

Evaluation of Body Shape as a Human Body Composition Assessment in Isolated Conditions and Remote Environments

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Supplementary Table 1. Regional removal analysis (n=28)

	Reference		Inverted		All ¹		Arms ²		Back ²		Head ²		Legs ²		Lower Legs	
	R ²	RMSE	R ²	RMSE	R ²	RMSE	R ²	RMSE	R ²	RMSE	R ²	RMSE	R ²	RMSE	R ²	RMSE
Total Fat	0.74	2.69	0.50	2.87	0.67	2.19	0.73	2.75	0.76	2.44	0.75	2.70	0.78	2.32	0.72	2.87
Total Lean	0.97	2.03	0.94	2.86	0.96	2.31	0.97	2.00	0.97	2.17	0.97	2.06	0.98	1.87	0.96	2.23
Percent Fat	0.69	3.52	0.54	3.26	0.71	2.68	0.70	3.51	0.72	3.43	0.70	3.60	0.77	2.94	0.64	3.93
VAT	0.76	0.06	0.36	0.11	0.68	0.07	0.75	0.07	0.67	0.07	0.76	0.07	0.73	0.08	0.72	0.08
Arm Fat	0.50	0.27	0.19	0.30	0.31	0.25	0.52	0.27	0.51	0.26	0.49	0.29	0.48	0.27	0.48	0.3
Arm Lean	0.93	0.32	0.92	0.35	0.91	0.32	0.94	0.29	0.94	0.29	0.94	0.29	0.94	0.28	0.94	0.29
Leg Fat	0.58	0.59	0.15	0.76	0.49	0.53	0.58	0.62	0.66	0.58	0.59	0.61	0.65	0.48	0.59	0.63
Leg Lean	0.92	0.62	0.86	0.65	0.88	0.64	0.91	0.56	0.91	0.64	0.93	0.55	0.91	0.58	0.90	0.64
Trunk Fat	0.80	1.25	0.57	1.38	0.68	1.15	0.76	1.42	0.81	1.04	0.80	1.28	0.79	1.28	0.78	1.34
Trunk Lean	0.94	1.49	0.93	1.27	0.93	1.46	0.94	1.38	0.94	1.43	0.95	1.34	0.94	1.32	0.94	1.41

SRL-3 scanner was used for this analysis.

¹ Refers to the standing scan from the SRL-3 with all regions removed to mimic the inverted scan but without inversion.

² Only the posterior side of this body part was removed before processing through Meshcapade.

Supplementary Table 2. Comparison of automated anthropometry of region removal analysis to SRL-3 reference mesh.

		R ²	RMSE	Mean Difference (cm)	P-Value
Head	Neck Circ.	0.99	0.26	-0.42	<0.001
	Waist Circ.	0.99	0.10	-0.04	0.080
	Hip Circ.	0.99	0.11	-0.05	0.050
	Thigh Circ.	0.99	0.09	-0.03	0.151
	Arm Circ.	0.99	0.23	-0.01	0.911
	Chest Circ.	0.99	0.10	-0.07	0.009
Arms	Neck Circ.	0.99	0.09	0.06	0.048
	Waist Circ.	0.99	0.14	-0.05	0.168
	Hip Circ.	0.99	0.17	0.04	0.399
	Thigh Circ.	0.99	0.10	0.00	0.871
	Arm Circ.	0.95	1.05	-0.83	0.038
	Chest Circ.	0.99	0.17	0.17	0.002
Legs	Neck Circ.	0.99	0.08	0.04	0.086
	Waist Circ.	0.99	0.21	-0.12	0.028
	Hip Circ.	0.94	1.29	-0.73	0.107
	Thigh Circ.	0.95	0.70	-0.82	0.017
	Arm Circ.	0.99	0.49	-0.5	0.002
	Chest Circ.	0.99	0.15	0.01	0.891
Back	Neck Circ.	0.99	0.19	0.02	0.754
	Waist Circ.	0.99	0.86	0.49	0.166
	Hip Circ.	0.99	0.16	0.02	0.649
	Thigh Circ.	0.99	0.14	-0.06	0.139
	Arm Circ.	0.99	0.62	-0.32	0.043
	Chest Circ.	0.99	0.99	1.37	0.007
Lower Legs					

	Neck Circ.	0.97	0.50	-0.1	0.461
	Waist Circ.	0.99	0.99	-0.13	0.616
	Hip Circ.	0.99	0.29	0.03	0.684
	Thigh Circ.	0.97	0.73	-0.05	0.765
	Arm Circ.	0.71	3.52	0.81	0.343
	Chest Circ.	0.99	0.25	0.11	0.078
All Parts Removed					
	Neck Circ.	0.95	0.66	-0.61	0.002
	Waist Circ.	0.97	1.31	0.74	0.206
	Hip Circ.	0.96	0.89	-0.28	0.567
	Thigh Circ.	0.94	0.76	-0.40	0.215
	Arm Circ.	0.87	1.54	-2.55	<0.001
	Chest Circ.	0.94	1.76	0.9	0.261
Inverted					
	Neck Circ.	0.81	1.71	0.20	0.639
	Waist Circ.	0.94	2.01	-3.13	<0.001
	Hip Circ.	0.80	1.85	-2.12	0.014
	Thigh Circ.	0.90	0.90	-1.03	0.022
	Arm Circ.	0.88	1.49	1.75	0.005
	Chest Circ.	0.97	1.39	1.53	0.034

Abbreviations: Circ. (Circumference)

R² and RMSE reported from linear regression. Mean difference and p-value were reported from paired Student's t-test.

Mean difference = Experimental measurement – Reference measurement

Bold: mean difference was significant (p>0.05)

Supplementary Table 3. Agreement between scan speeds on SRL-3 scanner

Outcome	8s		30s	
	8s R ²	RMSE	30s R ²	RMSE
Total Fat	0.96	1.04	0.98	0.80
Total Lean	0.99	1.04	0.99	0.80
Percent Fat	0.94	1.52	0.97	1.17
VAT	0.88	0.05	0.94	0.03

Abbreviations: s (seconds), VAT (visceral adipose tissue)

All outcomes are presented in kg except percent fat.

8s and 30s were compared to the reference scan taken at 15s.