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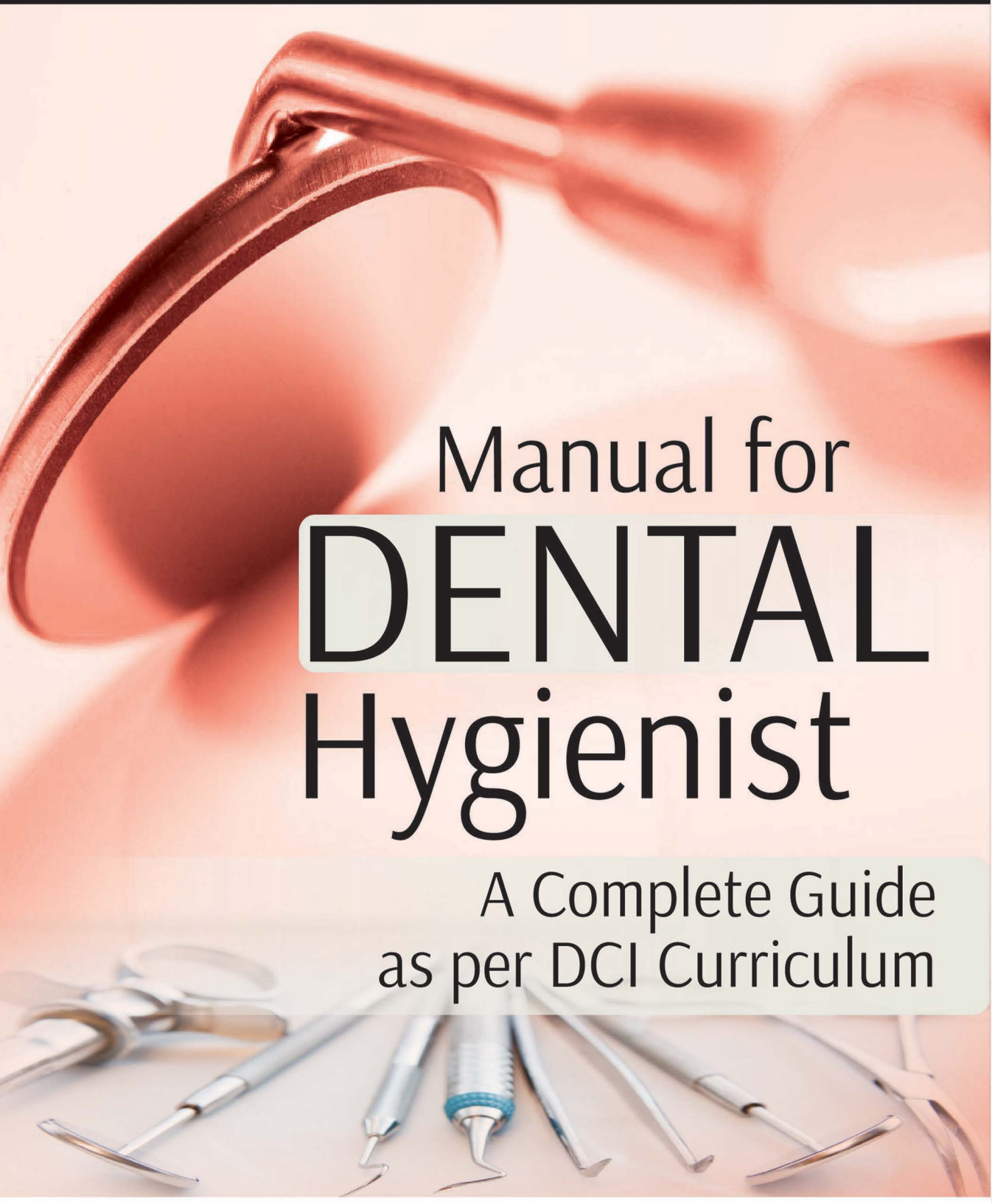

Manual for DENTAL Hygienist

A Complete Guide as per DCI Curriculum

PN Awasthi VSM

Foreword
Vimal Arora PVSM

JAYPEE

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CHAPTER 4

Human Dentition: Primary and Permanent Teeth

INTRODUCTION

Two different sets of teeth erupt during the course of a human's life, i.e. temporary or primary dentition and the secondary or permanent dentition.

PRIMARY TEETH

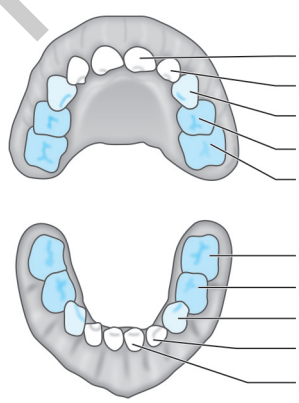
This is the first set of teeth in the human beings, which must function until these teeth are replaced by secondary teeth or permanent teeth. Other names are milk teeth, temporary teeth or deciduous teeth because they are shed and replaced by other teeth later in life. These teeth start eruption between 6 months and 8 months of life and are shed by 11–12 years when they are replaced by permanent teeth. They are 20 in number; incisor (8), canines (4), molars (8) as shown in Figure 4.1.

Eruption Sequence

- *Central incisors:* Eruption 7 months, shedding 6–7 years
- *Lateral incisors:* Eruption 8 months, shedding 7–8 years
- *Canines:* Eruption 17 months, shedding 10–12 years
- *First molars:* Eruption 14 months, shedding 10–12 years
- *Second molars:* Eruption 21 months, shedding 10–12 years.

SECONDARY OR PERMANENT TEETH

They begin to erupt at the 6th year and they are meant to function throughout the individual's life. These teeth have no successors except those provided as substitutes artificially. They



Age of eruption in Months

Fig. 4.1: Primary teeth

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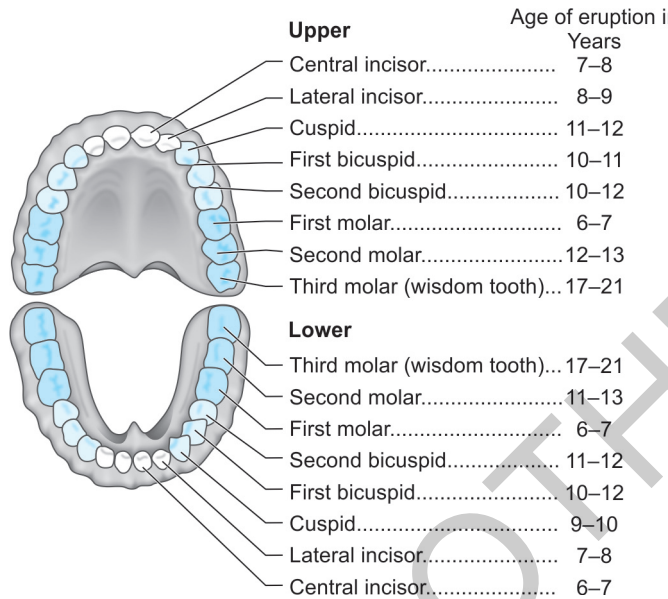

Fig. 4.2: Permanent teeth

are 32 in number; incisors (8), canines (4), premolars (8), and molars (12) as shown in Figure 4.2.

Time of Eruption

- *Central incisors:* 8 years
- *Lateral incisors:* 7–9 years
- *Canines:* 10–12 years
- *First premolars:* 10–12 years
- *Second premolars:* 10–12 years
- *First molars:* 6 years
- *Second molars:* 12 years
- *Third molars:* 17–21 years.

The pattern of tooth eruption and shedding of both deciduous and permanent teeth is depicted in Table 4.1.

TOOTH NUMBERING SYSTEM

The Federation Dentaire Internationale (FDI) two digit tooth numbering system is used in all examinations which is shown in Figures 4.3 and 4.4.

FUNCTIONS OF TEETH

General functions of teeth are mastication, aesthetics, and phonetics.

The word "incisors" is derived from Latin incidere, which means to cut into. They are used for shearing of food and these are forced between the posterior teeth by tongue and cheek muscles. For canines or cuspids, the word cusp refers to the spear-shaped crown of these teeth. They are much thicker because of a strong ridge of enamel on the labial and on the lingual surfaces. This ridge of enamel extends from the tip of the cusp to the cervical line or neck of tooth, and therefore, makes it a strong tooth.

It has also good support in the bone because it has the longest root. It is a corner tooth at the angle of the mouth which helps it to tear the food, e.g. carnivorous animals tear the flesh of their prey and man tears sugarcane.

Bicuspids or premolars mean two cuspids, preceding the molars. They pulverize the food

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Table 4.1: Chronology of mineralization and eruption of the human dentition

Tooth	*Initial mineralization*	*Enamel formed at birth*	*Enamel formation completed*	*Root formation completed*	*Eruption*
Deciduous dentition					
Upper/maxillary					
First molar	4 months in utero	Five-sixths	1 ½ months	1 ½ years	7 ½ months
Second incisor	4½ months in utero	Two-thirds	2 ½ months	2 years	9 months
Canine	5 months in utero	One-third	9 months	3 ¼ years	18 months
First molar	5 months in utero	Cusps united	6 months	2 ½ years	14 months
Second molar	6 months in utero	Cusp tips still isolated	11 months	3 years	24 months
Lower/mandibular					
First incisor	4 ½ months in utero	Three-fifths	2 ½ months	1 ½ years	6 months
Second incisor	4 ½ months in utero	Three-fifths	3 months	1 ¾ years	7 months
Canine	5 months in utero	One-third	9 months	3 ¼ years	16 months
First molar	5 months in utero	Cusps united	5 ½ months	2 ¼ years	12 months
Second molar	6 months in utero	Cusp tips still isolated	10 months	3 years	20 months
Permanent dentition					
Upper/maxillary					
First incisor	3–4 months		4–5 years	10 years	7–8 years
Second incisor	10–12 months		4–5 years	11 years	8–9 years
Canine	4–5 months		6–7 years	13–15 years	11–12 years
First premolar	1 ½–1 ¾ years		5–6 years	12–13 years	10–11 years
Second premolar	2–2 ¼ years		6–7 years	12–14 years	10–12 years
First molar	At birth	Sometimes a trace	2 ½–3 years	9–10 years	6–7 years
Second molar	2 ½–3 years		7–8 years	14–16 years	12–13 years
Third molar	7–9 years		12–16 years	18–25 years	17–21 years
Lower/mandibular					
First incisor	3–4 months		4–6 years	9–10 years	6–7 years
Second incisor	3–4 months		4–5 years	10 years	7–8 years
Canine	4–5 months		6–7 years	12–14 years	9–10 years
First premolar	1 ¾–2 years		5–6 years	12–13 years	10–12 years
Second premolar	2 ¼–2 ¾ years		6–7 years	13–14 years	11–12 years
First molar	At birth	Sometimes a trace	2 ½–3 years	9–10 years	6–7 years
Second molar	2 ½–3 years		7–8 years	14–15 years	11–13 years

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which has been cut into pieces by incisors and canines.

Molars, this word is derived from Latin "molaris". They are the largest teeth in the mouth because of the size of their crown and because of well-developed two or three roots. Upper molars have three roots and lower two roots. The last molars are the smallest, and least functional.

Maxillary incisors are larger than mandibular teeth. The lateral incisors are more rounded and smaller than the central incisors, which are stronger than their distal neighbors. Lower lateral is a slightly larger than the lower central incisor. The cuspids—maxillary canine is longest tooth in both the arches. It is bigger than mandibular canine. The cingulum or maxillary cuspid is more prominent. Upper 1st premolar has two roots while all other premolars have one root. Lower 1st premolar is smallest of all permanent teeth. Second premolars are more developed for grinding of food. Maxillary 1st molar is largest of all the molars and has three well-developed roots and is the most useful teeth. Third molars are smallest and are called wisdom teeth (Fig. 4.5).

Occlusion

The biting surface of the teeth is called occlusal surfaces of teeth. Occlusion of the teeth means functional relationship of upper and lower teeth when the jaws are closed and teeth meet in contact with each other. Every tooth has two antagonists with the exception of lower central incisors and upper 3rd molars. The study of surface anatomy of the teeth is important in rendering any treatment of the teeth such as dental prophylaxis and dental restoration. The form of the teeth is interrelation to the functions that they are required to perform. The crown of an incisor tooth has an incisal edge and crowns of canines, premolars and molars have cusps. These incisal edges and cusps form the cutting surfaces of tooth crowns.

SURFACE ANATOMY

- Labial surface is the outer surface of the anterior teeth which faces forward towards the lips (Fig. 4.6)
- Buccal surface is the surface of posterior teeth facing the cheeks (Buccinator muscles)
- Lingual surface or inner surfaces of all the teeth in the lower jaw facing the tongue are called lingual surfaces. The corresponding surface of the upper teeth are called palatal surface
- Proximal surface is the area where the mesial surface of one tooth touches the distal surface of another; called also contact area or surface.

Permanent dentition

FDI	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	**FDI**
Universal	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Universal
	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	
FDI	4.8	4.7	4.6	4.5	4.4	4.3	4.2	4.1	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	**FDI**
	Right														Left		

Primary dentition

FDI	5.5	5.4	5.3	5.2	5.1	6.1	6.2	6.3	6.4	6.5	**FDI**
Universal	A	B	C	D	E	F	G	H	I	J	Universal
	T	S	R	Q	P	O	N	M	L	K	
FDI	8.5	8.4	8.3	8.2	8.1	7.1	7.2	7.3	7.4	7.5	**FDI**
	Right								Left		

Fig. 4.3: FDI/Universal tooth numbering system

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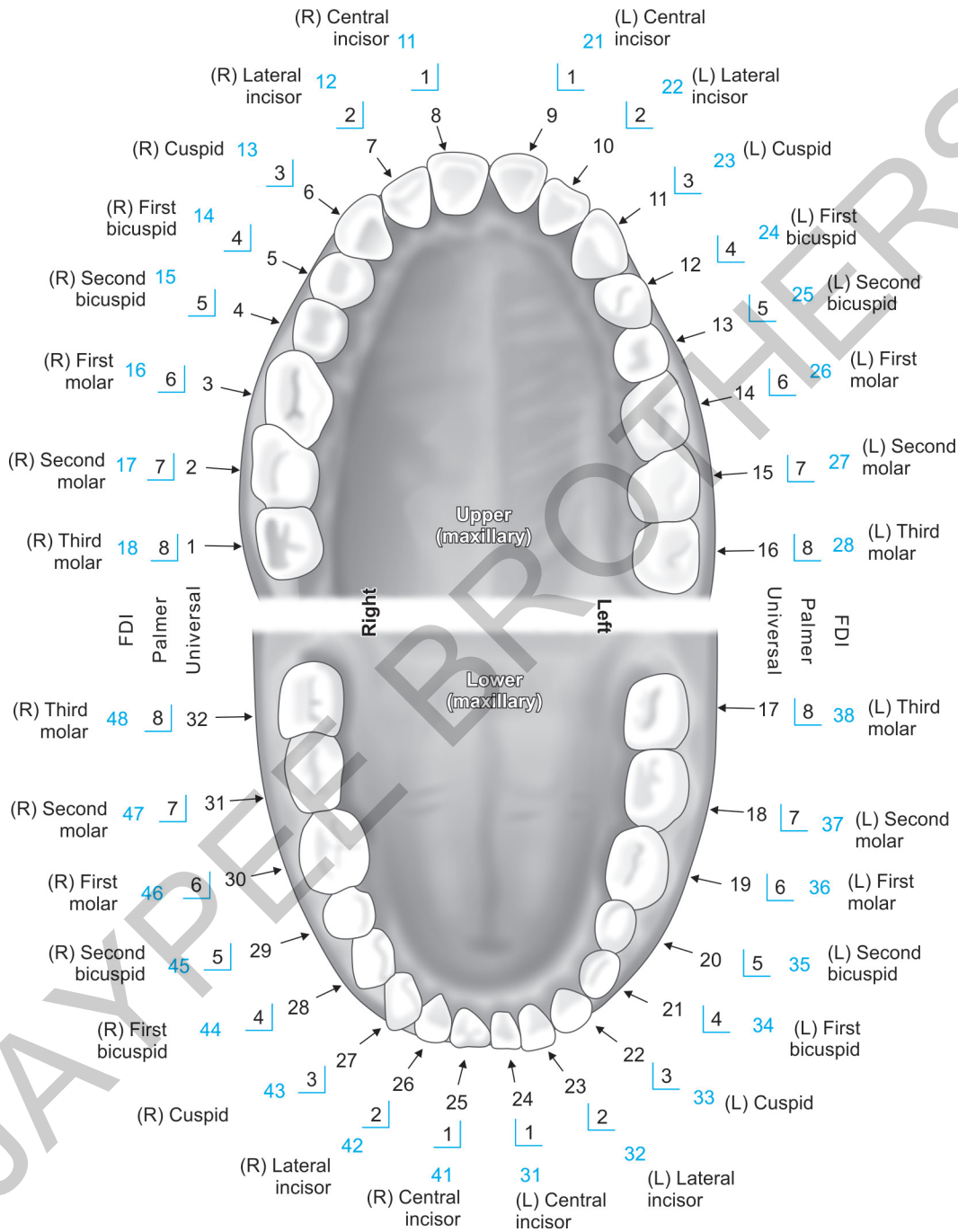

Fig. 4.4: Different types of tooth numbering system

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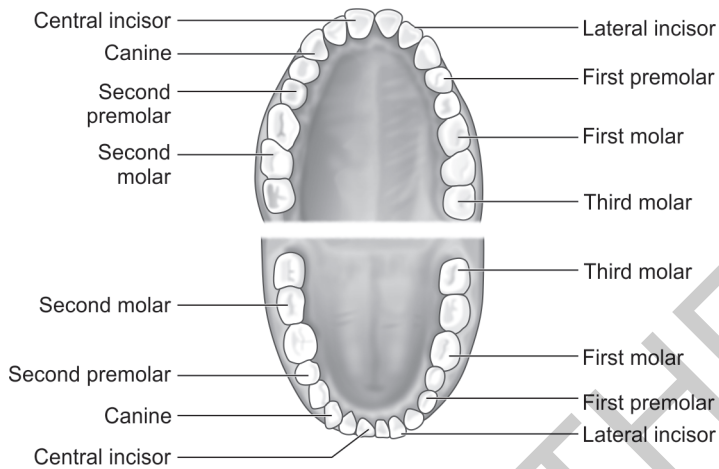

Fig. 4.5: Positioning of maxillary and mandibular teeth in oral cavity

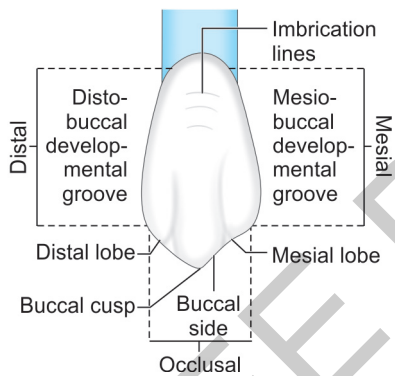

Fig. 4.6: Labial surface of incisor

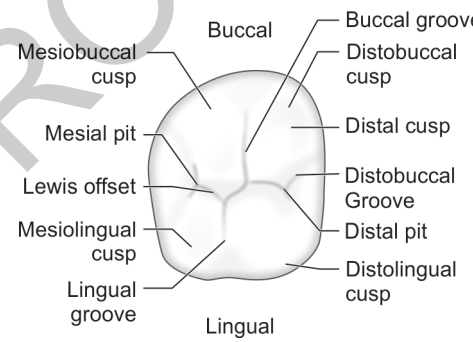

Fig. 4.7: Occlusal surface of molar

- Occlusal surface is the chewing surface of the premolars and molars (Fig. 4.7)
- Line angle is formed by the junction of two surfaces, e.g. mesiolabial line angle of anterior teeth
- Point angle is formed by the junction of three surfaces, e.g. mesiolabioincisal point angle of anterior teeth
- Cusp is a pronounced elevation on the occlusal surface of posterior teeth
- Tubercle is a small elevation on the crown which may not be typical
- Ridge is any linear elevation on the surface of the tooth
- Cingulum is a bulbous convexity near the cervical region of a tooth
- Marginal ridge are ridges at the mesial and distal edges of the occlusal surfaces of posterior teeth
- Fissure is along cleft between cusps or ridges
- A fossa is a rounded depression.

Axial wall is any wall of the pulp chamber which is parallel to the long axis of the tooth.

Maintenance of Tooth Position

The factors which keep the teeth in position are:

- *Occlusal contact:* Two antagonists except lower central incisor and upper 3rd molar
- *Intercuspal relation:* Interlocking of cusps prevent drifting

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- *Muscles of face and tongue:* Keep the teeth in natural zone
- *Mesial and distal contacts:* Prevent their movement mesially and distally, and protect gingiva and bone.

Teeth are sustained by their own functional anatomy. Form and function go hand in hand. They help to sustain themselves in the dental arch by assisting in the development and protection of the tissues that support them. The following anatomic features help in this.

- Contours or curves of surfaces of teeth protect food impaction on gums
- Contact and embrasure form provide spillways for dispersion of food during mastication. Normal contact and embrasure form is required for health of tissues
- Mesial and distal edges have elevations of enamel called the marginal ridges. These ridges convey the food in the proper direction.

Occlusal wear gradually decreases crown length of the teeth with edge, and teeth tend to erupt more in the oral cavity to compensate for this loss. They become wider and this results in overloading of the supporting structures.

Resorption of Teeth

Resorption of the roots of the teeth is of two types, which are termed as external resorption and internal resorption.

External Resorption

Physiological resorption occurs in deciduous teeth; there is a gradual resorption of their roots resulting in loss of attachment of their periodontal ligament. The developing permanent successor tooth creates sufficient pressure by its increase in size to produce resorption of the primary tooth root and of the bone surrounding the root. As the root resorbs, the tooth loosens. Eventually, all periodontal ligament attachment is lost and the rootless crown of the primary tooth literally falls off from the jaw and the process is called shedding of teeth. If the permanent tooth does not cause pressure on the primary tooth root, the resorption process may be delayed and continue to function for many years, but quite a few times the primary teeth are lost.

Other causes of external resorption are:

- Low grade periapical chronic inflammation
- Pressure from cysts, tumors and impacted teeth
- Orthodontic treatment excessive pressure
- Traumatic occlusion (excessive pressure of occlusal forces)
- Replantation or transplantation of teeth
- Resorption from unknown causes.

Internal or Idiopathic Resorption

Mouth is the gateway of the body and the teeth are the sentinels to protect it. The periodical visits are required to ensure the oral health. It can be arranged by either carrying out periodical dental inspections by carrying out periodical recalls for dental treatment.

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A Complete Guide as per DCI Curriculum

Salient Features

- Written in a very simplified, concise pattern so that the contents can be grasped easily by the trainees and trainers equally
- Designed on the lines of syllabus prescribed by Dental Council of India (DCI)
- Highlights: Dental Radiography, Gingival and Periodontal Diseases, Working Protocol for a Dental Hygienist, Food and Nutrition, Management of Medical Emergencies in Dentistry, Dental Materials, Dentists (Code of Ethics)
- A step-by-step learning of the science and art of oral hygiene on the pattern of Armed Forces teaching, where a dental hygienist before being mustered in the cadre has to undergo six months training on medical nursing and dental assistant course
- Mission of the manual is to meet the expectations of the dental hygienist to be a competent oral health care provider and be a respectful member of the dental profession
- An outline of the vast known and unknown challenges of maintaining a good oral health for which reader has to constantly update his skill from time to time.



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