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Vertebral Morphometrics and Lung Structure in Non-Avian Dinosaurs

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Supplementary Methods

Supplementary Methods 1

Extant taxa used in this analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Class** | **Order** | **Family** | **Genus** | **Species** |
| Reptilia | Crocodylia | Alligatoridae | *Alligator* | *mississipiensis* |
| Reptilia | Crocodylia | Alligatoridae | *Caiman* | *crocodilus* |
| Reptilia | Crocodylia | Crocodylidae | *Crocodylus* | *americanus* |
| Reptilia | Crocodylia | Gavialidae | *Gavialis* | *gangeticus* |
| Aves | Anseriformes | Anatidae | *Anser* | *anser* |
| Aves | Sphenisciformes | Spheniscidae | *Aptenodytes* | *patagonicus* |
| Aves | Apterygiformes | Apterygidae | *Apteryx* | *hastii* |
| Aves | Accipitriformes | Accipitridae | *Aquila* | *chrysaetos* |
| Aves | Pelecaniformes | Ardeidae | *Ardea* | *cinera* |
| Aves | Pelecaniformes | Balaenicipitidae | *Balaeniceps* | *rex* |
| Aves | Strigiformes | Strigidae | *Bubo* | *bubo* |
| Aves | Bucerotiformes | Bucerotidae | *Buceros* | *rhinoceros* |
| Aves | Bucerotiformes | Bucorvidae | *Bucorvus* | *abyssinicus* |
| Aves | Cacatuoidea | Cacatuidae | *Calyptorhynchus* | *baudini* |
| Aves | Cariamiformes | Cariamidae | *Cariama* | *cristata* |
| Aves | Cuculiformes | Cuculidae | *Centropus* | *sinenesis* |
| Aves | Anseriformes | Anhimidae | *Chauna* | *chavaria* |
| Aves | Ciconiiformes | Ciconiidae | *Ciconia* | *ciconia* |
| Aves | Anseriformes | Anatidae | *Coroscoba* | *coroscoba* |
| Aves | Procellariiformes | Diomedeidae | *Diomedea* | *epomophora* |
| Aves | Casuraiformes | Dromaidae | *Dromaius* | *novellhandiae* |
| Aves | Suliformes | Fregatidae | *Fregata* | *aquila* |
| Aves | Procellariiformes | Procellaridae | *Fulmarus* | *glacialis* |
| Aves | Charadriiformes | Haematopodidae | *Haematopus* | *ostralegus* |
| Aves | Otidiformes | Otididae | *Otis* | *tarda* |
| Aves | Accipitriformes | Accipitridae | *Pandion* | *haliaetus* |
| Aves | Podargiformes | Podargidae | *Podargus* | *strigoides* |
| Aves | Piciformes | Ramphastidae | *Ramphastos* | *tucanus* |
| Aves | Rheiformes | Rheidae | *Rhea* | *americana* |
| Aves | Accipitriformes | Sagittaridae | *Sagittarius* | *serpentarius* |
| Aves | Struthioniformes | Struthionidae | *Struthio* | *camelus* |
| Aves | Muscophagiformes | Musophagidae | *Tauraco* | *persa* |
| Aves | Charadriiformes | Laridae | *Thalasseus* | *sandvicensis* |

Supplementary Methods 2

Extinct taxa used in this analysis

|  |  |  |
| --- | --- | --- |
| **Group** | **Genus** | **References and Specimen ID** |
| Ornithischia | Ankylosaurus | Carpenter, 2004 |
| Sauropoda | Camarasaurus | AMNH 5760, 5761, Osborn and Mook, 1921 |
| Dinosauromorpha | Silesaurus | Piechowski and Dzik, 2010 |
| Ornithischia | Huayangosaurus | Maidment et al., 2006 |
| Ornithischia | Iguanodon | Hooley, 1925; Norman, 1980 |
| Ornithischia | Kritosaurus | Lull and Wright, 1942 |
| Ornithischia | Dryosaurus | CM 3392, Galton, 1981 |
| Sauropoda | Apatosaurus | Gilmore, 1936 |
| Sauropoda | Diplodocus | Hatcher, 1901 |
| Ornithischia | Stegosaurus | Maidment et al., 2015 |
| Ornithischia | Styracosaurus | Holmes et al., 2005 |
| Theropoda | Allosaurus | Madsen Jr, 1976 |
| Theropoda | Deinonychus | YPM 5210, Ostrom, 1969 |
| Theropoda | Sinraptor | Currie and Zhao, 1993 |
| Theropoda | Tyrannosaurus | Brochu, 2003 |
| Ornithischia | Triceratops | Ostrom and Wellnhofer, 1986 |

Supplementary Methods 3

Landmark definitions used in the geometric morphometric analysis.

|  |  |
| --- | --- |
| Landmark | Description |
| 1 | Midline dorsal margin of the centrum |
| 2 | Lateral-most point of the centrum |
| 3 | Midline ventral margin of the centrum |
| 4 | Midline ventral margin of the neural arch |
| 5 | Midline dorsal margin of the neural arch |
| 6 | Dorsal margin of the neural spine |
| 7 | Ventromedial margin of the prezygapohyseal articular facet |
| 8 | Dorsolateral margin of the prezygapohyseal articular facet |
| 9 | Lateral contact between the neural arch and prezygapophyseal body |
| 10 | Ventromedial edge of the parapophysis/ventrolateral edge of lumbar transverse process |
| 11 | Dorsomedial edge of the diapophysis/dorsolateral edge of lumbar transverse process |

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