

1

Introduction to Dental Anatomy

LEARNING OBJECTIVE

The student should be able to know the definition of dental anatomy, types of dentition, dental formula, and various tooth numbering systems.

Definition of Dental Anatomy

Dental anatomy is defined as the study of the development, morphology, function, and identity of each of the teeth in human dentition [1].

Types of Human Dentition

There are two types of dentition throughout the life of a human being: deciduous dentition and permanent dentition [1]. Deciduous dentition is also called dentition of childhood or primary dentition. This dentition begins prenatally at about 14 weeks in utero. The complete set of teeth in this dentition is seen from years 2–6. Deciduous dentition consists of 20 teeth, 10 in the upper arch and 10 in the lower arch [1, 2]. Permanent dentition is also known as dentition of adulthood or secondary dentition or *successive dentition*. Permanent dentition is composed of 32 teeth, 16 in the upper arch and 16 in the lower. Teeth seen between the deciduous and permanent dentition periods are in the *transition* or *mixed dentition period* [2]. The transition period lasts from about 6–12 years of age and ends when all the deciduous teeth are shed [1].

Arch

The arch formed by the teeth and upper jawbone is the maxillary arch. The arch formed by the teeth and lower jawbone is the mandibular arch. Both the maxillary and

the mandibular arches have right and left halves known as quadrants [2].

Quadrants

Each dentition is divided into four quadrants named clockwise as upper right, upper left, lower left, and lower right. The left and right quadrants on both jaws are divided by the midsagittal plane so that the upper right quadrant mirrors the upper left quadrant and the lower right quadrant mirrors the lower left quadrant. Within each quadrant there are four classes of teeth: incisors (central and lateral), canines, premolars (first and second), and molars (first, second, and third) [3].

Dental Formula

For Primary Dentition

This formula (Figure 1.1) should be read as two incisors in the maxilla and two incisors in the mandible, one maxillary canine and one mandibular canine; two maxillary and two mandibular molars, altogether 10 on one side, either right or left side [2].

For Permanent Dentition

The dental formula for permanent dentition (Figure 1.2) is read as two incisors in the maxilla and two incisors in the

$$I \frac{2}{2} C \frac{1}{1} M \frac{2}{2} = \frac{5 \text{ Teeth in upper quadrant}}{5 \text{ Teeth in upper quadrant}} = \text{Total 10 teeth on one side}$$

Figure 1.1 Dental formula for deciduous dentition.

$$I \frac{2}{2} C \frac{1}{1} PM \frac{2}{2} M \frac{3}{3} = \frac{8 \text{ Teeth in upper quadrant}}{8 \text{ Teeth in upper quadrant}} = \text{Total 16 teeth on one side}$$

Figure 1.2 Dental formula for permanent dentition.

mandible, one maxillary canine and one mandibular canine, two maxillary and two mandibular premolars, three maxillary and three mandibular molars [2].

Tooth Notation

Universal System

In the *universal* system for primary dentition (Figure 1.3) uppercase letters are used starting from A through J (starting from the right maxillary second molar to the left maxillary second molar) for maxillary teeth and from letters K through T (beginning from the left mandibular second molar ending at the right mandibular second molar) for mandibular teeth [2].

In the universal notation system for permanent dentition (Figure 1.4), numbers from 1 through 32 are used for the full set of teeth. The maxillary teeth are numbered from 1 through 16 (beginning from the right maxillary third molar as tooth no. 1 ending at the left maxillary third molar as tooth no. 16). Mandibular teeth are numbered from 17 through 32 (beginning from the left mandibular third molar as tooth no. 17, ending at the right mandibular third molar as tooth no. 32) [2].

Zsigmondy Palmer Notation

In this system both the maxillary and mandibular arches are divided into two quadrants, so that there are a total of four quadrants in the oral cavity, each quadrant with a set of teeth as follows [2, 3]:



Figure 1.3 Universal system for primary dentition.

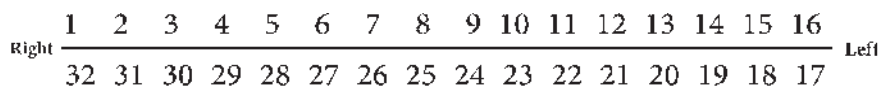


Figure 1.4 Universal system for permanent dentition.

For Primary Teeth

In each quadrant capital letters are used to denote teeth, from A (for central incisor) to E (for second molar); see Figure 1.5 [2].

For Permanent Teeth

In each quadrant, numbers are used to denote teeth from 1 (for central incisor) to 8 (for third molar); see Figure 1.6 [2, 3].

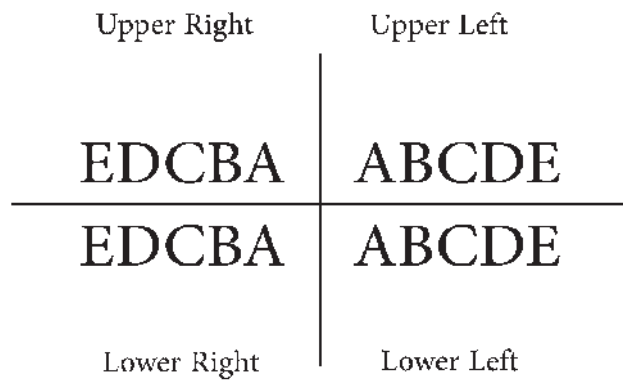


Figure 1.5 Zsigmondy Palmer notation for primary dentition.

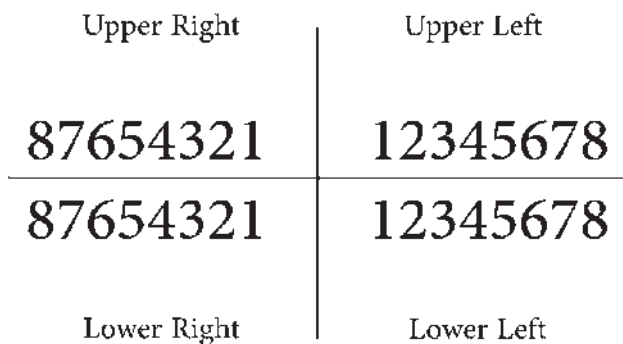


Figure 1.6 Zsigmondy Palmer notation for permanent dentition.

FDI System

A two-digit system proposed by Fédération Dentaire Internationale (FDI): In this system, the first number indicates the quadrant and the second number indicates a particular tooth (Figures 1.7 and 1.8) [2, 3].

For the Primary Teeth

Upper Right					Upper Left				
55	54	53	52	51	61	62	63	64	65
85	84	83	82	81	71	72	73	74	75
Lower Right					Lower Left				

Figure 1.7 FDI system for primary dentition.

For the Permanent Teeth

Upper Right							Upper Left								
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
Lower Right							Lower Left								

Figure 1.8 FDI system for permanent dentition.

References

- 1** Stanley, J.N. and Major, M.A. C. (2010). *Wheeler's Dental Anatomy and Occlusion*, 9e. St. Louis, MO: Saunders Elsevier.
- 2** Rickne, C.S. and Weiss, G. (2012). *Woelfel's Dental Anatomy*, 8e. Philadelphia: Lippincott Williams & Wilkins.
- 3** Hillson, S. (2012). *Dental Anthropology*. Cambridge University Press. Kindle Edition.

