

DENTITION IN MAMMALS

Teeth and Dentition

The hard and usually pointed structures connected to the jaw bones in the buccal cavity of vertebrates, are known as **teeth**. The structure, kind, number and arrangement of teeth are collectively known as **dentition**. Although teeth are found among fishes, amphibians and reptiles and are also known to have been present in ancestral birds, but they are most highly specialised in mammals. Teeth are as a rule present in the foetal as well as adult conditions of mammals. In all such cases they are never found on the palatal bones, but are present on the premaxillae, maxillae and mandibles and are unlike those in most lower vertebrates, differentiated in form and functions.

Functions of Teeth

Teeth play an important role in everyday life of an animal :

- I. The primary function of teeth is to grasp and hold the prey or food in the mouth cavity.
- II. Teeth are modified to serve as a grinding mill for chewing food.
- III. Teeth may serve as weapons for offence and defence by working as tearing organs.

Significance of Teeth

- I. Teeth are so characteristics of mammals that their classification is based largely on their dentition. Thus, 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 mammals.
- III. Dentition provides clue to the diet of the mammals.
- IV. Study of dentition has helped in deciding the pedigree or ancestry of certain mammals.

1. Shape (Differentiation) of Teeth

Morphologically, the teeth can be differentiated into two types such as **homodont and heterodont**.

I. 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 similar in shape. Further the number of teeth in these homodont mammals varies between 2 and 200. In certain mammals such as toothed whales, dolphins, porpoises and armadillos, teeth become secondarily uniform or homodont.

II. Heterodont Teeth : Mammalian teeth are characteristically **heterodont**, *i.e.*, dissimilar in shape and size. They are differentiated into several types known as **incisors, canines, premolars and molars**. This differentiation depend upon the nature of food eaten and the manner of securing it.

2. Attachment of Teeth

The manner of attachment of teeth at their bases with the jaw bones varies throughout vertebrates.

I. Acrodont : This condition occurs in most vertebrates in which teeth are attached to the free surface or summit of the jaw bone in a shark or frog. Such teeth are apt to break off easily but are replaced.

II. Pleurodont : In this condition, common in urodels and lizards. Teeth are attached to the shelf like indentation 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 along lateral side at the base of the tooth.

III. Thecodont : This type of teeth are found in some fishes, crocodiles and mostly in mammals. In this type of teeth have root (one or more) and the roots are embedded in sockets called **alveoli or theca** of jaw bones, a crown projects above the socket. In mammals the roots of thecodont teeth are longer, they may be open or closed below. In the open type the pulp cavity has a wide opening or root canal, such teeth continue to grow throughout life by addition of dentition *e.g.*, incisors of rodents, tusk of elephants. Most teeth are of the closed type in which the opening of the pulp cavity is very small and serve only for passage of blood vessels and nerves, such teeth do not grow after reaching a definite size.

3. Succession of Teeth

According to the succession of teeth (replacement or performance) it is of three types :

I. Polyphyodont : In most of the lower vertebrates, the teeth are being constantly replaced an indefinite number of times during life *i.e.*, succession are numerous and continuous throughout life. Such a condition is known as **polyphyodont** which is not found in mammals.

II. Diphyodont : In most mammals teeth develop during life into two successive sets, this condition is known as **diphyodont**. Teeth of the first set are called **deciduous, lacteal or milk teeth**. They usually erupt after birth, but in guinea pigs, bats and others, they are formed and shed even before birth. Milk dentition has no molars included. Later milk teeth are replaced in the adult by the permanent teeth which last throughout the life. If lost they are not replaced. **In cape ant-eaters or aardvarks** milk teeth outnumber the permanent teeth.

III. Monophyodont : In some mammals such as **platypus, marsupials, moles, sirenians, toothless whales, etc.** only one set of teeth develops known as **monophyodont** conditions.

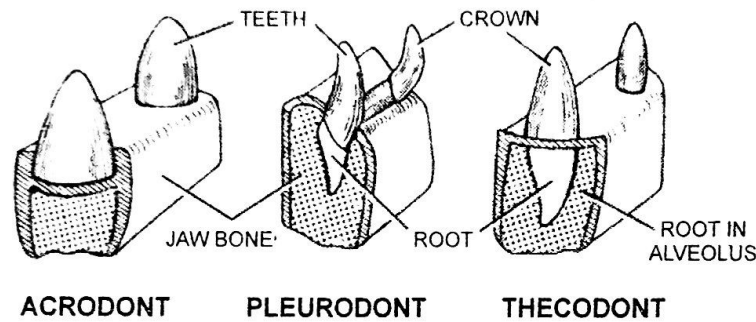


Fig. 9.17 Three methods of attachment of teeth to jaws.

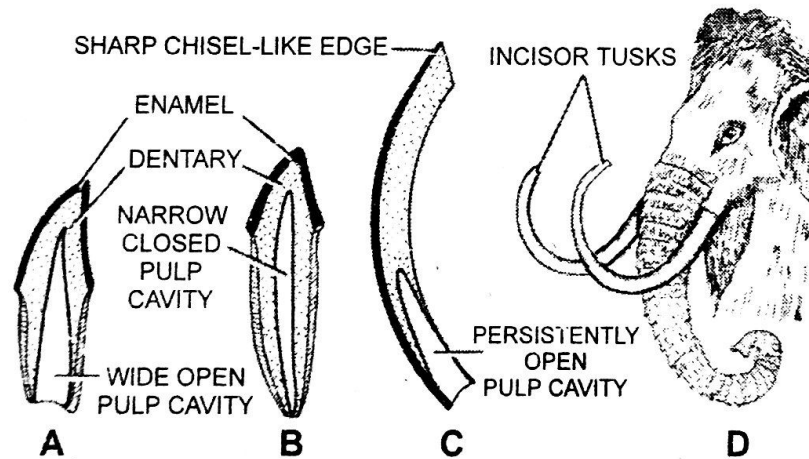


Fig.9.18 Various forms of incisor teeth. A—Immature open rooted. B—Mature close-rooted. C—Open-rooted rodent incisor. D—Open-rooted upper incisors in mastodon.

4. Kinds of Teeth (Variation of form and structure)

In different mammals, the different kinds of teeth may undergoes variation of form and structure. In many cases these variations are found to be correlated with the feeding habits and the types of food eaten. When the growth of the root ceases, as it does in the majority of mammals, the opening of the pulp cavity becomes reduced to a narrow foramen. In some cases, however, the root grows indefinitely and in these forms the opening of the pulp cavity remains permanently wide such roots are said to be rootless. In such cases the crown of the tooth is always long and such long-crowned teeth are called **hypodont** in contradistinction to the ordinary

short-crowned teeth, which are called **brychydont**. These and other variations may be found in many type of teeth.

There are various four types of tooth found in mammal which are as :

I. Incisors : These are the front teeth borne by the premaxillae in upper jaw and tips of dentaries in lower jaw. They are single-rooted monocuspid and long curved and sharp-edged. They are adapted for seizing, cutting and biting.

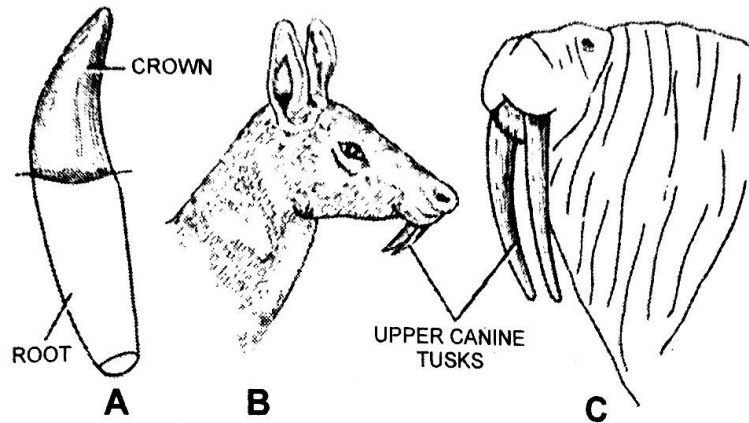


Fig. 9.19 Canine teeth. A—of a carnivore (jaguar); B—of male musk deer. C—of walrus

In rodents and logomorphs, incisors are open-rooted and continue to grow throughout life. They have enamel on their anterior face only. Since enamel wears down more slowly than dentine, sharp chisel like edges result which serve for cutting and gnawing. In Lemurs, incisors are denticulates like a comb, serving for cleaning fur. Elephant tusks are modified upper incisor with open roots. Incisors may be totally absent (sloths) or lacking on the upper jaw (Ox).

II. Canines : A single canine tooth occurs in each half of each jaw, just out side the incisors. Upper canines are the first teeth on maxillae. Canines are generally elongated, single rooted and with a conical sharp monocuspid crown. They are meant for pierching, tearing and offence and defence.

In carnivores (Dog) canines become large, strong and pointed spear like for tearing flesh. They are often larger in male. They are present only in upper jaw in male musk deer. Upper canines form tusk in walrus for digging molluscs and for locomotion on ice. Canines are absent in some herbivores such as rodents (Rat), lagomorphs (Rabbit) and some ungulates (Ox) leaving a wide toothless space called **diastema**.

III. Cheek Teeth : Canines are followed by premolars followed by molars. Both types are collectively called the **cheek teeth**. Their crown have broad surfaces with ridges and tubercles meant for crushing, grinding and chewing. Premolars usually have two roots and two cusps and are represented in milk dentition. Molars generally have more than two roots and several cusps and do not have milk predecessors.

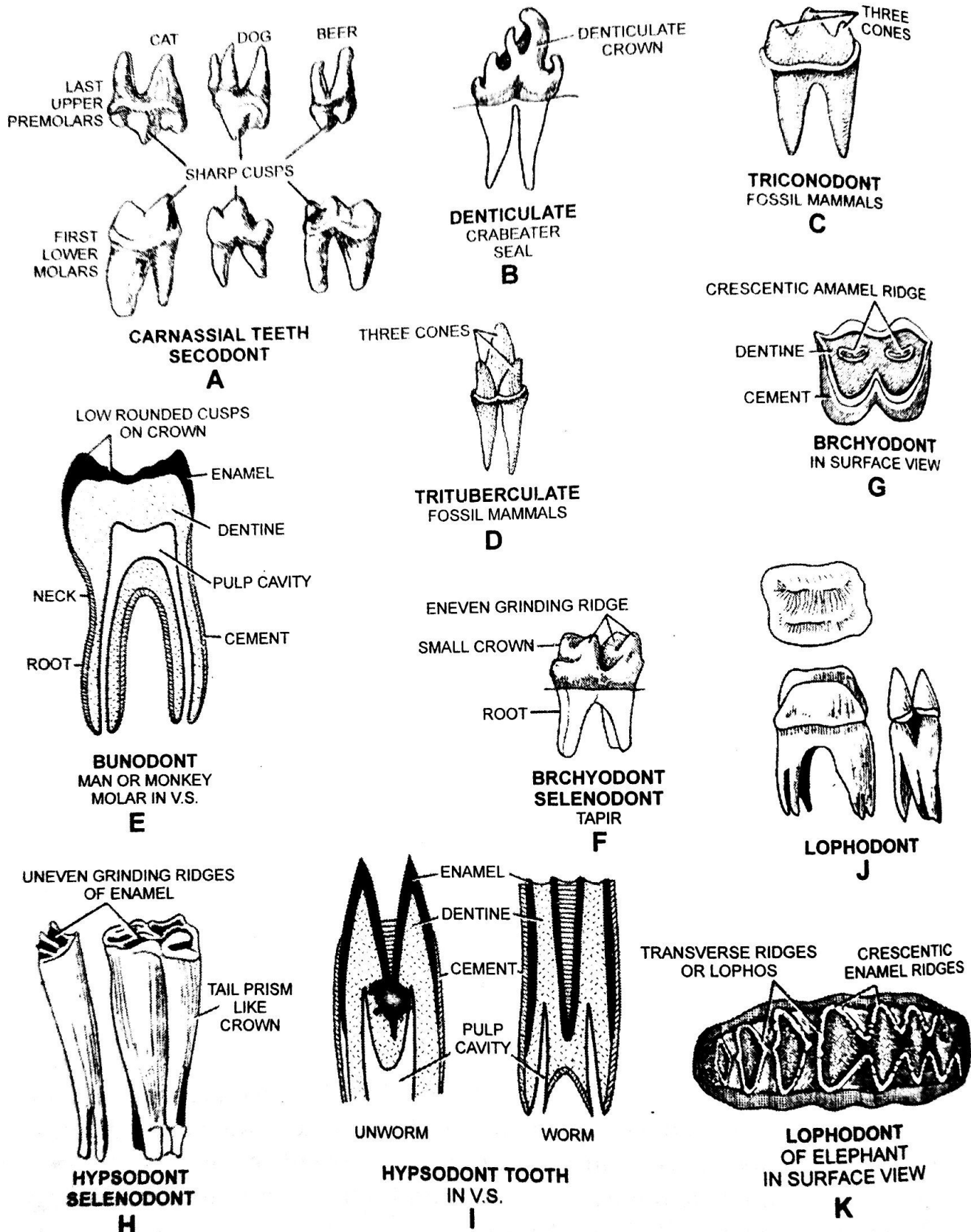


Fig. 9.29 Modifications of cheek teeth. A—Carnassial teeth (secodont). B—Denticulate molar. C—Triconodont tooth. D—Tritubercular tooth showing arrangement of cusps. E—Bunodont molar in V.S. F—Brachyodont selenodont molar. G—Surface view of crown of brachyodont molar. H—Hypsodont selenodont molars. I—Hypsodont teeth in V.S. J—Lophodont molar. K—Lophodont in surface view.

The cheek teeth or grinding teeth are the teeth which show the greatest amount of variation in their form and structure. This is shown by the

variety of the number and arrangement of cusps and ridges at the apex of the crown. The number of cusps of a cheek teeth may vary from one to many. In carnivores, last premolars in upper jaw and first molar in lower jaw may have very sharp cusp for cracking bones and shearing tendons. These are called **carnassial teeth**. In lemurs, first premolars are like canines. In crab-eater seal-molars bear denticulate processes to strain plankton. In higher primates (man) last molar is called **Wisdom Tooth**. Its eruption may be delayed, or it is imperfectly formed or absent in man.

Types of Cheek Teeth

Cheek teeth are of various types depending on the number, shape and arrangement of cusps. These are of following types :

(a) **Tricodont** : It is found in fossil mesozoid mammals in which 3 cones are arranged in a straight line or linear series.

(b) **Trituberculate** : It is also known in fossil mammals in which 3 cones or tubercles are arranged in the form of a triangle.

(c) **Bunodont** : These are found in mammals with a mixed diet such as man, monkey, pig, etc. Their crowns bear small separate blunt and rounded tubercles meant for crushing.

(d) **Secodont** : This condition is found in carnivores in which teeth have sharp cutting edges for tearing and cutting flesh.

(e) **Selenodont** : This condition is found for grinding in herbivores ruminating mammals such as cow, horse and others in which cheek teeth have vertical crescent-shaped fold of hard enamel enclosing softer areas of dentine with cement filling interstices. Normal low crowned selenodont teeth with short roots (ground squirrel) are termed **brachydont**. In large grazing mammals such as horse and cattle, teeth are elongated, prism shaped with high crowns and low roots. This condition is known as **hypodont**.

(f) **Lophodont** : In lophodont condition found in elephant, there is an intricate folding of enamel and dentine. Crescentic enamel cusps are connected by several transverse ridges called **lophos**. A single large lophodont molar, 30 cm by 10 cm, is present at one time in each half of each jaw. These are adapted to grind all sorts of plants including grasses. In elephants as well as manatee, there is a constant succession of teeth from behind throughout life. The front ones are pushed forward and are shed as new ones form behind. Only one fully developed tooth is present at any one time on each side of each jaw in elephant.