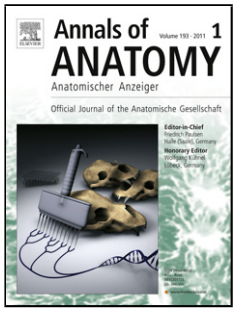

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Can Skull Form Predict the Shape of the Temporomandibular Joint? A Study Using Geometric Morphometrics on the Skulls of Wolves and Domestic Dogs

Abbreviated title: Canine Skull and Temporomandibular Joint Covariation

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ABSTRACT

The temporomandibular joint (TMJ) conducts and restrains masticatory movements between the mammalian cranium and the mandible. Through this functional integration, TMJ morphology in wild mammals is strongly correlated with diet, resulting in a wide range of TMJ variations. However, in artificially selected and closely related domestic dogs, dietary specialisations between breeds can be ruled out as a diversifying factor although they display an enormous variation in TMJ morphology. This raises the question of the origin of this variation. Here we hypothesise that, even in the face of reduced functional demands, TMJ shape in dogs can be predicted by skull form; i.e. that the TMJ is still highly integrated in the dog skull. If true, TMJ variation in the dog would be a plain by-product of the enormous cranial variation in dogs and its genetic causes. We addressed this hypothesis using