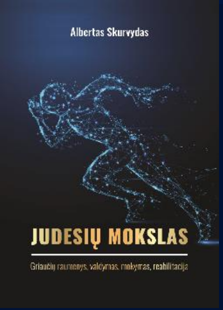
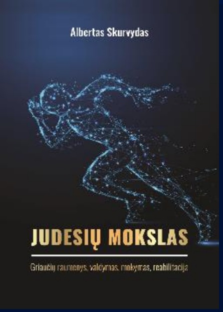
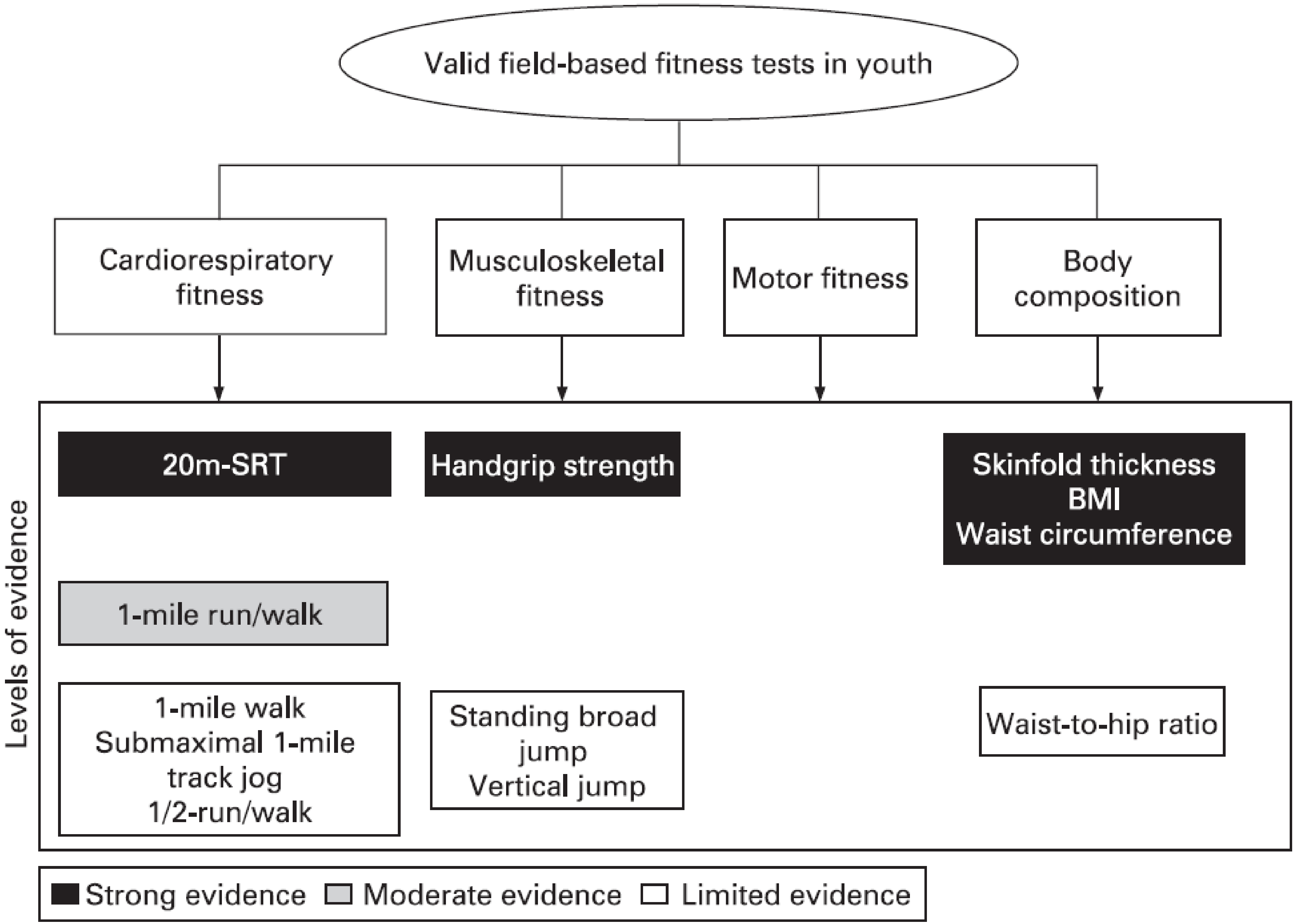


CVF!

Albertas Skurvydas
2022



Įvadas



Valid field-based fitness tests in youth
Cardiorespiratory fitness
Musculoskeletal fitness
Motor fitness
Body composition
Levels of evidence
20m-SRT
Handgrip strength
Skinfold thickness
BMI
Waist circumference
1-mile run/walk
1-mile walk
Submaximal 1-mile track jog
1/2-run/walk
Standing broad jump
Vertical jump
Waist-to-hip ratio
Strong evidence
Moderate evidence
Limited evidence

Journal of Physical Activity and Health, 2019, 16, 1-11
https://doi.org/10.1123/jpah.2018-0618

Human Kinetics
ORIGINAL RESEARCH

The Scientific Foundation for the *Physical Activity Guidelines for Americans*, 2nd Edition

Kenneth E. Powell, Abby C. King, David M. Buchner, Wayne W. Campbell, Loretta DiPietro, Kirk I. Erickson, Charles H. Hillman, John M. Jakicic, Kathleen F. Janz, Peter T. Katzmarzyk, William E. Kraus, Richard F. Macko, David X. Marquez, Anne McTiernan, Russell R. Pate, Linda S. Pescatello, and Melicia C. Whitt-Glover

Table 4 Leading Causes of Death, Most Prevalent Chronic Conditions, and Most Expensive Medical Conditions for Which Greater Participation in Physical Activity Would Be Expected to Reduce Incidence, Prevalence, and Expense Indicated by Shading and Bold Type

Ten leading causes of death[54]	Ten most prevalent chronic conditions[55]	Ten most expensive medical conditions[56]
Heart disease	**Hypertension**	**Heart conditions**
Cancer	**Hyperlipidemia**	**Trauma disorders[a]**
Chronic lung diseases	Upper respiratory conditions[b]	**Cancer**
Unintentional injuries[a]	**Arthritis**	**Mental disorders**
Stroke	**Mood disorders**	Asthma/COPD
Alzheimer's disease	**Diabetes**	**Hypertension**
Diabetes	**Anxiety disorders**	**Type 2 diabetes**
Influenza and pneumonia	Asthma	**Arthritis**
Kidney disease	**Coronary artery disease**	Back problems
Suicide	Thyroid disorders	Healthy childbirth

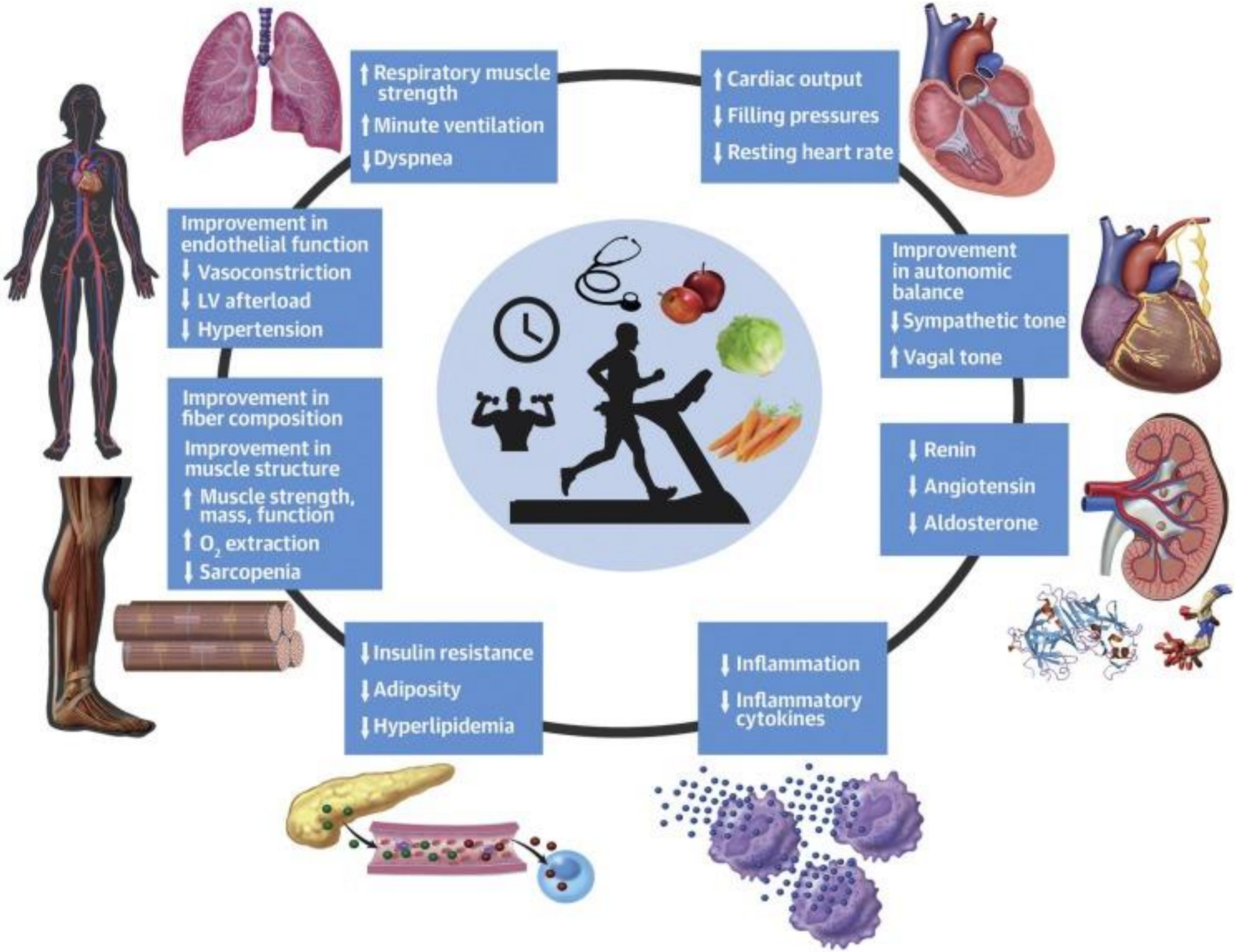
Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015

*GBD 2015 Risk Factors Collaborators**

Leading risks 1990	Leading risks 2005	% change number of DALYs 1990–2005	% change all-age DALY rate 1990–2005	% change age-standardised DALY rate 1990–2005	Leading risks 2015	% change number of DALYs 2005–15	% change all-age DALY rate 2005–15	% change age-standardised DALY rate 2005–15
1 Childhood undernutrition	1 High blood pressure	28·4%	4·4%	–11·0%	1 High blood pressure	11·7%	–1·2%	–13·6%
2 Unsafe water	2 Childhood undernutrition	–48·3%	–58·0%	–46·9%	2 Smoking	1·0%	–10·7%	–21·3%
3 High blood pressure	3 Smoking	16·9%	–4·9%	–17·7%	3 High fasting plasma glucose	22·2%	8·1%	–4·5%
4 Household air pollution	4 High fasting plasma glucose	48·1%	20·5%	4·7%	4 High body-mass index	22·0%	7·9%	–4·9%
5 Smoking	5 Unsafe sex	199·0%	143·2%	155·7%	5 Childhood undernutrition	–38·5%	–45·6%	–42·7%
6 Ambient particulate matter	6 Ambient particulate matter	–9·6%	–26·5%	–23·4%	6 Ambient particulate matter	–4·2%	–15·3%	–21·3%
7 Unsafe sanitation	7 Household air pollution	–21·4%	–36·1%	–31·1%	7 High total cholesterol	8·6%	–4·0%	–16·4%
8 Suboptimal breastfeeding	8 High body-mass index	54·7%	25·8%	8·4%	8 Household air pollution	–20·3%	–29·5%	–33·1%
9 Handwashing	9 Unsafe water	–35·3%	–47·3%	–37·8%	9 Alcohol use	–1·2%	–12·6%	–17·9%
10 High fasting plasma glucose	10 Alcohol use	28·6%	4·6%	–4·7%	10 High sodium	7·2%	–5·2%	–17·0%
11 Alcohol use	11 High total cholesterol	24·9%	1·6%	–13·8%	11 Low whole grains	7·1%	–5·3%	–16·1%
12 High total cholesterol	12 High sodium	27·2%	3·4%	–10·5%	12 Unsafe sex	–29·5%	–37·6%	–37·6%
13 High body-mass index	13 Low whole grains	33·1%	8·2%	–6·4%	13 Low fruit	5·5%	–6·7%	–17·4%
14 High sodium	14 Low fruit	31·7%	7·1%	–7·2%	14 Unsafe water	–26·2%	–34·7%	–32·7%
15 Low whole grains	15 Unsafe sanitation	–38·1%	–49·7%	–40·7%	15 Low glomerular filtration	15·5%	2·2%	–8·6%
16 Low fruit	16 Handwashing	–36·3%	–48·2%	–38·1%	16 Iron deficiency	–4·1%	–15·2%	–12·0%
17 Iron deficiency	17 Iron deficiency	12·6%	–8·4%	–2·8%	17 Low nuts and seeds	13·0%	0	–11·8%
18 Second-hand smoke	18 Suboptimal breastfeeding	–50·0%	–59·3%	–48·5%	18 Handwashing	–26·3%	–34·8%	–32·9%
19 Vitamin A deficiency	19 Low glomerular filtration	31·7%	7·1%	–4·8%	19 Unsafe sanitation	–31·9%	–39·8%	–37·9%
20 Unsafe sex	20 Low nuts and seeds	33·4%	8·5%	–7·0%	20 Low vegetables	4·7%	–7·4%	–18·3%
21 Low glomerular filtration	21 Low vegetables	27·7%	3·8%	–10·6%	21 Low physical activity	17·4%	3·9%	–9·6%
22 Low vegetables	22 Second-hand smoke	–36·1%	–48·0%	–39·2%	22 Suboptimal breastfeeding	–33·7%	–41·4%	–37·8%
23 Low nuts and seeds	23 Low physical activity	32·0%	7·4%	–8·3%	23 Low omega-3	10·4%	–2·3%	–13·8%
24 Low physical activity	24 Low omega-3	29·3%	5·1%	–9·6%	24 Drug use	15·8%	2·4%	–1·0%
25 Low omega-3	25 Drug use	75·3%	42·6%	33·9%	25 Second-hand smoke	–15·9%	–25·6%	–28·1%
26 Zinc deficiency	26 Vitamin A deficiency	–57·4%	–65·3%	–56·3%	26 Occupational ergonomic	10·6%	–2·2%	–7·4%
27 Drug use	27 Occupational ergonomic	23·3%	0·3%	–8·8%	27 High processed meat	13·9%	0·8%	–11·1%
28 Occupational ergonomic	28 Intimate partner violence	76·1%	43·2%	32·5%	28 Intimate partner violence	–10·5%	–20·9%	–23·2%
29 High processed meat	29 High processed meat	32·9%	8·1%	–7·5%	29 Occupational injury	10·5%	–2·3%	–3·1%
30 Occupational injury	30 Occupational injury	27·1%	3·4%	–1·6%	30 High trans fat	14·4%	1·2%	–9·8%
31 Intimate partner violence	31 High trans fat				39 Vitamin A deficiency			
33 High trans fat	36 Zinc deficiency				40 Zinc deficiency			

Environmental
Behavioural
Metabolic

CENTRAL ILLUSTRATION: Mechanisms of Beneficial Effects of Exercise Training and Cardiac Rehabilitation in Patients With Heart Failure



Bozkurt, B. et al. J Am Coll Cardiol. 2021;77(11):1454-69.

>12500 žingsnių per dieną

Labai didelis PA

Didelis PA

10000-12499 žingsniai per dieną

Vidutinis PA

7500-9999 žingsniai per dieną

Mažas PA

5000-7499 žingsniai per dieną

Labai mažas PA

2500-4999 žingsniai per dieną

„Ligotas“ PA

<2500 žingsnių per dieną

MET= 3.5 ml/min/kg

Einat 4.8 k/h greičiu, suvartoja O2 apie 13 ml/min/kg (apie 3.7 MET) nepriklausomai nuo amžiaus, lyties ir treniruotumo!

Apie 15 kg raumenų dirba einant vidutiniu tempu 75 kg Žmogui!

Treniravimo įvadas!

Quantity and Quality of Exercise for Developing and Maintaining Cardiorespiratory, Musculoskeletal, and Neuromotor Fitness in Apparently Healthy Adults: Guidance for Prescribing Exercise

AMERICAN COLLEGE of SPORTS MEDICINE

POSITION STAND

This pronouncement was written for the American College of Sports Medicine by Carol Ewing Garber, Ph.D., FACSM, (Chair); Bryan Blissmer, Ph.D.; Michael R. Deschenes, Ph.D., FACSM; Barry A. Franklin, Ph.D., FACSM; Michael J. Lamonte, Ph.D., FACSM; I-Min Lee, M.D., Sc.D., FACSM; David C. Nieman, Ph.D., FACSM; and David P. Swain, Ph.D., FACSM.

MEDICINE & SCIENCE IN SPORTS & EXERCISE®

TABLE 5. Classification of exercise intensity: relative and absolute exercise intensity for cardiorespiratory endurance and resistance exercise.

	Cardiorespiratory Endurance Exercise											Resistance Exercise
	Relative Intensity				Intensity (% $\dot{V}O_{2max}$) Relative to Maximal Exercise Capacity in METs			Absolute Intensity	Absolute Intensity (MET) by Age			Relative Intensity
Intensity	%HRR or % $\dot{V}O_2R$	% HR_{max}	% $\dot{V}O_{2max}$	Perceived Exertion (Rating on 6–20 RPE Scale)	20 METs % $\dot{V}O_{2max}$	10 METs % $\dot{V}O_{2max}$	5 METs % $\dot{V}O_{2max}$	METs	Young (20–39 yr)	Middle-aged (40–64 yr)	Older (≥65 yr)	% 1RM
Very light	<30	<57	<37	<Very light (RPE < 9)	<34	<37	<44	<2	<2.4	<2.0	<1.6	<30
Light	30–39	57–63	37–45	Very light–fairly light (RPE 9–11)	34–42	37–45	44–51	2.0–2.9	2.4–4.7	2.0–3.9	1.6–3.1	30–49
Moderate	40–59	64–76	46–63	Fairly light to somewhat hard (RPE 12–13)	43–61	46–63	52–67	3.0 to 5.9	4.8–7.1	4.0–5.9	3.2–4.7	50–69
Vigorous	60–89	77–95	64–90	Somewhat hard to very hard (RPE 14–17)	62–90	64–90	68–91	6.0–8.7	7.2–10.1	6.0–8.4	4.8–6.7	70–84
Near–maximal to maximal	≥90	≥96	≥91	≥Very hard (RPE ≥ 18)	≥91	≥91	≥92	≥8.8	≥10.2	≥8.5	≥6.8	≥85

Table adapted from the American College of Sports Medicine (14), Howley (173), Swain and Franklin (344), Swain and Leutholtz (346), Swain et al. (347), and the US Department of Health and Human Services (370).

HR_{max}, maximal HR; % HR_{max}, percent of maximal HR; HRR, HR reserve; $\dot{V}O_{2max}$, maximal oxygen uptake; % $\dot{V}O_{2max}$, percent of maximal oxygen uptake; $\dot{V}O_2R$, oxygen uptake reserve; RPE, ratings of perceived exertion (48).

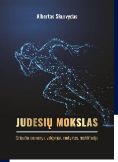
European Heart Journal (2016) 37, 2315–2381
doi:10.1093/eurheartj/ehw106

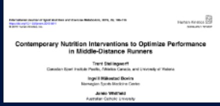
JOINT ESC GUIDELINES

2016 European Guidelines on cardiovascular disease prevention in clinical practice

The Sixth Joint Task Force of the European Society of Cardiology and Other Societies on Cardiovascular Disease Prevention in Clinical Practice (constituted by representatives of 10 societies and by invited experts)

Absolute intensity			Relative intensity		
Intensity	**MET**	**Examples**	**%HRmax**	**RPE (Borg scale score)**	**Talk Test**
Light	1.1–2.9	Walking <4.7 km/h, light household work.	50–63	10–11	
Moderate	3–5.9	Walking briskly (4.8–6.5 km/h), slow cycling (15 km/h), painting/decorating, vacuuming, gardening (mowing lawn), golf (pulling clubs in trolley), tennis (doubles), ballroom dancing, water aerobics.	64–76	12–13	Breathing is faster but compatible with speaking full sentences.
Vigorous	≥6	Race-walking, jogging or running, bicycling >15 km/h, heavy gardening (continuous digging or hoeing), swimming laps, tennis (single).	77–93	14–16	Breathing very hard, incompatible with carrying on a conversation comfortably.





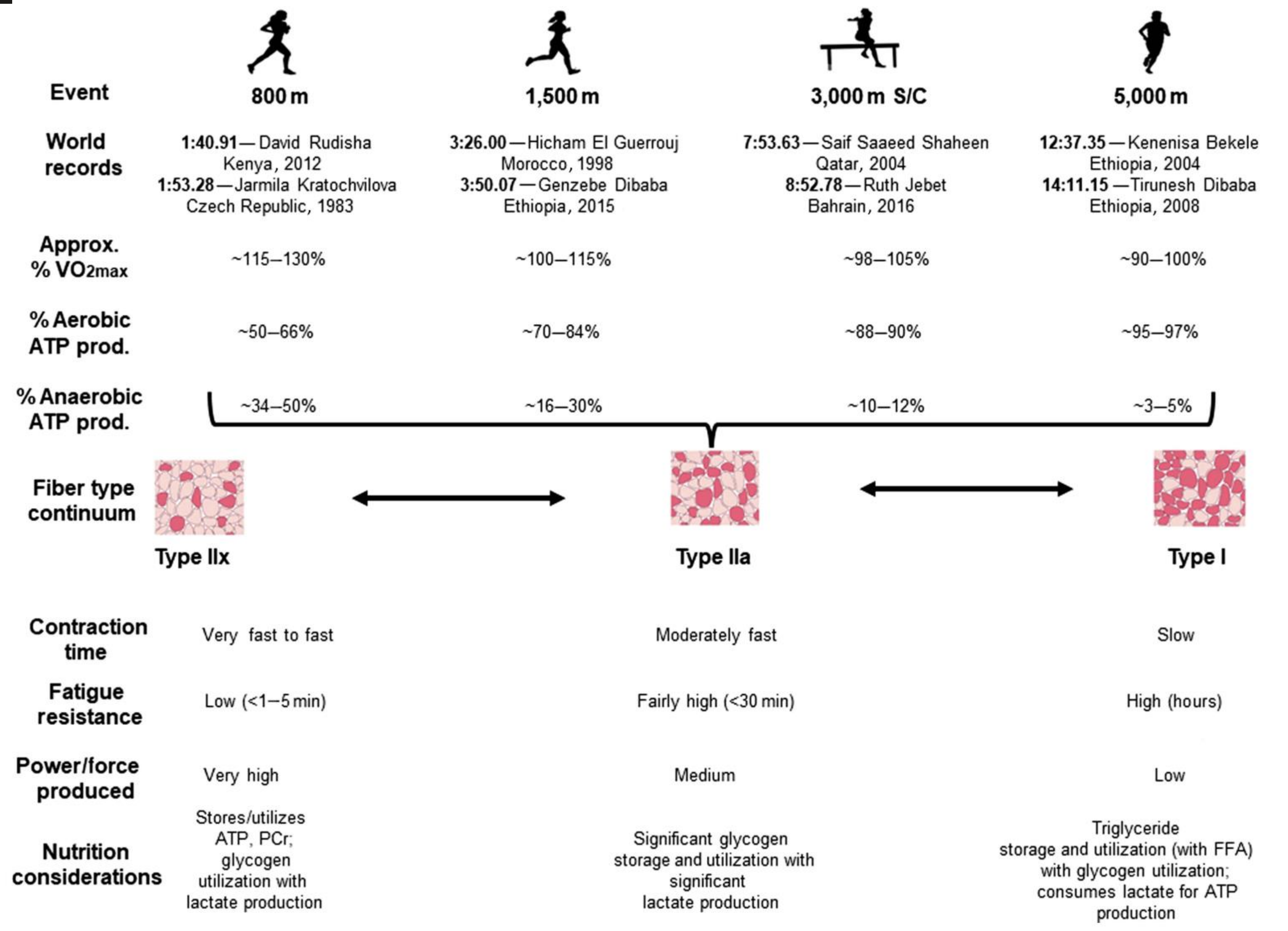


Figure 1 — Differences in ATP energy source provision in middle-distance events within the context of fiber types and endogenous nutrition considerations. It should be noted that fiber typing is a continuum, and only 100- to 400-m athletes have >60% Type IIx fiber types, while most middle-distance athletes Type I fibers range from 40% to 70% (Costill et al., 1976). ATP = adenosine triphosphate; FFA = free fatty acids; PCr = phosphocreatine; prod. = production. Data adapted from Astrand et al. (1986), Costill et al. (1976), Gaston (1998), and Spencer and Gastin (2001).

Aerobic High-Intensity Intervals Improve $\dot{V}O_{2max}$ More Than Moderate Training

JAN HELGERUD[1,2], KJETILL HØYDAL[1], EIVIND WANG[1], TRINE KARLSEN[1], PÅLR BERG[1], MARIUS BJERKAAS[1], THOMAS SIMONSEN[1], CECILIES HELGESEN[1], NINAL HJORTH[1], RAGNHILD BACH[1], and JAN HOFF[1,3]

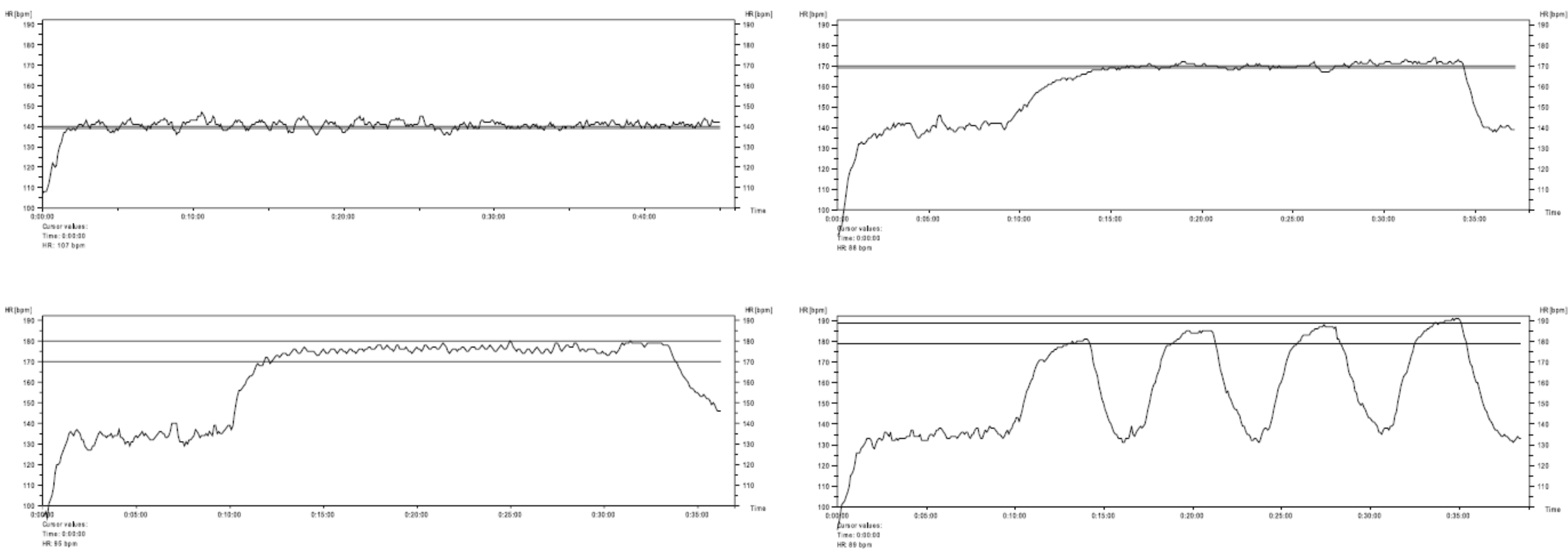


FIGURE 1—Examples of the heart rate response to the four different training regimens in a subject from each group. Subject a (HR_{max} 200 bpm); long slow distance running (LSD) 70% HR_{max}. Subject b (HR_{max} 200 bpm): lactate threshold running (LT), 85% HR_{max}. Subject c (HR_{max} 189 bpm): 15-s interval running at 90–95% HR_{max}, with 15 s of active recovery (15/15). Subject d (HR_{max} 199 bpm): 4 × 4-min interval running at 90–95%, with 3 min of active recovery (4 × 4 min).

Keturi bėgimo bėgimo ištvermės treniravmo mezociklai (po 4 savaites) (Daniels system)

1. Bendorios jėgos ir bendrosios ištvermės treniravimas

2. MDS treniravimo blokas. 95 % MDS intensyvumu. Intervalai: 800-1200 m, kas 2-3 min.

3. LaS treniravimo blokas. Intervalai: 1600-2000 m, kas 2-3 min.

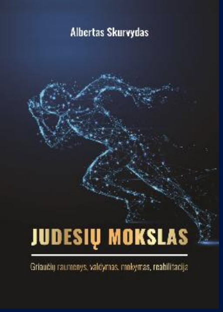
4. Bėgimo ekonomiškumo treniravimo blokas. 400 m bėgti 5 s greičiau nei 5 km bėgimo tempas.

Keli faktai!

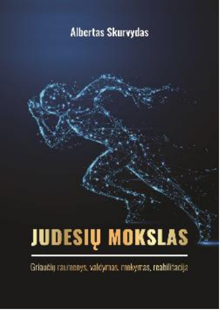
1. MDS priklauso 50 procentų nuo genetikos ir 50 procentų nuo treniruočių.
2. Labai svarbūs genai: PPAR-delta, IGF, ACE, AMPK, EPOR.
3. Tiems, kuriems gerėja dėl treniruočių MDS, tie ir turi didesnį ištermės treniravimo potencialą.
4. MDS apie 50 proc. priklauso sistolinio tūrio per min ir 50 proc. muo raumenų gebėjimo panaudoti O2.
5. Kraujo plazmai padidėjus apie 200-300 mil, MDS padidėja apie 4 proc. Nutraukus 2 savaites treniruotes kraujo plazma sumažėja apie 200-300 mil.
6. Tik mažai teniruotiems atletams padidinus MDS, tiesiogiai padidėja ir bėgimo rezultatas. Pvz., MDS padididėjus nuo 50 iki 60 mil/min/kg, 5 km bėgimas pagerėja nuo 22 min iki 18 min.
7. Dar daug atletų ir trenerių yra įstikinę, kad geriausai MDS treniruoja tik „didelės apimties krūviai“.
8. 4 savaitės HIT. 6X3-3,5 min; MDS pagerėjo 5 proc.
9. Jei Tavo rezultats 5 km bėgimo yra 20 min, tada 100 proc. MDS yra 400 m per 90 s.
10. Kopenhagos tyrimas. A grupė. 100 km nubėgo per sav. (MDS apie 60-80 proc.) B – 50 km (MDS apie 95-100 proc). Tik B pagerėjo MDS (apie 7 proc.).
11. Per paskutinį „piko pasiekimo“ mikrociklą (taikant HIT) bėgimo ekonomiškums pagerėja net apie 6 proc. Bėgimas į kalną ir jėgos treniruotės taip pat gerina bėgimo ekonomiškumą.
12. Kepenys iš laktato pagamina gliukozę. Laktatas greičiau nei gliukozė pereina raumenų membraną.

Keli faktai!

1. Greitumo treniruotės labai gerai pagerina ir 5 km bėgimo rezultatą.
2. Viena iš geriausių ištvermės atletų treniravimo stategijų - sumažinti apie 10-20 ms kontakto trukmę bėgant.
3. 80-120 km per savaitę – tai bėgimo apimtis, po kurios atletams ištvermė mažai gerėja dėl apimties didinimo.
4. 140-150 kartai/min – ŠSD, kuris jau pradeda labai gerai treniruoti ištvermę.
5. 4X15 min 10 proc. aukščiau AnS. Labai geras krūvis anaerobiniam slenksčiui pakelti.
6. Aerobinių fermentų (cytochrome c) gerinimui (ir lėtose, ir greitose RS). Per dieną apie 90 min 80proc MDS. Padidėja rekordiškai fermentų aktyvumas apie 80 procentų.
7. Mitochondrijų kiekiui treniruoti. 3-5x20-30 s (maksimalus intensyvumas), kas 2 min. 8 savaites.
8. MDS pagerina ir laktato panaudojimas, kaip energijos šaltinis, ir mitochondrijų kiekio padidėjimas.
9. Mitochondrijų kiekį per 6 savaites galima padvigubinti, atliekant HIT. Tai stimuliuoja PGC-1alpha.
10. Du kartus per dieną treniruotis, kas antrą dieną – super strategija.
11. Ilgą bėgimą savaitgaliais rekomenduojama, kas antrą ar kas trečią savaitgalį.
12. Ir maratonininkams yra svarbu pagerinti maksimalų bėgimo greitį.
13. 10-12 km, bėgimas į lengvą įkalnę maratoninkams yra super treniruotė.
14. Ekscentrinės jėgos treniravimas bėgikams yra būtinas.
15. Treniruotės apimtis kitą savaitę negali padidėti daugiau nei 10 procentų.
16. Psichologinis rengimas (pastangų sumažinimas) labai pagerina bėgimo rezultatą.


Albertas Skurvydas
JUDESIŲ MOKSLAS
Griaučių raumenys, valdymas, mokymas, reabilitacija

Laktatas!



0+ years of controversy

: A. Brooks[3] and L. Bruce Gladden[4]

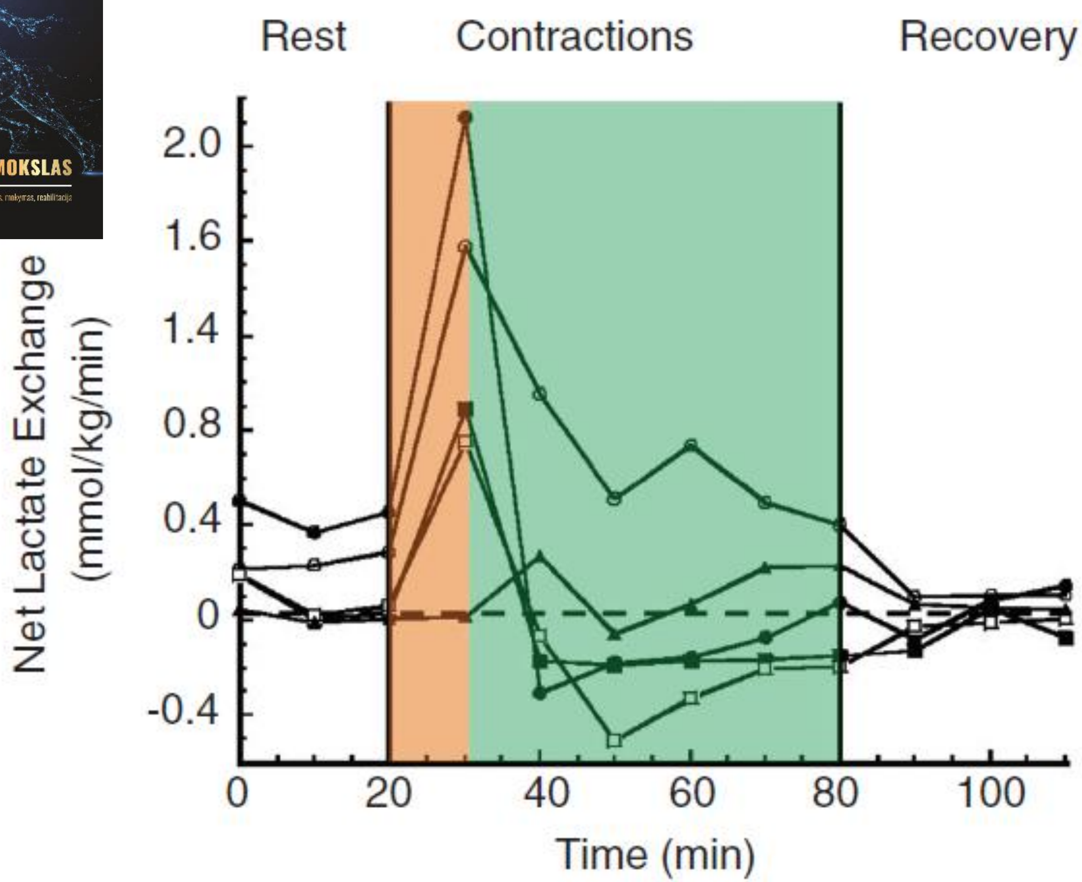
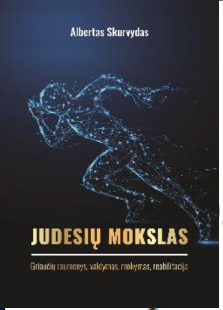


Figure 3. Net La⁻ exchange for isolated, blood-perfused, canine gastrocnemius muscles that were stimulated *in situ* for a period of 60 min

The interesting result was that although net La⁻ release occurred during the first period of the contractions (orange shading), this release decreased and sometimes reversed to net La⁻ uptake (green shading). Redrawn from Welch & Stainsby (1967).



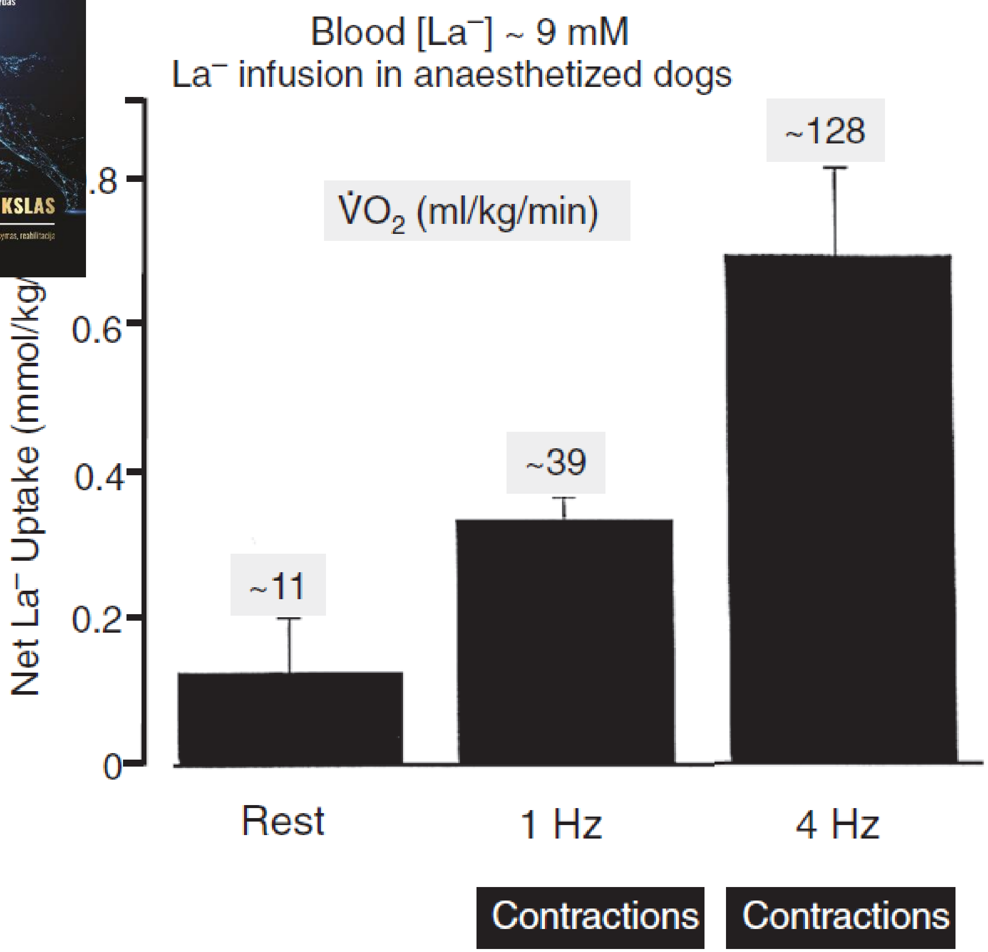
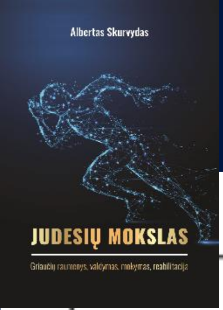


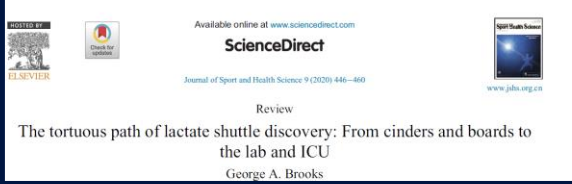
Figure 5. Net La⁻ uptake during rest and contractions in isolated canine skeletal muscle

La⁻ was infused into anaesthetized dogs to a level of about 9 mM. Subsequently, the isolated, blood-perfused, gastrocnemius muscles were either at rest or stimulated to contract at either 1 Hz or 4 Hz. The figure shows net La⁻ uptake *versus* contractile condition with the corresponding $\dot{V}_{O_2}$ above each histogram. Based on steady state data from Gladden (1991).

threshold: 50+ years of controversy

B. Rossiter[2], George A. Brooks[3] and L. Bruce Gladden[4]

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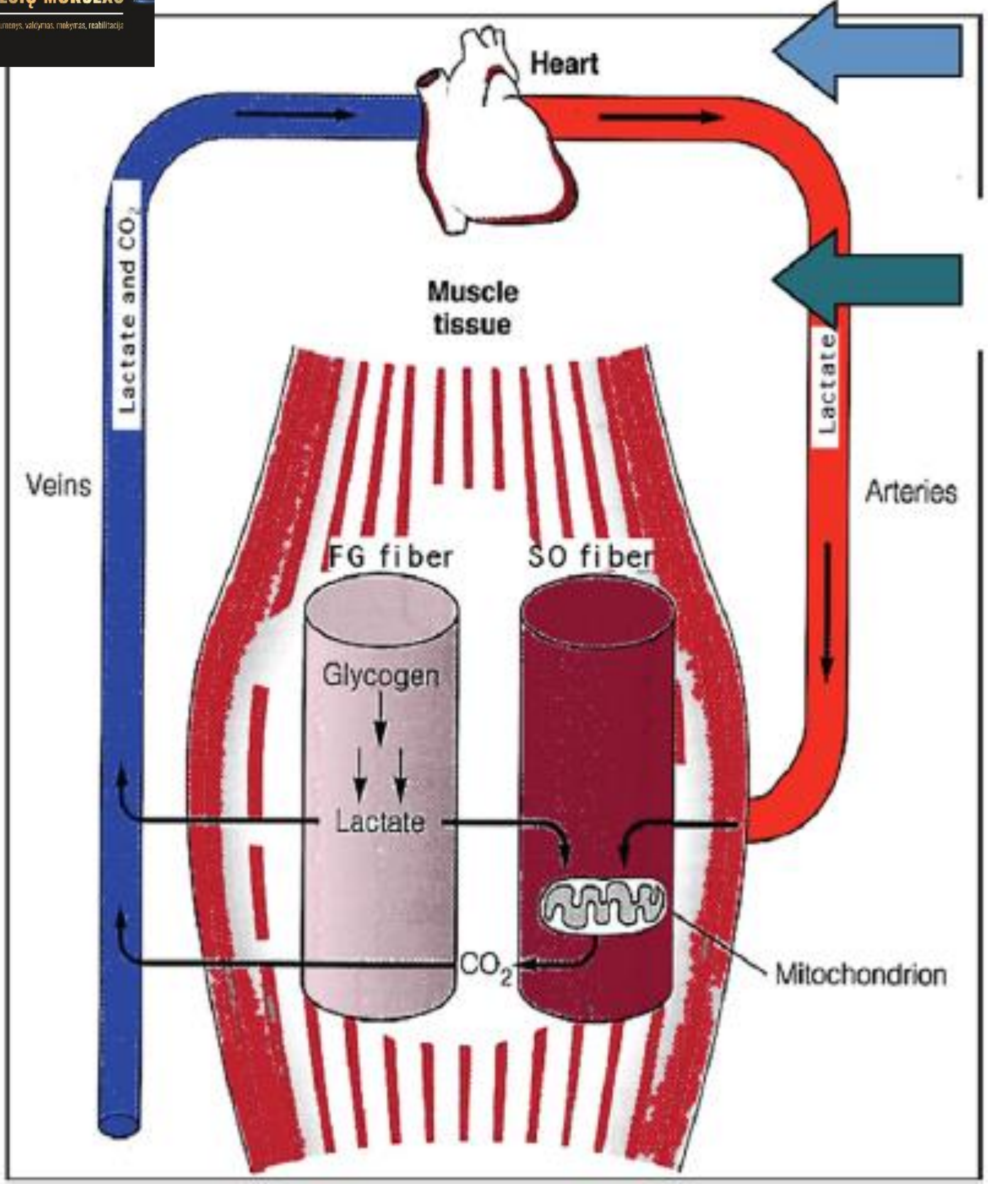
Journal of Sport and Health Science 9 (2020) 446–460
www.jshs.org.cn

Review

The tortuous path of lactate shuttle discovery: From cinders and boards to the lab and ICU

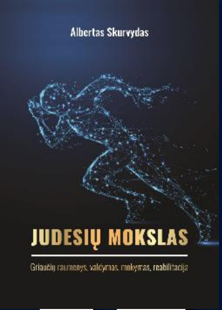
George A. Brooks

Lactate shuttle

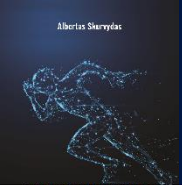


Brain missing

Liver missing



Keli daugiausiai cituojami tyrimai apie CVF!



Minimum amount of physical activity for reduced mortality and extended life expectancy: a prospective cohort study

Chi Pang Wen*, Jackson Pui Man Wai*, Min Kuang Tsai, Yi Chen Yang, Ting Yuan David Cheng, Meng-Chih Lee, Hui Ting Chan, Chwen Keng Tsao, Shan Pou Tsai, Xifeng Wu

Lancet 2011; 378: 1244–53

In this prospective cohort study, 416 175 individuals (199 265 men and 216 910 women)

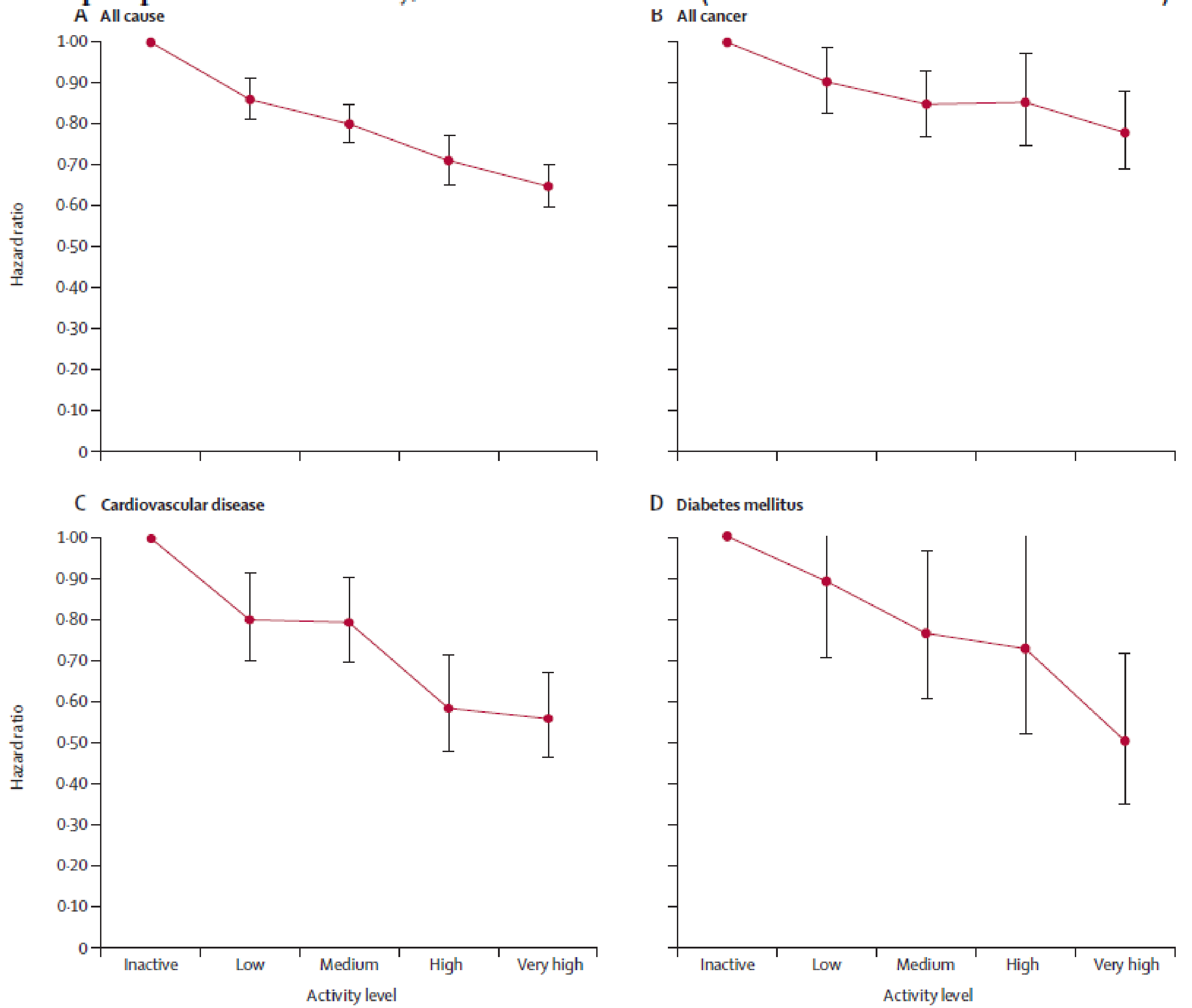


Figure 1: **Relation between physical activity volume and mortality reduction compared with individuals in the inactive group**
Bars show 95% CIs.

JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY
VOL. 64, NO. 5, 2014

ISSN 0735-1097/$36.00
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http://dx.doi.org/10.1016/j.jacc.2014.05.026

EDITORIAL COMMENT

Minimal Amount of Exercise to Prolong Life

To Walk, to Run, or Just Mix It Up?*

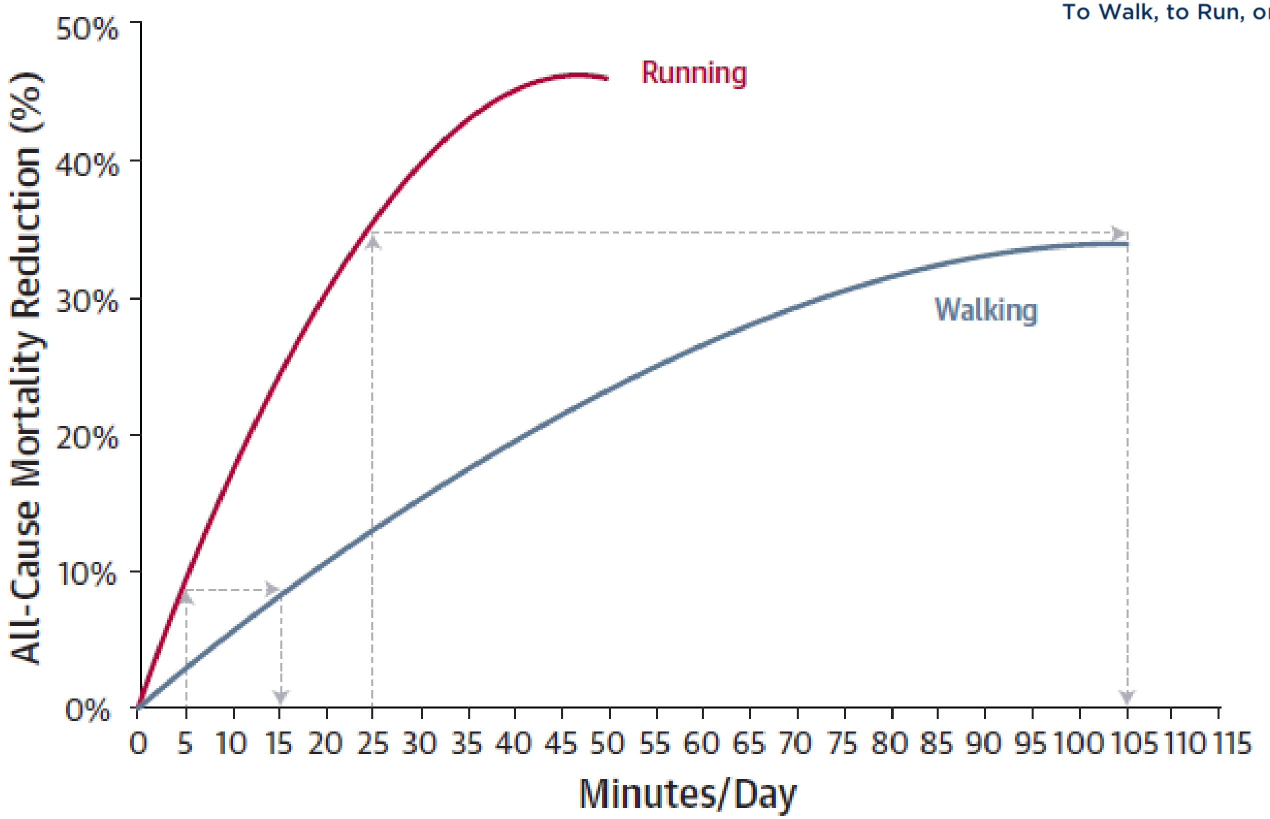


FIGURE 1 Comparison of Benefits Between Walking and Running

A 5-min run generates the same benefits as a 15-min walk, and a 25-min run is equivalent to a 105-min walk.

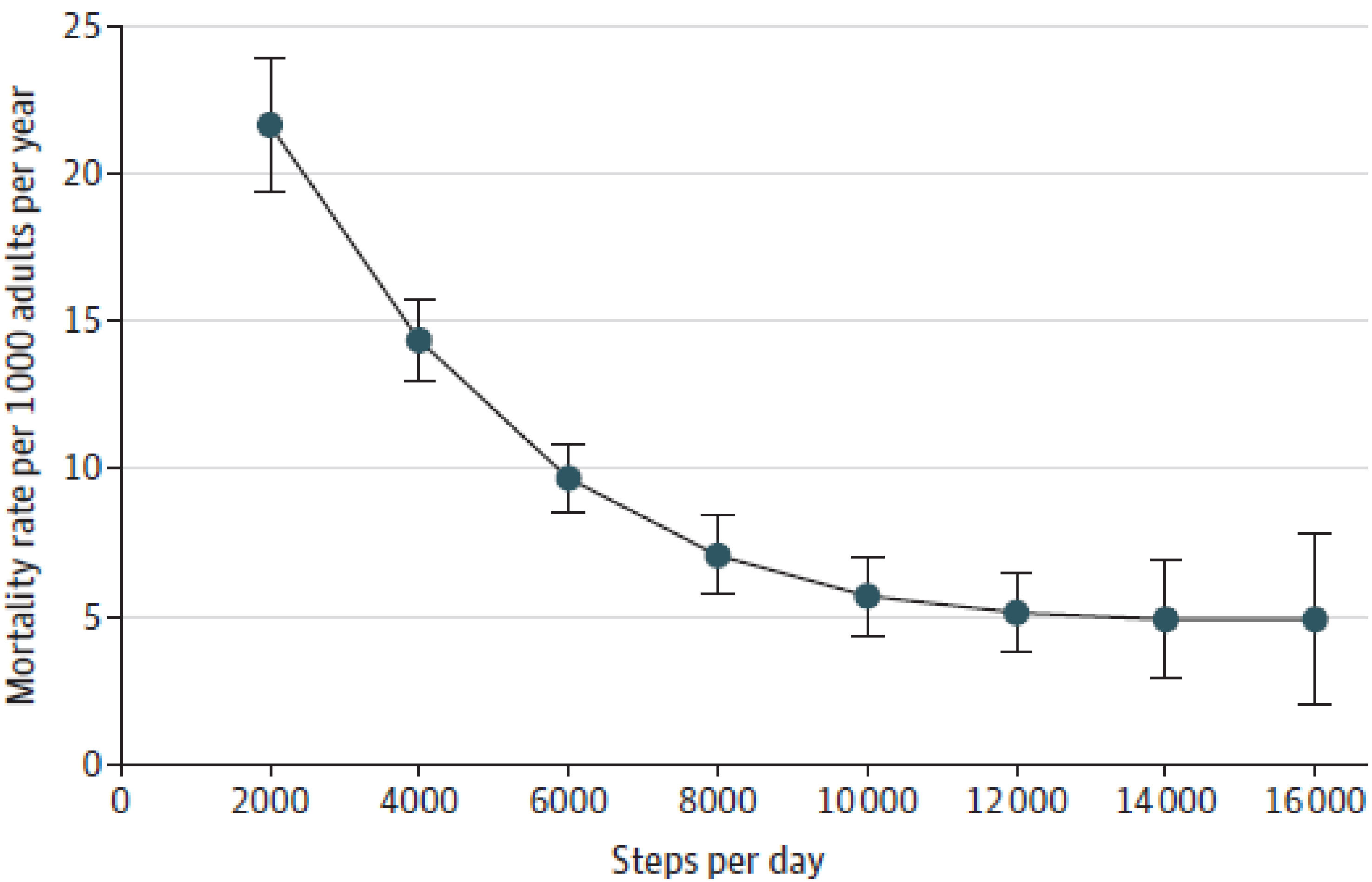
JAMA | Original Investigation

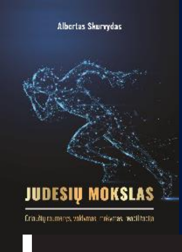
Association of Daily Step Count and Step Intensity With Mortalit Among US Adults

Pedro F. Saint-Maurice, PhD; Richard P. Troiano, PhD; David R. Bassett Jr, PhD; Barry I. Graubard, PhD;
Susan A. Carlson, PhD; Eric J. Shiroma, ScD; Janet E. Fulton, PhD; Charles E. Matthews, PhD

JAMA. 2020;323(12):1151-1160. doi:10.1001/jama.2020.1382

eps per Day and All-Cause Mortality in a Study of the Association of Daily Step Count and Step Intensity With Mortality Among US Adults Aged at Least 40 Years





Cardiorespiratory Fitness as a Quantitative Predictor of All-Cause Mortality and Cardiovascular Events in Healthy Men and Women

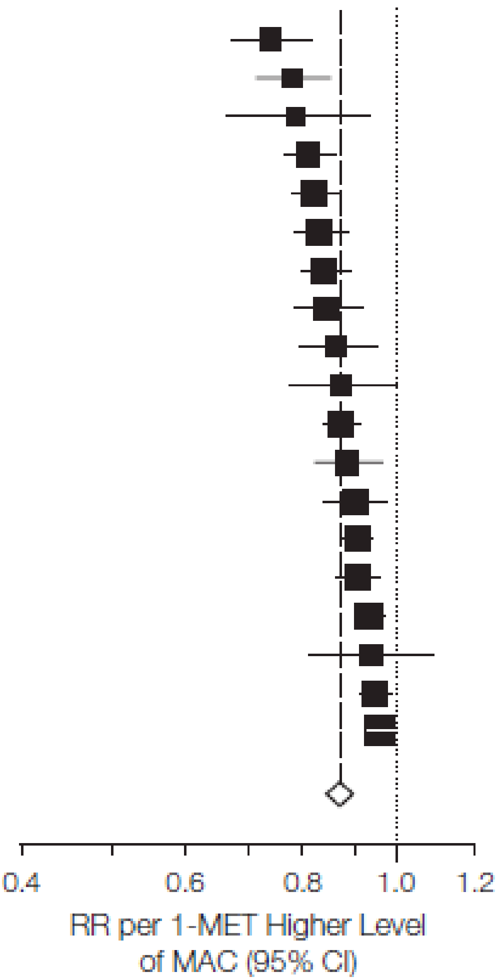
A Meta-analysis

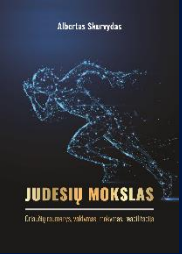
JAMA, May 20, 2009–

Figure 2. Meta-analysis of All-Cause Mortality and CHD/CVD per 1-MET Higher Level of MAC

Source	Weight, %	RR (95% CI)
All-cause mortality		
Erikksen et al,[36] 1998	4.46	0.74 (0.67-0.81)
Aktas et al,[30] 2004	4.52	0.78 (0.71-0.85)
Miller et al,[6] 2005	2.33	0.78 (0.66-0.93)
Katzmarzyk et al,[45] 2005	6.01	0.81 (0.77-0.86)
Laukkanen et al,[8] 2007	5.78	0.82 (0.77-0.87)
Gulati et al,[39] 2005	5.59	0.83 (0.78-0.89)
Myers et al,[47] 2002	5.84	0.84 (0.79-0.89)
Sawada and Muto,[51] 1999	4.85	0.85 (0.78-0.92)
Arraiz et al,[32] 1992	4.45	0.87 (0.79-0.95)
Sandvik et al,[50] 1993	3.38	0.88 (0.77-1.00)
Mora et al,[46] 2003	6.43	0.88 (0.84-0.92)
Stevens et al,[21] 2002 [women]	4.99	0.89 (0.82-0.96)
Farrell et al,[38] 2002	5.27	0.91 (0.84-0.98)
Aijaz et al,[29] 2008	6.64	0.91 (0.87-0.94)
Stevens et al,[22] 2004	6.21	0.91 (0.87-0.96)
Stevens et al,[21] 2002 [men]	6.79	0.94 (0.91-0.97)
Villeneuve et al,[53] 1998	2.84	0.94 (0.81-1.09)
Hein et al,[42] 1992	6.77	0.95 (0.92-0.98)
Slattery and Jacobs,[5] 1988	6.85	0.96 (0.93-0.99)
Overall	100.00	0.87 (0.84-0.90)

Test for heterogeneity: $I^2 = 82.3\%$; $P < .001$





AHA SCIENTIFIC STATEMENT

Importance of Assessing Cardiorespiratory Fitness in Clinical Practice: A Case for Fitness as a Clinical Vital Sign

A Scientific Statement From the American Heart Association

Circulation. 2016;134:e653–e699.

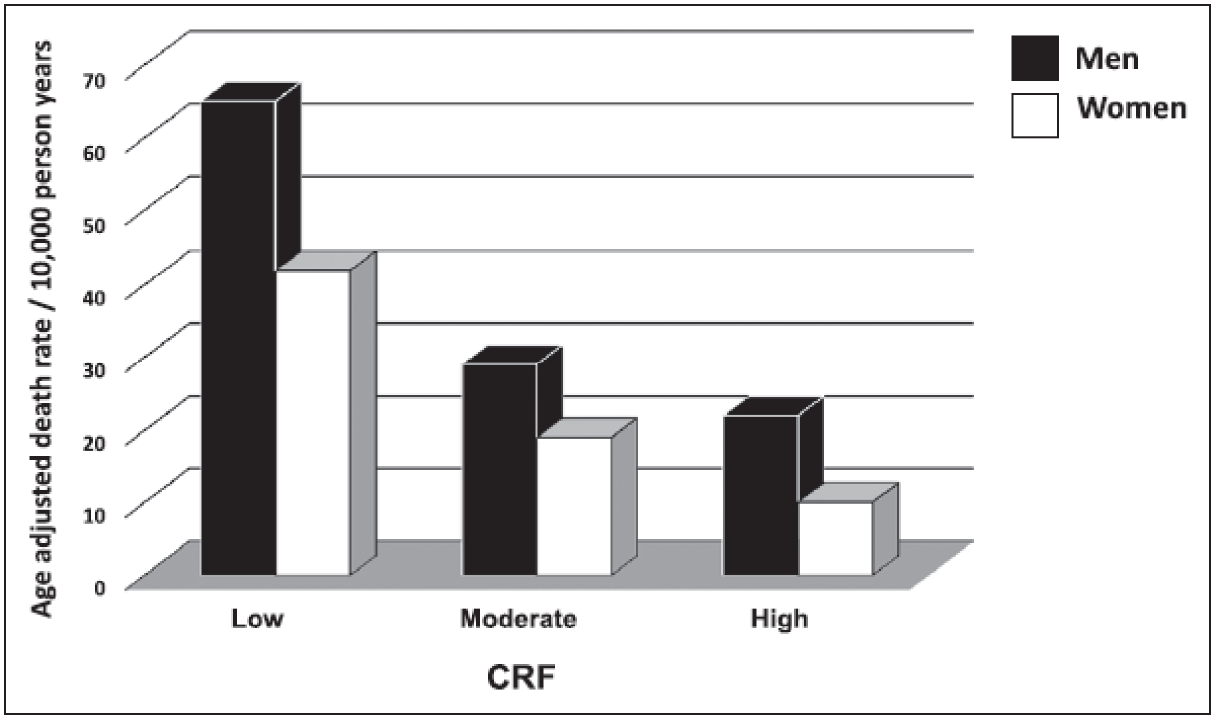
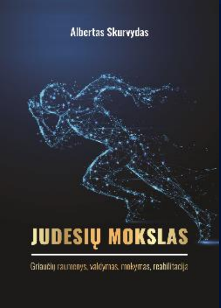
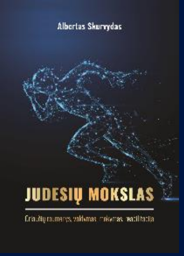


Figure. **All-cause death rates across categories of cardiorespiratory fitness (CRF) in 3120 women and 10 224 men.**
Modified from Blair et al[2] with permission from the publisher. Copyright © 1989, American Medical Association.


Albertas Skurvydas
JUDESIŲ MOKSLAS
Griaučių raumenys, valdymas, mokymas, reabilitacija

CVF:
kas tai?!



ESC
European Society of Cardiology
European Heart Journal (2021) **42**, 17–96
doi:10.1093/eurheartj/ehaa605
ESC GUIDELINES

2020 ESC Guidelines on sports cardiology and exercise in patients with cardiovascular disease

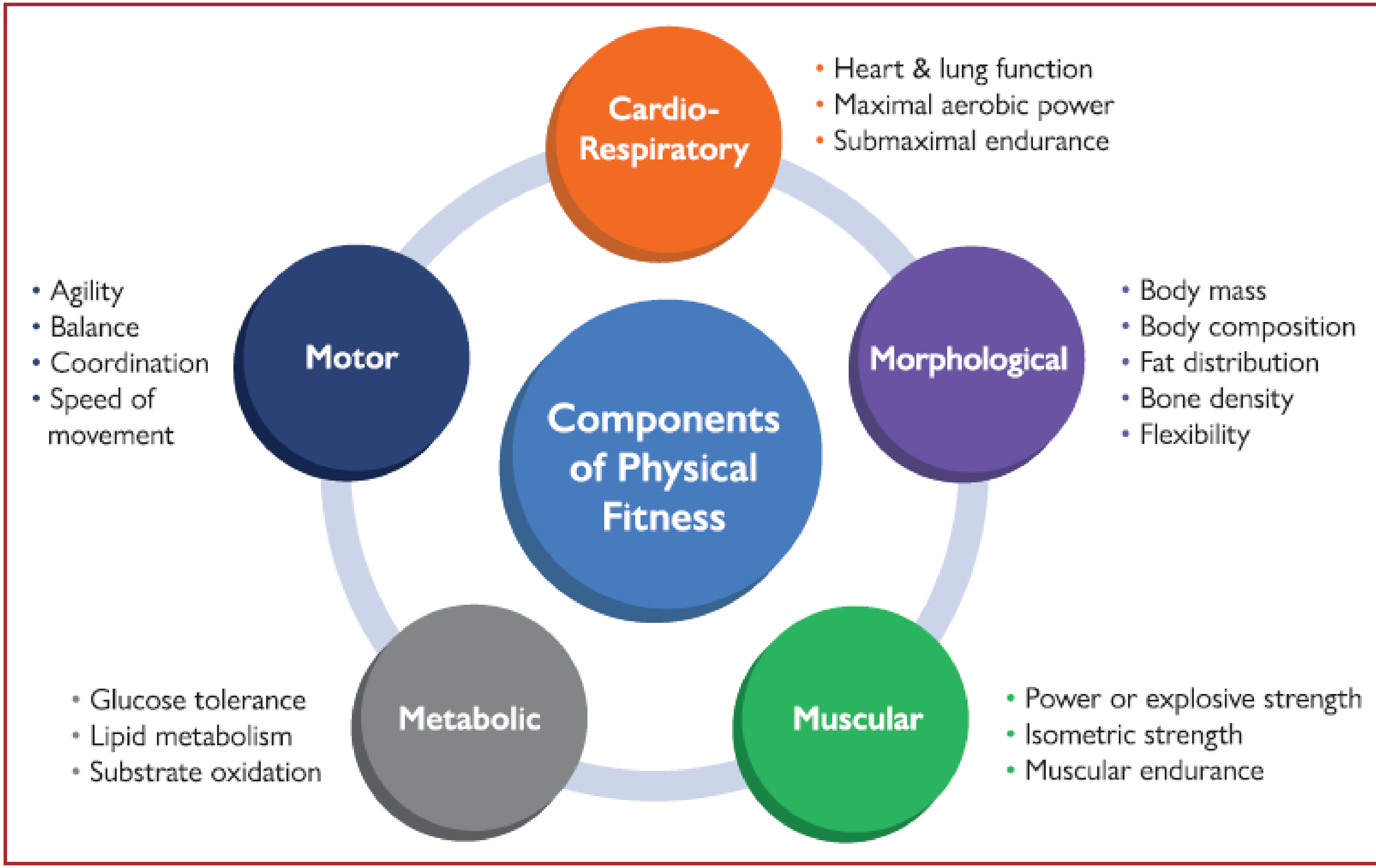
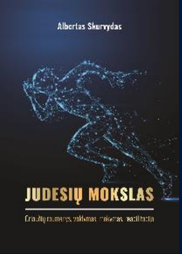


Figure 1 Components for expression of physical fitness.



Field-based fitness assessment in young people: the ALPHA health-related fitness test battery for children and adolescents

Jonatan R Ruiz,[1,2] José Castro-Piñero,[3] Vanesa España-Romero,[1,2] Enrique G Artero,[1] Francisco B Ortega,[1,2] Magdalena M Cuenca,[1] David Jimenez-Pavón,[1] Palma Chillón,[4] María J Girela-Rejón,[4] Jesús Mora,[3] Ángel Gutiérrez,[1] Jaana Suni,[5] Michael Sjöström,[2] Manuel J Castillo[1]

Br J Sports Med 2011;**45**:518–524.

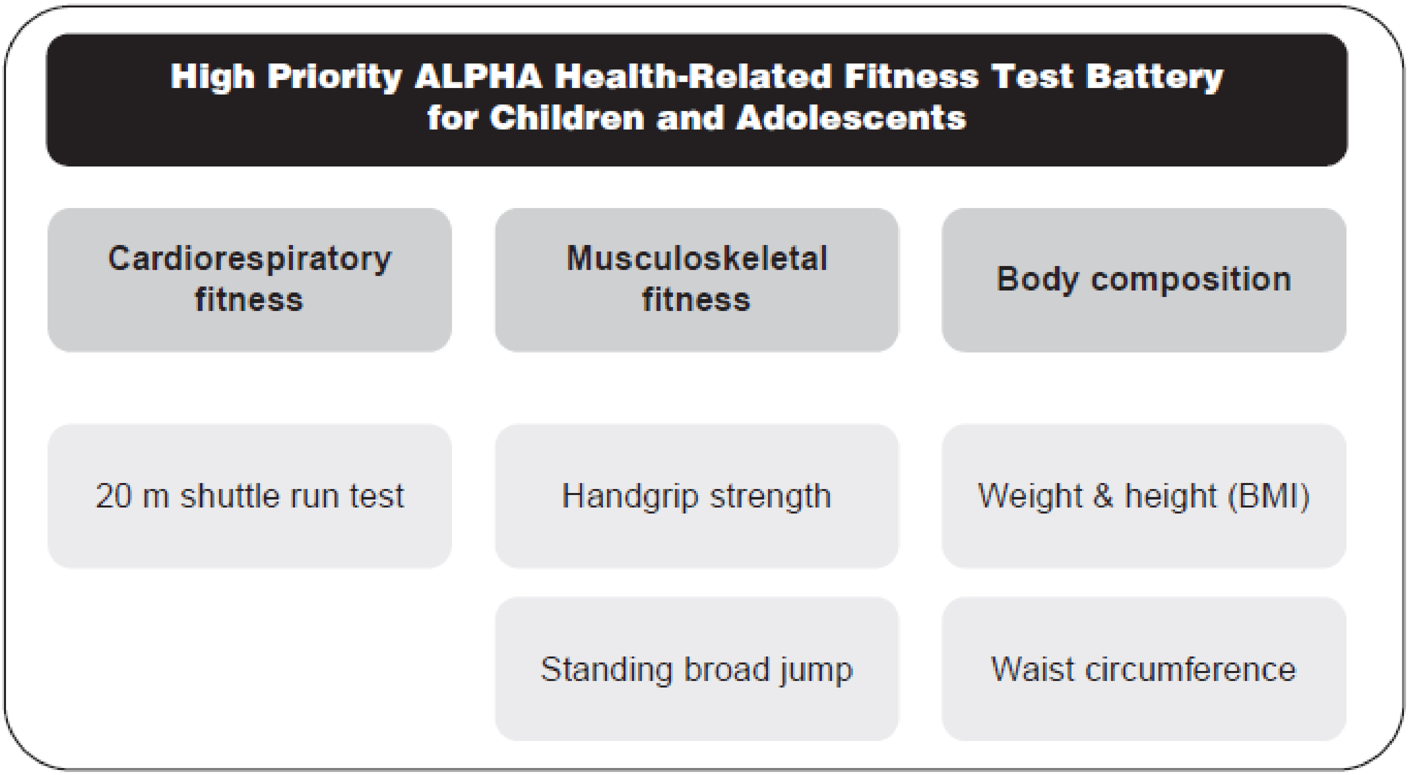
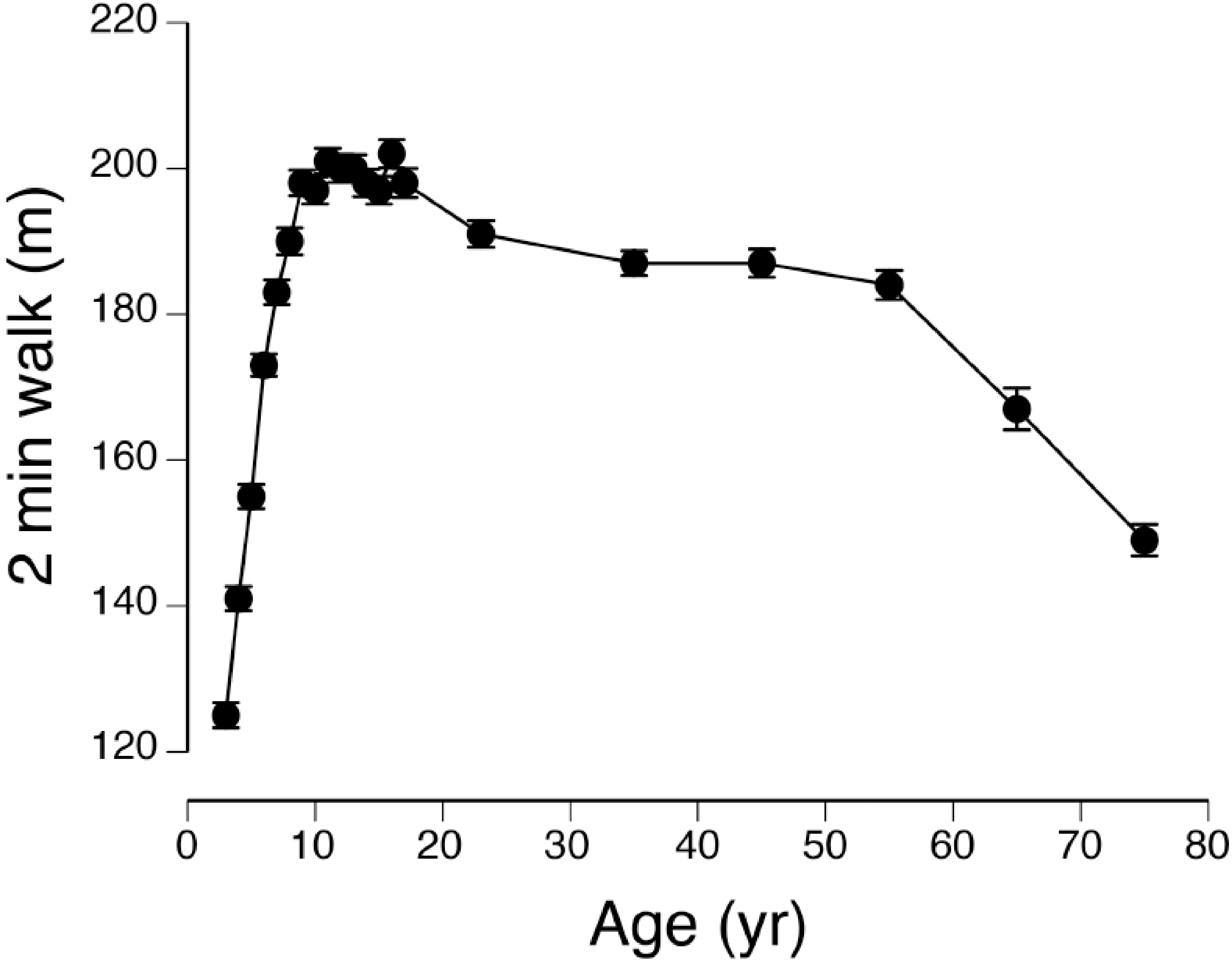


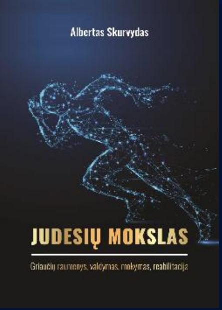
Figure 3 High-priority ALPHA health-related fitness test battery for Children and Adolescents. BMI indicates body mass index (weight in kg divided by height in metres squared, kg/m^2).

Med Sci Sports Exerc. 2016 November ; 48(11): 2228–2238. doi:10.1249/MSS.0000000000000929.

Translating Fatigue to Human Performance

Roger M. Enoka[1] and Jacques Duchateau[2]





VO2max – geriausias CVF rodiklis!

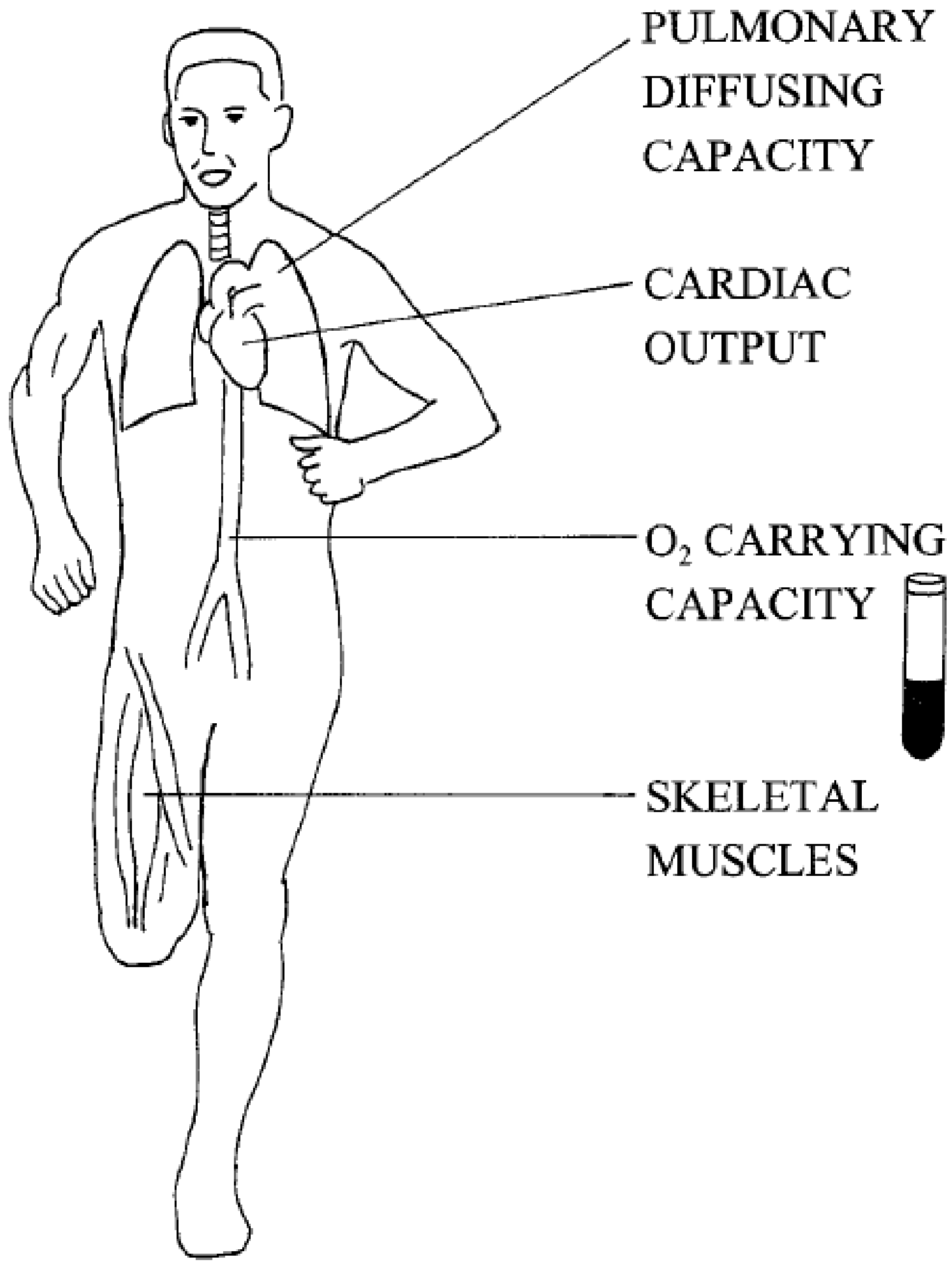


Figure 4—Physiological factors that potentially limit maximum oxygen uptake ($\dot{V}O_{2max}$) in the exercising human.

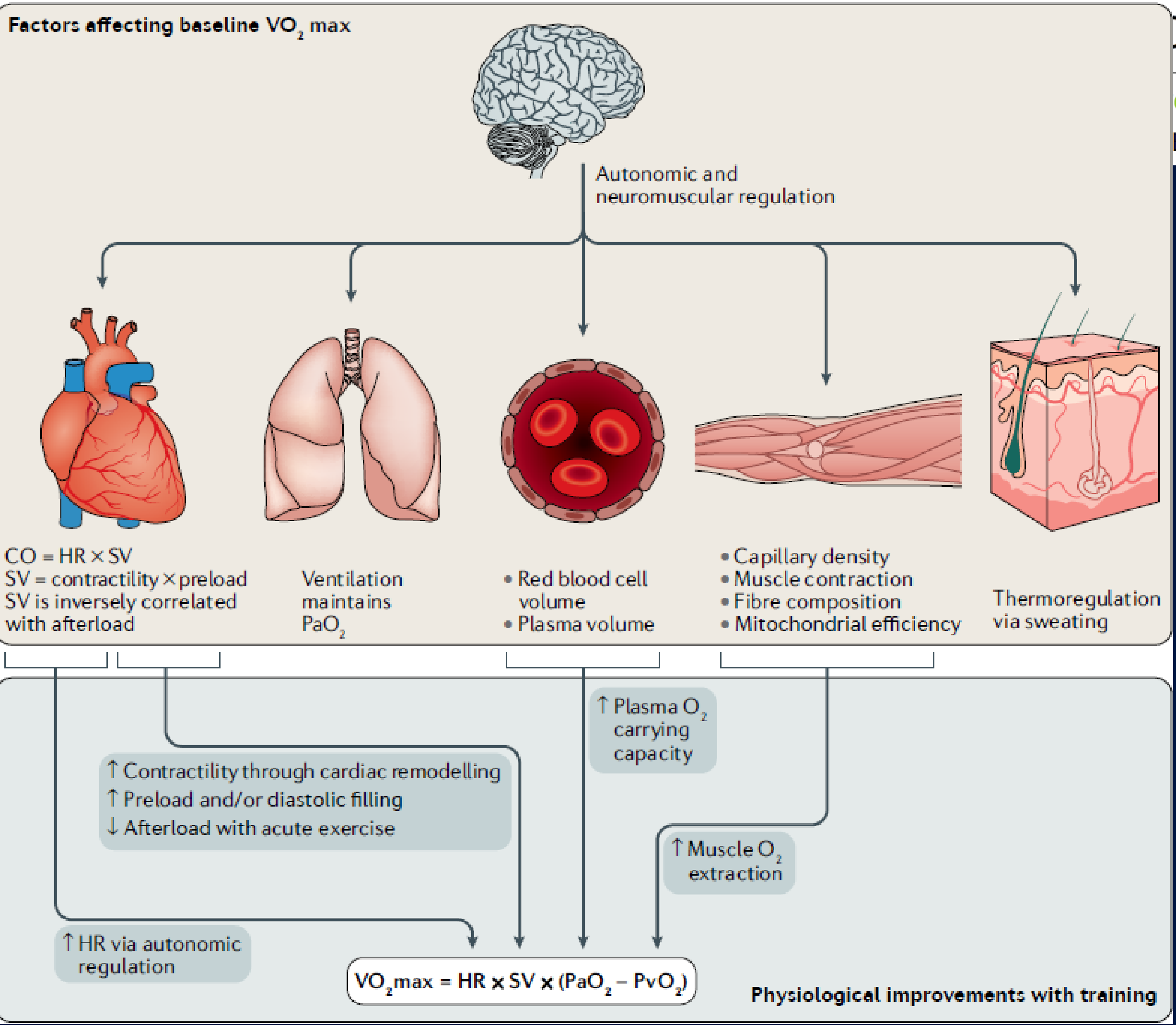
Limiting factors for maximum oxygen uptake and determinants of endurance performance

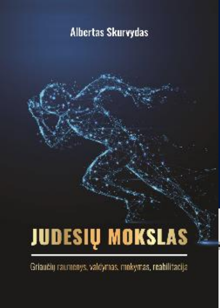
DAVID R. BASSETT, JR. and EDWARD T. HOWLEY

ormance

1,2,3,4 2021

EWS | GENETICS

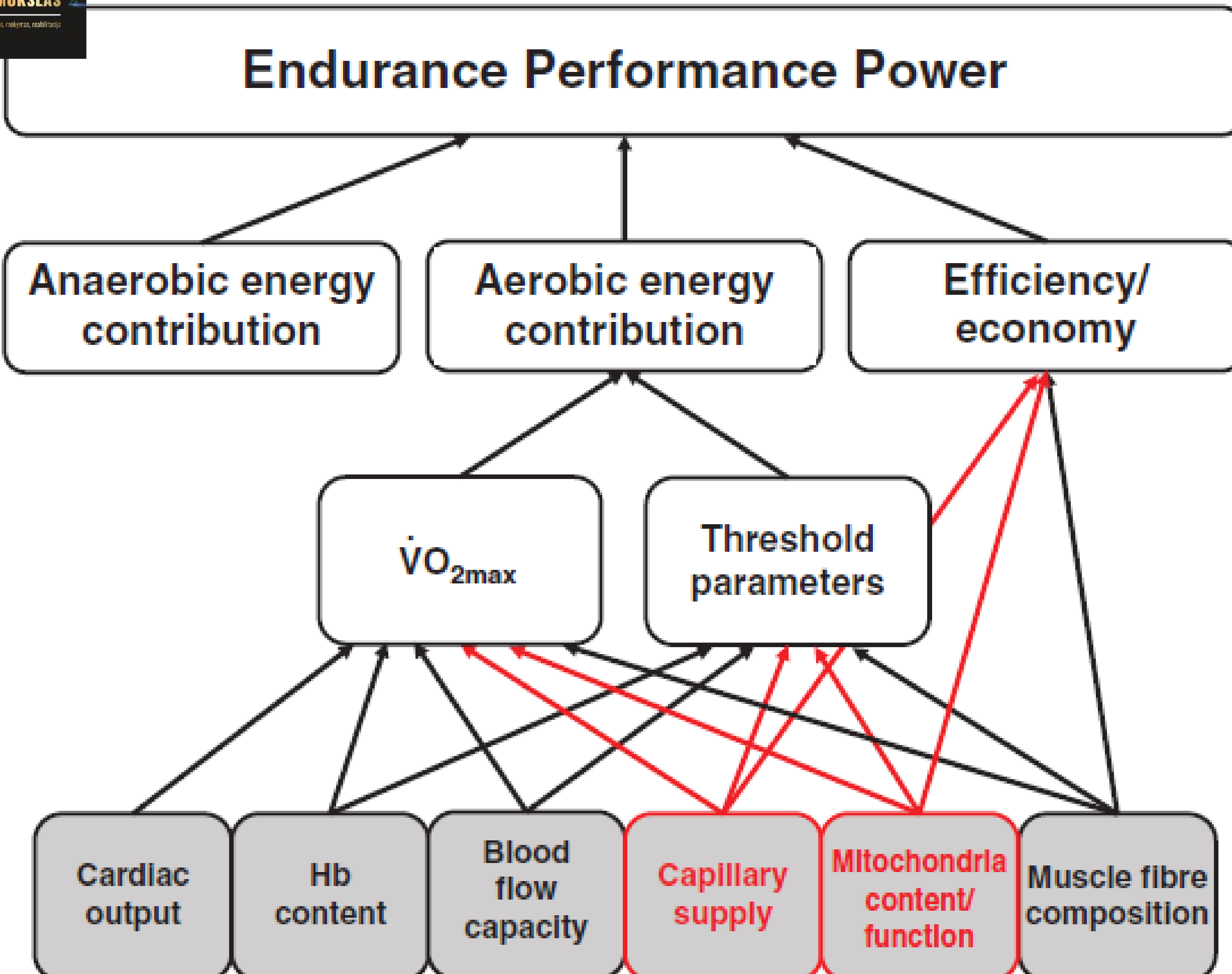


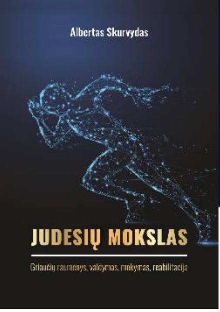



Received: 21 November 2020 | Accepted: 19 January 2021
DOI: 10.1113/EP089280
Experimental Physiology WILEY
REVIEW ARTICLE

Blood-flow-restricted exercise: Strategies for enhancing muscle adaptation and performance in the endurance-trained athlete

Richard A. Ferguson[1] | Emma A. Mitchell[1] | Conor W. Taylor[2] | David J. Bishop[3] | Danny Christiansen[4]

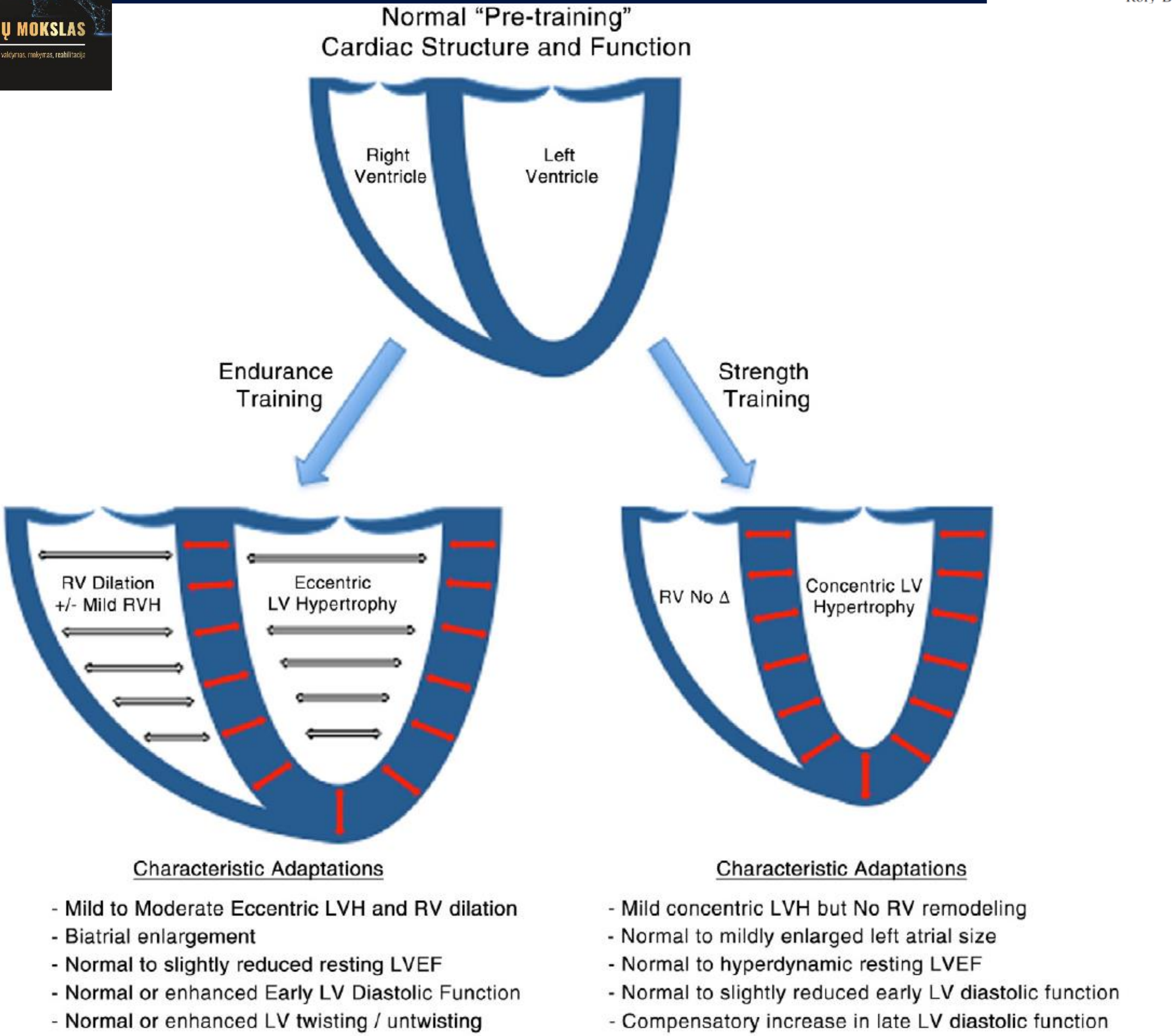





Progress in Cardiovascular Diseases 54 (2012) 380–386
www.onlinepcd.com

Exercise-Induced Cardiac Remodeling

Rory B. Weiner, Aaron L. Baggish*



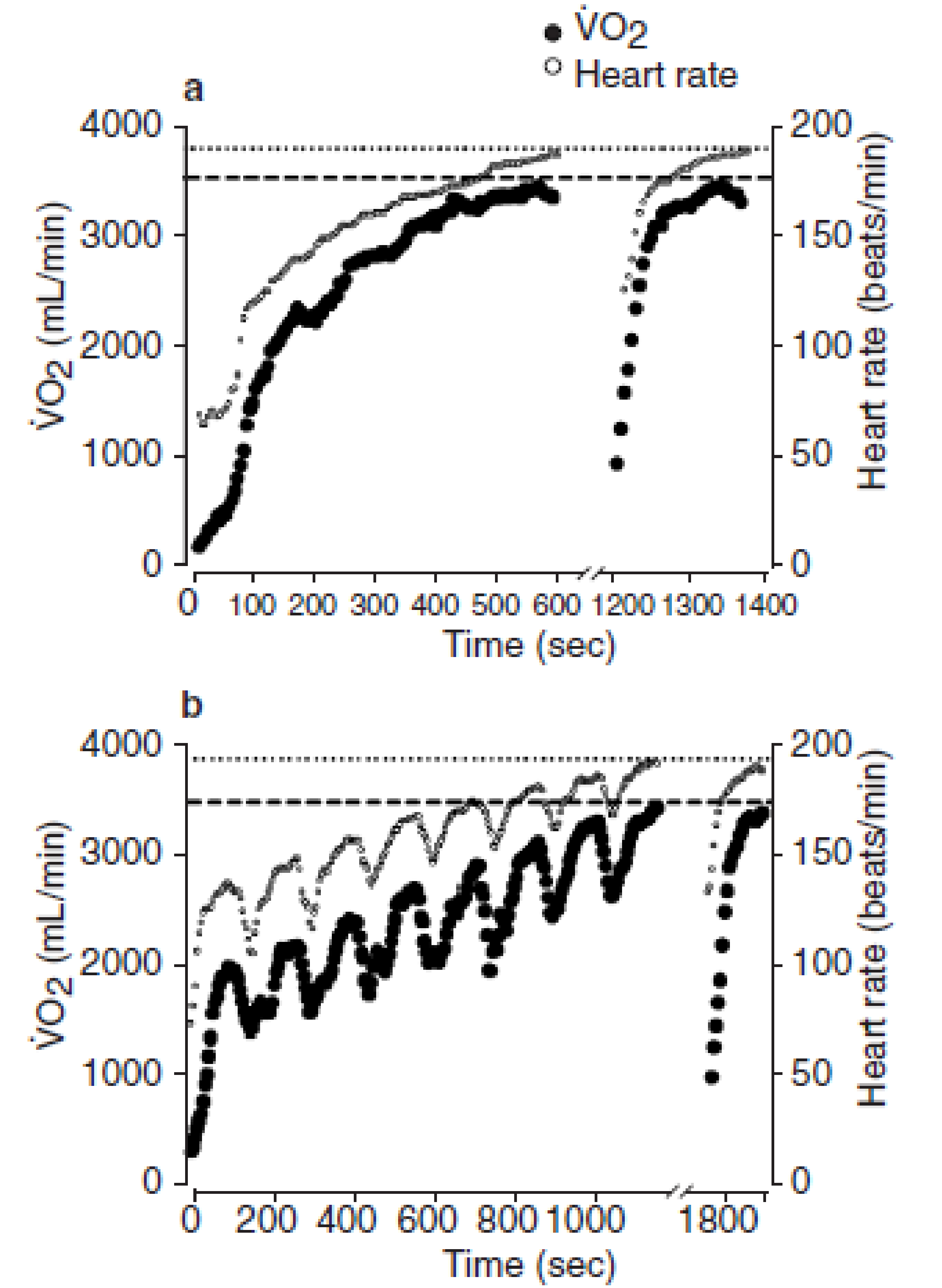
CURRENT OPINION

Sports Med 2007; 37 (12): 1019-1028
0112-1642/07/0012-1019/$44.95/0

Criteria for Determination of Maximal Oxygen Uptake

A Brief Critique and Recommendations for Future Research

Adrian W. Midgley,[1] Lars R. McNaughton,[1] Remco Polman[1] and David Marchant[2]



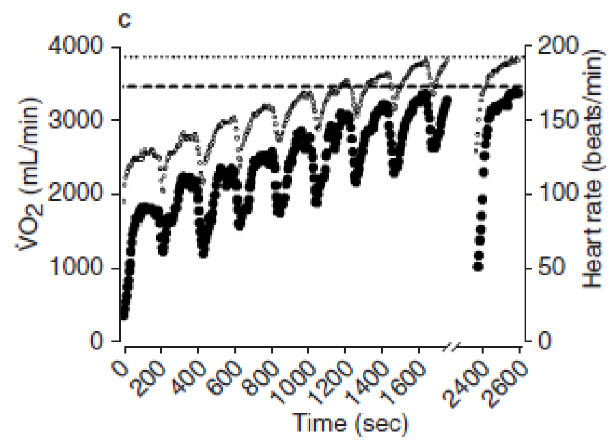
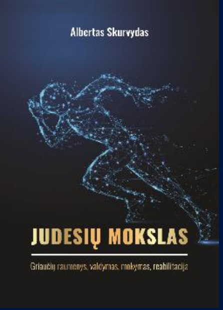
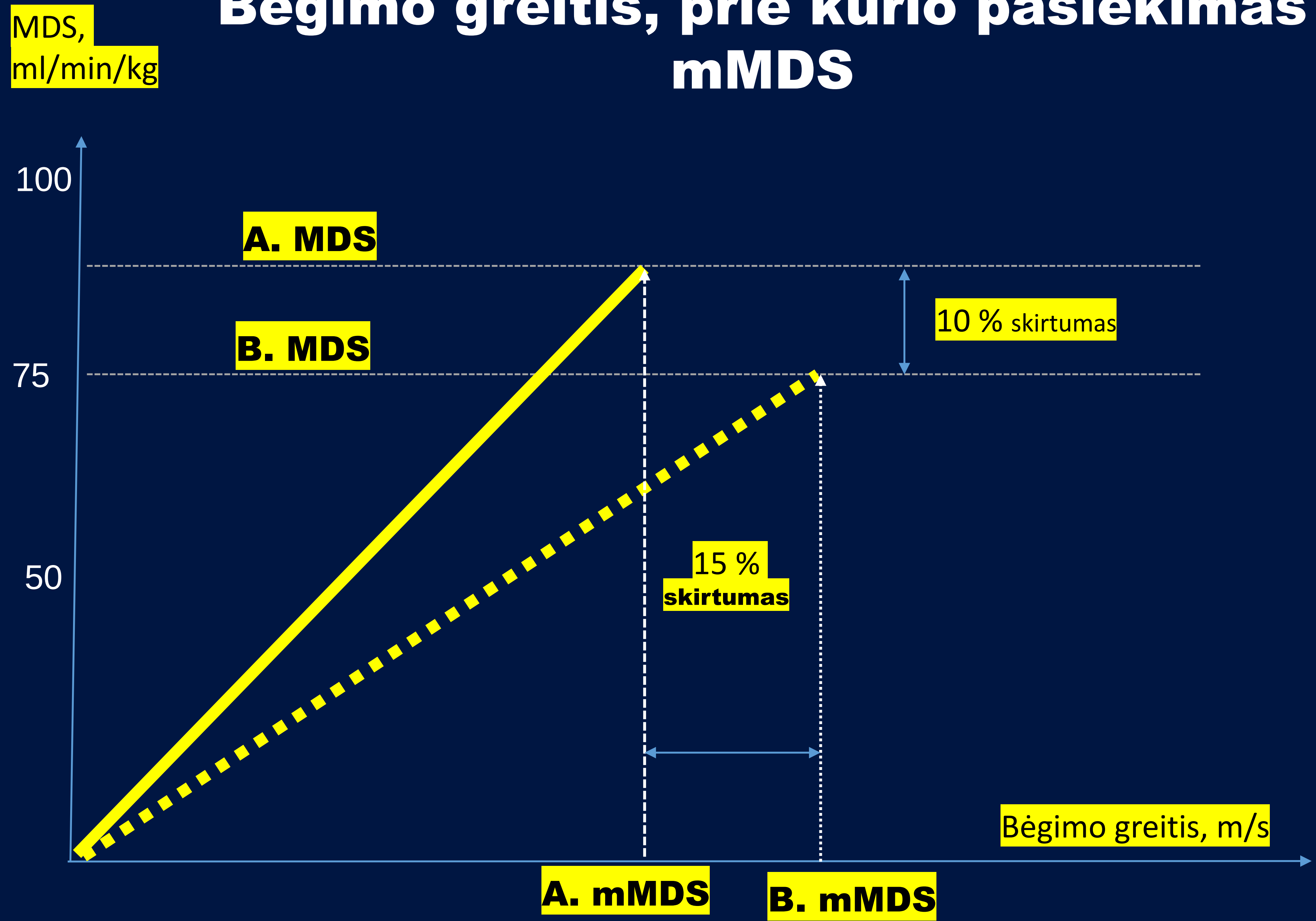


Fig. 1. Oxygen uptake ($\dot{V}O_2$) and heart rate responses of a 34-year-old, regional level, male long-distance runner during three maximal oxygen uptake ($\dot{V}O_{2max}$) tests, each incorporating different incremental test phases.[30] The incremental phases were: (**a**) a continuous protocol with 1-minute stage durations; (**b**) a discontinuous protocol with 2-minute stage durations and 30-second rest periods; and (**c**) a discontinuous protocol with 3-minute stage durations and 30-second rest periods. Each incremental phase was followed by a 10-minute rest phase and a verification phase. The verification phase consisted of a run to exhaustion at a speed that was equivalent to one stage higher than the last completed stage in the incremental phase. The similarities between the maximal $\dot{V}O_2$ and heart rate values in the incremental and verification phases confirms (verifies) that $\dot{V}O_{2max}$ and the maximal heart rate were elicited during the increment phases. The horizontal dashed and dotted lines are to aid comparison of $\dot{V}O_{2max}$ and heart rate values attained in the incremental and verification phases.



Minimlaus greičio MDS treniravimas!

Bėgimo greitis, prie kurio pasiekimas mMDS

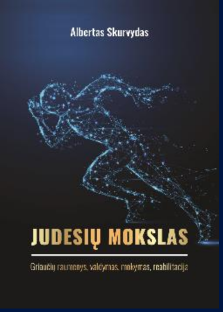


Minimalaus bėgimo greičio, prie kurio per 6 min pasiekiamas MDS, apskaičiavimas

Nuotolio įveikimas (m) per 6 min	400 m tempas, s
2000	72
1800	80
1728	83
1600	90
1200	120
1000	144

Idealiausias būdas maksimaliam deguonies suvartojimui treniruoti (du kartus per savaitę, 4 savaites).

Jei per 6 min nubėgate	Tada Jums rekomenduoju bėgti 400 m tokiu tempu
2000	72 sek (3 kartus po 400 m, kas 3min)
1800	80 s (tris kartus po 400 m)
1728	83 s (tris kartus po 400 m)
1600	90 s (tris kartus po 400 m)
1200	120 s (du kartus po 400 m)
1000	144 s (du kartus po 400 m)

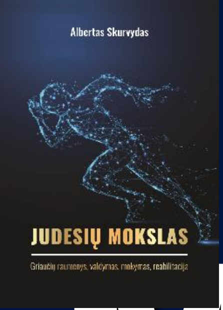


Aerobinių fermentų treniravimas!

Aerobinių fermentų (cytochrome c) treniravimas!

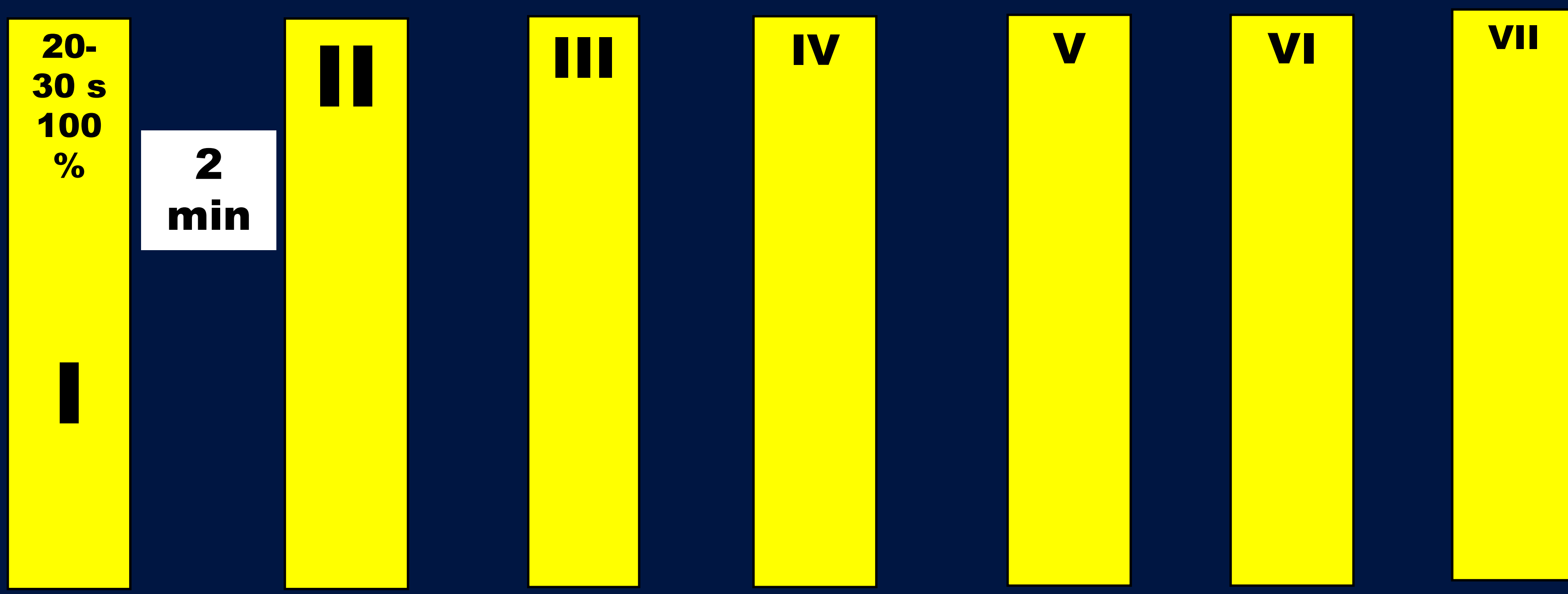
Keturios savaitės, vieną kartą per savaitę 80 % nuo MDS, trukmė – kol gali išlaikyti šį intensyvumą (vidutiniškai iki 90-100 min); tempas – nepertraukiamas.

Cytochrome c aktyvumas padidėja apie 80 %.



Mitochondrijų treniravimas!

Mitochondrijų kiekiui treniruoti. 4-7x20-30 s (maksimalus intensyvumas), kas 2 min. 3-6 savaites. 2-3 kartai per savaitę.



Mitochondrijų skaičių per 6 savaites galima padvigubinti!

Metabolinis sindromas

International Diabetes Foundation (IDF) (7)	the U.S. National Cholesterol Education Program (NCEP) Adult treatment Panel -III (ATP-III) (7)	World Health Organization (WHO) (7)
• WC ≥ 94cm for Europid men and ≥ 80cm for Europid women		• fasting plasma glucose > 6.1 mM or taking medication for diabetes
plus any two of the following:	≥ 3 of the following:	plus any two of the following:
• Triglycerides: ≥ 1.7 mM, or specific treatment for this lipid abnormality • HDL cholesterol: < 1.03 mM in men < 1.29 mM in women, or specific treatment for this lipid abnormality • systolic BP ≥ 130 or diastolic BP ≥ 85 mm Hg, or treatment of previously diagnosed hypertension • fasting plasma glucose ≥ 5.6 mM, or previously diagnosed type 2 DM	• WC > 120 cm in men and > 88 cm in women • Triglycerides ≥ 1.7 mM • HDL cholesterol: < 1.0 mM in men and < 1.3 mM in women, • systolic BP ≥ 130 and/or diastolic BP ≥ 85 mm Hg • Fasting plasma glucose ≥ 6.1 mM	• BMI > 30 kg/m^2 or waist-to-hip ratio > 0.85 • Triglycerides ≥ 1.7 mM • HDL cholesterol < 0.9 mM in men, < 1.0 mM in women • Systolic BP ≥ 140 and/or diastolic BP ≥ 90 mm Hg

Review
Open Access
N Bergmann *et al.* | Psychosocial stress and the metabolic syndrome | 1–26 | 3:R55
Endocrine CONNECTIONS

The appraisal of chronic stress and the development of the metabolic syndrome: a systematic review of prospective cohort studies

N Bergmann[1], **F Gyntelberg**[2] and **J Faber**[1,3]

[1]Endocrine Unit, Department of Medicine O, Herlev University Hospital, DK-2730 Herlev, Denmark
[2]The National Research Centre for the Working Environment, Copenhagen, Denmark
[3]Faculty of Health Sciences, Copenhagen University, Copenhagen, Denmark

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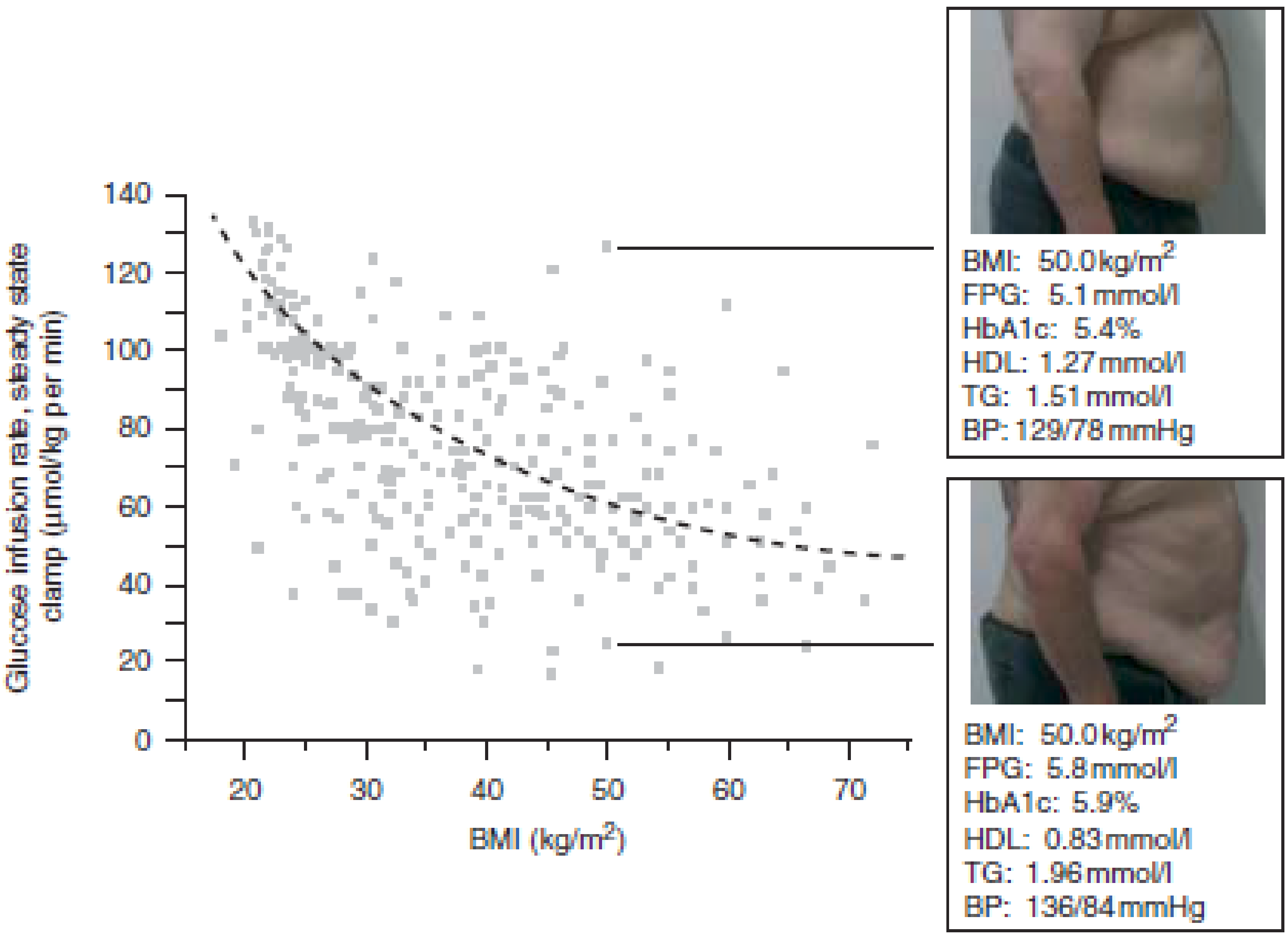
Email
n.c.bergmann@hotmail.com

Are metabolically healthy obese individuals really healthy?

Matthias Blüher

Department of Medicine, University of Leipzig, Liebigstrasse 20, D-04103 Leipzig, Germany

Correspondence should be addressed to M Blüher
Email
bluma@medizin.uni-leipzig.de



European Heart Journal (2010) 31, 146–148
doi:10.1093/eurheartj/ehp339

EDITORIAL

The obesity paradox: weighing the benefit

Wolfram Doehner[1,2,*], Andrew Clark[3], and Stefan D. Anker[2,4]

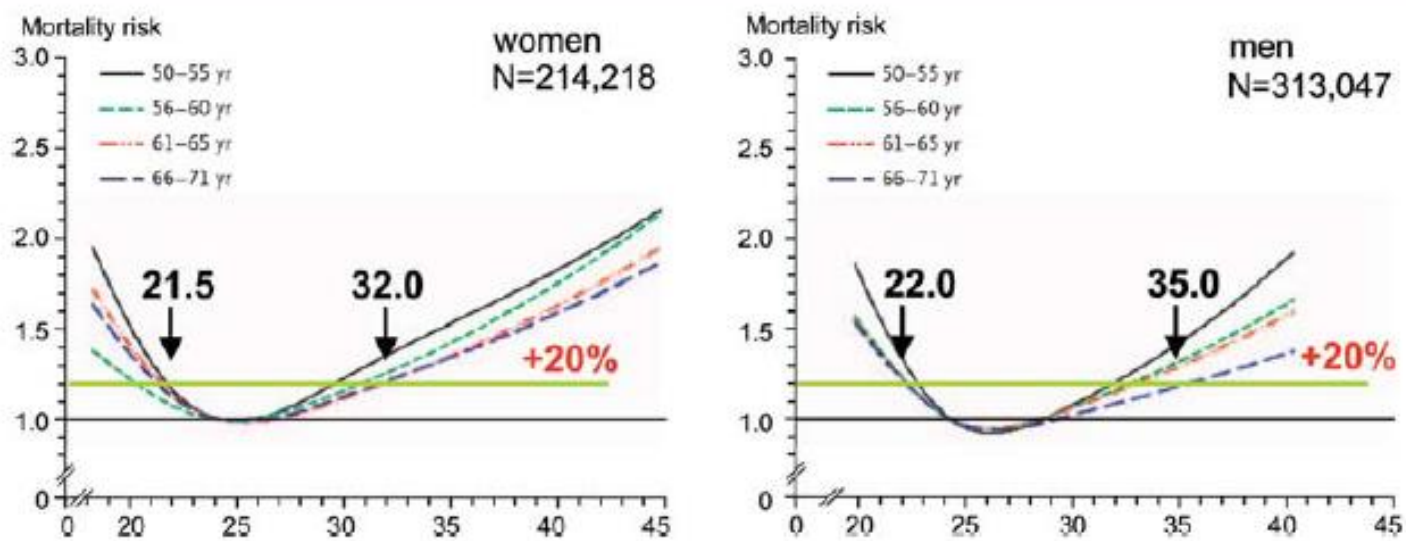
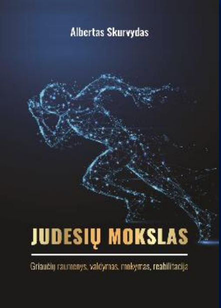


Figure 1 Association of BMI and mortality risk in age subgroups in men and women. The green line indicates a 20% increased risk of death, showing a similar risk for men aged over 66 years with a BMI of 22 kg/m^2 and with a BMI 35 of kg/m^2. Adapted from Adams *et al.*[18]



ACSM apie CVF!

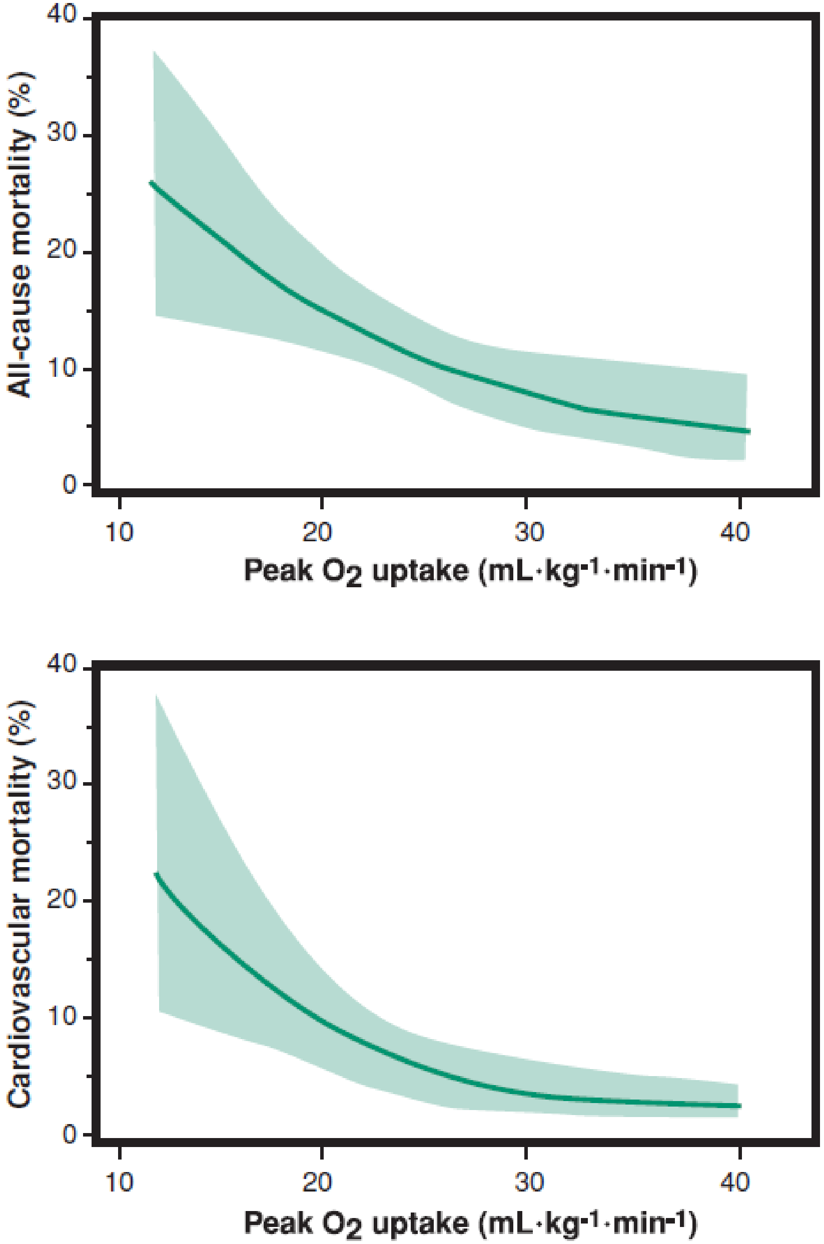
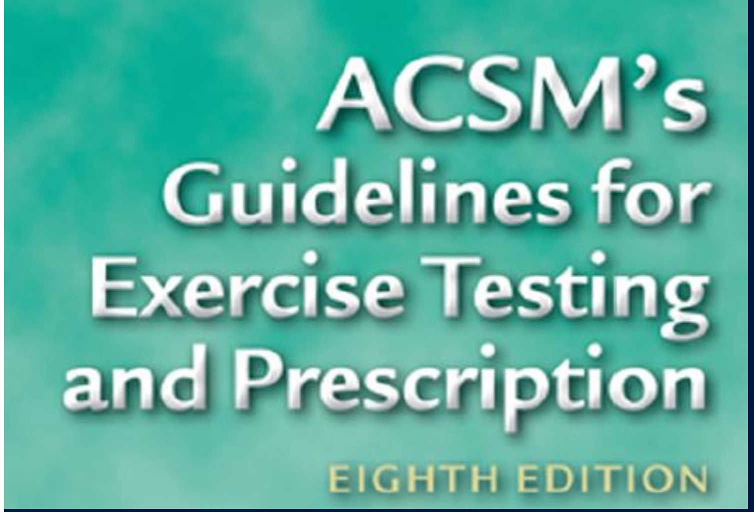
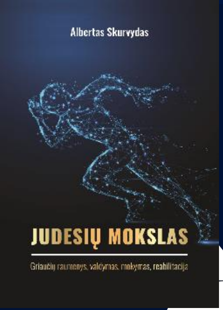


FIGURE 5.2. Relation between peak oxygen uptake with all-cause mortality (*top*) and cardiovascular mortality (*bottom*) in patients with coronary artery disease (*shaded area represents 95% confidence limits*). (Modified from Vanhees L, Fagard R, Thijs L, et al. Prognostic significance of peak exercise capacity in patients with coronary artery disease. *J Am Coll Cardiol.* 1994;23:358–63.)





ŠKS sveikata!

Table 6 Risk factor goals and target levels for important cardiovascular risk factors

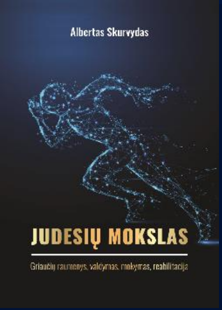
Smoking	No exposure to tobacco in any form.
Diet	Low in saturated fat with a focus on wholegrain products, vegetables, fruit and fish.
Physical activity	At least 150 minutes a week of moderate aerobic PA (30 minutes for 5 days/week) or 75 minutes a week of vigorous aerobic PA (15 minutes for 5 days/week) or a combination thereof.
Body weight	BMI 20–25 kg/m². Waist circumference <94 cm (men) or <80 cm (women).
Blood pressure	<140/90 mmHg[a]
Lipids[b] LDL[c] is the primary target	**Very high-risk: <1.8 mmol/L (<70 mg/dL),** or a reduction of at least 50% if the baseline is between 1.8 and 3.5 mmol/L (70 and 135 mg/dL)[d] **High-risk: <2.6mmol/L (<100 mg/dL)**, or a reduction of at least 50% if the baseline is between 2.6 and 5.1 mmol/L (100 and 200 mg/dL) **Low to moderate risk: <3.0 mmol/L (<115 mg/dL).**
HDL-C	No target but >1.0 mmol/L (>40mg/dL) in men and >1.2 mmol/L (>45 mg/dL) in women indicate lower risk.
Triglycerides	No target but <1.7 mmol/L (<150 mg/dL) indicates lower risk and higher levels indicate a need to look for other risk factors.
Diabetes	HbA1c <7%. (<53 mmol/mol)

European Heart Journal (2016) 37, 2315–2381
doi:10.1093/eurheartj/ehw106

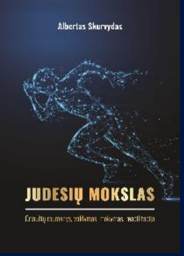
JOINT ESC GUIDELINES

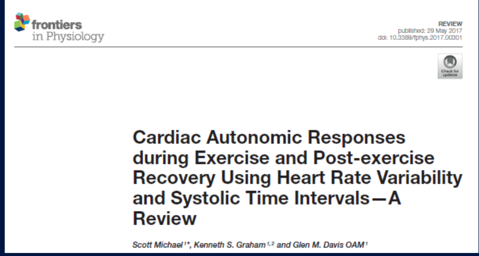
2016 European Guidelines on cardiovascular disease prevention in clinical practice

The Sixth Joint Task Force of the European Society of Cardiology and Other Societies on Cardiovascular Disease Prevention in Clinical Practice (constituted by representatives of 10 societies and by invited experts)



ŠSD atsigavimas po krūvio – rimtas CVF rodiklis!

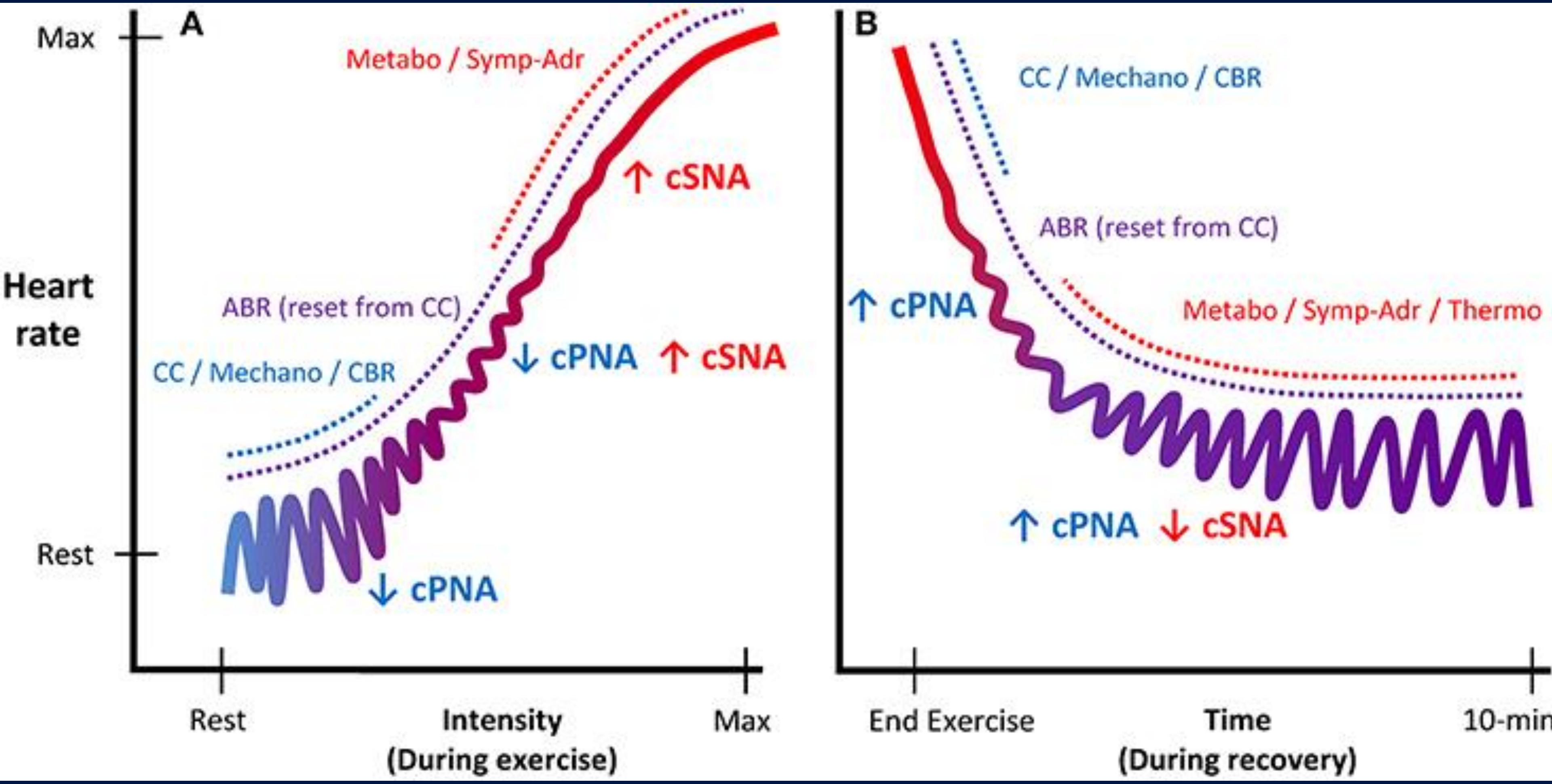


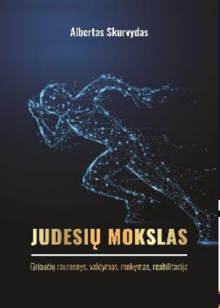

frontiers in Physiology

REVIEW

Cardiac Autonomic Responses during Exercise and Post-exercise Recovery Using Heart Rate Variability and Systolic Time Intervals—A Review

Scott Michael, Kenneth S. Graham and Glen M. Davis OAM





Autonomic Tone as a Cardiovascular Risk Factor: The Dangers of Chronic Fight or Flight

Brian M. Curtis, MD, and James H. O'Keefe, Jr, MD

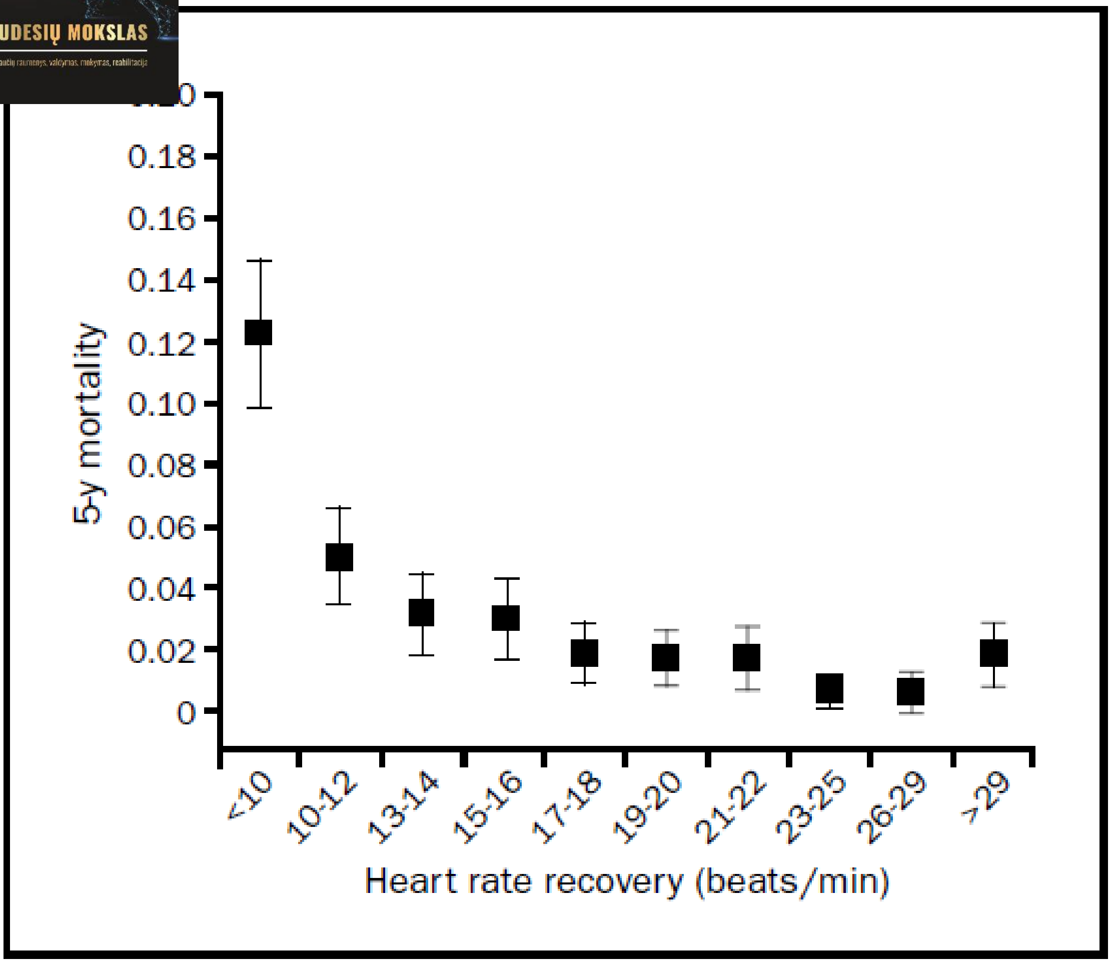
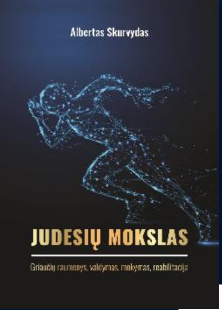


Figure 1. The 5-year Kaplan-Meier survival estimates in 9454 patients according to deciles of heart rate recovery 1 minute after exercise. Mortality was predicted by abnormal heart rate recovery, hazard ratio of 4.16 (95% confidence interval, 3.33-5.19; $P<.001$). Reprinted with permission from Nishime et al.[6]



Raumenų jėga ir CVF!

Prognostic value of grip strength: findings from the Prospective Urban Rural Epidemiology (PURE) study

:hy Rangarajan, Patricio Lopez-Jaramillo, Alvaro Avezum Jr, Andres Orlandini, Pamela Seron, Suad H Ahmed,
. Omar Rahman, Sumathi Swaminathan, Romaina Iqbal, Rajeev Gupta, Scott A Lear, Aytekin Oguz,
ı, Jephat Chifamba, Ehimario Igumbor, Viswanathan Mohan, Ranjit Mohan Anjana, Hongqiu Gu, Wei Li,
pective Urban Rural Epidemiology (PURE) Study investigators*

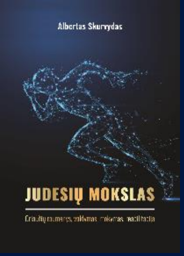
Lancet 2015; 386: 266–73

	Adjusted model
All-cause mortality	
Grip strength	1·37 (1·28–1·47); p<0·0001
Systolic blood pressure	1·15 (1·10–1·21); p<0·0001
MET-min per week	1·09 (1·04–1·15); p=0·002
Cardiovascular mortality	
Grip strength	1·45 (1·30–1·63); p<0·0001
Systolic blood pressure	1·43 (1·32–1·57); p<0·0001
MET-min per week	1·12 (1·03–1·22); p=0·01
Cardiovascular disease	
Grip strength	1·21 (1·13–1·29); p<0·0001
Systolic blood pressure	1·39 (1·32–1·47); p<0·0001
MET-min per week	1·04 (0·991–1·09); p=0·1

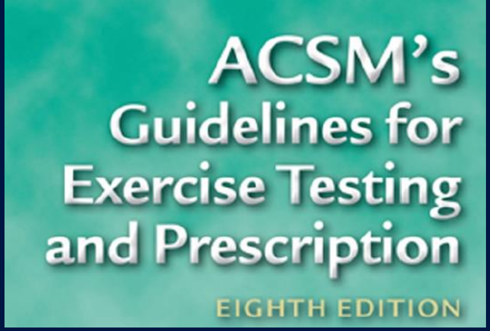
HRs are per SD reduction in grip strength, per SD reduction in log(MET-min per week), and per SD increase in systolic blood pressure. Model adjusted for age; sex; country income level; education level; employment status; tobacco and alcohol use; daily dietary energy intake; proportion of caloric intake from protein; diabetes, heart failure, coronary artery disease, and chronic obstructive pulmonary disease; self-reported prior stroke; self-reported prior cancer; body-mass index; and waist-to-hip ratio. Physical activity levels and a past history of hypertension were omitted as covariates because of collinearity with log (MET-min per week) and systolic blood pressure, respectively. HR=hazard ratio. MET=metabolic equivalent of task.

Table 3: **HR for all-cause mortality and subdistribution HR for cardiovascular mortality and cardiovascular disease**

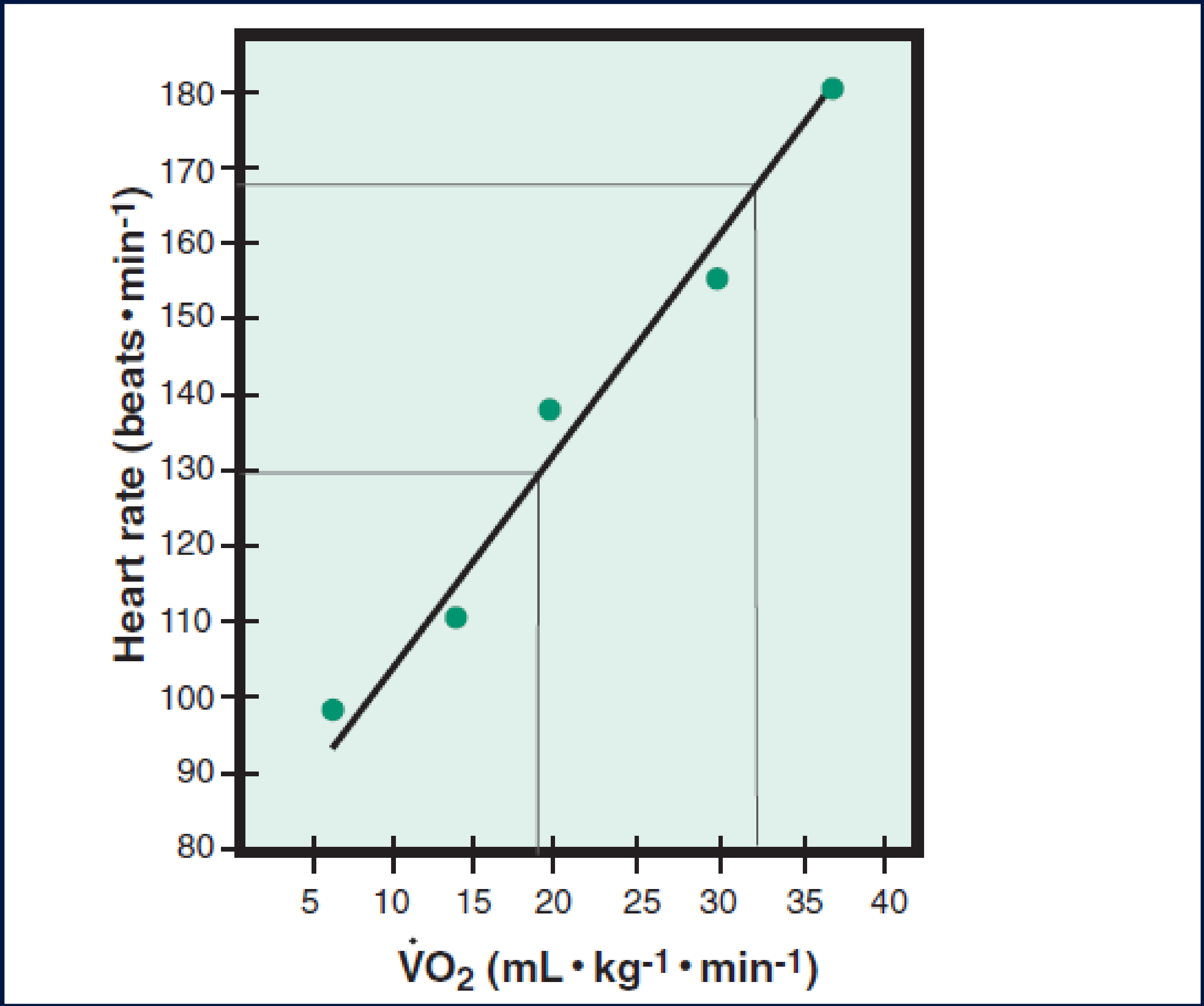
ŠSDmax – vienas iš svarbiausių CVF rodiklių!



Albertas Skurvydas
JUDESIŲ MOKSLAS



ACSM's
Guidelines for
Exercise Testing
and Prescription
EIGHTH EDITION



Heart rate (beats • min-1)
180
170
160
150
140
130
120
110
100
90
80
5
10
15
20
25
30
35
40
V̇O2 (mL • kg-1 • min-1)

if

$HR_{max} = 195$ and $HR_{min} = 80$

$$VO_2 \text{ max} = 15 \times (HR_{max}/HR_{rest})$$

$$VO_2 \text{ max} = 15 \times (195/80)$$

Solve: $VO_2 \text{ max} = 15 \times 2.44$

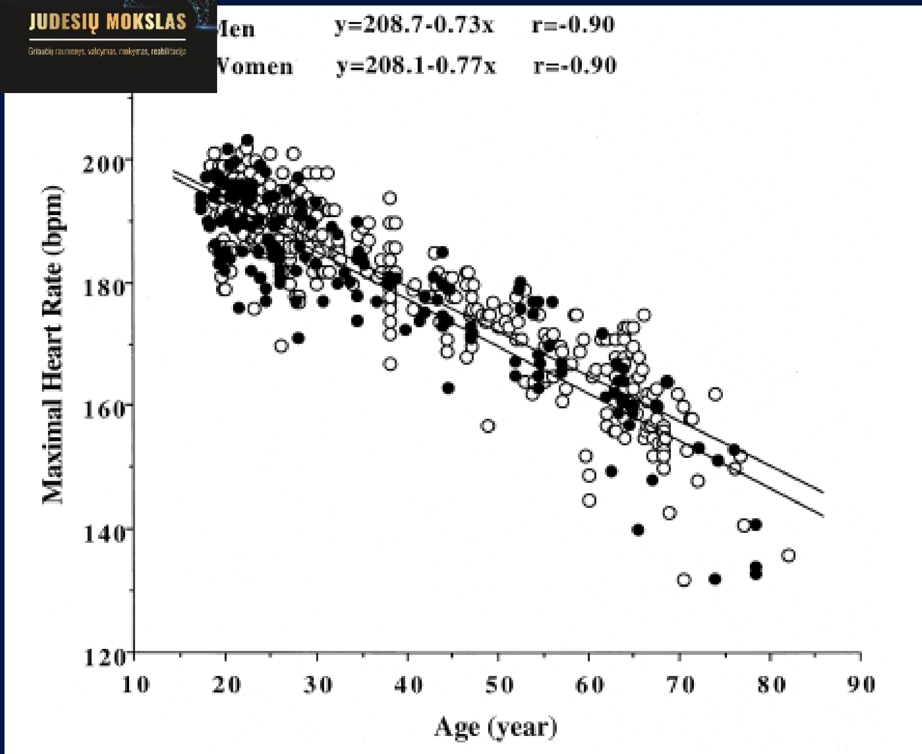
$= 36.56$ mL/kg/min

Journal of the American College of Cardiology

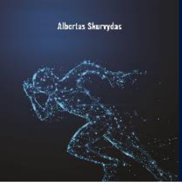
Published by Elsevier Science Inc.

Age-Predicted Maximal Heart Rate Revisited

Hirofumi Tanaka, PHD, Kevin D. Monahan, MS, Douglas R. Seals, PHD



ŠSDmax= (208 - 0.7 x amžius)



Interpreting the Incremental Cardiopulmonary Exercise Test

Samir Nusair, MD[a]

Am J Cardiol 2017;119:497–50

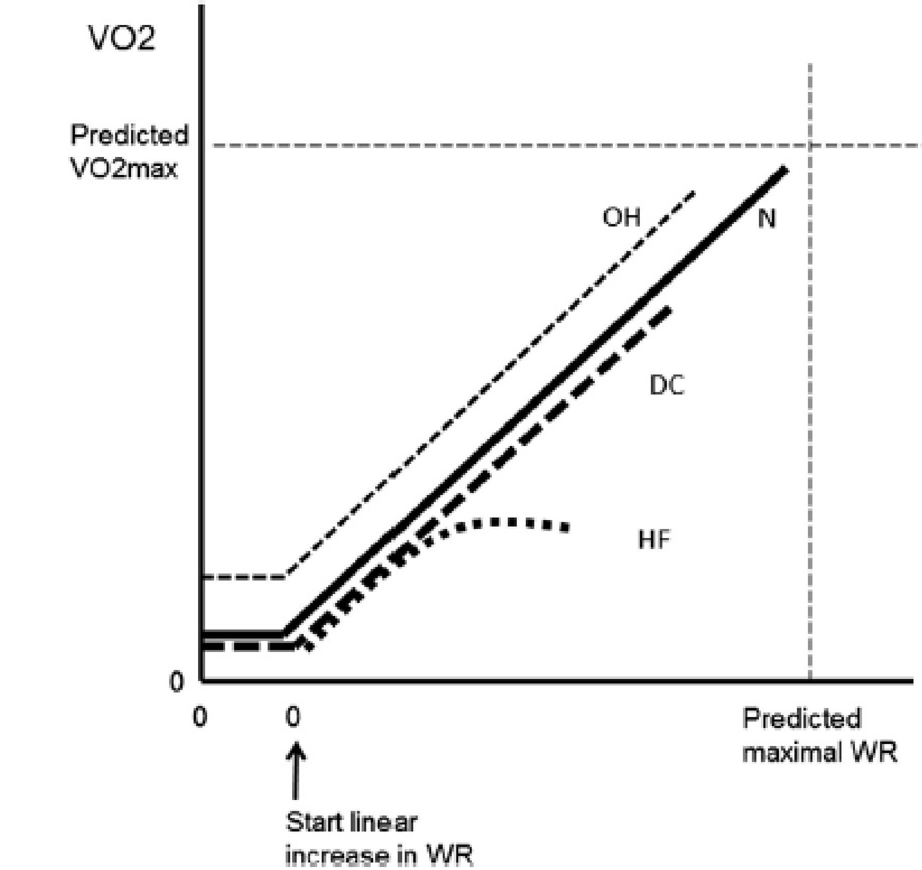


Figure 1. Several schematic plots demonstrating VO_2 versus WR slope in normal, variant, and pathological states. *Horizontal dashed line* represent predicted maximal VO_2 and *vertical dashed line* represent predicted maximal WR. *Arrow* point to start of loading after a period of unloaded effort. The plot (N) depicts the normal relation in which the intercept of the curve with VO_2 axis represents VO_2 at rest and the slope of the curve represents a linear relation between VO_2 and WR. Plot (OH) represents obese healthy subjects who are not deconditioned, and who have increased muscle mass, so the plot is displaced upward compared with normal subjects. Plot (DC) represents deconditioned subject in whom a normal VO_2/WR relation is maintained, however, less than predicted VO_2 and WR at peak effort are achieved. Plot (HF) represents an abnormal VO_2 response to WR often seen in patients with myocardial insufficiency in whom oxygen delivery to skeletal muscle is abnormal as a result of decreased cardiac output and therefore the increase in VO_2 is markedly decreased causing an early halt of exercise effort. DC = deconditioned; HF = myocardial insufficiency; N = normal VO_2/WR slope; OH = obese healthy subjects; VO_2 = oxygen consumption; WR = work rate.

nayocp.2015.07.026.

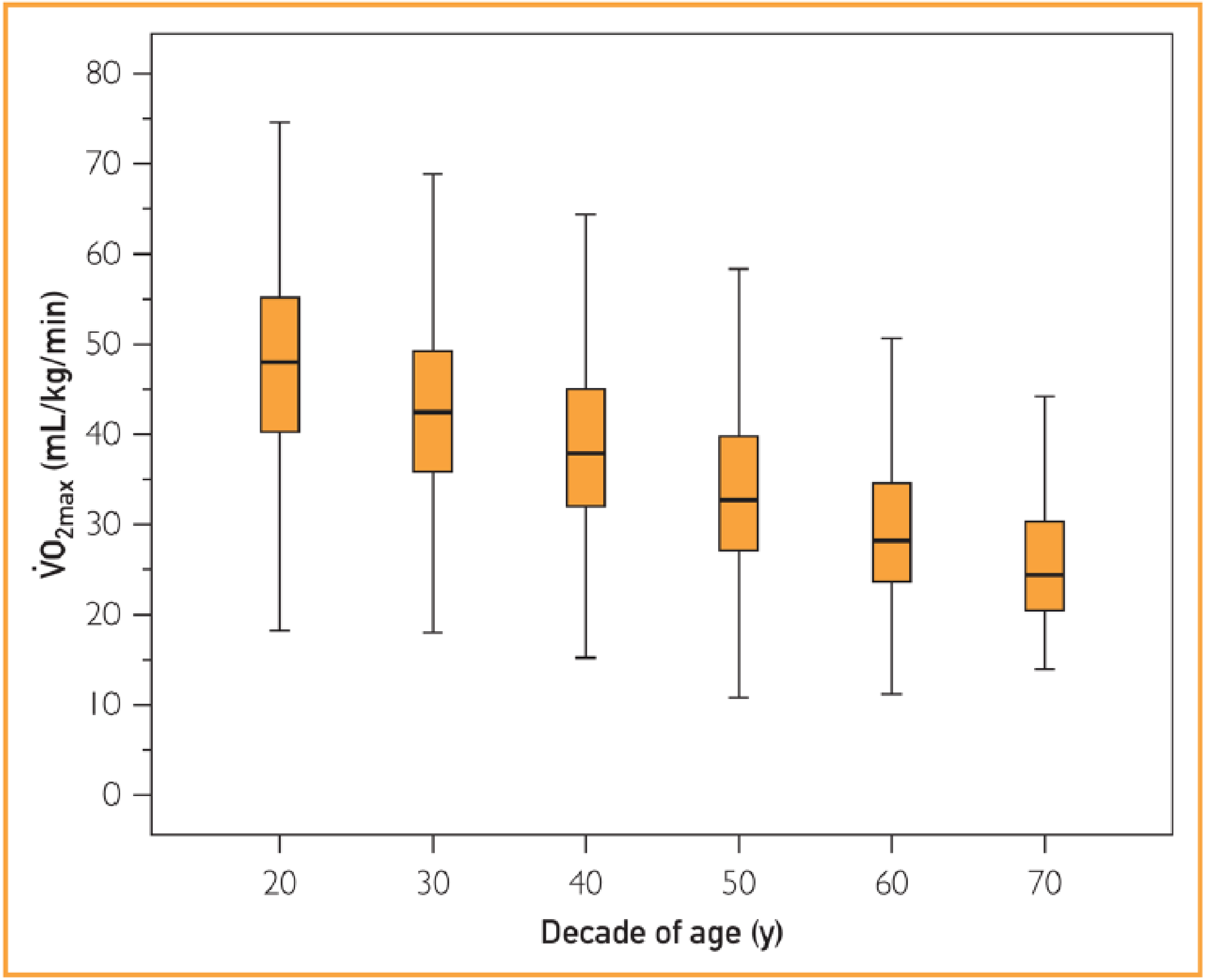


FIGURE 1.
Boxplot of measured maximal oxygen update ($\dot{V}_{O_{2max}}$) in the Fitness Registry and the Importance of Exercise National Database obtained from men performing treadmill exercise tests during a 6-decade period. Error bars indicate SD.

Fitness Measured
ıta From the Fitness
ıtional Database

Myers, PhD

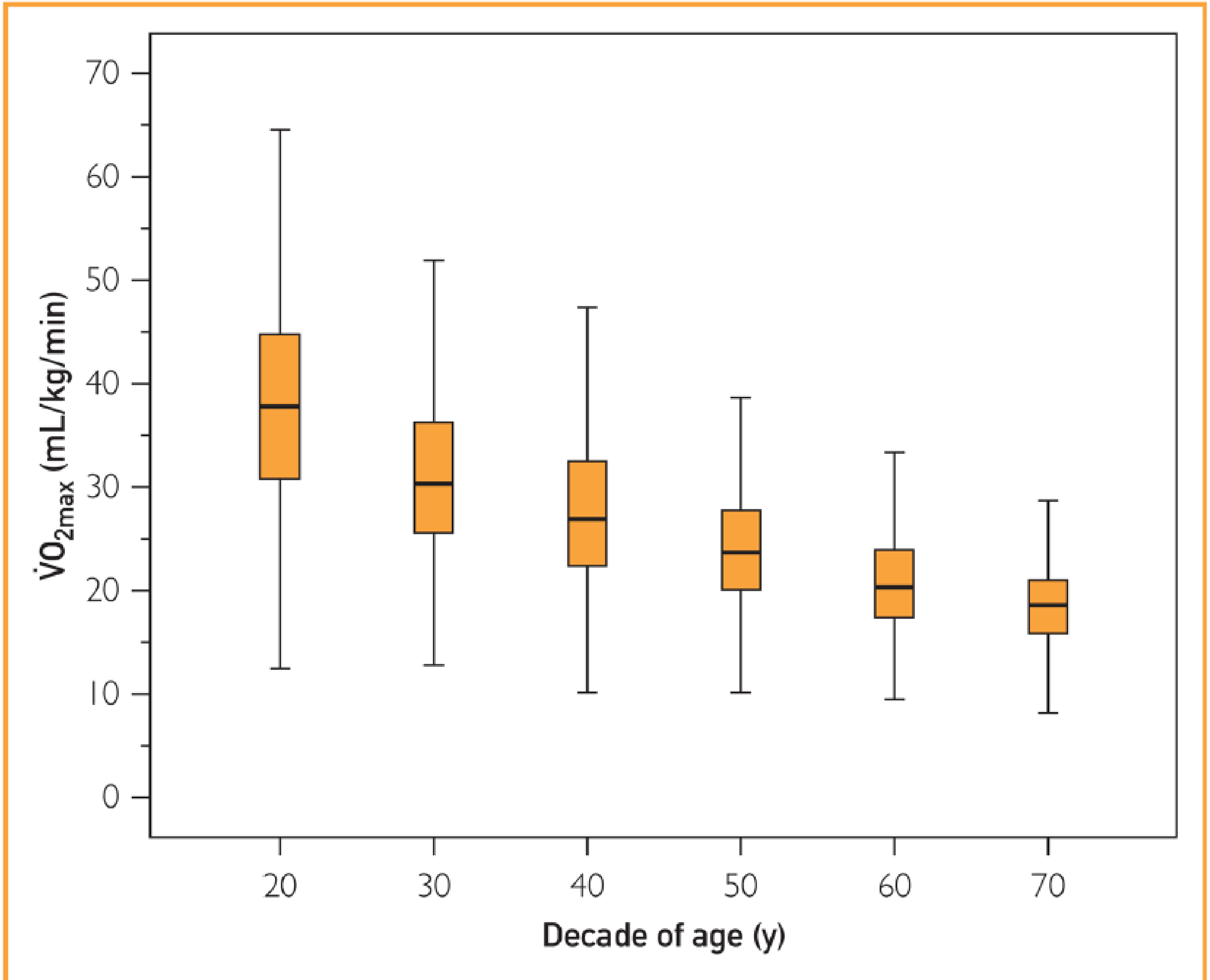


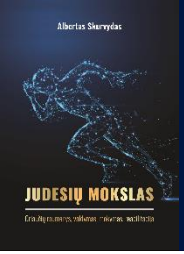
FIGURE 2.
Boxplot of measured maximal oxygen update ($\dot{V}_{O_{2max}}$) in the Fitness Registry and the Importance of Exercise National Database obtained from women performing treadmill exercise tests during a 6-decade period.

.1016/j.mayocp.2015.07.026.

atory Fitness Measured
g: Data From the Fitness
se National Database

athan Myers, PhD

ŠSD ramybėje taip pat labai rimtas CVF rodiklis!



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ISSN 0735-1097/07/$32.00
doi:10.1016/j.jacc.2007.04.079

STATE-OF-THE-ART PAPER

Resting Heart Rate in Cardiovascular Disease

Kim Fox, MD, FESC,* Jeffrey S. Borer, MD, FACC,† A. John Camm, MD, FESC, FACC,‡
colas Danchin, MD, FESC,§ Roberto Ferrari, MD, FESC,||
e L. Lopez Sendon, MD, FESC, FACC,¶ Philippe Gabriel Steg, MD, FESC, FACC,#
n-Claude Tardif, MD, FACC, FRCPC,** Luigi Tavazzi, MD, FESC, FACC,††
chal Tendera, MD, FESC, FACC,‡‡ for the Heart Rate Working Group

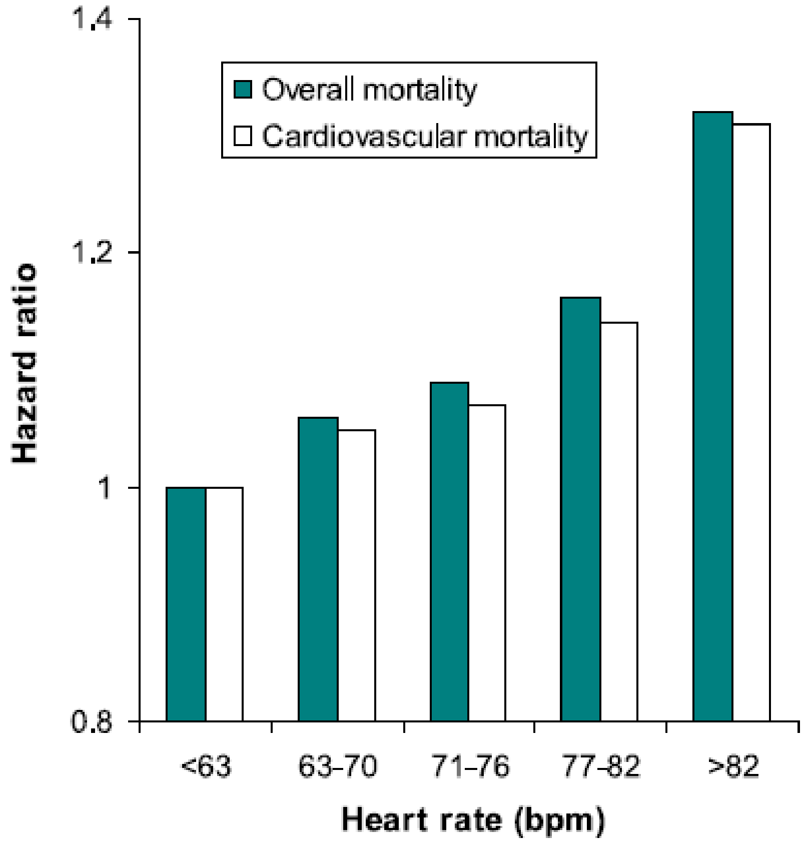
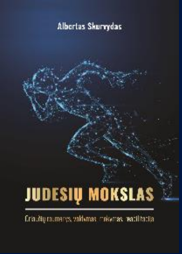


Figure 2 Heart Rate and Mortality in Coronary Artery Disease

Relationship between hazard ratio and resting heart rate for all-cause and cardiovascular mortality in 24,913 patients with suspected or proven coronary artery disease. Based on data from Diaz et al. (5). bpm = beats/min.



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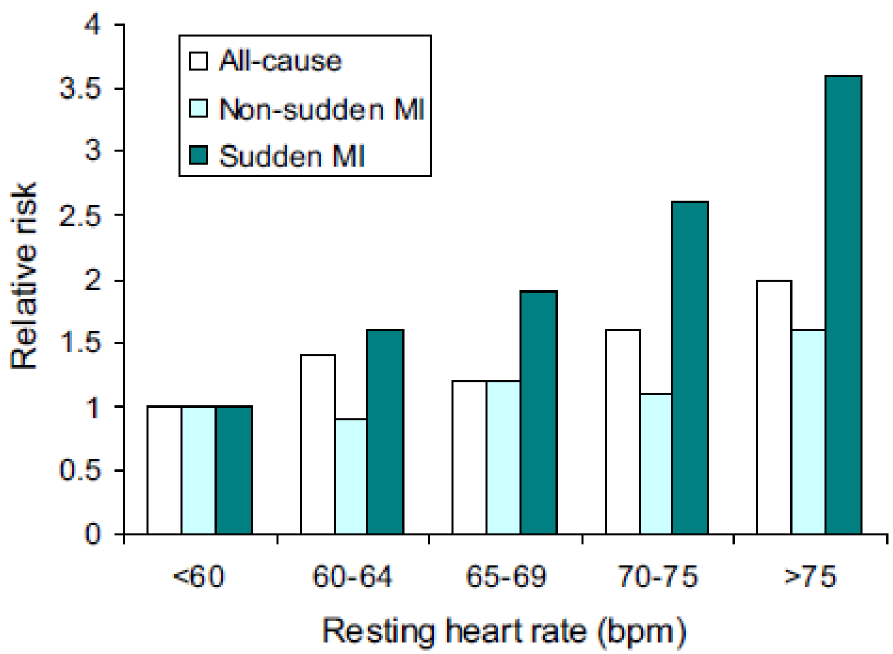
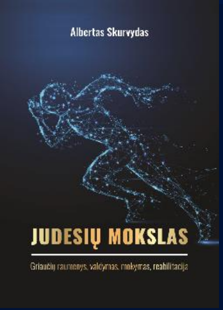


Figure 1 Heart Rate and Mortality in Healthy Men

Relative risk of death from any cause, nonsudden death from myocardial infarction (MI), and sudden death from MI by quintiles of resting heart rate in 5,713 men without known or suspected heart disease. Reprinted with permission from Jouven et al. (1). bpm = beats/min.



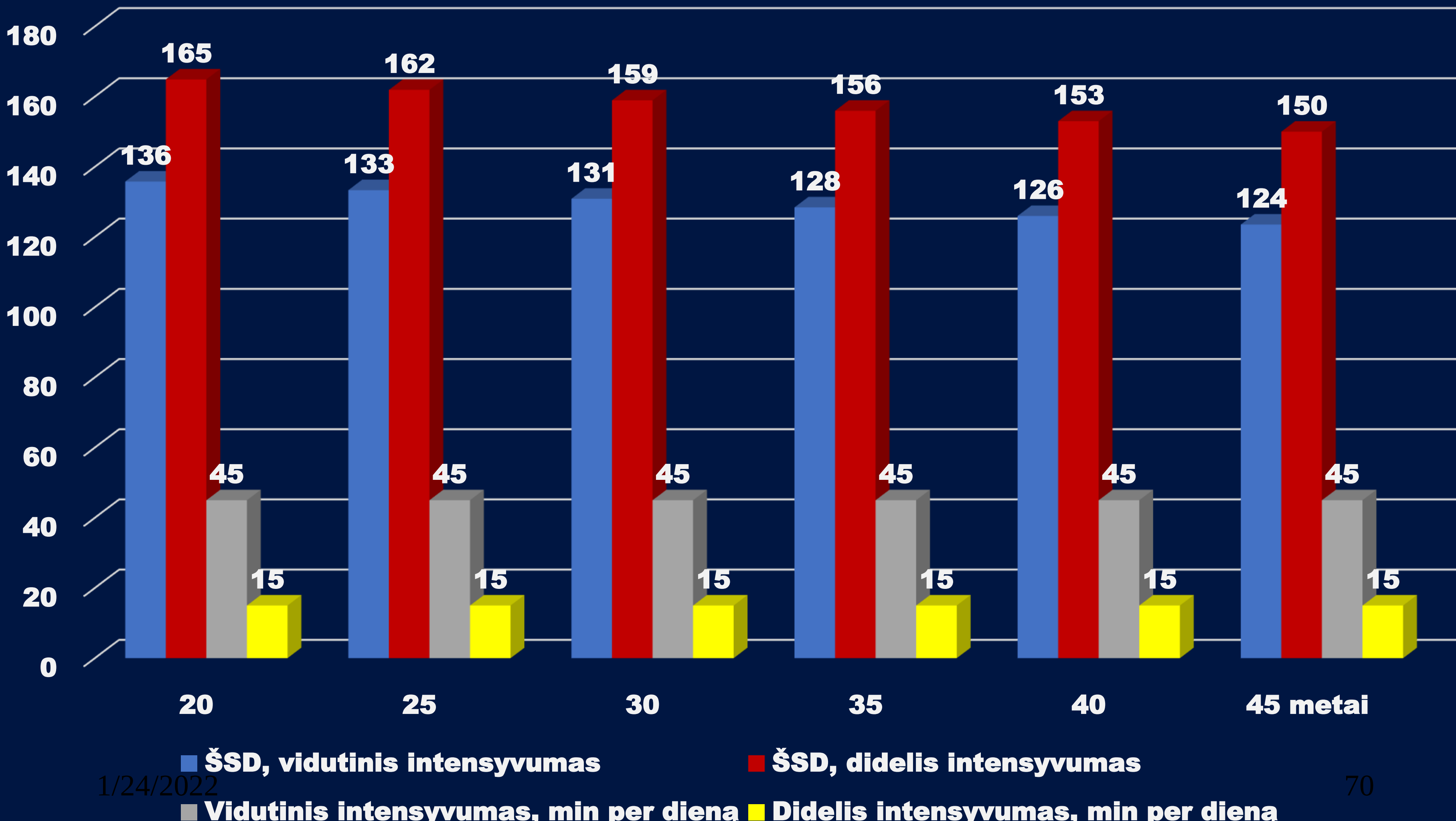
ŠKS stiprinimas!

Būtinas fizinis aktyvumas įvairaus amžiaus Žmonėms

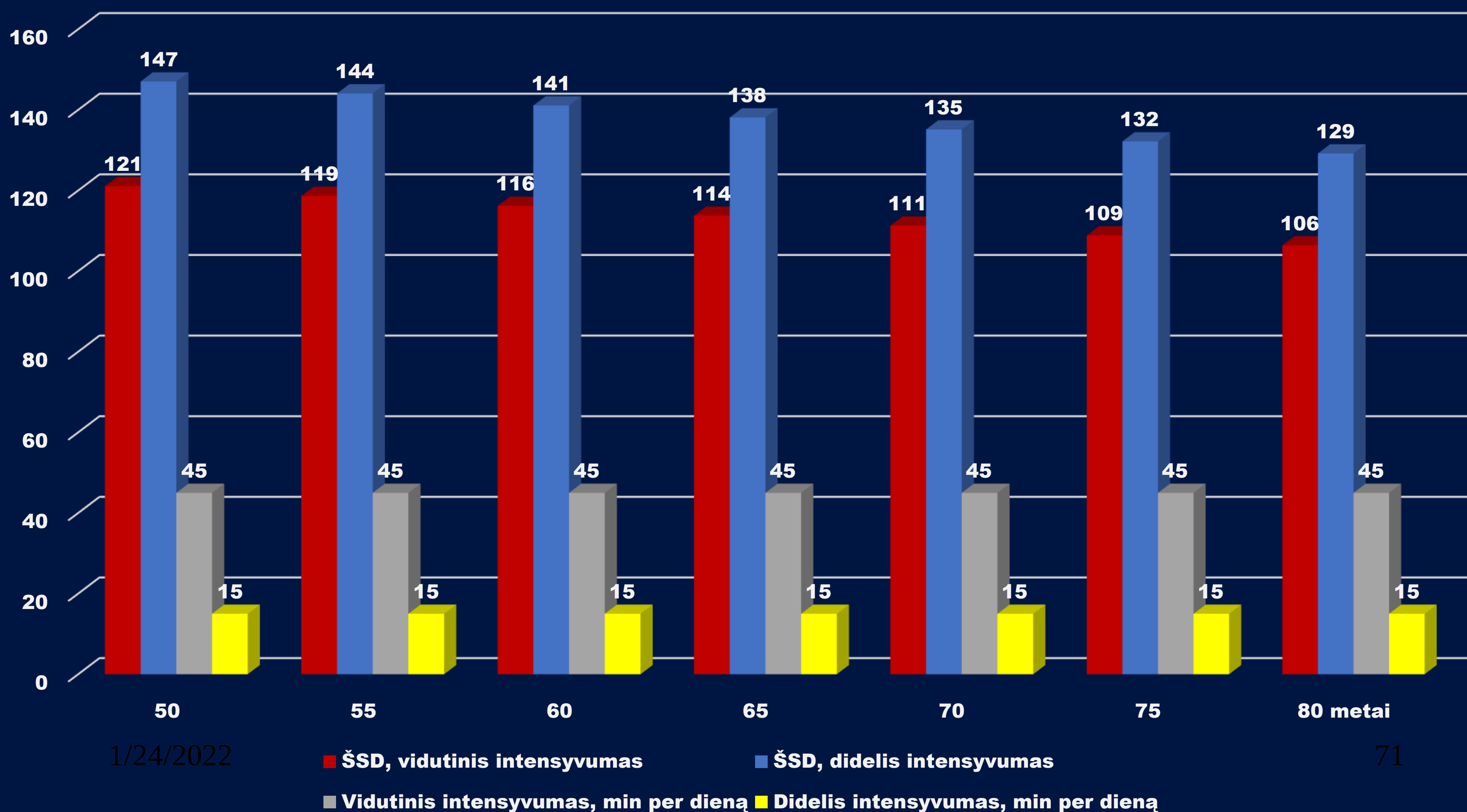
(parengiau pagal WHO, 2020)

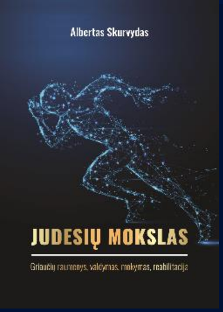
Amžius, sveikata	Vidutinio ir didelio intensyvumo aerobinis fizinis aktyvumas	Jėgos pratimai	Pusiausvyros palaikymo, tempimo ir judesių valdymo pratimai	Kiti patarimai
1) 5-17 metai	Ne mažiau kaip 420 min per savaitę	3 kartus per savaitę		Bet koks judėjimas yra žymiai geriau nei sėdėjimas!
2) 18-64 metai	Ne mažiau kaip 300 min per savaitę	2 kartus per savaitę		
3) >65 metų	Ne mažiau kaip 300 min per savaitę	2 kartus per savaitę	3 kartus per savaitę	
4) Nėščioms moterims	Ne mažiau kaip 150 min per savaitę	2 kartus per savaitę	Lengvi ištempimai	
5)>18 metų, sergantys diabetu, vėžiu, depresija, hipertenzija ir kitomis lėtinėmis ligomis	Ne mažiau kaip 300 min per savaitę	2 kartus per savaitę		
6) Negalią turintys	Ne mažiau kaip 150 min per savaitę	2 kartus per savaitę		

Kiek ir kokiu intensyvumu (širdies susitraukimo dažnumas, min/kartai) per dieną reikia judėti, kad širdis būtų sveika skirtingo amžiaus Žmonėms



Kiek ir kokiu intensyvumu (širdies susitraukimo dažnumas, min/kartai) per dieną reikia judėti, kad širdis būtų sveika (50-80 metų vyrams ir moterims)




Albertas Skurvydas
JUDESIŲ MOKSLAS
Griaučių raumenys, valdymas, mokymas, reabilitacija

HIT!

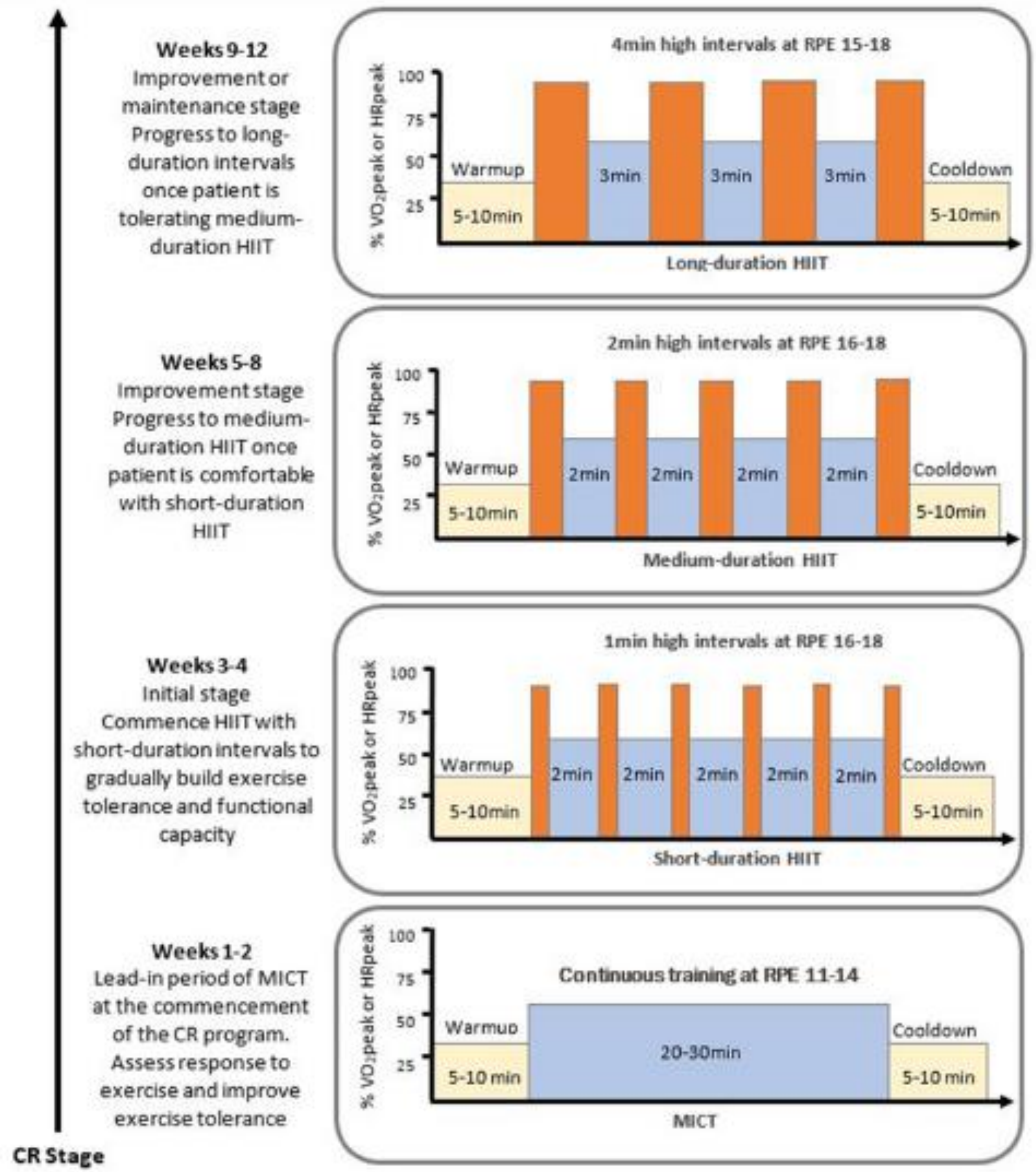
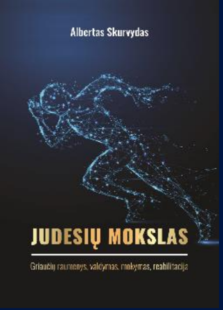


FIGURE 2 | Example of a HIIT progression model within a cardiac rehabilitation program. Exercise intensity remains constant for each HIIT protocol with high intensity intervals eliciting 85-95 %HRpeak and RPE 15-18, and the low intensity intervals involving recovery at 50-75 %HRpeak or RPE 11-14. CR, cardiac rehabilitation; HIIT, high intensity interval training; HRpeak, peak heart rate; MICT, moderate intensity continuous training; RPE, rating of perceived exertion on 6-20 Borg scale; VO_2peak, peak oxygen consumption. This figure has been adapted from the previously published work of (158); with permission of Mayo Foundation for Medical Education and Research, all rights reserved.

Medicine
REVIEW
published: 03 September 2021
doi: 10.3389/fcvm.2021.734278

Optimizing Outcomes in Cardiac Rehabilitation: The Importance of Exercise Intensity

Jenna L. Taylor*, Amanda R. Bonikowske and Thomas P. Olson

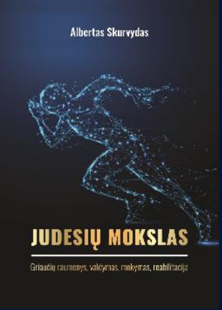


High-intensity interval training in patients with lifestyle-induced cardiometabolic disease: a systematic review and meta-analysis

Kassia S Weston,[1] Ulrik Wisløff,[2] Jeff S Coombes[1]

What are the new findings?

- High-intensity interval training (HIIT) is superior to moderate-intensity continuous training in improving cardiorespiratory fitness in lifestyle-induced cardiometabolic diseases.
- HIIT is well-tolerated, safe and improves the quality of life.
- Central and peripheral adaptations are responsible for the superior benefits of HIIT.



High-intensity interval training in patients with lifestyle-induced cardiometabolic disease: a systematic review and meta-analysis

Kassia S Weston,[1] Ulrik Wisløff,[2] Jeff S Coombes*Br J Sports Med* 2014;

Table 2 Protocol recommendations for HIIT

Frequency	3×/Week
Duration	40 min
Modality	Treadmill/hill, cycle ergometer. Increasing speed or incline
Intensity	Interval=85–95% PHR Rest=passive–70% PHR
Interval times	4×4 min intervals 3×3 min recovery
Warm-up	10 min at 60% PHR
Cool-down	5 min at 50% PHR

HIIT, homeostasis model assessment-insulin resistance; PHR, peak heart rate.

atients
lic disease:
sis

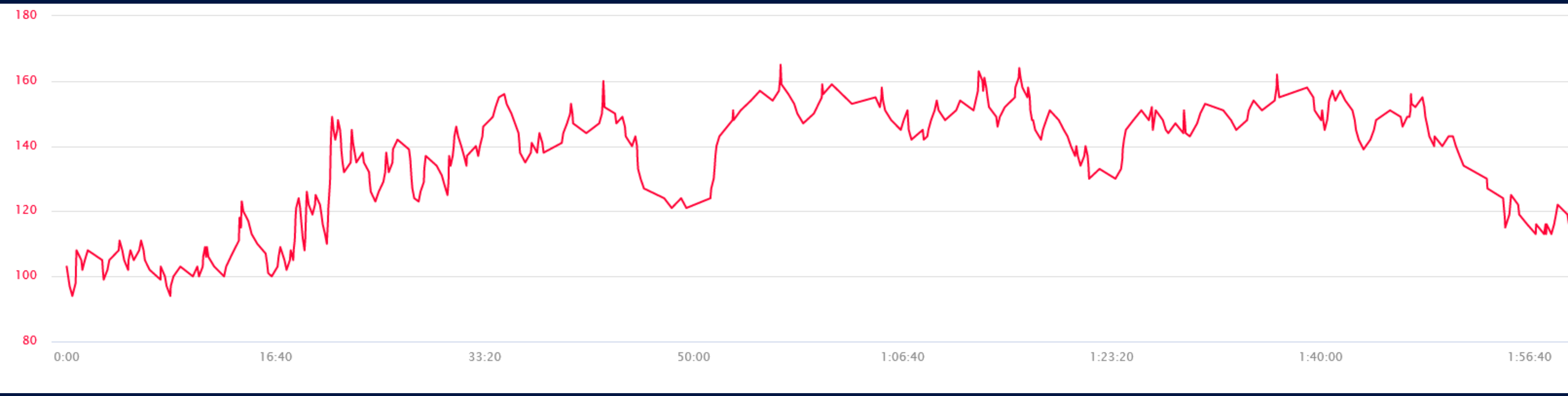
orts *Med* 2014;

Box 1 Adaptations occurring significantly more with HIIT compared to MICT

- ↑VO_2peak
- ↓Systolic and diastolic blood pressure
- ↑High density lipoproteins
- ↓Triglycerides and fasting glucose
- ↓Oxidative stress and inflammation
- ↓FATP-1 and FAS
- ↑Adiponectin, insulin sensitivity and β-cell function
- ↑PGC-1α
- ↑Maximal rate of Ca^{2+} reuptake
- ↑Availability of nitric oxide
- ↑Cardiac function
- ↑Enjoyment of exercise
- ↑Quality of life

FATP-1, fatty acid transport protein 1; FAS, fatty acid synthase; HIIT, high-intensity interval training; MICT, moderate-intensity continuous training

Futbolo žaidmas!



Ėjimas,

Bėgimas,

Važiavimas dviračiu

Sveikatai!

Klasifikuota 40 ėjimo tipų!

Compendium of Physical Activities: an update of activity codes and MET intensities

BARBARA E. AINSWORTH, WILLIAM L. HASKELL, MELICIA C. WHITT, MELINDA L. IRWIN, ANN M. SWARTZ, SCOTT J. STRATH, WILLIAM L. O'BRIEN, DAVID R. BASSETT, JR., KATHRYN H. SCHMITZ, PATRICIA O. EMPLAINCOURT, DAVID R. JACOBS, JR., and ARTHUR S. LEON

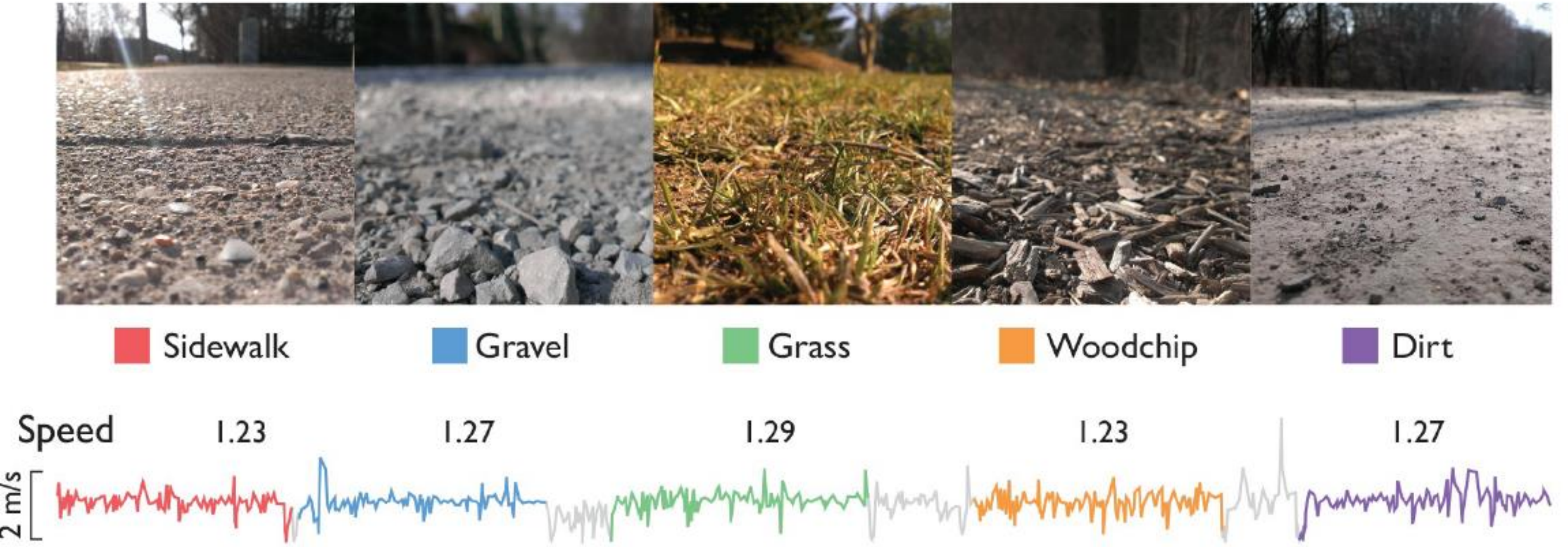
Med. Sci. Sports Exerc., Vol. 32, No. 9, Suppl., pp. S498–S516, 2000

16050	3.0	transportation,	driving heavy truck, tractor, bus
17010	7.0	walking,	backpacking (Taylor Code 050)
17020	3.5	walking,	carrying infant or 15 pound load (e.g. suitcase), level ground or downstairs
17025	9.0	walking,	carrying load upstairs, general
17026	5.0	walking,	carrying 1 to 15 lb load, upstairs
17027	6.0	walking,	carrying 16 to 24 lb load, upstairs
17028	8.0	walking,	carrying 25 to 49 lb load, upstairs
17029	10.0	walking,	carrying 50 to 74 lb load, upstairs
17030	12.0	walking,	carrying 74+ lb load, upstairs
17031	3.0	walking,	loading /unloading a car
17035	7.0	walking,	climbing hills with 0 to 9 pound load
17040	7.5	walking,	climbing hills with 10 to 20 pound load
17050	8.0	walking,	climbing hills with 21 to 42 pound load
17060	9.0	walking,	climbing hills with 42+ pound load
17070	3.0	walking,	downstairs
17080	6.0	walking,	hiking, cross country (Taylor Code 040)
17085	2.5	walking,	bird watching
17090	6.5	walking,	marching, rapidly, military
17100	2.5	walking,	pushing or pulling stroller with child or walking with children
17105	4.0	walking,	pushing a wheelchair, non-occupational setting
17110	6.5	walking,	race walking
17120	8.0	walking,	rock or mountain climbing (Taylor Code 060)
17130	8.0	walking,	up stairs, using or climbing up ladder (Taylor Code 030)
17140	5.0	walking,	using crutches
17150	2.0	walking,	walking, household
17151	2.0	walking,	walking, less than 2.0 mph, level ground, strolling, very slow
17152	2.5	walking,	walking, 2.0 mph, level, slow pace, firm surface
17160	3.5	walking,	walking for pleasure (Taylor Code 010)
17161	2.5	walking,	walking from house to car or bus, from car or bus to go places, from car or bus to and from the worksite
17162	2.5	walking,	walking to neighbor's house or family's house for social reasons
17165	3.0	walking,	walking the dog
17170	3.0	walking,	walking, 2.5 mph, firm surface
17180	2.8	walking,	walking, 2.5 mph, downhill
17190	3.3	walking,	walking, 3.0 mph, level, moderate pace, firm surface
17200	3.8	walking,	walking, 3.5 mph, level, brisk, firm surface, walking for exercise
17210	6.0	walking,	walking, 3.5 mph, uphill
17220	5.0	walking,	walking, 4.0 mph, level, firm surface, very brisk pace
17230	6.3	walking,	walking, 4.5 mph, level, firm surface, very, very brisk

RESEARCH ARTICLE

Human walking in the real world: Interactions between terrain type, gait parameters, and energy expenditure

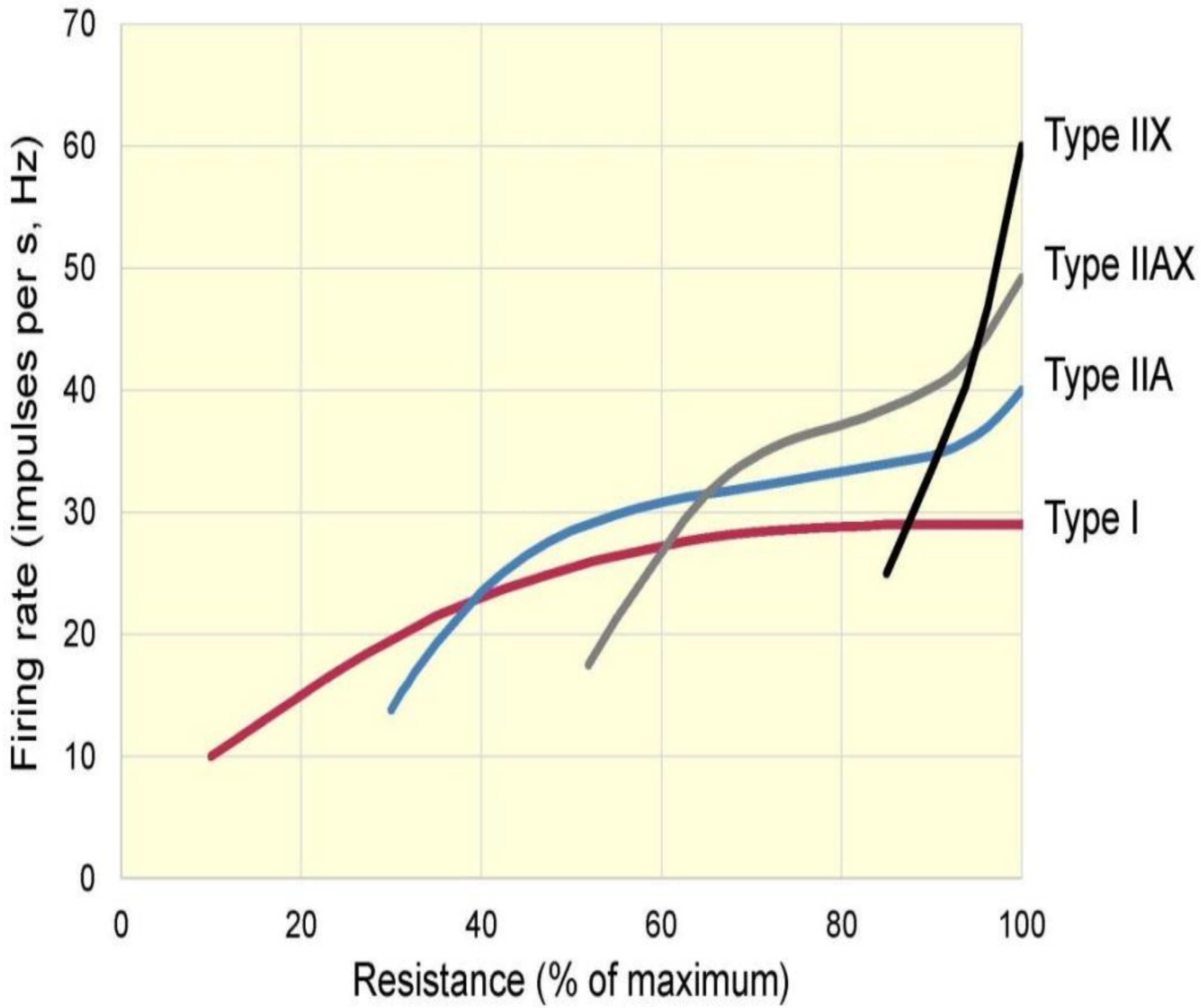
Daniel B. Kowalsky[1], John R. Rebula[1], Lauro V. Ojeda[1], Peter G. Adamczyk[2], Arthur D. Kuo[1,3]*



Muscle fibre activation and fatigue with low-load blood flow restricted resistance exercise—An integrative physiology review

Wernbom, Mathias; Aagaard, Per

Published in:
Acta Physiologica



Muscle fibre activation and fatigue with low-load blood flow restricted resistance exercise—An integrative physiology review

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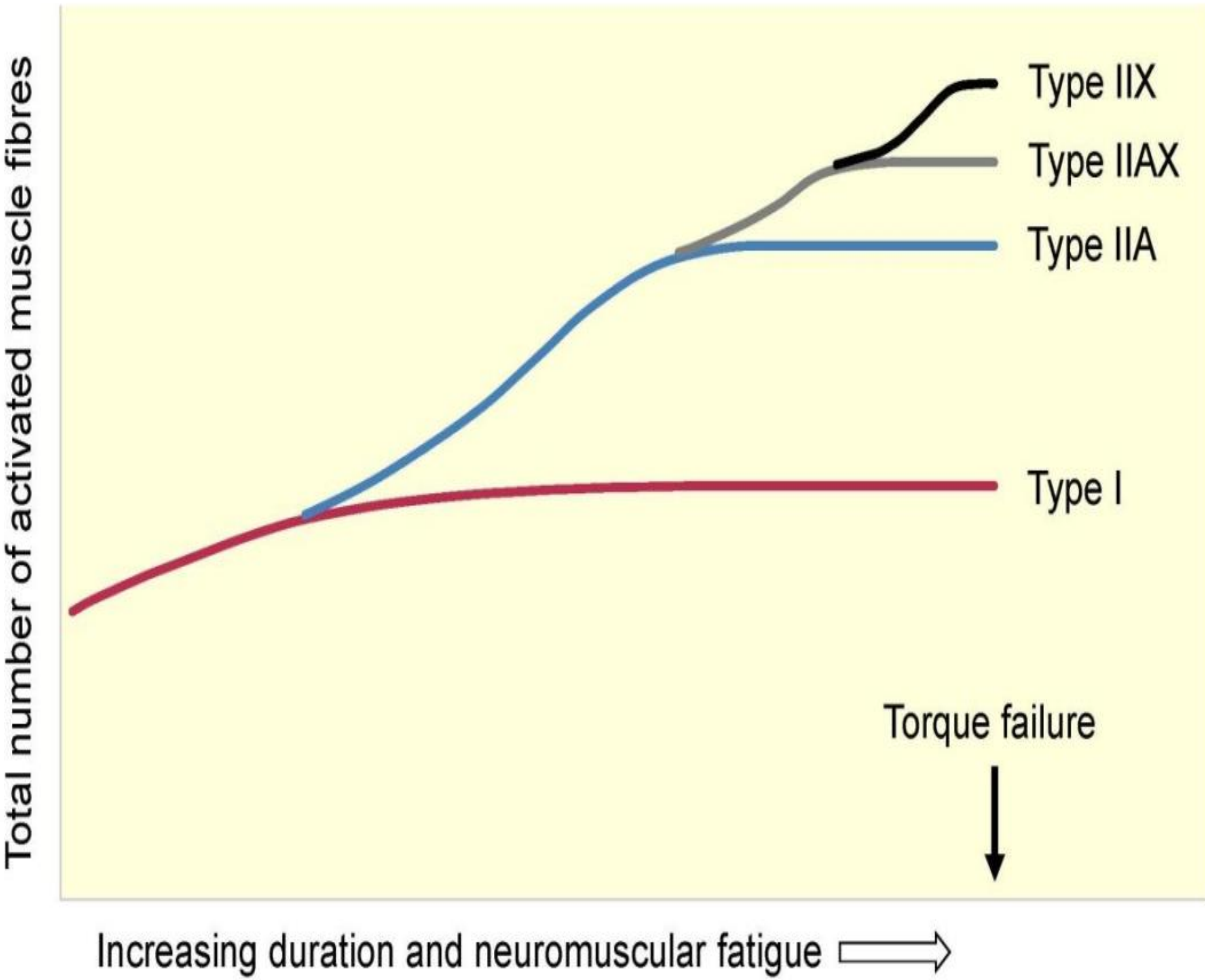
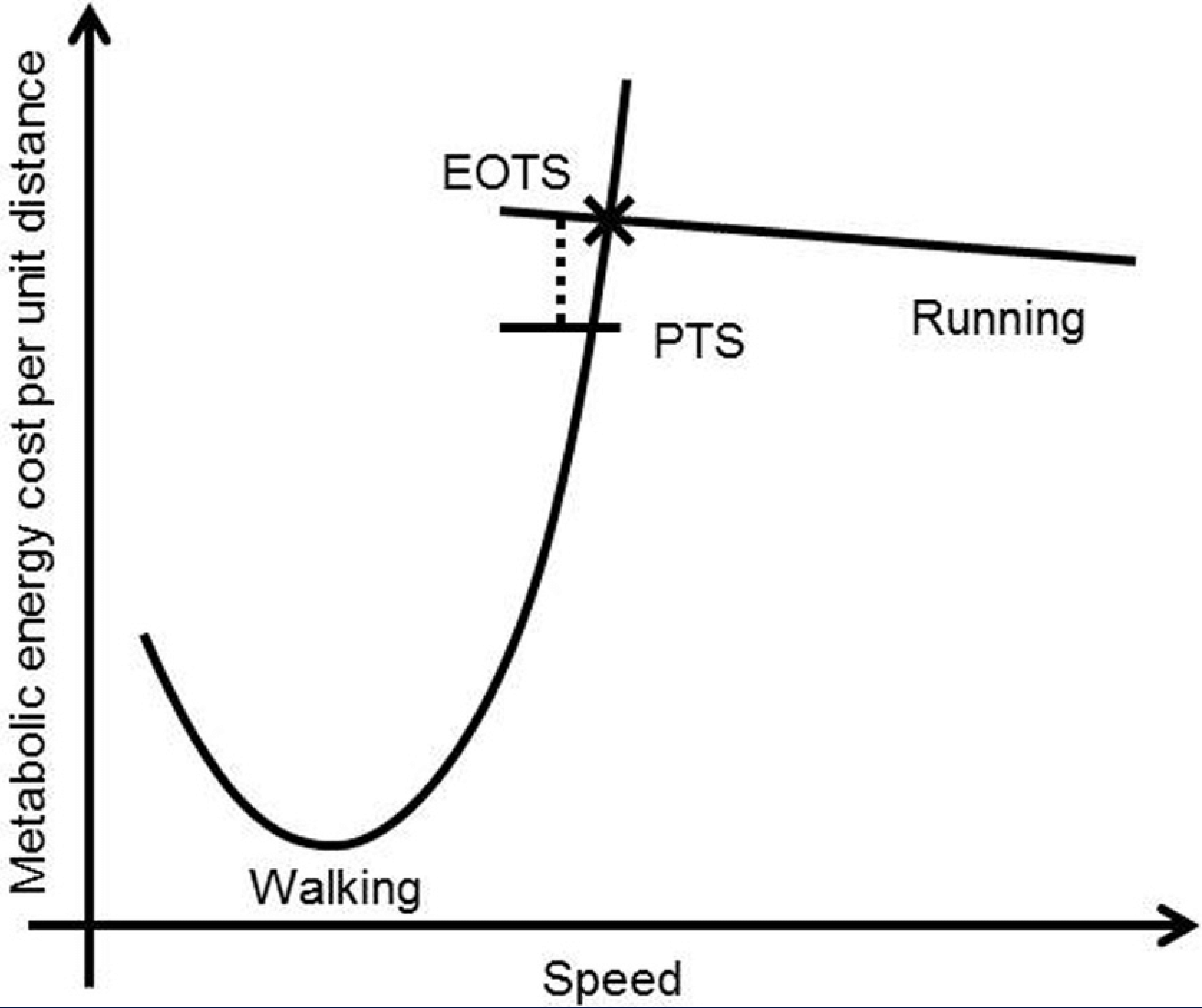



Metabolic energy cost per unit distance
EOTS
PTS
Running
Walking
Speed

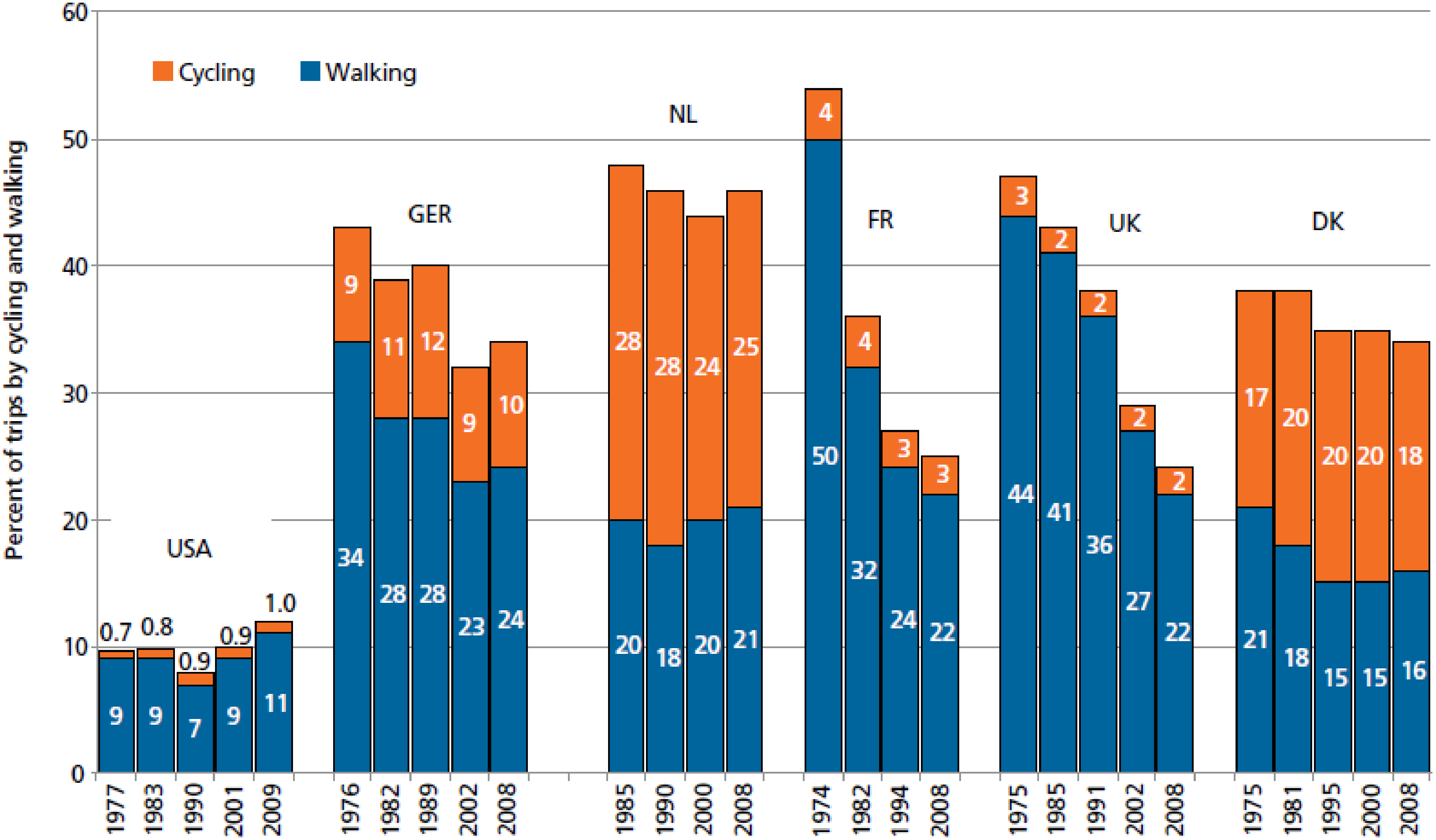


FIGURE 2 Trends in combined cycling and walking share of all daily trips in the United States, Germany (GER), the Netherlands (NL), France (FR), the United Kingdom (UK), and Denmark (DK), 1974–2009.

Note: Dissimilarities in data collection methods, timing, and variable definitions limit the comparability of the modal shares shown. The increase reported for the United States in the combined walk and bike share of trips between 1990 and 2001 probably results from a change in methodology that captured previously underreported walk trips. (Sources: Danish MOT, British DfT, French MOT, German MOT, Netherlands MOT, U.S. DOT, and Norwegian Institute of Economic Research.)

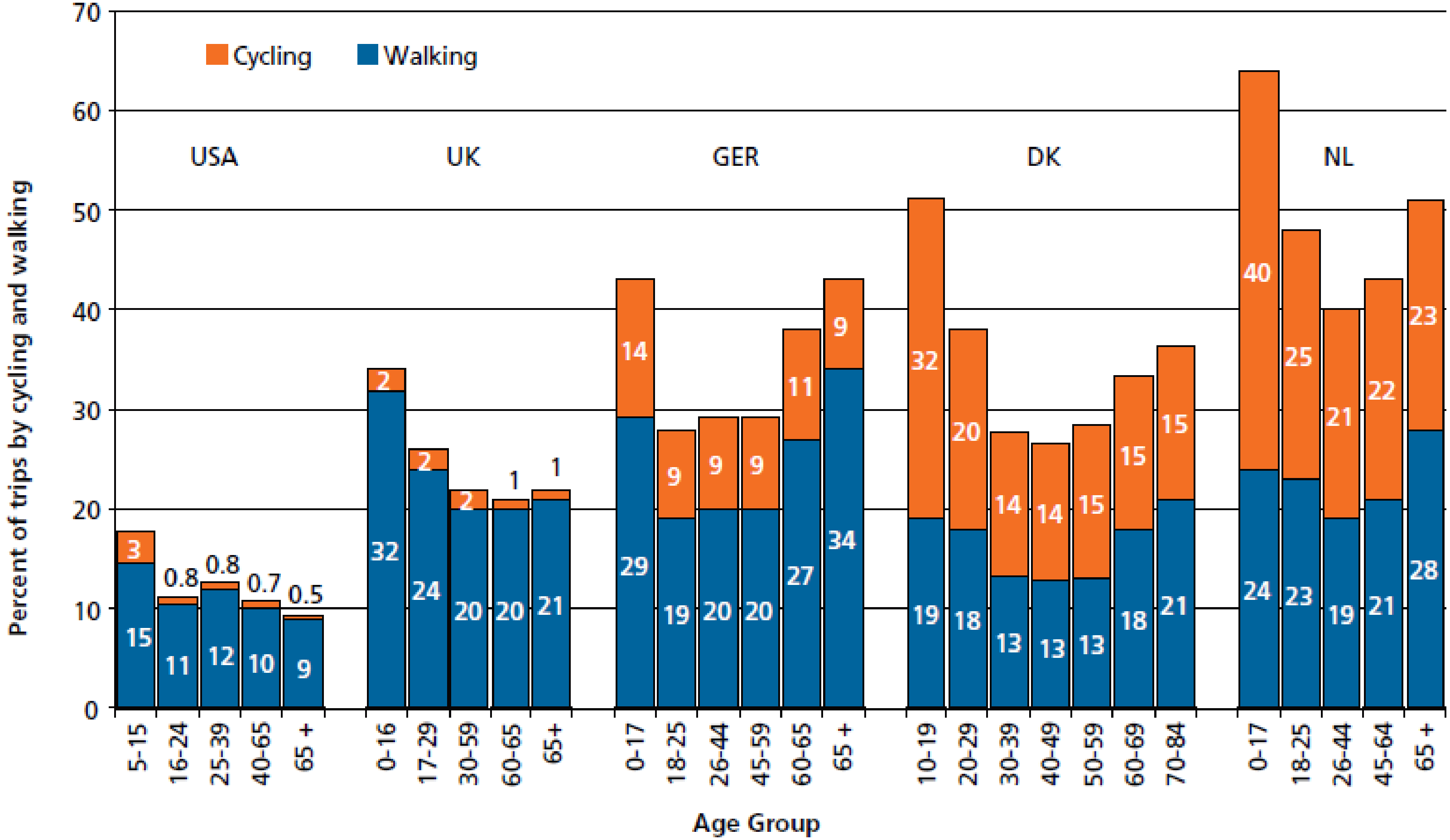
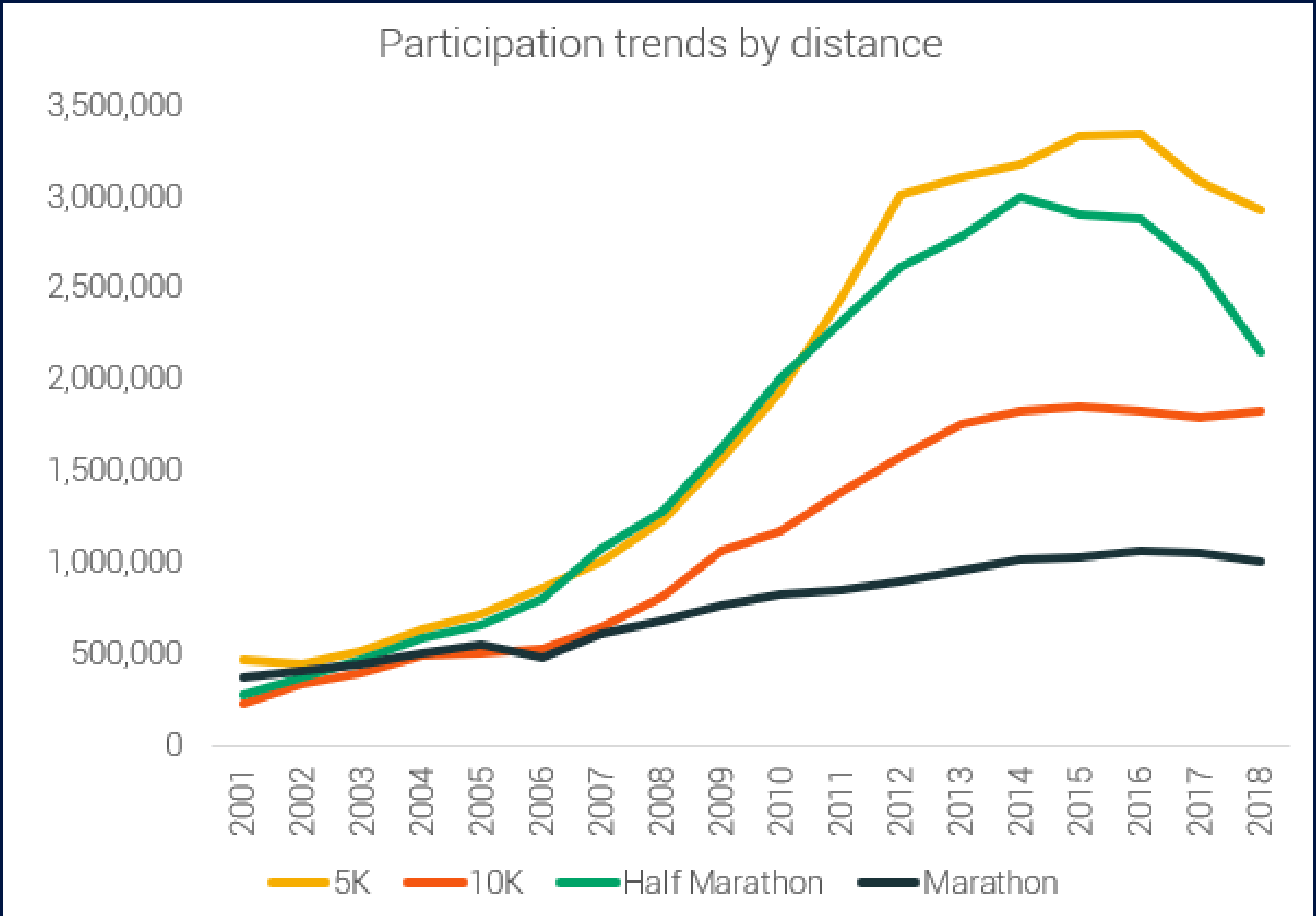
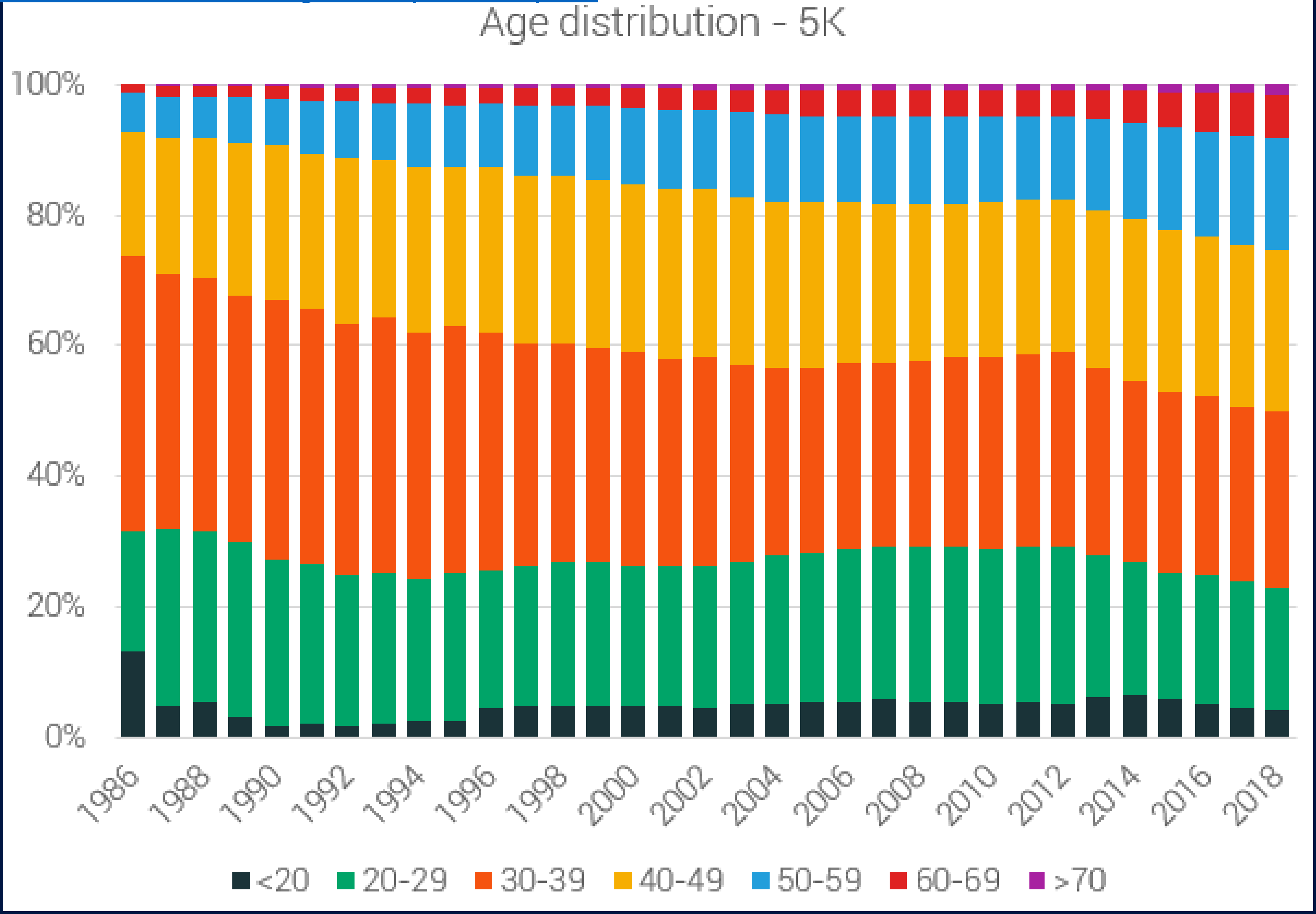


FIGURE 3 Cycling and walking share of trips within each age group in the Netherlands, Denmark, Germany, the United Kingdom, and the United States, 2009, as percent of trips by all modes for all trip purposes.
Note: Each country uses somewhat different age categories in travel surveys. The percentages shown refer to the walking and cycling share of all trips made by persons within each age category. (Sources: Danish MOT, British DfT, German MOT, Netherlands MOT, and U.S. DOT.)

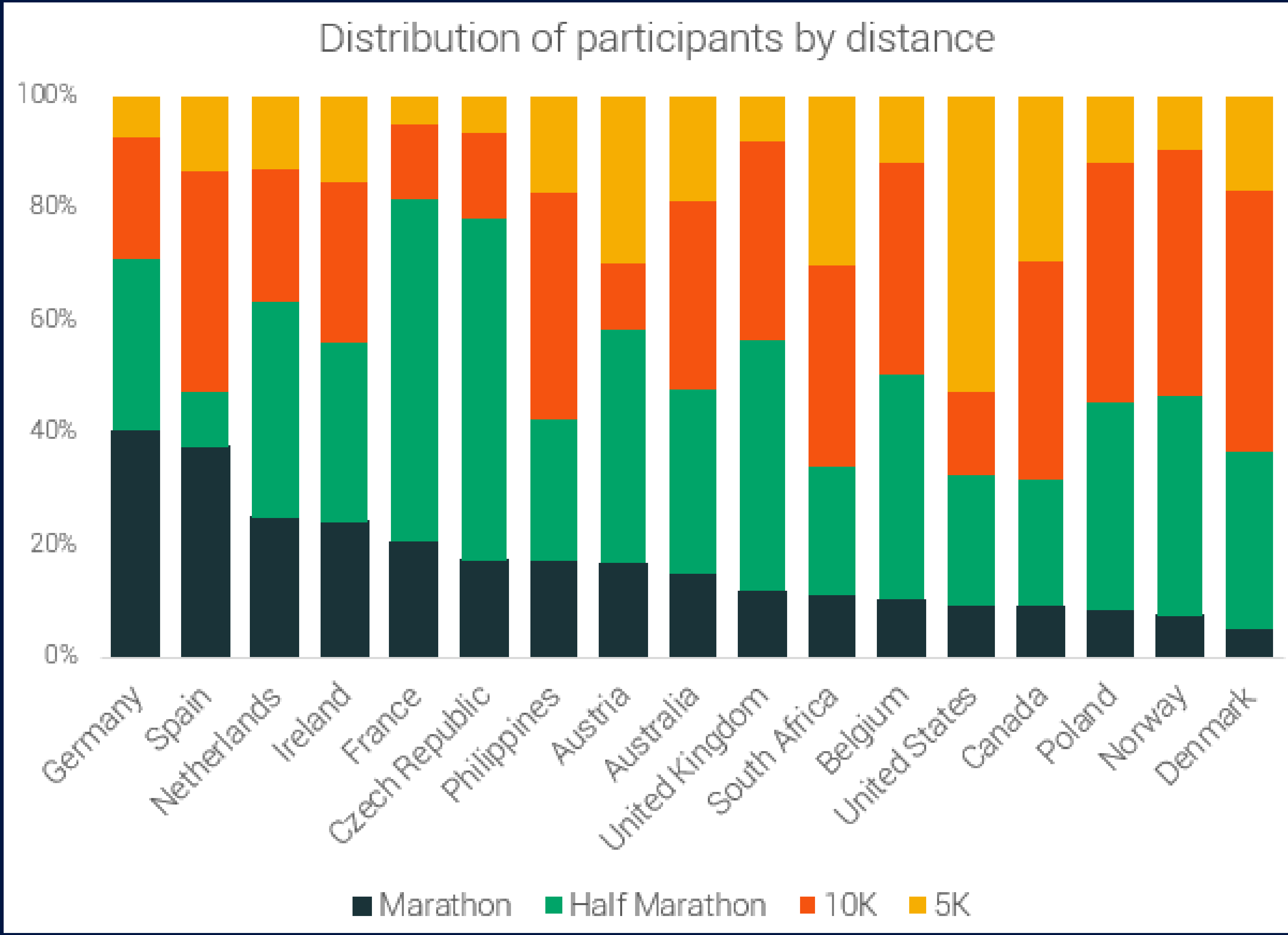
[The State of Running 2019 | RunRepeat]



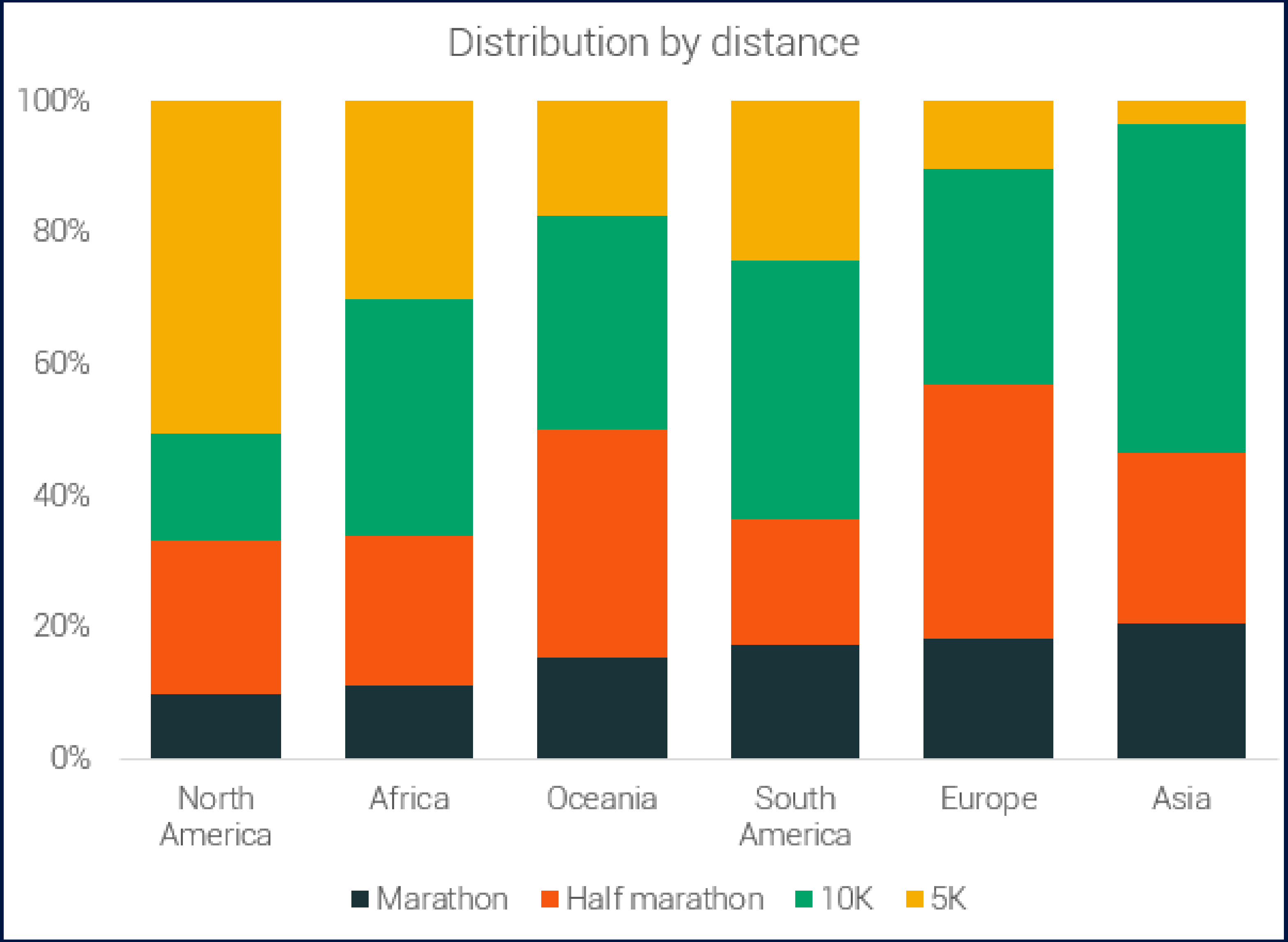
[The State of Running 2019 | RunRepeat]



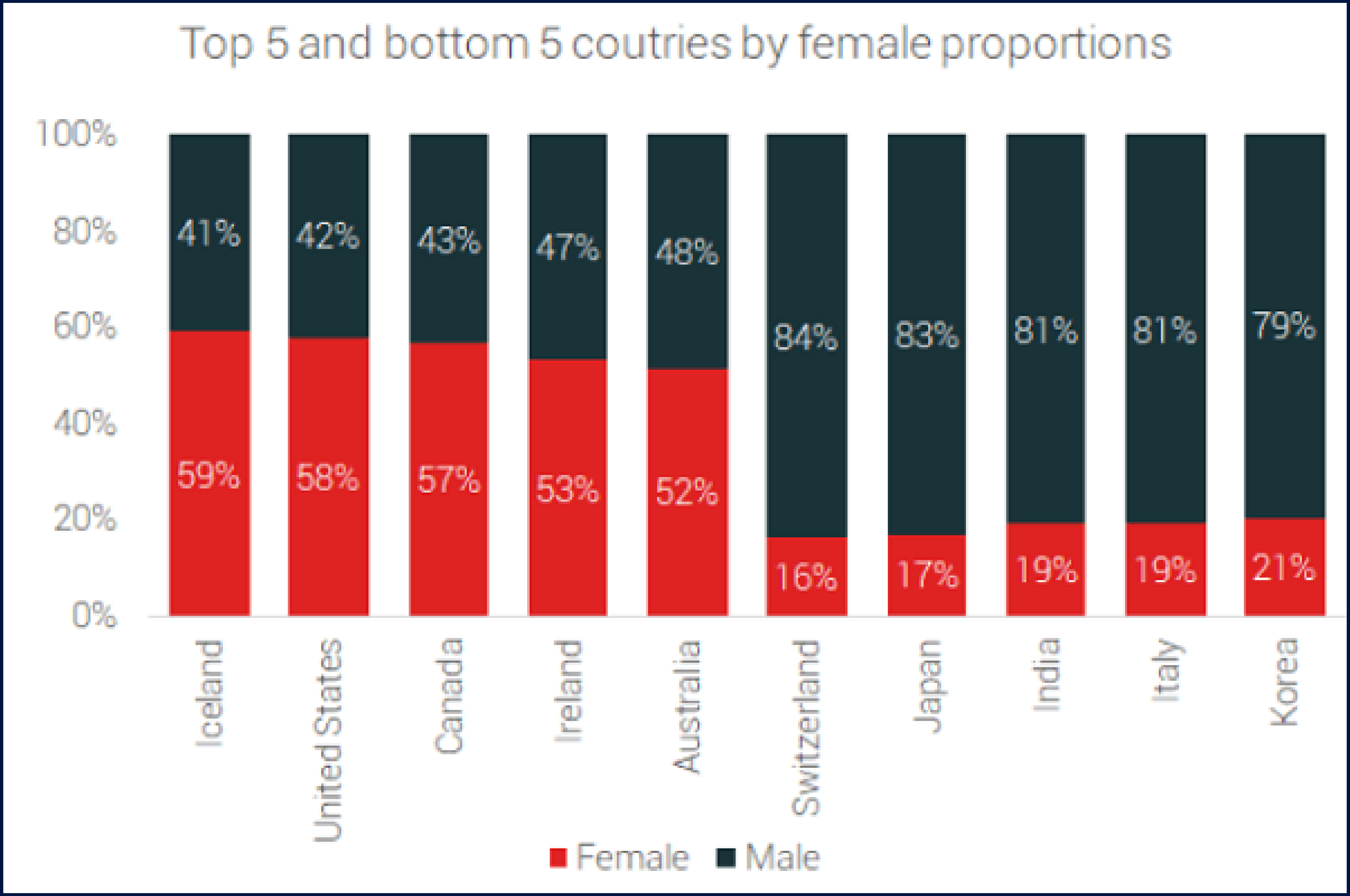
[The State of Running 2019 | RunRepeat]



[The State of Running 2019 | RunRepeat]



[The State of Running 2019 | RunRepeat]



Ėjimo/bėgimo naudos!

The New England Journal of Medicine

WALKING COMPARED WITH VIGOROUS EXERCISE FOR THE PREVENTION OF CARDIOVASCULAR EVENTS IN WOMEN

JoAnn E. Manson, M.D., Dr.P.H., Philip Greenland, M.D., Andrea Z. LaCroix, Ph.D., Marcia L. Stefanick, Ph.D., Charles P. Mouton, M.D., Albert Oberman, M.D., M.P.H., Michael G. Perri, Ph.D., David S. Sheps, M.D., Mary B. Pettinger, M.S., and David S. Siscovick, M.D., M.P.H.

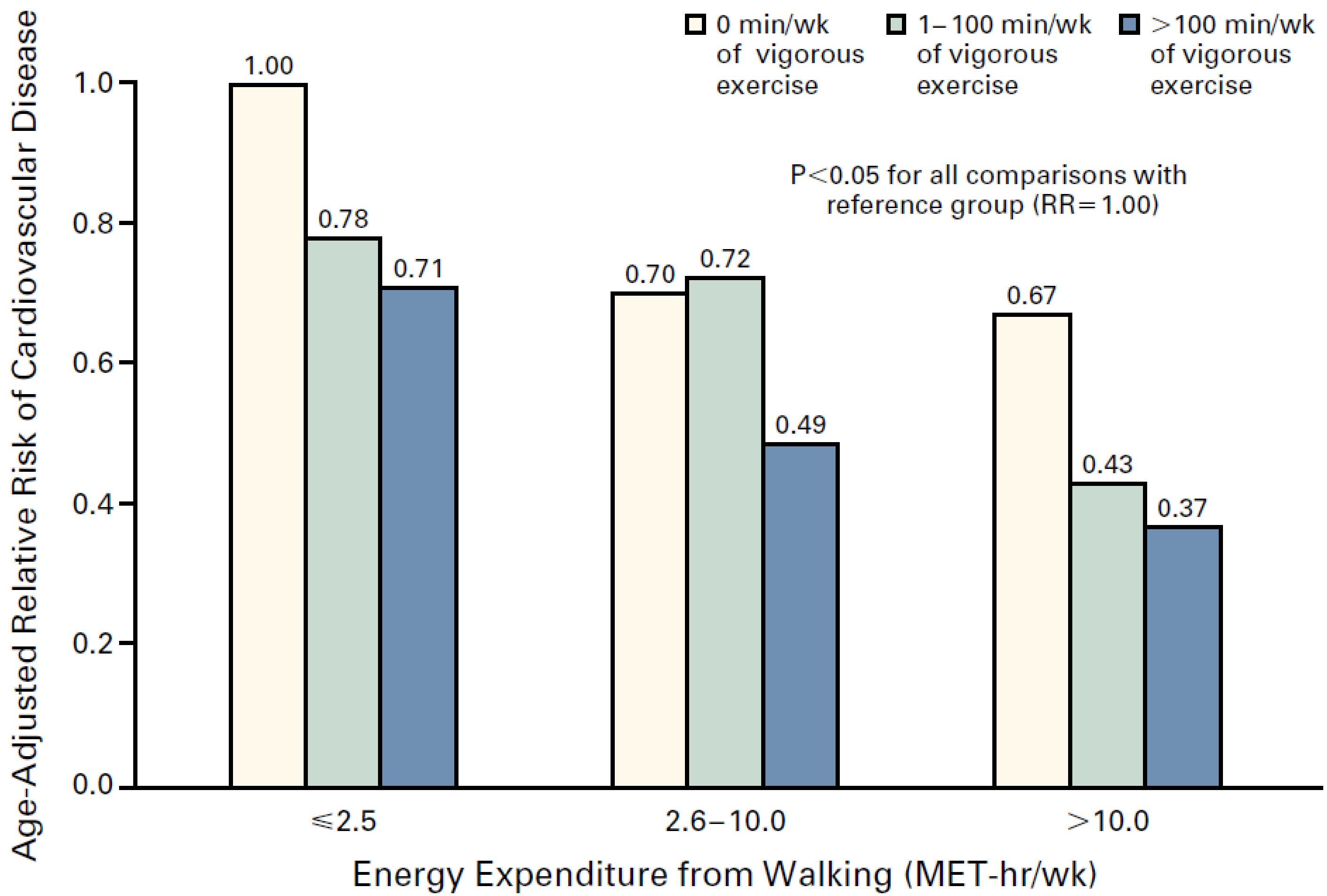
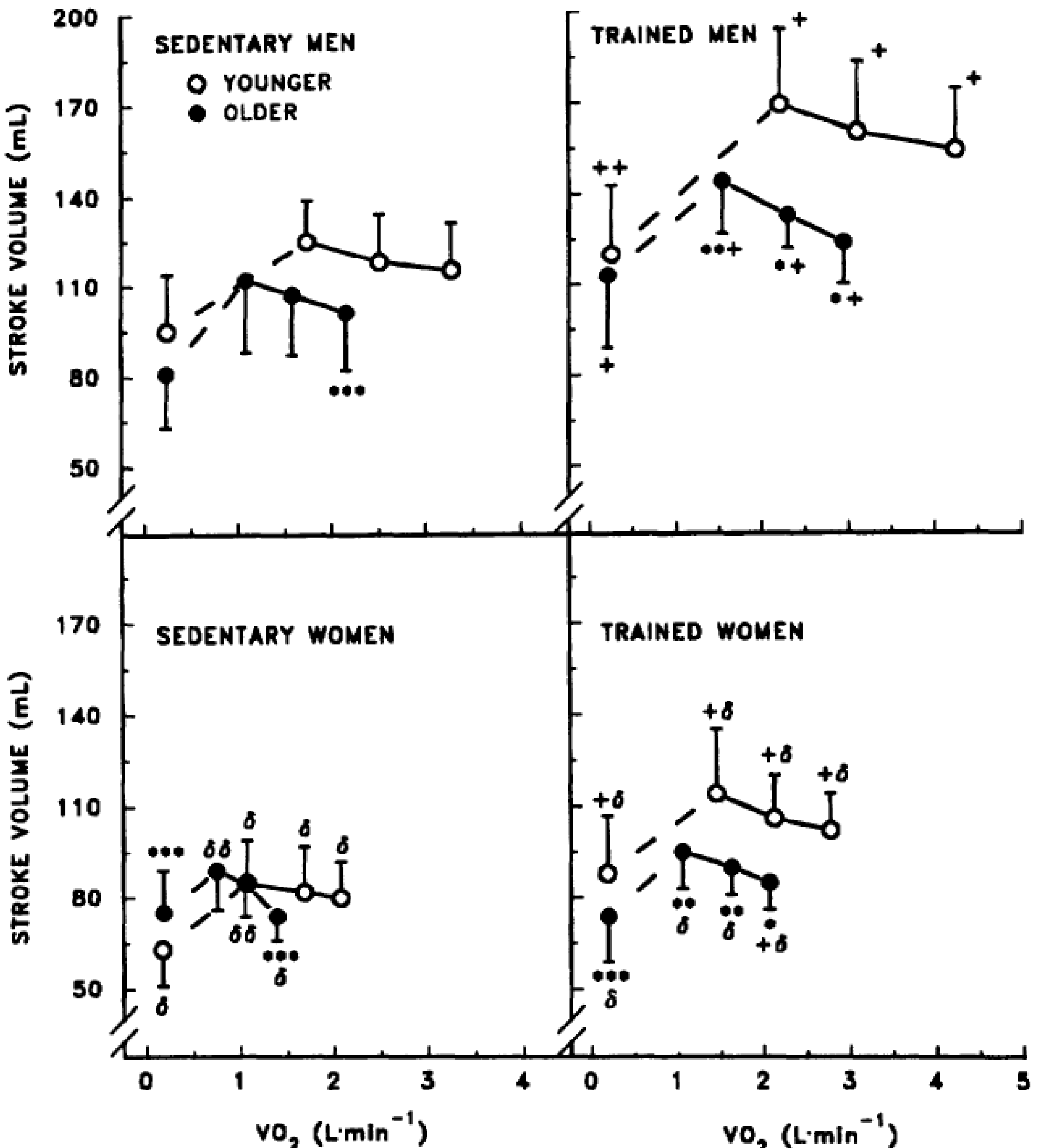


Figure 3. Joint Association of Walking and Vigorous Exercise with the Age-Adjusted Relative Risk of Cardiovascular Disease. RR denotes relative risk.

Effects of Aging, Sex, and Physical Training on Cardiovascular Responses to Exercise

Takeshi Ogawa, MD; Robert J. Spina, PhD; Wade H. Martin III, MD; Wendy M. Kohrt, PhD; Kenneth B. Schechtman, PhD; John O. Holloszy, MD; and Ali A. Ehsani, MD



REVIEW ARTICLE

Sports Med. 1997 May; 23 (5): 306-332
0112-1642/97/0005-0306/$13.50/0

Walking to Health

Jeremy N. Morris[1] and *Adrianne E. Hardman*[2]

Table VII. Risk of death in middle-aged and elderly men recording at entry 15km of regular walking per week compared with men walking less in a prospective study, 1977 to 1988 (Paffenbarger RS, personal communication 1996)

Mortality	Relative risk	p
Coronary heart disease	0.83	0.141
Total cardiovascular disease	0.74	0.003
All causes	0.87	0.023

Table VI. Regular walking and the age-standardised incidence (first clinical episodes) of coronary heart disease in 4824 British male executive grade civil servants aged 55-64y at entry and followed on average for 9y, 4mo. Rates per 1000 man-years[86,119,123,124]

	No. of cases	Total rate	Fatal rate
Hours in week[a]			
0[b]	25	5.3	3.9
≤3.5	148	5.1	4.1
≤7	42	4.6	3.6
>7	9	4.4	3.3
Usual pace[a]			
Stroll	41	7.9	6.6
Normal/average	107	4.7	3.8
Fairly brisk	50	4.1	3.3
Fast (>6.4 km/h)	1	1.4	
Usual pace by hours in week			
Stroll			
≤3.5	32	7.3	5.8
>3.5	9	11.2	10.6
Normal			
≤3.5	80	4.6	3.7
>3.5	27	5.5	4.2
Brisk[c]			
≤3.5	35	5.0	4.3
>3.5	16	2.7	2.1

REVIEW ARTICLE

Sports Med. 1997 May; 23 (5): 306-332
0112-1642/97/0005-0306/$13.50/0

Walking to Health

Jeremy N. Morris[1] and Adrianne E. Hardman[2]

Nutrients **2017**, *9*, 513; doi:10.3390/nu9050513

Potential Impact of Nutrition on Immune System Recovery from Heavy Exertion: A Metabolomics Perspective

David C. Nieman [1,*] and Susan Hazels Mitmesser [2]

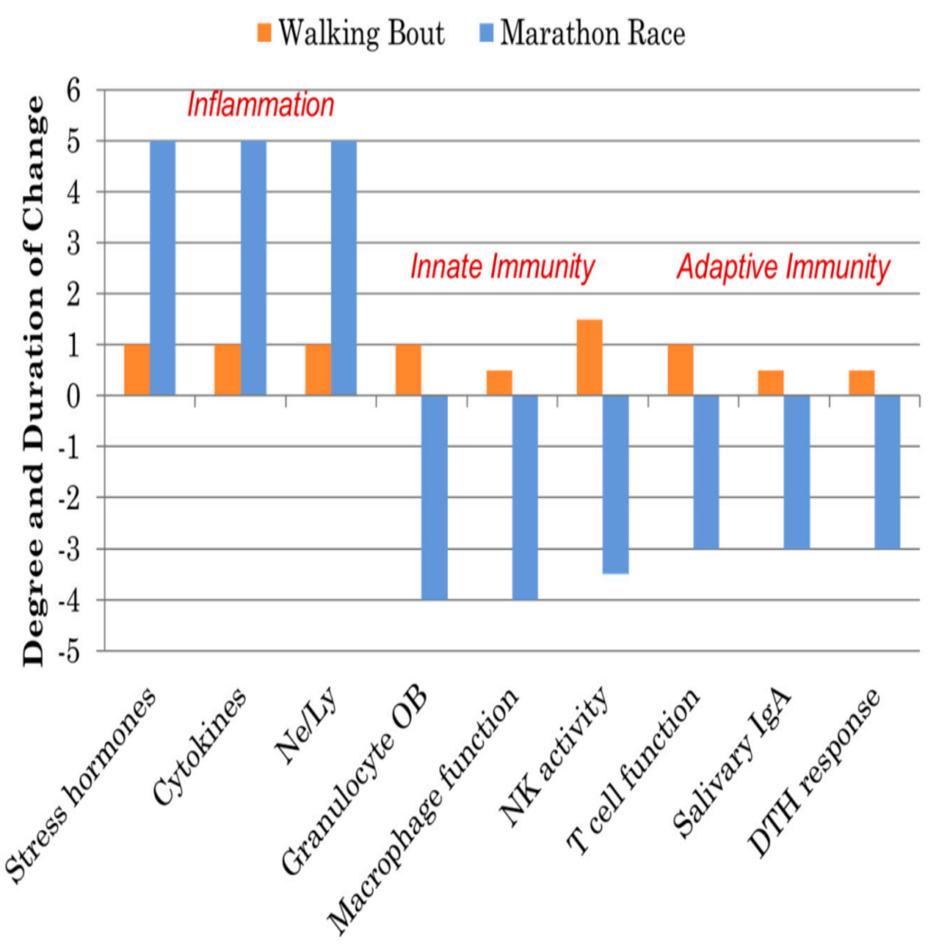


Figure 2. Comparison of the immune responses to a marathon race and a walking bout. (DTH = delayed-type hypersensitivity; NK = natural killer; OB = oxidative burst activity; Ne/Ly = ratio of neutrophil to lymphocyte cell counts, a marker of exercise-induced inflammation).

REVIEW ARTICLE

Sports Med. 1997 May; 23 (5): 306-332
0112-1642/97/0005-0306/$13.50/0

Walking to Health

Jeremy N. Morris[1] and Adrianne E. Hardman[2]

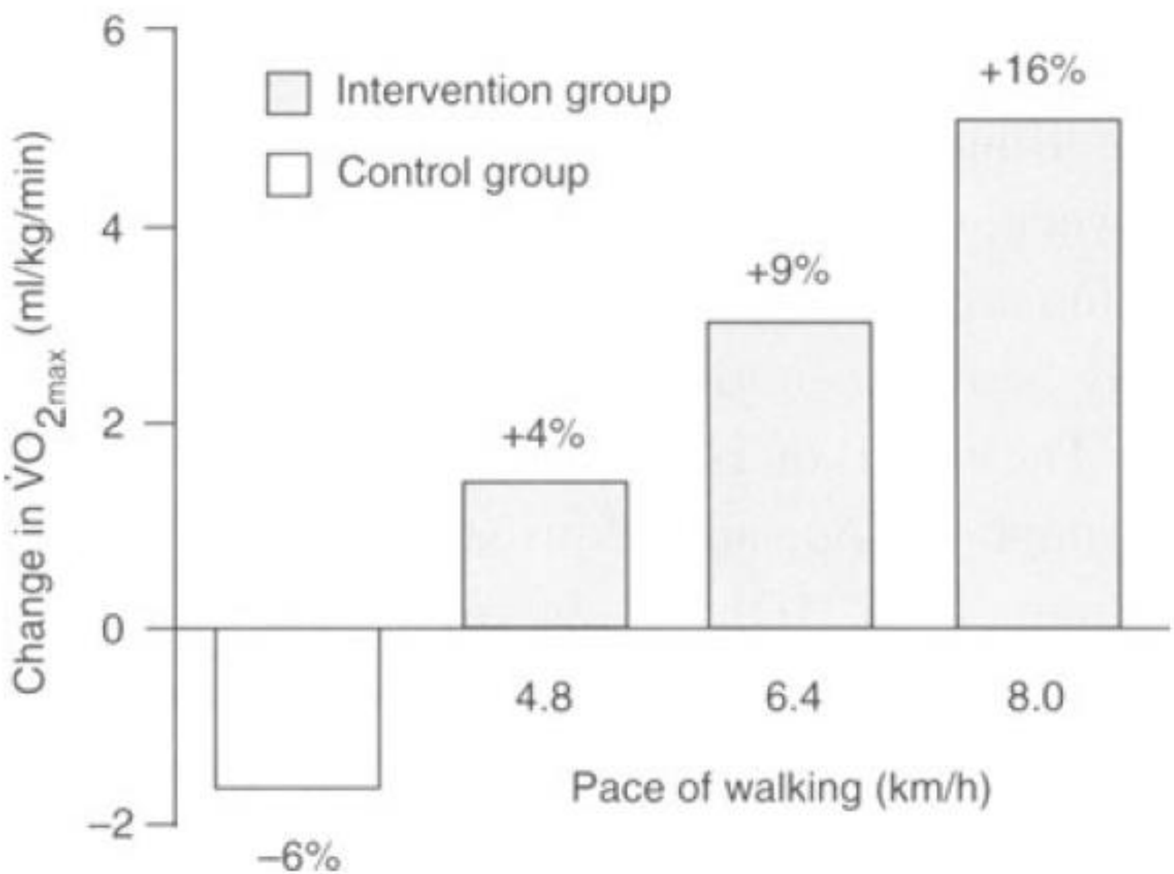
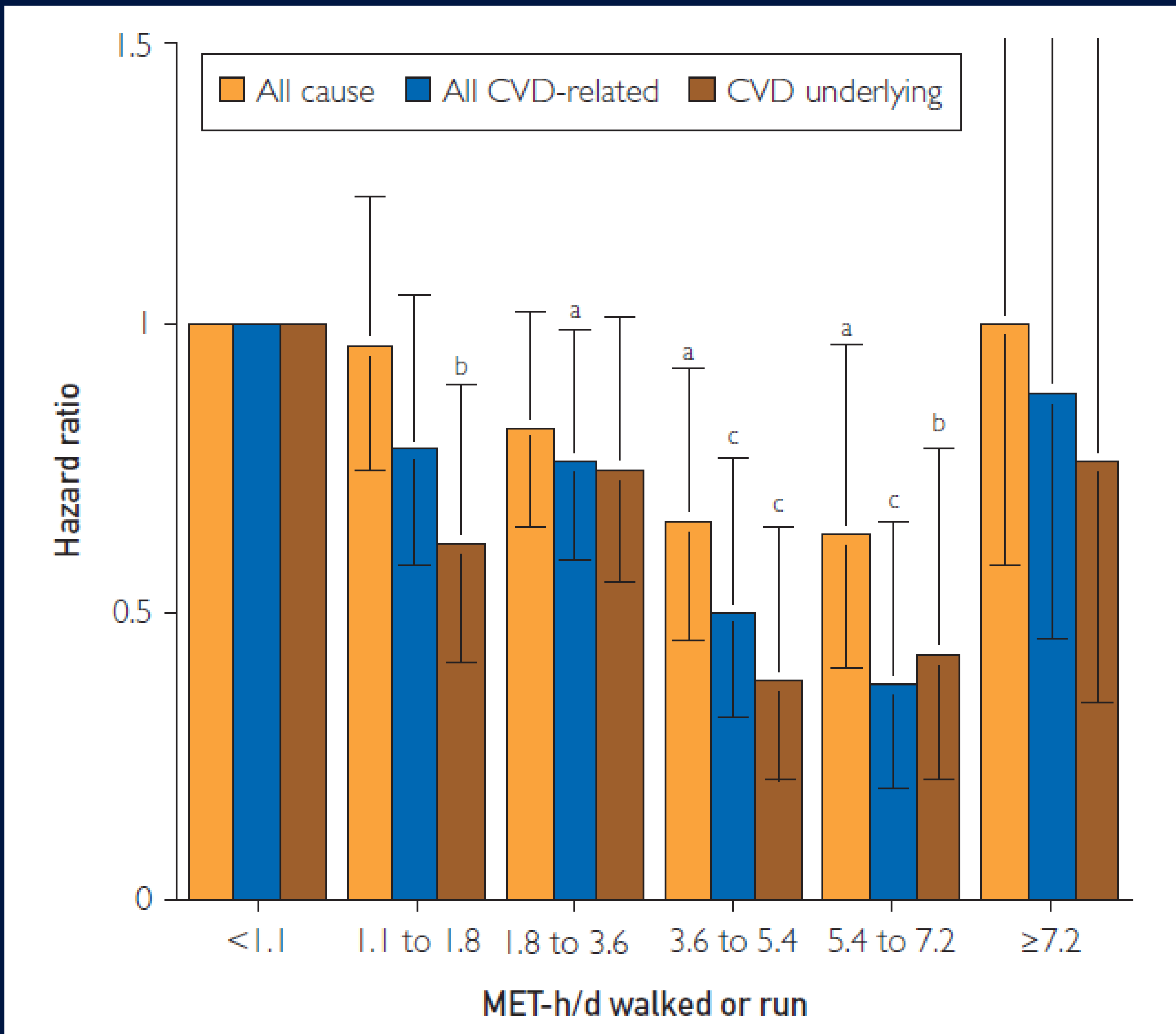


Fig. 2. Changes in maximal oxygen uptake ($\dot{V}O_{2max}$), in women aged 20 to 24 years after a 24-week walking programme (4.8 km/day, 5 days/wk).[10] Compliance was more than 85% of sessions for all groups. The control group remained sedentary.

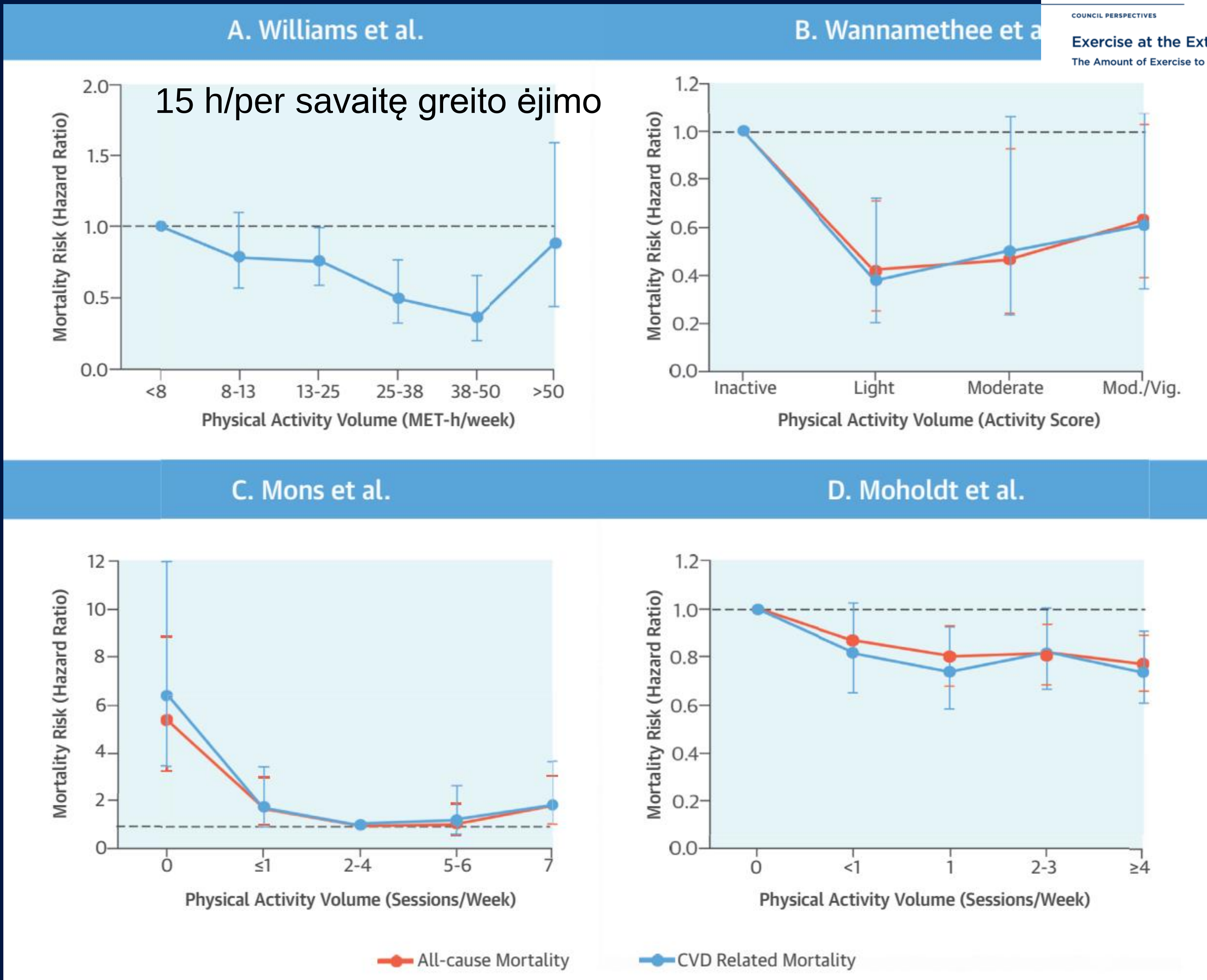
ORIGINAL ARTICLE

Increased Cardiovascular Disease Mortality Associated With Excessive Exercise in Heart Attack Survivors

Paul T. Williams, PhD, and Paul D. Thompson, MD



15 h/per savaitę greito ėjimo



JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY
VOL. 67, NO. 3, 2016

ISSN 0735-1097/$36.00
PUBLISHED BY ELSEVIER
http://dx.doi.org/10.1016/j.jacc.2015.11.034

THE PRESENT AND FUTURE

COUNCIL PERSPECTIVES

Exercise at the Extremes

The Amount of Exercise to Reduce Cardiovascular Events

Lancet Psychiatry 2018
5: 739–46

Association between physical exercise and mental health in 1·2 million individuals in the USA between 2011 and 2015: a cross-sectional study

Sammi R Chekroud, Ralitza Gueorguieva, Amanda B Zheutlin, Martin Paulus, Harlan M Krumholz, John H Krystal, Adam M Chekroud

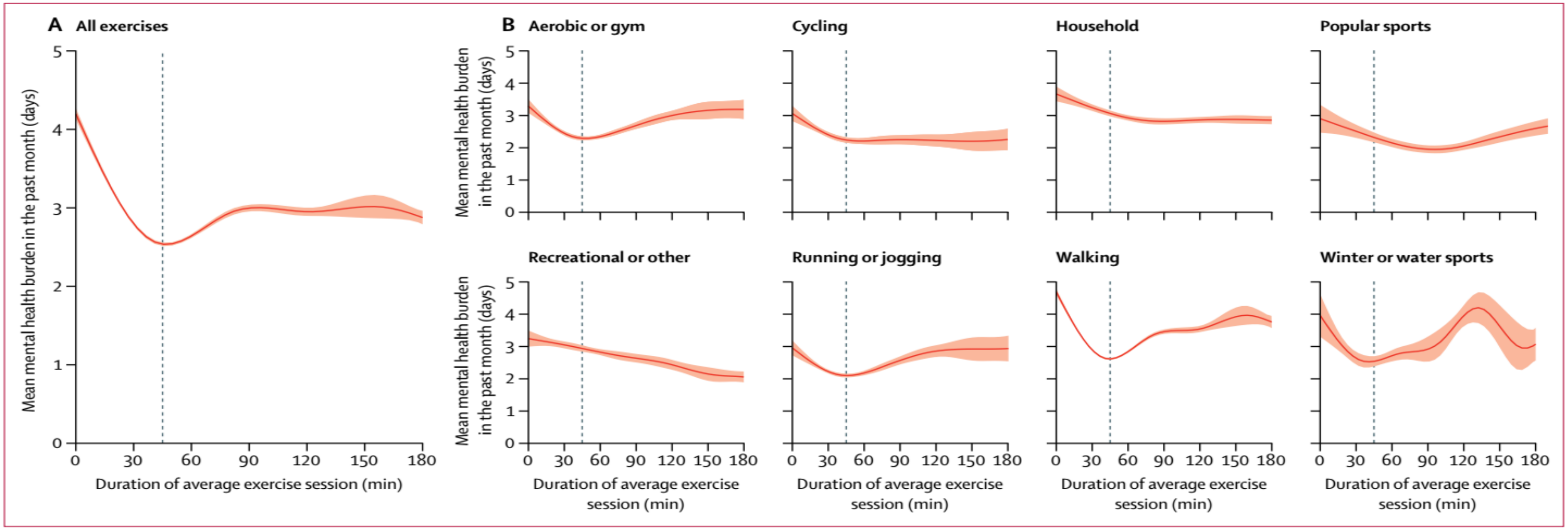


Figure 2: Mental health burden as a function of exercise duration

Lancet Psychiatry 2018
5: 739–46

Association between physical exercise and mental health in 1·2 million individuals in the USA between 2011 and 2015: a cross-sectional study

Sammi R Chekroud, Ralitza Gueorguieva, Amanda B Zheutlin, Martin Paulus, Harlan M Krumholz, John H Krystal, Adam M Chekroud

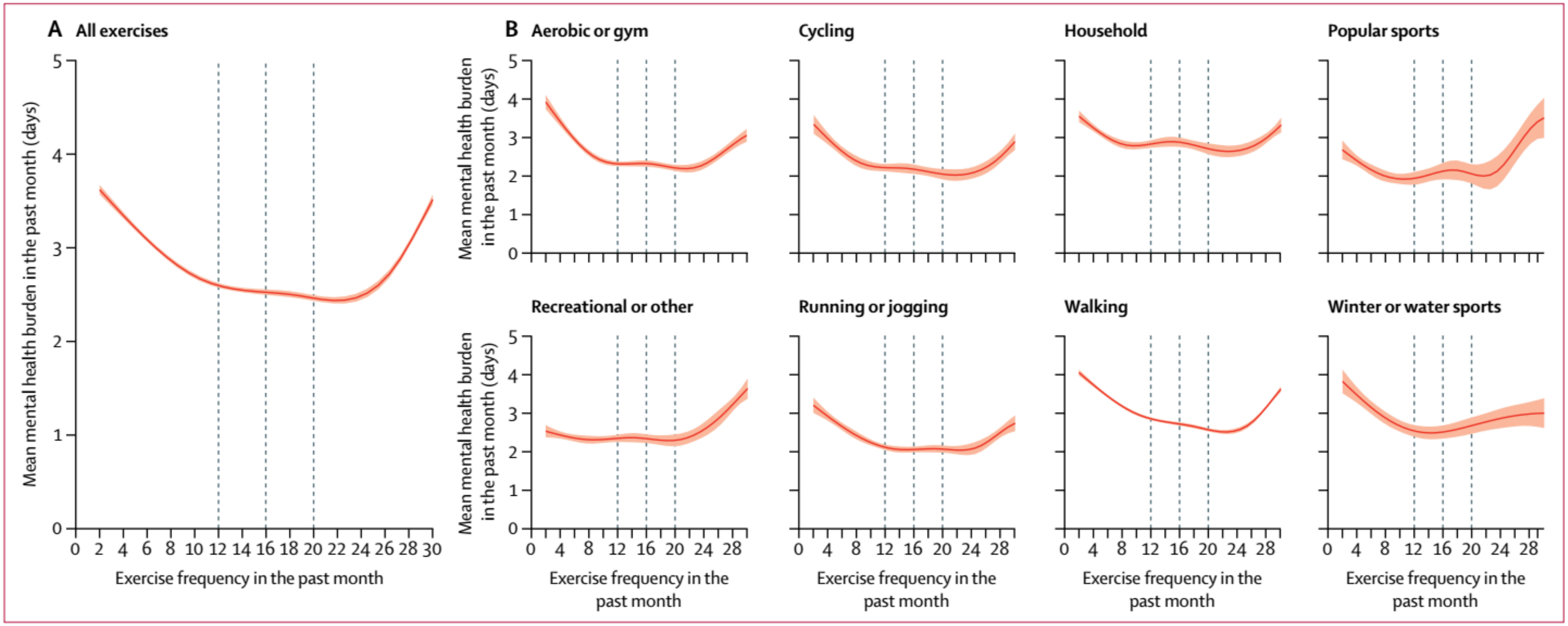


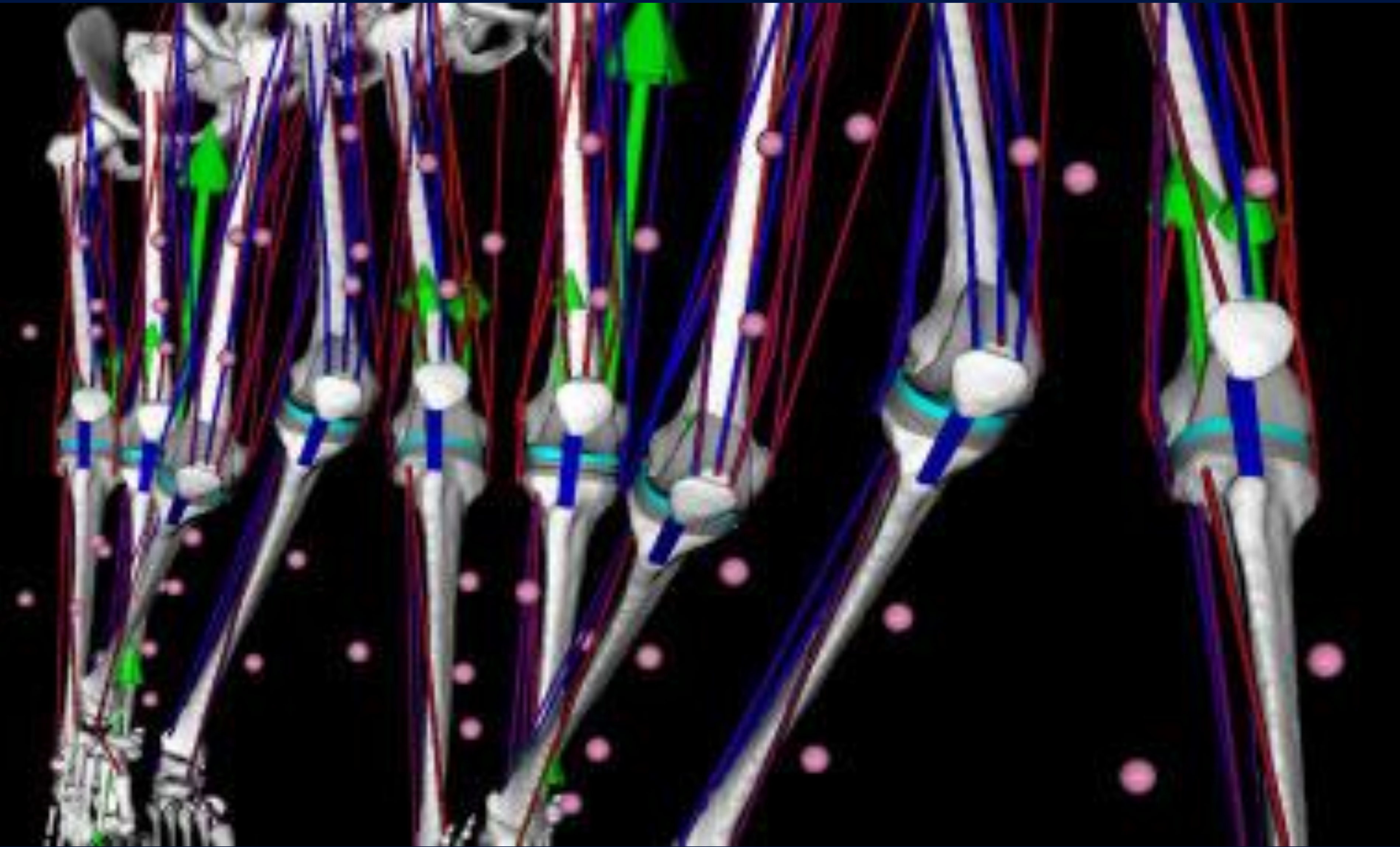
Figure 3: Mental health burden as a function of exercise frequency

Ėjimo neuro-mechanika!

RESEARCH PERSPECTIVE

Grand Challenge Competition to Predict In Vivo Knee Loads

Benjamin J. Fregly,[1,2,3] Thor F. Besier,[4] David G. Lloyd,[5] Scott L. Delp,[6] Scott A. Banks,[1,2,3]
Marcus G. Pandy,[7] Darryl D. D'Lima[8]

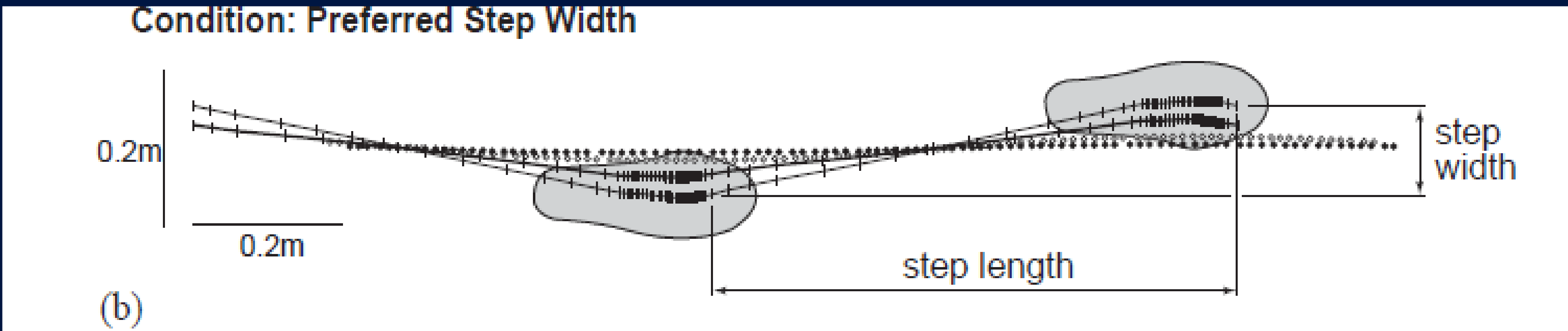


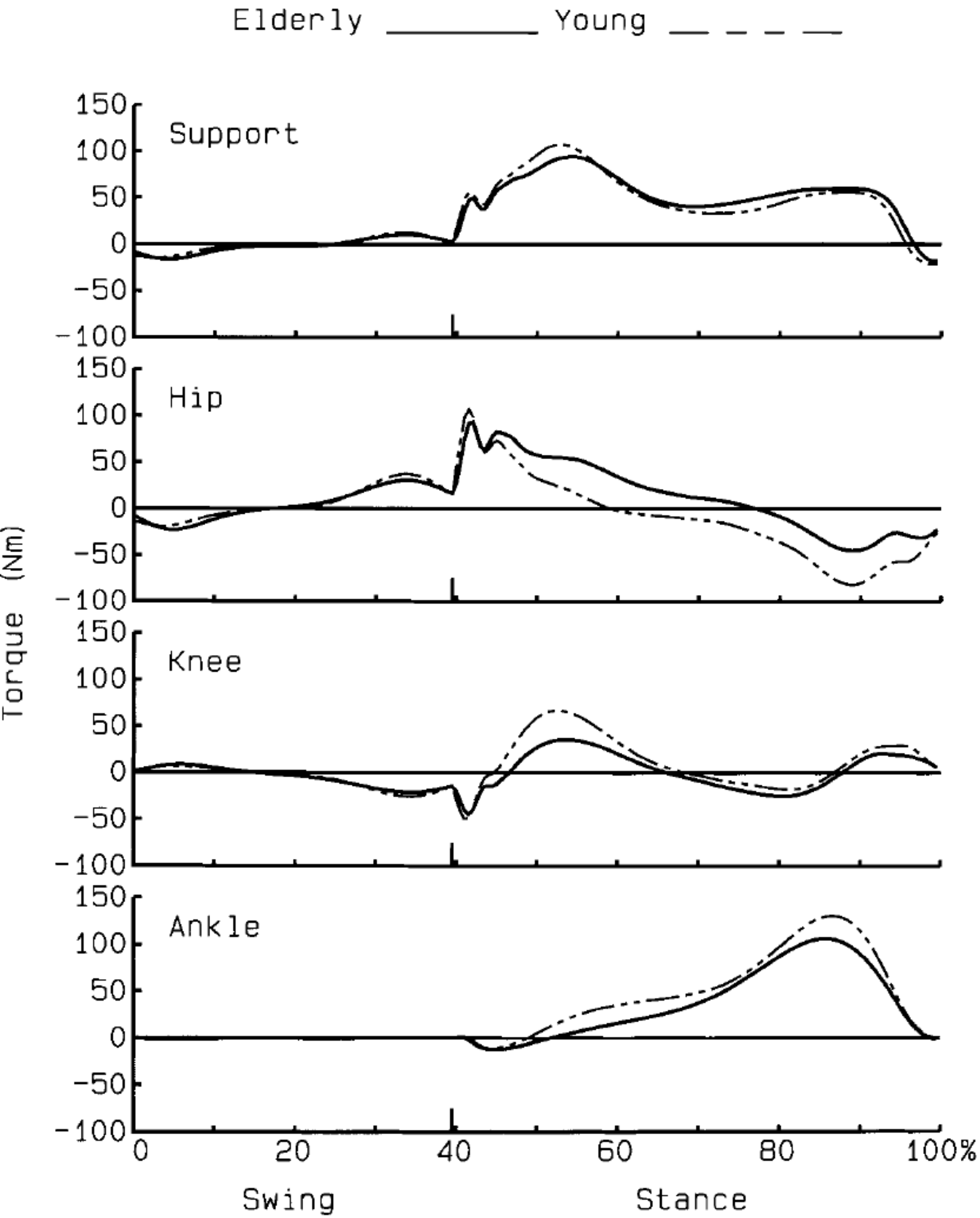
JOURNAL OF BIOMECHANICS
ELSEVIER
Journal of Biomechanics 37 (2004) 827–835
www.elsevier.com/locate/jbiomech
www.JBiomech.com

Young Scientist Pre-Doctoral Award

Mechanical and metabolic requirements for active lateral stabilization in human walking

J. Maxwell Donelan[a,*], David W. Shipman[b], Rodger Kram[c], Arthur D. Kuo[d]





J Appl Physiol
88: 1804–1811, 2000.

Age causes a redistribution of joint torques and powers during gait

PAUL DeVITA AND TIBOR HORTOBAGYI

Gait Posture. 2008 July ; 28(1): 135–143.

The effect of walking speed on muscle function and mechanical energetics

Richard R. Neptune[a,*], Kotaro Sasaki[a], and Steven A. Kautz[b,c,d]

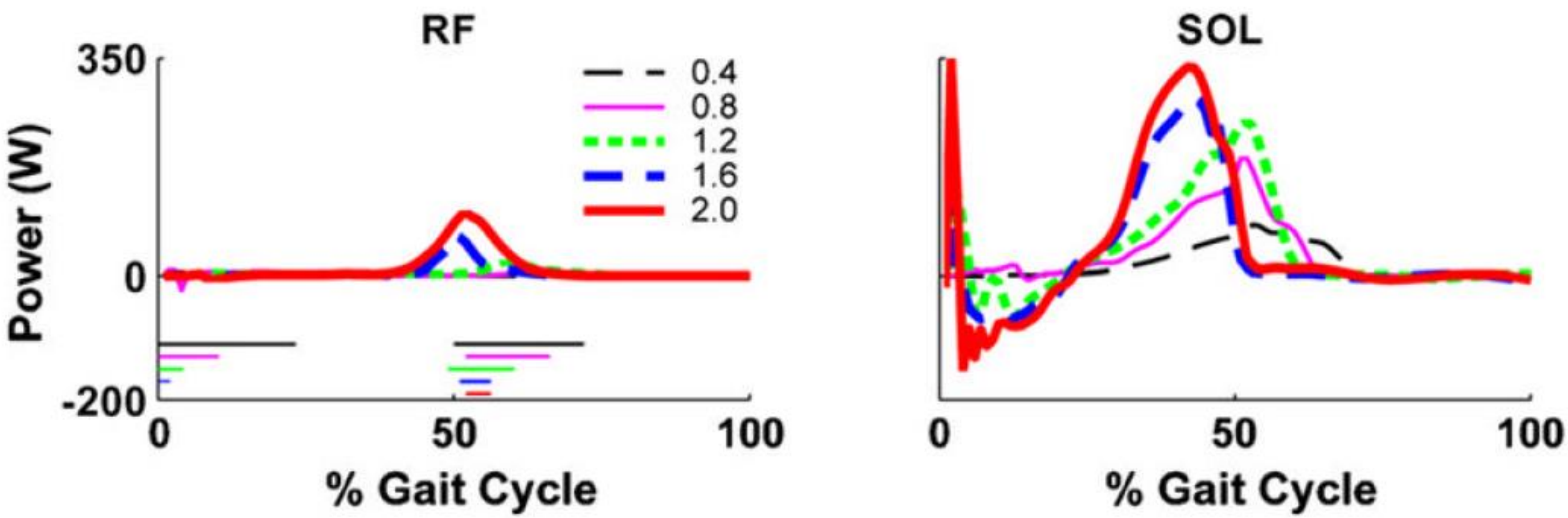
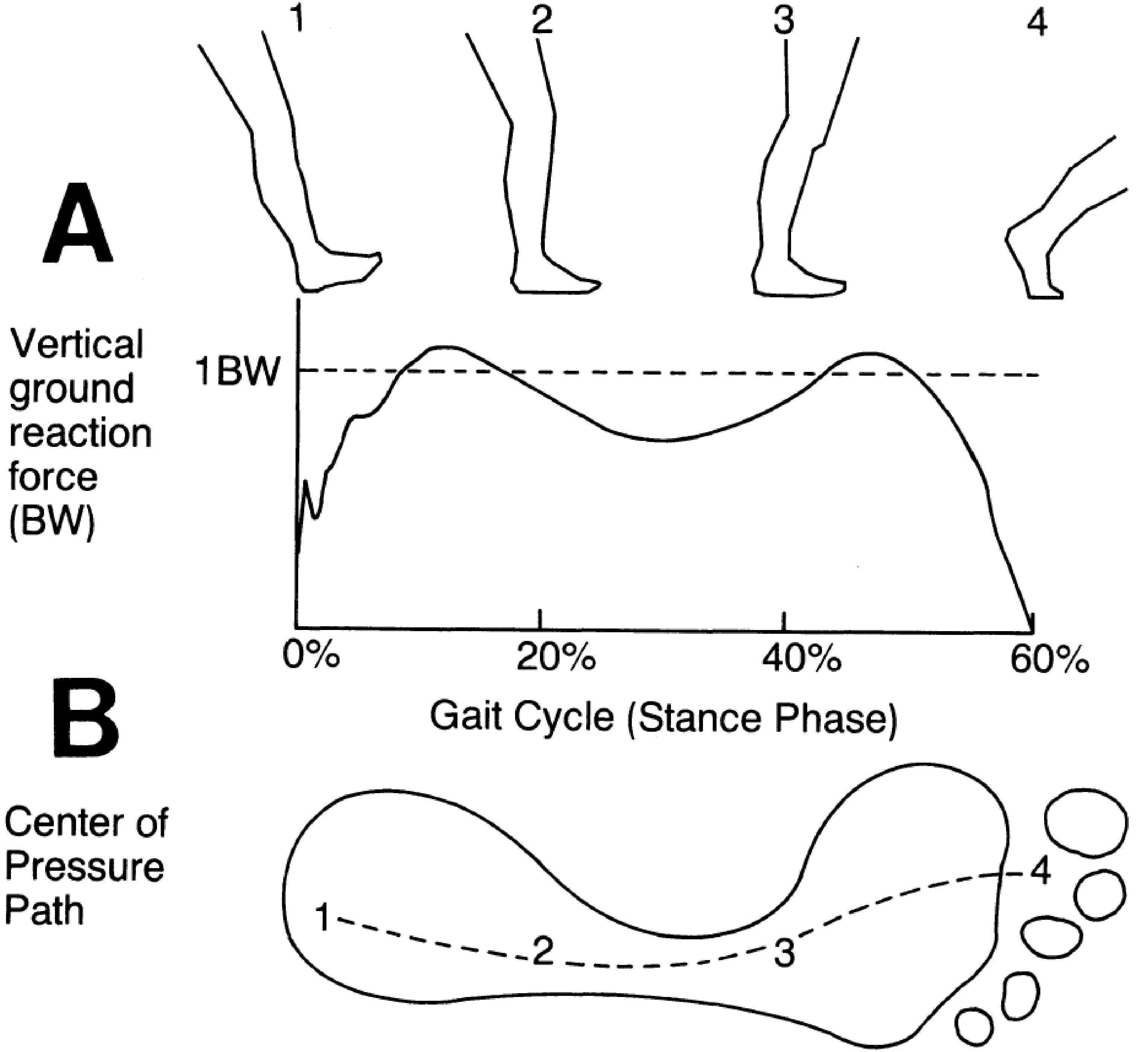


Fig. 5.
Mechanical power delivered to the trunk in the horizontal direction to provide forward propulsion by SOL and RF across increasing walking speeds. The horizontal bars indicate the regions of double support, which decreased in duration with increasing speed.

d Ankle


A
1
2
3
4
Vertical ground reaction force (BW)
1BW
0%
20%
40%
60%
Gait Cycle (Stance Phase)
B
Center of Pressure Path
1
2
3
4

Dynamic Biomechanics of the Normal Foot and Ankle During Walking and Running

MARY M. RODGERS

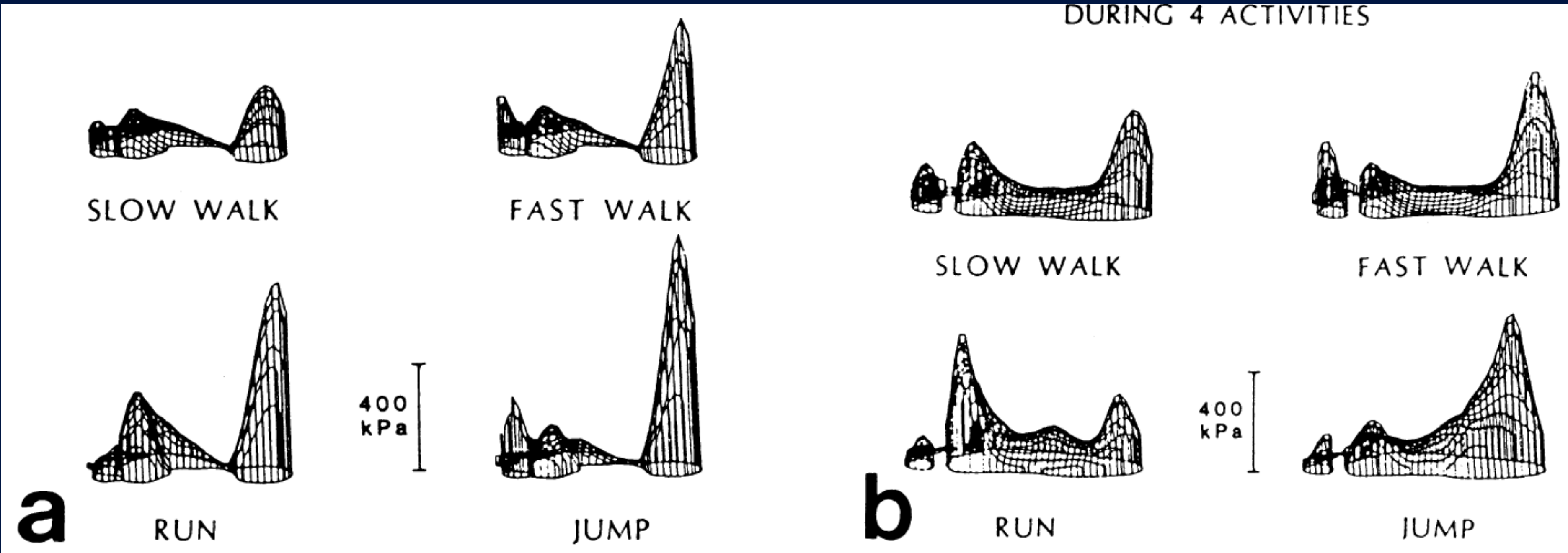


Fig. 5. Pressure-distribution patterns during slow and fast walking, running, and landing from a jump beneath a high-arched (a) and a flat-arched (b) foot. The flat-arched foot shows more spreading of pressure beneath the midfoot region. (Reprinted with permission of Martinus Nijhoff/Dr W Junk Publishers.[25])

Smegenys ir ėjimas!

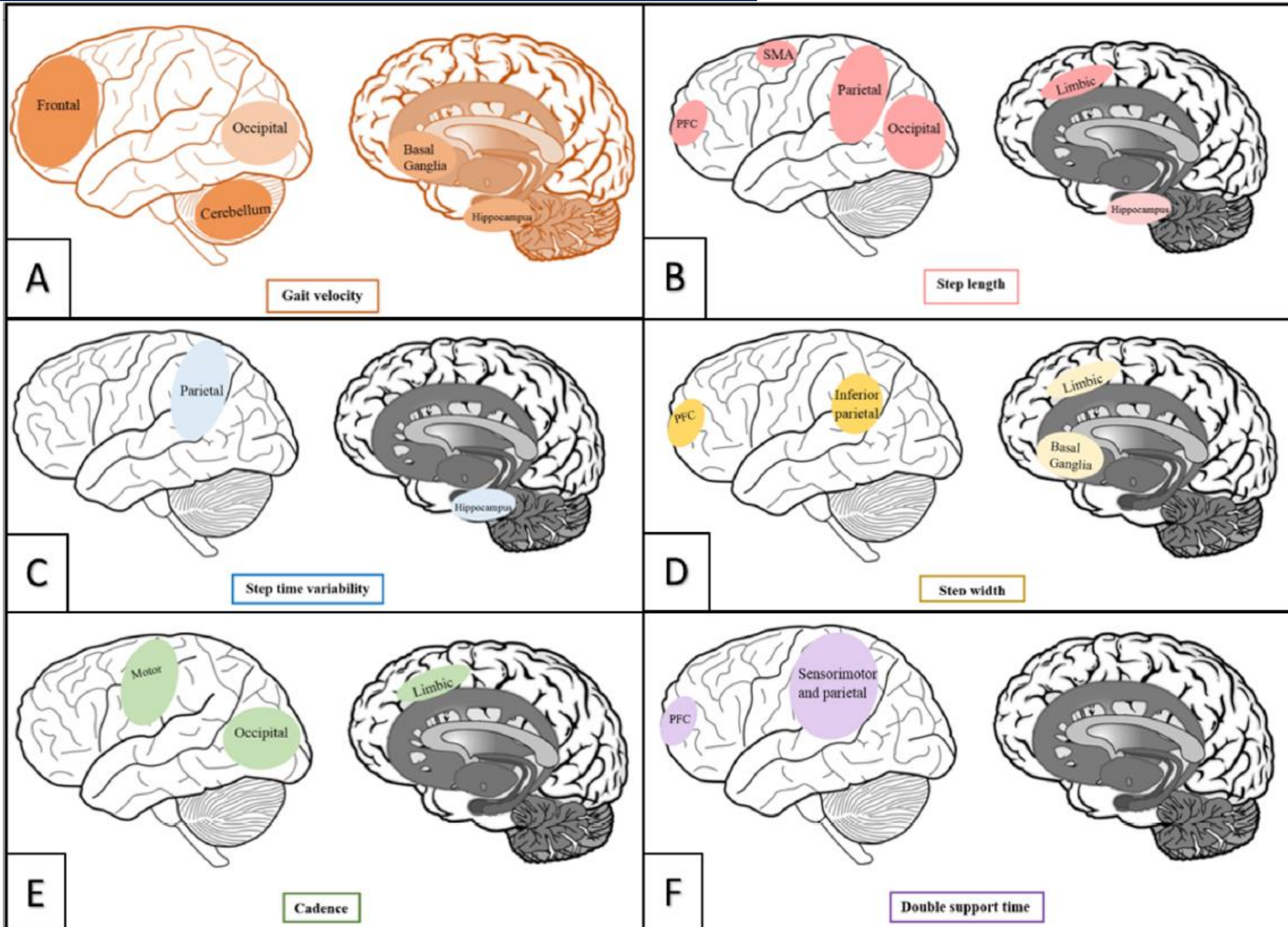
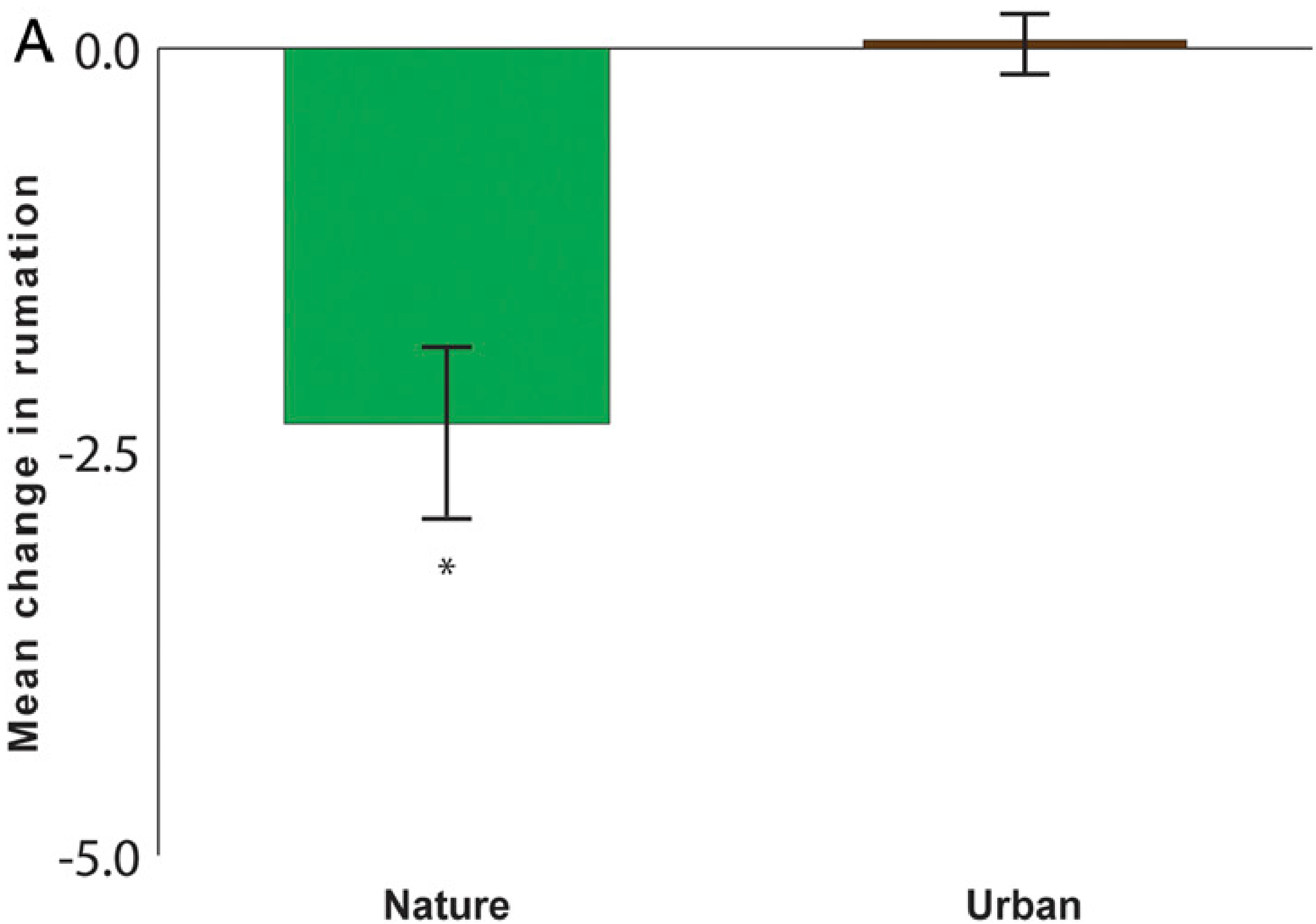


Fig. 5. Map of the regional associations between GM volume and gait characteristics; gait velocity (A), step length (B), step time variability (C), step width (D), cadence (E) and double support time (F). Areas which are darker in colour indicate regions that were associated with the characteristic in multiple studies. Panel A shows the entire brain in an orange colour, to indicate that the volume of most brain regions have been associated with gait velocity.

Nature experience reduces rumination and subgenual prefrontal cortex activation

PNAS | July 14, 2015 | vol. 112

Gregory N. Bratman[a,1], J. Paul Hamilton[b], Kevin S. Hahn[c], Gretchen C. Daily[d,e,1], and James J. Gross[c]



Nature experience reduces rumination and subgenual prefrontal cortex activation

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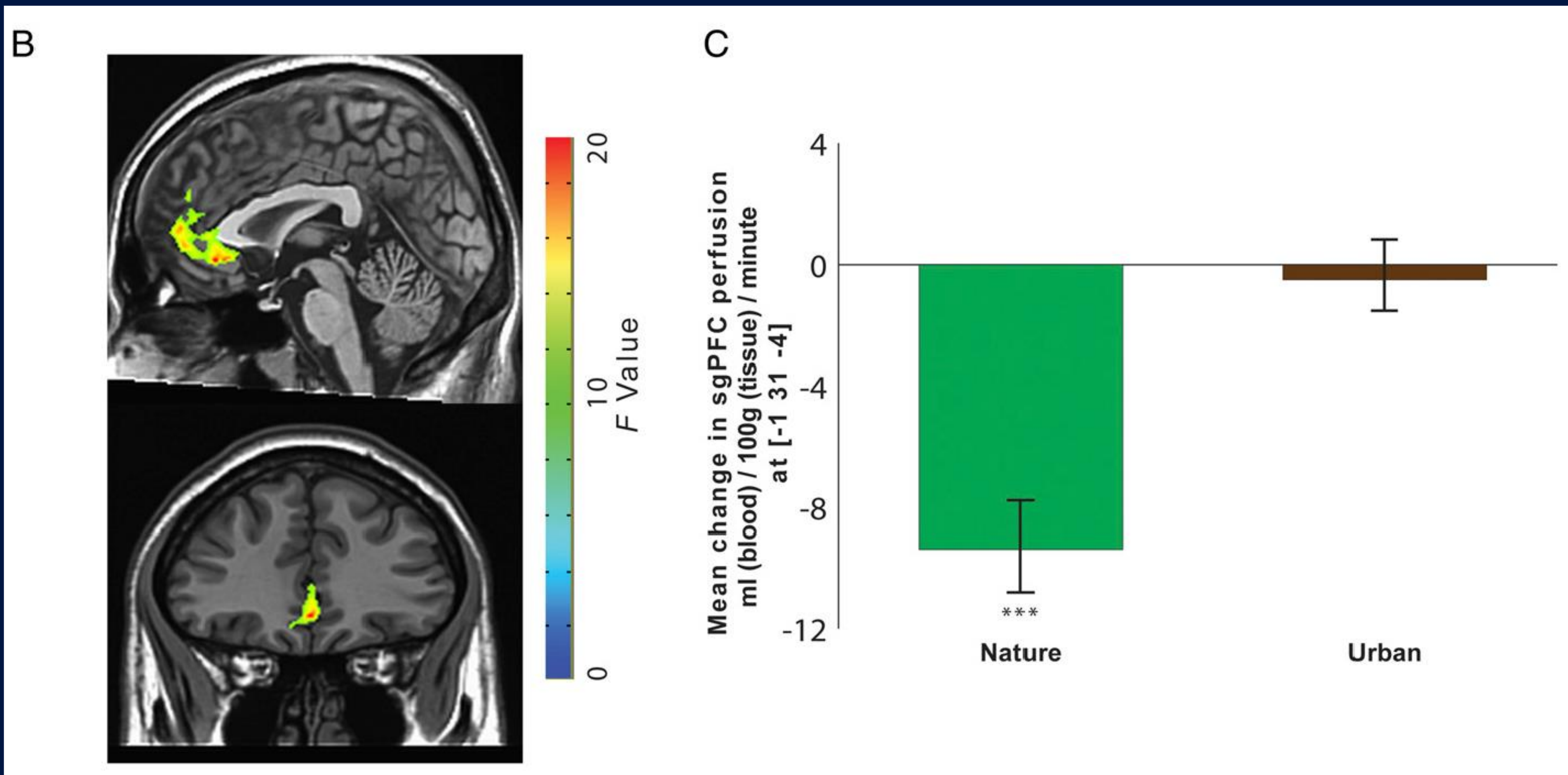

Travel Behaviour and Society 16 (2019) 249–261

Contents lists available at ScienceDirect

Travel Behaviour and Society

journal homepage: www.elsevier.com/locate/tbs

Walking (and cycling) to well-being: Modal and other determinants of subjective well-being during the commute

Patrick A. Singleton*

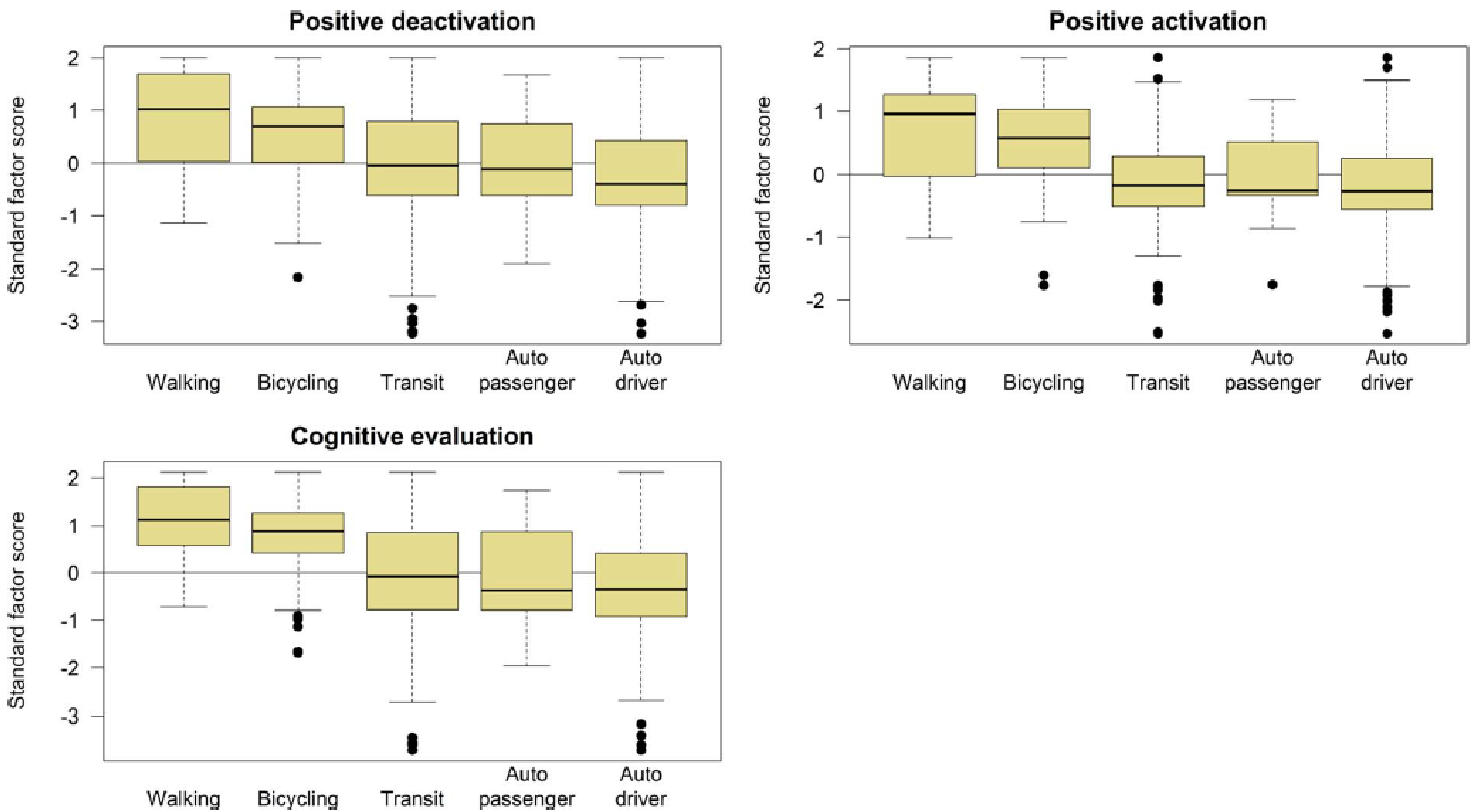

Fig. 2. Box plots of STS factor scores by commute mode.

Travel Behaviour and Society 16 (2019) 249–261
Contents lists available at ScienceDirect
Travel Behaviour and Society
journal homepage: www.elsevier.com/locate/tbs

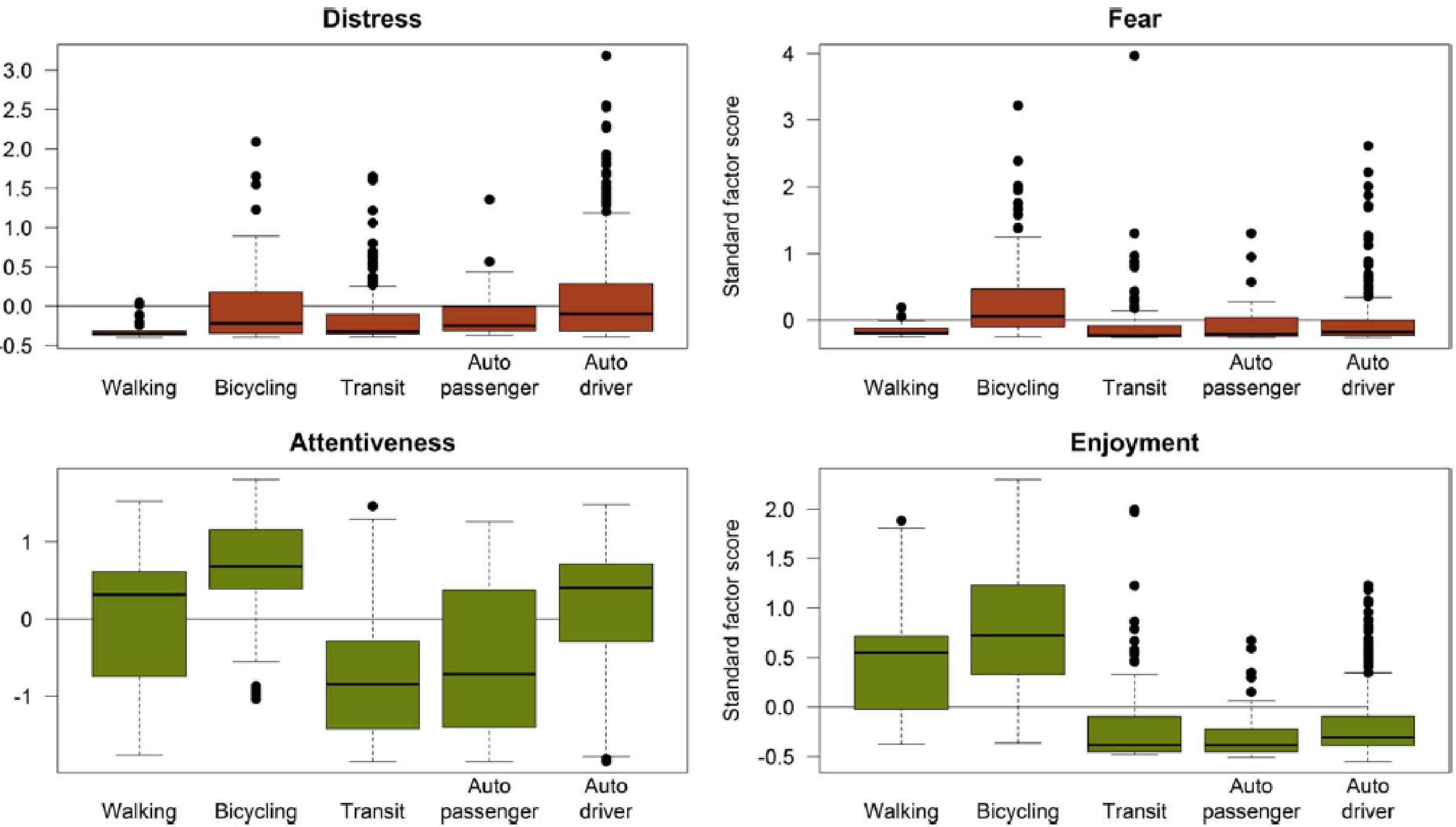

Fig. 3. Box plots of travel affect factor scores by commute mode.

Travel Behaviour and Society 16 (2019) 249–261
Contents lists available at ScienceDirect
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journal homepage: www.elsevier.com/locate/tbs

Walking (and cycling) to well-being: Modal and other determinants of subjective well-being during the commute

Patrick A. Singleton*

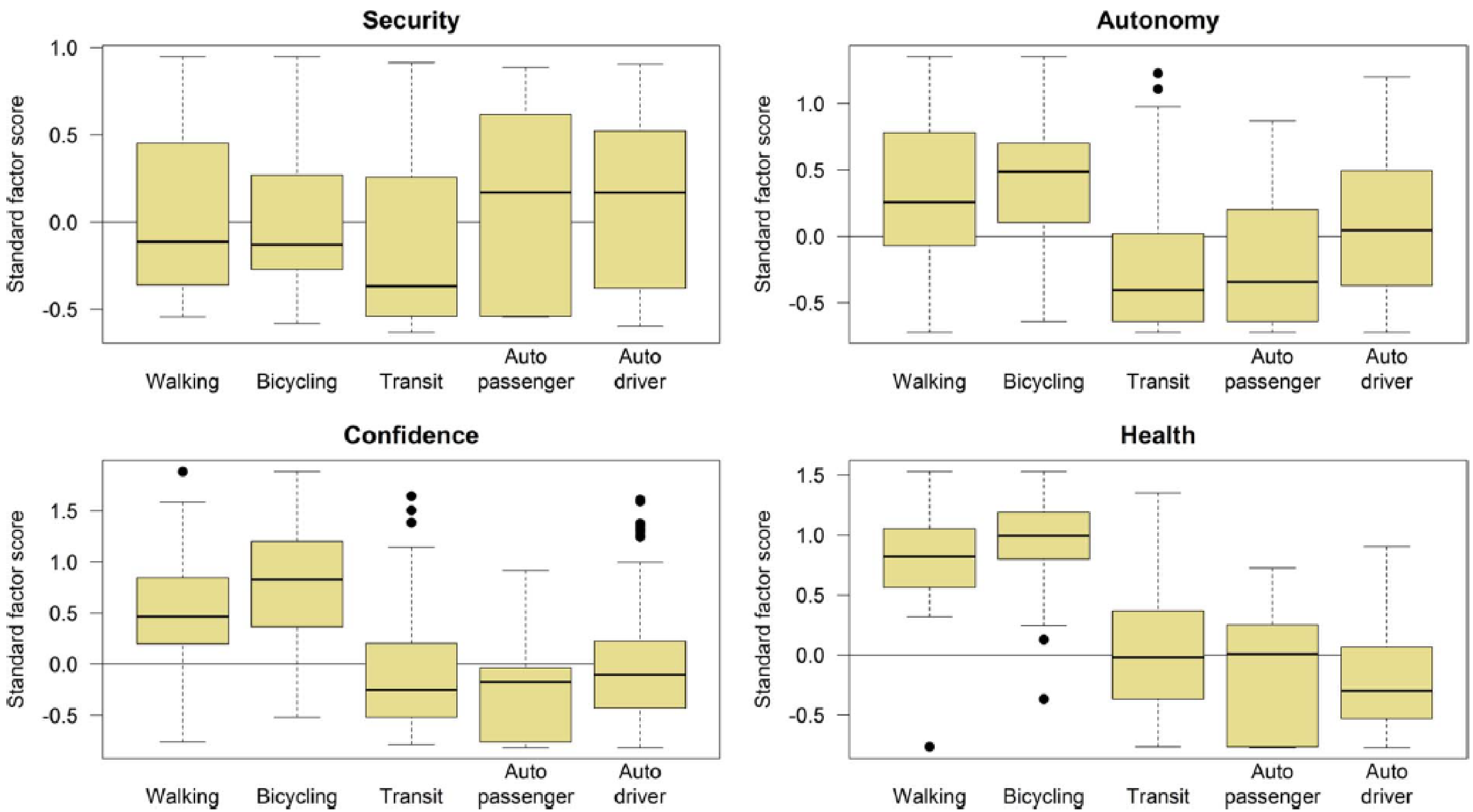


Fig. 4. Box plots of travel eudaimonia factor scores by commute mode.

Ėjimo dozės ir sveikata!

Leisure Time Physical Activity of Moderate to Vigorous Intensity and Mortality: A Large Pooled Cohort Analysis

Steven C. Moore[1]*, Alpa V. Patel[2], Charles E. Matthews[1], Amy Berrington de Gonzalez[1], Yikyung Park[1], Hormuzd A. Katki[1], Martha S. Linet[1], Elisabete Weiderpass[3,4,5,6], Kala Visvanathan[7], Kathy J. Helzlsouer[7], Michael Thun[2], Susan M. Gapstur[2], Patricia Hartge[1], I-Min Lee[8]

deaths. A physical activity level of 0.1–3.74 MET-h/wk, equivalent to brisk walking for up to 75 min/wk, was associated with a gain of 1.8 (95% CI: 1.6–2.0) y in life expectancy relative to no leisure time activity (0 MET-h/wk). Higher levels of physical activity were associated with greater gains in life expectancy, with a gain of 4.5 (95% CI: 4.3–4.7) y at the highest level (22.5+ MET-h/wk, equivalent to brisk walking for 450+ min/wk). Substantial gains were also observed in each BMI group. In joint analyses, being active (7.5+ MET-h/wk) and normal weight (BMI 18.5–24.9) was associated with a gain of 7.2 (95% CI: 6.5–7.9) y of life compared to being inactive (0 MET-h/wk) and obese (BMI 35.0+). A limitation was that physical activity and BMI were ascertained by self report.

Kiek prideda prie gyvenimo metų spėrus ėjimas?

75 min/sav – 1,8 metus, lyginant su tais, kurie greitai vaikšto – 0 min/sav.
450 min/sav – 4,5 metus.

AMERICAN COLLEGE of SPORTS MEDICINE.

PRONOUNCEMENT

Physical Activity, All-Cause and Cardiovascular Mortality, and Cardiovascular Disease

WILLIAM E. KRAUS[1], KENNETH E. POWELL[2], WILLIAM L. HASKELL[3], KATHLEEN F. JANZ[4], WAYNE W. CAMPBELL[5], JOHN M. JAKICIC[6], RICHARD P. TROIANO[7], KYLE SPROW[7], ANDREA TORRES[8], and KATRINA L. PIERCY[9], FOR THE 2018 PHYSICAL ACTIVITY GUIDELINES ADVISORY COMMITTEE*

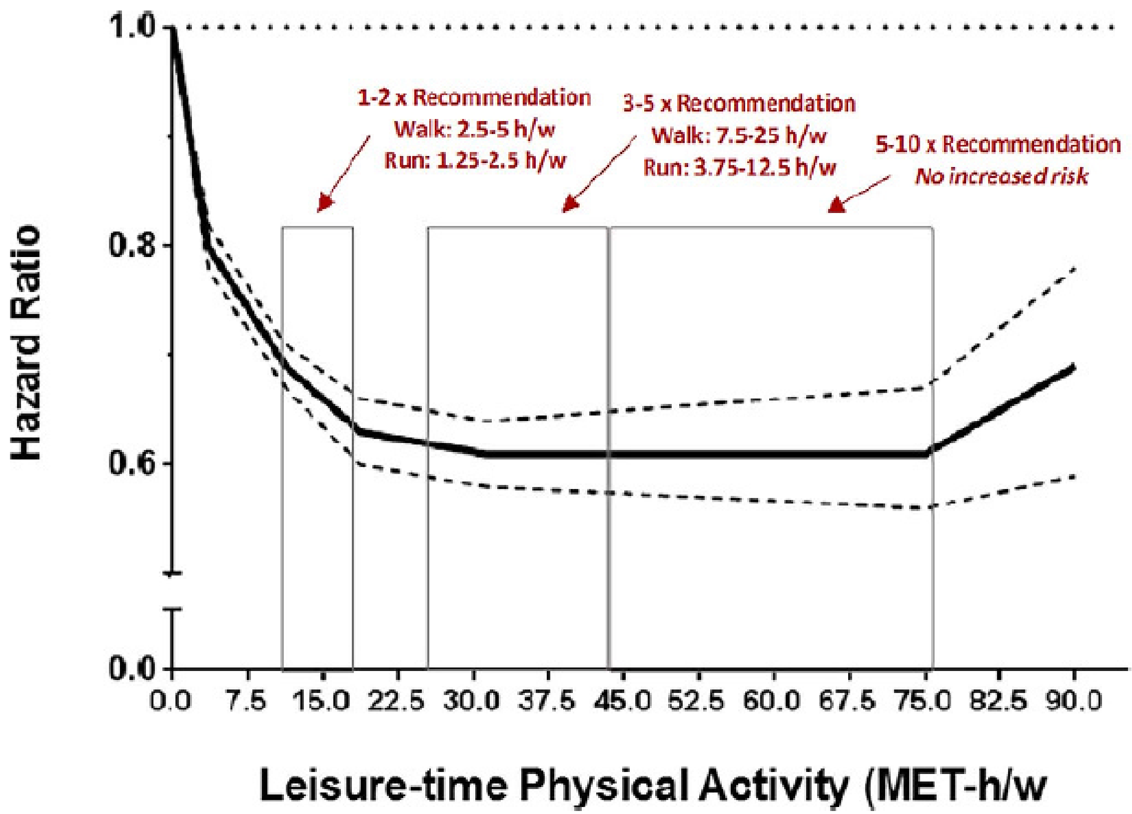


FIGURE 3—Relationships of MVPA to all-cause mortality, with highlighted characteristics common to studies of this type. The ranges of physical activity relative to 2008 US Physical Activity Guidelines for aerobic activity are shown as ranges. There is no increase in risk noted up to 10 times the current guidelines PA amounts. Source: adapted from Arem et al. (15).

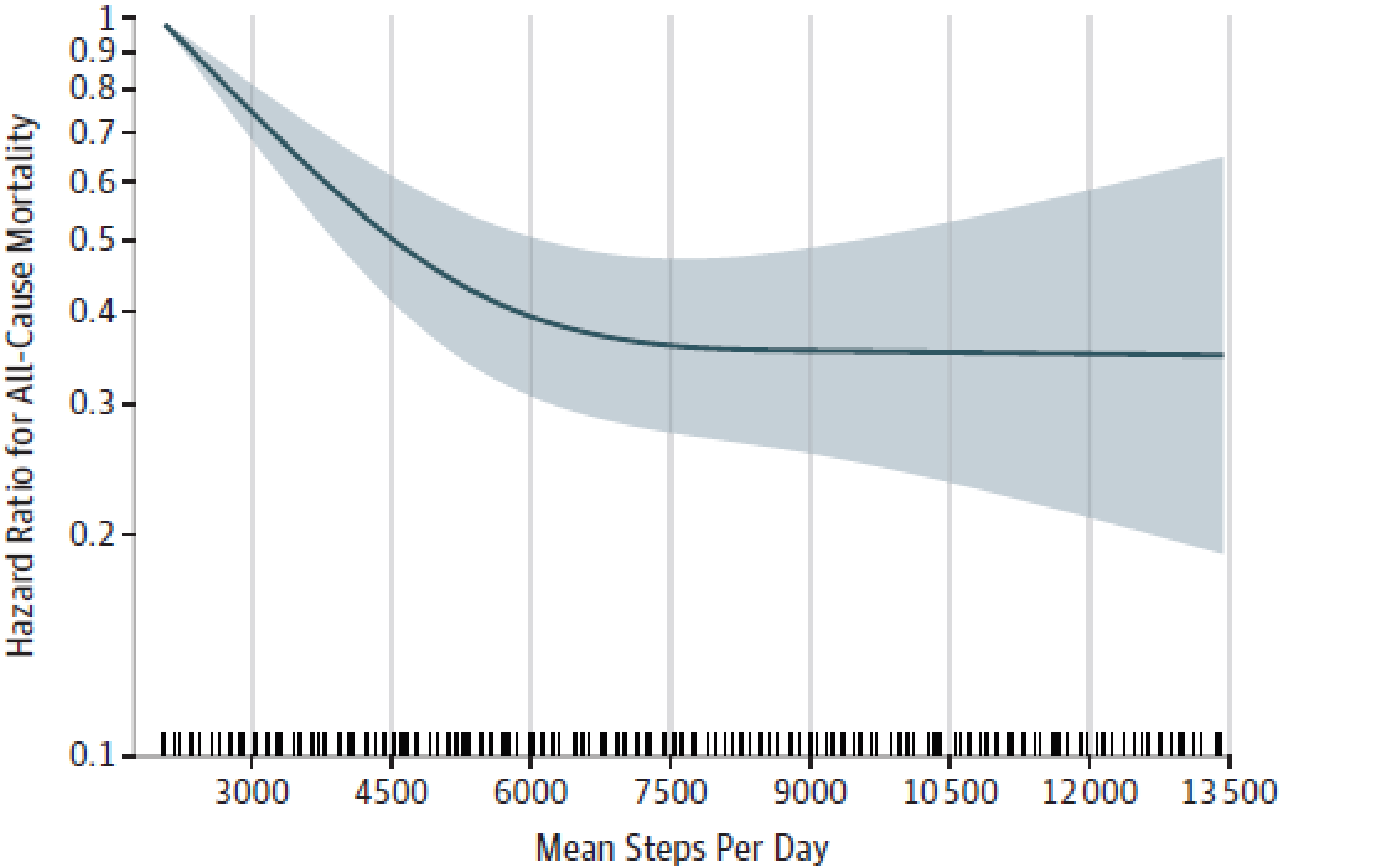
JAMA Internal Medicine | Original Investigation

Association of Step Volume and Intensity With All-Cause Mortality in Older Women

I-Min Lee, MBBS, ScD; Eric J. Shiroma, ScD; Masamitsu Kamada, PhD; David R. Bassett, PhD; Charles E. Matthews, PhD; Julie E. Buring, ScD

JAMA Intern Med. 2019;179(8):1105-1112.

B Mean steps per day as a continuous variable



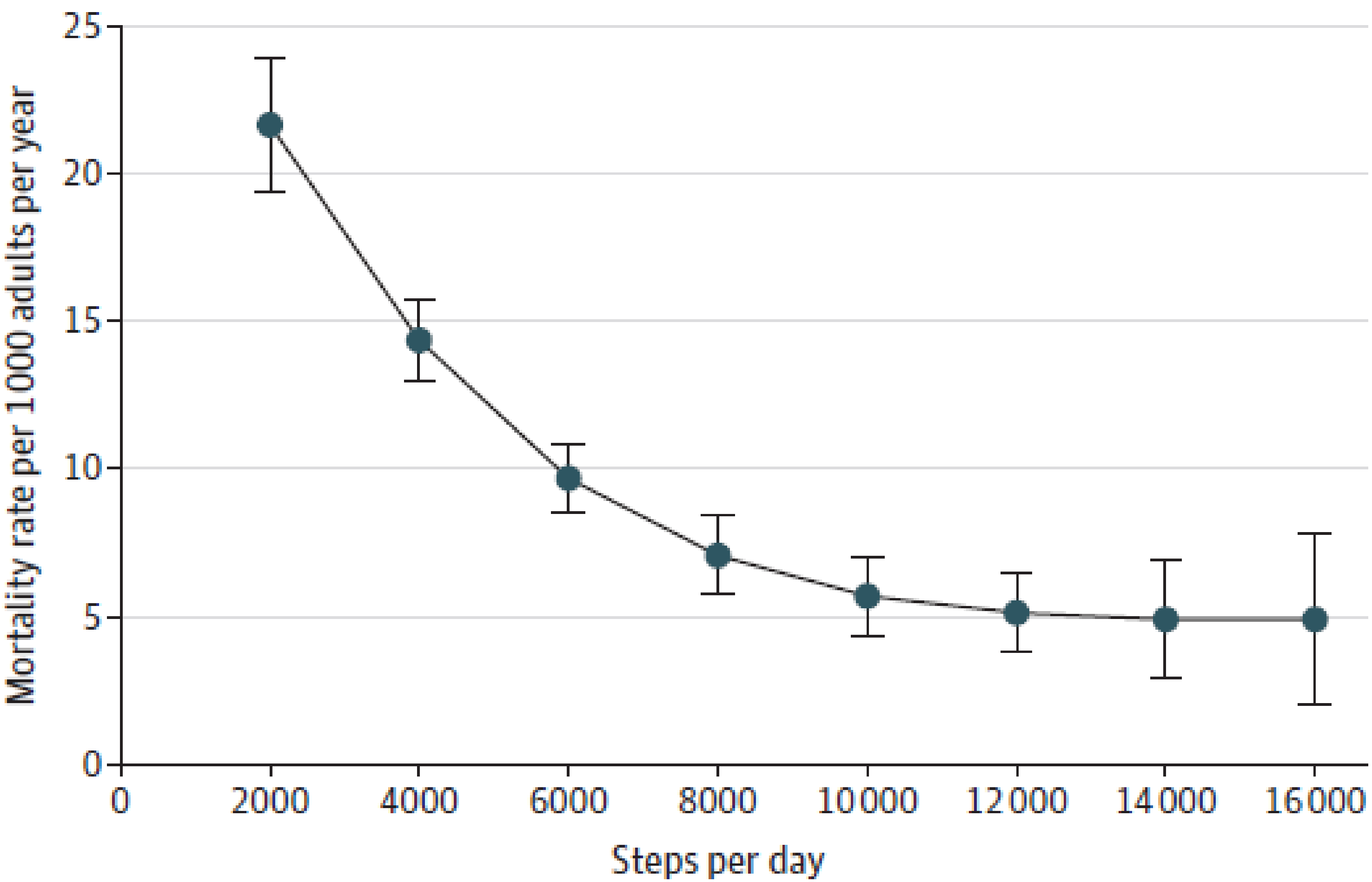
JAMA | Original Investigation

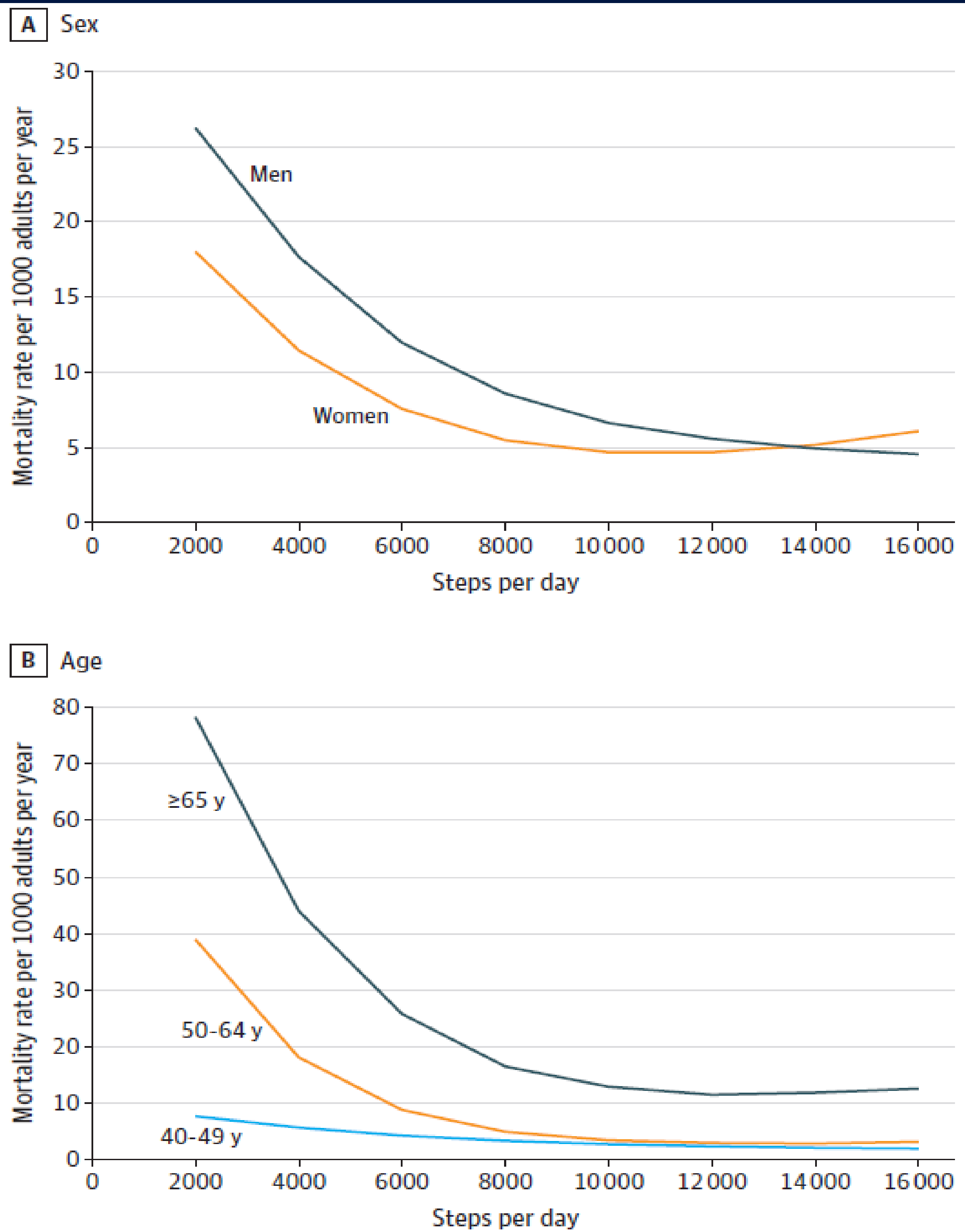
Association of Daily Step Count and Step Intensity With Mortalit
Among US Adults

Pedro F. Saint-Maurice, PhD; Richard P. Troiano, PhD; David R. Bassett Jr, PhD; Barry I. Graubard, PhD;
Susan A. Carlson, PhD; Eric J. Shiroma, ScD; Janet E. Fulton, PhD; Charles E. Matthews, PhD

JAMA. 2020;323(12):1151-1160. doi:10.1001/jama.2020.1382

Figure 1. Steps per Day and All-Cause Mortality in a Study of the Association of Daily Step Count and Step Intensity With Mortality Among US Adults Aged at Least 40 Years





JAMA | Original Investigation

Association of Daily Step Count and Step Intensity With Mortality Among US Adults

Pedro F. Saint-Maurice, PhD; Richard P. Troiano, PhD; David R. Bassett Jr, PhD; Barry I. Graubard, PhD; Susan A. Carlson, PhD; Eric J. Shiroma, ScD; Janet E. Fulton, PhD; Charles E. Matthews, PhD

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JAMA | Original Investigation

Association of Daily Step Count and Step Intensity With Mortality Among US Adults

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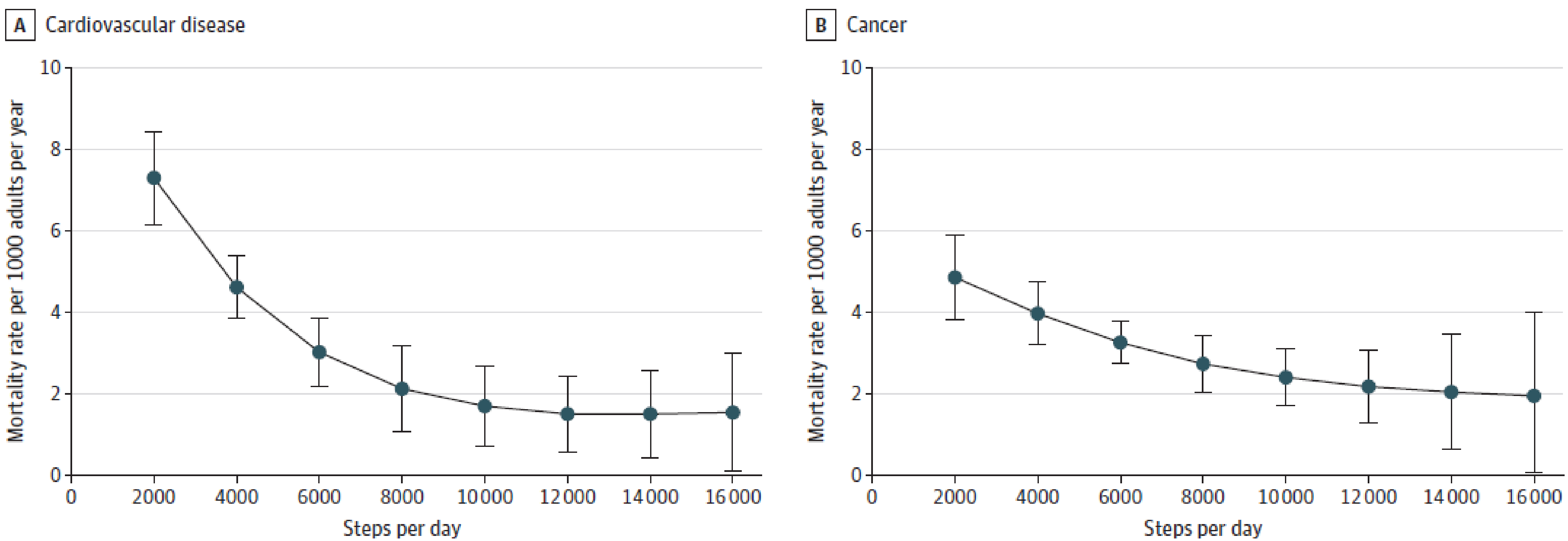
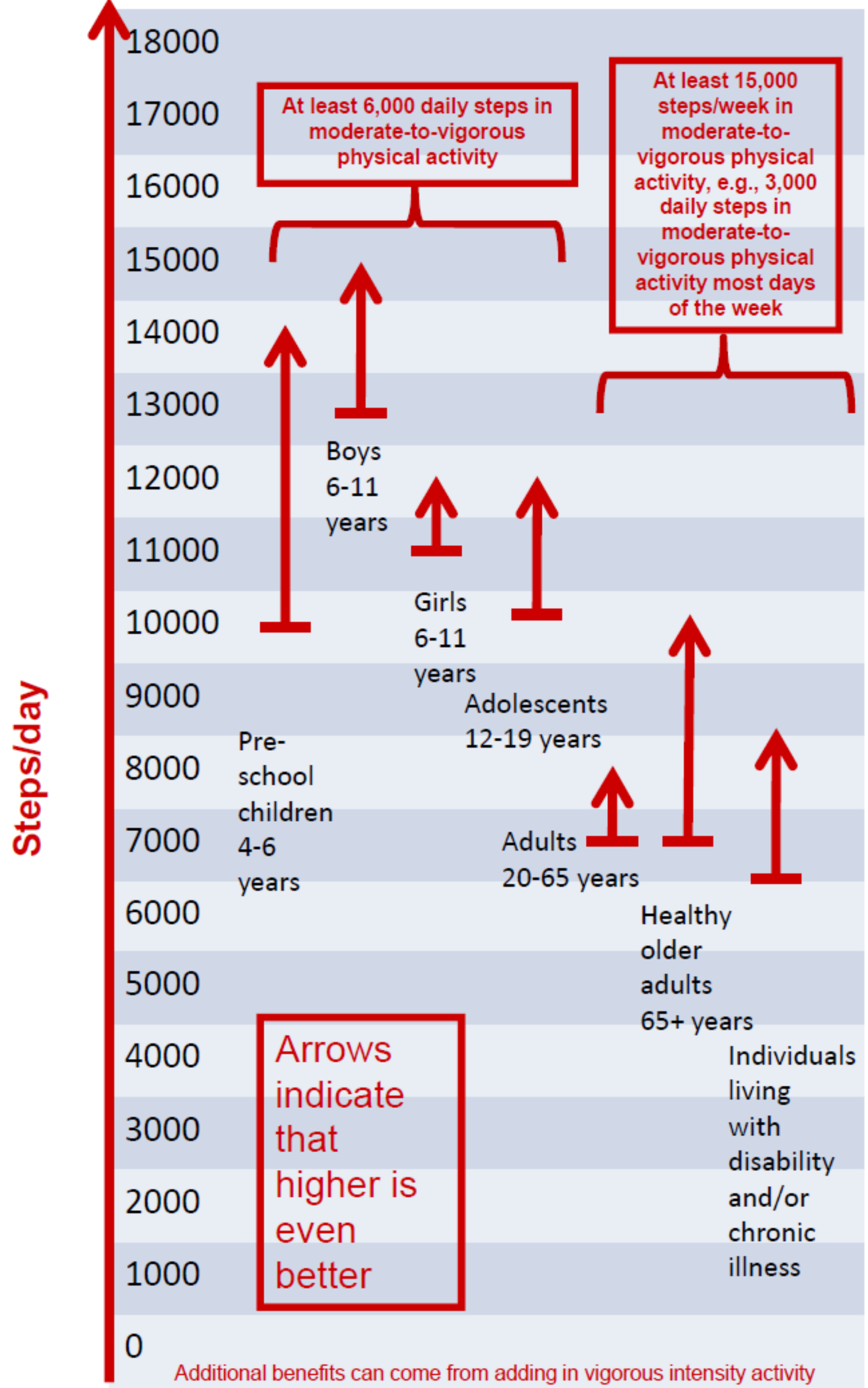
JAMA. 2020;323(12):1151-1160. doi:10.1001/jama.2020.1382

Figure 4. Steps per Day and Mortality From Cardiovascular Disease (CVD) and Cancer in a Study of the Association of Daily Step Count and Step Intensity With Mortality Among US Adults Aged at Least 40 Years





s/day scale schematic linked to time spent in MVPA.

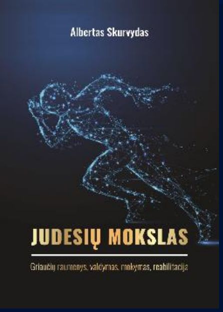
Tudor-Locke *et al. International Journal of Behavioral Nutrition and Physical Activity* 2011, 8:80
http://www.ijbnpa.org/content/8/1/80

INTERNATIONAL JOURNAL OF BEHAVIORAL NUTRITION AND PHYSICAL ACTIVITY

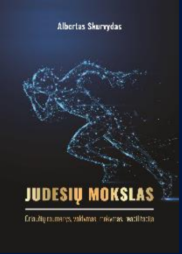
REVIEW Open Access

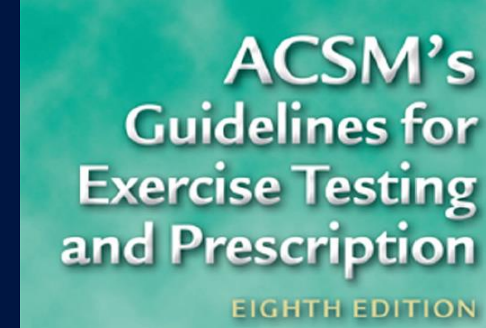
How many steps/day are enough? For older adults and special populations

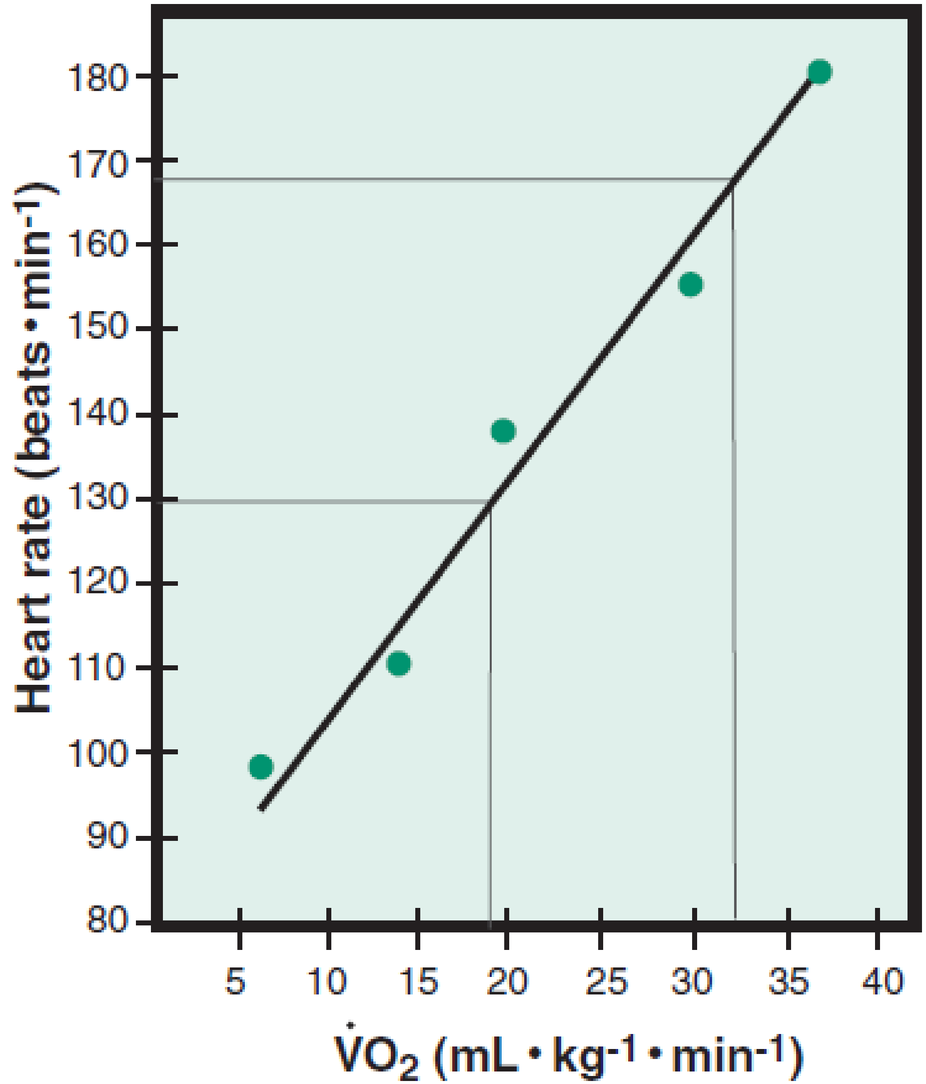
Catrine Tudor-Locke[1,2*], Cora L Craig[2,3], Yukitoshi Aoyagi[4], Rhonda C Bell[5], Karen A Croteau[6], Ilse De Bourdeaudhuij[7], Ben Ewald[8], Andrew W Gardner[9], Yoshiro Hatano[10], Lesley D Lutes[11], Sandra M Matsudo[12,13], Farah A Ramirez-Marrero[14], Laura Q Rogers[15], David A Rowe[16], Michael D Schmidt[17,18], Mark A Tully[19] and Steven N Blair[20]



Testai!


Albertas Skurvydas
JUDESIŲ MOKSLAS


ACSM's
Guidelines for
Exercise Testing
and Prescription
EIGHTH EDITION

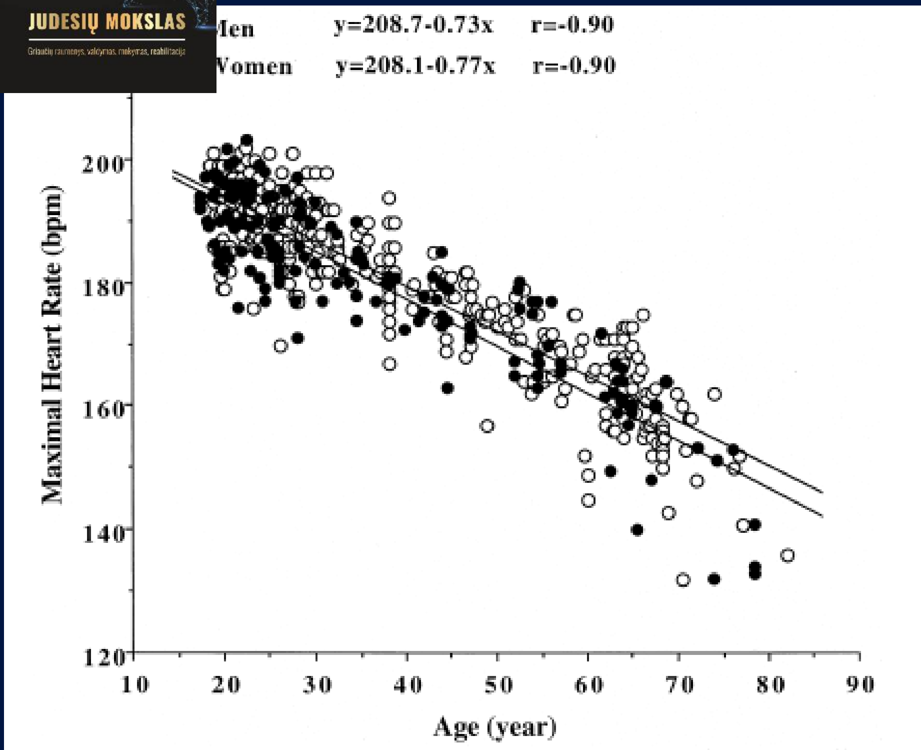

Heart rate (beats • min-1)
180
170
160
150
140
130
120
110
100
90
80
5
10
15
20
25
30
35
40
V̇O2 (mL • kg-1 • min-1)

Journal of the American College of Cardiology

Published by Elsevier Science Inc.

Age-Predicted Maximal Heart Rate Revisited

Hirofumi Tanaka, PHD, Kevin D. Monahan, MS, Douglas R. Seals, PHD



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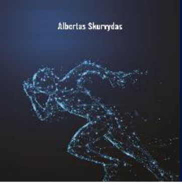


Interpreting the Incremental Cardiopulmonary Exercise Test

Samir Nusair, MD[a]

Am J Cardiol 2017;119:497–50

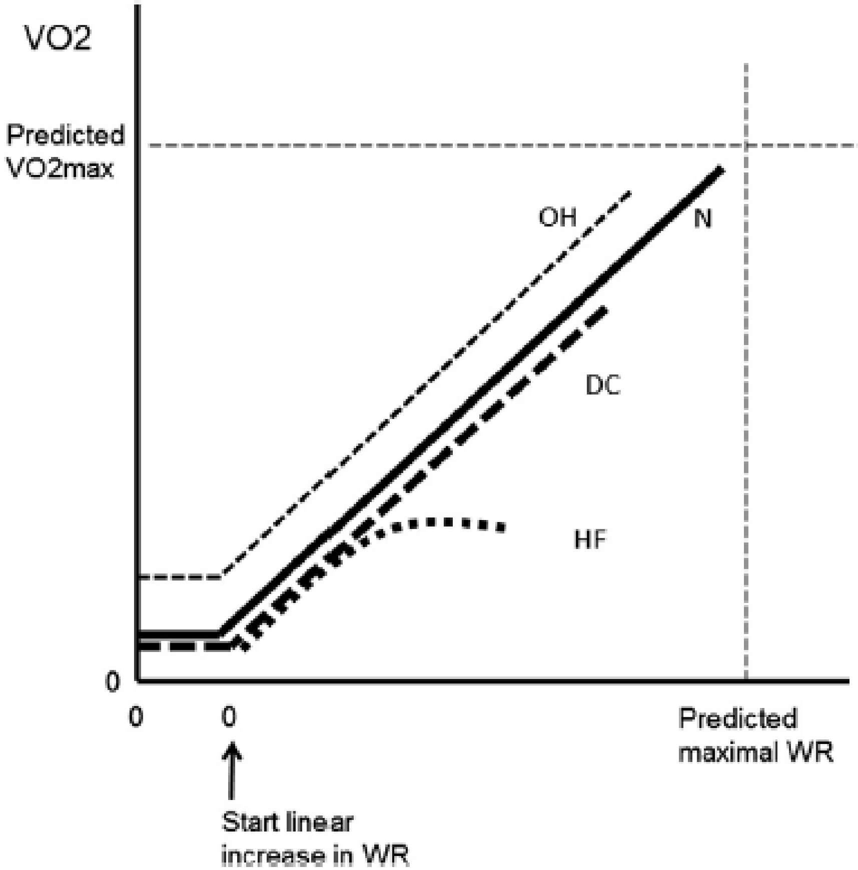


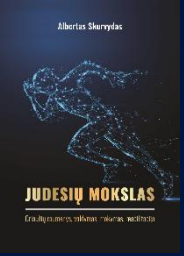
Figure 1. Several schematic plots demonstrating VO_2 versus WR slope in normal, variant, and pathological states. *Horizontal dashed line* represent predicted maximal VO_2 and *vertical dashed line* represent predicted maximal WR. *Arrow* point to start of loading after a period of unloaded effort. The plot (N) depicts the normal relation in which the intercept of the curve with VO_2 axis represents VO_2 at rest and the slope of the curve represents a linear relation between VO_2 and WR. Plot (OH) represents obese healthy subjects who are not deconditioned, and who have increased muscle mass, so the plot is displaced upward compared with normal subjects. Plot (DC) represents deconditioned subject in whom a normal VO_2/WR relation is maintained, however, less than predicted VO_2 and WR at peak effort are achieved. Plot (HF) represents an abnormal VO_2 response to WR often seen in patients with myocardial insufficiency in whom oxygen delivery to skeletal muscle is abnormal as a result of decreased cardiac output and therefore the increase in VO_2 is markedly decreased causing an early halt of exercise effort. DC = deconditioned; HF = myocardial insufficiency; N = normal VO_2/WR slope; OH = obese healthy subjects; VO_2 = oxygen consumption; WR = work rate.

2. National Aeronautics and Space Administration (NASA) /Johnson Space Centre Physical Activity Rating (PA-R) scale

VO_2 max was calculated taking into account subjects PAR Score, BMI and gender. The PAR is a physical activity questionnaire which has a score of 0-7 [59].

Male: VO2max (ml/kg/min) = 67.350 – [0.381 x age (years)] – (0.754 x BMI) + (1.951 x PAR);

Female: VO2max (ml/kg/min) = 56.363 – (0.381 x age (yrs)) – (0.754 x BMI) + (1.951 x PAR)



3. The Jackson Non-Exercise Test

The estimation of VO_2 max with this test requires a score from a simple exercise history questionnaire in addition to age, height, weight and gender. No exercise is performed but a measure of past exercise is determined by the physical activity questionnaire [60]. The VO_2 max is computed using the formula:

VO2max (ml /kg/min) = 56.363 + (1.921 * PA-R) - (0.381 * AGE) - (0.754 * BMI) + (10.987 * Gender)

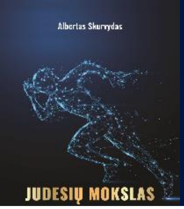
Where: Male = 1, Female = 0

BMI = Weight in kg / Height2 in meters

PA-R = Score on the physical activity questionnaire

The PA-R is a physical activity questionnaire which has a score of 0 - 7.

to check whether it is valid for the desired population. Bruce Protocol is commonly used treadmill exercise protocol for direct method and Queen's college step test, 20 meter Shuttle Run test and 6 minute walk test is common indirect test for VO_2 max estimation. As the Equipment required for



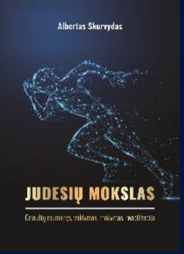
b. Non- exercise based Predictive Equations

1. Wasserman's Equation

Wasserman's Equation has been formulated on the basis of normative data obtained from Caucasian population. This non-exercise based VO_2 max is estimated by age, body mass index and body surface area [58].

Male: - VO2 max (L/min) = wt X [50.72-(0.372 X age)]/1000;

Female:-VO2 max (L/min) = (wt+42.8) X (22.78-0.17 X age)/1000.



3. The 1-Mile Jog Test

This test is performed over a 1 mile measured distance. The time for the mile should be greater than 8 min for males and greater than 9 min for females. The time to run the mile (in min and seconds) and the heart rate at the end need to be recorded. At the completion of the mile, the heart rate should be taken within 15-20 seconds. VO_2 max is computed using the formula [34].

VO2max ($ml \cdot kg^{-1} \cdot min^{-1}$ = 100.5 + (8.344 * gender) – (0.0744 * weight) - (1.438 * mile time) - (0.1928 * heart rate)

Where: gender = 1 for male; 0 for female Weight = pounds

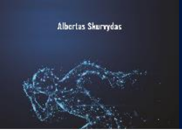
Time = minutes and fraction of minutes (14:30 = 14.5 minutes)

5. Queen's college step test (QCT)

The step test was performed using a tool of 16.25 inches height. Stepping was done for a total duration of 3 minutes at the rate of 24 steps up per minute for males and 22 steps up per minute for females which was set by a metronome. After completion of exercise, the carotid pulse rate was measured from the fifth to the twentieth second of recovery period. The 15 seconds pulse rate was converted into beats per minute and following equation was used to predict VO_2 max [37]

For males: VO_2 max = 111.33 – [0.42 × pulse rate beats/min]

For females: VO_2 max= 65.81–[0.1847×pulse rate beats/min].



8. 12-Minute Run Test (12-MRT) [41]

The individual is instructed to "cover the longest possible distance in 12 min, running preferably but walking whenever necessary to prevent becoming excessively exhausted". Record the distance in miles completed in 12 min. On completion of the test, the individual should continue walking to cool down.

Estimated VO_2 max (ml/kg/min) = 35.97 X distance (mile) – 11.29

10. 1-Mile Track Walk Test (Rockport Fitness test) [43]

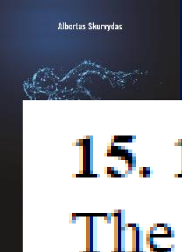
The individual is instructed "to walk as fast as possible". Record HR at the end of every quarter mile. Record the time to complete the test (in minutes). On completion of the test, the individual should continue walking to cool down.

VO_2 max ($ml \cdot kg^{-1} \cdot min^{-1}$) = 132.853 – (0.0769*weight) - (0.3877 * age) + (6.315 * gender) - (3.2649 * mile walk time) - (0.1565 * ending heart rate)

Where: Gender = 1 for male, 0 for female

Weight = pounds

Mile walk time = minutes and fractions of minute (14:30 = 14.5 min)



15. 12- Minute walk test (12-MWT) [48]

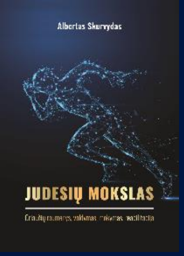
The individual walks a measured Distance. For the 12-MWT, the individual is instructed "to cover as much ground as possible on foot in 12 minutes and to keep going continuously if possible but not to be concerned if you have to slow down or rest", at the end of the test, subjects should feel they could not have cove red more ground in the time.

VO_2 max (ml/kg/min) = (35.97 x miles) - 11.29.

16. 6- Minutes' walk test (6-MWT) [49]

For the 6-MWT, the individual is instructed "to walk from end to end, covering as much ground as possible in 6 minutes", at the end of the 6 or 12 min, the individual is instructed to stop, the total distance is recorded.

VO_2 max (ml/kg/min) = 553.289 + (-2.11 x age) + (45.323 x sex) men=1, women=0



22. American College of Sports Medicine (ACSM's) Running Equation [55]

American College of Sports Medicine (ACSM) has published metabolic equation for the indirect measurement of VO_2 max while running. ACSM's running equation using treadmill speed and grade. The VO_2 max measured using the following equation:

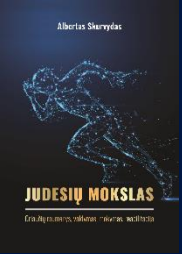
VO_2 max (ml/kg/min) = 0.2 (speed) + 0.9 (speed) (fractional grade) +3.5

23. American College of Sports Medicine (ACSM's) Walking Equation [56]

ACSM's walking equation is developed using highly fit male subjects or based on estimates ACSM'S walking equation is low speed and low fractional grade treadmill equation for VO_2 max estimation.

VO_2 max (ml/kg/min) = 0.1(speed) + 1.8 (speed) (fractional grade) + 3.5

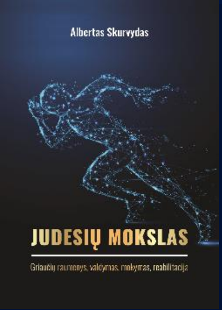
S: speed; G: grade



24. The FRIEND (Fitness Registry and the Importance of Exercise National Database) equation [57]

FRIEND equation is given by Fitness Registry and the Importance of Exercise National Database (FRIEND) for CRF assessment. Treadmill speed and treadmill grade is considered in the final model as predictors of measured VO2 max and the VO_2 max measured using the following equation:

VO_2 max (ml /kg/min) = [speed (m/min) x (0.17+ fractional grade x 0.79) + 3.5



Patikimi CVF nustatymo būdai pagal ŠSD ramybėje ir ŠSDmax?

HR Index—A Simple Method for the Prediction of Oxygen Uptake

Med. Sci. Sports Exerc., Vol. 43, No. 10, pp. 2005–2012, 2011.

JOHN RICHARD WICKS[1], NEIL B. OLDRIDGE[2,3], LARS K. NIELSEN[4], and CLAUDIA E. VICKERS[4]

TABLE 1. Input data for hypothetical model describing the relationship between HR parameters and METs.

METs	$HR_{absolute}$	HR_{net} ($HR_{absolute} - HR_{rest}$)	HR_{index} ($HR_{absolute}/HR_{rest}$)
10	170	102	2.5
9	159	91	2.3
8	147	79	2.2
7	136	68	2.0
6	125	57	1.8
5	113	45	1.7
4	102	34	1.5
3	91	23	1.3
2	79	11	1.2
1 (rest)	68	0	1.0

HR Index—A Simple Method for the Prediction of Oxygen Uptake

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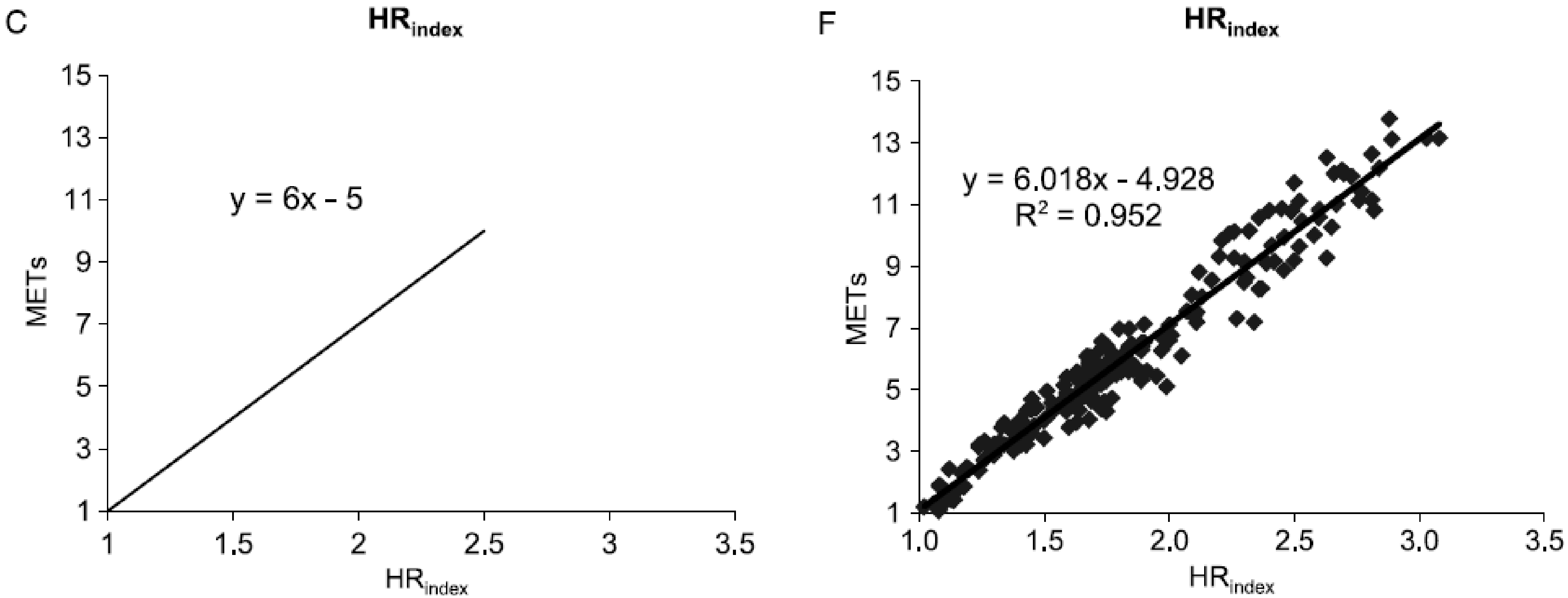
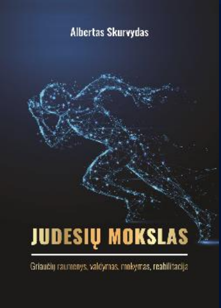


FIGURE 2—Comparison of theoretical models and actual data. Theoretical models (A, B, C) using a hypothetical 50-yr-old sedentary male (data in Table 1) are shown next to actual data (D, E, F) describing the exercise–response relationship between individual HR parameters ($HR_{absolute}$, HR_{net}, HR_{index}) and METs. Linear regression analyses for actual data collected from studies are shown in D–F (*n* = 220). Regression equations and R^2 values for each model and data set are shown.



YMCA 3 min laipiojimo testas?

The YMCA 3-min step test was altered by adjusting the step height to the individual participant's stature, based on the following equations:

$$\text{Step height for women (cm)} = (0.189) \times (\text{participant height in cm});$$

$$\text{step height for men (cm)} = (0.192) \times (\text{participant height in cm}).$$

Sports Med (2016) 46:737–750
DOI 10.1007/s40279-015-0445-1

SYSTEMATIC REVIEW

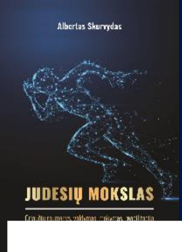
Validity of Submaximal Step Tests to Estimate Maximal Oxygen Uptake in Healthy Adults

Hunter Bennett[1] · Gaynor Parfitt[1] · Kade Davison[1] · Roger Eston[1]

All other parameters used were the same as the original YMCA step test [20], in which participants step up and down a single step at a rate of 24 steps/min for 3 min. Following the 3-min test, recovery heart beat count is measured for 15 s, commencing 5 s after the completion of the test (5–20 s), and 1 min post-test (60–75 s), and converted to beats/min.

$$VO_2max = (-0.9675 \times \text{post-test HR 15 s}) + 77.643;$$
$$VO_2max = (-0.2805 \times \text{post-test HR at 60 s}) + 76.710.$$

3 min testas, aprobuotas 2021 metais!



sensors

Sensors 2021, 21, 5726.

Article

Development of a New Submaximal Walk Test to Predict Maximal Oxygen Consumption in Healthy Adults

Hyuk In Yang [1,2], Wonhee Cho [1,2,3], Dong Hoon Lee [4], Sang-Hoon Suh [5] and Justin Y. Jeon [1,2,6,*]

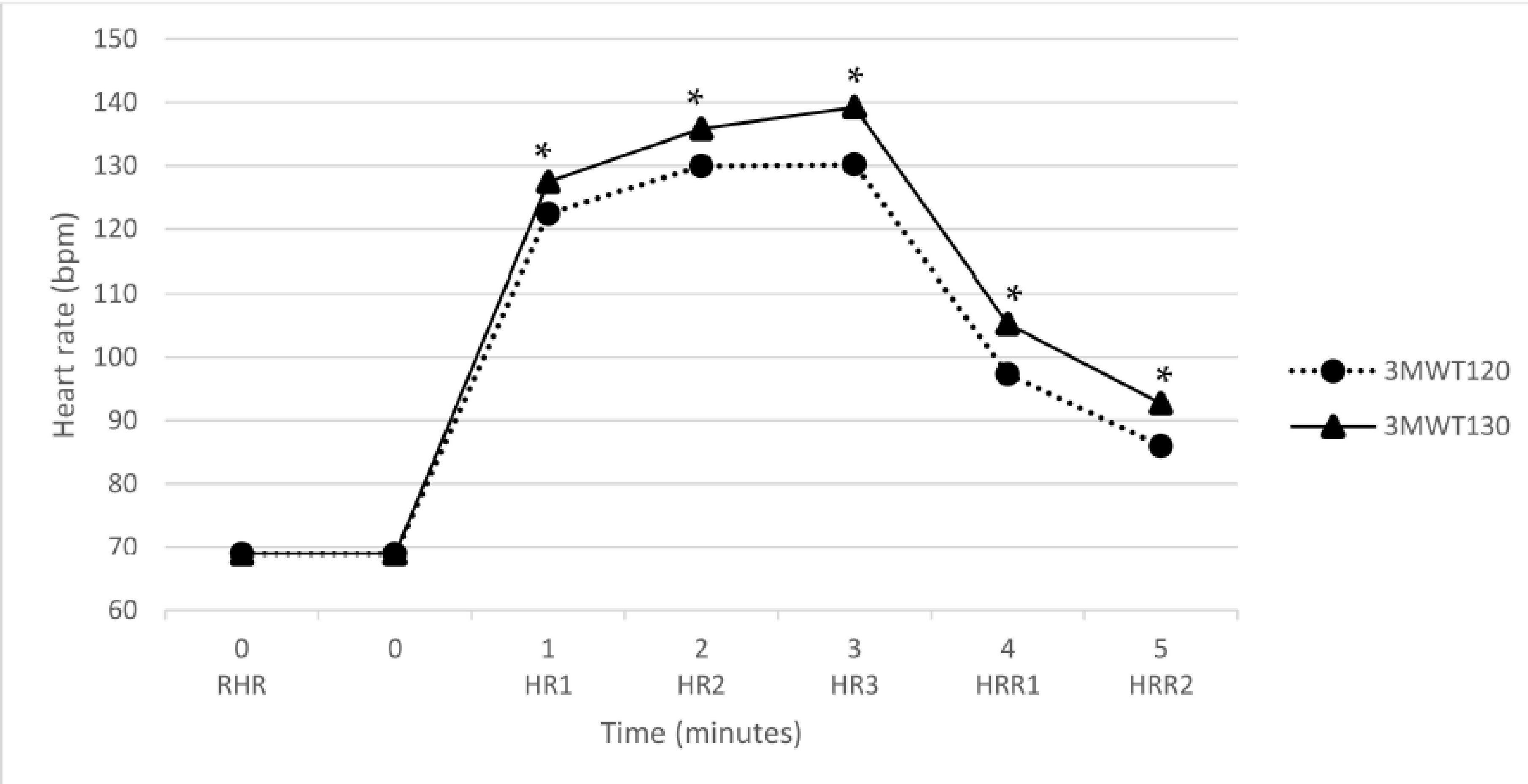
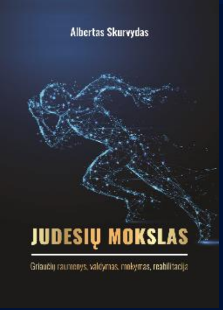
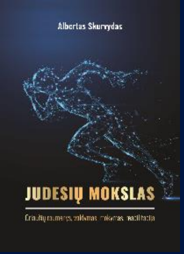


Figure 1. Heart rate response during the 3MWT at a cadence of 120 spm and 130 spm; * significant difference of $p < 0.05$. Abbreviation: $3MWT_{120}$, 3 min walk test at a cadence of 120 spm; $3MWT_{130}$, 3 min walk test at a cadence of 130 spm; spm, steps per minute; RHR, resting heart rate; HR1, heart rate at 1 min of exercise; HR2, heart rate at 2 min of exercise; HR3, heart rate at 3 min of exercise; HRR1, heart rate recovery at 1 min; HRR2, heart rate recovery at 2 min.



Vaikų super CVF testas?



Brit.J.Sports Med. — Vol. 22, No. 4, December 1988, pp. 141-144

A PROGRESSIVE SHUTTLE RUN TEST TO ESTIMATE MAXIMAL OXYGEN UPTAKE

R. RAMSBOTTOM, J. BREWER and C. WILLIAMS

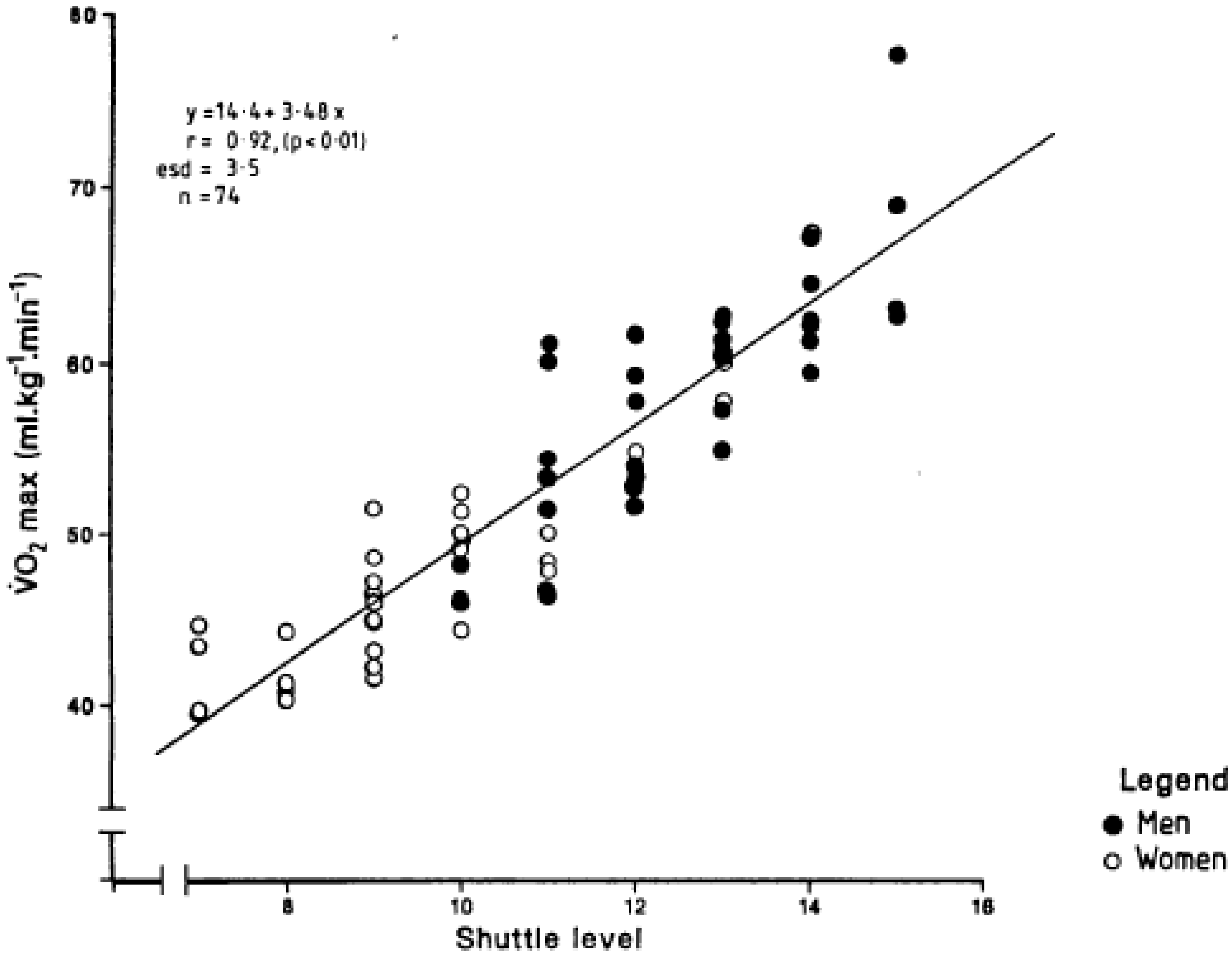
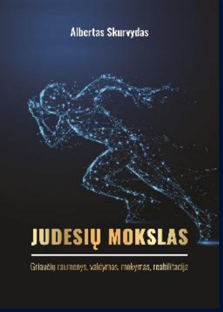
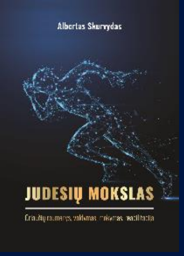
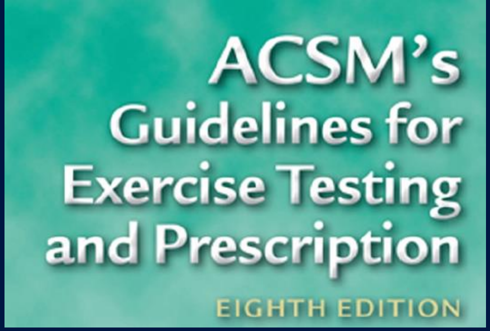


Fig. 3: The relationship between $\dot{V}O_2$ max and 20 m PST performance for men (n = 36) and women (n = 38).

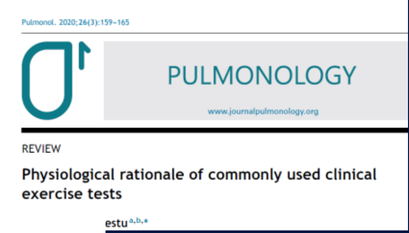


ACSM siūlomi testai?





- *Field tests* consist of walking or running a certain distance in a given time (i.e., 12-minute and 1.5-mile [2.4-km] run tests, and the 1- and 6-minute walk test). The advantages of field tests are that they are easy to administer to large numbers of individuals at one time and little equipment (e.g., a stop-watch) is needed. The disadvantages are that they all potentially could be maximal tests, and by their nature, are unmonitored for BP and HR. An individual's level of motivation and pacing ability also can have a profound impact on test results. These all-out run tests may be inappropriate for sedentary individuals or individuals at increased risk for cardiovascular and musculoskeletal complications. However, $\dot{V}O_{2max}$ can be estimated from test results.



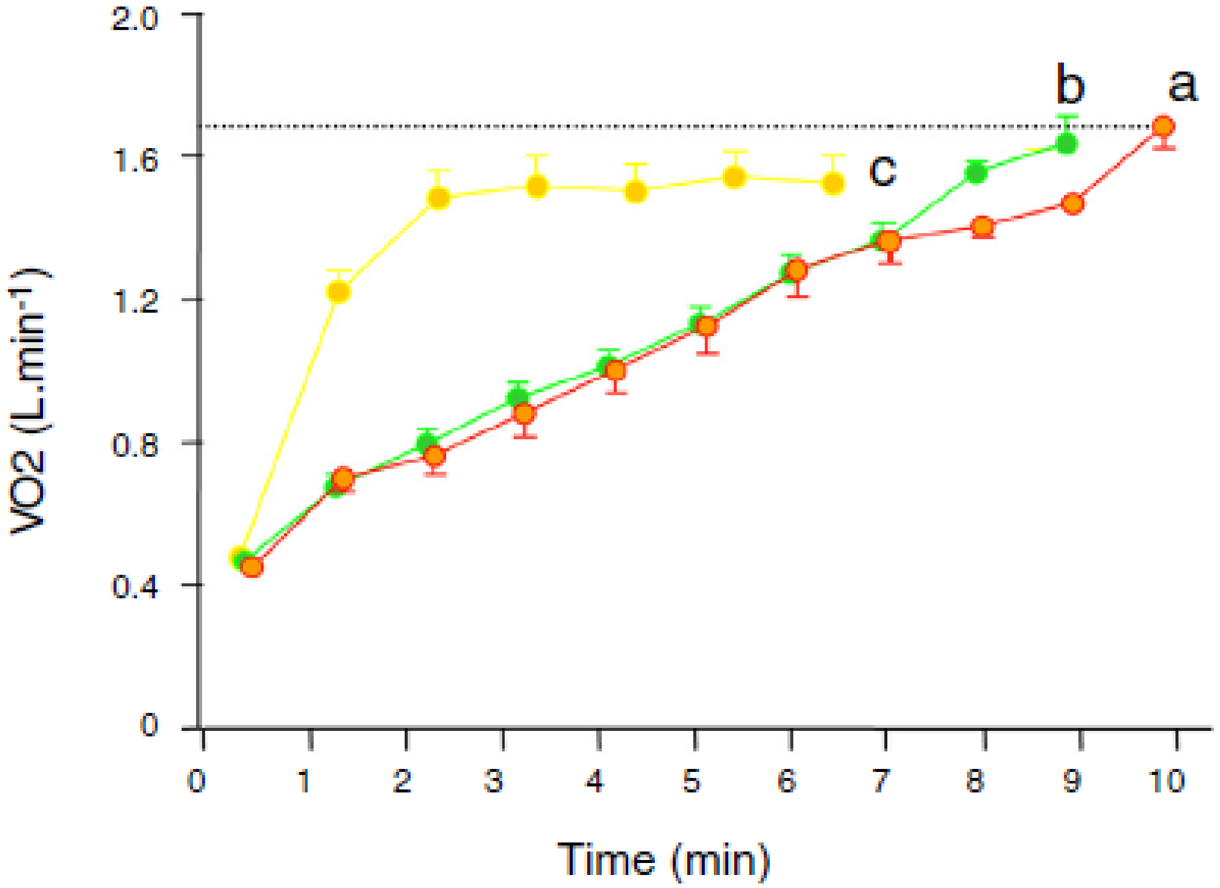
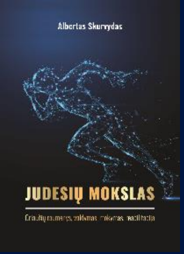


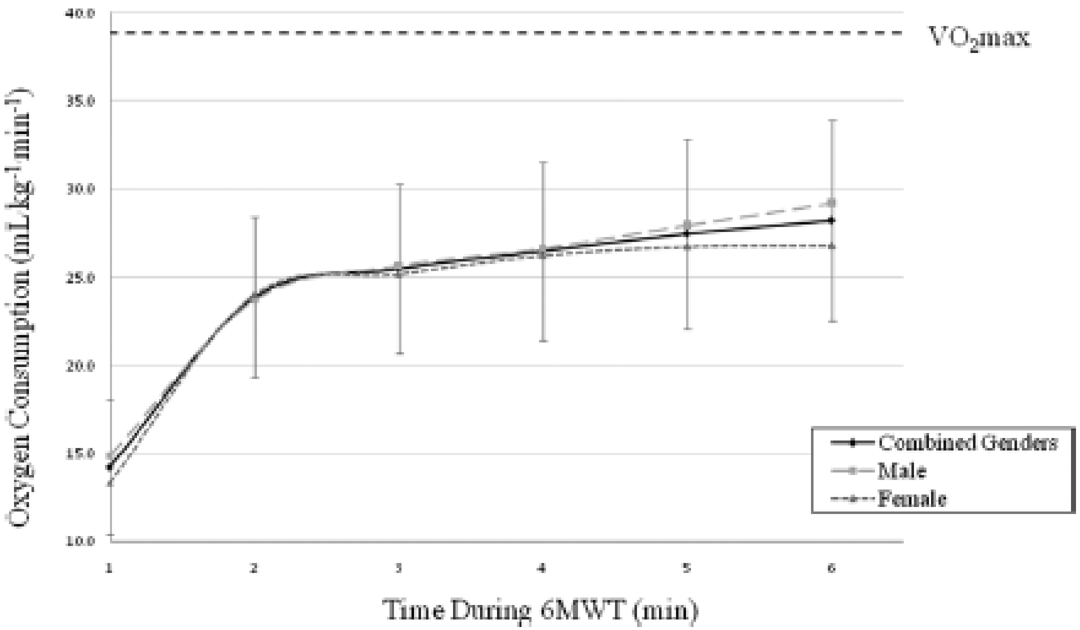
Fig. 5 VO_2 profile in 3 different exercise tests in 8 COPD patients: a) incremental cycle-ergometer exercise test b) incremental shuttle walking test (ISWT) and; c) 6-minute walking test.



The 6-Minute Walk Test as a Predictor of Objectively Measured Aerobic Fitness in Healthy Working-Aged Adults

nd Sportsmedicine, Volume 39, Issue 2, May 2011

Figure 1. The VO_2 of healthy working-aged adults during the 6MWT by minute. Test demands are compared with VO_2 max by relative oxygen consumption (mL/kg/min) on the left axis and by percentage of VO_2 max on the right axis.

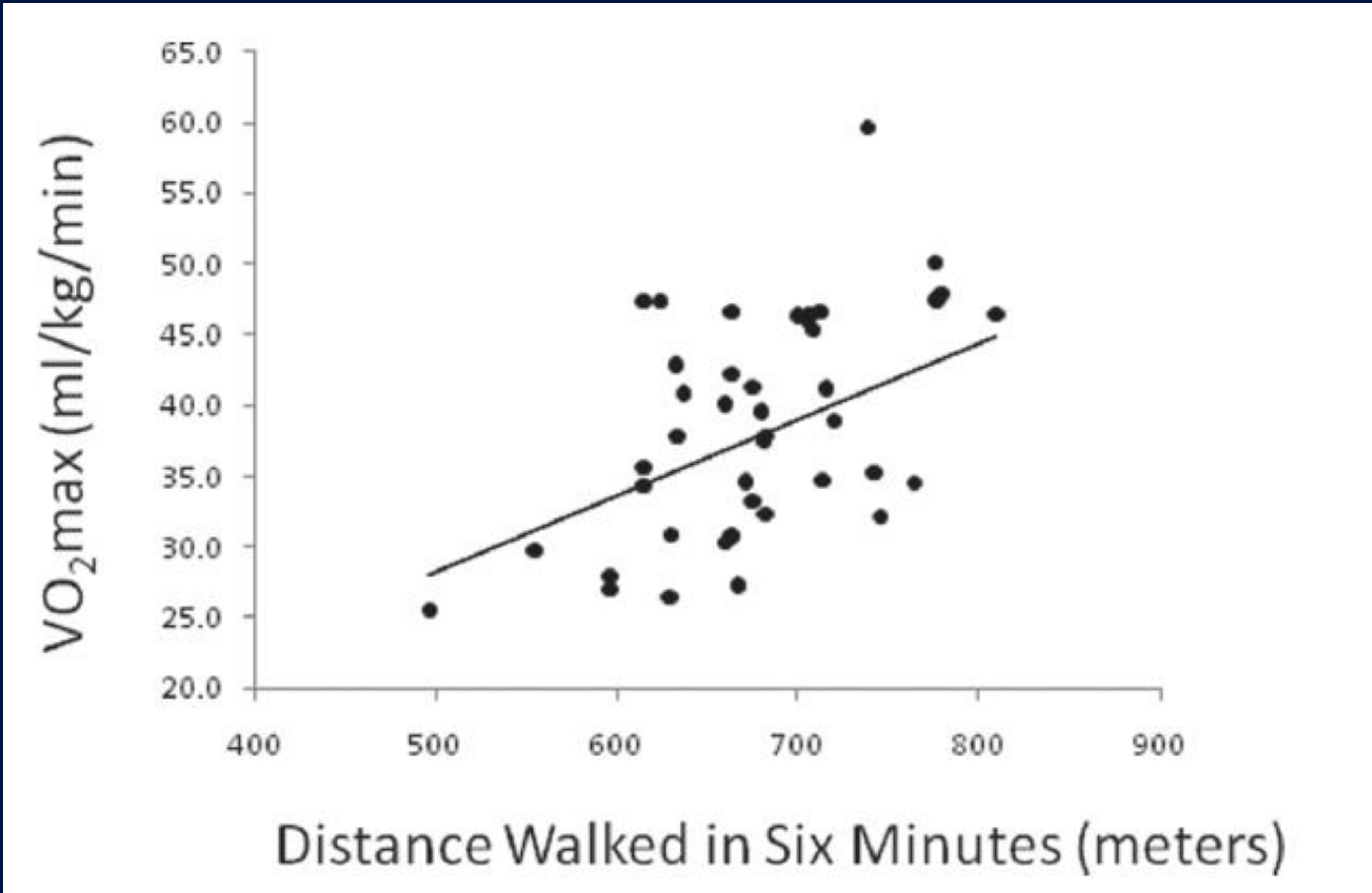


Error bars represent the standard deviation of the combined-gender VO_2 averaged over each minute.

Abbreviations: 6MTW, 6-minute walk test; VO_2 max, oxygen consumption.

Jamie F. Burr, PhD[1–3]
Shannon S. D. Bredin, PhD[3]
Marc D. Faktor, MSc[2]
Darren E. R. Warburton, PhD[1,3]

The Six-Minute Walk Test as a Predictor of Objectively Measured Aerobic Fitness in Healthy Working-Aged Adults



ACSM's Guidelines for Exercise Testing and Prescription, 9th ed. Philadelphia, PA: Wolters Kluwer Lippincott Williams & Wilkins. 2014, p 173

6 Minute Walk Test Distance Conversion Table

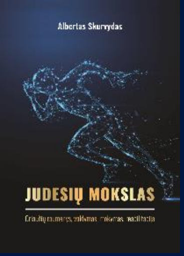
Standard estimates from 6MWD (feet walked) to METs

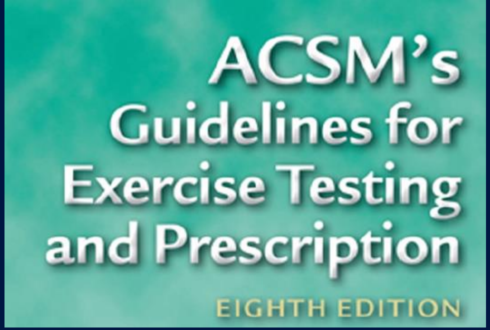
Based on ACSM metabolic prediction equation formula for horizontal walking.*

Distance in feet	Distance in meters	MPH	Meters·min^{-1}	VO2(ml·kg^{-1}·min^{-1})	METs
500	152	.94	25	6.04	1.73
510	155	.96	26	6.09	1.74
520	159	.98	26	6.14	1.75
530	162	1.00	27	6.19	1.77
540	165	1.02	27	6.24	1.78
550	168	1.04	28	6.29	1.80
560	171	1.06	28	6.35	1.81
570	174	1.08	29	6.39	1.83
580	177	1.10	29	6.45	1.84
590	180	1.11	30	6.50	1.86
600	183	1.13	30	6.55	1.87
610	186	1.15	31	6.59	1.89
620	189	1.17	32	6.65	1.90
630	192	1.19	32	6.70	1.91
640	195	1.21	33	6.75	1.93
650	198	1.23	33	6.80	1.94
660	201	1.25	34	6.85	1.96
670	204	1.27	34	6.90	1.97
680	207	1.28	35	6.95	1.99
690	210	1.30	35	7.00	2.00
700	213	1.32	36	7.06	2.02

ACSM's Guidelines for Exercise Testing and Prescription, 9th ed. Philadelphia, PA: Wolters Kluwer Lippincott Williams & Wilkins. 2014, p 173

feet	meters	MPH	Meters·min-1	VO2(ml·kg-1·min-1)	METs
910	277	1.72	46	8.12	2.32
920	280	1.74	47	8.17	2.34
930	283	1.76	47	8.22	2.35
940	287	1.78	48	8.28	2.36
950	290	1.79	48	8.33	2.38
960	293	1.81	49	8.38	2.39
970	296	1.83	49	8.43	2.41
980	299	1.85	50	8.47	2.42
990	302	1.87	50	8.52	2.44
1000	305	1.89	51	8.58	2.45
1100	335	2.08	56	9.08	2.60
1200	366	2.26	61	9.59	2.74
1300	396	2.45	66	10.10	2.89
1400	427	2.64	71	10.61	3.03
1500	457	2.83	76	11.12	3.18
1600	488	3.02	81	11.62	3.32
1700	518	3.21	86	12.13	3.47
1800	549	3.40	91	12.64	3.61
1900	579	3.59	97	13.15	3.76
2000	610	3.70	102	13.66	3.90
2100	640	3.97	107	14.16	4.05
2200	671	4.16	112	14.67	4.19
2300	701	4.34	117	15.18	4.34
2400	732	4.53	122	15.69	4.48
2500	762	4.72	127	16.20	4.63
2600	792	4.91	132	16.70	4.77
2700	823	5.10	137	17.22	4.92
2800	853	5.29	142	17.72	5.06
2900	884	5.48	147	18.23	5.21
3000	914	5.67	152	18.74	5.35

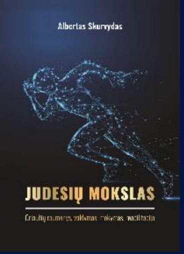




VO_2 from the 6-minute walk; however, the following equation requires minimal clinical information (10):

- Peak $\dot{V}O_2 = \dot{V}O_2\ mL \cdot kg^{-1} \cdot min^{-1} = [0.02 \times \text{distance (m)}] - [0.191 \times \text{age (yr)}] - [0.07 \times \text{weight (kg)}] + [0.09 \times \text{height (cm)}] + [0.26 \times RPP\ (\times 10^{-3})] + 2.45$

  Where m = distance in meters; y = year; kg = kilogram; cm = centimeter; RPP = rate pressure product (HR × systolic BP in mm Hg)
- $R^2 = 0.65$ SEE = 2.68



http://www.biomedcentral.com/1471-2466/10/31

BMC
Pulmonary Medicine

RESEARCH ARTICLE Open Access

The six minute walk test accurately estimates mean peak oxygen uptake

Robert M Ross*[1], Jayasimha N Murthy[2], Istvan D Wollak[3] and Andrew S Jackson[4]

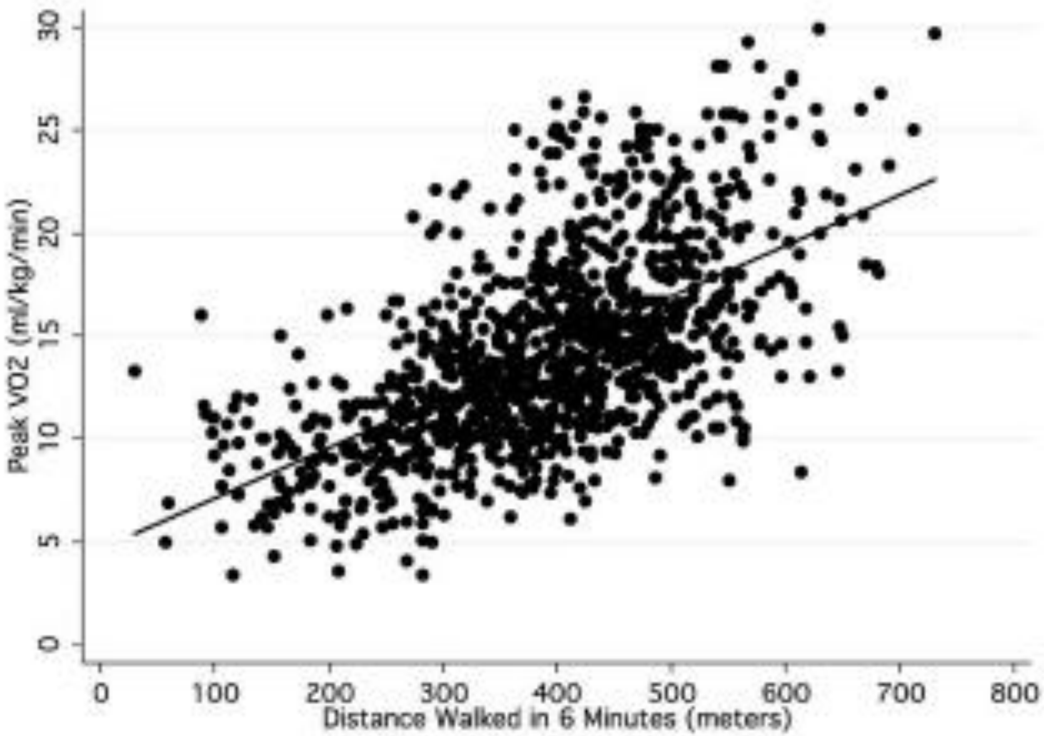
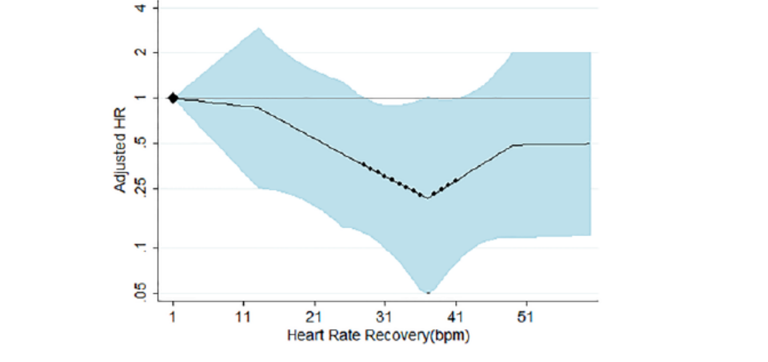


Figure 2 Scattergram and linear regression line for the distance walked in 6 minutes and peak VO2 for all patients from the 11 studies.



Iš naujo nustatyti mastelį

2. Hazard ratios (HRs) of colorectal cancer incidence according to heart rate recovery (HRR) in
RR = Maximal heart rate − 2-Minute recovery heart rate.

VO2max=33,5 mil/min/kg

Viršytas laikas

755 metrai per 6 min.

able 4. Regression Equations to Predict VO_2 Max and 6MWT Distance Using Age, Basic Anthropometry, and Simple Fitness Measures

O_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$) = 70.161 + (0.023 × 6MWT [m]) – (0.276 × weight [kg]) – (6.79 × sex, where m = 0, f = 1) – (0.193 × resting HR [bpm]) – 191 × age [y])
IWT distance (m) = –60.697 + (5.181 × height [cm]) – (1.906 × body weight [kg])

obreviations: 6MWT, 6-minute walk test; bpm, beats per minute; HR, heart rate; VO_2 max, maximal oxygen consumption.

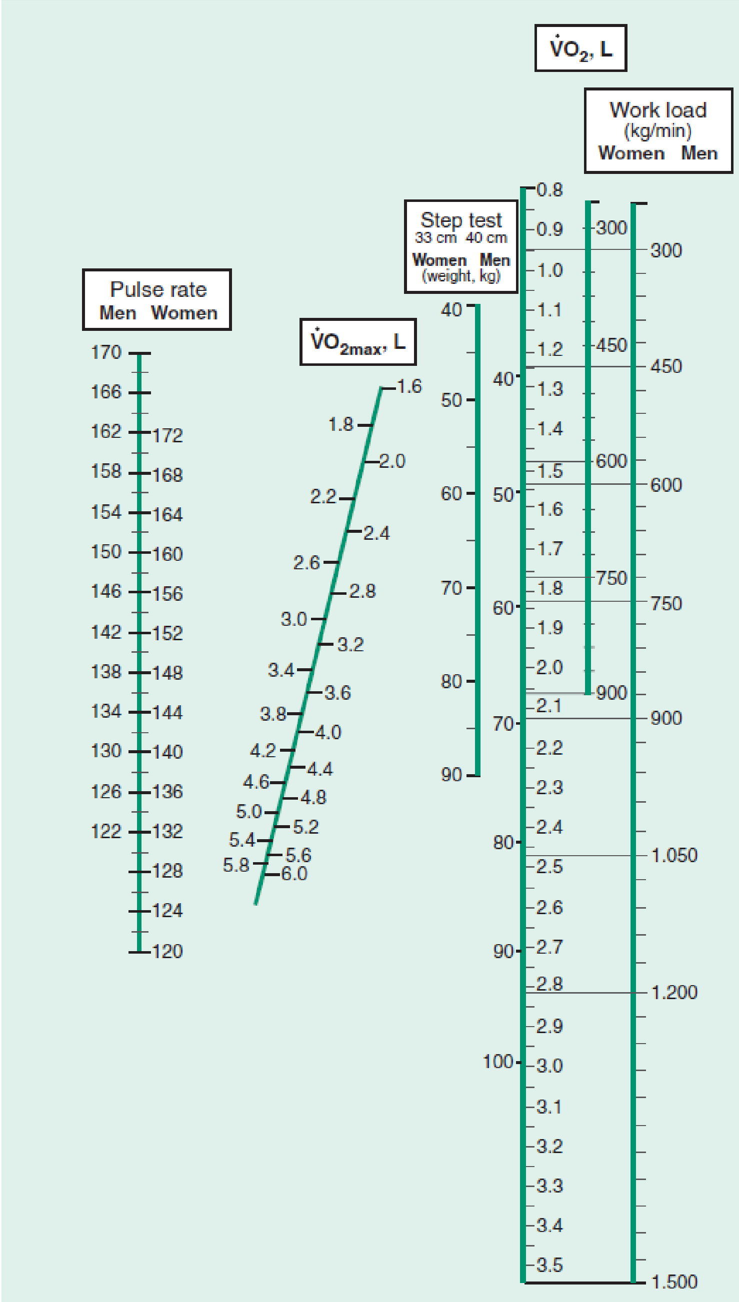
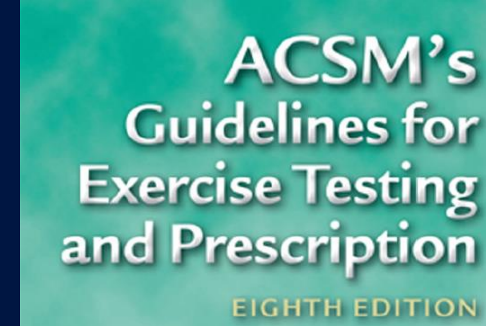


FIGURE 4.1. Modified Astrand-Ryhming nomogram. (Used with permission from Astrand PO, Ryhming I. A nomogram for calculation of aerobic capacity [physical fitness] from pulse rate during submaximal work. *J Appl Physiol.* 1954;7:218–21.)

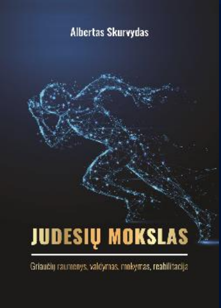


https://www.acsm.org/blog-detail/acsm-certified-blog/2019/08/19/astrand-ryhming-step-test-video

Step Tests

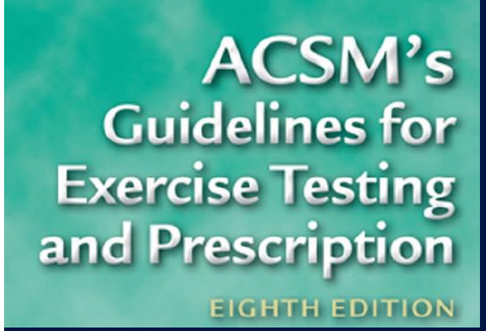
Step tests have also been used to estimate $\dot{V}O_{2max}$. Astrand and Ryhming (3) used a single-step height of 33 cm (13 in) for women and 40 cm (15.7 in) for men at a rate of 22.5 steps $\cdot$ min^{-1}. These tests require oxygen uptakes of about 25.8 and 29.5 mL $\cdot$ kg^{-1} $\cdot$ min^{-1}, respectively. Heart rate is measured as described for the cycle test, and $\dot{V}O_{2max}$ is estimated from the nomogram (Fig. 4.1). In contrast, Maritz et al. (44) used a single-step height of 12 inches (30.5 cm) and four-step rates to systematically increase the work rate. A steady-state HR was measured for each step rate, and a line formed from these HR values was extrapolated to age-predicted maximal HR; the maximal work rate was determined as described for the YMCA cycle test. $\dot{V}O_{2max}$ can be estimated from the formula for stepping in Chapter 7. Such step tests should be modified to suit the population being tested. The Canadian Home Fitness Test has demonstrated that such testing can be performed on a large scale and at low cost (2,3,24,36,38,44,64).

Instead of estimating $\dot{V}O_{2max}$ from HR responses to several submaximal work rates, a wide variety of step tests have been developed to categorize cardiovascular fitness on the basis of a person's recovery HR following a standardized step test. The 3-Minute YMCA Step Test is a good example of such a test. This test uses a 12-inch (30.5 cm) bench, with a stepping rate of 24 steps $\cdot$ min^{-1} (estimated oxygen cost of 25.8 mL $\cdot$ kg^{-1} $\cdot$ min^{-1}). After exercise is completed, the subject immediately sits down and HR is counted for 1 minute. Counting must start within 5 seconds at the end of exercise. Heart rate values are used to obtain a qualitative rating of fitness from published normative tables (24).



Galite pasilyginti su kitais?

TABLE 4.8. PERCENTILE VALUES FOR MAXIMAL AEROBIC POWER



MALES

	AGE 20–29				AGE 30–39				
%	Balke Treadmill (time)	Max $\dot{V}O_2$ (mL/kg/min)	12 min Run (miles)	1.5 Mile Run (time)	Balke Treadmill (time)	Max $\dot{V}O_2$ (mL/kg/min)	12 min Run (miles)	1.5 Mile Run (time)	
99	32:00	61.2	2.02	8:22	30:00	58.3	1.94	8:49	
95	28:31	56.2	1.88	9:10	27:11	54.3	1.82	9:31	S
90	27:00	54.0	1.81	9:34	26:00	52.5	1.77	9:52	
85	26:00	52.5	1.77	9:52	24:45	50.7	1.72	10:14	
80	25:00	51.1	1.73	10:08	23:30	47.5	1.67	10:38	E
75	23:40	49.2	1.68	10:34	22:30	47.5	1.63	10:59	
70	23:00	48.2	1.65	10:49	22:00	46.8	1.61	11.09	
65	22:00	46.8	1.61	11:09	21:00	45.3	1.57	11:34	
60	21:15	45.7	1.58	11:27	20:20	44.4	1.55	11:49	G
55	21:00	45.3	1.57	11:34	20:00	43.9	1.53	11 :58	
50	20:00	43.9	1.53	11:58	19:00	42.4	1:49	12:25	
45	19:26	43.1	1.51	12:11	18:15	41.4	1.46	12:44	
40	18:50	42.2	1.49	12:29	18:00	41.0	1.45	12:53	F
35	18:00	41.0	1.45	12:53	17:00	39.5	1.41	13:25	
30	17:30	40.3	1.43	13:08	16:15	38.5	1.38	13:48	
25	17:00	39.5	1.41	13:25	15:40	37.6	1.36	14:10	
20	16:00	38.1	1.37	13:58	15:00	36.7	1.33	14:33	P
15	15:00	36.7	1.33	14:33	14:00	35.2	1.29	15:14	
10	14:00	35.2	1.29	15:14	13:00	33.8	1.25	15:56	
5	12:00	32.3	1.21	16:46	11:10	31.1	1.18	17:30	
1	8:00	26:6	1.05	20:55	8:00	26.6	1.05	20:55	VP
		n = 2,606				n = 13,158			

Total n = 15,764

S, Superior; E, excellent; G, good; F, fair; P, poor; VP, very poor.

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TABLE 4.8. PERCENTILE VALUES FOR MAXIMAL AEROBIC POWER (*Continued*)

MALES

	AGE 40–49				AGE 50–59				
%	Balke Treadmill (time)	Max $\dot{V}O_2$ (mL/kg/ min)	12 min Run (miles)	1.5 Mile Run (time)	Balke Treadmill (time)	Max $\dot{V}O_2$ (mL/kg/ min)	12 min Run (miles)	1.5 Mile Run (time)	
99	29:06	57.0	1.90	9:02	27:15	54.3	1.82	9:31	
95	26:16	52.9	1.79	9:47	24:00	49.7	1.69	10:27	S
90	25:00	51.1	1.73	10:09	22:00	46.8	1.61	11:09	
85	23:14	48.5	1.66	10:44	20:31	44.6	1.55	11:45	
80	22:00	46.8	1.61	11:09	19:35	43.3	1.52	12:08	E
75	21:02	45.4	1.58	11:32	18:32	41.8	1.47	12:37	
70	20:15	44.2	1.54	11:52	18:00	41.0	1.45	12:53	
65	20:00	43.9	1.53	11:58	17:00	39.5	1.41	13:25	
60	19:00	42.4	1.49	12:25	16:10	38:3	1.38	13.53	G
55	18:02	41.0	1.45	12:53	16:00	38.1	1.37	13:58	
50	17:34	40.4	1.44	13:05	15:02	36.7	1.33	14:33	
45	17:00	39.5	1.41	13:25	14:56	36.6	1.33	14:35	
40	16:12	38.4	1.38	13:50	14:00	35.2	1.29	15:14	F
35	15:38	37.6	1.36	14:10	13:05	33.9	1.26	15:53	
30	15:00	36.7	1.33	14:33	12:38	33.2	1.24	16:16	
25	14:20	35.7	1.31	15:00	12:00	32.3	1.21	16:46	
20	13:35	34.6	1.28	15:32	11:10	31.1	1.18	17:30	P
15	12:45	33.4	1.24	16:09	10:15	29.8	1.14	18:22	
10	11:40	31.8	1.20	17:04	9:15	28.4	1.10	19:24	
5	10:00	29.4	1.13	18:39	7:30	25.8	1.03	21:40	
1	7:00	25.1	1.01	22.22	4:20	21.3	0.90	27:08	VP
		n = 16,534				n = 9,102			

Total n = 25,636

S, Superior; E, excellent; G, good; F, fair; P, poor; VP, very poor.

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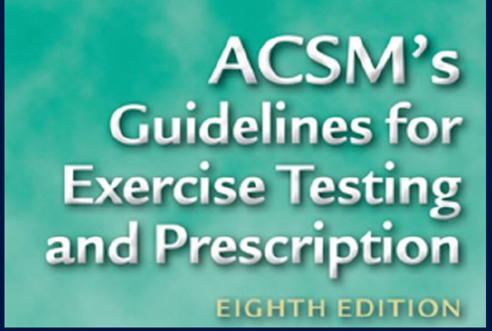
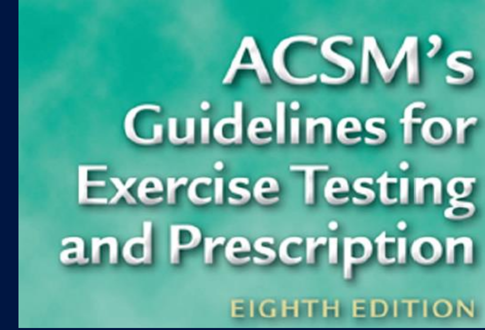


TABLE 4.8. PERCENTILE VALUES FOR MAXIMAL AEROBIC POWER (*Continued*)



MALES

	AGE 60–69				AGE 70–79				
%	Balke Treadmill (time)	Max $\dot{V}O_2$ (mL/kg/ min)	12 min Run (miles)	1.5 Mile Run (time)	Balke Treadmill (time)	Max $\dot{V}O_2$ (mL/kg/ min)	12 min Run (miles)	1.5 Mile Run (time)	
99	25:02	51.1	1.74	10:09	24:00	49.7	1.69	10:27	
95	21:33	46.1	1.60	11:20	19:00	42.4	1.49	12:25	S
90	19:30	43.2	1.51	12:10	17:00	39.5	1.41	13:25	
85	18:00	41.0	1.45	12:53	16:00	38.1	1.37	13:57	
80	17:00	39.5	1.41	13:25	14:34	36.0	1.32	14:52	E
75	16:00	38.1	1.37	13:58	13:25	34.4	1.27	15:38	
70	15:00	36.7	1.33	14:33	12:27	33.0	1.23	16:22	
65	14:30	35.9	1.31	14:55	12:00	32.3	1.21	16:46	
60	13:51	35.0	1.29	15:20	11:00	30.9	1.17	17:37	G
55	13:04	33.9	1.26	15:53	10:30	30.2	1.15	18:05	
50	12:30	33.1	1.23	16:19	10:00	29.4	1.13	18:39	
45	12:00	32.3	1.21	16:46	9:20	28.5	1.11	19:19	
40	11:21	31.4	1.19	17:19	9:00	28.0	1.09	19:43	F
35	10:49	30.6	1.17	17:49	8:21	27.1	1.07	20:28	
30	10:00	29.4	1.13	18:39	7:38	26.0	1.04	21:28	
25	9:29	28.7	1.11	19:10	7:00	25.1	1.01	22:22	
20	8:37	27.4	1.08	20:13	6:00	23.7	0.97	23:55	P
15	7:33	25.9	1.03	21:34	5:00	22.2	0.93	25:49	
10	6:20	24.1	0.99	23:27	4:00	20.8	0.89	27:55	
5	4:55	22.1	0.93	25:58	3:00	19.3	0.85	30:34	
1	2:29	18.6	0.83	31:59	2:00	17.9	0.81	33:30	VP
		n = 2,682				n = 467			

Total n = 3,149

S, Superior; E, excellent; G, good; F, fair; P, poor; VP, very poor.

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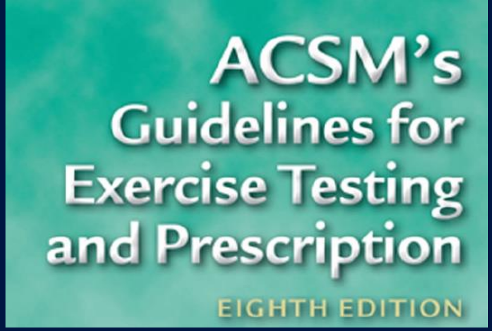
TABLE 4.8. PERCENTILE VALUES FOR MAXIMAL AEROBIC POWER (*Continued*)



FEMALES

	AGE 20–29				AGE 30–39				
%	Balke Treadmill (time)	Max $\dot{V}O_2$ (mL/kg/min)	12 min Run (miles)	1.5 Mile Run (time)	Balke Treadmill (time)	Max $\dot{V}O_2$ (mL/kg/min)	12 min Run (miles)	1.5 Mile Run (time)	
99	27:43	55.0	1.84	9:23	26:00	52.5	1.77	9:52	
95	24:24	50.2	1.71	10:20	22:06	46.9	1.62	11:08	S
90	22:30	47.5	1.63	10:59	20:34	44.7	1.56	11:43	
85	21:00	45.3	1.57	11:34	19:03	42.5	1.50	12:23	
80	20:04	44.0	1.54	11:56	18:00	41.0	1.45	12:53	E
75	19:42	43.4	1.52	12:07	17:30	40.3	1.43	13:08	
70	18:06	41.1	1.46	12:51	16:30	38.8	1.39	13:41	
65	17:45	40.6	1.44	13:01	16:00	38.1	1.37	13.58	
60	17:00	39.5	1.41	13:25	15:02	36.7	1.33	14:33	G
55	16:00	38.1	1.37	13:58	15:00	36.7	1.33	14:33	
50	15:30	37.4	1.35	14:15	14:00	35.2	1.29	15:14	
45	15:00	36.7	1.33	14:33	13:30	34.5	1.27	15:35	
40	14:11	35.5	1.30	15:05	13:00	33.8	1.25	15:56	F
35	13:36	34.6	1.27	15:32	12:03	32.4	1.21	16:43	
30	13:00	33.8	1.25	15:56	12:00	32.3	1.21	16:46	
25	12:04	32.4	1.22	16:43	11:00	30.9	1.17	17:38	
20	11:30	31.6	1.19	17:11	10:20	29.9	1.15	18:18	P
15	10:42	30.5	1.16	17:53	9:39	28.9	1.12	19:01	
10	10:00	29.4	1.13	18:39	8:36	27.4	1.08	20:13	
5	7:54	26.4	1.05	21:05	7:16	25.5	1.02	21:57	
1	5:14	22.6	0.94	25:17	5:20	22.7	0.94	25:10	VP
		n = 1,350				n = 4,394			
Total n = 5,744									

S, Superior; E, excellent; G, good; F, fair; P, poor; VP, very poor.

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TABLE 4.8. PERCENTILE VALUES FOR MAXIMAL AEROBIC POWER (*Continued*)

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EIGHTH EDITION

FEMALES

	AGE 40–49				AGE 50–59				
%	Balke Treadmill (time)	Max $\dot{V}O_2$ (mL/kg/min)	12 min Run (miles)	1.5 Mile Run (time)	Balke Treadmill (time)	Max $\dot{V}O_2$ (mL/kg/min)	12 min Run (miles)	1.5 Mile Run (time)	
99	25:00	51.1	1.74	10:09	21:00	45.3	1.57	11:34	
95	20:56	45.2	1.57	11:35	17:16	39.9	1.42	13:16	S
90	19:00	42.4	1.49	12:25	16:00	38.1	1.37	13:58	
85	17:20	40.0	1.43	13:14	15:00	36.7	1.33	14:33	
80	16:34	38.9	1.40	13:38	14:00	35.2	1.29	15:14	E
75	16:00	38.1	1.37	13:58	13:15	34.1	1.26	15:47	
70	15:00	36.7	1.33	14:33	12:23	32.9	1.23	16:26	
65	14:14	35.6	1.30	15:03	12:00	32.3	1.21	16:46	
60	13:56	35.1	1.29	15:17	11:23	31.4	1.19	17:19	G
55	13:02	33.8	1.25	15:56	11:00	30.9	1.17	17:38	
50	12:39	33.3	1.24	16:13	10:30	30.2	1.15	18:05	
45	12:00	32.3	1.21	16:46	10:00	29.4	1.13	18:39	
40	11:30	31.6	1.19	17:11	9:30	28.7	1.11	19:10	F
35	11:00	30.9	1.17	17:38	9:00	28.0	1.09	19:43	
30	10:10	29.7	1.14	18:26	8:30	27.3	1.07	20:17	
25	10:00	29.4	1.13	18:39	8:00	26.6	1.05	20:55	
20	9:00	28.0	1.09	19:43	7:15	25.5	1.02	21:57	P
15	8:07	26.7	1.06	20:49	6:40	24.6	1.00	22:53	
10	7:21	25.6	1.03	21:52	6:00	23.7	0.97	23:55	
5	6:17	24.1	0.98	23:27	4:48	21.9	0.92	26:15	
1	4:00	20.8	0.89	27:55	3:00	19.3	0.85	30:34	VP
		n = 4,834				n = 3,103			

Total n = 7,937

S, Superior; E, excellent; G, good; F, fair; P, poor; VP, very poor.

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ACSM's Guidelines for Exercise Testing and Prescription
EIGHTH EDITION

TABLE 4.8. PERCENTILE VALUES FOR MAXIMAL AEROBIC POWER (*Continued*)

FEMALES

	AGE 60–69				AGE 70–79				
%	Balke Treadmill (time)	Max $\dot{V}O_2$ (mL/kg/min)	12 min Run (miles)	1.5 Mile Run (time)	Balke Treadmill (time)	Max $\dot{V}O_2$ (mL/kg/min)	12 min Run (miles)	1.5 Mile Run (time)	
99	19:00	42.4	1.49	12:25	19:00	42.4	1.49	12:25	
95	15:09	36.9	1.34	14:28	15:00	36.7	1.33	14:33	S
90	13:33	34.6	1.27	15:32	12:50	33.5	1.25	16:06	
85	12:28	33.0	1.23	16:22	11:46	32.0	1.20	16:57	
80	12:00	32.3	1.21	16:46	10:30	30.2	1.15	18:05	E
75	11:04	31.0	1.18	17:34	10:00	29.4	1.13	18:39	
70	10:30	30.2	1.15	18:05	9:15	28.4	1.10	19:24	
65	10:00	29.4	1.13	18:39	8:43	27.6	1.08	20:02	
60	9:44	29.1	1.12	18:52	8:00	26.6	1.05	20:54	G
55	9:11	28.3	1.10	19:29	7:37	26.0	1.04	21:45	
50	8:40	27.5	1.08	20:08	7:00	25.1	1.01	22:22	
45	8:15	26.9	1.06	20:38	6:39	24.6	1.00	22:54	
40	8:00	26.6	1.05	20:55	6:05	23.8	0.98	23:47	F
35	7:14	25.4	1.02	22:03	5:28	22.9	0.95	24:54	
30	6:52	24.9	1.01	22:34	5:00	22.2	0.93	25:49	
25	6:21	24.2	0.99	23:20	4:45	21.9	0.92	26:15	
20	6:00	23.7	0.97	23:55	4:16	21.2	0.90	27:17	P
15	5:25	22.8	0.95	25:02	4:00	20.8	0.89	27:55	
10	4:40	21.7	0.92	26:32	3:00	19.3	0.85	30:34	
5	3:30	20.1	0.87	29:06	2:00	17.9	0.81	33:32	
1	2:10	18.1	0.82	33:05	1:00	16.4	0.77	37:26	VP
		n = 1,088				n = 209			

Total n = 1,297

S, superior; E, excellent; G, good; F, fair; P, poor; VP, very poor.

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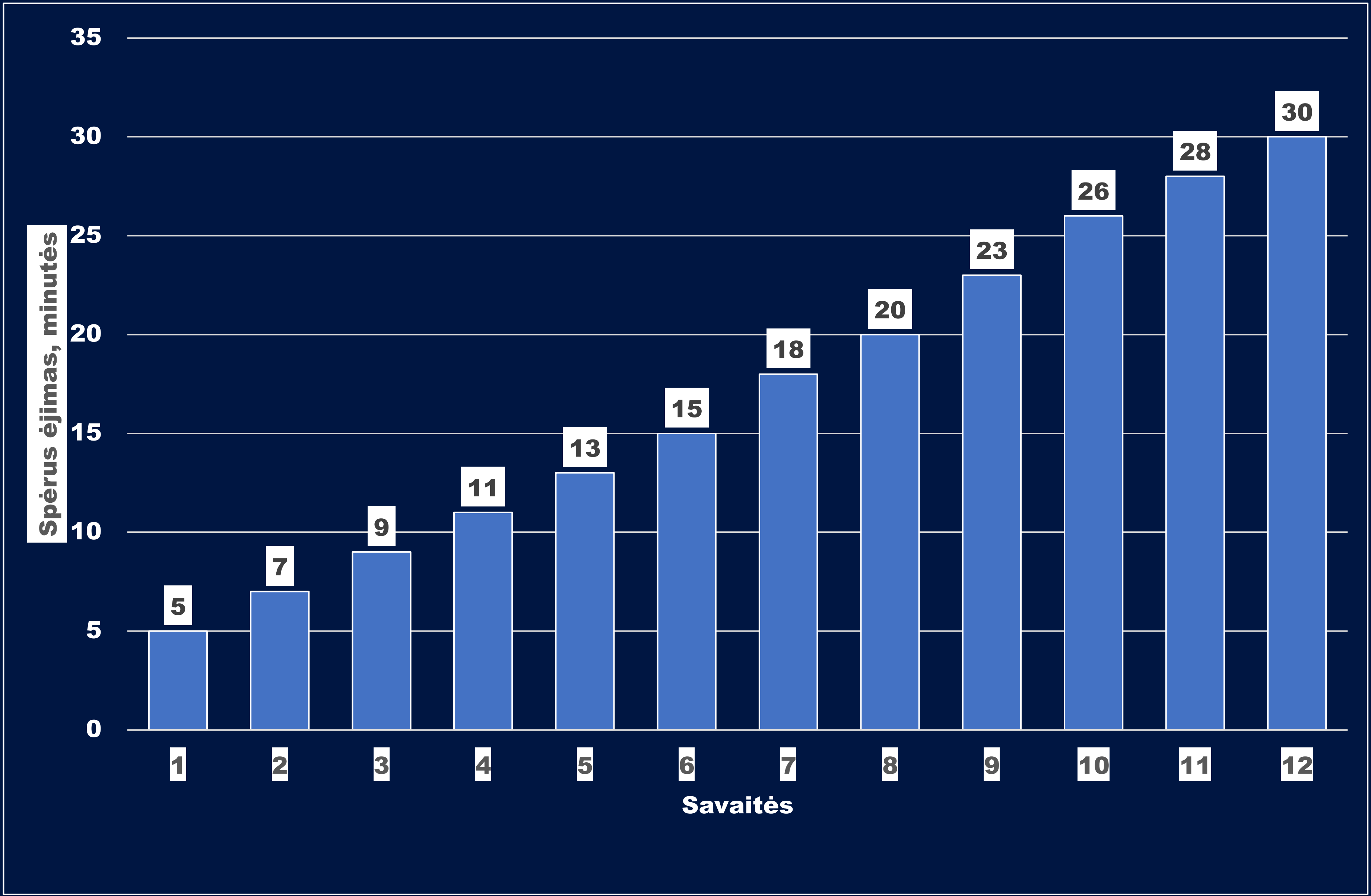
Mayo klinkos patarimai

Myo Clinics



Spėrus ėjimas, minutės
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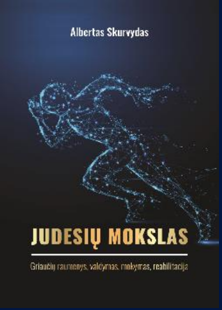
Savaitės

MAYO CLINIC

5K run: 7-week training schedule for beginners

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
	On run/walk days, walkers walk only. Runners run for 15 seconds/walk for 45 seconds.						
Week 1	Run/walk 30 minutes	Walk 30 minutes	Run/walk 30 minutes	Walk 30 minutes	Rest	Run/walk 3 miles (4.8 km)	Rest or walk
	On run/walk days, walkers walk only. Runners run for 15 seconds/walk for 45 seconds.						
Week 2	Run/walk 30 minutes	Walk 30 minutes	Run/walk 30 minutes	Walk 30 minutes	Rest	Run/walk 3.5 miles (5.6 km)	Rest or walk
	On run/walk days, walkers walk only. Runners run for 20 seconds/walk for 40 seconds.						
Week 3	Run/walk 30 minutes	Walk 30 minutes	Run/walk 30 minutes	Walk 30 minutes	Rest	Run/walk 2 miles (3.2 km) with Magic Mile*	Rest or walk
	On run/walk days, walkers walk only. Runners run for 20 seconds/walk for 40 seconds.						
Week 4	Run/walk 30 minutes	Walk 30 minutes	Run/walk 30 minutes	Walk 30 minutes	Rest	Run/walk 4 miles (6.4 km)	Rest or walk
	On run/walk days, walkers walk only. Runners run for 25 seconds/walk for 35 seconds.						
Week 5	Run/walk 30 minutes	Walk 30 minutes	Run/walk 30 minutes	Walk 30 minutes	Rest	Run/walk 2 miles (3.2 km) with Magic Mile*	Rest or walk
	On run/walk days, walkers walk only. Runners run for 25 seconds/walk for 35 seconds.						
Week 6	Run/walk 30 minutes	Walk 30 minutes	Run/walk 30 minutes	Walk 30 minutes	Rest	Run/walk 4.5 miles (7.2 km)	Rest or walk
	On run/walk days, walkers walk only. Runners run for 30 seconds/walk for 30 seconds.						
Week 7	Run/walk 30 minutes	Walk 30 minutes	Run/walk 30 minutes	Walk 30 minutes	Rest	**5K race day**	Rest or walk

Source: Galloway, J. Galloway's 5K/10K Running. 2nd. ed. Aachen, Germany: Meyer & Meyer Sport; 2008:38. Used with permissi


Albertas Skurvydas
JUDESIŲ MOKSLAS
Griaučių raumenys, valdymas, mokymas, reabilitacija

Ačiū!