

# MORPHOMETRIC ANALYSIS OF THE FORAMEN MAGNUM IN THE TOY BREEDS

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**Introduction:** Foramen magnum (FM) marks the border between cranial cavity and vertebral canal. It is a ring formed by basioccipital, supraoccipital and paired exoccipital bones. Literature provide no information about the dependence of the shape and dimensions of FM in relation to the constitutional type (body weight) of a dog. In small dogs occipital dysplasia is frequently observed (1). It is characterized by a dorsal extension (dorsal notch) of the FM.

**Aim:** The aim of this study was to describe morphological diversity in FM structure among the so called toy breeds.

**Material and methods:** Morphological investigations were carried out on the skulls of 15 dogs belonging to the so called toy breeds of various age (2-16 years) and both sexes. Dogs were of mesaticephalic (n=11) and brachycephalic morphotype (n=4). Their heads were macerated in hot water with the use of calcined soda and then anatomically prepared. Morphometric study was performed using an electric caliper, exact to 0.01 mm. Following measurements were performed: ZyZy – skull width (the maximum distance between the bilateral zygomatic arches), AP - skull length (distance between prosthion and akrokranium points); H – height of the FM with the dorsal notch; h – height of the FM without the dorsal notch; N – height of the dorsal notch; W – width of the FM. Basing on the obtained data the following values were calculated: foramen magnum index - IOW ( $W/H \times 100$ ), occipital index - IPF ( $H/W \times 100$ ), dorsal notch index – IWD ( $N/H \times 100$ ) and occipital dysplasia index - ISD ( $N/h \times 100$ ).

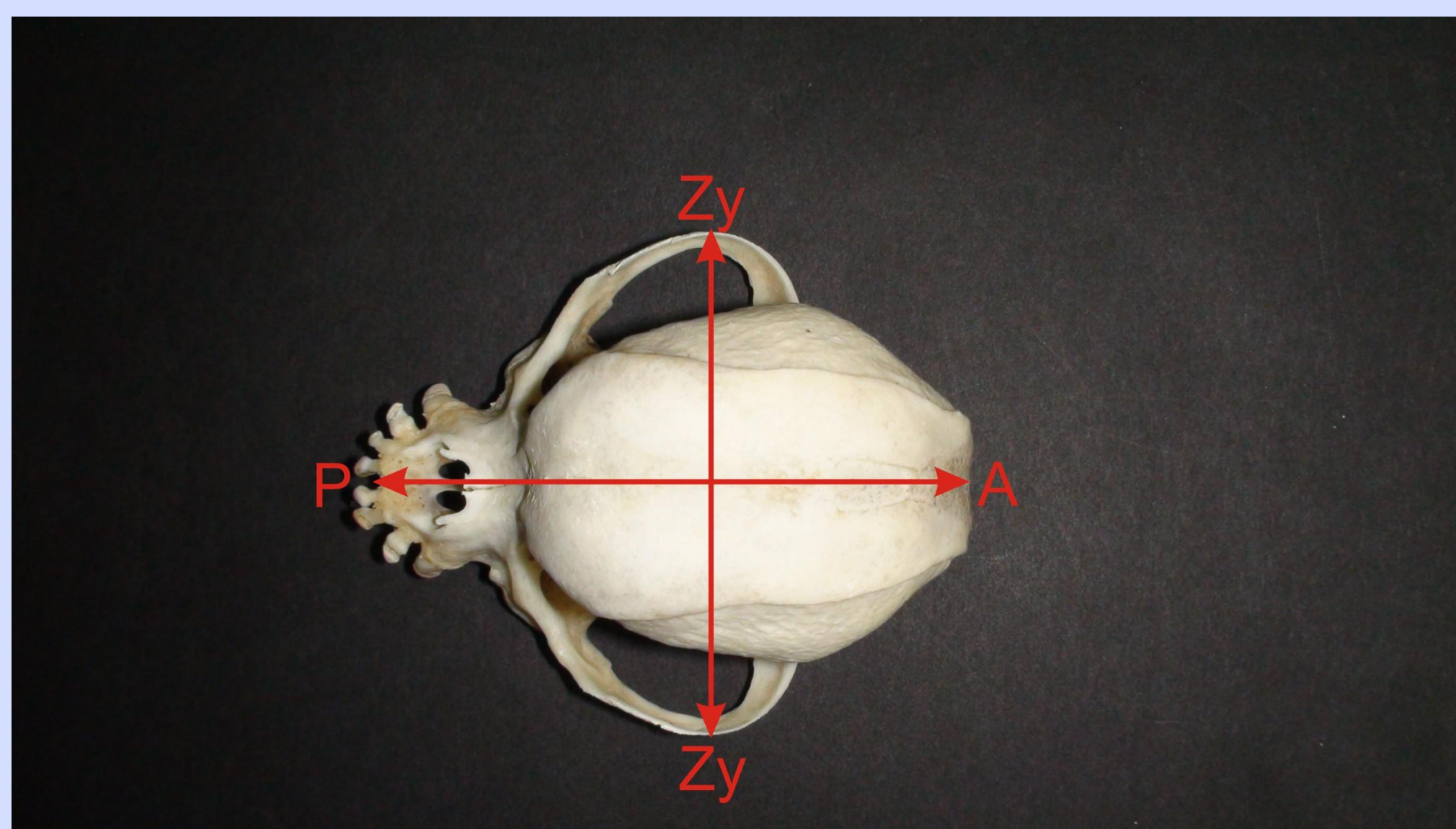


Fig. 1. Cranium. ZyZy – skull width (the maximum distance between the bilateral zygomatic arches), AP - skull length (distance between prosthion and akrokranium points)

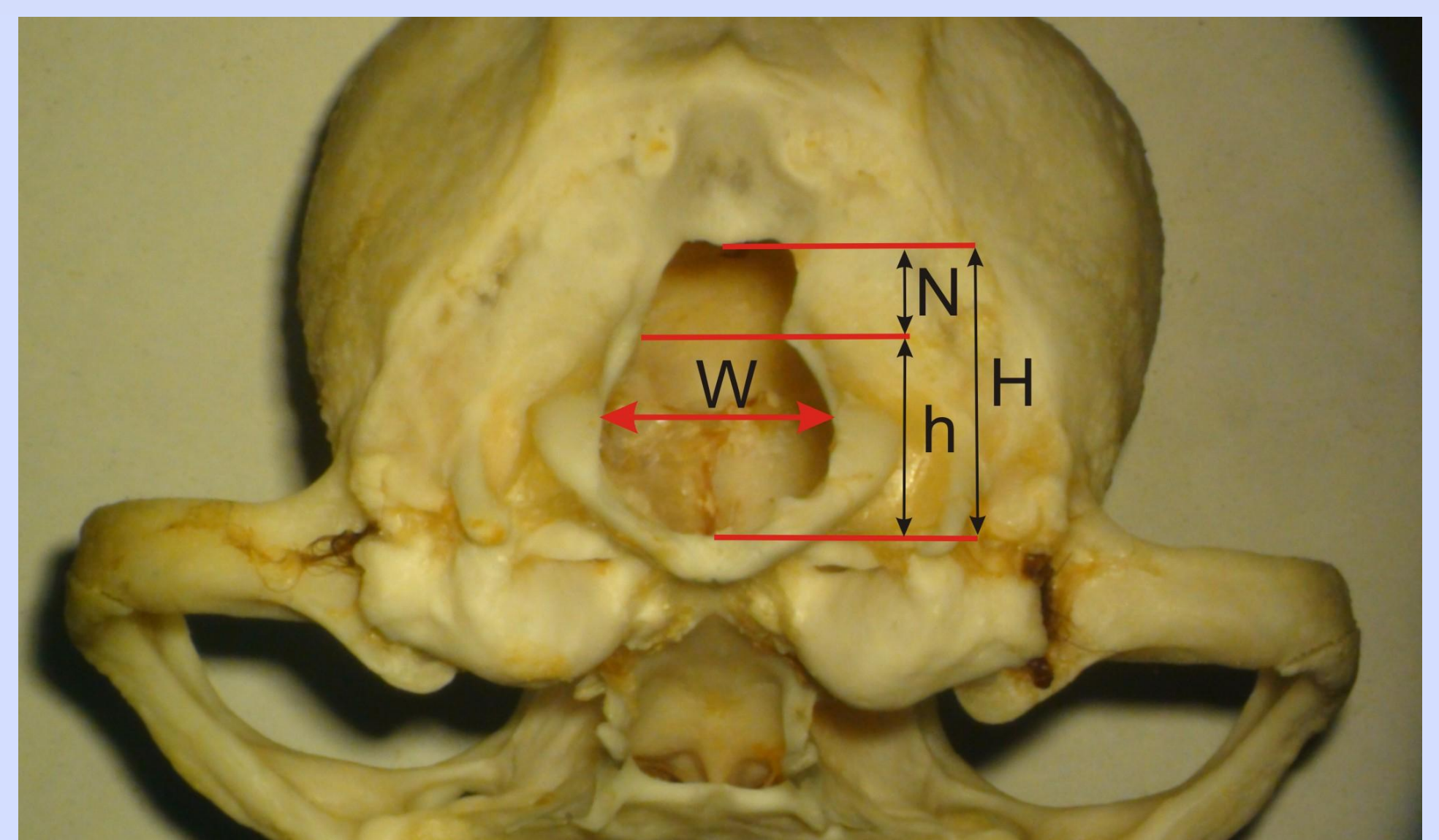


Fig. 2. Foramen magnum. Pekinese. H – height of the FM with the dorsal notch; h – height of the FM without the dorsal notch; N – height of the dorsal notch; W – width of the FM

**Results:** Dorsal notch was found in 14 of 15 examined skulls (93,3% of presented population). It was found in all dogs of the brachycephalic morphotype (n=4) and in 10 belonging to the mesaticephalic breeds. High occurrence of the occipital dysplasia in small breed dogs shown in this study is consistent with the data which can be found in literature. Average height of the FM was  $16,8 \text{ mm} \pm 1,47 \text{ mm}$ , while its width was  $13,3 \text{ mm} \pm 1,97 \text{ mm}$ . Statistical analysis was performed using U Mann-Whitney test. We found statistically important differences ( $p \leq 0,05$ ) between a group of males and females in the following parameters: DN, IOW, IPF, ISD, IWD. These differences allow us to conclude that in males parameter H was of greater value than in the females. Demonstrated results show the anatomical diversity in FM dimensions and shape. However, differences regarding FM dimensions found between male and female groups require further research.

## References:

1. De Lahunta A.: Veterinary Neuroanatomy and Clinical Neurology, 3rd edition. Saunders, 2009.