

APPENDIX

Table A1
Participant Anthropometric Dimensions

Dimension	Mean	SD*	Minimum	Maximum
Age (yr)	48	18	18	71
Stature with shoes (mm)	1722	109	1548	1967
Stature without shoes (mm)	1694	100	1521	1898
Weight without shoes (kg)	82.6	17.5	54.1	127.4
BMI (kg/m ²)	28.7	4.9	21.0	37.2
Erect Sitting Height (mm)	883	57	782	983
Eye Height Sitting (mm)	772	55	677	874
Acromial Height Sitting (mm)	588	44	515	661
Knee Height (mm)	518	38	459	607
Head Length (mm)	196	10	176	219
Tragion to Top of Head (mm)	126	8	114	144
Head Breadth (mm)	155	6	142	168
Shoulder-Elbow Length (mm)	370	25	332	419
Elbow-Hand Length (mm)	463	32	404	520
Maximum Hip Breadth (mm)	397	32	341	448
Buttock-Knee Length (mm)	608	39	546	682
Buttock-Popliteal Length (mm)	503	31	450	555
Bi-Acromial Breadth (mm)	386	29	338	443
Shoulder Breadth (mm)	458	35	394	532
Bi-ASIS Breadth (mm)	234	19	195	272

*Standard deviation

Table A2
Mid-hip Location for All Participants

Back Angle (deg)	X*	X SD†	Z	Z SD
23	11.3	20.9	-11.7	13.8
33	12.5	22.4	-12.9	13.2
43	14.8	22.1	-10.2	13.7
53	25.5	23.9	-8.4	14.8

* Positive values indicate the hip location is rearward of the seat H-point measured at 23 degrees.

† Standard deviation

Table A3
Body Segment Angles – No Head Rest

Variable (deg)	Seat Back Angle (deg)							
	23		33		43		53	
	Mean	SD*	Mean	SD	Mean	SD	Mean	SD
Pelvis Angle	52.7	9.3	60.6	11.8	63.1	15.4	59.6	32.8
Lumbar Angle	20.6	8.0	30.3	8.2	41.3	12.6	48.5	11.6
Thorax Angle	6.5	4.4	15.1	4.6	24.3	5.6	33.5	6.0
Neck Angle	1.3	5.2	4.4	7.4	9.7	8.5	19.0	10.7
Head Angle	0.3	7.0	-0.2	7.0	4.7	9.8	12.2	13.3
Thigh Angle	12.8	2.2	13.3	1.9	12.7	2.3	13.0	2.2
Leg Angle	47.1	5.4	47.4	5.6	47.4	5.8	48.1	5.8
Hip-Eye Angle	7.0	2.7	14.7	3.3	22.7	3.8	31.1	3.6

* Standard deviation

Table A4
Body Segment Angles – With Head Rest

Variable (deg)	Seat Back Angle (deg)							
	23		33		43		53	
	Mean	SD*	Mean	SD	Mean	SD	Mean	SD
Pelvis Angle	51.0	10.1	54.3	12.7	58.6	15.1	63.3	15.3
Lumbar Angle	21.4	8.7	31.5	9.5	43.3	11.8	54.5	15.0
Thorax Angle	10.6	8.1	19.3	6.0	28.6	5.9	38.7	6.1
Neck Angle	11.4	7.8	18.6	8.0	29.6	10.3	41.0	8.9
Head Angle	7.5	10.1	13.3	9.7	23.4	10.1	34.7	8.9
Thigh Angle	12.7	2.0	12.5	2.1	12.5	2.2	10.5	4.0
Leg Angle	47.4	5.2	47.0	6.1	46.9	5.9	43.2	20.4
Hip-Eye Angle	11.0	5.8	18.9	4.1	28.4	4.1	38.4	3.4

* Standard deviation

Table A5
Regression Equations Predicting Dependent Measures

Variable (mm, deg)	Intercept	Stature	BMI	SHS	Head Rest	Back Angle	H*B	RMSE	R ² adj
HipX	79.0	-0.047				0.448		21.9	0.09
HipZ	35.2	-0.029			5.94			13.3	0.08
Pelvis Angle	84.8		-1.37			0.331		15.4	0.19
Lumbar Angle	30.2	-0.0328	0.794			1.02		9.4	0.64
Thorax Angle	-34.1		-0.670	73.9	4.44	0.919		4.8	0.84
Neck Angle	-13.6				0.834	0.584	0.413	8.5	0.67
Head Angle	-28.0		0.584		-3.62	0.406	0.501	9.3	0.59
Thigh Angle	6.00		0.226					2.3	0.19
Leg Angle	-20.9	0.040						7.8	0.22
Hip-Eye Angle	-7.5		-0.217		5.30	0.860		3.8	0.87
Hip-Eye X	-628	0.119	-1.85	671	65.6	8.60		42.3	0.86
Hip-Eye Z	-537	0.382	1.77	1101		-4.04		23.6	0.87
Cervical Flexion†	41.2	0.000288	-1.26		-1.09	0.267		8.8	0.49
Lumbar Flexion†	24.3	0.033	-0.643		-6.62	-0.591		15.2	0.24

* Stature (mm), BMI (kg/m²), SHS = erect sitting height / stature, Head Rest Present = 1, Absent = 0, Back Angle = SAE A40 (see text); H*B = BackAngle (deg) * HR Present (1|0)

† Lumbar flexion was computed as the pelvis angle minus thorax angle. Cervical flexion was computed as thorax angle minus head angle.

Table A6
Means and Standard Deviations of Lap Belt Score (mm)

Seat Back Angle (deg)	Lap Belt X		Lap Belt Z	
	Mean	SD*	Mean	SD
23	-88.9	34.9	74.6	27.8
33	-82.0	27.5	75.9	27.5
43	-70.9	26.3	73.1	24.6
53	-63.4	24.5	75.3	27.9

*Standard deviation

Table A7
Regression Models for Lap and Torso Belt Scores

Variable (mm)	Intercept	Stature (mm)	SHS*	BMI (kg/m ²)	Seat Back Angle (deg)	(Seat Back Angle) ² (deg)	RMSE	R ² adj
Lap Belt Score X	10.7			-4.22	0.908		19.6	0.57
Lap Belt Score Z	-139.3	0.0582		4.00			17.8	0.56
Torso Belt Score	-665	0.089	1090			-0.0258	24.3	0.55

* Erect sitting height divided by stature.