

The evolution of the jaw system in canids: jaw muscle architecture and bite force

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Dogs are famous for the variation in cranial morphology surpassing even the variation observed across all canids. However, whether this equally holds for the associated jaw muscles remains unknown. Over the past decades we have collected data on the jaw system in canids and caniformia more generally, focusing both on domestic as well as wild species. Data for over 20 species of wild canids have been collected and are compared to data for 59 domestic dogs 20 street dogs, 7 captive dogs, and 8 dingos. For each specimen the abductor and adductor muscles were dissected and their mass, fibre length, pennation angle, and cross-sectional area were quantified. A principal component analysis of the muscle architecture data showed that wild canids were equally variable as domestic dogs suggesting that the exceptional morphological diversity in cranial shape is not reflected in functionally relevant traits of the jaw muscles. Functional covariation between the jaw and mandible like drives the observed pattern and prevents artificial selection for divergent phenotypes in domestic dogs.