

Wildlife Services

Protecting People
Protecting Agriculture
Protecting Wildlife

Tech Note

April 2018

Aging Feral Swine in the Field



Materials Needed:

- Accompanying photo guide
- Personal protective equipment

This Tech Note highlights a new photo guide for aging feral swine by looking at their teeth. The guide includes representative photos of age intervals and descriptions to help identify specific teeth as eruption and replacement occurs.

Determining the age structure of a feral swine provides insight into the population's biological fitness and ecological well-being. This knowledge is beneficial for planning control strategies or evaluating the success of removal efforts. It is also important in disease surveillance and population modeling.

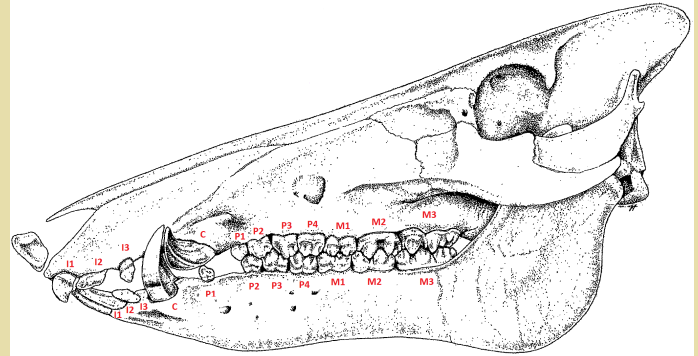
Quick Start

Feral swine can be categorized by nine age intervals that are defined by the eruption and/or replacement of specific teeth from birth to three years of age (See table on page 2).

The accompanying photo guide provides more details for aging feral swine, however to get a quick start, follow the directions below.

To protect against infectious diseases, wear appropriate personal protective equipment (i.e., gloves, goggles/glasses, long sleeved-shirt and pants) when handling feral swine.

- 1) With the animal anesthetized or euthanized, open the mouth and look for the canines. A permanent canine is unmistakable. It is the most notable tooth since it is longer and larger than the other teeth.
- 2) If the canine is permanent, work your way forward through the photo guide starting at Age Interval 4 (30 to 51 weeks). If the canine is deciduous, check for the presence of the erupting or permanent I3.



The age of feral swine can be determined by inspecting the eruption and/or replacement of specific teeth.

If neither the permanent canine nor the I3 teeth are present, work your way backwards through the photo guide starting at Age Interval 3 (20 to 30 weeks).

Helpful Tips

- Most age intervals have multiple defining characteristics, however, only one needs to be present to confirm the age interval.
- Read the "Special Notes" section of each age interval as they describe important details to help in identifying age intervals.
- Check the "Additional Information" section on the back of the photo guide for illustrations of permanent and deciduous teeth.

Age Interval	Age	Defining Characteristics
1	0 to 8 weeks	i2 and p2 absent
2	8 to 20 weeks	i2 intact (fully erupted) or erupting AND/OR p2 intact or erupting
3	20 to 30 weeks	P1 intact or erupting AND/OR M1 intact or erupting
4	30 to 51 weeks	C intact or erupting AND/OR I3 intact or erupting
5	12 to 18 months	M2 intact or erupting AND/OR I1 intact or erupting AND/OR P2, P3, P4 intact or erupting AND i2 present
6	18 to 26 months	I2 intact or erupting AND/OR Lower M3 intact or erupting
7	26 to 36 months	Upper M3 erupting
8	36 to 48 months	M3s intact
9	48+ months	Visible wear on M3s All other teeth show visible wear Some teeth may be missing
<p><i>Note: Capital and lowercase letters depict permanent and deciduous teeth, respectively.</i></p> <p>I – Incisor P – Premolar C – Canine M – Molar</p>		

Other Aging Techniques

Other aging techniques for feral swine and wild pigs are generally limited to laboratory analysis and are not suitable for use in the field. Cementum analysis has been explored extensively, but environmental factors, such as diet and climatic differences, influence the presence and regular accumulation of cementum rings. Other techniques include evaluating the spina ristae ficilais relative to the upper M3, measuring pulp cavity ratios, and morphological measurements. Several techniques to age older animals by visually observing molar wear or measuring molar dentin have been developed and used with some success.

Note: The accompanying photo guide is based on efforts by former USDA employee George Matschke. Matschke monitored the timing of tooth eruption and replacement of captive-raised offspring of wild caught Eurasian wild boar. (Matschke, G.H. 1967. Aging European wild hogs by dentition. Journal of Wildlife Management 31:109-113)

Disclaimer

It is well documented that tooth eruption and replacement in domestic pigs occurs earlier than wild boar. Feral swine have been in the continental U.S. since the 1500s and introductions of Eurasian wild boar began in the late 1800s. The origin of ancestry and unknown degree of hybridization between domestic and European lineages may result in differences in the timing of tooth eruption and replacement in some feral swine encountered in the U.S.

Additional Information

For more information on aging feral swine, please contact:

USDA-APHIS-Wildlife Services
National Wildlife Research Center
4101 LaPorte Avenue
Fort Collins, CO 80521
(970) 266-6000



Protecting People | Protecting Agriculture | Protecting Wildlife



United States Department of Agriculture
Animal and Plant Health Inspection Service

The U.S. Department of Agriculture (USDA) is an equal opportunity provider and employer.

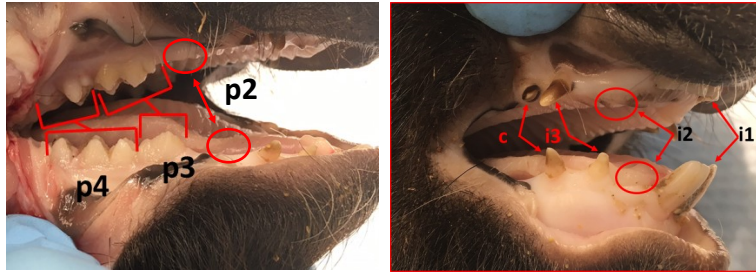
1: 0-8 weeks

Defining Characteristics:

- **i2 and p2 absent**

Special Notes:

All teeth are deciduous. Deciduous i3 and canine present at birth. i1, p3, and p4 erupt within 2-3 weeks.



(Above) This 7-week piglet has i1s, canines, and i3s (top i3 is missing), as well as p3 and p4s. Note the absence of i2s and p2s and the presence of a lower, 3-cusped p4.

Overview

This guide uses tooth eruption and replacement to estimate the age of feral swine. Each age interval is defined by the presence or absence of specific teeth. For most teeth, the entire time range of possible eruption and/or replacement is included within one age interval. However, some overlap between age intervals may exist. When estimating age, start by checking the canines. If permanent, start at Age Interval 4 and work forward through the guide. If deciduous and Incisor 3 is absent, start at Age Interval 3 and work backwards through the guide. Capital and lowercase letters depict permanent and deciduous teeth, respectively (I—Incisor, C—Canine, P—Premolar, M—Molar). See “Additional Information” on the back of the guide for illustrations of permanent and deciduous teeth.

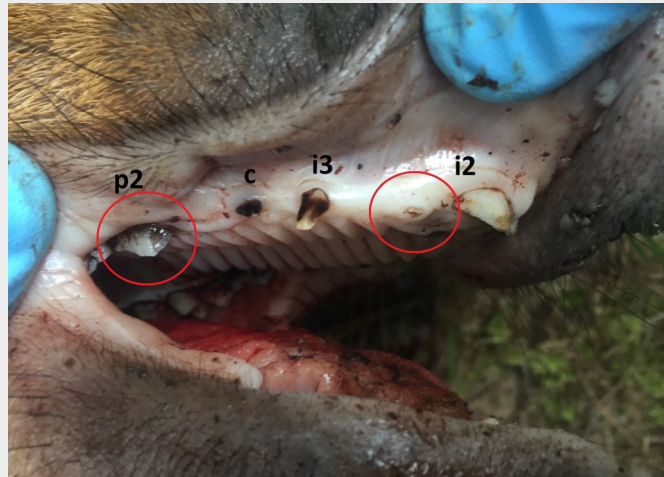
2: 8-20 weeks

Defining Characteristics:

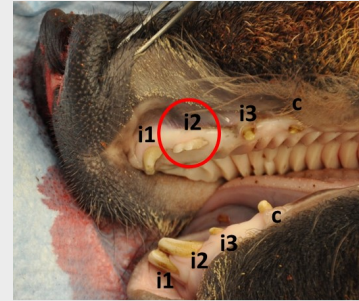
- **i2 intact or erupting AND/OR p2 intact or erupting**

Special Notes:

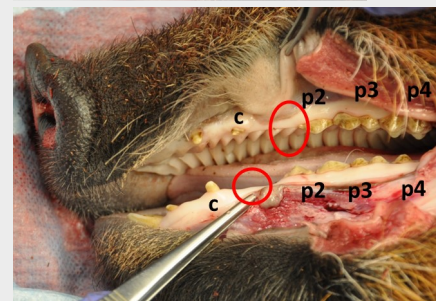
All teeth are deciduous. The i1, i3, canine, p3, and p4 (3 cusps) are present, but the i2 and p2s do not erupt until 8-20 weeks. Many, but not all, feral swine up to 20 weeks old will have striped pelage. This will dissipate sometime between 16-24 weeks of age as individuals begin to take on adult coloration (Mayer 1991).



(Above) The upper i2 is just beginning to erupt and the upper p2 is intact. Note the light color and minimal staining on the p2.



(Upper left) Note the recently erupted upper i2. This tooth is light in color and has well defined tips. The lower i2 is intact (fully erupted).



(Lower left) This same individual as above has intact p2s, but does not have P1s or M1s indicative of the next age interval.

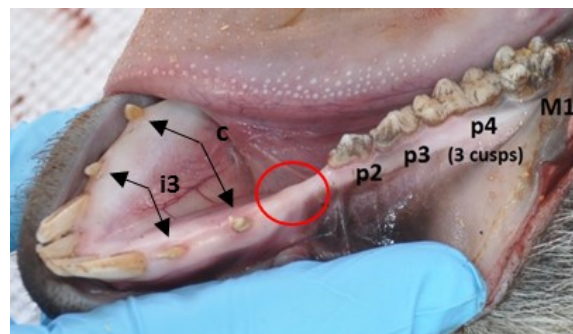
3: 20-30 weeks

Defining Characteristics:

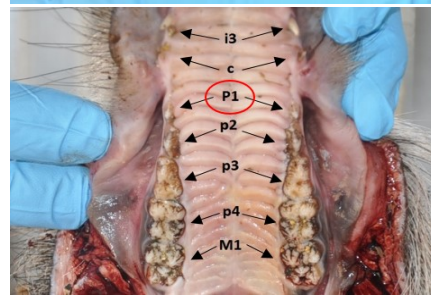
- **P1 intact or erupting AND/OR M1 intact or erupting**

Special Notes:

M1s and P1s do not exist as deciduous teeth. One or both lower P1s may be absent. The lower P1s are well spaced between the canine and p2. The upper P1s are grouped with the other premolars. The presence of M1s often define this age interval.

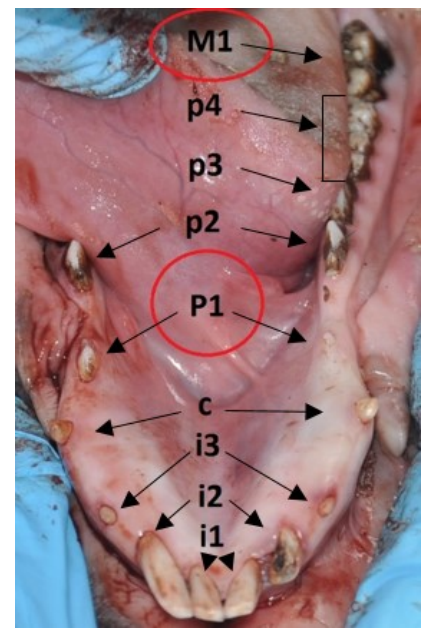


(Upper left) P1s are absent on the lower jaw. M1 is fully erupted. Note the 3 cusps on the lower p4. The p2, p3, and p4 have little wear. The canines and i3s are deciduous.



(Lower left) P1s are present on the upper jaw. M1s are intact. The canines, p2, p3, and p4 show little visible wear.

(Right) P1 is intact on the left and erupting on the right. All other teeth are deciduous except the M1. Note the broken i2.



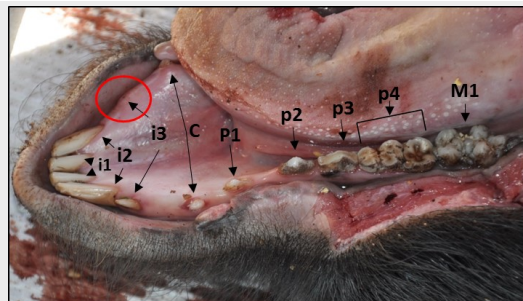
4: 30-51 weeks

Defining Characteristics:

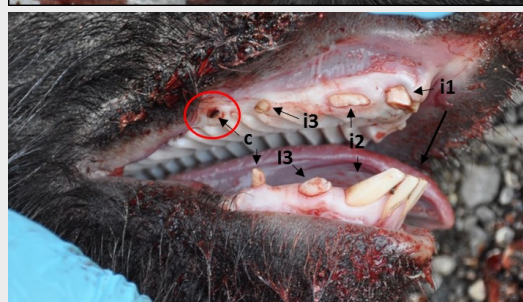
- **C intact or erupting AND/OR I3 intact or erupting**

Special Notes:

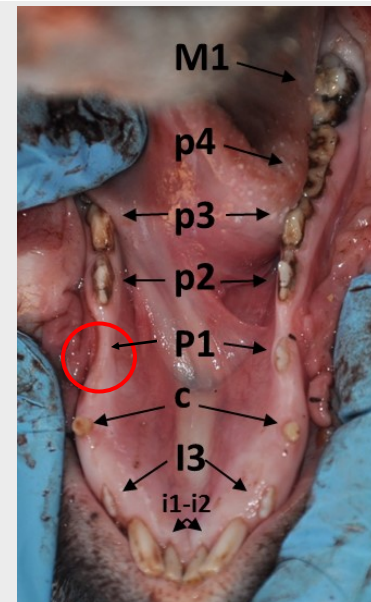
i1s, i2s, p2, p3, and p4s are deciduous. In this age interval, the permanent canines and I3s both begin to erupt and replace the deciduous teeth at roughly the same time. M1s are present; however, if M2s are erupting, the animal should be assigned to Age Interval 5 (12-18 months).



(Upper left) One i3 is absent. It likely fell out. Note the early eruption of the permanent canines. The p2, p3, and p4s have moderate wear and dentin present.



(Lower left) Note the lower I3 and the upper i3. The lower canine is still deciduous and the upper canine was recently lost.



TIP: Use your finger to wiggle the incisors to confirm if deciduous or permanent. Deciduous teeth have shallow roots and will be loose just before replacement.

(Left) Note the deciduous canines, erupting I3s, and only one P1. All 3 cusps of the p4 show wear.

Authors' Note

The data used to identify age intervals in this guide originate from Dr. George Matschke's 1967 publication *Aging European wild hogs by dentition*. Matschke recorded the timing of tooth eruption in captive-raised offspring of wild caught Eurasian boar in Tennessee. It is the only data on feral swine tooth eruption and replacement collected from live feral swine in the U.S. Most wild boar data from other countries tend to correlate well with Matschke's findings with only minor differences. Age Interval 8, suggesting complete dentition between 36 and 48 months, was derived using data from multiple studies including Matschke (1967), Boitani and Mattei (1992), Clark et al. (1992), and Iff (1978). It is the authors' conclusion that Age Interval 8 captures most feral swine with fully erupted, complete dentition. However, it is well documented that domestic pigs erupt and replace teeth earlier than wild boar. The origin of ancestry and unknown degree of hybridization between domestic and European lineages may result in differences in the timing of tooth eruption and replacement in some feral swine encountered in the U.S.

Citations

- Boitani, L. and L. Mattei. 1992. Aging wild boar (*Sus scrofa*) by tooth eruption. In F. Spitz, G. Janeau, G. Gonzalez, and S. Aulagnier (eds.), *Ongules/Ungulates 91 Proceedings of the international symposium*. Toulouse, France, September 2-6, (1991), Société Française pour l'Etude et la Protection des Mammifères, and Toulouse: Institut de Recherché sur les Grands Mammifères, Paris & Toulouse, France. 661 pp. : 419-421.
- Clarke, C.M.H., R.M. Dzizielowski, D. Batcheler and C.M. Frampton. 1992. A comparison of tooth eruption and wear and dental cementum techniques in age determination of New Zealand feral pigs. *Wildlife Research* (6):769-778.
- Iff, U. 1978. Determination de l'age chez le Sanglier. *Diana* 95(10):377-381.
- Iff, U. 1983. Alterbestimmung und Schätzung beim Schwarzwild (Age determination and estimation in wild boar). *Wild und Hund*, 86(11):26-30.
- Matschke, G.H. 1967. Aging European hogs by dentition. *Journal of Wildlife Management* 31:109-113.
- Mayer, J.J. 2002. A simple field technique for age determination of adult wild pigs: Environmental information document. WSRP-RP-2002-00635. Westinghouse Savannah River Company, Aiken, South Carolina.
- Mayer, J.J. and I.L. Brisbin, Jr. 1991. *Wild pigs in the United States: Their history, comparative morphology, and current status*. The University of Georgia Press, Athens, Georgia.

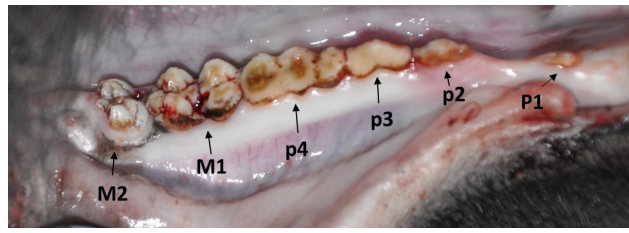
5: 12-18 months

Defining Characteristics:

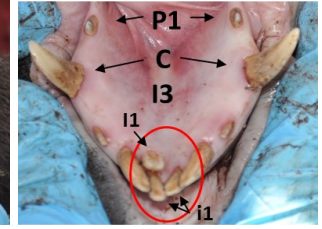
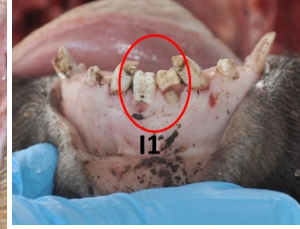
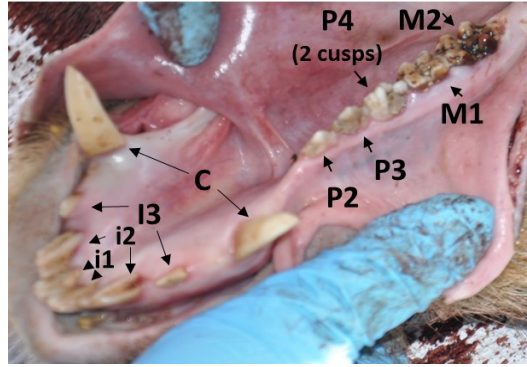
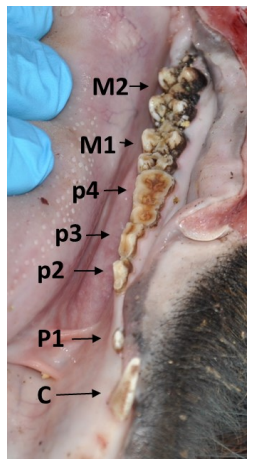
- **M2s intact or erupting AND/OR I1s intact or erupting AND/OR P2s, P3s, P4s intact or erupting**

Special Notes:

The i2 is still present. The M2s (not present as deciduous teeth) and I1s erupt earlier in this age interval than P2s, P3s, and P4s. The P4s have 2 cusps rather than 3 cusps like the p4. The I1s can be tricky to identify. They are generally a little bigger, lighter in color when new, and have more defined tips than the worn i1s.



(Upper left) Note partially erupted M2. **(Lower left)** Note newly replaced P2, P3, and P4s with light color and 2 cusps on the P4. The M2 is discolored from use. **(Upper right)** Note wear on p3 and p4 and erupting M2.



(Center left) Note newly erupted I1s with lighter color and defined tips. **(Center right)** The right I1 is in the process of replacing the i1. The canines are permanent.

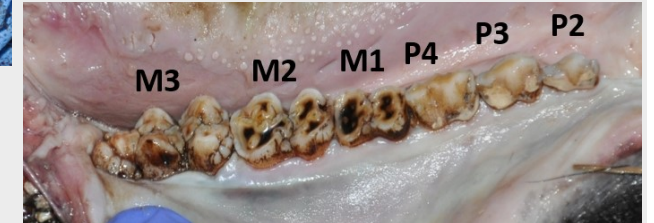
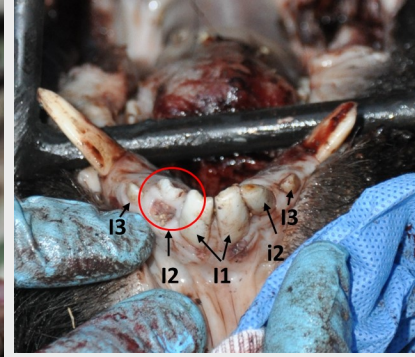
6: 18-26 months

Defining Characteristics:

- **I2 intact or erupting AND/OR Lower M3 intact or erupting**

Special Notes:

The lower I2 will generally erupt (18-22 months) before the upper I2 (21-26 months). The lower M3 will erupt between 22-26 months. If a lower M3 is present, check for the upper M3. If the upper M3 is erupting or intact the animal should be assigned to the next age interval (7: 26-36 months). The M3s (not present as deciduous teeth) have 2 cusp pairs and a final large single cusp.



(Left) Note the upper and lower I2s. **(Above)** The recently lost i2 is being replaced by the I2. **(Upper right)** The second cusp pair is erupting and the final single cusp is not yet present in the lower M3.

(Lower right) The single rear cusp on the lower M3 is erupting. It will eventually be above the gum line.

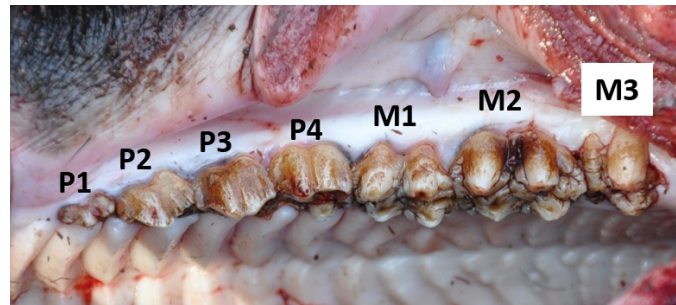
7: 26-36 months

Defining Characteristics:

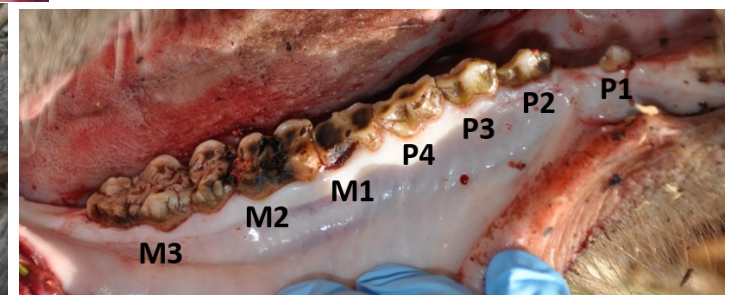
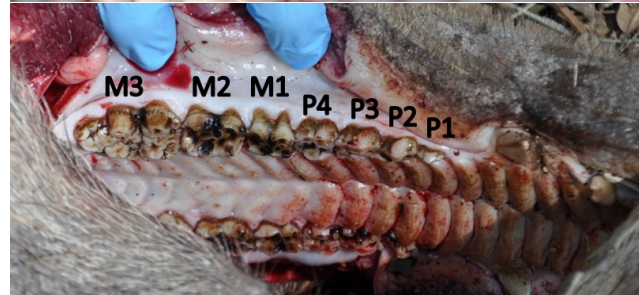
- **Upper M3 erupting**

Special Notes:

The upper M3 erupts on average 4 months after the lower M3. If the upper M3 is intact, the animal should be assigned to Age Interval 8.



(Left) Only the first cusp pair has erupted on the upper M3. Note minimal wear on M1 and M2. **(Lower left and right)** Intact dentition with minimal wear on the M3s. Note the 2 pairs of cusps and a single rear cusp on both of the M3s. Note rear cusps of M3s are above the gums. There is also wear and dentin on M1s and M2s. These individuals are 36 to 48 months old.



8: 36- ~48 months

Dentition complete with intact M3s. Some wear may exist on the lower M3s. Look for fully exposed single cusp on the rear of upper M3. The lower M3 has 2 cusp pairs and a single rear cusp.

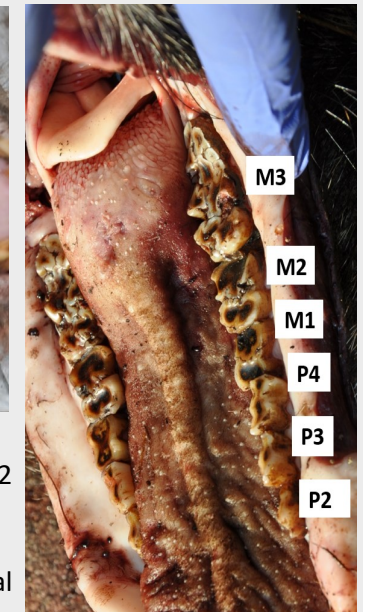
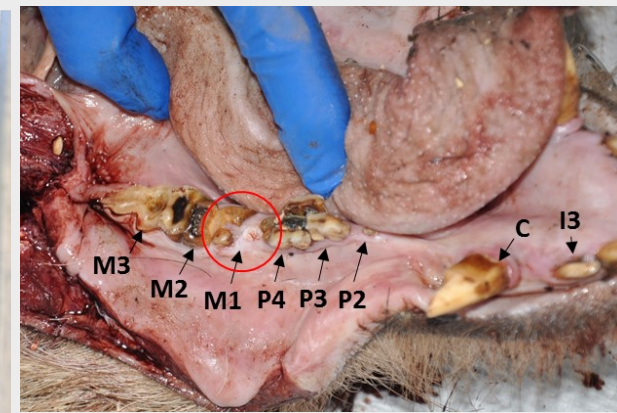
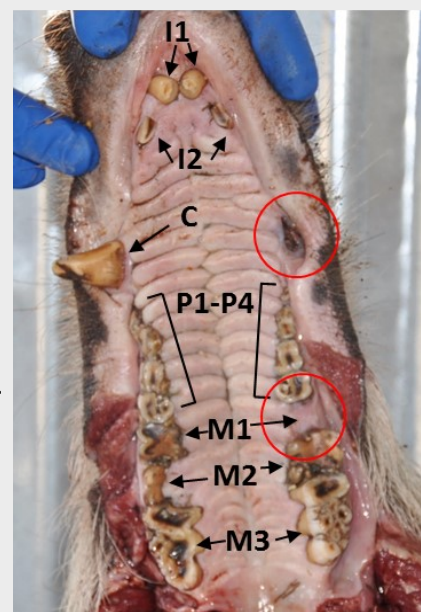
9: Older Adults ~48+

Defining Characteristics:

- **Visible wear on M3s**
- **All other teeth show visible wear and some teeth may be missing**

Special Notes:

Pay attention to plaque and tartar build up, discoloration, and decay as evidence of older teeth. Dentin will be present on worn surfaces of teeth and some tooth cusps will be worn down. Observe the level of tooth wear decreasing towards the gum line.



(Left) Note missing Canine and M1; significant wear on M2s and M3s. I3s are missing. **(Above)** P2 and lower M3 is worn to the gum and M1 is missing. **(Right)** Note dentin on P4, M1, M2, and M3s, as well as cupping/sharp edges from occlusal wear on the M3s.

Additional Information

A detailed method for estimating feral swine age over 48 months using tooth wear is available in Mayer (2002) (See "Citations" on front page).

More detailed illustrations of tooth eruption and replacement on the lower mandible is available in Iff (1983) (See "Citations" on front page).

(Below left) A modified illustration from Iff (1983) showing permanent dentition from German wild boar. **(Below right)** Illustration of deciduous dentition from Matschke (1967).

