

Supplementary Tables

Boys								
	N	Drop-out mean	sd	N	Studied sample mean	sd	Test of the difference	
							W	p-value
at birth	51	51.1	1.6	167	50.8	2.1	4414	0.69
at age 1	46	76.8	2.9	163	77.1	2.5	3446	0.40

Girls								
	N	Drop-out mean	sd	N	Studied sample mean	sd	Test of the difference	
							W	p-value
at birth	60	49.5	2.1	167	50.0	2.0	4564	0.30
at age 1	57	74.7	2.6	162	75.4	2.5	4040	0.16

Table S1 Test of differences in body length/height between the tested sample and drop-out of the Brno Growth Study, for testing their differences Wilcoxon rank sum test with continuity correction was used.

variable	n	mean	sd	median	trimmed	min	max	range	skew	kurtosis
apv.reference	167	11.61	0.9	11.7	11.61	9.09	13.75	4.66	-0.18	-0.31
apv.fpca.s1	167	11.52	0.58	11.59	11.55	9.67	12.77	3.1	-0.46	-0.33
apv.fpca.s2	167	11.58	0.75	11.66	11.64	7.4	12.95	5.55	-1.76	6.94
apv.fpca.s3	167	11.59	0.7	11.63	11.61	9.57	13.31	3.74	-0.21	-0.14
apv.fpca.s4	167	11.63	0.66	11.75	11.65	9.66	13.17	3.51	-0.42	-0.21
apv.fpca.s5	167	11.72	0.71	11.77	11.74	9.66	13.44	3.79	-0.29	-0.17
apv.fpca.s6	167	11.73	0.7	11.81	11.74	9.98	13.69	3.71	-0.09	-0.39
apv.fpca.s7	167	11.8	0.61	11.79	11.79	10.57	13.7	3.13	0.14	-0.45
vpv.reference	167	7.57	0.88	7.54	7.57	5.19	10.8	5.62	0.2	0.74
vpv.fpca.s1	167	8.02	0.59	7.96	8	6.58	10.11	3.53	0.47	0.55
vpv.fpca.s2	167	7.91	0.65	7.87	7.9	6.21	10.61	4.4	0.41	1.04
vpv.fpca.s3	167	7.75	0.71	7.75	7.75	5.85	10.55	4.7	0.3	1.22
vpv.fpca.s4	167	7.69	0.69	7.66	7.69	5.86	10.28	4.42	0.25	1.05
vpv.fpca.s5	167	7.58	0.57	7.57	7.58	5.92	9.46	3.55	0.04	0.59
vpv.fpca.s6	167	7.61	0.39	7.59	7.61	6.34	9.07	2.73	-0.19	2.12
vpv.fpca.s7	167	7.81	0.23	7.77	7.79	7.28	9.18	1.9	1.63	7.05
ato.reference	167	9.03	0.92	9.11	9.03	6.4	11.23	4.82	-0.09	-0.38
ato.fpca.s1	167	9.26	0.47	9.37	9.31	7.31	10	2.69	-1.12	1.67
ato.fpca.s2	167	9.42	0.51	9.46	9.45	7.22	10.37	3.14	-0.99	2.53
ato.fpca.s3	167	9.52	0.51	9.51	9.52	7.91	10.79	2.88	-0.19	0.54
ato.fpca.s4	167	9.51	0.48	9.58	9.54	7.92	10.69	2.77	-0.51	0.08
ato.fpca.s5	167	9.59	0.49	9.59	9.59	8.12	10.68	2.56	-0.13	-0.18
ato.fpca.s6	167	9.61	0.49	9.63	9.61	8.33	10.89	2.56	0.05	-0.22
ato.fpca.s7	167	9.62	0.41	9.65	9.61	8.77	10.9	2.13	0.23	-0.13
vto.reference	167	5.19	0.67	5.06	5.17	3.26	7.23	3.97	0.35	0.32
vto.fpca.s1	167	5.36	0.54	5.27	5.32	4.09	7.87	3.78	1.04	2.44
vto.fpca.s2	167	5.39	0.71	5.27	5.33	3.92	8.48	4.56	1.28	3.21
vto.fpca.s3	167	5.36	0.67	5.25	5.33	3.9	7.39	3.49	0.5	0.25
vto.fpca.s4	167	5.26	0.58	5.24	5.24	3.83	6.92	3.09	0.25	0.05
vto.fpca.s5	167	5.17	0.45	5.19	5.16	3.95	6.55	2.6	0.1	-0.15
vto.fpca.s6	167	5.2	0.38	5.19	5.2	4.25	6.21	1.96	0.1	-0.42
vto.fpca.s7	167	5.22	0.34	5.25	5.22	4.38	6.02	1.64	0.07	-0.38

Table S2 Girls: Descriptive statistics of the reference values of all milestones and their estimates by FPCA method for each testing sample (s1–s7) separately.

variable	n	mean	sd	median	trimmed	min	max	range	skew	kurtosis
apv.reference	167	13.61	0.91	13.62	13.59	10.95	16.57	5.62	0.09	0.76
apv.fpca.s1	167	13.41	0.68	13.5	13.44	11.16	14.76	3.6	-0.62	0.47
apv.fpca.s2	167	13.5	0.75	13.55	13.51	11.15	15.09	3.95	-0.36	0.16
apv.fpca.s3	167	13.53	0.75	13.55	13.51	11.19	15.48	4.29	0.05	0.77
apv.fpca.s4	167	13.58	0.68	13.65	13.6	11.19	14.87	3.68	-0.52	0.52
apv.fpca.s5	167	13.66	0.72	13.69	13.67	11.24	15.42	4.18	-0.3	0.54
apv.fpca.s6	167	13.67	0.7	13.68	13.67	11.72	15.43	3.71	-0.02	-0.1
apvfpca.s7	167	13.71	0.63	13.71	13.7	12.41	15.22	2.81	0.08	-0.65
vpv.ref	167	9.21	1.22	9.21	9.25	6.15	11.96	5.81	-0.17	-0.34
vpv.fpca.s1	167	9.93	1.16	9.8	9.92	7.32	13.07	5.75	0.17	-0.21
vpv.fpca.s2	167	9.88	1.21	9.84	9.88	7.16	13.01	5.85	0.01	-0.38
vpv.fpca.s3	167	9.7	1.31	9.83	9.72	6.57	12.68	6.11	-0.13	-0.32
vpv.fpca.s4	167	9.48	1.22	9.53	9.52	5.78	12.73	6.94	-0.26	-0.21
vpv.fpca.s5	167	9.3	0.99	9.25	9.32	6.28	12.27	5.99	-0.09	0.25
vpv.fpca.s6	167	9.28	0.72	9.32	9.27	6.95	11.66	4.7	0.07	0.9
vpv.fpca.s7	167	9.57	0.49	9.52	9.56	7.8	11.8	4	0.44	2.85
ato.reference	167	10.54	0.89	10.52	10.54	7.99	13.02	5.02	-0.07	0.27
ato.fpca.s1	167	10.76	0.5	10.88	10.8	9.15	11.59	2.44	-0.76	0.13
ato.fpca.s2	167	10.86	0.58	10.9	10.88	9.16	12.18	3.01	-0.35	-0.16
ato.fpca.s3	167	10.93	0.61	10.92	10.93	9.3	12.63	3.33	0.03	-0.15
ato.fpca.s4	167	11.01	0.62	10.98	10.99	9.43	12.76	3.33	0.3	0.03
ato.fpca.s5	167	11.09	0.63	11.01	11.06	9.38	12.84	3.45	0.41	0.32
ato.fpca.s6	167	11.08	0.64	11.01	11.04	9.53	13.04	3.51	0.66	0.68
ato.fpca.s7	167	11.07	0.56	11.02	11.03	9.95	12.84	2.88	0.7	0.62
vto.reference	167	4.77	0.56	4.83	4.77	3.49	6.31	2.82	0.07	-0.32
vto.fpca.s1	167	4.92	0.47	4.87	4.9	4.01	7.04	3.03	1.02	2.86
vto.fpca.s2	167	4.92	0.51	4.89	4.9	3.8	6.87	3.08	0.71	1.71
vto.fpca.s3	167	4.89	0.47	4.87	4.88	3.69	6.49	2.8	0.41	1.09
vto.fpca.s4	167	4.82	0.43	4.8	4.82	3.55	6.4	2.85	0.17	1.82
vto.fpca.s5	167	4.78	0.41	4.75	4.76	3.67	6.45	2.77	0.59	2.7
vto.fpca.s6	167	4.79	0.38	4.76	4.78	3.66	6.06	2.4	0.3	1.25
vto.fpca.s7	167	4.8	0.32	4.77	4.79	3.97	5.66	1.69	0.24	0.1

Table S3 Boys: Descriptive statistics of the reference values of all milestones and their estimates by FPCA method for each testing sample (s1–s7) separately.

variable	n	mean	sd	median	trimmed	min	max	range	skew	kurtosis
apv.reference	167	11.61	0.9	11.7	11.61	9.09	13.75	4.66	-0.18	-0.31
apv.sitar.s1	167	11.54	0.55	11.64	11.59	9.49	12.66	3.17	-0.81	0.43
apv.sitar.s2	167	11.65	0.58	11.74	11.68	9.9	12.9	3	-0.49	-0.24
apv.sitar.s3	167	11.75	0.64	11.77	11.76	10.08	13.1	3.02	-0.15	-0.53
apv.sitar.s4	167	11.64	0.68	11.73	11.65	9.66	13.39	3.73	-0.21	-0.01
apv.sitar.s5	167	11.64	0.64	11.76	11.67	9.8	12.93	3.13	-0.4	-0.37
apv.sitar.s6	167	11.71	0.64	11.77	11.72	10.13	13.38	3.25	-0.07	-0.53
apv.sitar.s7	167	11.79	0.58	11.78	11.77	10.65	13.68	3.03	0.33	-0.28
vpv.reference	167	7.57	0.88	7.54	7.57	5.19	10.8	5.62	0.2	0.74
vpv.sitar.s1	167	7.94	0.41	7.91	7.92	7.09	9.46	2.38	0.59	0.18
vpv.sitar.s2	167	7.88	0.41	7.85	7.86	6.98	9.23	2.25	0.5	-0.05
vpv.sitar.s3	167	7.81	0.44	7.78	7.79	6.85	9.12	2.26	0.34	-0.45
vpv.sitar.s4	167	7.8	0.46	7.77	7.78	6.76	9.07	2.31	0.25	-0.36
vpv.sitar.s5	167	7.77	0.43	7.73	7.75	6.74	8.99	2.25	0.33	-0.4
vpv.sitar.s6	167	7.73	0.42	7.69	7.72	6.69	8.77	2.09	0.1	-0.57
vpv.sitar.s7	167	7.68	0.38	7.68	7.69	6.72	8.46	1.74	-0.2	-0.55
ato.reference	167	9.03	0.92	9.11	9.03	6.4	11.23	4.82	-0.09	-0.38
ato.sitar.s1	167	9.33	0.44	9.43	9.37	7.62	10.23	2.61	-0.92	0.68
ato.sitar.s2	167	9.42	0.47	9.52	9.45	7.99	10.45	2.46	-0.49	-0.25
ato.sitar.s3	167	9.53	0.53	9.57	9.54	8.16	10.65	2.49	-0.15	-0.5
ato.sitar.s4	167	9.52	0.57	9.6	9.53	7.78	10.94	3.16	-0.27	0.1
ato.sitar.s5	167	9.54	0.54	9.64	9.57	7.92	10.64	2.71	-0.46	-0.32
ato.sitar.s6	167	9.6	0.54	9.66	9.61	8.2	11.03	2.83	-0.11	-0.49
ato.sitar.s7	167	9.66	0.49	9.67	9.65	8.67	11.3	2.63	0.3	-0.24
vto.reference	167	5.19	0.67	5.06	5.17	3.26	7.23	3.97	0.35	0.32
vto.sitar.s1	167	5.48	0.29	5.45	5.46	4.88	6.56	1.68	0.62	0.21
vto.sitar.s2	167	5.43	0.29	5.41	5.41	4.8	6.39	1.58	0.51	-0.06
vto.sitar.s3	167	5.39	0.31	5.37	5.37	4.71	6.31	1.59	0.35	-0.45
vto.sitar.s4	167	5.41	0.32	5.39	5.4	4.68	6.3	1.62	0.26	-0.36
vto.sitar.s5	167	5.4	0.31	5.36	5.38	4.67	6.25	1.57	0.34	-0.4
vto.sitar.s6	167	5.37	0.3	5.34	5.36	4.64	6.1	1.46	0.12	-0.57
vto.sitar.s7	167	5.33	0.26	5.33	5.34	4.66	5.88	1.23	-0.19	-0.55

Table S4 Girls: Descriptive statistics of the reference values of all milestones and their estimates by SITAR method for each testing sample (s1–s7) separately.

variable	n	mean	sd	median	trimmed	min	max	range	skew	kurtosis
apv.reference	167	13.61	0.91	13.62	13.59	10.95	16.57	5.62	0.09	0.76
apv.sitar.s1	167	13.47	0.68	13.56	13.49	11.23	15.04	3.81	-0.53	0.63
apv.sitar.s2	167	13.55	0.73	13.59	13.57	11.22	15.24	4.02	-0.35	0.31
apv.sitar.s3	167	13.64	0.78	13.61	13.63	11.11	15.57	4.47	-0.06	0.36
apv.sitar.s4	167	13.63	0.82	13.62	13.62	11.1	15.85	4.75	0.1	0.66
apv.sitar.s5	167	13.57	0.77	13.56	13.56	11.25	16.04	4.79	0.16	0.82
apv.sitar.s6	167	13.57	0.71	13.55	13.55	11.77	15.48	3.71	0.21	-0.08
apv.sitar.s7	167	13.59	0.65	13.51	13.55	12.45	15.46	3.01	0.47	-0.35
vpv.reference	167	9.21	1.22	9.21	9.25	6.15	11.96	5.81	-0.17	-0.34
vpv.sitar.s1	167	9.54	0.51	9.49	9.53	8.36	11.25	2.89	0.51	0.68
vpv.sitar.s2	167	9.5	0.51	9.46	9.49	8.36	11.21	2.85	0.5	0.71
vpv.sitar.s3	167	9.46	0.54	9.41	9.45	8.18	11.29	3.11	0.36	0.62
vpv.sitar.s4	167	9.46	0.56	9.46	9.46	8.03	11.29	3.26	0.17	0.58
vpv.sitar.s5	167	9.49	0.53	9.48	9.49	7.92	11.16	3.24	0.06	0.67
vpv.sitar.s6	167	9.49	0.49	9.49	9.49	8.28	10.74	2.46	-0.04	-0.2
vpv.sitar.s7	167	9.47	0.45	9.51	9.49	8.29	10.35	2.06	-0.28	-0.45
ato.reference	167	10.54	0.89	10.52	10.54	7.99	13.02	5.02	-0.07	0.27
ato.sitar.s1	167	10.58	0.53	10.66	10.6	8.83	11.72	2.89	-0.64	0.75
ato.sitar.s2	167	10.66	0.57	10.67	10.68	8.75	11.96	3.21	-0.41	0.32
ato.sitar.s3	167	10.75	0.62	10.7	10.74	8.65	12.24	3.59	-0.1	0.42
ato.sitar.s4	167	10.74	0.65	10.74	10.73	8.65	12.47	3.83	0.05	0.74
ato.sitar.s5	167	10.69	0.61	10.69	10.69	8.77	12.61	3.84	0.1	0.82
ato.sitar.s6	167	10.69	0.56	10.66	10.68	9.18	12.19	3.01	0.17	-0.07
ato.sitar.s7	167	10.7	0.52	10.65	10.68	9.71	12.18	2.46	0.46	-0.34
vto.reference	167	4.77	0.56	4.83	4.77	3.49	6.31	2.82	0.07	-0.32
vto.sitar.s1	167	5.08	0.28	5.05	5.07	4.44	6.03	1.59	0.56	0.81
vto.sitar.s2	167	5.03	0.28	5	5.02	4.38	6.02	1.63	0.53	0.85
vto.sitar.s3	167	4.99	0.3	4.97	4.99	4.28	6.05	1.77	0.39	0.79
vto.sitar.s4	167	5	0.31	4.99	4.99	4.21	6.05	1.84	0.21	0.73
vto.sitar.s5	167	5.01	0.29	5	5.01	4.15	5.97	1.82	0.11	0.78
vto.sitar.s6	167	5.01	0.27	5.01	5.01	4.36	5.74	1.38	0	-0.15
vto.sitar.s7	167	5	0.25	5.02	5.01	4.36	5.48	1.12	-0.26	-0.44

Table S5 Boys: Descriptive statistics of the reference values of all milestones and their estimates by SITAR method for each testing sample (s1–s7) separately.

variable	n	mean	sd	median	trimmed	min	max	range	skew	kurtosis
apv.fpca.s1	167	-0.09	0.66	-0.06	-0.09	-1.83	1.85	3.68	0.14	0.57
apv.fpca.s2	167	-0.02	0.6	-0.01	-0.04	-1.87	2.19	4.07	0.42	1.97
apv.fpca.s3	167	-0.01	0.49	0.03	-0.01	-1.65	2.36	4.01	1.01	7.18
apv.fpca.s4	167	0.02	0.35	0.05	0.03	-1.25	1.96	3.21	0.45	6.99
apv.fpca.s5	167	0.11	0.34	0.09	0.09	-0.73	2.53	3.26	2.66	16.41
apv.fpca.s6	167	0.13	0.37	0.11	0.1	-0.7	2.67	3.38	2.49	14.47
apv.fpca.s7	167	0.19	0.43	0.14	0.15	-0.64	2.6	3.24	1.85	6.88
vpv.fpca.s1	167	0.45	0.84	0.42	0.44	-2.03	2.56	4.59	0	0.27
vpv.fpca.s2	167	0.34	0.71	0.25	0.31	-1.63	2.33	3.96	0.3	0.22
vpv.fpca.s3	167	0.18	0.48	0.18	0.16	-2	1.8	3.81	0.08	3.3
vpv.fpca.s4	167	0.12	0.38	0.15	0.15	-1.6	0.84	2.44	-1.52	4.58
vpv.fpca.s5	167	0.01	0.53	0.11	0.07	-2.49	0.91	3.4	-1.62	3.79
vpv.fpca.s6	167	0.03	0.67	0.15	0.1	-3.27	1.49	4.77	-1.25	3.12
vpv.fpca.s7	167	0.24	0.84	0.29	0.27	-3.09	2.38	5.47	-0.55	0.97
ato.fpca.s1	167	0.24	0.65	0.28	0.25	-1.8	2.25	4.06	-0.17	0.89
ato.fpca.s2	167	0.4	0.61	0.29	0.37	-1.25	2.25	3.51	0.46	0.49
ato.fpca.s3	167	0.49	0.66	0.42	0.45	-1.47	2.8	4.27	0.62	0.98
ato.fpca.s4	167	0.49	0.63	0.45	0.47	-1.22	2.26	3.48	0.26	0.23
ato.fpca.s5	167	0.56	0.62	0.49	0.54	-0.89	2.5	3.39	0.42	0.21
ato.fpca.s6	167	0.59	0.65	0.54	0.56	-0.81	2.67	3.48	0.41	0.15
ato.fpca.s7	167	0.6	0.7	0.55	0.58	-1	2.67	3.68	0.3	0.04
vto.fpca.s1	167	0.17	0.28	0.16	0.17	-0.46	0.88	1.34	0.08	-0.5
vto.fpca.s2	167	0.2	0.38	0.16	0.16	-0.53	2.7	3.23	2.38	11.47
vto.fpca.s3	167	0.17	0.39	0.11	0.15	-0.83	1.93	2.77	0.87	2.14
vto.fpca.s4	167	0.07	0.47	0.07	0.07	-1.21	1.48	2.7	-0.02	0.16
vto.fpca.s5	167	-0.02	0.51	-0.01	-0.01	-1.54	1.56	3.1	-0.2	0.44
vto.fpca.s6	167	0.01	0.52	0.01	0.02	-1.49	1.54	3.03	-0.1	0.25
vto.fpca.s7	167	0.03	0.55	0.05	0.04	-1.57	1.56	3.13	-0.13	0.23

Table S6 Girls: Descriptive statistics of D values (differences between FPCA estimates and reference values) of all milestones for each testing sample (s1–s7) separately.

variable	n	mean	sd	median	trimmed	min	max	range	skew	kurtosis
apv.fpca.s1	167	-0.2	0.5	-0.1	-0.15	-2.47	0.78	3.25	-1.34	2.69
apv.fpca.s2	167	-0.11	0.41	-0.01	-0.06	-1.96	1.24	3.2	-1.26	3.6
apv.fpca.s3	167	-0.08	0.32	0.01	-0.03	-1.42	0.7	2.12	-1.73	4.23
apv.fpca.s4	167	-0.03	0.33	0.03	0.01	-2.85	0.58	3.42	-4.3	30.88
apv.fpca.s5	167	0.05	0.28	0.08	0.07	-2.03	0.63	2.67	-2.56	16.86
apv.fpca.s6	167	0.06	0.3	0.09	0.08	-1.69	0.97	2.65	-1.09	6.17
apv.fpca.s7	167	0.1	0.39	0.1	0.1	-1.98	1.61	3.59	-0.27	6.23
vpv.fpca.s1	167	0.72	1.3	0.59	0.66	-3.11	5.27	8.39	0.57	1.05
vpv.fpca.s2	167	0.66	1.17	0.45	0.55	-3.4	5.57	8.97	1.1	3.45
vpv.fpca.s3	167	0.49	0.95	0.37	0.37	-1.59	6.1	7.69	2.84	12.79
vpv.fpca.s4	167	0.26	0.5	0.3	0.32	-2.74	1.02	3.76	-2.79	12.63
vpv.fpca.s5	167	0.09	0.6	0.27	0.17	-2.34	1.22	3.56	-1.56	2.85
vpv.fpca.s6	167	0.06	0.91	0.27	0.11	-2.47	2.24	4.71	-0.55	-0.1
vpv.fpca.s7	167	0.36	1.2	0.51	0.37	-2.22	3.05	5.27	-0.13	-0.78
ato.fpca.s1	167	0.23	0.52	0.23	0.23	-1.55	2.35	3.9	0.05	2.89
ato.fpca.s2	167	0.33	0.49	0.27	0.3	-1.13	2.41	3.54	0.82	2.46
ato.fpca.s3	167	0.39	0.49	0.33	0.36	-0.6	2.46	3.06	0.89	1.93
ato.fpca.s4	167	0.47	0.51	0.4	0.44	-1.08	2.57	3.66	0.8	1.97
ato.fpca.s5	167	0.55	0.53	0.48	0.51	-0.5	2.65	3.15	0.88	1.15
ato.fpca.s6	167	0.55	0.58	0.46	0.51	-0.55	2.59	3.14	0.72	0.49
ato.fpca.s7	167	0.53	0.61	0.44	0.49	-0.75	2.61	3.36	0.63	0.32
vto.fpca.s1	167	0.15	0.3	0.12	0.13	-0.55	1.6	2.15	1.1	3.54
vto.fpca.s2	167	0.15	0.34	0.11	0.12	-0.68	1.77	2.45	1.17	3.72
vto.fpca.s3	167	0.11	0.39	0.08	0.1	-1	1.39	2.39	0.35	0.79
vto.fpca.s4	167	0.04	0.44	0.02	0.04	-1.22	1.34	2.56	0.02	0.41
vto.fpca.s5	167	0	0.45	0	0	-1.28	1.38	2.66	-0.02	0.32
vto.fpca.s6	167	0.02	0.45	0.04	0.02	-1.25	1.12	2.37	-0.19	-0.12
vto.fpca.s7	167	0.02	0.44	0.05	0.04	-1.2	1.12	2.32	-0.29	-0.27

Table S7 Boys: Descriptive statistics of D values (differences between FPCA estimates and reference values) of all milestones for each testing sample (s1–s7) separately.

variable	n	mean	sd	median	trimmed	min	max	range	skew	kurtosis
apv.sitar.s1	167	-0.06	0.64	-0.05	-0.05	-1.84	1.45	3.29	-0.19	0.2
apv.sitar.s2	167	0.05	0.53	0.04	0.03	-1.33	1.9	3.23	0.44	1.32
apv.sitar.s3	167	0.15	0.62	0.07	0.08	-0.93	3.8	4.73	2.84	13
apv.sitar.s4	167	0.04	0.4	0.03	0.03	-1.05	2.61	3.66	1.67	10.4
apv.sitar.s5	167	0.04	0.4	0.05	0.03	-1.1	2.19	3.29	0.86	5.71
apv.sitar.s6	167	0.11	0.4	0.11	0.08	-0.75	2.43	3.18	1.6	7.43
apv.sitar.s7	167	0.18	0.46	0.14	0.13	-0.61	2.63	3.23	1.77	5.66
vpv.sitar.s1	167	0.37	0.83	0.3	0.35	-2.18	2.66	4.85	0.14	0.22
vpv.sitar.s2	167	0.31	0.77	0.31	0.31	-2.21	2.39	4.61	-0.03	0.29
vpv.sitar.s3	167	0.23	0.76	0.25	0.25	-2.42	2.06	4.48	-0.33	0.35
vpv.sitar.s4	167	0.22	0.8	0.25	0.23	-2.64	2.59	5.22	-0.17	0.58
vpv.sitar.s5	167	0.2	0.84	0.18	0.2	-2.68	2.58	5.26	-0.09	0.52
vpv.sitar.s6	167	0.16	0.83	0.15	0.17	-2.65	2.38	5.04	-0.17	0.46
vpv.sitar.s7	167	0.11	0.81	0.14	0.12	-2.73	2.23	4.96	-0.23	0.49
ato.sitar.s1	167	0.3	0.76	0.31	0.32	-1.9	2	3.9	-0.25	-0.36
ato.sitar.s2	167	0.4	0.64	0.38	0.39	-1.59	1.99	3.58	0.01	0.05
ato.sitar.s3	167	0.51	0.67	0.45	0.46	-1.19	3.62	4.81	1.2	3.64
ato.sitar.s4	167	0.5	0.59	0.46	0.47	-1.21	2.25	3.46	0.28	0.51
ato.sitar.s5	167	0.51	0.65	0.51	0.51	-1.3	2.39	3.69	0.07	0.43
ato.sitar.s6	167	0.58	0.65	0.58	0.56	-1.05	2.62	3.67	0.23	0.35
ato.sitar.s7	167	0.64	0.67	0.61	0.61	-0.91	2.77	3.68	0.38	0.19
vto.sitar.s1	167	0.29	0.45	0.33	0.29	-1.1	1.64	2.74	-0.03	0.34
vto.sitar.s2	167	0.24	0.45	0.33	0.26	-1.18	1.55	2.73	-0.29	0.34
vto.sitar.s3	167	0.2	0.48	0.3	0.22	-1.36	1.58	2.94	-0.45	0.67
vto.sitar.s4	167	0.22	0.48	0.28	0.24	-1.31	1.62	2.92	-0.34	0.61
vto.sitar.s5	167	0.21	0.5	0.28	0.22	-1.34	1.71	3.04	-0.24	0.49
vto.sitar.s6	167	0.18	0.51	0.27	0.19	-1.41	1.74	3.15	-0.23	0.55
vto.sitar.s7	167	0.15	0.53	0.22	0.16	-1.55	1.76	3.31	-0.28	0.61

Table S8 Girls: Descriptive statistics of D values (differences between SITAR estimates and reference values) of all milestones for each testing sample (s1–s7) separately.

variable	n	mean	sd	median	trimmed	min	max	range	skew	kurtosis
apv.sitar.s1	167	-0.14	0.54	-0.08	-0.09	-2.54	0.99	3.53	-1.09	2.37
apv.sitar.s2	167	-0.05	0.4	-0.02	-0.04	-2.02	1.26	3.27	-0.72	3.65
apv.sitar.s3	167	0.03	0.37	0.06	0.03	-1.3	1.96	3.27	0.88	6.7
apv.sitar.s4	167	0.02	0.29	0.04	0.03	-0.76	0.9	1.66	-0.22	0.58
apv.sitar.s5	167	-0.04	0.38	0	-0.01	-3.21	0.62	3.83	-3.59	27.49
apv.sitar.s6	167	-0.04	0.3	-0.02	-0.04	-1.1	1.04	2.14	0.12	1.48
apv.sitar.s7	167	-0.02	0.37	-0.05	-0.04	-1.52	1.6	3.12	0.9	4.33
vpv.sitar.s1	167	0.33	1.14	0.38	0.3	-2.47	3.57	6.03	0.23	-0.35
vpv.sitar.s2	167	0.29	1.04	0.34	0.26	-2.28	3.22	5.5	0.24	-0.28
vpv.sitar.s3	167	0.24	1.01	0.24	0.22	-2.35	2.78	5.14	0.16	-0.46
vpv.sitar.s4	167	0.25	1.1	0.19	0.21	-2.51	4.11	6.61	0.44	0.48
vpv.sitar.s5	167	0.28	1.16	0.24	0.22	-2.57	3.92	6.49	0.43	0.17
vpv.sitar.s6	167	0.28	1.13	0.23	0.23	-2.49	3.65	6.15	0.33	-0.06
vpv.sitar.s7	167	0.26	1.11	0.26	0.22	-2.3	3.48	5.79	0.31	-0.22
ato.sitar.s1	167	0.04	0.64	0.06	0.05	-2.04	2.16	4.2	-0.15	1.21
ato.sitar.s2	167	0.13	0.53	0.09	0.12	-1.59	2.21	3.8	0.26	1.79
ato.sitar.s3	167	0.21	0.51	0.13	0.19	-1.01	2.21	3.22	0.67	1.37
ato.sitar.s4	167	0.21	0.55	0.17	0.18	-1.47	2.19	3.67	0.57	1.11
ato.sitar.s5	167	0.16	0.63	0.15	0.13	-2.57	2.17	4.74	0.06	2.12
ato.sitar.s6	167	0.15	0.6	0.11	0.12	-1.17	2.21	3.38	0.61	0.6
ato.sitar.s7	167	0.17	0.62	0.09	0.13	-1.21	2.25	3.46	0.63	0.46
vto.sitar.s1	167	0.3	0.42	0.27	0.31	-0.94	1.19	2.13	-0.17	-0.36
vto.sitar.s2	167	0.25	0.43	0.24	0.26	-0.99	1.14	2.13	-0.22	-0.25
vto.sitar.s3	167	0.22	0.44	0.21	0.23	-1.12	1.15	2.27	-0.26	-0.07
vto.sitar.s4	167	0.22	0.45	0.24	0.23	-1.15	1.41	2.56	-0.1	-0.21
vto.sitar.s5	167	0.24	0.46	0.29	0.25	-1.14	1.44	2.58	-0.17	-0.29
vto.sitar.s6	167	0.24	0.46	0.26	0.25	-1.11	1.4	2.51	-0.19	-0.3
vto.sitar.s7	167	0.23	0.46	0.26	0.24	-1.05	1.4	2.45	-0.2	-0.23

Table S9 Boys: Descriptive statistics of D values (differences between SITAR estimates and reference values) of all milestones for each testing sample (s1–s7) separately.

Table S10 Results of four Mixed Effects Linear Models analysis of differences (D) between estimates of growth milestones (APV, VPV, ATO, VTO) and their reference values.

The mixed-effects linear models were computed using the Maximum Likelihood estimator (ML) in the R-package *lme4* (Bates et al., 2015). Computation of p-values was based on conditional F-tests with the Kenward-Roger approximation for the degrees of freedom as available in the R-package *pbkrtest* (Halekoh and Hojsgaard 2014). Tables were formatted with the assistance of the *sjPlot* package (Lüdtke, 2021; Nakagawa et al., 2017) and *ggplot2* (Wickham, 2016).

Abbreviations in the MLM tables are as follows:

difference (D)—difference between estimate and the reference (observe) value

samp—individual subjects

met—consecutive observations (1–5)

sex—biological sex (male, female)

apv.ref—reference value of APV

vpv.ref—reference value of VPV

ato.ref—reference value of ATO

vto.ref—reference value of VTO

CI—95% confidence intervals

p—significance of the F-test

df—degrees of freedom

Random effects

σ^2 —random variance estimate

τ_{00} —random intercept variance

τ_{11} —random slope variance

ρ_{01} —random slope-intercept correlation

ICC—intraclass correlation coefficient (proportion of variance explained by a grouping (random) factor - subjects)

N—number of groups (subjects)

R²—coefficient of determination

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<i>Predictors</i>	difference			
	<i>Estimates</i>	<i>CI</i>	<i>p</i>	<i>df</i>
(Intercept)	5.34	4.44 – 6.23	< 0.001	375.03
samp	–0.28	–0.45 – –0.12	0.001	398.07
met [SITAR]	0.86	0.42 – 1.30	< 0.001	4000.00
sex [m]	–1.62	–2.99 – –0.25	0.021	375.03
apv.ref	–0.47	–0.55 – –0.39	< 0.001	375.03
samp * met [SITAR]	–0.03	–0.13 – 0.07	0.521	4000.00
samp * sex [m]	0.31	0.05 – 0.56	0.018	398.07
met [SITAR] * sex [m]	–0.67	–1.36 – 0.01	0.053	4000.00
samp * apv.ref	0.03	0.01 – 0.04	< 0.001	398.07
met [SITAR] * apv.ref	–0.07	–0.10 – –0.03	0.001	4000.00
sex [m] * apv.ref	0.18	0.07 – 0.29	0.001	375.03
(samp * met [SITAR]) * sex [m]	–0.09	–0.24 – 0.06	0.239	4000.00
(samp * met [SITAR]) * apv.ref	0.00	–0.01 – 0.01	0.785	4000.00
(samp * sex [m]) * apv.ref	–0.03	–0.05 – –0.01	0.010	398.07
(met [SITAR] * sex [m]) * apv.ref	0.06	0.01 – 0.12	0.022	4000.00
(samp * met [SITAR] * sex[m]) * apv.ref	0.01	–0.01 – 0.02	0.400	4000.00
Random Effects				
σ^2	0.04			
τ_{00} ID	0.18			
τ_{11} ID.samp	0.01			
ρ_{01} ID	–0.90			
ICC	0.64			
N ID	334			
Observations	4676			
Marginal R ² / Conditional R ²	0.504 / 0.820			

<i>Predictors</i>	difference			
	<i>Estimates</i>	<i>CI</i>	<i>p</i>	<i>df</i>
(Intercept)	3.62	2.83 – 4.41	<0.001	609.69
samp	0.22	0.05 – 0.39	0.010	662.84
met [SITAR]	2.62	1.81 – 3.43	<0.001	4000.00
sex [m]	–0.25	–1.30 – 0.80	0.638	609.69
vpv.ref	–0.43	–0.53 – –0.32	<0.001	609.69
samp * met [SITAR]	–0.20	–0.39 – –0.02	0.029	4000.00
samp * sex [m]	0.08	–0.14 – 0.30	0.483	662.84
met [SITAR] * sex [m]	1.53	0.45 – 2.61	0.006	4000.00
samp * vpv.ref	–0.04	–0.06 – –0.01	0.001	662.84
met [SITAR] * vpv.ref	–0.35	–0.45 – –0.24	<0.001	4000.00
sex [m] * vpv.ref	0.14	0.02 – 0.27	0.028	609.69
(samp * met [SITAR]) * sex [m]	–0.02	–0.27 – 0.22	0.841	4000.00
(samp * met [SITAR]) * vpv.ref	0.03	0.00 – 0.05	0.020	4000.00
(samp * sex [m]) * vpv.ref	–0.01	–0.03 – 0.02	0.603	662.84
(met [SITAR] * sex [m]) * vpv.ref	–0.15	–0.28 – –0.02	0.023	4000.00
(samp * met [SITAR] * sex[m]) * vpv.ref	0.01	–0.02 – 0.04	0.688	4000.00
Random Effects				
σ^2	0.27			
τ_{00} ID	0.16			
τ_{11} ID.samp	0.01			
ρ_{01} ID	–0.97			
ICC	0.13			
N ID	334			
Observations	4676			
Marginal R ² / Conditional R ²	0.634 / 0.682			

<i>Predictors</i>	difference			
	<i>Estimates</i>	<i>CI</i>	<i>p</i>	<i>df</i>
(Intercept)	5.42	4.92 – 5.92	<0.001	411.10
samp	0.14	0.04 – 0.24	0.006	436.03
met [SITAR]	0.85	0.53 – 1.17	<0.001	4000.00
sex [m]	–0.55	–1.33 – 0.23	0.168	411.10
ato.ref	–0.57	–0.63 – –0.52	<0.001	411.10
samp * met [SITAR]	–0.23	–0.30 – –0.16	<0.001	4000.00
samp * sex [m]	–0.04	–0.20 – 0.11	0.596	436.03
met [SITAR] * sex [m]	–0.58	–1.09 – –0.08	0.023	4000.00
samp * ato.ref	–0.01	–0.02 – 0.00	0.087	436.03
met [SITAR] * ato.ref	–0.09	–0.13 – –0.06	<0.001	4000.00
sex [m] * ato.ref	0.13	0.05 – 0.21	0.001	411.10
(samp * met [SITAR]) * sex [m]	0.21	0.09 – 0.32	<0.001	4000.00
(samp * met [SITAR]) * ato.ref	0.02	0.02 – 0.03	<0.001	4000.00
(samp * sex [m]) * ato.ref	0.01	–0.01 – 0.02	0.506	436.03
(met [SITAR] * sex [m]) * ato.ref	0.05	0.00 – 0.11	0.038	4000.00
(samp * met [SITAR] * sex[m]) * ato.ref	–0.03	–0.04 – –0.02	<0.001	4000.00
Random Effects				
σ^2	0.03			
τ_{00} ID	0.09			
τ_{11} ID.samp	0.00			
ρ_{01} ID	–0.45			
ICC	0.74			
N ID	334			
Observations	4676			
Marginal R ² / Conditional R ²	0.689 / 0.919			

<i>Predictors</i>	difference			
	<i>Estimates</i>	<i>CI</i>	<i>p</i>	<i>df</i>
(Intercept)	0.19	−0.13 – 0.50	0.240	432.72
samp	0.49	0.45 – 0.54	<0.001	635.98
met [SITAR]	3.23	3.00 – 3.45	<0.001	4000.00
sex [m]	0.97	0.50 – 1.43	<0.001	432.72
vto.ref	0.01	−0.05 – 0.07	0.791	432.72
samp * met [SITAR]	−0.43	−0.48 – −0.38	<0.001	4000.00
samp * sex [m]	−0.21	−0.28 – −0.14	<0.001	635.98
met [SITAR] * sex [m]	−1.11	−1.44 – −0.77	<0.001	4000.00
samp * vto.ref	−0.10	−0.11 – −0.09	<0.001	635.98
met [SITAR] * vto.ref	−0.61	−0.65 – −0.57	<0.001	4000.00
sex [m] * vto.ref	−0.21	−0.31 – −0.12	<0.001	432.72
(samp * met [SITAR]) * sex [m]	0.21	0.14 – 0.29	<0.001	4000.00
(samp * met [SITAR]) * vto.ref	0.09	0.08 – 0.10	<0.001	4000.00
(samp * sex [m]) * vto.ref	0.04	0.02 – 0.05	<0.001	635.98
(met [SITAR] * sex [m]) * vto.ref	0.19	0.12 – 0.25	<0.001	4000.00
(samp * met [SITAR] * sex[m]) * vto.ref	−0.04	−0.05 – −0.02	<0.001	4000.00
Random Effects				
σ^2	0.02			
τ_{00} ID	0.05			
τ_{11} ID.samp	0.00			
ρ_{01} ID	−0.33			
ICC	0.67			
N ID	334			
Observations	4676			
Marginal R ² / Conditional R ²	0.644 / 0.881			

	numDF	denDF	F-value	p-value
(Intercept)	1	4330	633.755	<0.0001
samp	1	4330	70.842	<0.0001
met	1	4330	5.469	0.02
sex	1	330	33.383	<0.0001
vpv.ref	1	330	5345.838	<0.0001
samp:met	1	4330	42.93	<0.0001
samp:sex	1	4330	0.312	0.6
met:sex	1	4330	19.939	<0.0001
samp:vpv.ref	1	4330	20.095	<0.0001
met:vpv.ref	1	4330	499.773	<0.0001
sex:vpv.ref	1	330	6.136	0.014
samp:met:sex	1	4330	25.96	<0.0001
samp:met:vpv.ref	1	4330	20.479	<0.0001
samp:sex:vpv.ref	1	4330	0.13	0.7
met:sex:vpv.ref	1	4330	18.186	<0.0001
samp:met:sex:vpv.ref	1	4330	0.161	0.7

Table S11 Analysis of Variance of the Linear Mixed Effects model for differences (D) between estimates and references values of Peak Velocity (VPV) with effects of sample (*samp*, 1–7), sex (*sex*, males, females), estimation method (*met*, FPCA, SITAR), and reference VPV (*vpv.ref*, in cm per year), including all interactions.

	numDF	denDF	F-value	p-value
(Intercept)	1	4330	199.064	<0.0001
samp	1	4330	151.1493	<0.0001
met	1	4330	1018.19	<0.0001
sex	1	330	0.002	0.96
vto.ref	1	330	701.3529	<0.0001
samp:met	1	4330	52.1274	<0.0001
samp:sex	1	4330	7.3955	0.007
met:sex	1	4330	31.1382	<0.0001
samp:vto.ref	1	4330	297.9201	<0.0001
met:vto.ref	1	4330	1084.619	<0.0001
sex:vto.ref	1	330	2.2175	0.14
samp:met:sex	1	4330	0.1006	0.75
samp:met:vto.ref	1	4330	360.9978	<0.0001
samp:sex:vto.ref	1	4330	9.2265	0.002
met:sex:vto.ref	1	4330	7.868	0.0051
samp:met:sex:vto.ref	1	4330	22.6918	<0.0001

Table S12 Analysis of Variance of the Linear Mixed Effects model for differences (D) between estimates and references values of Velocity at Take-off (VTO) with effects of sample (*samp*, 1–7), sex (*sex*, males, females), estimation method (*met*, FPCA, SITAR), and reference VTO (*vto.ref*, in cm per year), including all interactions.