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Age of elk from their "famous" teeth /



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Age of Elk From Their Canine Teeth



MONTANA FISH & GAME DEPARTMENT

Information Bulletin - October, 1967



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AGE OF ELK FROM THEIR "FAMOUS" TEETH

by
Kenneth R. Greer

Unlike other members of the deer family, elk have a single tooth on each side in the forward, upper portion of the mouth. These special teeth are located similarly to the upper fangs or canine teeth of dogs and are properly called canine teeth. Elk hunters also refer to them as: Ivory teeth, eye teeth, tusks, whistlers, elk teeth, bugler teeth, wapiti teeth or fobs.

An extensive collection of lower jaws and upper canine teeth was available during recent studies of the Northern Yellowstone elk herd. Lower jaws provided the primary basis of age for over 1,000 male and 1,500 female canine teeth which were examined at the Wildlife Lab in Bozeman. A summary of this study is outlined below and further details are available in the article by Greer and Yeager.^{1/}

Deciduous upper canine teeth appear in elk calves about a month after birth and are teeth which will be replaced later by larger, permanent teeth. These small temporary teeth are almost identical in size and shape in both male and female calves. They are quite small compared to permanent teeth--about 1/20 of the size of male and 1/10 the size of female permanent canines. The small deciduous teeth, retained for about a year, are replaced in June or July when the crowns of permanent canine teeth appear. Nearly a year is required for exposure of approximately half of the crown. Root extremities are the last part to develop and the tooth is completely formed between the second and third years.

^{1/} Greer, K. R. and H. W. Yeager. 1967. Sex and age indications from upper canine teeth of elk (Wapiti). *Journal of Wildlife Management*. 31(3): 408-417.

The formation, development and wear of these canine teeth are slightly more advanced in the females than in males. It is quite easy to recognize the characteristic size and shape between the male and female permanent canine teeth - see page 1 and 14.

Although these upper canine teeth do not have an opposing tooth to provide a wearing surface, they do reveal a great amount of wear. The surface wear of this lone tooth is due to contact with the tongue as well as the specialized muscle in the lower lip which is easily distinguished by a circular patch of black hair.

The series of teeth in photographs, on the inside of the cover, may be useful in distinguishing the approximate age of a pair of canine teeth. Specimens from the age class of each sex is described in further detail.

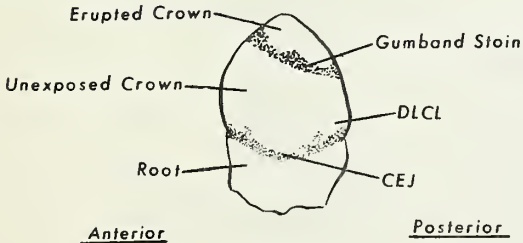
Within a year after appearing through the gums, wear is noticeable on the canine tooth and continues throughout the animal's life. A general sequence for the appearance of tooth crowns, gradual wearing away and decreasing root lengths are diagrammed in the appendix figure. The complete crown is exposed in almost all elk 7 years or older, while in animals over 15 years the root component often forms the wearing surface.

In the following, various features are described to indicate differences between age classes and groups. Since development is in progress during the first and second year, the teeth are quite easy to distinguish. Many factors influence the variations found in individuals and this is also true for the individual canine tooth. Therefore, age designation after 3 years may vary by a year or two.

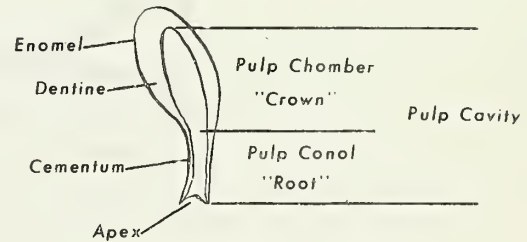
MALE - 1½-YEAR

- Crown.* - About ¼ of the crown has been exposed and the surface is chalky white. Enamel is polished by wear but not enough to expose dentine layers.
- The cemento-enamel junction (CEJ) is a point of distinction between the anatomical root (CEMENTUM) and crown (ENAMEL). In upper canine teeth of elk, this particular area is not readily distinguished.
- Root.* - One-fourth to ¾ complete, ends are paper thin, apex completely open.
- Pulp Cavity.* - Occupies 70 to 95 percent of the tooth.
- DLCL.* - The disto-linguo-cervical-lobe (DLCL) is usually present but occasionally this area and adjacent root has not been formed.

LINGUAL VIEW



SECTIONED VIEW

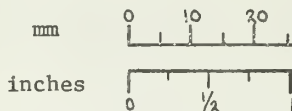


Note: Sketches are of the inside or tongue side with the anterior or front edge to the left and posterior or rear edge to the right. Sectioned views are through the center of tooth.

MALE - 2½-YEAR

Crown. - About ½ of crown is exposed through the gum. Exposed crown is buff colored and wear has penetrated enamel layer. Central dentine rings are less than 5 mm long.

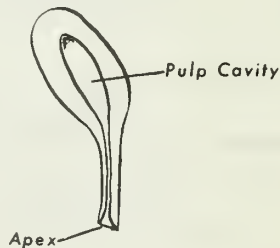
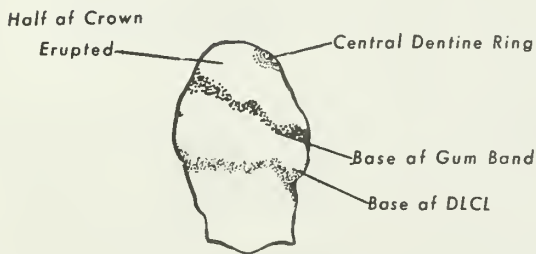
NOTE: Standard terminology for biological measurements is in the metric system. The following scale of 25.4 millimeters (mm) is equivalent to 1 inch.



Root. - External root is nearly completely formed and ends are firm. Apex is open and the canal can be probed 10-20 mm with a knife point.

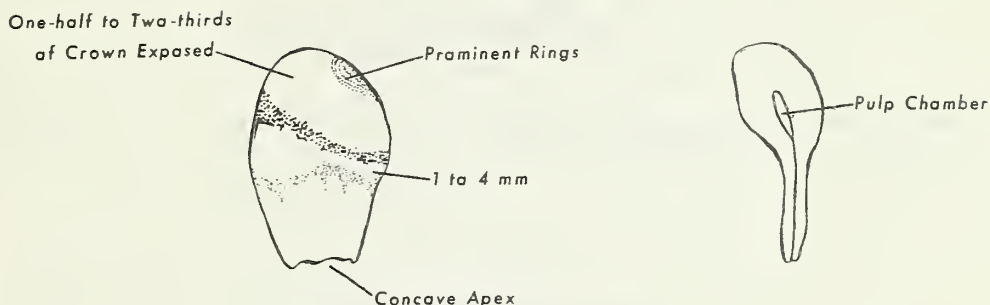
Pulp Cavity. - Occupies 30 to 70 percent of the tooth.

DLCL. - The base of gum band is from 3 to 10 mm away from base of lobe.



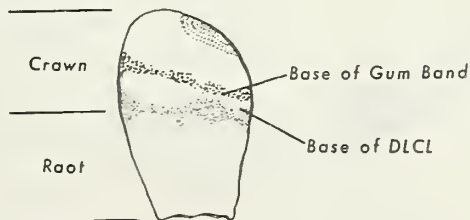
MALE - 3½-YEAR

- Crown.* - More than ½ of crown is exposed. Prominent dentine-enamel rings on wearing surfaces are frequently more than half the width of crown.
- Root.* - Anterior and posterior ends of root are complete but between these points an incompleated development reveals a concave shape.
- Pulp Cavity.* - Mostly chamber and occupies 5 to 10 percent of tooth.
- DLCL.* - Base of gum band about 1 to 4 mm above base of lobe.



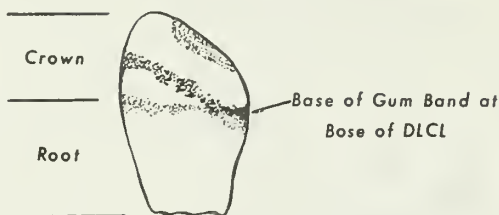
MALE - 4½ - 5½ YEARS

- Crown.* - One-fourth to one-third of crown is exposed.
- Root.* - None exposed.
- Crown-Root Relationship.* - Crown is about half the overall length of tooth.
- DLCL.* - Base of gum band about 1 to 4 mm above base of lobe.



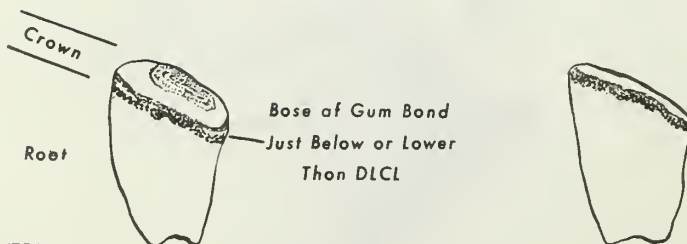
MALE - 6½ - 7½-YEARS

- Crown.* - Rear portion of entire crown is usually exposed.
- Root.* - Occasionally, some root exposed.
- Crown-Root Relationship.* - Crown is less than half the overall length of tooth.
- DLCL.* - Base of gum band near or on base of lobe.



MALE - 8½-YEARS & OLDER

- Crown.* - All of crown exposed. Many crowns are almost completely worn away and wearing surfaces are only about half as wide, from inside to outside, as found in younger teeth.
- Root.* - Some of root usually exposed.
- Crown-Root Relationship.* - Crown is a quarter or less of the overall length of tooth.
- DLCL.* - Base of gum band is just below or lower than the base of lobe.

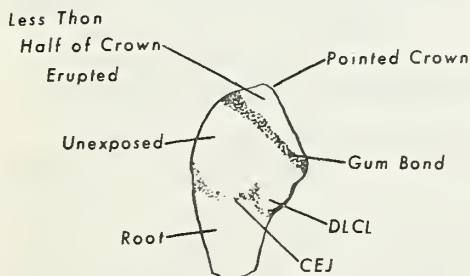


Because of the differences in the rate of growth and wear of canines between males and females -- descriptions for each are necessary. In the following descriptions of females it will be noticed that the sequences are similar to the males. However, the older females have two characteristics of "grooving" and "bulbing" that were not obvious in males of similar ages.

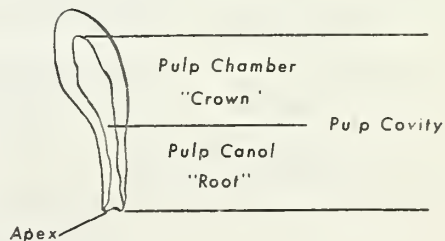
FEMALE -- 1½-YEAR

- Crown.* - One-fourth to ½ of the crown is exposed. About 50 percent of all teeth had a prominently pointed crown. Only 10 percent of the teeth had wearing surfaces worn through the enamel layer.
- Root.* - Three-fourths to completely formed but ends are very thin.
- Pulp Cavity.* - Occupies 75 to 90 percent of the tooth.
- DLCL.* Formed in all teeth.

LINGUAL VIEW



SECTIONED VIEW



FEMALE - 2½-YEAR

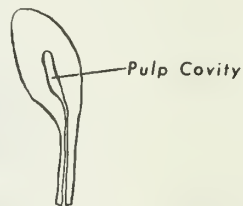
- Crown.* - Nearly ½ of the crown is exposed. Dentine-enamel rings 4 to 7 mm in length.
- Root.* - External tooth completely developed and ends are thick and firm. Root slightly more than half the length of the tooth. Root apex open in 50 percent of all teeth and canal may be probed 1 to 4 mm with knife point.
- Pulp Cavity.* - Occupies 30 to 60 percent of the tooth.
- DLCL.* - The base of gum band is 3 to 5 mm away from base of lobe.

Less Than
Half of Crown

Exposed

Small Rings
on Surface

3 to 5 mm



FEMALE - 3½-YEAR

- Crown.* - At least ½ of the crown is erupted. Dentine-enamel concentric rings extend from half to fully across wearing surface of the crown.
- Root.* - Bottoms of the root are completely developed and form a straight or outward curved line between front and back edges of the tooth. Apex completely open in 20 percent of the specimens.
- Pulp Cavity.* - Mostly chamber, occupies 5 to 10 percent of the tooth.
- DLCL.* - Base of gum band from 2 to 4 mm from base of lobe.

One-half to Two-thirds
of Crown Exposed

Prominent Rings

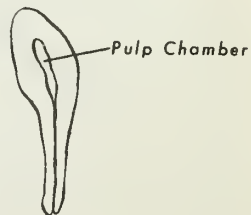
Gum Band

2 to 4 mm

DLCL

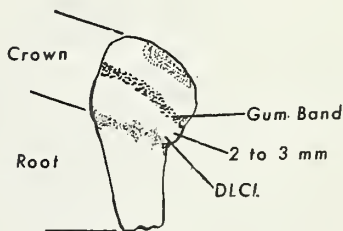
Straight Apex

Pulp Chamber







FEMALE - 4½ - 6½-YEARS

- Crown.* - One-fourth to 1/3 of crown is not exposed. Grooving appeared in the back edge of the crown-root area on about 11 percent of the 5½-year-old and 31 percent of the 6½-year-old canines.
- Root.* - Roots not usually exposed. About 90 percent of the root apices were completely hardened and pin holes were present in the others. The root apex may have a rounded shape and sides may have a bulbing appearance.
- Crown-Root Relationship.* - Crown is about half the length of tooth.
- Gum Band & DLCL.* - (4½-5½years). About 2 to 3 mm apart.



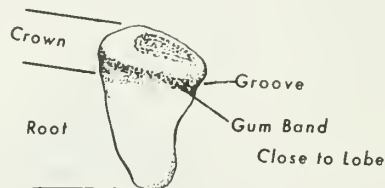
Root Apex. - Profile begins to change from a straight to rounded shape due to re-sorbtion of front and back corners.

Root Bulbing. - Cementum deposits on the sides of root at base form a bulb shape.

<u>Side View</u>	<u>Age</u>	<u>Round</u>	<u>End View</u>	<u>Age</u>	<u>Bulbed</u>
	5½ Yr.	3%		5½ Yr.	1%
	6½ Yr.	20%		6½ Yr.	20%







FEMALE - 7½ - 9½-YEARS

- Crown.* - Usually, all of the crown is exposed. Grooving occurred on the back edge of the crown or crown-root area in 44, 53 and 67 percent of the 7½, 8½, and 9½-year-old canines, respectively.
- Root.* - Occasionally, some of the root has been exposed. The root apex is usually rounded and the sides are bulbed.
- Crown-Root Relationship.* - The crown is less than half of the overall tooth length and root bases appear to be slightly resorbed.
- Gum Band & DLCL.* - (6½-7½-years). Base of gum band closely associated with base of the lobe.



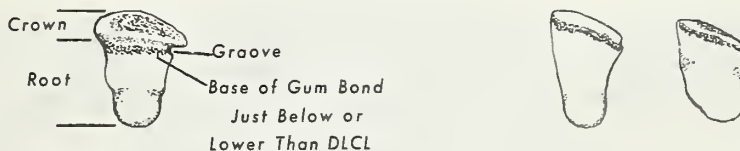
Root Apex. - Most apexes have rounded shape.

Root Bulbing. - Most roots have bulbed appearance.

<u>Side View</u>	<u>Age</u>	<u>Round</u>	<u>End View</u>	<u>Age</u>	<u>Bulbed</u>
	7½-Yr.	50%		7½-Yr.	75%
	8½-Yr.	90%		8½-Yr.	90%
	9½-Yr. and older	100%		9½-Yr. and older	100%

FEMALE - 10 YEARS AND OLDER

- Crown.* - All of the crown is exposed. Grooving was present on posterior edges of crowns or crown-root areas in about 70 percent of the 10 to 15-year-old animals. The low incidence of this groove, only 7 percent, in 16-years-and older canines is because the general area where the groove appears had been completely worn away.
- Root.* - Some of the root is usually exposed. Apex is completely closed.
- Crown-Root Relationship.* - The crown is a quarter or less of the overall length of tooth. Root lengths generally appear to have smaller sizes than younger teeth.
- Gum Band & DLCL.* - (8 years and older). Base of gum band usually just below or lower than the lobe.



The Fish and Game Department requires several types of information to have knowledge about various big game herds. This information is required by biologists to formulate annual management programs to regulate a herd. Under certain circumstances, some information must be obtained by alternate methods. Such is the case with these canine teeth! While the lower jaw is preferred, for examination, to reveal the age of an elk, it is frequently not available.

Hunters often leave an elk's head in the hills when they must pack out their meat. However, most elk hunters remove the canine teeth and frequently

show them to personnel at a checking station. It has been found that this method is quite reliable, and from the canine teeth, an age may be assigned to the particular animal.

These ages of animals harvested are important for interpreting the age structure of males and females in a herd and the survival, growth and longevity of various age classes.



MALE

CALF



6½



1½



7½



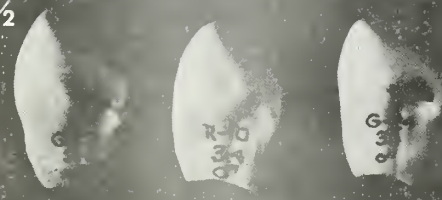
2½



8½



3½



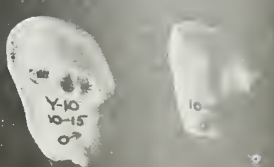
9½



4½



10-15



5½



FEMALE

CALF



6½



1½



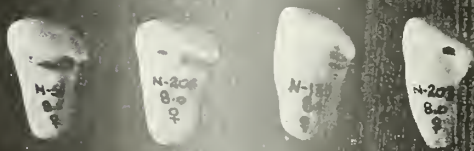
7½



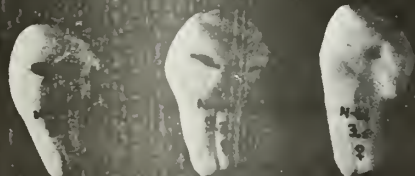
2½



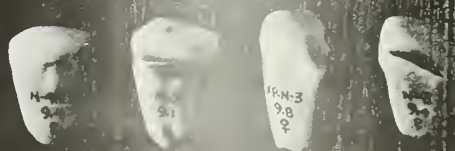
8½



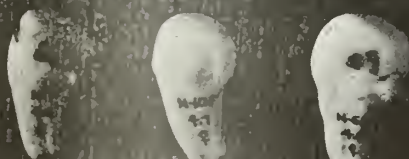
3½



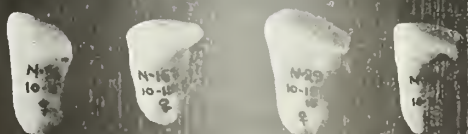
9½



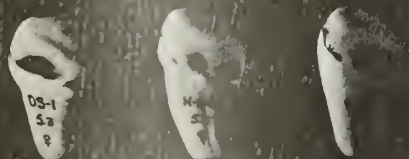
4½



10-15

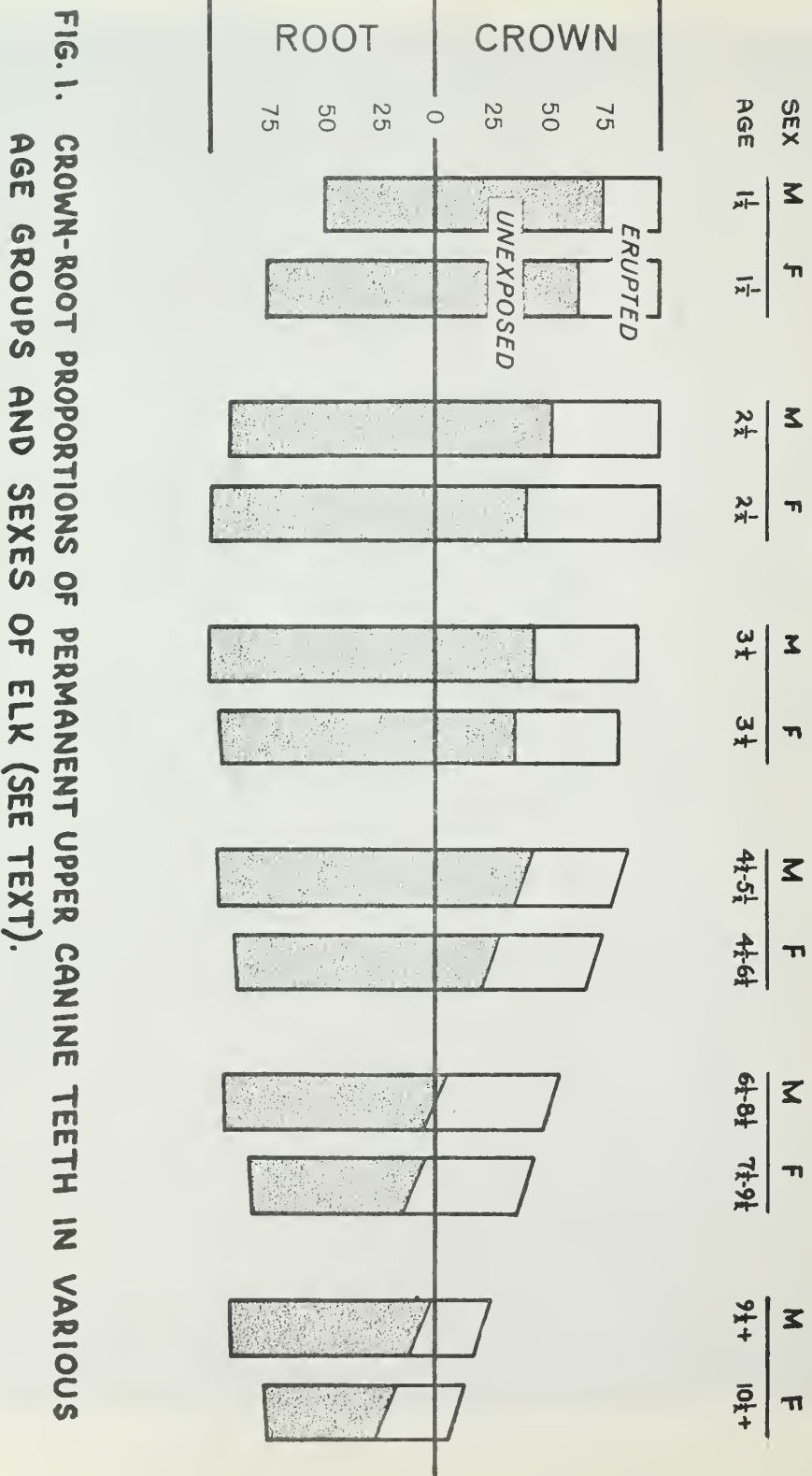


5½



16-21





Age Structure of 2 Elk Herds

