
Mandibular tori
Maxillary tuberosity
Median sulcus
Nasolabial groove
Oral cavity
Oral mucosa
Oral vestibule
Palatine raphe
Palatine rugae
Palatine torus
Philtrum
Posterior tonsillar pillar
Retromolar area
Soft palate
Stensen's papilla
Sublingual fold
Sublingual caruncle
Taste buds
Tonsils
Uvula
Vermilion zone

RELATED TERMINOLOGY

The names of many oral cavity structures, as well as associated and descriptive terms, are derived from Latin words. As these words appear repeatedly throughout the readings, it is helpful to become familiar with them. (See **Table 2–1**.)

TABLE 2–1. Oral Cavity Terminology

TERM	MEANING
Alba	White
Bucca	Cheek
Buccal	Relating to the cheek
Fornix	Arch
Frenum	Folds of tissue
Labia	Lip
Labial	Relating to the lip
Linea	Line
Lingual	Relating to the tongue
Mental	Relating to the chin
Nasal	Relating to the nose
Naso	Nose
Oral	Relating to the mouth
Plica	Fold (of tissue)
Raphe	A seam (of tissue)
Sub	Under

THE ORAL CAVITY

The term **oral cavity** is used when referring to the inner portion of the mouth. The oral cavity extends from the anterior opening at the lips to the oropharynx, or throat posteriorly. The palate, or roof of the mouth, is the superior, or upper, border; the tongue, along with the musculature beneath it, defines the inferior or lower boundary.

A soft, moist tissue called the *mucous membrane* lines the oral cavity. In the mouth, the mucous membrane is referred to as **oral mucosa**. The oral mucosa is pink, occurring in various shades of pink and degrees of thickness. Although the oral mucosa is not as strong or as thick as skin, it acts as a protective covering for the oral cavity. In some areas, the oral mucosa is firmly attached, as on the gingiva and hard palate, and in other areas, such as the cheek, it is much looser. There are three types of oral mucosa, each classified according to function and location:

1. *Masticatory mucosa* covers the areas subject to stress, such as gingival tissue and the hard palate.

2. *Specialized mucosa* covers the area that has the specific function of taste on the dorsum of the tongue.
3. *Lining mucosa* covers all other areas of the oral cavity, such as the inner surfaces of the lips and cheeks and the floor and roof of the mouth.

Divisions

The oral cavity is divided into two sections: the oral vestibule and the oral cavity proper. The **oral vestibule** is the area between the inner lips, or **labial** mucosa, and cheeks (**buccal** mucosa) and the front (facial) surfaces of the teeth. The *oral cavity proper* extends from the inner (lingual) surfaces of the teeth to the oropharynx.

Functions

Chewing of food, or **mastication,** is the most obvious function of the oral cavity. As mastication occurs, food is moistened with saliva, preparing it for **deglutition** (swallowing) and digestion. The tongue is the taste organ for food and assists the cheek and lip muscles with the movement of food within the oral cavity. Not only does the oral cavity assist in digestion, but it also provides an air passage to the throat and assists the tongue with speech.

STRUCTURES EXTERNAL TO THE ORAL CAVITY

The structures of the lips, cheeks, and related areas of the face are closely associated with the oral cavity because they assist with its effective functioning (See **Figure 2–1**). These outer structures are composed of

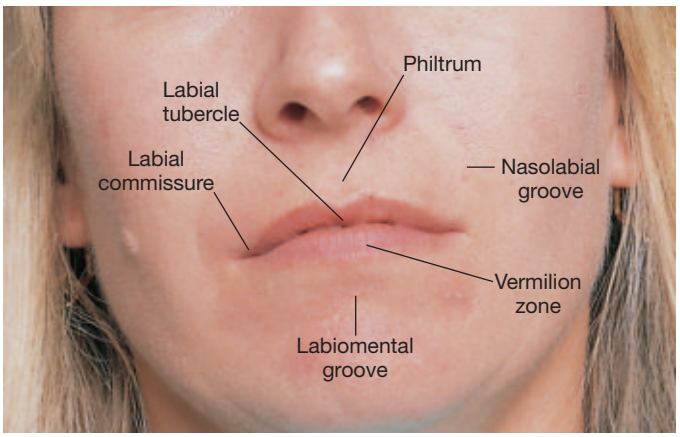


Figure 2–1. External structures of the oral cavity.

muscles that aid in opening and closing the lips and compressing food, as well as moving it away from the teeth. They include:

Labial commissure: the closure line of the lips where upper lip meets lower lip

Philtrum: shallow depression extending from the area below the middle of the nose to the center of the upper lip

Vermilion zone: the pink border of the lips (thinly keratinized epithelium)

Nasolabial groove: a shallow depression extending from the corner of the nose (ala) to the corner of the lips

Labiomental groove: a shallow linear depression between the center of the lower lip and the chin

Labial tubercle: a small projection in the middle of the upper lip that may enlarge or thicken

STRUCTURES OF THE ORAL VESTIBULE

Although the oral vestibule is a small antechamber, it contains several structures that should be recognized.

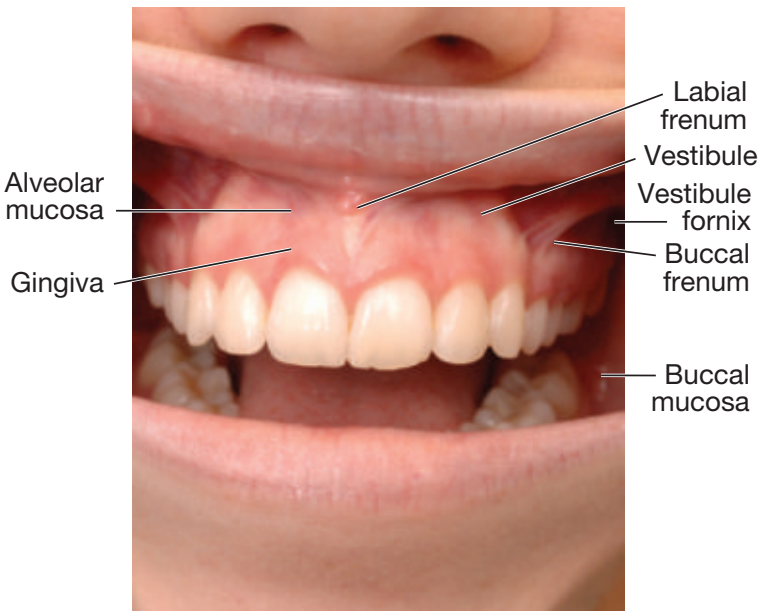


Figure 2–2A. Structures of the oral vestibule.

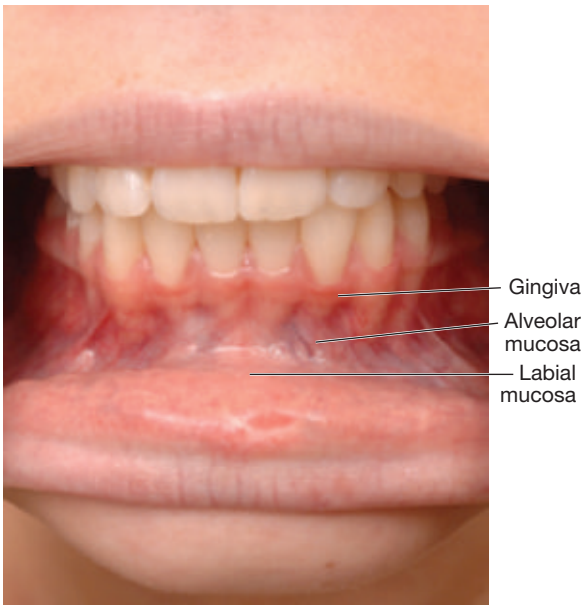


Figure 2–2B. Structures of the oral vestibule.

Labial frenum: an elevated fold of soft mucous tissue extending from the alveolar mucosa of the two central incisors to the labial mucosa (A superior frenum exists in the maxillary area; an inferior frenum is in the mandibular area.) (See **Figure 2–2A**.)

Buccal frenum: an elevated fold of soft tissue extending from the alveolar mucosa above the canine or premolar to the buccal mucosa

Maxillary tuberosity: a small, rounded extension of bone, covered with soft tissue, posterior to the last maxillary tooth

Retromolar area: a triangular area of bone, covered with soft tissue, posterior to the last mandibular tooth

Stensen's papilla (parotid papilla): a small, raised flap of soft tissue on the buccal mucosa opposite the maxillary molar (It is often marked with a tiny red dot, which is the opening to the parotid or Stensen's salivary gland.)

Linea alba: a raised, white horizontal extension of soft tissue along the buccal mucosa at the occlusal line (The literal translation of these words is "white line." The linea alba is not present in all mouths.)

Gingiva: pink, stippled mucosa surrounding the necks of the teeth and covering the bone in which the teeth are anchored (See **Figure 2–2B**.)

Fordyce granules: small, yellow spots on the buccal mucosa and inner lip, which are sebaceous glands and have no clinical significance

STRUCTURES OF THE ORAL CAVITY PROPER

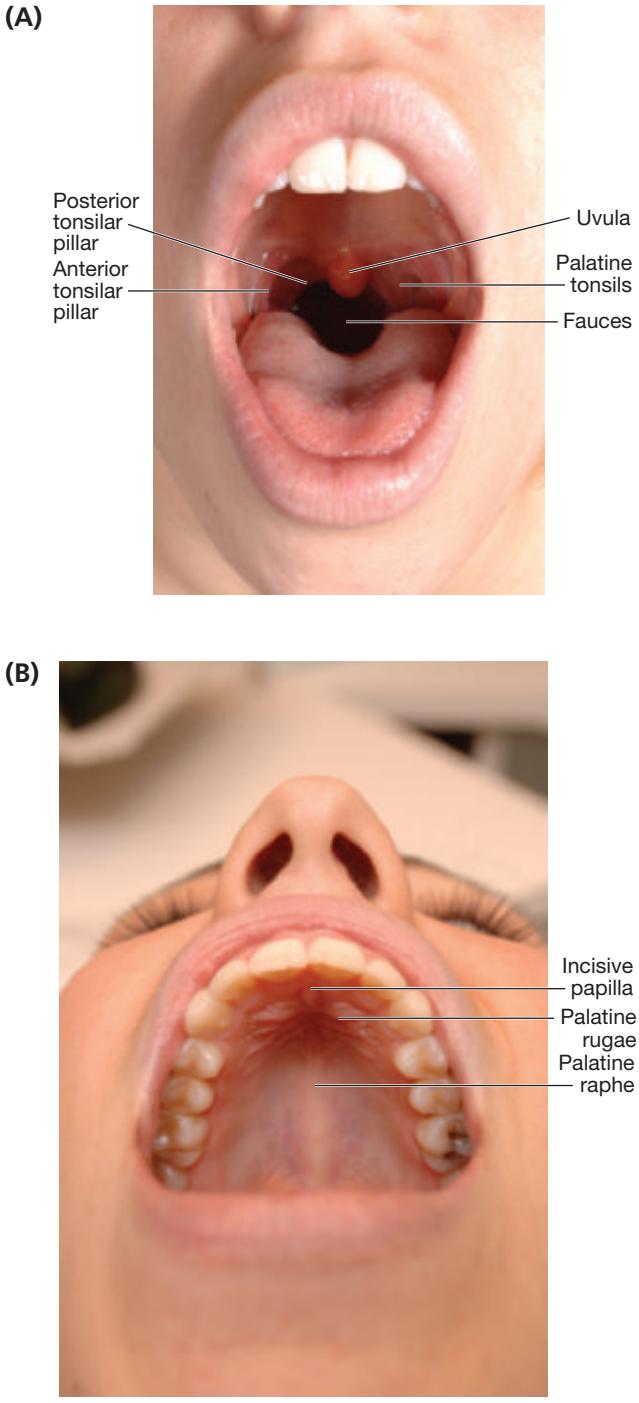


Figure 2–3. Structures of the oral cavity proper.

Roof of the Mouth

When the mouth is wide open, it is possible to observe all the structures of the oral cavity proper. The following structures are located on the roof of the mouth (See **Figure 2–3B**):

Palate: the concave surface that is known as the roof of the mouth and is divided into the hard and soft palate

Hard palate: the bony anterior two-thirds of the palate that is covered with mucosa (See **Figure 2–3B**.)

Soft palate: the posterior third of the palate, composed of muscular fibers covered with mucosa (It is a deeper pink than the hard palate because of its highly vascular composition.)

Palatine torus: a bony prominence of varied size located at the midline of the hard palate (It is a nonpathologic excess of bone covered with mucosa and is present in only about 20 percent of the population.)

Incisive papilla: a small, raised, rounded structure of soft tissue at the anterior midline of the hard palate (It is directly behind the two maxillary central incisors and covers and protects the incisive foramen, an opening in the bone directly beneath it through which nerves and blood vessels travel.) (See **Figure 2–3B**.)

Palatine raphe: a junction of soft tissue extending vertically along the entire midline of the hard palate; also known as the median palatine raphe (See **Figure 2–3B**.)

Palatine rugae: paired raised, transverse palatine folds of soft tissue on the anterior portion of the hard palate, which extend horizontally from the raphe and prevent food from adhering to the palate (See **Figure 2–3B**.)

Fovea palatinus: two small indentations, one on either side of the raphe, located at the junction of the hard and soft palate (These are remnants of minor salivary glands. Their only value is as the terminal demarcation in the fabrication of the maxillary denture.)

Uvula: a downward projection of the soft palate composed of connective tissue, muscles, and glands (See **Figure 2–3A**.)

Fauces

The following structures are located at the posterior portion of the oral cavity and form the pillars of fauces, the arch or entryway that joins the oral cavity with the pharynx, shown in **Figure 2–3A**.

Anterior tonsillar pillar: folds of tissue that extend horizontally from the uvula to the base of the tongue (See **Figure 2–3A**.)

Posterior tonsillar pillar: a set of arches of tissue set farther back in the throat than the anterior tonsillar pillar (See **Figure 2–3A**.)

Oropharynx: the area of the oral cavity that joins it with the throat or pharynx (On either side are the arches of muscular tissue called the pillars of fauces.)

Glossopharyngeal muscle: the anterior pillar of fauces extending from the outer surface of the palate to the tongue

Palatopharyngeal muscle: the posterior pillar of fauces extending from the pharynx to the palate

Palatine tonsils: masses of lymphoid tissue located between the anterior and posterior pillars of fauces (See **Figure 2–3A**.)

Tongue

The tongue is a muscular structure covered with oral mucosa. The anterior two-thirds of the tongue is referred to as the *body*; the posterior third is the *base* of the tongue. The following structures are located on the *dorsum* (upper side) of the tongue, as shown in **Figure 2–4A**.

Median sulcus: a shallow groove extending along the midline of the tongue, ending in a slight depression called the *foramen caecum*

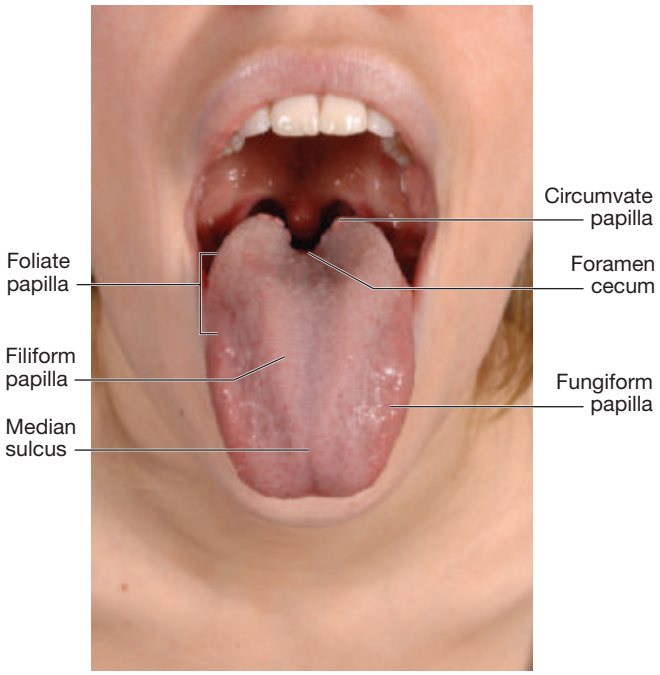


Figure 2–4A. Dorsum of the tongue

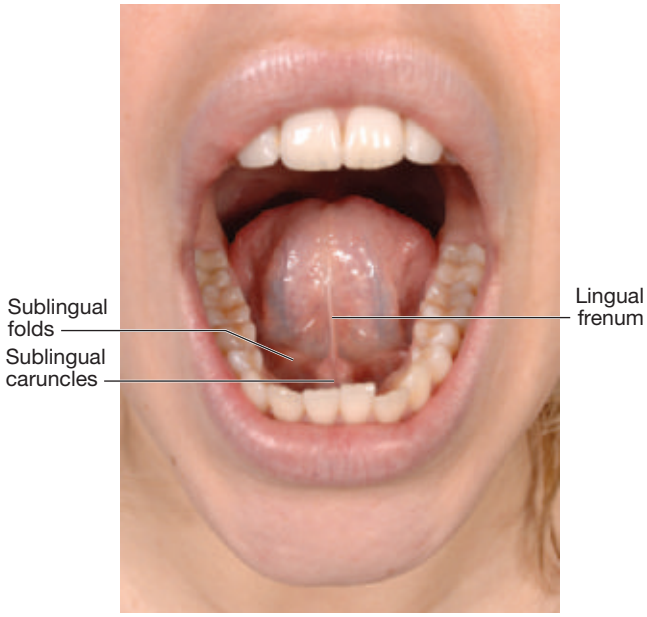


Figure 2–4B. Structures located on the floor of the oral cavity.

Foramen caecum: a "V"-shaped terminal sulcus at the posterior area of the median sulcus, considered the junction of the oral and pharyngeal sections of the tongue

There are numerous ***papillae*** (small projections) on the dorsum of the tongue:

Circumvallate: form a "V" shape and are anterior to the foramen caecum. They vary from eight to ten in number and are the largest of the papillae.
Fungiform: broad, round, red toadstool-shaped papillae located on the sides and apex of the tongue, although they can appear on other portions as well
Filiform: are abundantly located on the anterior two-thirds of the tongue (These long, thin, more flexible papillae are grayish in color.)
Foliate: situated on the lateral surfaces of the posterior third of the tongue (There are three to five [or more] of these large raised papillae on each side.)

The tongue functions as the main organ of taste and is an important adjunct of speech. It also assists in mastication by rolling and kneading the food against the teeth and hard palate and in deglutition by pushing the food backward into the oropharynx.

Taste buds: situated within the papillae of the tongue and stimulated when food is dissolved (The four primary taste sensations are bitter, sweet, salty, and sour [acid], as shown in **Table 2–2** and described in the "Head and Neck Anatomy" section of this text.)

TABLE 2–2. Papillae and Associated Tastes

PAPILLAE	TASTE
Circumvallate	Bitter
Fungiform	Sweet, sour, salty
Foliate	Sour
Filiform	Rarely have taste buds

The base of the tongue is attached. It is continuous with the oral portion, extending downward toward the epiglottis. The lingual tonsils (or lingual follicles), located on the sides of the posterior median line, are nodular masses of lymphoid follicles.

The following structures are located on the floor of the oral cavity. For these structures to be observed, the tongue must be raised, as shown in **Figure 2–4B**.

Lingual frenum: an elevated fold of soft tissue located on the floor of the mouth at the midline, which extends from the tissue below the central incisors to the undersurface of the tongue

Sublingual caruncles: round, elevated sections of soft tissue on either side of the lingual frenum, directly behind the central incisors on the floor of the mouth (Within the caruncles are duct openings to the sublingual [Bartholin's] and submandibular [Wharton's] salivary glands.)

Sublingual plica or fold: an elevated fold of soft tissue extending, medially, along the floor of the mouth toward the tongue and containing the opening to salivary glands called the *ducts of Rivinus*

Mandibular tori: an overgrowth of bone occurring bilaterally on the internal borders of the mandible, which, as with the maxillary torus, is nonpathologic and occurs in only 8 percent of the population

SUMMARY

The structures external to (outside) the oral cavity include the lips, cheeks, and related areas of the face that assist the oral cavity in functioning effectively.

The entire oral cavity, or mouth, is lined with a soft, moist covering called the *oral mucosa*. This lining has different degrees of consistency that enhance and protect the oral structures, such as the tongue and hard palate.

The oral cavity is divided into two sections: the oral vestibule and the oral cavity proper, each with its associated structures. It is important to be familiar with all the anatomical names of oral structures, as well as with its terminology so as to differentiate normal from abnormal.

WORKSHEET

Define the following words as well as those in the "Key Terms" list at the beginning of the chapter

Buccal _____

Sub _____

Frenum _____

Labial _____

Lingual _____

Mental _____

Nasal _____

Plica _____

Raphe _____

Clinical Applications

For observations of the oral cavity:

WASH YOUR HANDS FIRST.

Then use a *mouth mirror* and *a piece of gauze* for the following exercise.

Review all the structures of the oral cavity so that you will be able to recognize normal and thus any deviation from it.

For each structure listed, provide the following information:

- Its precise location in the oral cavity
- Its clinical appearance (size, shape, color, texture)
- Its comparison to the normal

Using this information as a guide, complete your observations.

1. Vermillion area: Is there cracking? Note any sores. What is the variation in coloring?
2. Philtrum: Note the depth of concavity. How does this affect one's appearance?
3. Maxillary tuberosity: Is this a large projection? What is the condition of the tissue?
4. Retromolar area: Is this mucosa about the same consistency as the buccal mucosa? How large an area is this?
5. Labial frenum: About how many millimeters is this small extension of tissue? Does it extend onto the attached gingiva?

6. Lingual frenum: What is the extent of its length? Is it raised or flat?
7. Buccal frenum: In what position must the jaws be before this can be observed? Which posterior teeth lie adjacent to this?
8. Incisive papilla: Is it raised, flat, inflamed?
9. Palatine rugae: Are they raised or flat? How many pairs are observed?
10. Palatine raphe: How far does this extend along the palate? Is it clearly observed?
11. Fovea palatinus: Are they on the hard or soft palate?
12. Pillars of fauces: Provide another name for the anterior and posterior pillar.
13. Palatine tonsils: Are they present? Describe their position and condition.
14. Uvula: Is it inflamed? What is the length?
15. Tongue: Observe the size and note whether it is coated. Also locate the papillae: filiform, fungiform, circumvallate, and foliate.
16. Sublingual caruncles: Can you see the duct openings? Describe what the duct openings are like. How high are the caruncles?
17. Buccal mucosa: Is it consistently pink and soft?
18. Stenson's papilla: Which posterior tooth is adjacent to this? Can the opening to the duct be seen?

Answer the following multiple-choice questions

1. Which of the following is the superior boundary of the oral cavity proper?
   - **a.** rugae
   - **b.** buccal mucosa
   - **c.** palate
   - **d.** uvula
2. An elevated fold of soft mucosal tissue extending from the alveolar mucosa of the maxillary central incisors to the labial mucosa is referred to as:
   - **a.** rugae
   - **b.** raphe
   - **c.** labial frenum
   - **d.** fovea

3. A raised, white horizontal extension of soft tissue extending along the buccal mucosa at the occlusal line is referred to as:
   - **a.** palatine rugae
   - **b.** linea alba
   - **c.** raphe
   - **d.** buccal fovea

4. A bony prominence located at the midline of the hard palate is referred to as:
   - **a.** uvula
   - **b.** frenum
   - **c.** papilla
   - **d.** torus

5. The area of the oral cavity that joins with the throat is referred to as:
   - **a.** oropharynx
   - **b.** oral septum
   - **c.** oronasum
   - **d.** oral tonsil

6. The most numerous papillae on the dorsum of the tongue are:
   - **a.** fungiform
   - **b.** fusiform
   - **c.** filiform
   - **d.** foliate

CHAPTER 3

The Tooth and Its Surrounding Structures

- Divisions of the Tooth
- Surfaces of the Tooth
- Tissues of the Tooth
- The Periodontium

Objectives

At the completion of this chapter, you will be able to:

1. Identify, on a diagram, the divisions of the tooth, surfaces of the tooth, tissues of the tooth, and tissues of the periodontium.
2. Describe each tooth tissue and those of the surrounding structures as to location, composition, and function.
3. Define the terms noted in boldface.
4. Perform the clinical applications as requested on the worksheet at the end of the chapter.

Key Terms

Alveolar mucosa
Alveolar process
Alveolus
Anatomic crown
Anatomic root
Apex

Continues

Key Terms *continued*

Apical foramen
Attached gingiva
Buccal
Cementum
Cervix
Clinical crown
Contact area
Crown
Dentin
Distal
Enamel
Facial
Free (marginal) gingiva
Free gingival junction
Incisal edge
Interproximal
Labial
Lamina dura
Line angle
Lingual
Melanin
Mesial
Mucogingival junction
Occlusal
Periodontal ligament
Point angle
Proximal
Pulp
Pulp canal
Pulp cavity
Pulp chamber
Pulp horns
Root
Sulcus

The teeth are not isolated structures, rather they rely on their surrounding anatomy for support and survival. The study of tooth anatomy and composition, along with examination of the tissues surrounding it, requires thorough familiarity in order to relate dental information on oral examinations, documents, and dialogue with other professionals

DIVISIONS OF THE TOOTH

When examining the tooth, note that it is divided into three sections (**Figure 3–1**):

1. The crown
2. The neck or cervix
3. The root

The **crown** is that portion of the tooth normally visible in the mouth and covered with enamel. The teeth have differently shaped crowns, each adapted to perform a specific function in reducing food for digestion.

The **root**, located in the bone and not normally visible, is covered with cementum. Roots stabilize, or support, the teeth when the pressure from mastication is exerted on them. The crown joins the root at the neck, **cervix**, or cemento-enamel junction (CEJ), a junction between the **anatomic crown** and the **anatomic root**. The anatomic crown is covered with enamel; the anatomic root is covered with cementum. After eruption is complete, only the anatomic crown is seen in the mouth. In later life, as part of the aging process, the gingiva and bone may recede, exposing a portion of the root. All of the tooth that is visible in the mouth, the crown *and* the exposed root together, is referred to as the **clinical crown** (**Figure 3–2**). The clinical crown extends from the biting surface of the tooth to the gingival margin.

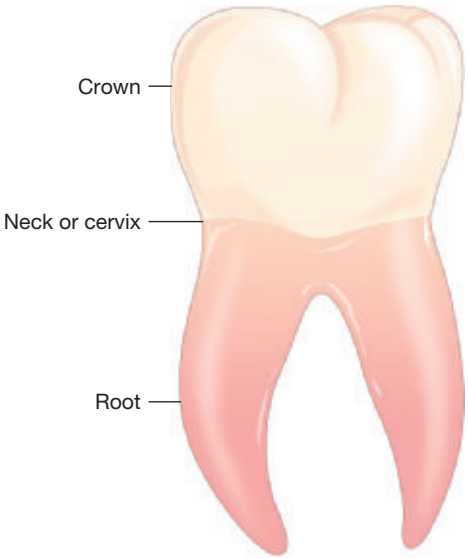


Figure 3–1. The three divisions of a tooth: crown, neck or cervix, and the root.

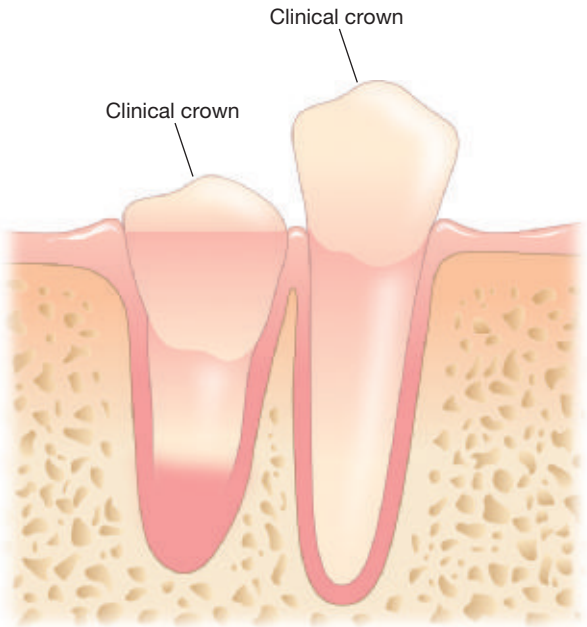


Figure 3–2. Clinical crown.