Mammalogy Lecture 6 - Dentition

I. Let's move on to the topic of dentition. You'll be learning a lot of terms here, but we'll really only scratch the surface of the study of mammalian dentition and focus on the primitive tooth type and subsequent modifications for diets.

II. First, here's some general information.

A. Anatomy – Because mammalian teeth are thecodont, there are two regions, the crown, above the gum line, and root, below.

There are two materials that form the hard parts: dentin and enamel.

Enamel completely covers the crown of the tooth in only some species of mammals, such as humans.

Dentin is softer than the enamel and wears away faster. The enamel then forms ridges and cusps, and much of the pattern of the occlusional surface is formed by wear.

Pulp cavity houses the nerve and blood supply.

Root is open while tooth is growing, and there is a blood supply to fuel this growth.

When tooth is fully developed, the root may close off, such that blood supply is cut off.
Brachydont - ancestral

In some forms (primarily herbivores) the root never closes off and the tooth is ever-growing. **Hypsodont - high-crowned**

These teeth then require constant wear, or animal will die.

B. Differentiation – Because mammals are strongly heterodont, teeth are differentiated.

Looking up at the palate of a human:
incisors - croppers and nippers (premaxilla)
canines - puncture and hold
premolars - slice and grind
molars - slice and grind.

Eutherians - only molars are non-deciduous, that is have only a single generation.

Metatherians - the last premolar is deciduous.

III. Dental formulae - There is a great deal of variation in which teeth are present across mammals, and mammalogists have a shorthand way of expressing the complement of teeth that characterizes a particular species. This is called the dental formula.

Exemplify this by *Homo sapiens*. 2/2 i, 1/1 c, 2/2 p, 3/3 m = 32 or just 2/2 1/1 2/2 3/3 = 32
Note that this just refers to one half the jaw, either the right or left side.

Primitive metatherian dental formula is: **5/4 1/1 3/3 4/4 = 50**

A unique aspect of marsupials is that they almost always have more upper incisors than lower.

Primitive eutherian dental formula is: **3/3 1/1 4/4 3/3 = 44**

In only a few groups have additional teeth evolved. Odontocetes, toothed whales, have >100 homodont teeth.

There are many groups that have fewer teeth than this, and the tendency is to lose teeth.

Teeth are lost in a particular pattern (over the course of evolution, not ontogeny)

incisors - posterior are lost first
premolars - anterior premolars are lost first.
molars - posterior are lost first.

So, if a group has only two premolars, it's the 1st and 2nd that have been lost and the 3rd and 4th that are retained.

IV. Different types of Cheek Teeth. Dietary habits lead to the adaptations of different types of teeth.

Primitive Tribosphenic molar - Upper

Metatherian and Eutherian Tribosphenic molars – Upper

Primitive and Derived Lower Tribosphenic molar

Drawings on board of cusp homologies in derived molars (pdf's of these drawings are on course website).

Dilambdodont – Insectivorous diet: Insectivora, Dermoptera & Chiroptera

Secodont/Carnassial – Carnivorous diet: Carnivora

Bunodont – Omnivorous diet: Many primates, bears (Ursidae), Suidae

Selenodont – Herbivorous diet; Many terrestrial cetartiodactyls (e.g., deer; Cervidae)

Lophodont – Herbivorous diet; Proboscidea, many rodents.

Selenolophodont – Herbivorous diet; e.g., Equidea, Rhinocerotidae.