

4TH ANNUAL MEETING OF THE **EVCBMAW**

EUROPEAN VETERINARY CONGRESS OF
BEHAVIOURAL MEDICINE AND ANIMAL WELFARE
SEPTEMBER, 28TH - OCTOBER, 1ST 2022 · PALMA (MALLORCA)

SPAIN



European Veterinary Congress of
Behavioural Medicine and Animal Welfare

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ABSTRACT BOOK

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POSTER Presentations



P-18

DEVELOPMENT OF A PREDICTIVE MODEL TO DETERMINE THE AGE OF DOG PUPPIES: A VARIABLE IMPORTANCE APPROACH TO TEETH DEVELOPMENT

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Age determination of dog puppies is important in forensic medicine to fight illegal puppy trade. The most widely used method for assessing young dogs' age is teeth examination. However, its forensic validity is limited due to lack of standardization and the variability factors that influence dental development (Roccaro and Peli, 2020). This study aims to develop a predictive model to determine the age of dog puppies.

Ninety-one privately owned puppies (40 males, 51 females) of ten breeds of different size and morphological type were examined every fortnight. A score (0-5) was assigned to each tooth according to its development stage. A predictive model to determine whether a puppy is 6 or 8 weeks old was developed using a random forest classifier (Breiman, 2001). Breed, size, morphological type, sex, and variables indicating each tooth's development stage were included as independent variables.

Firstly, the measures of variable importance were explored. Breed emerged as the most important variable, obscuring the others and entering into all variable interactions. A second forest was grown excluding breed; the most important variables were deciduous premolars eruption, incisors wearing, but also dog's size and morphological type ($p < 0.01$). The out-of-bag error rate estimate was 13.19%.

Our results prove that teeth development is inhomogeneous among dog breeds. However, a standardized age estimation method, valid at least for breed groups, to be used in forensic scenarios is highly needed. Having identified the most important variables, the next step will be to fine-tune a predictive model to determine young dogs' age.

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- Roccaro, M. and Peli, A. (2020) 'Age determination in dog puppies by teeth examination: legal, health and welfare implications, review of the literature and practical considerations', *Veterinaria Italiana*, 56(3), pp. 149–162.

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