

## DENTITION IN MAMMALS

The structure, number and arrangement of teeth in the upper and lower jaws are collectively called **dentition**.

### Structure of a Typical tooth

A typical tooth has a **crown**, **neck** and **root**. The root is embedded in a **socket**. The entire tooth encloses a pulp cavity. Tooth is made of **dentine**. The crown is covered externally by a hard **enamel**, the neck and root are covered by **cement**.

### Functions of Teeth

- (i) The primary function of teeth is to **grasp and hold the prey** or food.
- (ii) Teeth are modified to serve as a **grinding mill** for chewing food.
- (iii) Teeth may serve as weapons for **offence and defence**

### Significance of Teeth

- (i) Study of dentition is important for **taxonomic** work on mammals.
- (ii) The number of teeth present gives an idea of the approximate **age of the mammal**
- (iii) It helps in deciding the **pedigree** or ancestry of certain mammals.

## DIFFERENTIATION (SHAPE) OF TEETH

Morphologically, teeth can be distinguished into two types such as homodont and heterodont.

### 1. Homodont Teeth

In vertebrates other than mammals, all the teeth present are **similar in shape and size**. They are said to be homodont or isodont. Among mammals only certain cetaceans have homodont dentition, i.e., teeth which are all similar in shape. Further the number of teeth in these homodont mammals varies between 2 and 200.

### 2. Heterodont Teeth

Mammalian teeth are characteristically **heterodont**, i.e., dissimilar in shape, size and functions. The heterodont dentition commonly includes four kinds of teeth such as **incisors, canines, premolars and**

**molars**. The differentiation depends upon the nature of food eaten and the manner of securing it.

## ATTACHMENT OF TEETH

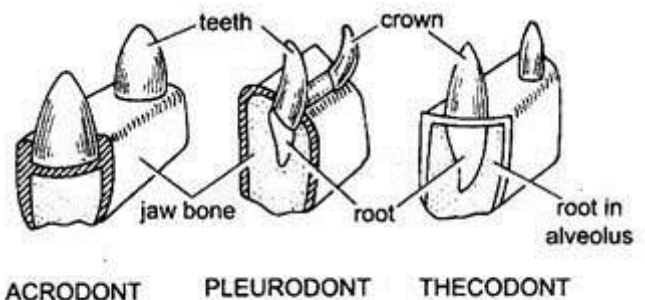
Based on the attachment of teeth on the jaw bone, there are three types of teeth.

### 1. Acrodont Type

In this type, teeth are attached on the **free surface of the jaw bone** as in shark or frog. Such teeth are apt to break off easily but are replaced.

### 2. Pleurodont Type

This condition occurs commonly in **urodels** and **lizards**. Teeth are attached to the **shelf-like indentations** on the inner margin of jaw bone by their bases as well as one side. Acrodont and pleurodont teeth are **rootless**, so that nerves and blood vessels enter the pulp cavity at the base of



**Fig. 33.1.** Three methods of attachment of teeth to jaws. the tooth.

### 3. Thecodont Type

Thecodont type of teeth is found in some fishes, crocodilians and mostly in mammals. In this type the teeth have roots (one or more) and the roots are embedded in **sockets** called alveoli or theca of jaw bones, a crown projects above the socket.

## SUCCESSION OF TEETH

According to their permanence or replacement (succession), teeth fall into three categories:

1. Polyphyodont,
2. Diphyodont and
3. Monophyodont.

### 1. Polyphyodont

In most of the lower vertebrates, the teeth are being **constantly replaced** an indefinite number of times

during life, i.e., successions are numerous and continuous throughout life. Such a condition is known as polyphyodont.

## 2. Diphyodont

In most mammals, there are only **two successions**, i.e., teeth develop during life in two successive sets. This condition is known as diphyodont. Teeth of the first set are called lacteal or milk teeth. They usually erupt after birth and they are replaced by permanent dentition.

## 3. Monophyodont

In some mammals such as platypus, marsupials, moles, cetaceans (toothless whales), etc., only one set of teeth develops, known as monophyodont condition.

## TYPES OF TEETH

In heterodont condition teeth can be distinguished into 4 types. These are incisors, canines, premolars and molars

### (i) Incisors:

They are **flat chisel-shaped** teeth having a single root. These are used for cutting and biting. The incisors are small in carnivorous animals (cat, tiger, dog).

### (ii) Canines

Canines are present in the majority of mammals. They are **sharp pointed teeth** having **single pointed crown** and a **single root**. They are used for **piercing** and **tearing** the flesh of the prey. In walruses only the upper canines develop into enormous offensive tusks.

### (iii) Cheek Teeth (Premolars and Molars):

Canines are followed by premolars followed by molars. Both types are collectively called cheek teeth or grinders. Their crowns have broad surfaces with ridges and tubercles meant for crushing, grinding and chewing. In higher primates (man), last molar is called **wisdom tooth**.

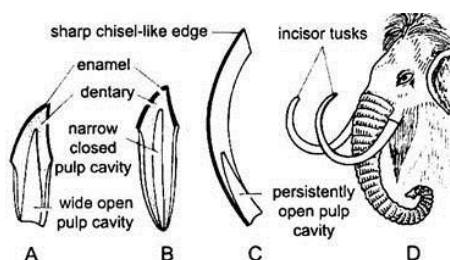


Fig. 33.2. Various forms of incisor teeth. A—Immature open-rooted; B—Mature close-rooted; C—Open-rooted rodent incisor; D—Open-rooted upper incisors in mastodon.

## Dental Formula

The number of each type of teeth of a mammal or dentition is expressed by a dental formula. The dental formula is expressed as the number of different types of teeth in one half of the upper jaw and is written above a line, while the number of teeth of one half of the lower jaw is written below the line, e.g.:

$$D.F. = \frac{\text{Number of teeth in one half on the upper jaw}}{\text{Number of teeth in same half on the lower jaw}}$$

$$\text{or } = \frac{\text{incisor}}{\text{incisor}}, \frac{\text{canine}}{\text{canine}}, \frac{\text{premolar}}{\text{premolar}}, \frac{\text{molar}}{\text{molar}} \times 2$$

$$\text{or } \frac{i}{i}, \frac{c}{c}, \frac{pm}{pm}, \frac{m}{m} = 2$$

Number of teeth shown in the formula multiplied by 2 gives the total number of teeth of a species.

A typical mammalian dentition includes 44 permanent teeth which are shown by the dental formula as follows:

$$i \frac{3}{3}, c \frac{1}{1}, pm \frac{4}{4}, m \frac{3}{3} \times 2 = 44$$

To simplify further, the same formula may be written as 3, 1, 4, 3/3, 1, 4, 3 = 44. When a certain type of teeth is lacking, it is indicated by a zero.

Dental formula of some common mammals is as follows:

Dog	$\frac{3,1,4,2}{3,1,4,3} = 42$	Horse, Pig and Mole	$\frac{3,1,4,3}{3,1,4,3} = 44$
Cat	$\frac{3,1,3,1}{3,1,2,1} = 30$	Squirrel	$\frac{1,0,2,3}{1,0,1,3} = 22$
Rat	$\frac{1,0,0,3}{1,0,0,3} = 16$	Cow, Sheep and Goat	$\frac{0,0,3,3}{3,1,3,3} = 32$
		Monkey	$\frac{2,1,2,3}{2,1,2,3} = 32$
Rabbit	$\frac{2,0,3,3}{1,0,2,3} = 28$	Lemur	$\frac{2,1,3,3}{2,1,3,3} = 36$
Kangaroo	$\frac{3,1,2,4}{1,0,2,4} = 34$	Man	$\frac{2,1,2,3}{2,1,2,3} = 32$
Opossum	$\frac{5,1,3,4}{4,1,3,4} = 50$	Elephant	$\frac{1,0,0,3}{0,0,0,3} = 14$