

Reliability of conformational measurements in the horse using a three-dimensional motion analysis system

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Supplementary information

TABLE 2: Conformation parameters and the markers used for their calculation

Conformation parameter	Markers used
Lengths	
neck	atlas, scapula
back	dsp, <i>tubersacrale</i>
horse	atlas, tailroot
trunk length	scapula, <i>tubercoxae</i>
trunk height	dsp, elbow
withers	dsp, ground
forelimb	scapula, ground
segmental fore	dsp, humerus, elbow, radius, MCP dors, coronet fore, hoof fore
scapula	dsp, humerus
humerus	humerus, elbow
radius	elbow, radius
carpus	radius, mc4
metacarpus	mc4, mcplat
digit fore	mcp dors, hoof fore
hoof fore	coronet fore, hoof fore
heel fore	heel fore, ground
rump height	<i>tubersacrale</i> , ground
hindlimb	greatertrochanter, ground
segmental hindlimb1	<i>tubersacrale</i> , greater trochanter, stifle, tarsus, mtp dors, coronet hind, hoof hind
segmental hindlimb2	greater trochanter, stifle, tarsus, mtp dors, coronet hind, hoof hind
pelvis length	<i>tubercoxae</i> , ischialtuber
pelvis height	<i>tubersacrale</i> , greater trochanter
croup length	<i>tubersacrale</i> , ischial tuber
ilium	<i>tubercoxae</i> , greater trochanter
pubis	greater trochanter, ischialtuber
femur	greater trochanter, stifle
tibia	stifle, tibia
tarsus	tibia, mt4
metatarsus	mt4, mtp lat
digit hind	mtp dors, hoof hind
hoof hind	coronet hind, hoof hind
heel hind	heel hind, ground
Angles 3D	
shoulder joint	scapula, humerus, elbow
elbow joint	humerus, elbow, radius
carpal joint	elbow, radius, mcp lat
mcp joint	carpus, mcp dors, coronet fore
dip joint fore	mcp dors, coronet fore, hoof fore
coxal angle	<i>tubercoxae</i> , greater trochanter, ischial tuber
hip joint	<i>tubercoxae</i> , greater trochanter, stifle
stifle joint	greater trochanter, stifle, tibia
tarsal joint	stifle, tarsus, mtp dors
mtp joint	tarsus, mtp dors, coronet fore hind
dip joint hind	mtp dors, coronet hind, hoof hind
Inclines	
scapula incline	segments with regards to horizontal scapula, humerus horizontal
humerus incline	humerus, elbow horizontal
pelvis incline	<i>tubercoxae</i> , ischial tuber horizontal
femur incline	greater trochanter, stifle horizontal
croup incline	<i>tubersacrale</i> , ischial tuber horizontal
hoof angle fore lat	coronet fore, hoof fore, ground
hoof angle hind lat	coronet hind, hoof hind, ground
Deviations lateral	
dev fore lat	segments with regards to transverse plane heel fore, scapula verticalxz
dev carpus lat	mc4, scapula verticalxz
dev mcp lat	mcp lat, scapula verticalxz
dev hind lat	heel hind, ischial tuber verticalxz
dev tarsus lat	tibia, ischial tuber verticalxz
dev mtp lat	mtp lat, ischial tuber verticalxz
Deviations cranial	
dev fore cran	segments with regards to median plane hoof fore, scapula verticalyz
dev carpus cran	carpus, scapula verticalyz
dev mcp cran	mcp dors, scapula verticalyz
dev hind caud	hoof hind, ischial tuber verticalyz
dev tarsus caud	calcaneus, ischial tuber verticalyz
dev mtp caud	mtp dors, ischial tuber verticalyz

TABLE 3: Intraoperator repeatability of marker placement: mean (mean diff) and s.d. (s.d. diff) of the differences between markings for each conformation parameter based on 2 repeated marker placements in 12 horses. Stance-related repeatability: within-subject standard deviation (s_w), between-subject s.d. (s_b), study population mean (mp) for each conformation parameter based on three repeated acquisitions in 108 horses. Lengths in cm, angles in degrees

	Intraoperator repeatability		Stance-related repeatability		Population mean	Intraoperator repeatability		Stance-related repeatability		Population mean	
	mean diff	s.d. diff	s_w	s_b	mp	mean diff	stdev diff	s_w	s_b	mp	
Lengths						Angles 2D lateral (viewed from lateral = projection into x,z plane)					
neck	2.06	2.81	2.97	7.22	76.36	shoulder joint lat	3.21	2.77	1.62	7.31	242.22
back	2.53	1.93	0.94	6.57	87.48	elbow joint lat	3.09	3.22	2.30	7.09	140.24
horse	1.53	2.03	4.37	12.44	197.64	carpal joint lat	3.79	2.34	1.17	5.33	186.11
trunk length	2.09	1.39	1.37	6.09	85.12	mcp joint lat	3.76	5.20	3.54	7.35	150.37
trunk height	0.82	0.57	0.55	3.24	73.28	dip joint fore lat	4.37	5.40	5.47	9.72	163.29
withers	0.46	0.52	0.77	5.93	161.86	coxal angle lat	8.89	7.08	3.16	19.34	212.17
forelimb	1.06	0.92	0.69	5.76	152.11	hip joint lat	3.69	3.35	2.51	16.50	75.42
segmental fore	1.33	1.32	1.27	6.76	184.45	stifle joint lat	5.07	3.43	3.97	14.45	240.59
scapula	1.11	0.92	0.54	3.46	57.90	tarsal joint lat	2.33	2.09	3.31	6.25	159.91
humerus	1.63	1.04	0.4	2.79	30.54	mtp joint lat	2.95	2.72	4.14	8.00	153.91
radius	0.66	0.73	0.29	2.58	40.47	dip joint hind lat	2.24	2.51	5.65	9.41	164.92
carpus	0.27	0.23	0.1	1.09	10.58	Angles 2D cranial (viewed from cranial = projection into y,z)					
metacarpus	0.35	0.31	0.17	1.38	23.67	shoulder joint cran	1.83	1.52	4.44	7.13	159.78
digit fore	1.15	0.78	0.75	1.99	21.79	elbow joint cran	2.82	2.76	3.66	7.29	177.58
hoof fore	0.44	0.35	0.32	1.30	9.10	carpal joint cran	1.48	1.66	0.86	2.86	186.08
heel fore	0.63	0.58	0.33	1.48	3.66	mcp joint cran	6.71	10.41	4.6	9.41	180.76
rump height	0.83	0.64	1.31	5.57	162.81	dip joint fore cran	8.57	10.54	5.63	12.43	182.59
hindlimb	1.24	0.58	1.45	6.06	137.79	stifle joint cran	5.19	4.30	3.69	7.59	167.39
segmental hindlimb1	1.55	2.15	1.32	12.51	218.68	tarsal joint cran	2.48	3.17	3.35	6.03	190.31
segmental hindlimb2	1.81	1.42	1.12	8.38	153.26	mtp joint cran	3.30	3.24	4.68	9.31	183.63
pelvis length	1.35	1.31	0.61	5.42	49.18	dip joint hind cran	3.46	4.26	4.52	9.51	190.57
pelvis height	1.15	0.89	0.32	3.13	38.73	Inclines (segments with regards to horizontal)					
croup length	2.45	1.58	0.52	4.40	41.44	scapula incline	1.99	1.78	2.34	5.67	68.77
ilium	1.17	0.85	0.35	5.31	34.85	humerus incline	2.87	2.62	2.91	5.20	130.95
pubis	1.03	0.98	0.48	5.71	18.30	pelvis incline	1.38	0.74	1.48	6.44	171.42
femur	1.39	0.78	0.66	6.37	34.49	femur incline	3.64	2.36	2.29	10.93	57.53
tibia	2.05	1.23	1.14	4.78	58.57	croup incline	1.71	1.10	1.29	5.58	146.66
tarsus	0.76	0.68	0.70	1.92	13.32	hoof angle fore	2.22	2.49	2.51	7.67	52.67
metatarsus	0.43	0.25	0.21	2.26	28.87	hoof angle hind	2.22	2.49	2.97	5.24	50.72
digit hind	0.70	0.84	0.66	1.85	22.28	Deviations lateral (segments with regards to transverse plane)					
hoof hind	0.26	0.20	0.27	1.25	9.32	dev fore lat	1.78	1.62	3.27	3.72	183.73
heel hind	0.41	0.32	0.47	1.52	3.56	dev carpus lat	1.51	1.38	3.13	3.48	184.58
Angles 3D						dev mcp lat	2.11	1.38	3.34	3.53	184.48
shoulder joint	2.97	2.57	1.11	6.55	115.81	dev hind lat	3.18	2.95	5.54	5.72	176.86
elbow joint	3.03	3.07	2.24	7.05	140.06	dev tarsus lat	4.07	4.50	4.61	5.61	176.17
carpal joint	3.24	2.68	0.81	3.43	170.85	dev mtp lat	3.81	2.71	5.22	6.00	177.70
mcp joint	1.59	2.12	3.77	7.66	149.74	Deviations cranial/caudal (segments with regards to median plane)					
dip joint fore	2.52	2.75	4.80	7.57	160.05	dev fore cran	2.52	1.94	2.32	3.60	180.40
coxal angle	7.78	6.22	2.00	13.71	133.36	dev carpus cran	2.72	3.10	2.39	3.83	180.02
hip joint	3.81	3.53	2.56	16.72	75.34	dev mcp cran	2.17	1.98	2.32	3.46	179.95
stifle joint	4.25	2.80	3.58	13.66	118.75	dev hind caud	1.90	1.55	1.94	2.54	180.07
tarsal joint	2.53	2.85	3.05	6.50	157.46	dev tarsus caud	1.73	1.23	2.29	3.16	179.69
mtp joint	2.54	2.60	3.77	8.18	152.88	dev mtp caud	2.17	1.91	1.99	2.64	179.74
dip joint hind	2.27	2.46	5.10	8.05	161.45						