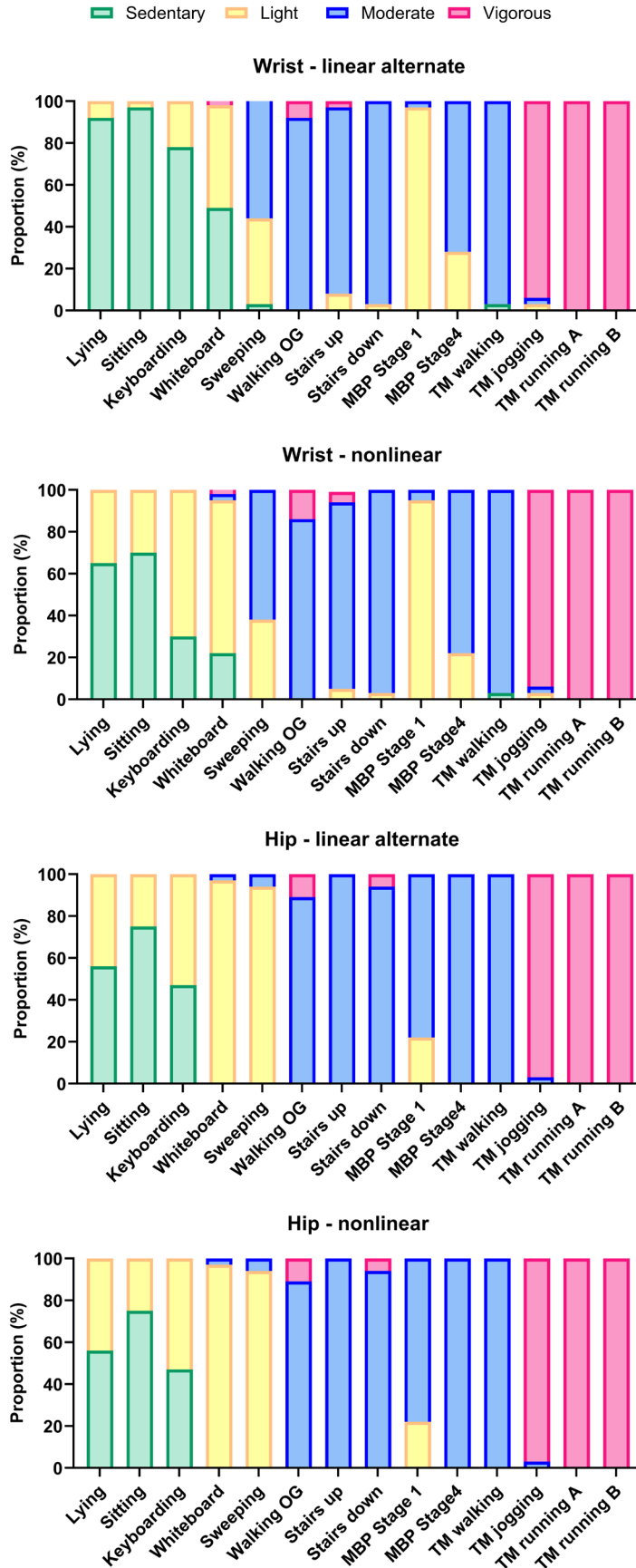


Additional File 1, Table S1. Weighted mean (SD) estimates of oxygen consumption and corresponding intensity classification for tasks used to estimate VO₂ based on previous studies.

Activity	Energy Expenditure Estimate (mLO ₂ /kg/min)	Total N	References
Lying down	3.33 (0.15) Sedentary	357	Bandyopadhyay & Chattopadhyay [1]; Barkley & Penko [2]; Crouter, Clowers, et al. [3]; Kozey, Lynden, et al. [4]; Kozey, Lynden, et al. [5]
Sitting quietly	4.09 (1.09) Sedentary	117	Anjos, Wohrlich, et al. [6]; Bandyopadhyay & Chattopadhyay [1]; Dafour [7]; deGuzman, Cabrera, et al. [8]; deGuzman, Dominguez, et al [9]
Keyboarding	4.50 (1.46) Sedentary to Light	68	Crouter, Clowers, et al. [3]; deGuzman, Cabrera, et al. [8]
Sweeping	11.36 (1.29) Light to Moderate	356	Bains, Kaur et al. [10]; Bassett, Ainsworth, et al. [11]; Foxhoven, Berg, et al., 2001[12]; Gunn, van der Ploeg, et al. [13]; Gunn, Brooks, et al. [14]; Kozey, Lynden, et al. [4]; Kozey, Lynden, et al. [5]; Kuriyan, Easwaran, et al. [15]; Norgan, Ferro-Luzzi, et al. [16]; Rao, Gokhale, et al. [17]; Torun, McGuire, et al.[18]; Welk, Blair, et al. [19]; Withers, Brooks, et al. [20]
Window washing (Whiteboard erasing)	12.29 (1.28) Light to Moderate	276	Brown, Ringnet, et al. [21]; Crouter, Clowers, et al. [3]; Gunn, Brooks, et al. [14]; Gunn, Brooks, et al. [22]; Gunn, van der Ploeg, et al. [13]; Hendelman, Miller, et al. [23]; Withers, Brooks, et al. [20]
Walking over-ground (~3.5 mph)	15.22 (1.03) Moderate	771	Anjos, Wohrlich et al. [6]; Campbell, Crocker, et al. [24]; Chaloupka, Kang et al. [25]; Crouter, Clowers, et al. [3]; de Guzman, Cabrera et al. [8]; de Guzman, Dominguez et al.[9]; Kozey, Lynden, et al. [4]; Kozey, Lynden, et al.[5]; Minetti, Ardigo et al. [26]; Yngve, Nilsson et al. [27]
Ascending stairs	30.12 (6.99) Vigorous	489	Aziz & Teh [28]; Bassett, Vachon, et al. [29]; Campbell, Crocker et al. [24]; Cole & Ogbe [30]; Crouter, Clowers, et al. [3]; Edholm and Fletcher [31]; Kozey, Lynden, et al. [5]; Teh & Aziz [32]; Yue, Woo et al. [33]
Descending stairs	13.92 (1.30) Moderate	560	Bassett, Vachon et al. [29]; Jones, Chak, et al. [34]; Kozey, Lynden, et al. [4]; Kozey, Lynden, et al. [5]; Teh & Aziz [32]

Activity	Energy Expenditure Estimate (mLO ₂ /kg/min)	Total N	References
Treadmill walking (3 mph)	12.77 (0.72) Moderate	882	Abel, Hannon et al. [35]; Brown & Weir [36]; Crouter, Clowers et al. [3]; Dal, Erdogan et al. [37]; Dufour [38]; Gunn, Brooks, et al. [14]; Gunn, Brooks, et al. [22]; Gunn, van der Ploeg et al. [13]; Haymes & Byrnes [39]; Kang, Chaloupka et al. [40]; Kozey, Lynden, et al. [4]; Kozey, Lynden, et al. [5]; Minetti, Ardigo et al. [26]; Welk, Blair et al. [19]; Yngve, Nilsson et al. [27]
Treadmill jogging (5 mph)	29.70 (2.20) Vigorous	63	Haymes & Byrnes [39]; Minetti, Ardigo et al. [41]; Sentija & Markovic [42]; Sherman, Morris, et al. [43]
Treadmill running (6 mph)	33.21 (3.29) Vigorous	203	Abel, Hannon et al. [35]; Crouter, Clowers et al. [3]; Haymes & Byrnes [39]; Mayhew, 1977 [44]; Minetti, Ardigo et al. [41]; Sherman, Morris, et al. [43]; Welk, Blair et al. [19]; Wulff, Cochrane, et al. [45]; Wyndham, Strydom, et al. [46]
Treadmill running (7 mph)	36.78 (3.56) Vigorous	145	Abel, Hannon et al. [35]; Crouter, Clowers, et al. [3]; Haymes & Byrnes [39]; Mayhew [44]; Mercer, Dolgan, et al. [47]; Minetti, Ardigo, et al. [41]; Wulff, Cochrane, et al. [45]; Wyndham, Strydom, et al. [46]
Treadmill running (8 mph)	40.96 (1.61) Vigorous	79	Costill, Thomason, et al. [48]; Haymes & Byrnes [39]; Mayhew [44]; Mercer, Dolgan et al. [47]; Wyndham, Strydom, et al. [46]
Treadmill running (9 mph)	43.72 (2.36) Vigorous	80	Costill, Thomason, et al. [48]; Mayhew [44]; Mayhew & Andrew [49]; Mercer, Dolgan et al. [47]; Wyndham, Strydom, et al. [46]
Treadmill running (10 mph)	48.29 (4.92) Vigorous	54	Costill, Thomason, et al. [48]; Mayhew [44]; Mayhew & Andrew [49]; Wyndham, Strydom, et al. [46]

Figure S1.



Additional File 1, Figure S1. Linear – alternate and nonlinear activity intensity category distribution (% of individuals) for each task, classified as sedentary (green; ≤ 1.5 Metabolic equivalents, METs); light (yellow; > 1.5 to < 3.0 METs); moderate (blue; ≥ 3.0 to < 6.0 METs); and vigorous (pink; ≥ 6.0 METs). Note the use of a 2nd step to identify sedentary behavior improves the agreement with the nonlinear model but appears to result in greater disagreement between wrist and hip estimates for the linear-alternate approach, suggesting the cut-off values are not equivalent. The nonlinear model can identify sedentary intensity levels without needing a secondary means to do so. Note OG = overground; MBP = Modified Bruce Protocol; TM = treadmill; running A = slower speed (6 – 8 mph); running B = faster speed (9 – 10 mph).

Additional File 1, Table S2. Pearson correlations (r) between hip and wrist accelerations by activity and overall.

Activity	r	p-value
Lying down	-.03	0.846
Sitting quietly	.06	0.751
Keyboarding	-.32	0.061
Sweeping	-.13	0.436
Whiteboard erasing	-.06	0.726
Walking over ground (~3.5 mph)	.76	< 0.001
Ascending stairs	.54	< 0.001
Descending stairs	.51	0.001
Treadmill walking (1.7 mph)	.49	0.003
Treadmill walking (2.5 mph, 12%)	.75	< 0.001
Treadmill walking (3 mph)	.57	< 0.001
Treadmill jogging (5 mph) (n=34)	.34	0.049
Treadmill running (6-8 mph) (n=26)	.38	0.054
Treadmill running (9-10 mph) (n=18)	.40	0.097
All tasks	.93	< 0.001

Note: n=36, unless otherwise noted; Significant correlations are bolded ($p < 0.05$).

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