

**Table II.** Characteristics of different tests and test populations for upper- and lower-body anaerobic exercise capacity

Device	Test	Study, Spec. ref.	Impairment	Athletes	Time since impairment	Measurement device; setting		
<i>Upper body</i>								
ACE	mWAnT	5 s 21	SCI (C5–C7)	Yes	Unknown	Modified leg cycle ergometer (Ergomic 620, Monark, Vansbro, Sweden)		
		10 s 22	SCI, poliomyelitis, amputation, lower-limb amelia, spina bifida, femur agenesis	Yes	Unknown	Electrically braked ergometer (Lode, Groningen, The Netherlands)		
		30 s 17	SCI (paraplegia), amputations (transtibial, transfemoral), polio	Yes/No	Unknown	Arm crank ergometer (Fleish Metabo, Geneva, Switzerland)		
			Unknown	Yes	4.2 (2.4) years/2.5 (1.9) years	Wheelchair ergometer (Ergomic 891E, Monark)		
			SCI, polio, amputation	Yes	Unknown	Arm crank ergometer (MET-300, Cybex, Massachusetts, USA)		
			SCI (paraplegia), amputations, polio	Yes	Unknown	Arm crank ergometer (Fleish Metabo)		
			SCI (T6–T10)	No	Unknown	Modified leg cycle ergometer (834E, Monark)		
			SCI (C5–C7)	No	C5 8.2 (3.9), C6 10.0 (7.2), C7 10.6 (7.4) years	Modified leg cycle ergometer (834E, Monark)		
			SCI (C5–C7)	No	>1 years	Modified leg cycle ergometer (834E, Monark)		
		SCI (T2–T12)	No	8.1 (7.1) years	Modified leg cycle ergometer (834E, Monark)			
		SCI (C5–C8)	No	>1 years	Modified leg cycle ergometer (834E, Monark)			
		SCI (C5–C7)	No	>1 years	Arm crank ergometer (Angio, Lode)			
		SCI (T5–T12)	No	13.1 (6.6) years	Table-mounted ergometer 834E (Monark)			
		SCI, polio, amputation	Yes	Unknown	Arm crank ergometer (Monark 891E)			
		MW-HIE	–	22	SCI, poliomyelitis, lower-limb amputation, lower-limb amelia, spina bifida, femur agenesis	Yes	Unknown	Isopower arm crank ergometer (Ergometrics 800, Ergoline, Bitz, Germany)
		FV- relationship	–	34	Able-bodied, lower-limb amputation, SCI (thoracic), paraplegias (Heine-Medin disease), CP, developmental defect of lower limbs	Yes/No	Unknown	Modified leg cycle ergometer (838E, Monark)
		WCE	mWAnT	8 s 35	Able-bodied	No	na	Standard wheelchair (Quickie EX, Nieuwegein, The Netherlands); friction braked ergometer (VP100H, HEF Tecmachiene, Andrézieux-Bouthéon, France)
				20 s 36	Able-bodied	No	na	Wheelchair ergometer (Niesing et al. (92)); individually adjusted
				30 s 37	SCI (C6–T12), polio	Yes	4–8 years (SCI), 29 years (polio)	Own wheelchair; clamped onto a set of rollers
SCI (C4–L5)	No				C4–C8 14.6 (8.8), T1–T5 15.3 (8.5), T6–T10 10.8 (8.4), T11–L5 7.3 (6.2) years	Wheelchair ergometer (Niesing et al. (92))		
38	SCI (C6–L3/4)			No	141 (66) days	Wheelchair ergometer (Niesing et al. (92))		
39	SCI (C6–L3/4)			No	331 (142) days	Wheelchair ergometer (Niesing et al. (92))		
40	SCI (C4–L4)			No	Unknown	Wheelchair ergometer (Niesing et al. (92))		
41	SCI (T4–L1), amputation (transfemoral), spina bifida, polio			Yes	Unknown	Computerized wheelchair ergometer (Bromakin UK, Loughborough, United Kingdom); own basketball sports wheelchair		
42	SCI (T5–L3), polio			Yes	Unknown	Computer motor-driven wheelchair ergometer (Sopur Ergotronic 9000); own sport wheelchair		
43	Polio, MS, SCI, transtibial amputation			Yes	Unknown	Motor-driven roller device (WILLY, health reliability, Israel); own sport wheelchairs		
44	SCI (C4/5–L5)			No	11.1 (8.2) years	Stationary wheelchair ergometer; own daily wheelchair		
45	SCI (paraplegia, tetraplegia)			Yes/No	8.7 (8.7) and 6.0 (6.5) years	Wheelchair ergometer (Niesing et al. (92))		
46	SCI (paraplegia)			Yes	Unknown	Friction braked wheelchair ergometer; own wheelchair sat		
47	SCI (paraplegia)			Yes	Unknown	Wheelchair ergometer (Niesing et al. (92))		
48	Spina bifida, CP, SCI (T3–L4), polio, amputation			Yes	16.7 (9.89) years	Computerized roller wheelchair ergometer		
49	Able-bodied			No	na	Computer-controlled stationary wheelchair ergometer		
50	Able-bodied			No	na	Wheelchair ergometer (Niesing et al. (92))		
51	Able-bodied	No	na	Wheelchair ergometer (Niesing et al. (92)); standardized settings				
52	Poliomyelitis, spina bifida, hemiplegia, knee arthrosis, SCI (C6–S1), above-knee amputation uni- and bi-lateral	Yes	Unknown	Wheelchair ergometer (Niesing et al. (92)); standardized settings				
53	SCI (C5–S1), poliomyelitis, spina bifida, knee arthrosis, hemiplegia, above-knee amputations uni- and bi-lateral	Yes	Unknown	Wheelchair ergometer (Niesing et al. (92))				
54	Able-bodied and SCI (T8 and lower)	No	na, unknown	Wheelchair ergometer (Niesing et al. (92))				
55	SCI (C5–C7)	Yes	10 (4) years	Wheelchair ergometer (Bromakin); own wheelchair				

Table II. Cont

Device	Test	Spec.	Study, ref.	Impairment	Athletes	Time since impairment	Measurement device; setting	
Wheelchair overground	Sprint test	5 s	56	SCI (paraplegia), spina bifida, short femur, hip deviations, spastic legs	Yes	Unknown	Wheelchair ergometer (Niesing et al. (92))	
		10 s	46	SCI (paraplegia)	Yes	Unknown	Friction braked wheelchair ergometer; own wheelchair sat	
			57	SCI (incomplete, L1)	Yes	Unknown	Stationary roller wheelchair ergometer (Bromakin); own wheelchair	
	Sprint test	20 s	58	Able-bodied	No	na	Basketball wheelchair (Quickie GPV)	
		30 s	48	Spina bifida, CP, SCI (T3–L4), polio, amputation	Yes	16.7 (9.89) years	Unknown	
		5 m	59	SCI, spina bifida, CP, phocomelia, poliomyelitis	Yes	13.1 (9.4) years	Own sports wheelchair	
			60	SCI, knee injury, amputation, spina bifida, hypoplastic right heart syndrome, poliomyelitis, rheumatoid arthritis, shattered calcaneus, complex regional pain syndrome	Yes	Unknown	Unknown	
		15 m	50	Able-bodied	No	na	Daily wheelchair (Sopur Starlight 622, Sunrise Medical, Nieuwegein, The Netherlands)	
			61*	SCI (paraplegia and tetraplegia)	No	11.8 (11.4) years	Own wheelchair or a laboratory chair fitted to the anthropometrics	
			20 m	62	SCI (paraplegia and tetraplegia)	No	>10 years	Own wheelchair with instrumented wheel
				48	Spina bifida, CP, SCI (T3–L4), polio, amputation	Yes	16.7 (9.89) years	Unknown
				63	SCI (T9–L4), motor neuropathy, spina bifida, brittle bones, amputations, myalgic encephalomyelitis, club foot	Yes	Unknown	Adjustable sport wheelchair (TOP End Transform); sports hall with wooden spring flooring
				64	SCI (lower than T9), amputations	Yes	Unknown	Adjustable sport wheelchair (TOP End Transformer); sports hall with wooden spring flooring
		65	SCI, amputation, polio, dermoid cyst, Legg–Calvé–Perthes, dysplasia, spina bifida, cauda equina syndrome	Yes	Unknown	Synthetic indoor court		
		66	SCI, CP, osteogenesis imperfect, distal-limb weakness, vanishing white matter disease	Yes	Unknown	Wireless time gates (Brower, UT, Draper, USA)		
75 m	67	Able-bodied and SCI (nr)	No	20 (9.9) years	Able-bodied; standard non-adjustable multisport MW (Invacare Kuschall); SCI used their own personalized multisport MW			
Wheelchair treadmill	Sprint test	100 m	46	SCI (paraplegia)	Yes	Unknown	Friction braked wheelchair ergometer; own wheelchair sat	
		15 m	68*	SCI (paraplegia, tetraplegia)	No	Unknown	Wheelchair (Sopur Starlight)	
Lower body Bicycle ergometer	mWAnT	30 s	69	CP	No	Unknown, age range 18–65	Excalibur bicycle ergometer (Lode)	
			70	Able-bodied, CP	Yes/No	na, age 18–49 years	Excalibur bicycle ergometer (Lode)	
			71	Able-bodied, CP	Yes/No	Unknown	Velotron Dynafit Pro (Racermate Inc., .: Seattle, USA)	
Recumbent ergometer	mWAnT	9 s	72	CVA (hemiplegia)	No	83.2 (53.0) days	StrengthErgo (Mitsubishi Electric Engineering Company, Tokyo, Japan); standardized settings	
No device	Sprint test	10 m	73	Amputation (unilateral, transtibial)	Yes	Unknown	Light gates (Tumer Electronic, Turkey); crutches without prostheses	
		20 m	73	Amputation (unilateral, transtibial)	Yes	Unknown	Light gates (Tumer Electronic); crutches without prostheses	
		25 m	74	CVA	No	2.5 years	–	
		30 m	73	Amputation (unilateral, transtibial)	Yes	Unknown	Light gates (Tumer Electronic); crutches without prostheses	
	Jump test	Counter movement	73	Amputation (unilateral, transtibial)	Yes	Unknown	Force plate (Tumer Electronic); crutches without prostheses	
			75	Amputation (unilateral, transtibial)	Yes/No	Athletes: 12.2 (7.2) years Non-athletes: 13.7 (7.7) years	–	
	Squad	73	Amputation (unilateral, transtibial)	Yes	Unknown	Force plate (Tumer Electronic); crutches without prostheses		

\*Test is part of a larger test battery, test result not individually analysed.

ACE: arm crank ergometer; WCE: wheelchair ergometer; mWAnT: modified Wingate protocol; MW-HIE: Mechanical Work in a High Intensity Exhaustion Exercise Test; FV-relationship: force velocity relationship; SCI: spinal cord injury; na: not applicable.