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Age estimation of camel in Nigeria using rostral dentition

A. Bello[a,*], M.L. Sonfada[a], A.A. Umar[a], M.A. Umaru[b], S.A. Shehu[a], S.A. Hena[a], J.E. Onu[a], O.O. Fatima[a]

[a]*Department of Veterinary Anatomy, Usmanu Danfodiyo University, Sokoto, Nigeria.*
[b]*Department of veterinary Theriogenology and Animal Production,Usmanu Danfodiyo University, Sokoto,* Nigeria.

[*]Corresponding author; Department of Veterinary Anatomy, Usmanu Danfodiyo University, Sokoto, Nigeria.

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ABSTRACT

The study aimed at providing information in estimating the age of camel using rostral dentition through the phenomenon of teeth eruption and wearing, thought, only way to age an animal accurately is to know the date of birth but where these records are not available various anatomical features are used to estimate age. A total of 1100 camels of both sex were used for the purpose of the study. Records were obtained between April to July 2010 on daily visit to the Sokoto metropolitan abattoir. Investigation showed that at birth, there were no teeth, at 9 month, all the deciduate teeth have erupted. At 4 years, all the deciduate incisors and canine have worn down. At 7 years, all the permanent incisors and canine teeth have erupted. At 12 years, all the permanent incisors are in wear, while At 15 years, all the permanent incisors and canine teeth have worn down. At 20 years, all the permanent teeth are down and clearly separated from each other.

1. Introduction

Age estimation using rostral dentition in camel is possible but required some experience and skills, this is mainly because it is sometimes difficult to distinguish clearly between deciduate and permanent incisors as there was no marked difference in size of the two stage as there is in true ruminant (Harvey, 1985; Alexander DeLahunta,

1986; Ferguson, 1990). Age simply refers to as the length of time that an animal exist r the duration of the animal's life at a point in time.

The only way to age an animal accurately is to know the date of birth but where these records are not available various anatomical features are used to estimate age (Alexander DeLahunta, 1986). The most convenient teeth for ageing are the incisors (front teeth), the canines and the first premolars. The remaining teeth are hidden by the cheeks. Camel has a narrow mouth and if the teeth within the cheeks need to be properly examined, an oral speculum or mouth gag and a light source may be required. Good restrain is always necessary.

Knowledge of age of an individual forms an essential part of anamnesis and aid I clinical diagnosis (Harvey, 1985; Ferguson, 1990 and Rodostits *et al.,* 1997). Also in chemotherapy, the choice and dosage of some drugs are influences by the age of the subject (Latshaw, 1987). In Africa, where most camels are held by pastoralists, some of whom cannot keep written records of their animals, estimation of age of such animals thus becomes necessary in the course of clinical evaluation and management of the herds.

This investigation aimed at providing information in estimating the age of camel using rostral dentition through the phenomenon of teeth eruption and wearing.

2. Materials and methods

A total of 1100 camels of both sex were used for the purpose of the study. Records were obtained between April to July 2010 on daily visit to the Sokoto metropolitan abattoir. Identification of camel before slaughtering was made to avoid repetition during teeth examination after slaughtering.

During subsequent examination of the oral cavity the eruption pattern of the upper and lower archs of the dentition was noted from literatures and compared. The eruption pattern of the deciduous and permanent incisors I_1, I_2 and I_3 (upper and lower) and the canine teeth were noted. The knowledge of changes in eruption and wearing of the deciduate and permanent teeth from literature were used to compare with our Nigerian local breeds. Photographs were taken to show the clear evidence of the teeth transformation.

3. Results and discussion

Estimation of age by dentition is an act that grows with experience and the degree of accuracy is limited (Berkowitz and Moxham, 1981). Following full tooth development, wear commences. The rate of wear is influenced by the camel's particular environment, nutritional status, genetic make-up, breed, sex and nature of type of food taken, which can influence the amount of abrasive materials contacted during eating.

3.1. Gross identification of camel teeth

3.1.1. Incisors teeth

Are the teeth that are across the front of the mouth. Camel has six (2 centrals, 2 laterals and 2 corners) in the lower jaw, and only two in the upper jaw that tend to be conical in shape. These upper incisors are less well developed or may be absent in adult female (Fig. 2).

3.1.2. Canine teeth

Are conical in shape (also called tusks or tushes) they develop in a space between the corner incisors and the first premolar tooth in both upper and lower jaws. They are usually larger in males than in females (Fig. 3 and 4). Deciduous canine are later replaced by larger, permanent canine teeth.

3.1.3. Premolar teeth

Are the most forward of the grinding teeth set further back in the jaws and within the cheeks. Premolar teeth are all deciduous (Fig. 1).

3.1.4. Molar teeth

They developed behind the premolar only as permanent teeth.

Photographs of fully grown pairs of temporary and permanent rostral teeth are presented in Fig. 1 to 4 to facilitate an appreciation of the differences between temporary and permanent teeth. Results on the ages and features of temporary and permanent teeth are summarized in table 1.

There is clear difference between the teeth of young and adult camel as stated by Mallei, 1987 and incisors as well as canine teeth of the lower jaw project almost horizontally from the jaw but with advance years they become upright. Some of the factors observed to indicate aged animal using teeth are:

- When the teeth are viewed in profiles, the angle between the upper and lower incisors become more acute with age Fig.2 and 4.
- When the teeth are viewed from the labial surface, they are diverged from the median plane in a young animal and converged in an older once.
- The arcade of the incisors when seen from the occlusal surface is semicircular in the young animal and a straight line in the older animals.

Table1

Relationship between ages of camel slaughtered and features of teeth observed.

Age	Observation (n) (%)	Features
1 month + 1 years	24 (2.18)	Eruption all the deciduate teeth DI1, DI2, DI3
About 2 years	38 (3.46)	DI1 in wear
About 3 years	42 (3.82)	DI2 in wear
About 4 years	60 (5.46)	All the incisors are quite worn down with square or irregular table and eruption of permanent canine teeth.
About 5 years	47 (4.27)	Eruption of permanent I1 (central)
About 6 years	9 (6.27)	Eruption of permanent I2 (lateral)
About 7 years	81 (7.36)	Eruption of permanent I3 (corner)
About 7½ years	151 (13.73)	All the permanent incisors have erupted and canine teeth have reached its full size.
About 9 years	116 (10.55)	Permanent I1 in wear
About 10 years	68 (6.18)	Permanent I2 in wear
	53 (4.82)	Permanent I3 in wear
About 11 years	111 (10.09)	Canine are stump or blunt
About 12 years	38 (3.45)	I1 are stub with square table
About 13 years	47 (4.27)	I2 are stub with square table
About 14 years	84 (7.64)	I3 are stub with square table
About 15 years	71 (6.45)	Increase wide gap in the interdental space.

DI1- Deciduous central incisors
DI2- Deciduous lateral incisors
DI3- Deciduous corner incisors
I1- Permanent central incisors
I2- Permanent lateral incisors
I3- Permanent corner incisors

Table 2
A summary of age estimation in camel up to 20years

Parameters use in ageing Camel	Central incisors (I1) (years)	Lateral incisors(I2) (years)	Corner incisors (I3) (years)	Canine (C) (years)
Eruption of permanent tooth	5	6	7	$7^{1/2}$
Wearing of permanent tooth	9	10	11	12
Neck of tooth visible above gum line	13	14	15	----
Square table with increase gap	16	17	18	20

From the result obtained, camel at the age of 6-9years which is the peak age of production are more slaughtered than when prematured or older ages. This is contrary to the FAO regulation of slaughter and may attribute to the shortage or decrease in population of camel especially in this part of the country.

The minimum age of camel slaughtered in Sokoto metropolitan abattoir are those ranging from 9 month to 1 year which are considered to have erupt all the deciduate incisor teeth. This category of age is contrary to that of Sudanese camel as reported by Swift, (1979) and Zeidan, (1999) as worked in Egypt i.e. Egyptian types of camel. Deciduous incisors D1, D2 and D3 are in wear at 2, 3 and 4 years respectively are in line with that of Sudanese, Egyptian and Morocco camel. These features agree with the finding of Arnautovic and Abdelmagid, (1974) and Mallei and Bezuidenhout (1987).

The eruption of permanent teeth I1, I2 and I3 at 5, 6 and 7 years is in line with the work of Yasin et al., (1957) on Parkistanian camel; Watson, (1969) on Egyptian and kenyan camel as well as the work of Saghiri and Driencourt, (1999) on Moroccan camel, but contrary to the work of Jamalar, (1996) on Bactrian camel. At 7½ years, the canine teeth reach its maximum size (Fig. 4). This is contrary to the work of Saghiri and Driencourt, (1999) whose finding was at 8 years. This difference may still be as a result of the geographical distribution or genetic make-up as this may be concerned with eruption and not wearing of the teeth.

The wearing of permanent I1, I2 and I3 at 9, 10 and 11 years and that of canine teeth at 12 years agrees with the finding of Moroccan camel as worked by Jamalar, (1996) but contrary with the Sudanese camel and Egyptian camel which wears at 9, 10½, 12 and 15 years respectively. The above difference may be attributed to the difference in nature of feed given to the animals. Animal fed with more coarse hard, leafs, thorn, shrubs may have their teeth worn out more within a short time than those animals fed on softer feed like brand, hay and leftovers.

Camels in this area aging above 15 years can only be estimated by progressive increase in interdental space, as this may result to increase in experience in estimating camel age. This is because there is no clear feature seen on the teeth but only stubs of incisors neck, as seen in equine teeth.

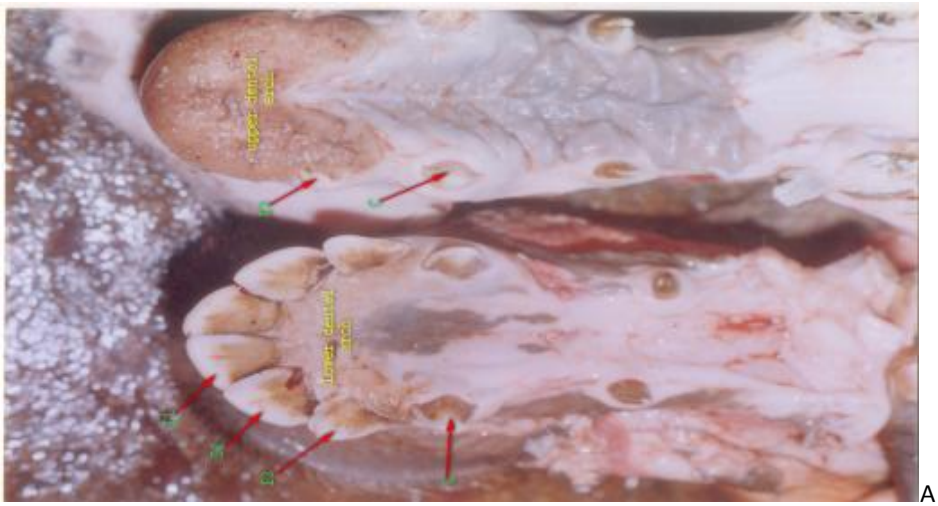
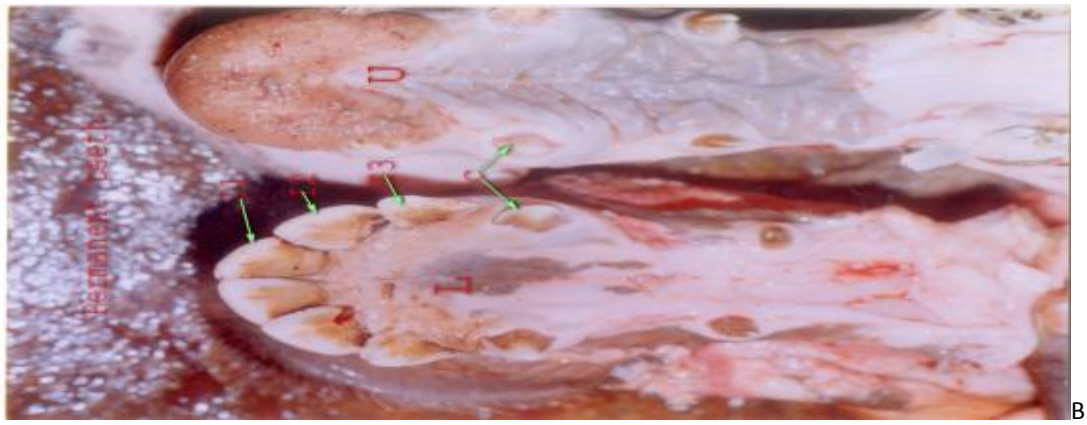

A

Fig. 1. Showing the upper and lower dental arch with the central incisor(I1), lateral incissor(I2) and corner incissor(I3) of adult male camel at 9 years.

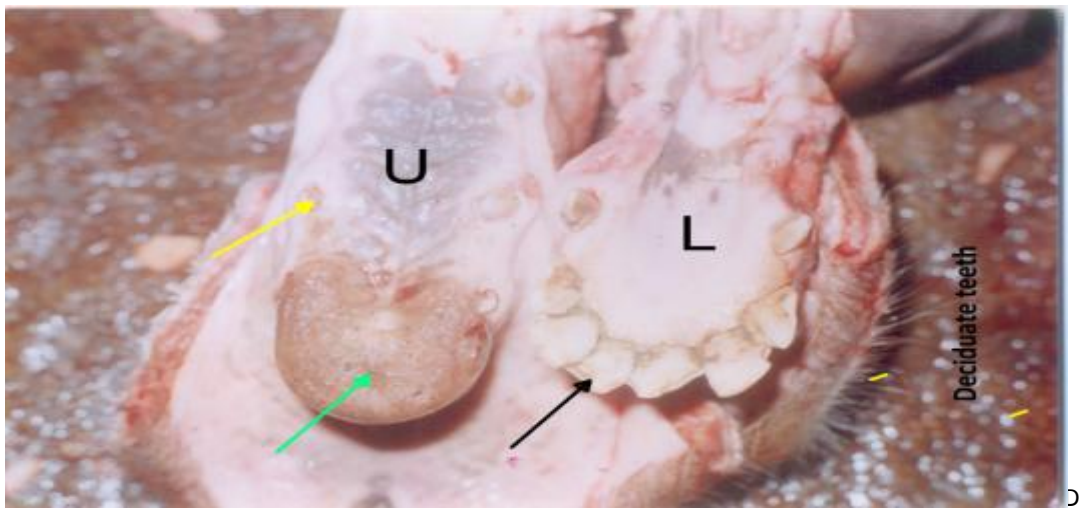


B

Fig. 2. Showing the upper(U) and lower(L) dental arch with the central incisor(I1), lateral incissor(I2) and corner incissor(I3) of adult male camel at 9 years.

C

Fig. 3. Showing the upper(U) and lower(L) dental arch with the central incisor(I1), lateral incissor(I2), corner incissor(I3) and canine (C) tooth of adult female camel.



D

Fig4. Showing the upper(U) and lower(L) dental arch with the central incisor(DI1), lateral incissor(DI2), corner incissor(DI3) and canine (C) tooth of adult female camel at 4years.

4. Conclusion

In summary, at birth, there were no teeth, at 9 month; all the deciduate teeth have erupted. At 4 years, all the deciduate incisors and canine have worn down. At 7 years, all the permanent incisors and canine teeth have erupted. At 12 years, all the permanent incisors are in wear, while At 15 years, all the permanent incisors and canine teeth have worn down. At 20 years, all the permanent teeth are down and clearly separated from each other.

It is therefore recommended that future research work should be conducted using live animals from birth to 20^{th} years for accurate age estimation. In addition, clinician should be acquainted with the technical knowledge of ageing camel specie for easy medication and diagnosis of disease.

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