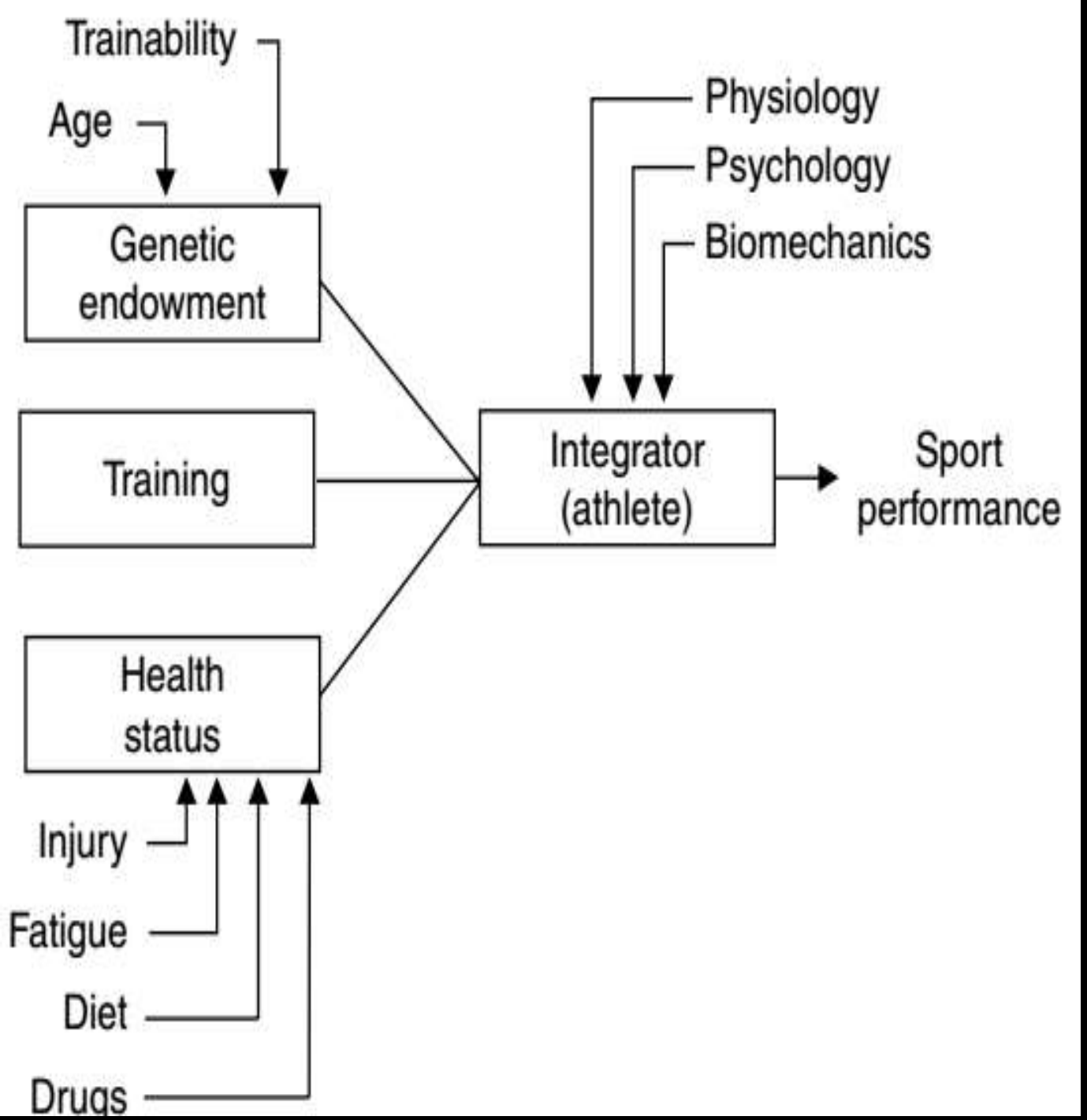
Tokijo: 2020! Efektyvus treniravimas!

Albertas Skurvydas
2020
Albertas.skurvydas@lsu.lt

Treniravimo mokslo šerdis!



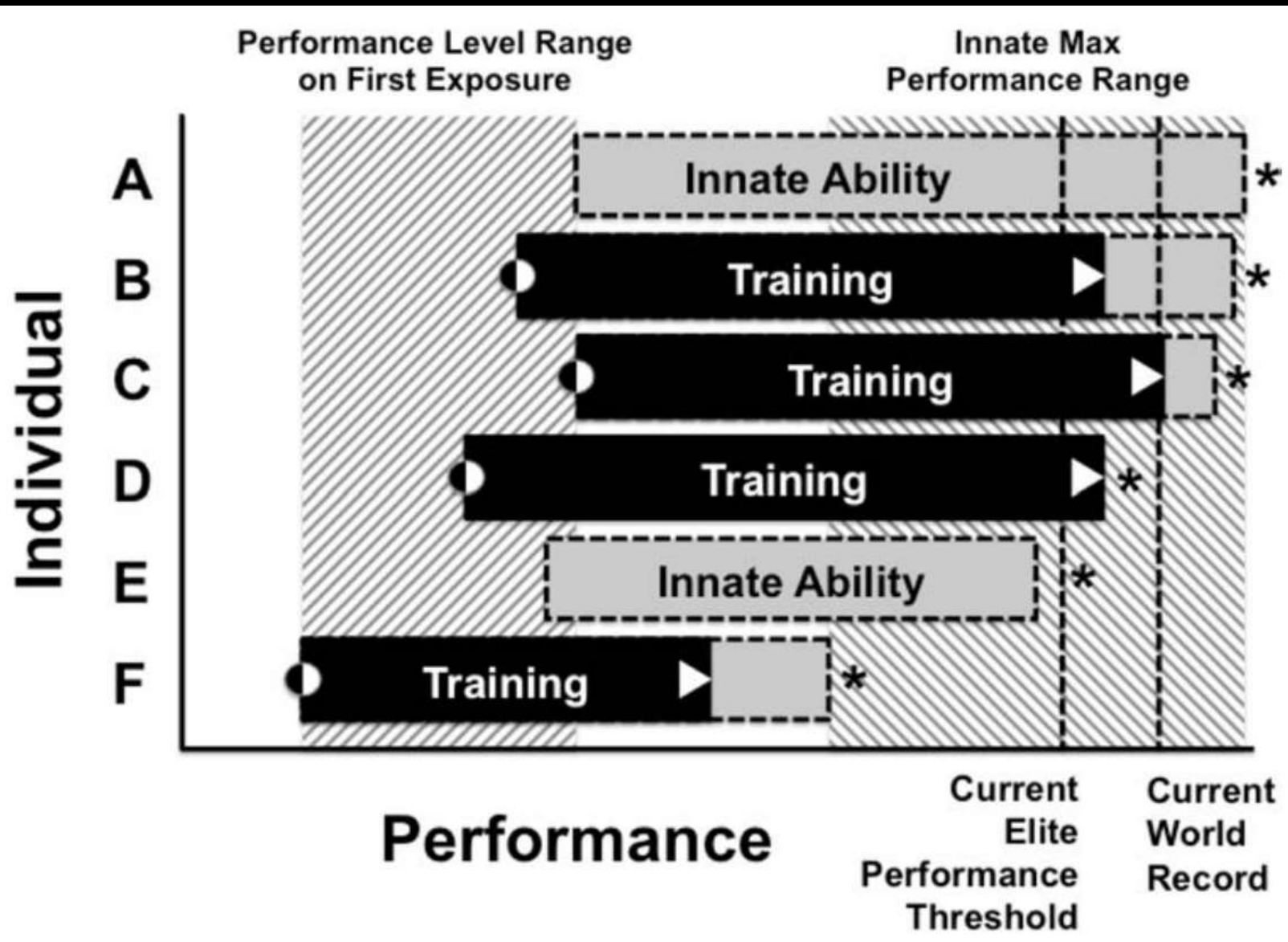
REVIEW ARTICLE

A Framework for Understanding the Training Process Leading to Elite Performance

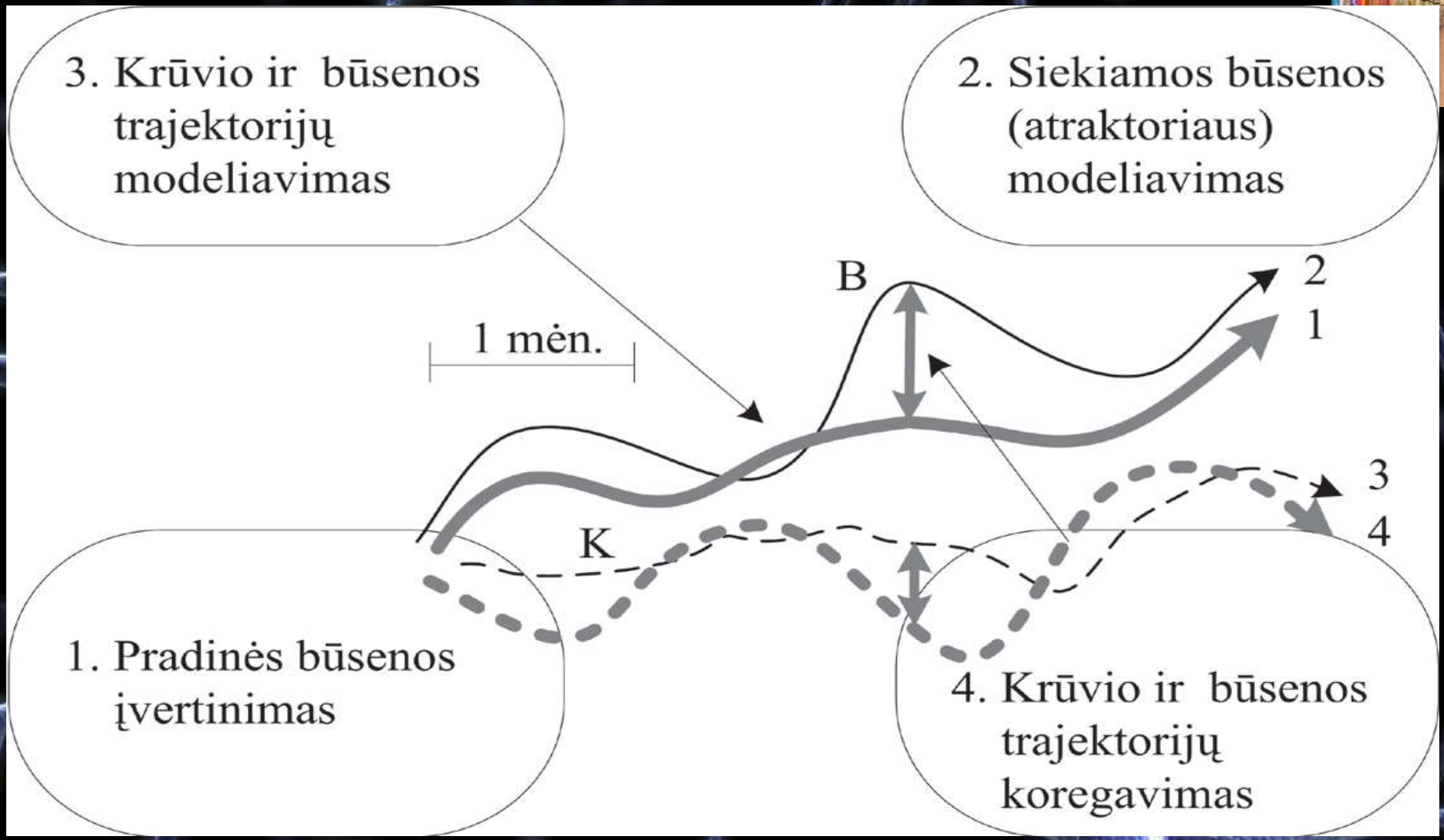
David J. Smith

What makes champions? A review of the relative contribution of genes and training to sporting success

Ross Tucker,[1] Malcolm Collins[2]

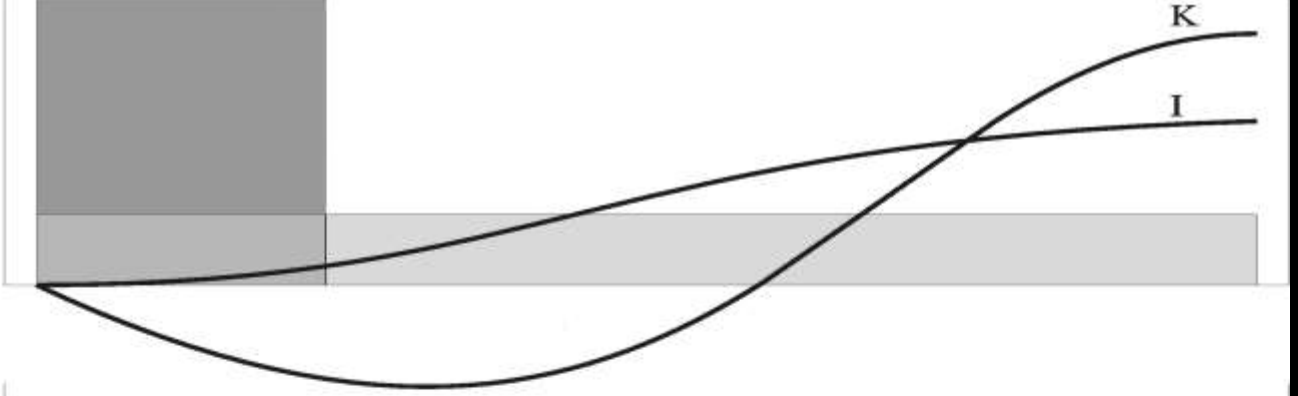


Krūvių valdymo 4 žingsniai

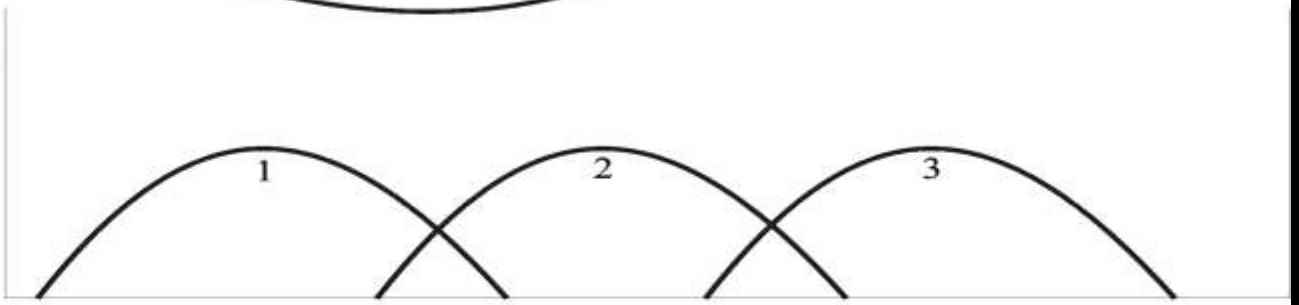

3. Krūvio ir būsenos trajektorijų modeliavimas
2. Siekiamos būsenos (atraktoriaus) modeliavimas
B
2
1
1 mėn.
3
4
K
1. Pradinės būsenos įvertinimas
4. Krūvio ir būsenos trajektorijų koregavimas

Krūvio planavmo strategijų analizė

I

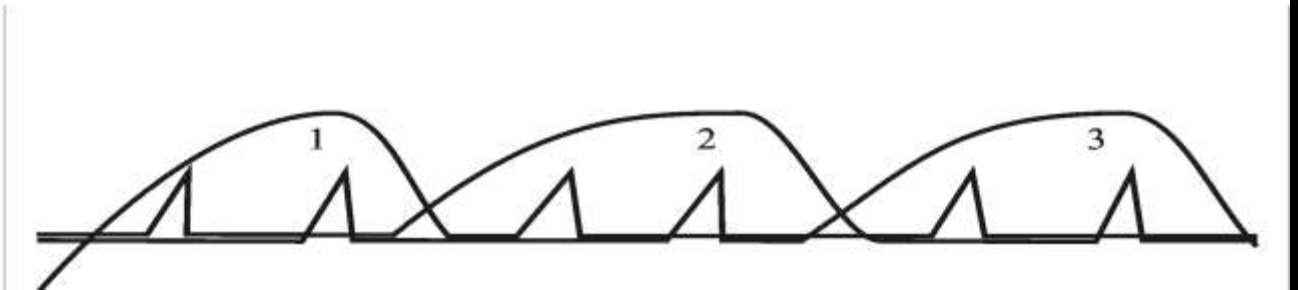


II

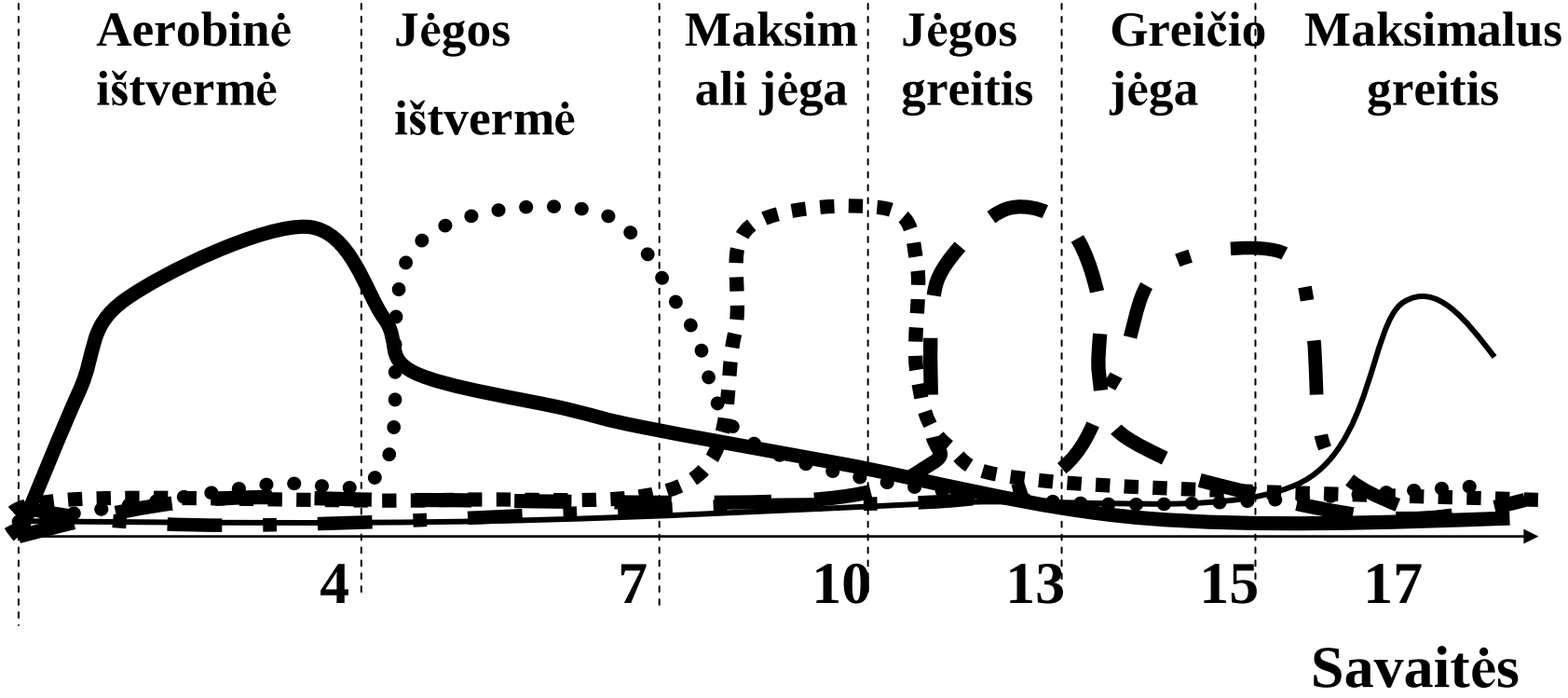


III

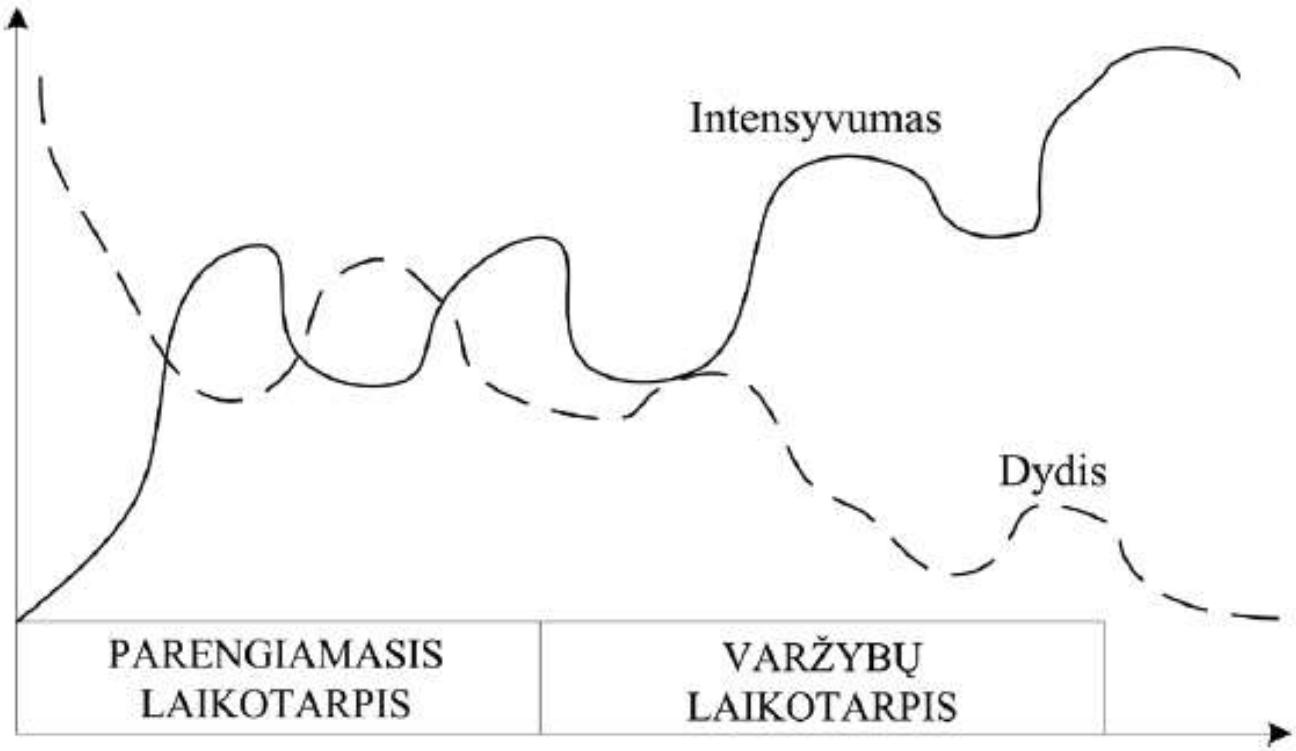
IV



Treniruočių krūviai



Krūvių
variabilumas



4.21 pav. Jėgos ugdymo krūvių planavimo moderni schema

Mikrociklai

Review Article

A Framework for Understanding the Training Process Leading to Elite Performance

David J. Smith

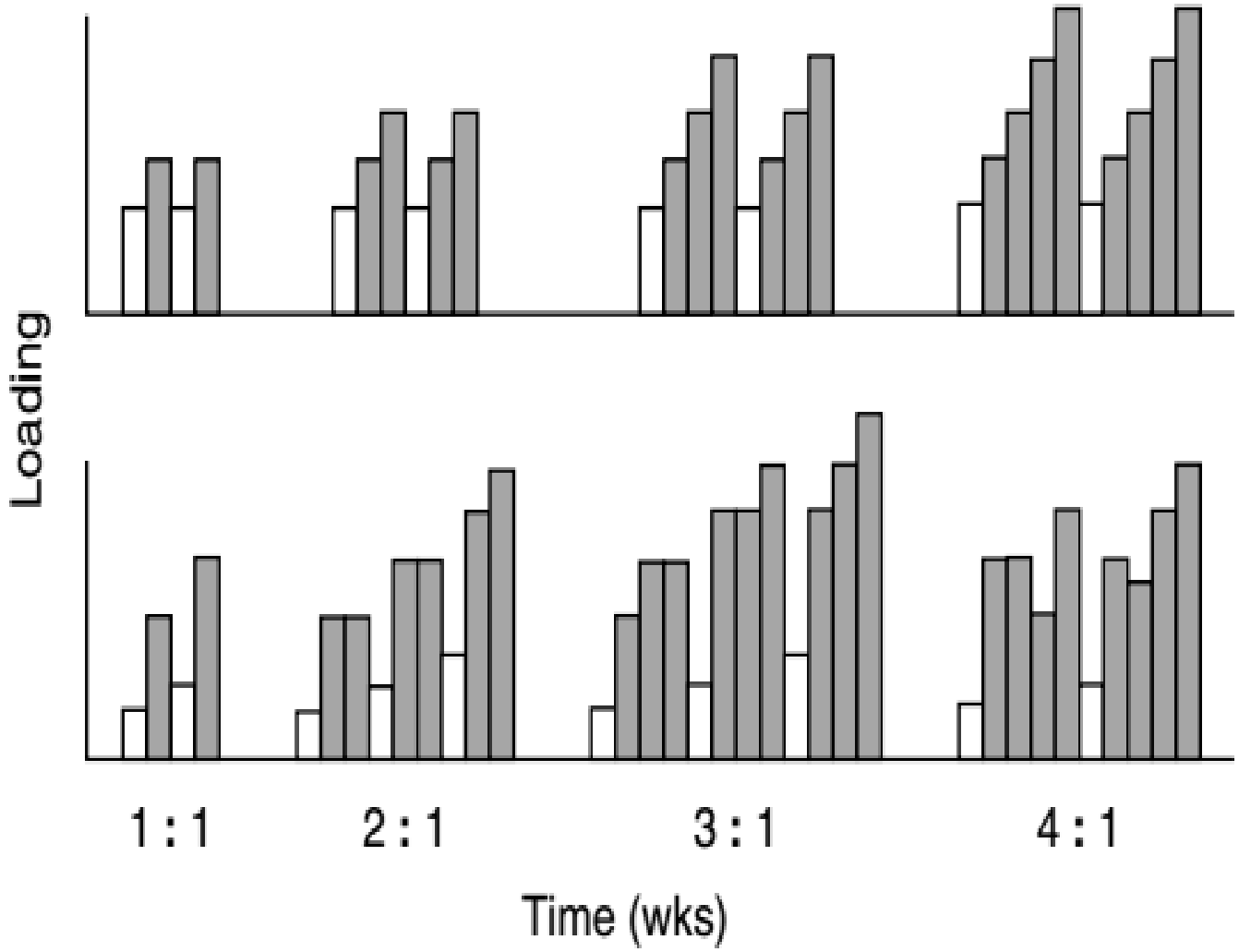


Fig. 4. Examples of training cycles.[3]

Individualizavimas – svarbiausioji treniravimo taisyklė!

Consensus statement

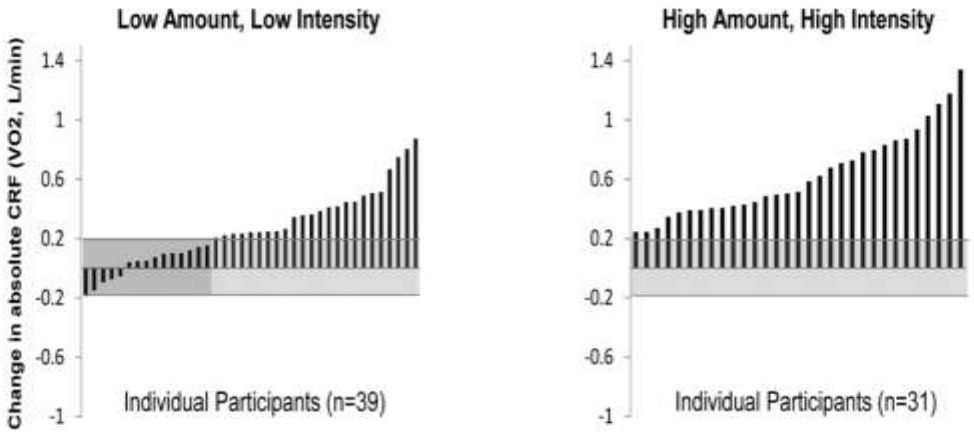
OPEN ACCESS

Precision exercise medicine: understanding exercise response variability

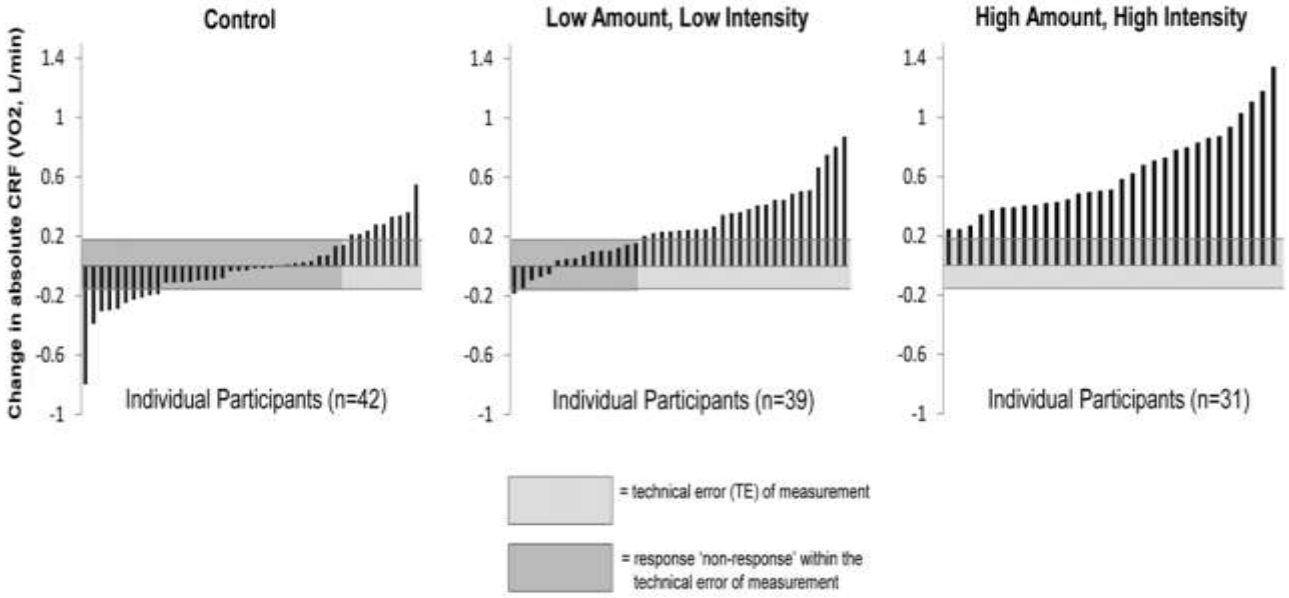
Robert Ross,[1] Brett R Goodpaster,[2] Lauren G Koch,[3] Mark A Sarzynski,[4] Wendy M Kohrt,[5] Neil M Johannsen,[6,7] James S Skinner,[8] Alex Castro,[9] Brian A Irving,[1,10] Robert C Noland,[11] Lauren M Sparks,[1] Guillaume Spielmann,[1,10] Andrew G Day,[12] Warren Pitsch,[13] William G Hopkins,[14] Claude Bouchard[15]

Br J Sports Med 2019

PANEL A

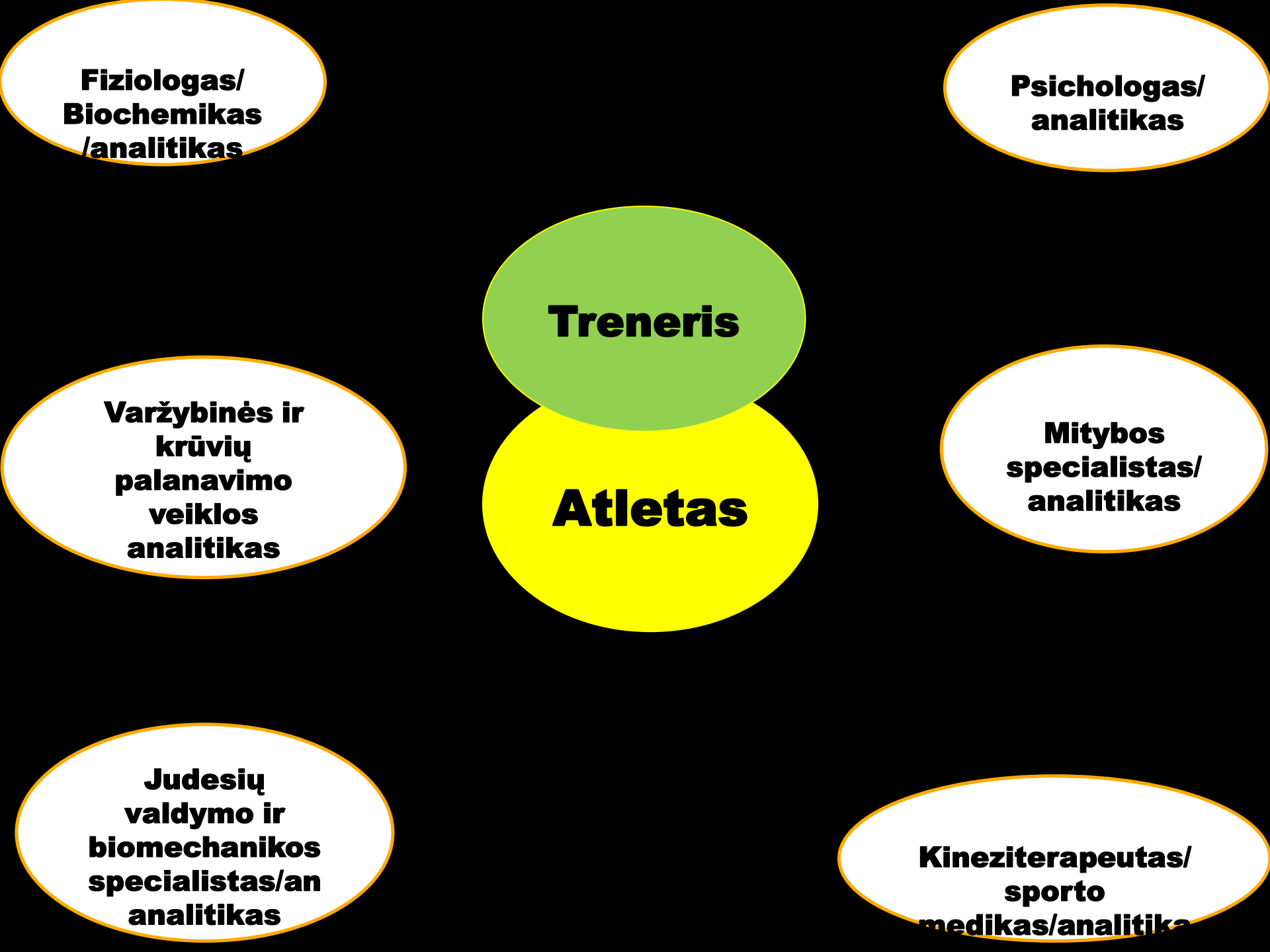


PANEL B



Norint priimti savalaikius ir teisingus sprendimus dėl atletų rengimo, reikia turėti išsamios ir svarbiausios informacijos.

Tam turi būti darni komanda!


Fiziologas/ Biochemikas /analitikas
Psichologas/ analitikas
Treneris
Atletas
Varžybinės ir krūvių palanavimo veiklos analitikas
Mitybos specialistas/ analitikas
Judesių valdymo ir biomechanikos specialistas/an analitikas
Kineziterapeutas/ sporto medikas/analitika

Krūvis,
mityba,
poilsis!

Annu. Rev. Nutr. 2019. 39:10.1–10.29

Annual Review of Nutrition

Dietary Fuels in Athletic Performance

Andreas Mæchel Fritzen, Anne-Marie Lundsgaard, and Bente Kiens

SUMMARY POINTS

1. Nutritional recommendations for athletes have not changed markedly during the past decade, but improved methods and scientific advances have increased our understanding of the physiological and molecular mechanisms of dietary interactions with training adaptations and led to more nuanced recommendations.
2. Athletes should aim to consume enough carbohydrates to meet the requirements of their training program and to optimize the replenishment of muscle glycogen stores between workouts. Appropriately timing the intake of carbohydrate-rich foods and beverages with a high-to-moderate glycemic index can provide a readily available source of carbohydrates for muscle glycogen synthesis.
3. The daily diet of most athletes comprises ample amounts of protein, and there is no clear evidence to support the idea that consuming more than ~1.6 g/kg per day of dietary protein will further increase resistance training–induced hypertrophy.
4. In the recovery period from exercise, consuming frequent meals ensures optimal muscle glycogen and protein synthesis due to persistently high plasma glucose, insulin, and amino acid availability. During recovery, muscle glycogen resynthesis is maximally stimulated by the intake of ~1.2 g carbohydrate/kg per hour, whereas maximal stimulation of muscle protein synthesis seems to occur at intakes of approximately 0.25–0.30 g protein/kg per meal.
5. It appears that steady-state exercise at low-to-moderate intensity can be maintained after adaptation to a ketogenic or nonketogenic high-fat diet, at least on a shorter-term basis. However, for exercise at higher intensities, which is relevant for many endurance athletes, a diet high in fat is inferior to a diet high in carbohydrates in improving performance in response to a training intervention. High-fat diets seem to impair rather than spare carbohydrate utilization during exercise.
6. It takes time for the body to adapt to utilize ketone bodies as an energy source and there is no clear evidence to support ketone bodies as an important energy fuel for skeletal muscle during exercise. However, the central nervous system may be a target for the performance-enhancing effects of nutritional ketosis.
7. General dietary recommendations for athletes can be provided, but they should be fine-tuned to individual considerations. An athlete's diet should never be static: It should be composed in accordance with the requirements of the training program.

Sports Foods and Dietary Supplements for Optimal Function and Performance Enhancement in Track-and-Field Athletes

Table 3 Performance Supplements That May Achieve a Marginal Performance Gain in Track-and-Field Events as Part of a Bespoke and Periodized Training and Nutrition Plan

Event	Caffeine	Creatine	Nitrate	β-Alanine	Bicarbonate
Sprints: 100 m, 100-m hurdles, 110-m hurdles, and 200 m	✓	✓			
Sustained sprints: 400 m and 400-m hurdles	✓	✓		✓	✓
Middle distance: 800 m, 1,500 m, 3,000 m, and steeple chase	✓		✓	✓	✓
Long distance: 5,000 m, 10,000 m, cross-country, 20-km race walk, half marathon, marathon, 50-km race walk, and mountain/ultra running	✓		✓		
Jumps and throws: high jump, long jump, triple jump, pole vault, discus throw, hammer throw, javelin throw, and shot put	✓	✓			
Multievents: heptathlon and decathlon	✓	✓	✓	✓	✓

Readers are referred to Burke et al. (2019), da Costa et al. (2019), Slater et al. (2019); Stellingwerff et al. (2019), and Sygo et al. (2019).

Journal of Sports Sciences, July 2006; 24(7): 665–674

Physical and metabolic demands of training and match-play in the elite football player

JENS BANGSBO, MAGNI MOHR, & PETER KRUSTRUP

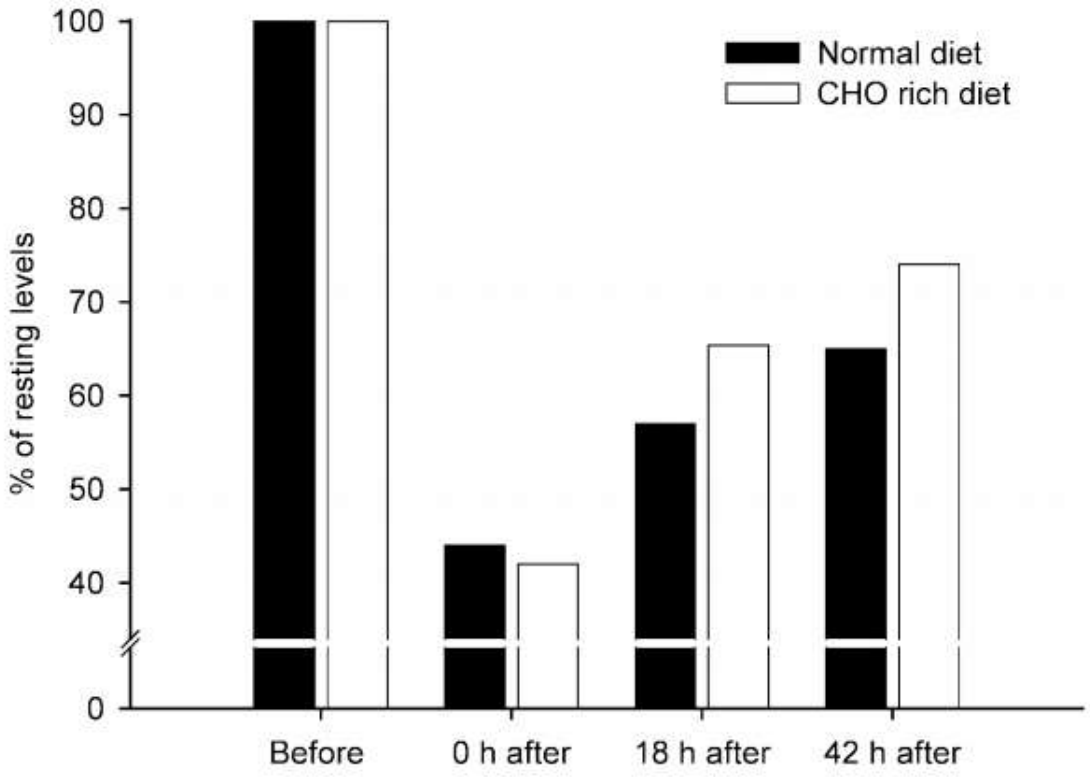
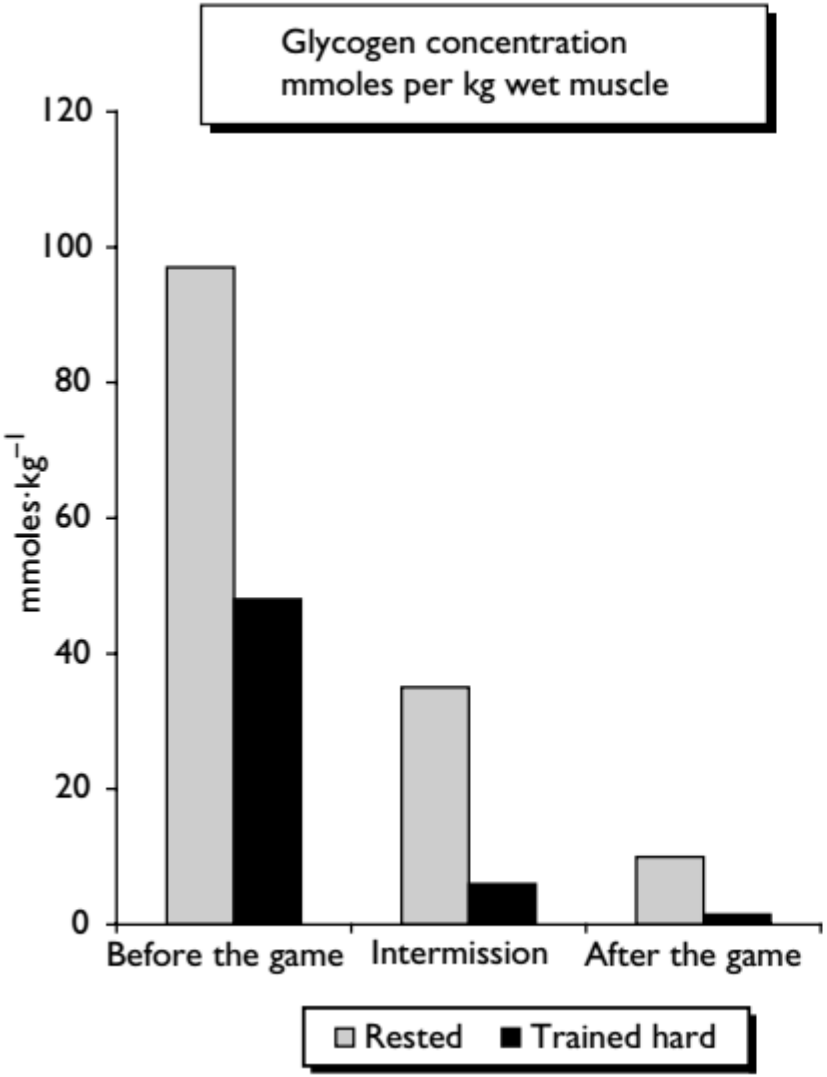
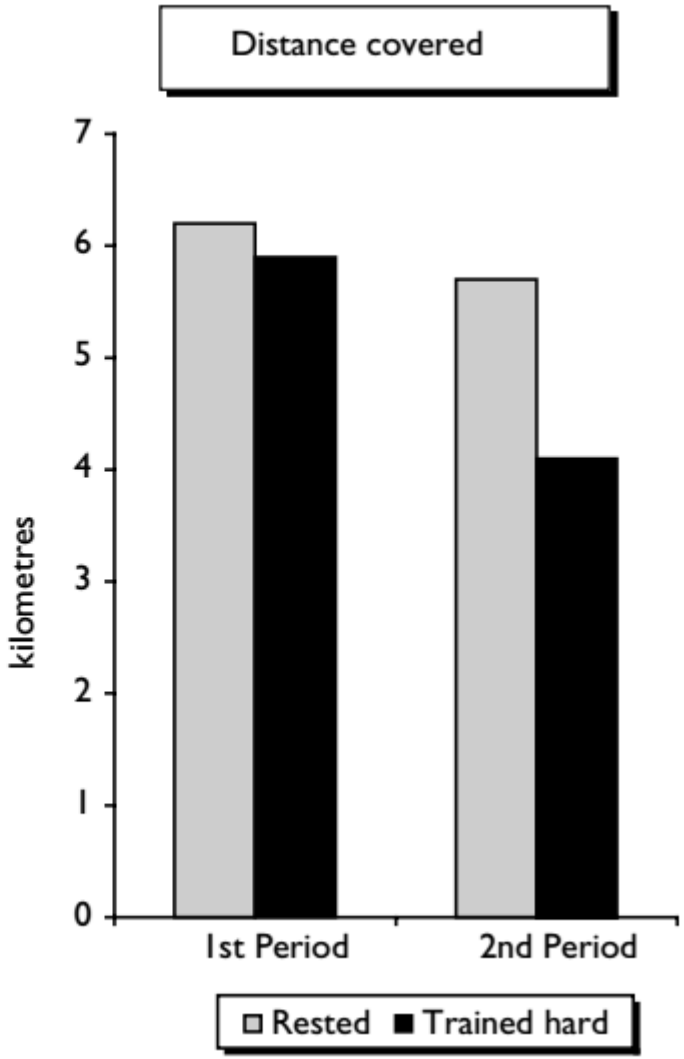


Figure 4. Muscle glycogen concentration (expressed as a percentage of resting values) after a competitive soccer match. Biopsies were obtained from the vastus lateralis muscle 0, 18, and 42 h after a game on two occasions, with a normal diet (solid bars) and a diet high in carbohydrates (open bars).


Glycogen concentration
mmoles per kg wet muscle
120
100
80
60
40
20
0
mmoles·kg⁻¹
Before the game
Intermission
After the game
Rested
Trained hard


Distance covered
7
6
5
4
3
2
1
0
kilometres
1st Period
2nd Period
Rested
Trained hard

Neskubėk, būsi pirmas!

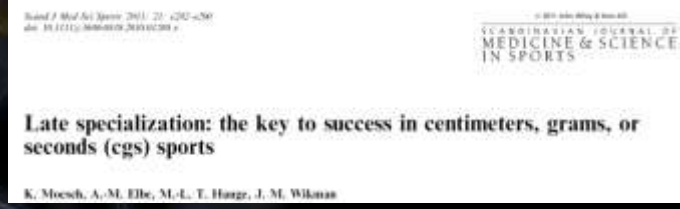
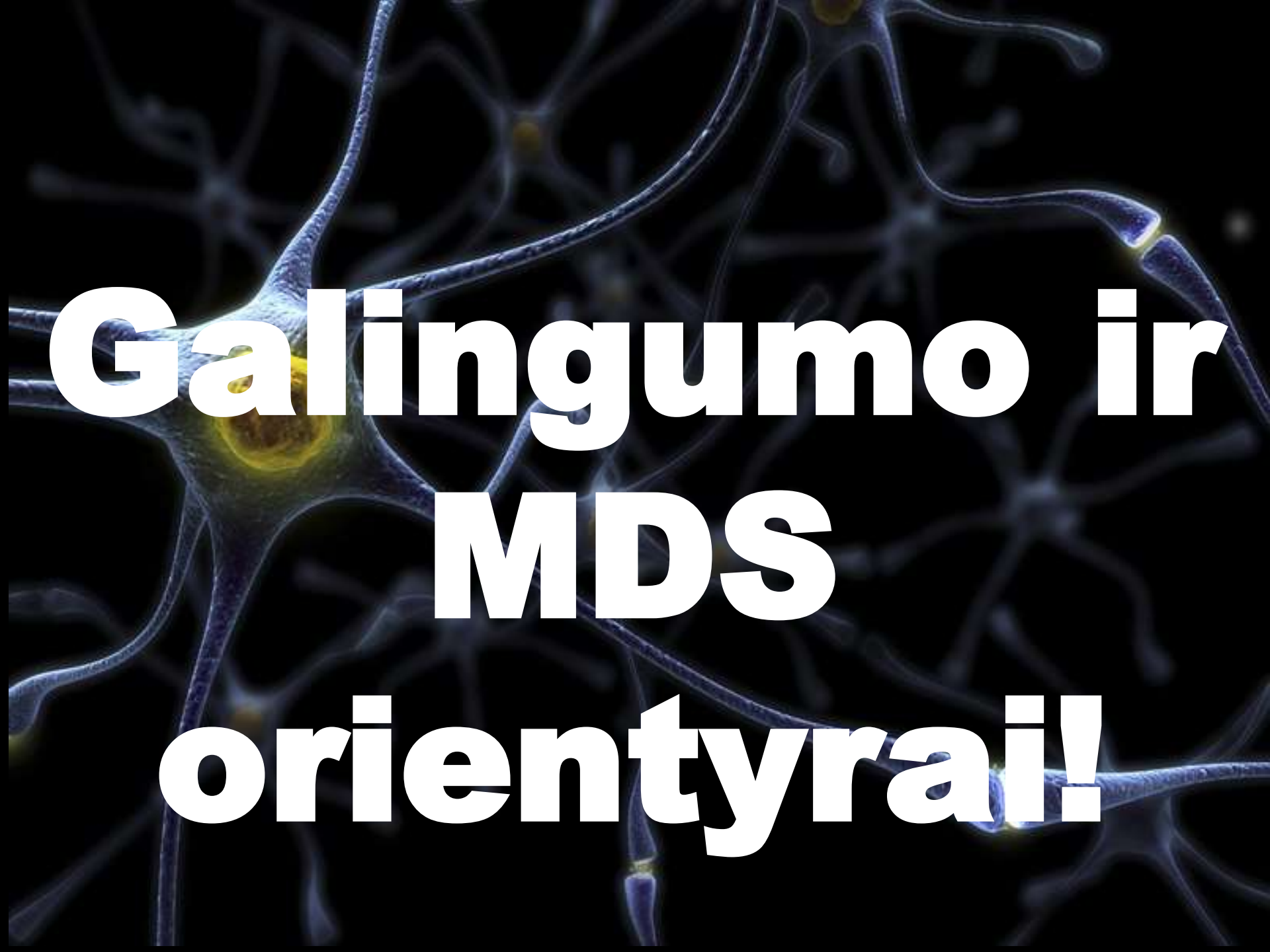


Table 2. Comparison between the elite and the near-elite group on data about practice hours, involvement in other sports and data on career development (Means, confidence intervals, mean differences, effect sizes and power)

Scale	Elite			Near-elite			*T*	*df*	*p*	|*d*|	*Power*
	n	*M*	*CI*	*n*	*M*	*CI*					
Accumulated amount of practice at age 9	99	113.98	61.57; 166.39	76	272.32	187.31; 357.32	3.11	129	<0.05	0.50	0.56
Accumulated amount of practice at age 12	99	584.61	410.15; 759.07	76	1063.41	832.29; 1294.53	3.31	173	<0.05	0.50	0.47
Accumulated amount of practice at age 15	99	1854.93	1481.53; 2228.33	76	2699.99	2278.57; 3121.41	2.94	173	<0.05	0.45	0.51
Accumulated amount of practice at age 18	99	4106.16	3507.46; 4704.86	76	4192.94	3664.33; 4721.55	0.21	173	0.83	0.03	0.49
Accumulated amount of practice at age 21	99	6334.81	5539.19; 7130.43	76	5204.71	4630.65; 5778.77	−2.26	167	<0.05	0.33	0.46
Months of involvement in other sports	148	62.97	47.65; 78.29	95	62.00	44.38; 79.62	−0.08	241	0.94	0.01	0.94
Number of other sports	148	1.57	1.30; 1.84	95	1.42	1.11: 1.73	−0.69	241	0.49	0.09	0.58
Entering Initiation stage	143	11.71	10.83; 12.59	94	8.55	7.65; 9.45	−4.74	235	<0.05	0.63	0.49
Entering Development stage	144	15.11	14.38; 15.84	95	12.87	12.03; 13.71	−3.88	237	<0.05	0.51	0.46
Entering Perfection stage	143	18.38	17.58; 19.18	87	16.30	15.38; 17.22	−3.28	228	<0.05	0.45	0.57
First national competition	148	14.53	13.71; 15.35	95	12.42	11.58; 13.26	−3.34	241	<0.05	0.44	0.51
First international competition	147	17.37	16.53; 18.21	87	15.43	14.59; 16.27	−3.21	215	<0.05	0.40	0.44
Years in junior national team	148	2.37	2.08; 2.66	95	2.93	2.46; 3.40	2.07	241	<0.05	0.27	0.50
Years in senior national team	148	4.54	4.01; 5.07	95	1.62	1.13; 2.11	−7.90	237	<0.05	0.97	0.98


Galingumo ir
MDS
orientyrai!

Raumenų galių etalonai

>85 W/kg V

>75 W/kg M

MDS etalonai

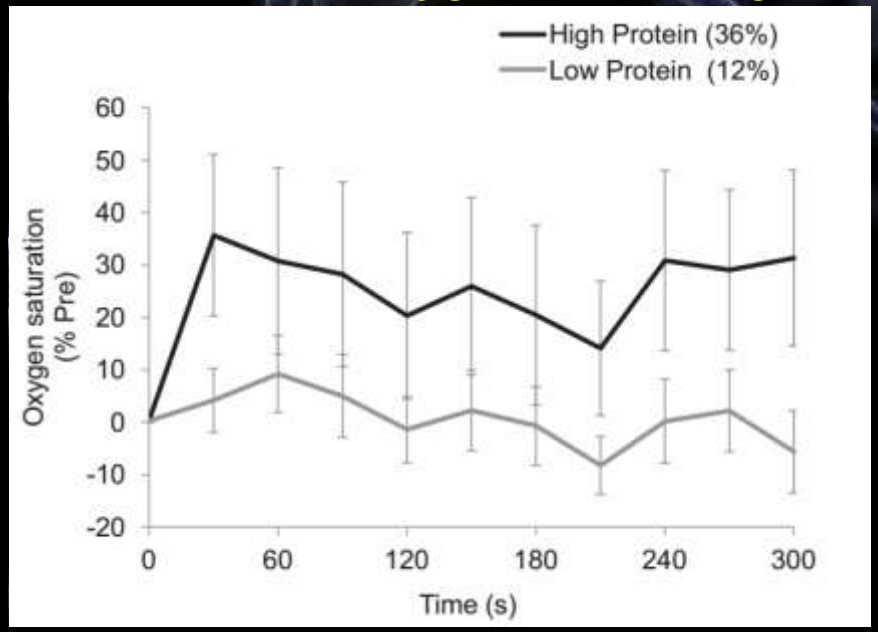
>90 mil/min/kg V

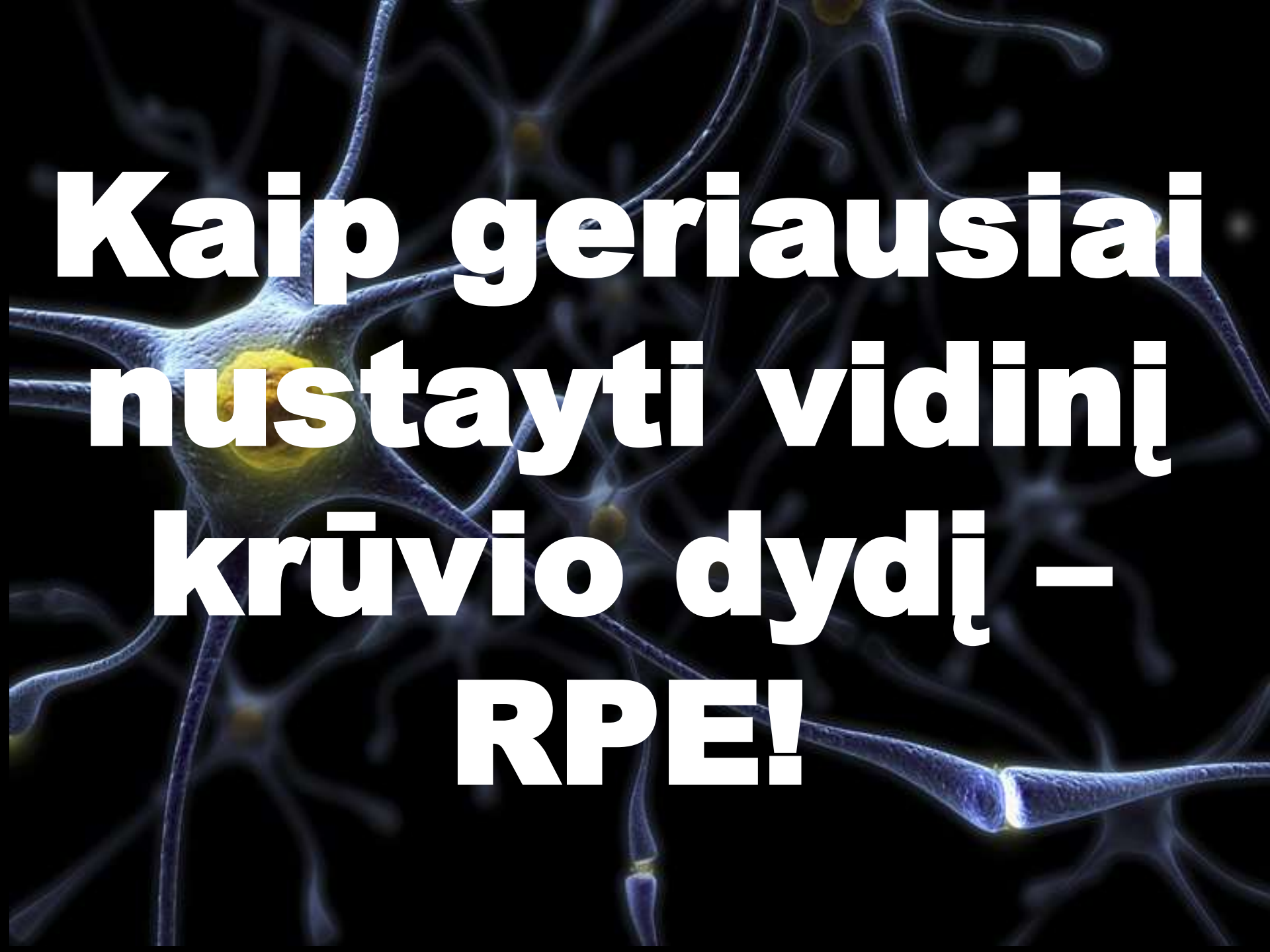
>75 mil/min/kg M

Čempionų smegenys yra dvigubai geriau aprūpinamos O2 intensyvaus fizinio krūvio metu!

Tam labai gerai padeda, baltymų papildų naudojimas kartu su angliavandeniais!

Cheng-Feng et al. 2018: *Protein supplementation enhances cerebral oxygenation during exercise in elite basketball players.*




Kaip geriausiai nustayti vidinį krūvio dydį – RPE!

Rev Bras Med Esporte – Vol. 17, Nº 4 – July/August, 2011

Training Load Monitoring in Judo: Comparison Between the Training Load Intensity Planned by the Coach and the Intensity Experienced by the Athlete

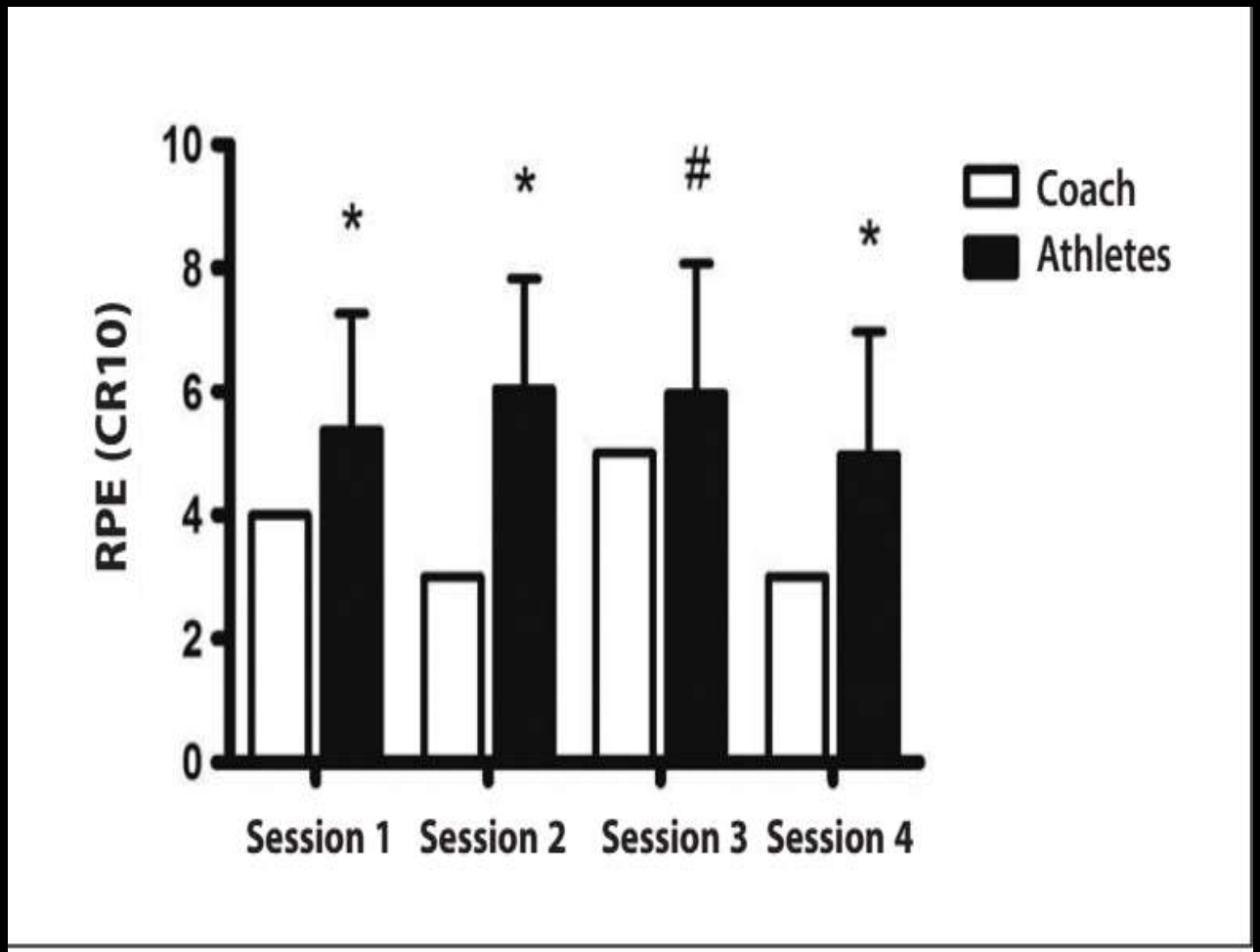


Figure 1. Comparison between training load intensity planned by the coach and the training load intensity experienced by the athletes (n = 40) through the session RPE method.

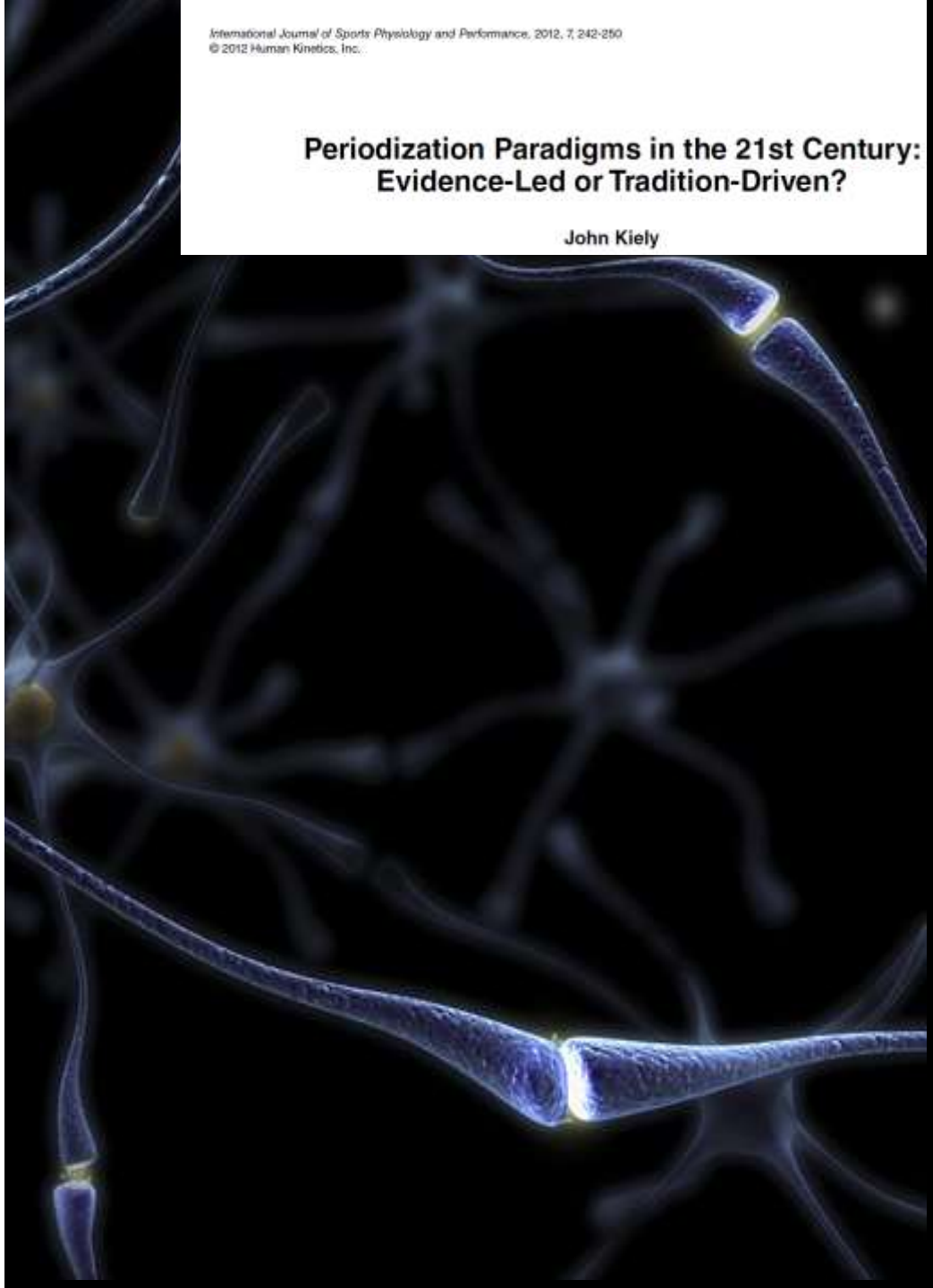
Table 1 Sample Information Capture and Tracking Options

Quantifying training stress	Sample metrics
Pretraining readiness	Perceived readiness rating
	Objective readiness measure (using habituated exercise tracking)
	Psychomotor speed
	Heart-rate variability
In-training variables	Empirical descriptors (load, sets, reps, recoveries, etc)
	Intensity rating (rating of perceived exertion per effort, set, or session)
	Technical execution (quality rating)
Assessing accumulative stress	Recovery-Stress Questionnaire for Athletes
	Profile of Mood State
	Recovery-cue
	Daily Analysis of Life Demands for Athletes[48]
	Heart-rate variability
	Monotony (weekly average load/SD)
	Strain (mean weekly load/monotony)
	Residual muscle-fatigue rating
	Training load (rating of perceived exertion × training time)
	Total Quality Recovery
	Category Ratio Pain Scale

International Journal of Sports Physiology and Performance, 2012, 7, 242-250
© 2012 Human Kinetics, Inc.

Periodization Paradigms in the 21st Century: Evidence-Led or Tradition-Driven?

John Kiely

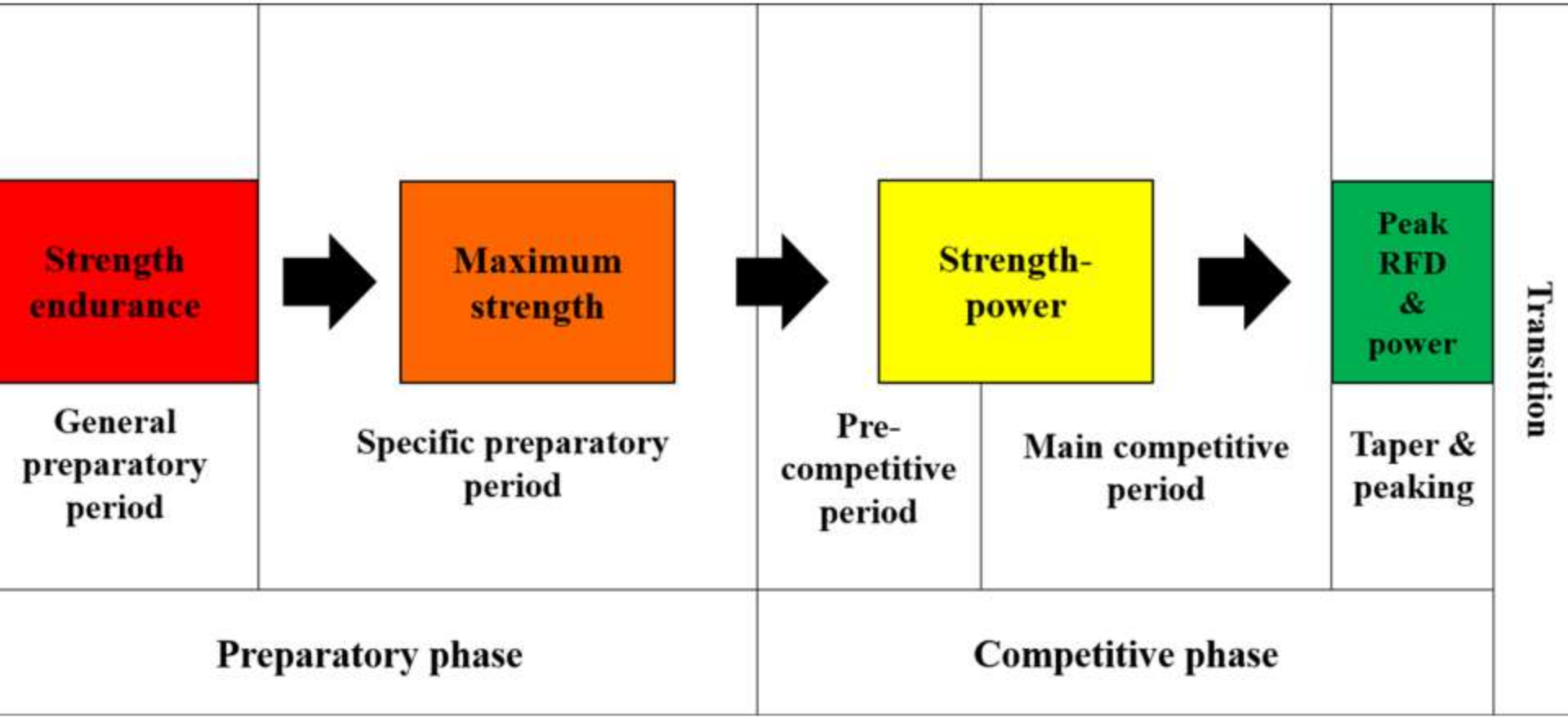


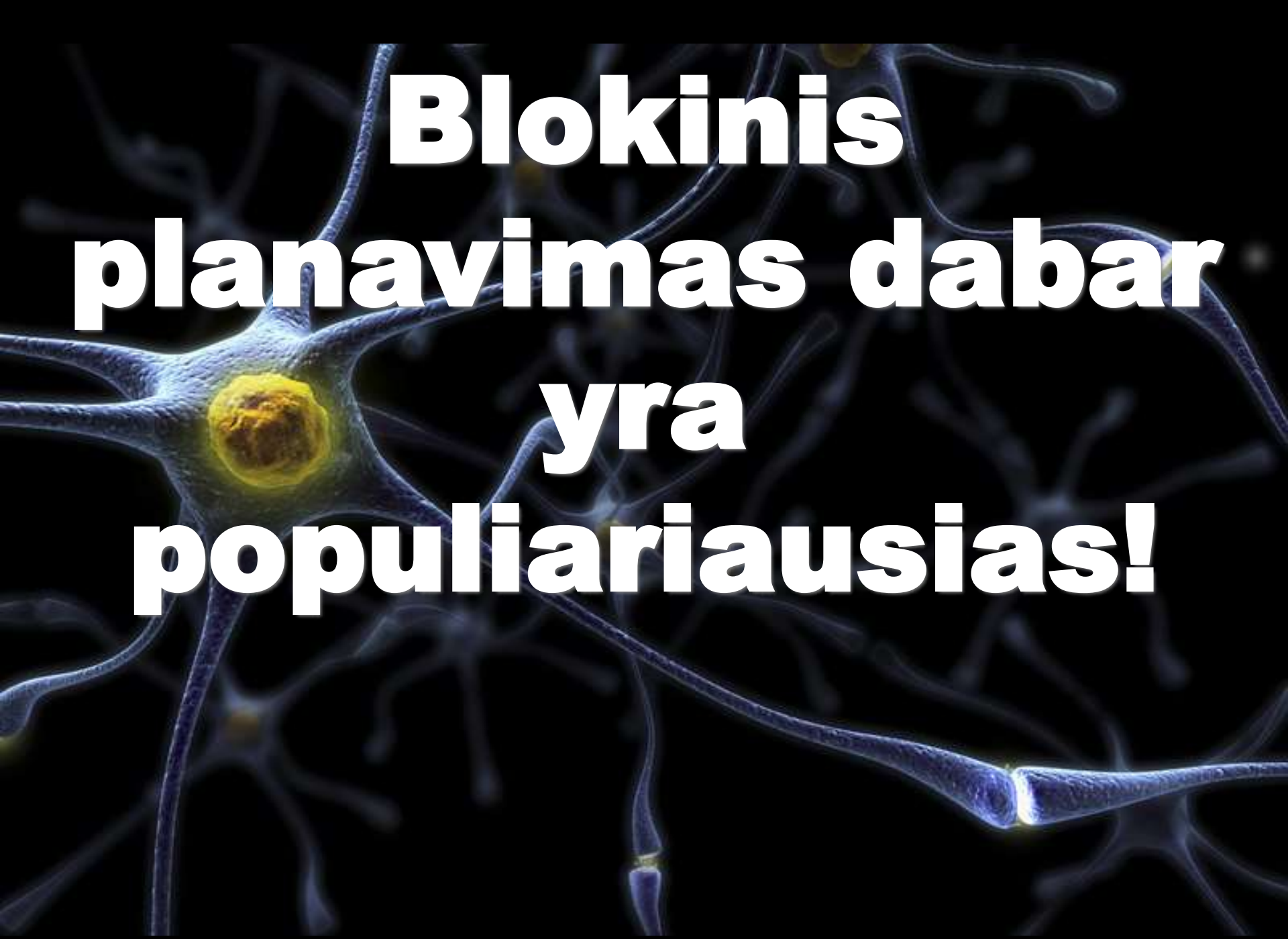
Mezociklai-
lemiama
organizmo
treniravimo
grandis

Sports Med
https://doi.org/10.1007/s40279-018-0862-z

REVIEW ARTICLE

The Importance of Muscular Strength: Training Considerations




Blokinis
planavimas dabar
yra
populiariausias!

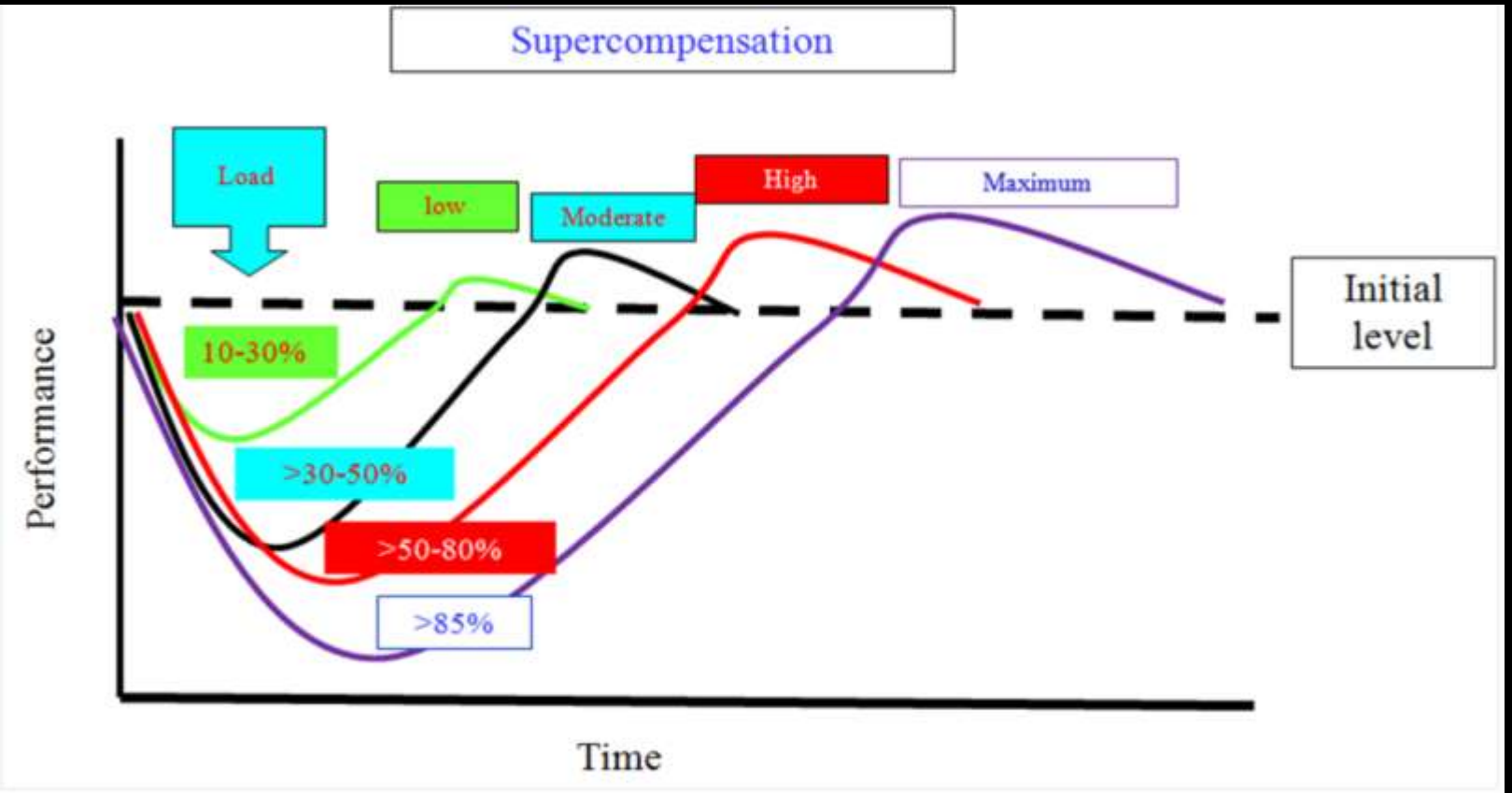
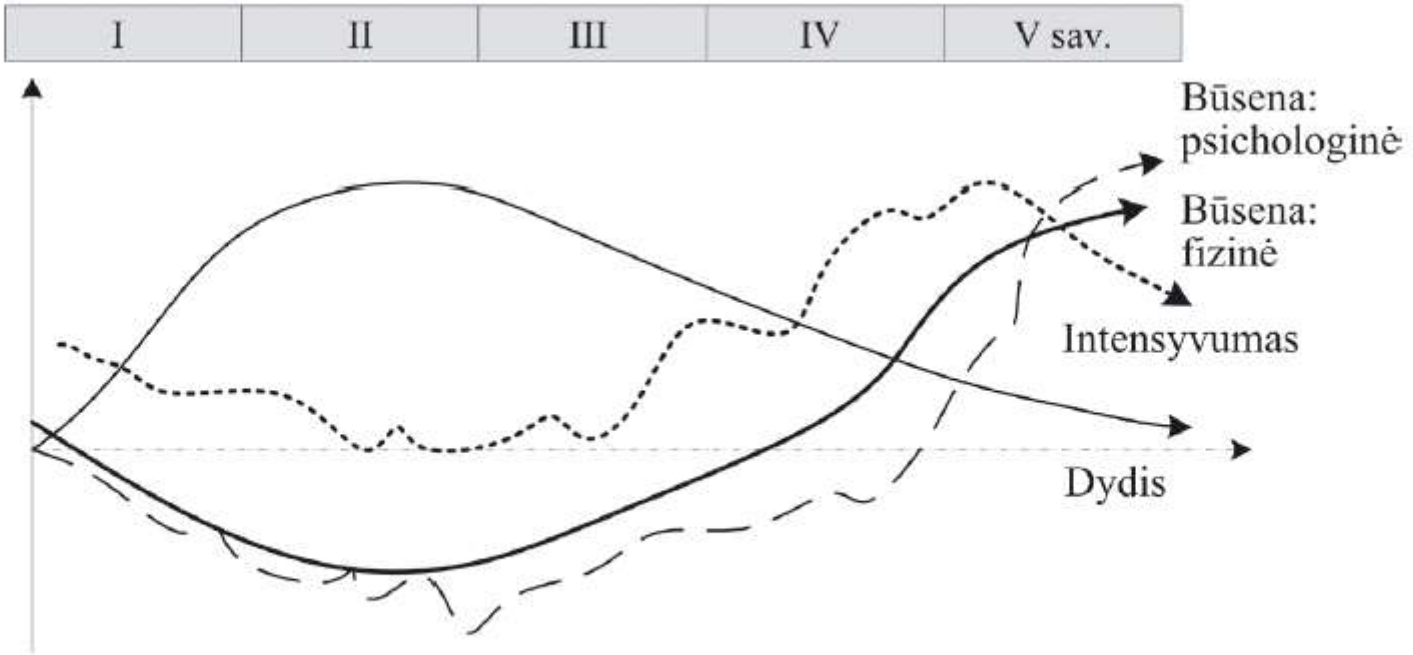


Figure 4. *Theoretical effect of low, moderate, high and maximum volume session on performance.*



6.31 pav. Sportininko didžiausio darbingumo siekimo filosofija per paskutinį priešvaržybinį mezociklą

Issurin 2010

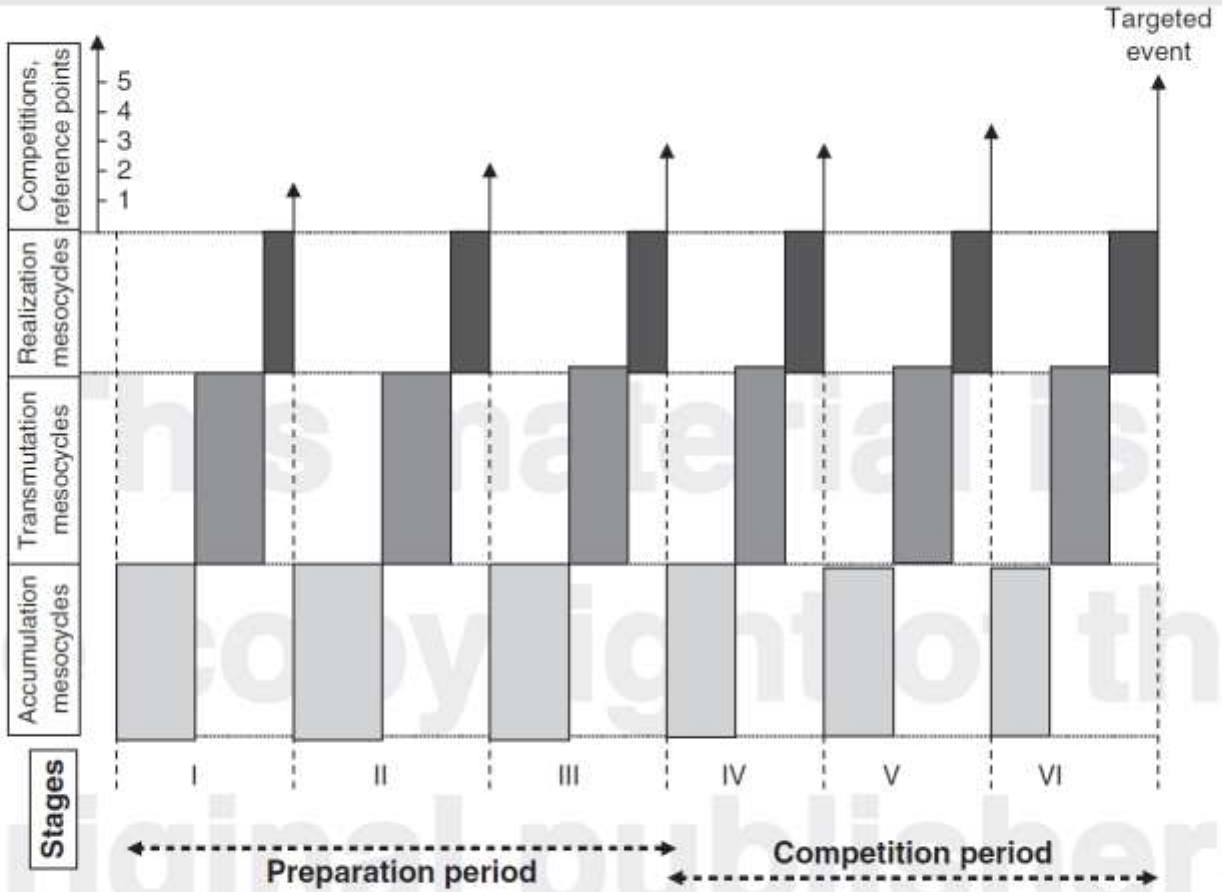


Fig. 5. Schematic chart of a block-periodized annual cycle. The importance of competitions is depicted in reference points ranging from 1 (the

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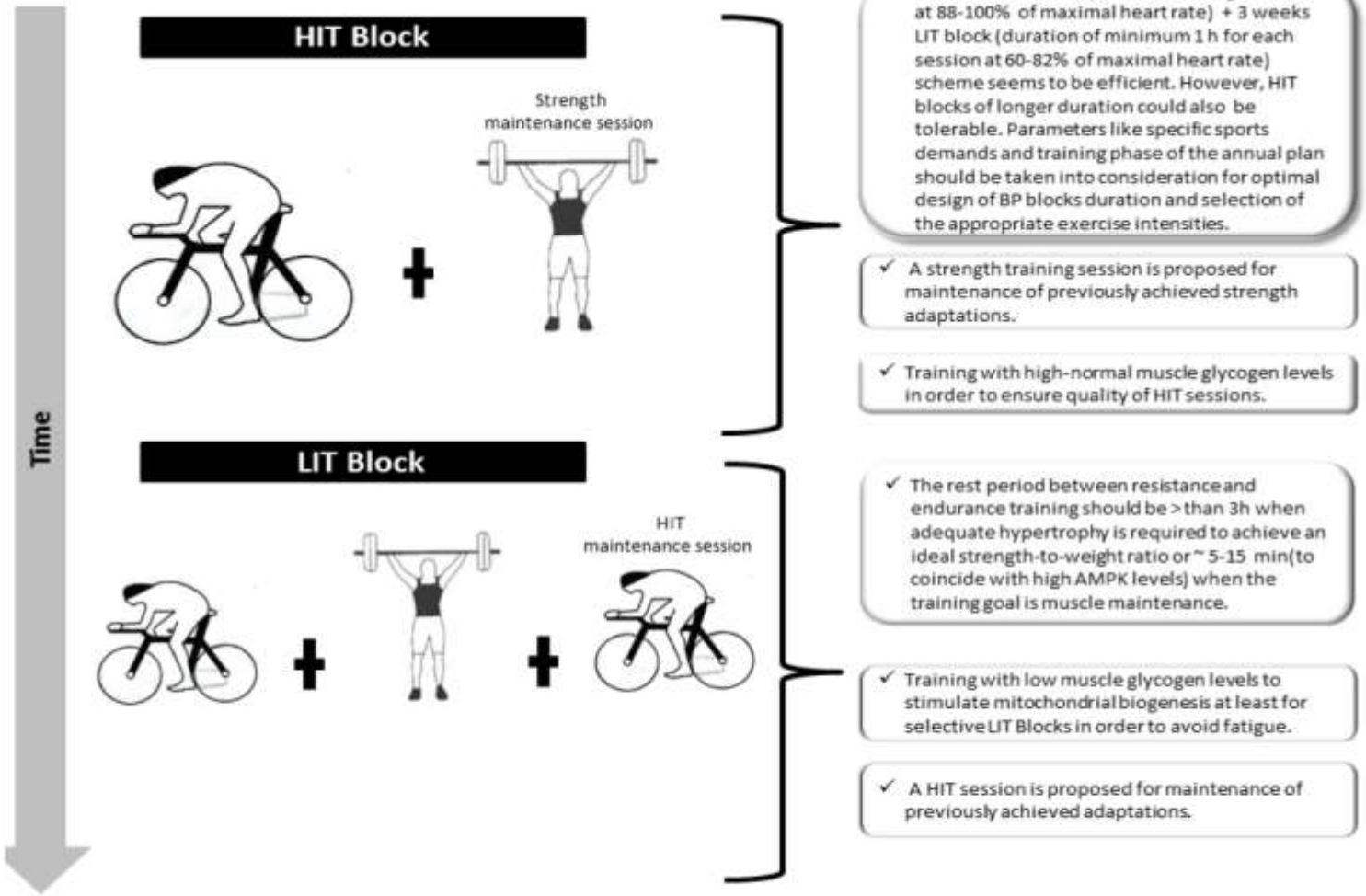
Freely Available Online Cellular and Molecular Exercise Physiology

Block periodization training of endurance athletes: A theoretical approach based on molecular biology

Georgios Goutianos[1]



gure 1. The organization of high and low intensity endurance training in specific training cycles/blocks (block periodization training, BP) has been recent oposed as an alternative training organization model. High intensity training (HIT) blocks include high intensity sessions, while low intensity training (LI ocks include mainly low intensity training sessions. The present figure summarizes practical recommendations regarding: Duration of blocks, use of HIT ar rength maintenance sessions, addition of strength during block periodization training (BP) and carbohydrate periodization during BP training to maximiz

Periodization Strategies

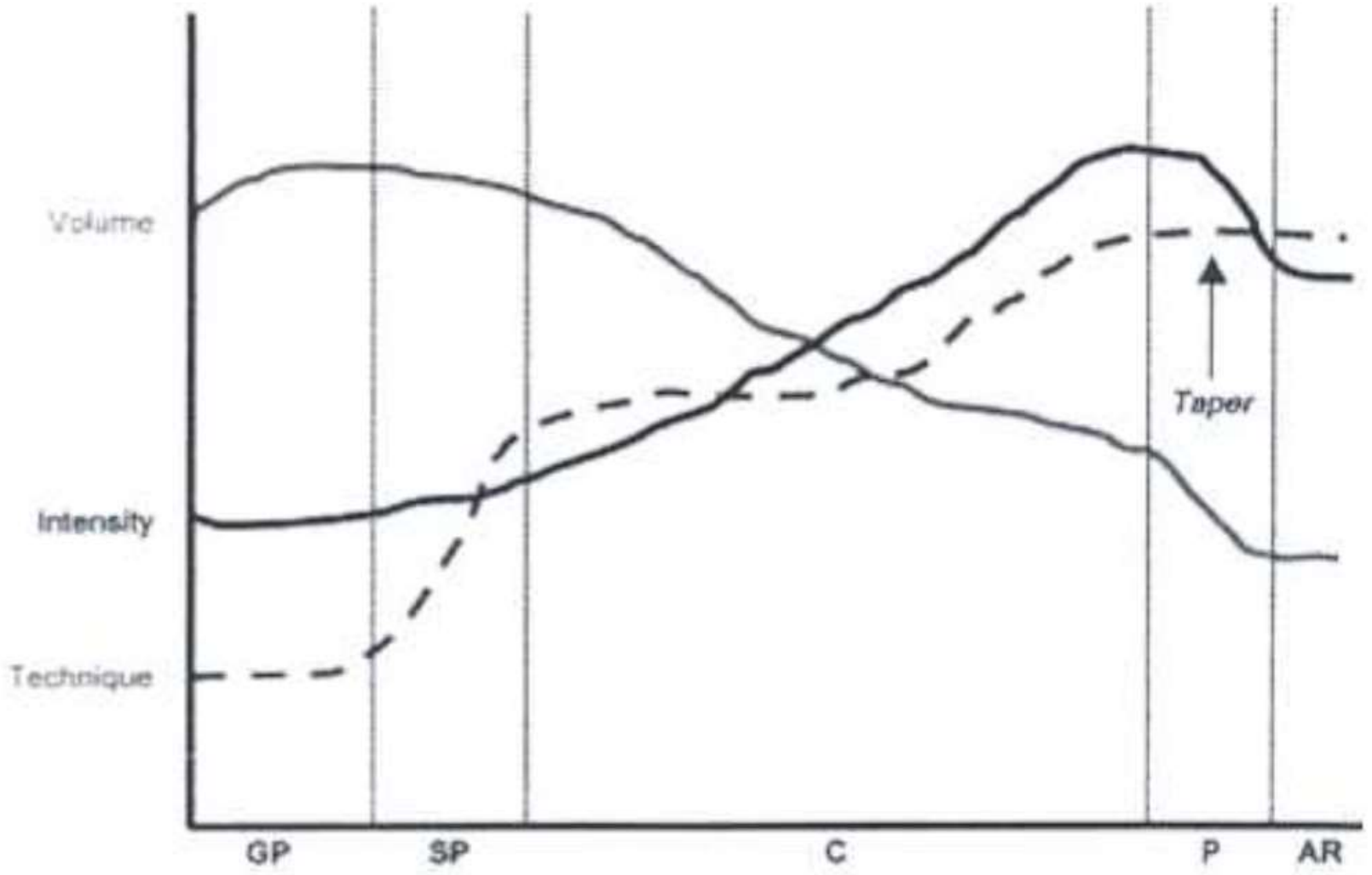


Figure 2a. *Generalized periodization model of strength-power training (basic application).* **The main premise is a wave-like shift from high-volume, low-**

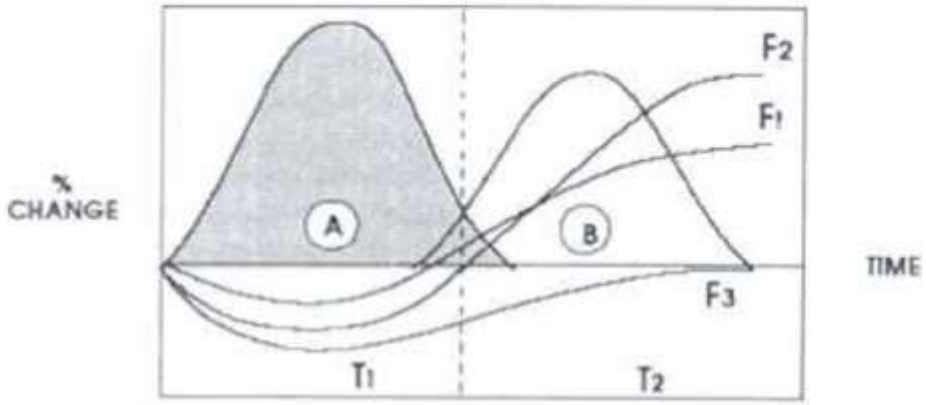
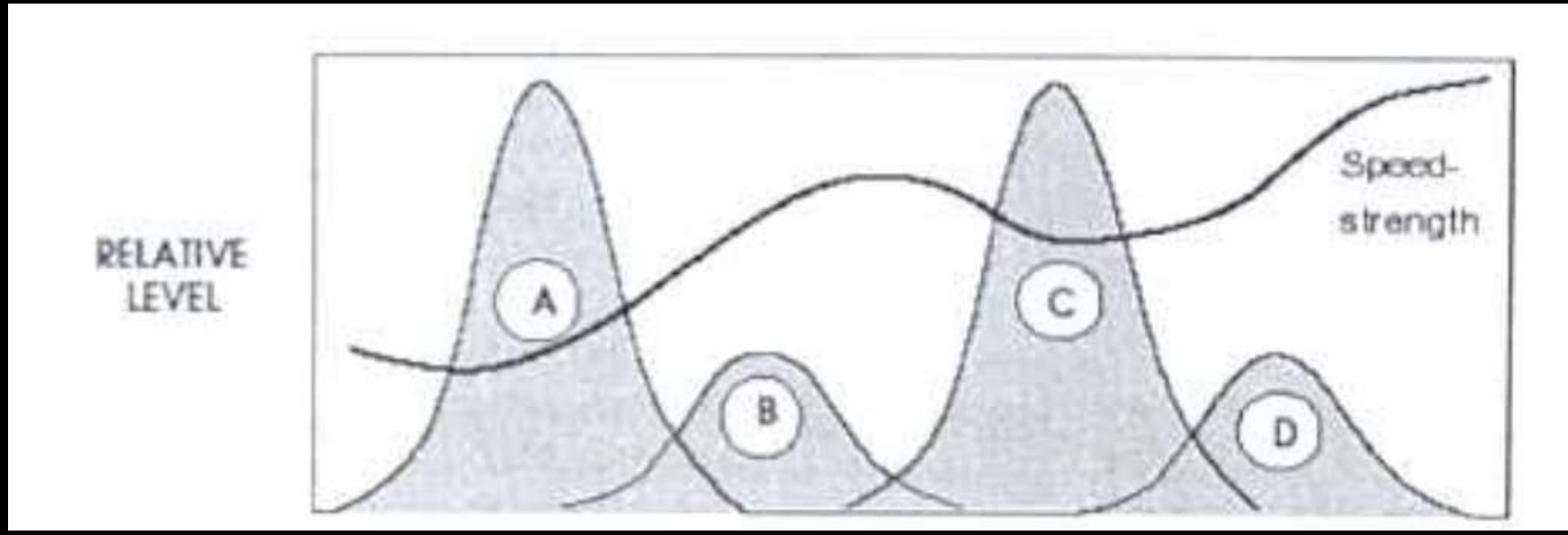


Figure 5a. *General scheme of the long-term delayed training effect (LDTE) of concentrated strength loading associated with the "conjugate sequence" system (advanced application).* The duration of the LDTE (T2) is approximately equal to that of the concentrated strength block (T1) and is usually 4–12 weeks depending on volume load and individual recoverability. Within optimal ranges, the greater the decrement in speed-strength indices (F1, F2, and F3) during accumulation block A, the greater their recovery during restitution block B. Reprinted by permission from Siff (58; p. 362).

Periodization Strategies



Sportinės formos
„užaštrinimo“
Taisyklė!

Scientific Bases for Precompetition Tapering Strategies

ÍÑIGO MUJIKA and SABINO PADILLA
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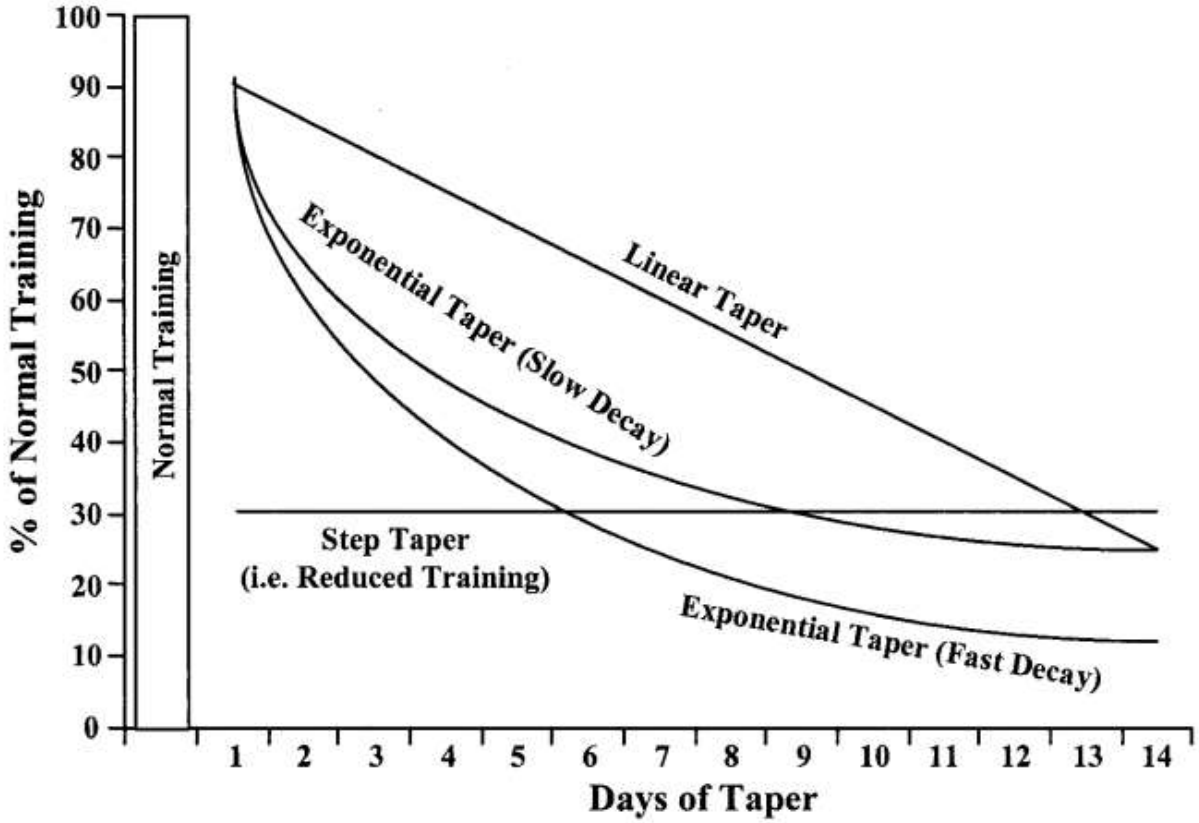

FIGURE 1—Schematic representation of the different types of tapers: linear taper, exponential taper with slow or fast time constants of decay of the training load, and step taper (also referred to as *reduced training*).

Table 5 Charlie Francis' 10-day tapering plan

Days to competition	Training prescription
10 days before	Spikes on track: 4 × 30 m from blo recovery. 80-100-120-150-m flying sprints with maximal intensity, full recovery (i.e., 20–35 min between sprints)
9 days before	Trainers on grass: 10 × 200 m tempo runs with 100-m walking in between
8 days before	Spikes on track: 4 × 30 m from blocks and 1 × 120 m at 95% intensity, full recovery
7 days before	Trainers on grass: 2 × 10 × 100 m tempo runs with 100-m walking in between
6 days before	Spikes on track: 4 × 30 m from blocks and 1 × 150 m at 95% intensity, full recovery
5 days before	No training
4 days before	Spikes on track: 4 × 30 m from blocks and 1 × 80 m at 95% intensity, full recovery
3 days before	Trainers on grass: 10 × 100 m tempo runs with 100-m walking in between
2 days before	Spikes on track: 4 × 30 m from blocks at 95% intensity, full recovery
1 day before	No training

Haugen et al. Sports Medicine - Open (2019) 5:44
https://doi.org/10.1186/s40798-019-0221-0

Sports Medicine - Ope

REVIEW ARTICLE Open Acces

The Training and Development of Elite Sprint Performance: an Integration of Scientific and Best Practice Literature

Thomas Haugen, Stephen Seiler, Øyvind Sandbakk and Espen Tønnessen

Vienintelis būdas IIX RS padidinti – tai „užaštrinimo“ blokas po pakrovimo bloko!

$MT = a + b[\log_2(2D/W)]$

Krepšininkų mikrociklų pavzdys

Profile of Weekly Training Load in Elite Male Professional Basketball Players

Vincenzo Manzi,[1] Stefano D'Ottavio,[1] Franco M. Impellizzeri,[2] Anis Chaouachi,[3] Karim Chamari,[3] and Carlo Castagna[1]

Journal of Strength and Conditioning Research

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Table 1. Training activities undertaken by players during the championship weeks monitored.

	Training activity		
Day	No game	1 Game	2 Games
Monday	Technical/tactical	Rest	Rest
Tuesday	Strength training + technical	Strength training + technical	Explosive weights + technical
Wednesday	Technical/tactical	Technical/tactical	Tactical
Thursday	Explosive weights + technical	Explosive weights + technical	Game
Friday	Technical/tactical	Technical/tactical	Tactical
Saturday	Tactical	Tactical	Technical/tactical
Sunday	Rest	Game	Game
Weekly load	3,334	2,928	2,791
Monotony (mean weekly load/*SD*)	1.70	1.59	1.62
Strain (load × monotony)	5,678	4,666	4,534

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Journal of Strength and Conditioning Research

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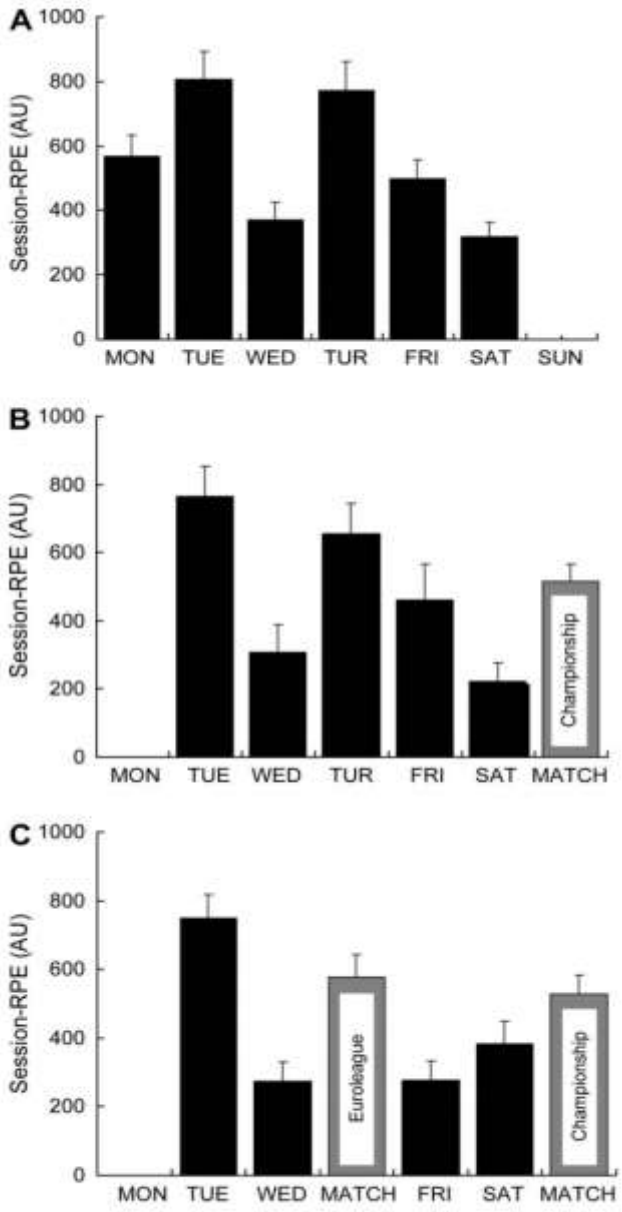


Figure 4. (A) Session-rate of perceived exertion (RPE) training load (TL) profile of the training week that comprised no game ($n = 8$); (B) session-RPE TL profile of the training week that comprised 1 game a week ($n = 8$); (C) session-RPE TL profile of the training week that comprised 2 games a week ($n = 8$).

Futbolininkų
mikrociklo
pavyzdžiai

Sports Med (2013) 43:927–954
DOI 10.1007/s40279-013-0066-5

REVIEW ARTICLE

High-Intensity Interval Training, Solutions to the Programming Puzzle

Part II: Anaerobic Energy, Neuromuscular Load and Practical Applications

Martin Buchheit · Paul B. Laursen

9 treniruotės

Table 6 Example of high-intensity interval training programming over three different weekly microcycles for elite soccer (male adults)

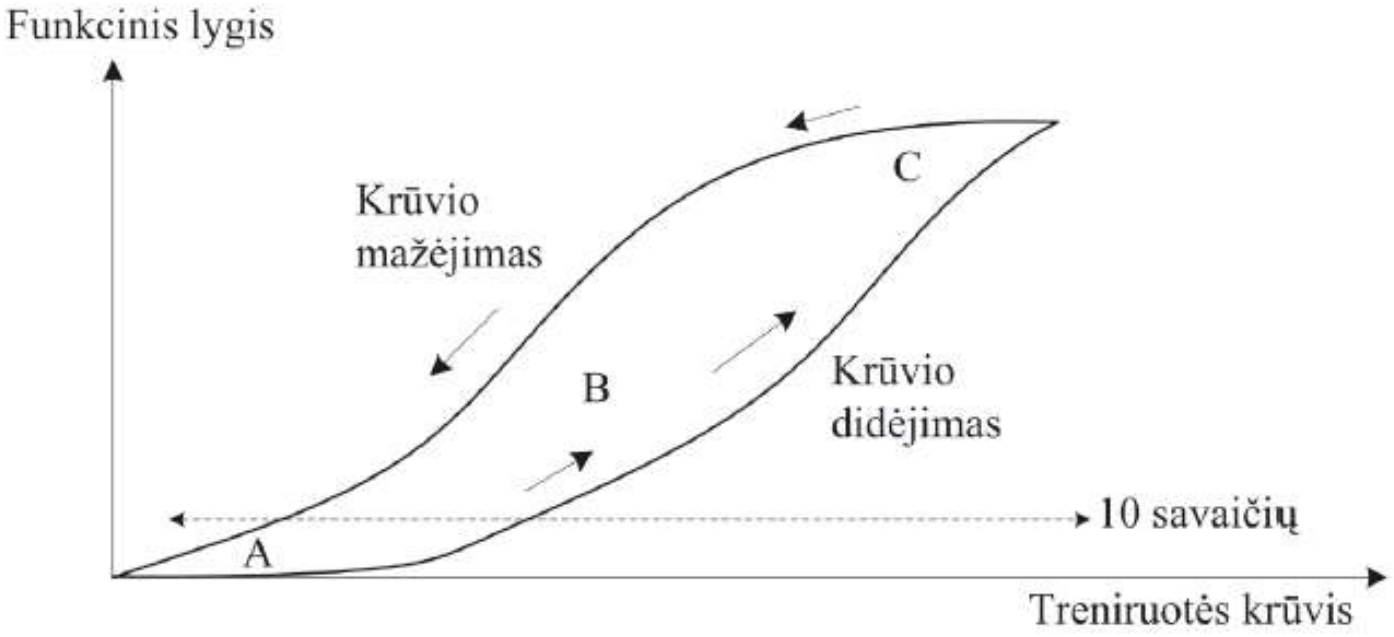
Microcycle (physical emphasis)	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Off-season $\dot{V}O_2$ development (generic)							
AM	Injury prevention	Speed (technique)	Soccer	Injury prevention	Power/ speed	Soccer	Rest
	HIT[a]: 2 × 5 min, 10 s [95 % V_{IFT}]/ 10 s [0]	Soccer	HIT[a]: 2 × 4 min 10 s [100 % V_{IFT}]/ 10 s [0]	Soccer	Soccer	HIT[a]: 5 × 3 min, [90 % $V_{Inc.Test}$]/ 2 min [0]	
PM	Soccer	Rest	Soccer	Rest	Soccer	Rest	
	HIT: 2 × 6 min [SSG][b] 5 versus 5 RPE 6		HIT: 2 × 4–5 min [SSG][b] 4 versus 4 RPE 7				

5 treniruotės + 1 varžybos

Competitive (in season)							
AM	Recovery/injury prevention	Soccer[d]	Power/speed	Speed Soccer	Agility Soccer	Rest	Rest
PM	Rest	Soccer[d]	Rest	Rest	Rest	Game	
		HIT[d]: 3–4 × 3 min [SSG][(b)] 4 versus 4, RPE 8					

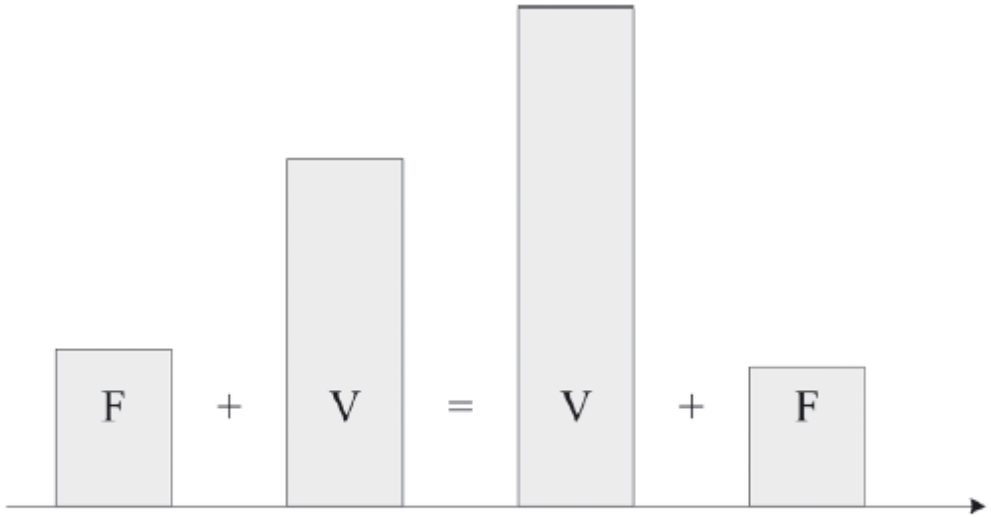
Treniruojantys,
palaikantys,
atstatantys
krūviai

Tik neužmirškim palaikyti anksčiau išugdytą savybę!

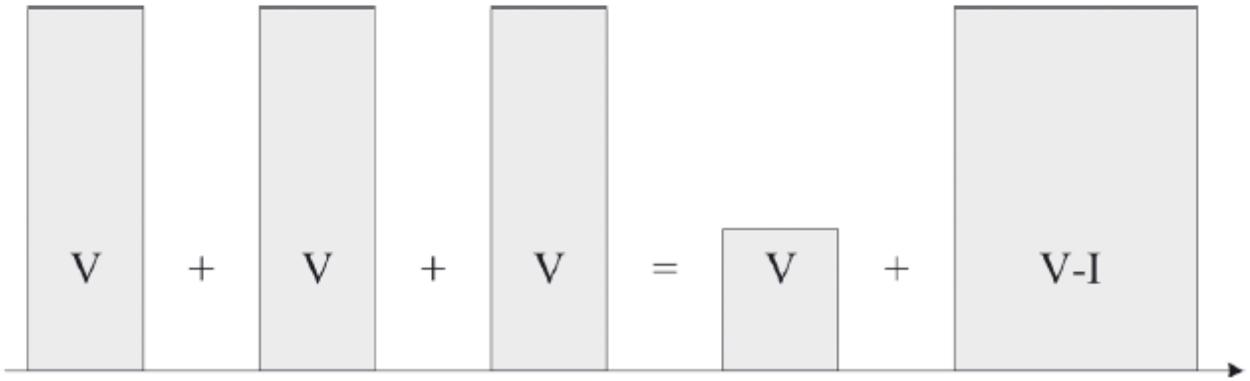


6.23 pav. Treniruotės poveikio kitimas (10 savaičių laipsniškai krūvį didinant arba mažinant)

Dažna klaida!
Neigiama krūvių suma

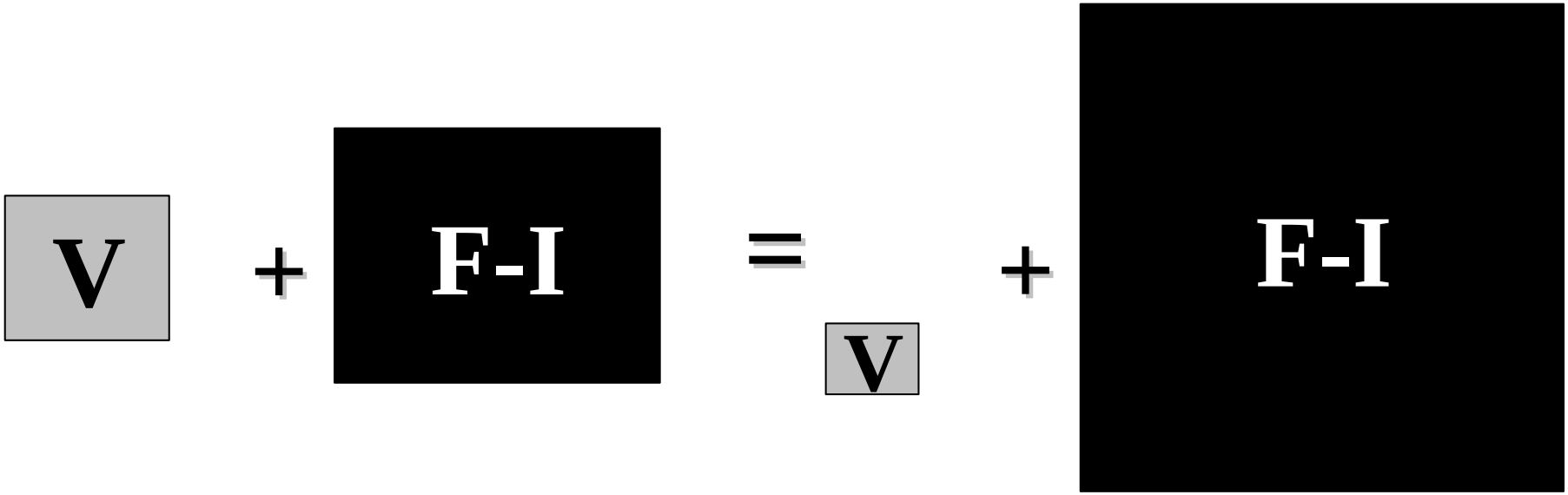


6.15 pav. Krūvio potenciacijos fenomenas



6.16 pav. Krūvio kokybinio sumavimosi fenomenas. Trejos greitumo pratybos per dieną ugdo ne greitumą (V), bet greitumo ištvermę (V-I)

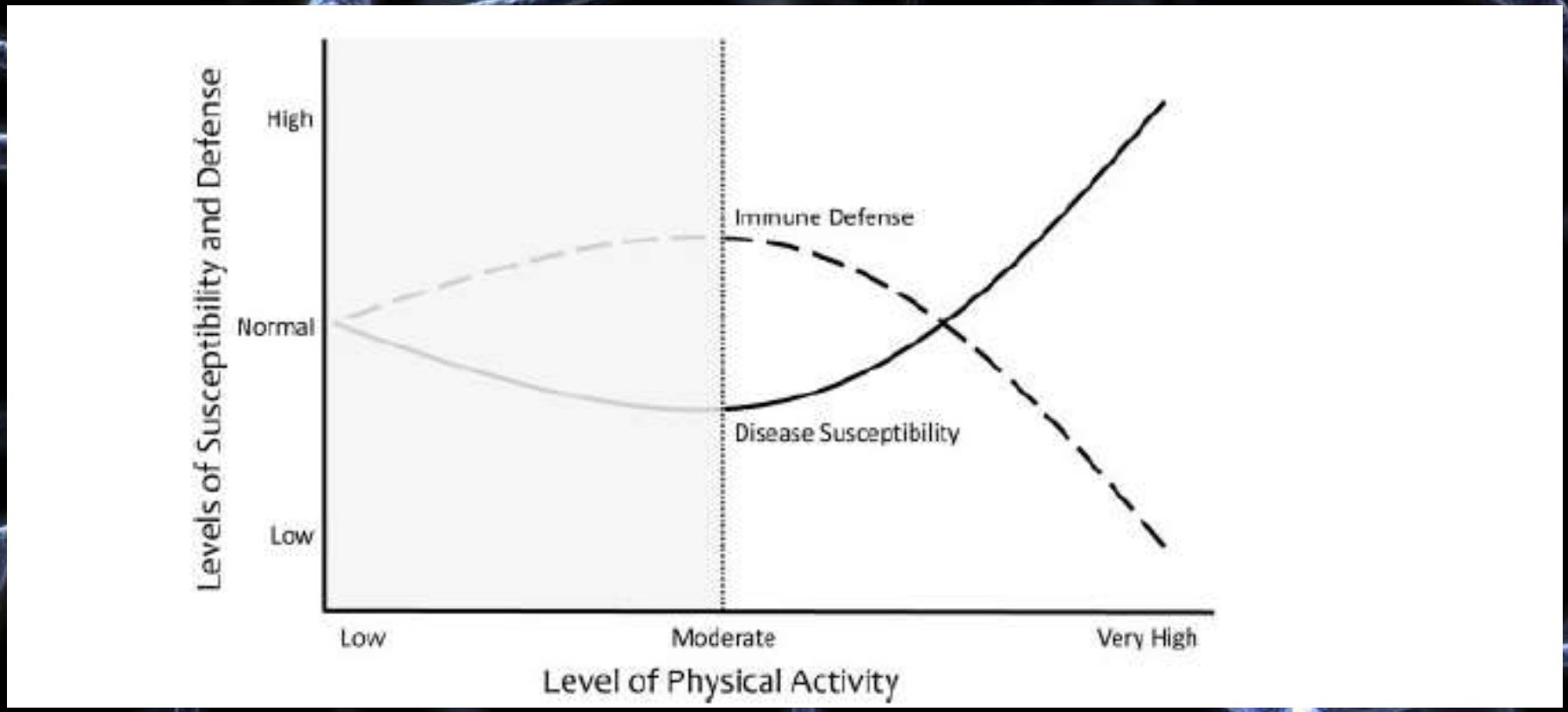
Skirtingo dydžio krūvių suma: treniruotės metu



Krūvių potenciacija

1. Jėgos ištvermė + hipertrofinė jėga
2. Hipertrofinė jėga + nervinė jėga
3. Nervinė jėga + galingumas
4. Galingumas + maksimalus greits
5. Kojų darbas + rankų darbas
6. Globalus raumenų darbas + lokalus darbas
7. Nedominuojančios galūnės darbas + dominuojančios

Persitreniravimas



Journal of Sport and Health Science 8 (2019) 201–217

Review

The compelling link between physical activity and the body's defense system

David C. Nieman [a,*], Laurel M. Wentz [b]

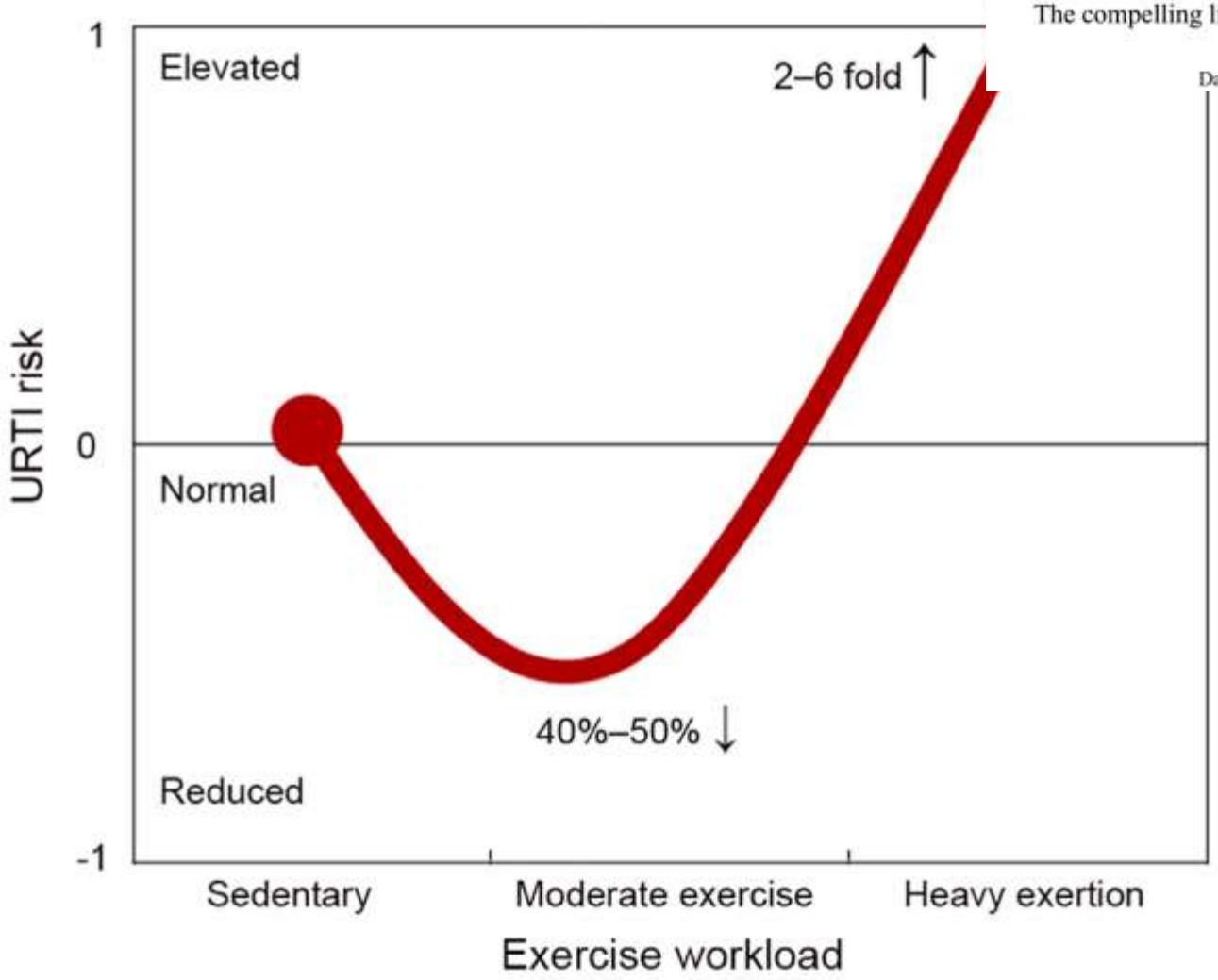


Fig. 5. J-curve model of the relationship between the exercise workload continuum and risk for upper respiratory tract infection (URTI). Other factors such as travel, pathogen exposure, sleep disruption, mental stress, and dietary patterns may influence this relationship. This figure was adapted from Nieman.[95]

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]

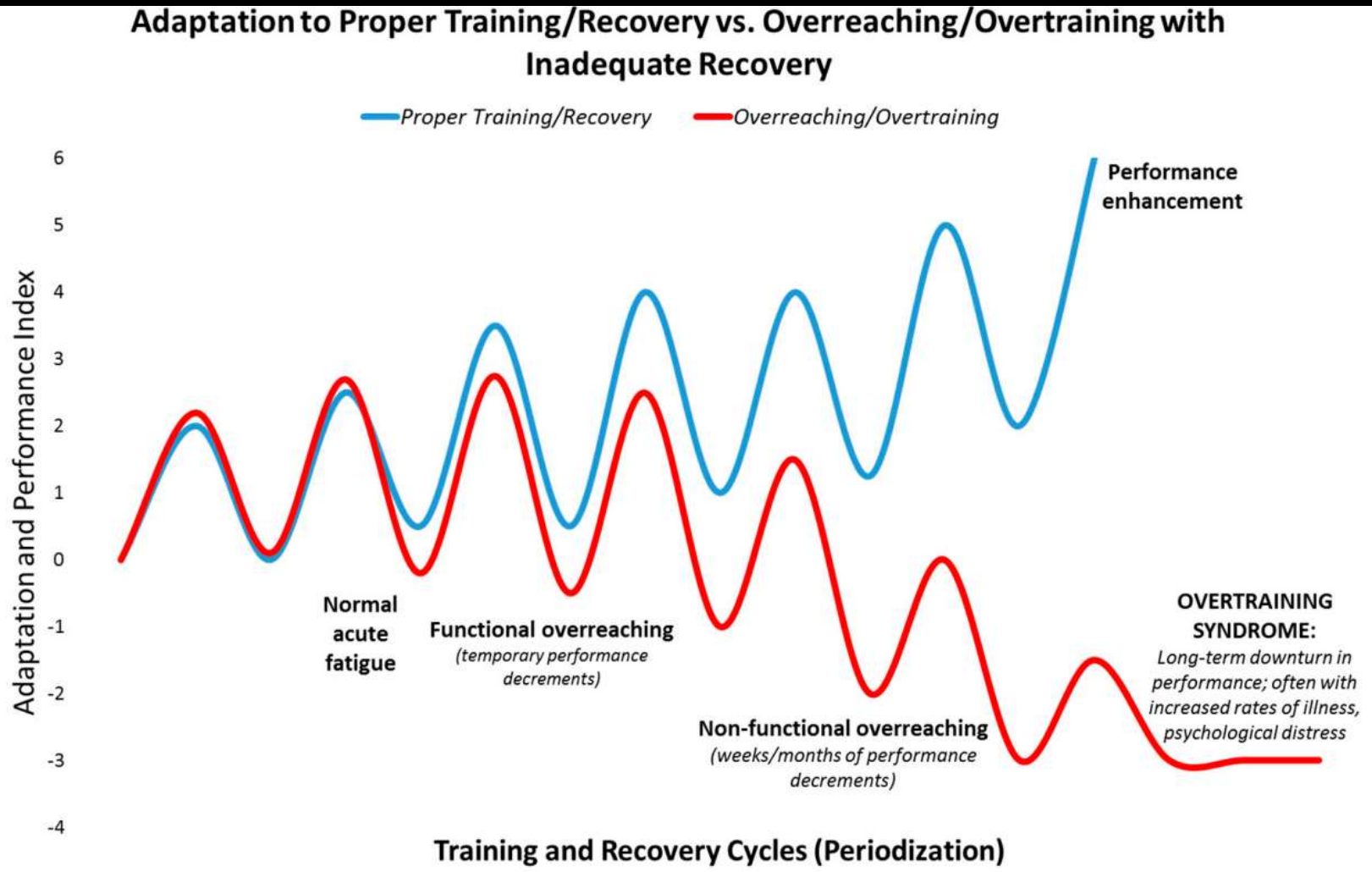


Figure 1. Depiction of the path towards overreaching and the overtraining syndrome compared to performance enhancement.

Prevention, Diagnosis, and Treatment of the Overtraining Syndrome: Joint Consensus Statement of the European College of Sport Science and the American College of Sports Medicine

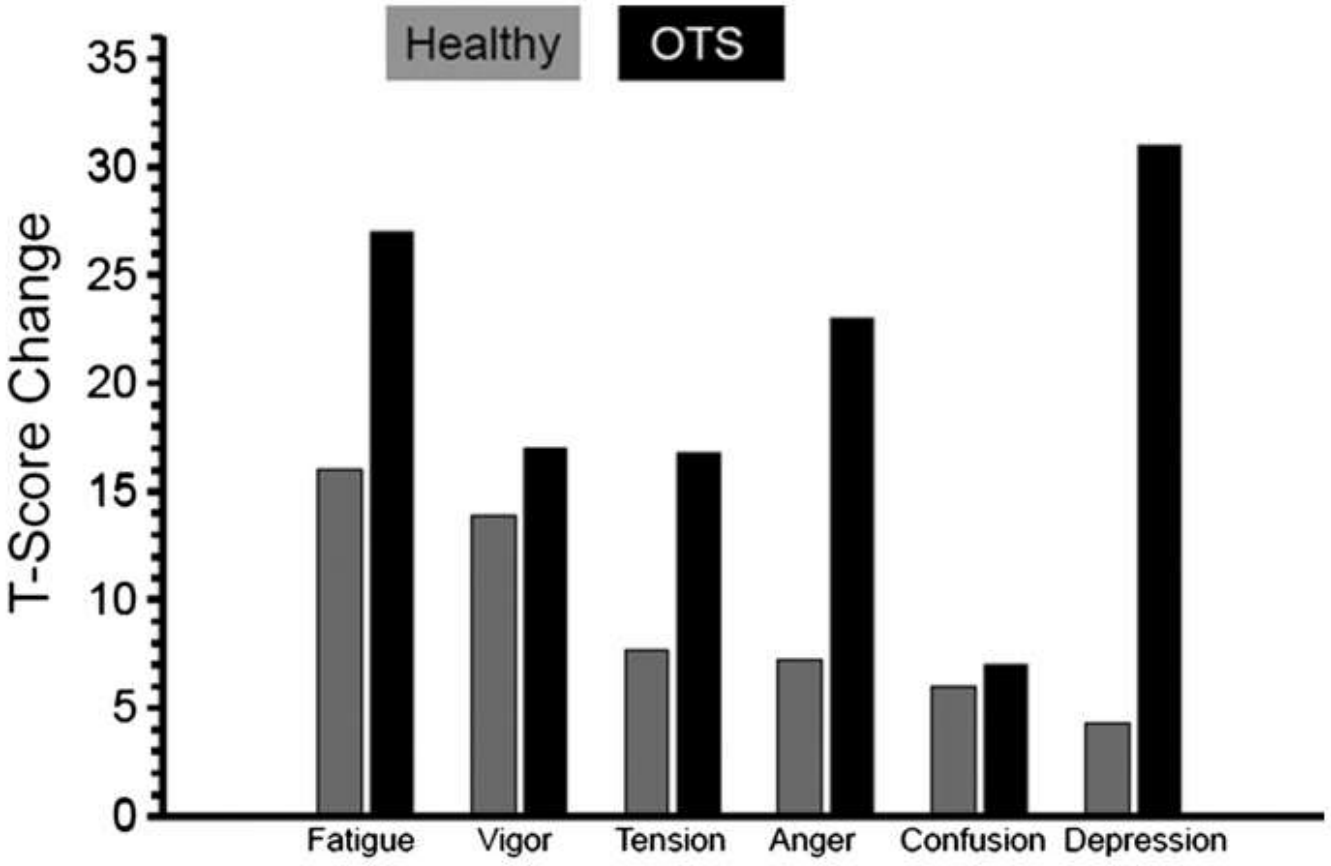


FIGURE 2—Magnitude of changes in POMS mood states from easy to maximal overload training in collegiate varsity swimmers who develop OTS or remain free of symptoms (i.e., "healthy"). (Adapted from Raglin and Morgan [114]).

LIETUVOS SPORTO UNIVERSITETAS

Techninio rengimo mokslo naujovės – technikos stabilizavimas kintančioje aplinkoje

Dėmesio fokusavimas

REVIEW ARTICLE

Principles of Motor Learning to Support Neuroplasticity After ACL Injury: Implications for Optimizing Performance and Reducing Risk of Second ACL Injury

Alli Gokeler · Dorothee Neuhaus · Anne Benjaminse · Dustin R. Grooms · Jochen Baumeister

2.1 External Focus of Attention Improves Motor Learning

Fig. 1 An external focus instruction to enhance postural stability "Try to keep the bars on the balance board as steady as possible"

Fig. 2 An external focus instruction to enhance postural stability "Keep the bar horizontal"

Variabilumas – judesius reikia išmokti atlikti realiomis, bet ne „šiltnamio sąlygomis“

GOLF SCIENCE

PaR (Plan-act-Review) Golf: Motor Learning Research and Improving Golf Skills

Timothy D. Lee
McMaster University

Richard A. Schmidt
Human Performance Research

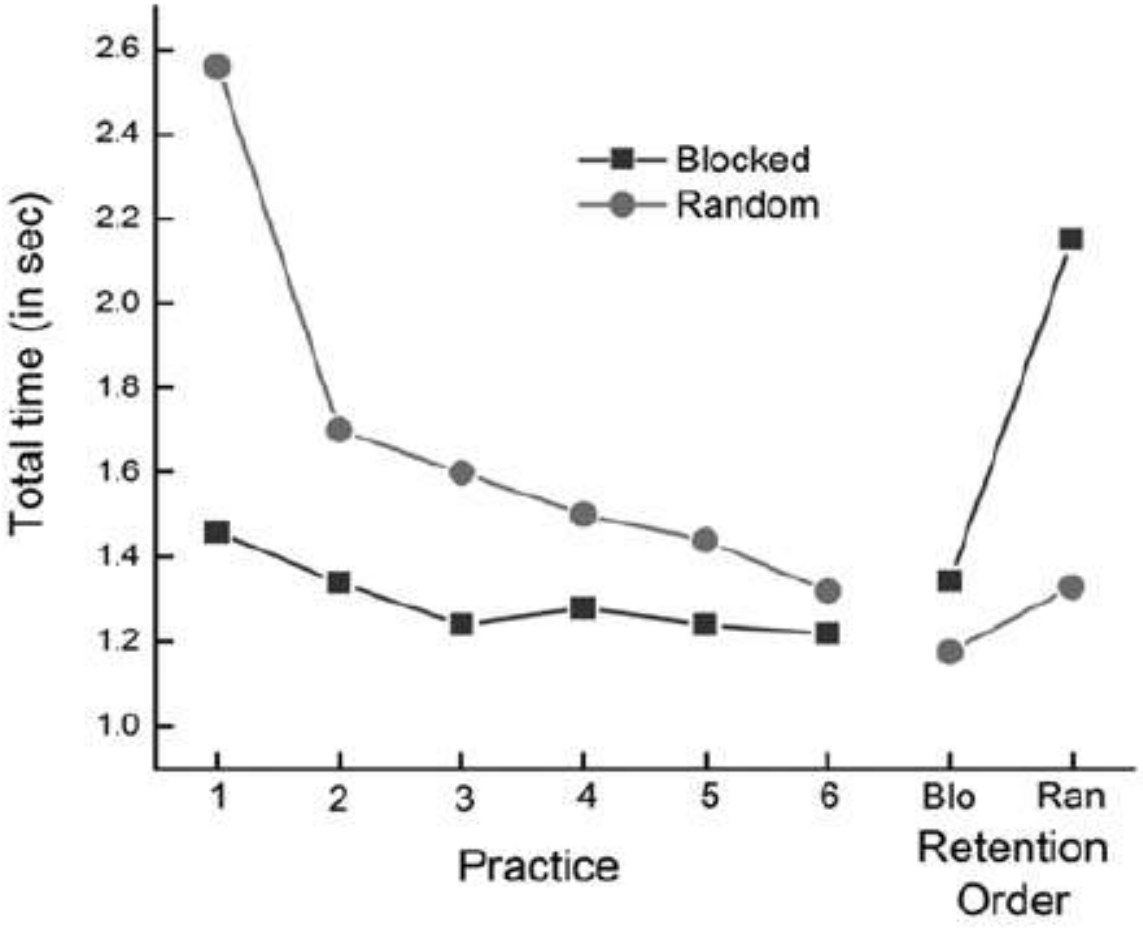


Figure 1 — Effects of blocked and random practice during practice trials and in retention (adapted from Shea & Morgan, 1979).

LIETUVOS SPORTO UNIVERSITETAS

Aerobika + mokymasis

Vokietijos futbolininkų rengimo sistema

European Journal of Sport Science

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Practice and play in the development of German top-level professional football players

Manuel Hornig, Friedhelm Aust & Arne Güllich

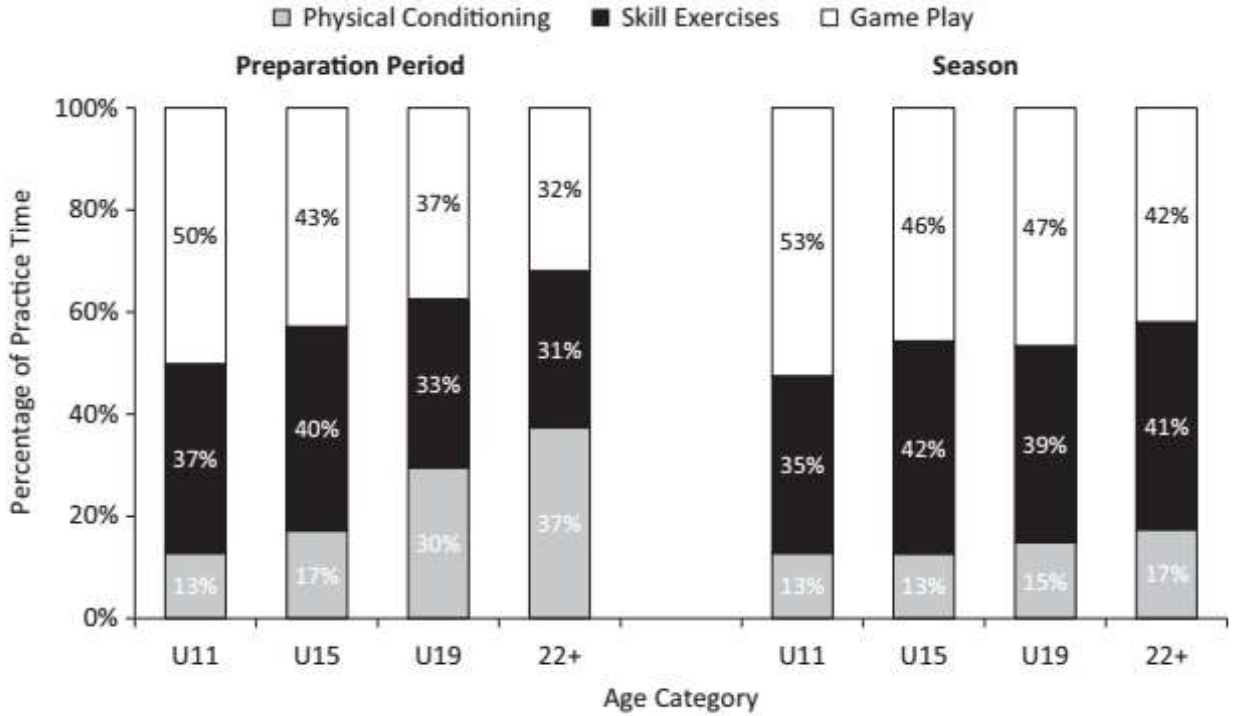


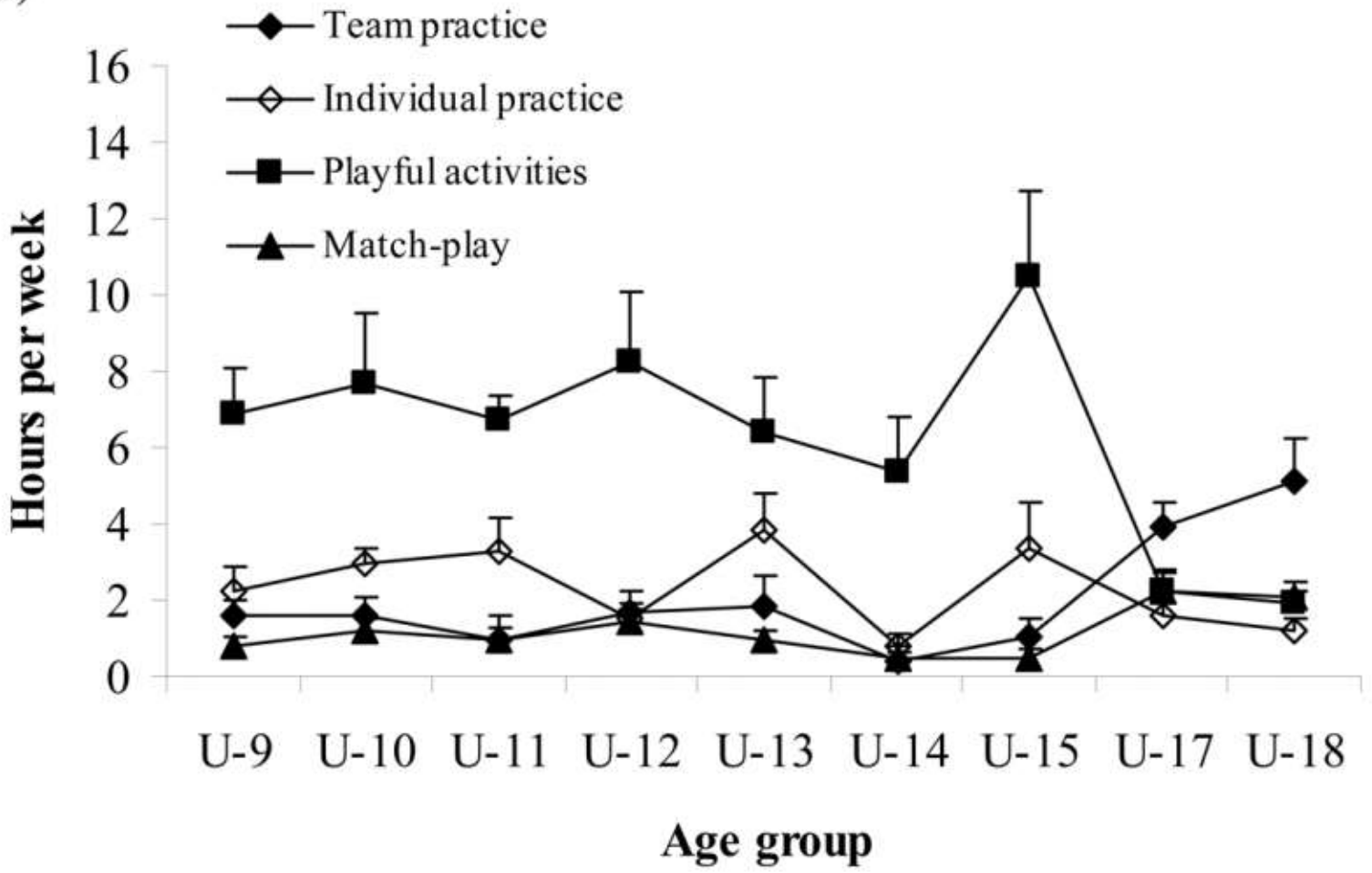
Figure 2. Proportions of physical conditioning, skill exercises, and game play within organised in-club football practice/training sessions. Mean values of 1st Bundesliga football players (including senior National Team members). Percentage is calculated exclusive time for warm-up activities, respectively.

Practice, instruction and skill acquisition in soccer: Challenging tradition

A Mark Williams & Nicola J Hodges

To cite this article: A Mark Williams & Nicola J Hodges (2005) Practice, instruction and skill acquisition in soccer: Challenging tradition, Journal of Sports Sciences, 23:6, 637-650, DOI: 10.1080/02640410400021328

a)



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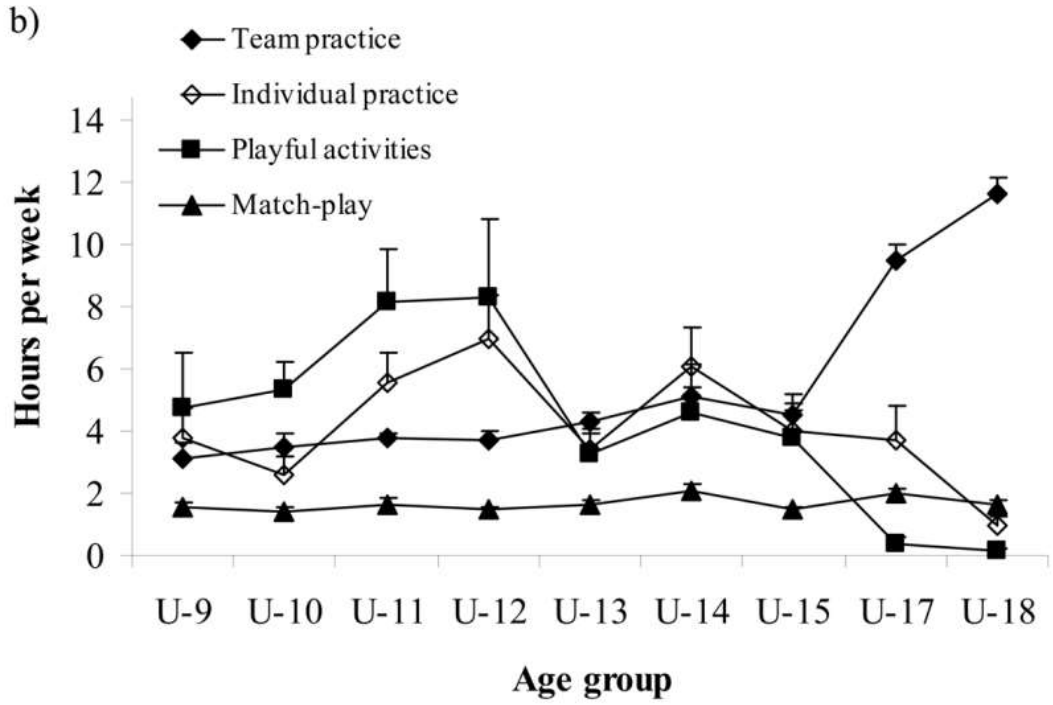
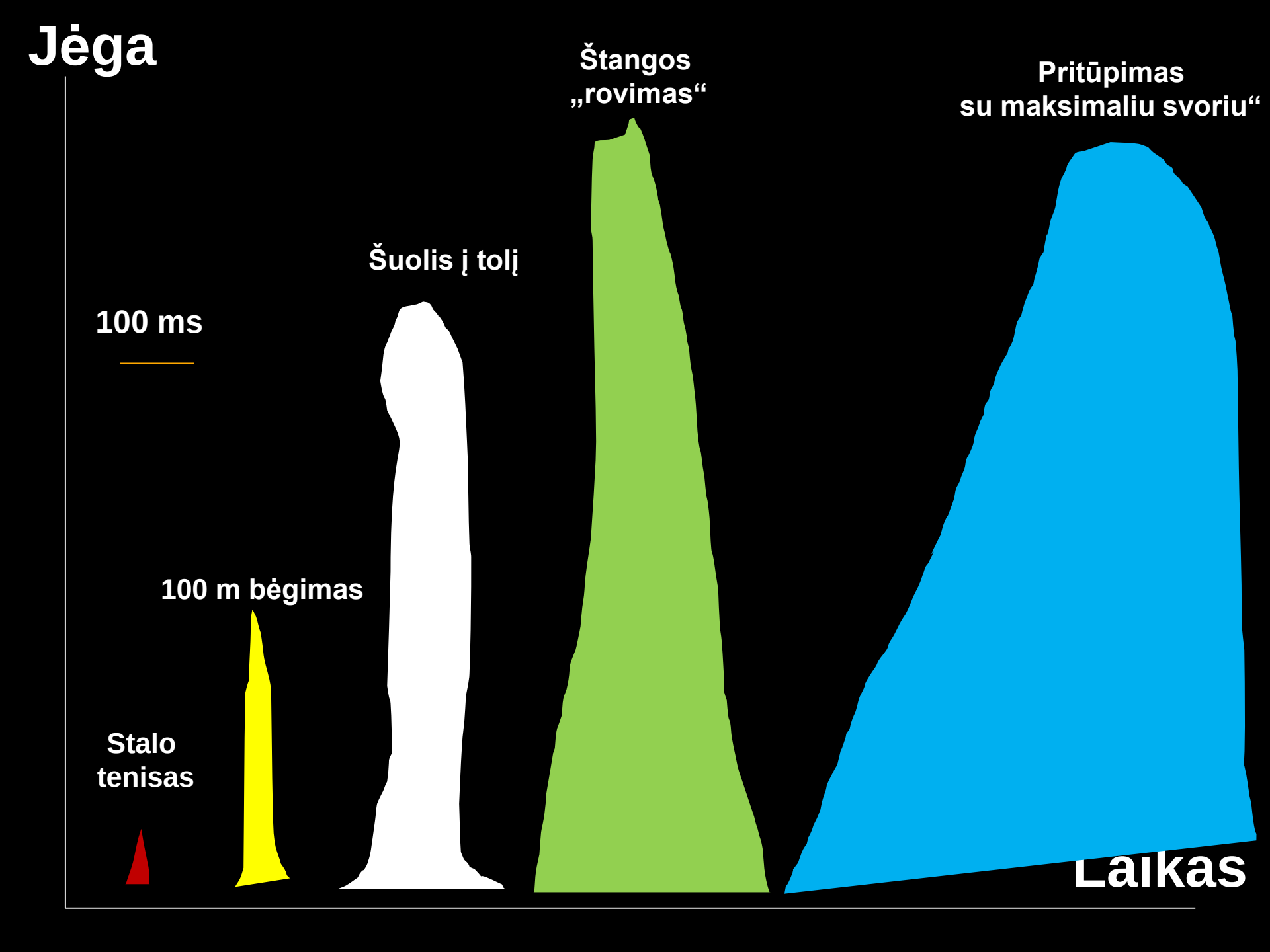


Figure 1. Cross-sectional data outlining the practice history profiles of (a) sub-elite and (b) elite soccer players from 8 to 18 years of age (data from Ward, 2002).

Specifiškumo ir nulinės sumos taisyklė

Šiuo metu žinoma, kad specifinė organizmo adaptacija priklauso nuo tokių veiksnių:

1) suaktyvinamų raumenų grupių specifikos ir kiekio;
2) judesių realizavimo programos specifikos;
3) raumenų susitraukimo jėgos, greičio ir galingumo;
4) raumenų jėgos ir greičio išvystymo pobūdžio (kreivės);
5) raumens ilgio;
6) raumenų darbo režimų;
7) atliekamo darbo trukmės;
8) poilsio trukmės tarp pratimų kartojimo, tarp serijų ir tarp treniravimosi dienų;
9) klimato ir socialinių sąlygų;
10) varžybų vykdymo sąlygų;
11) psichikos mobilizavimo laipsnio, psichinio streso specifikos.

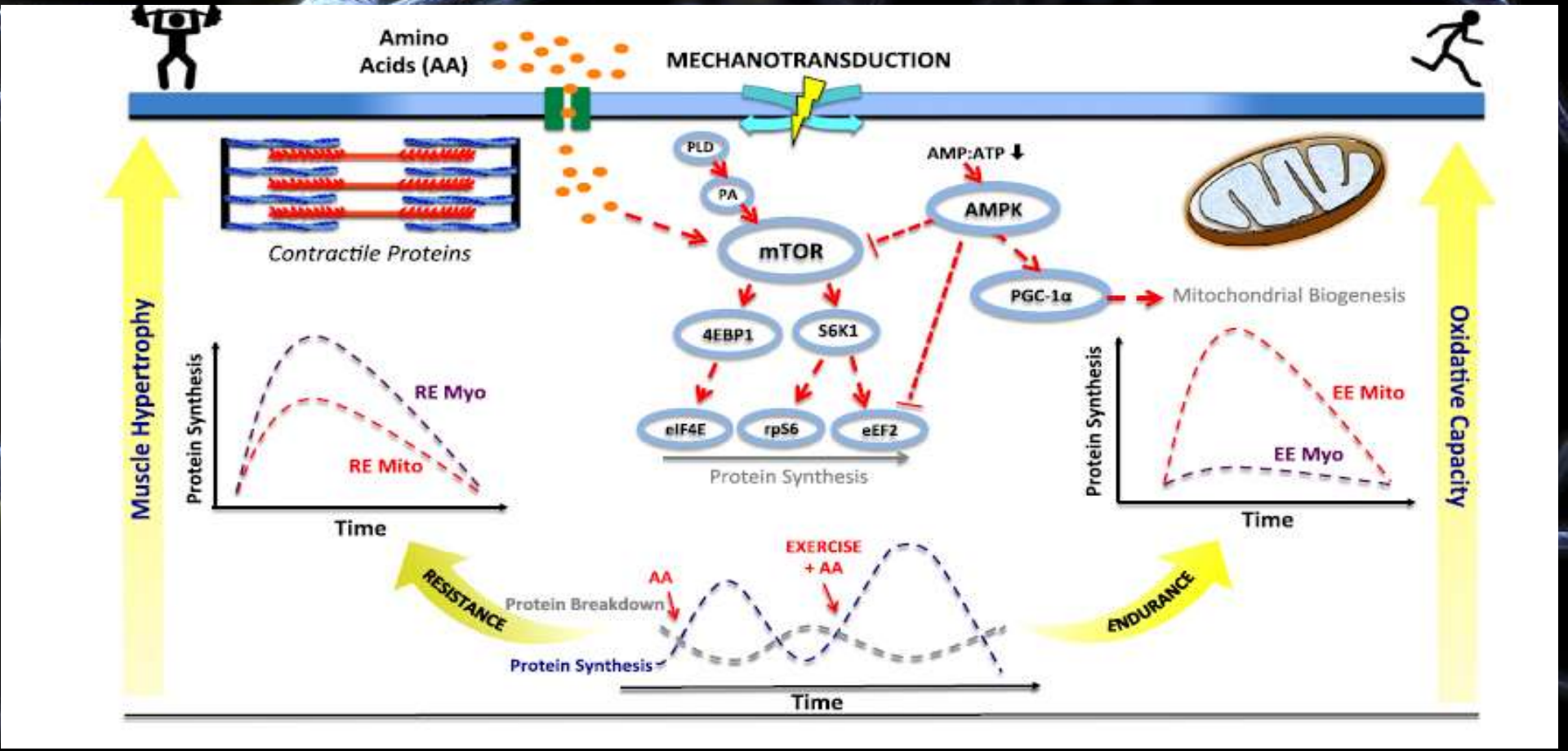

Jėga
Štangos „rovimas“
Pritūpimas su maksimaliu svoriu“
Šuolis į tolį
100 ms
100 m bėgimas
Stalo tenisas
Laikas

ACTA PHYSIOLOGICA
Acta Physiol 2016, 216, 15–41

REVIEW

Skeletal muscle homeostasis and plasticity in youth and ageing: impact of nutrition and exercise

M. S. Brook,[1,*] D. J. Wilkinson,[1,*] B. E. Phillips,[1] J. Perez-Schindler,[2] A. Philp,[2] K. Smith[1] and P. J. Atherton[1]

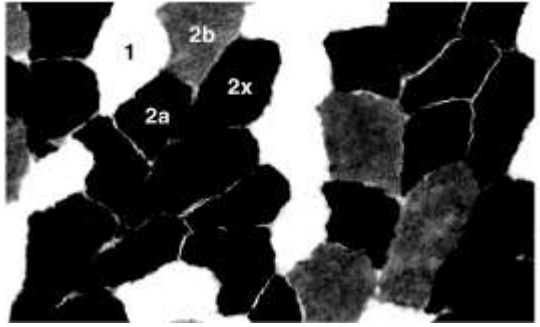


Intensyvumo specifika - trys skirtingi raumenų „varikliai“

1

Motorinio vieneto tipas { FF | FR | S

Histocheminis tipas { FG / II B | FOG / II A | SO / I



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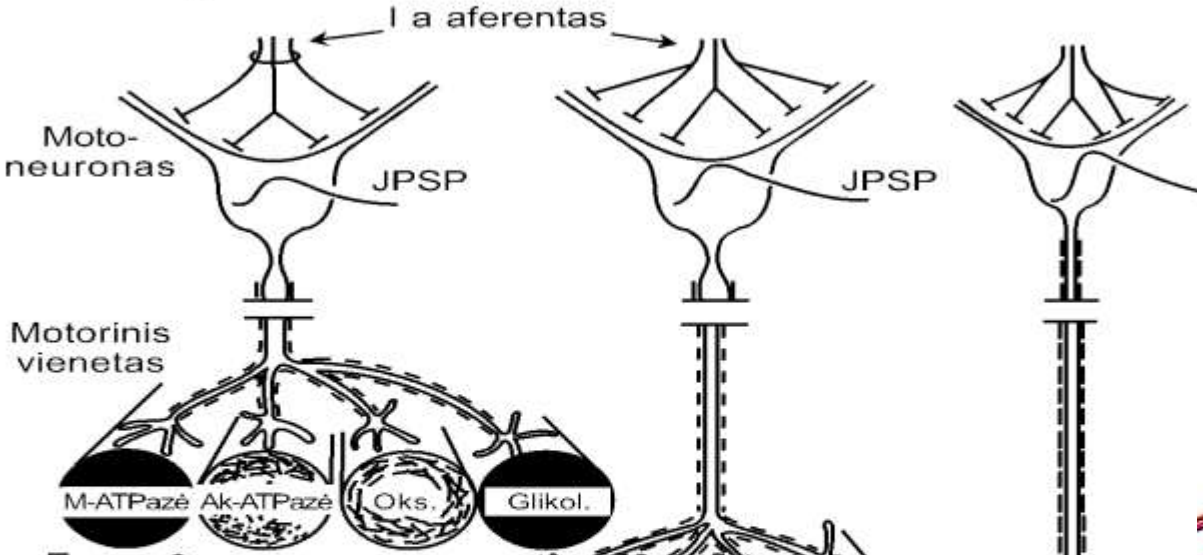

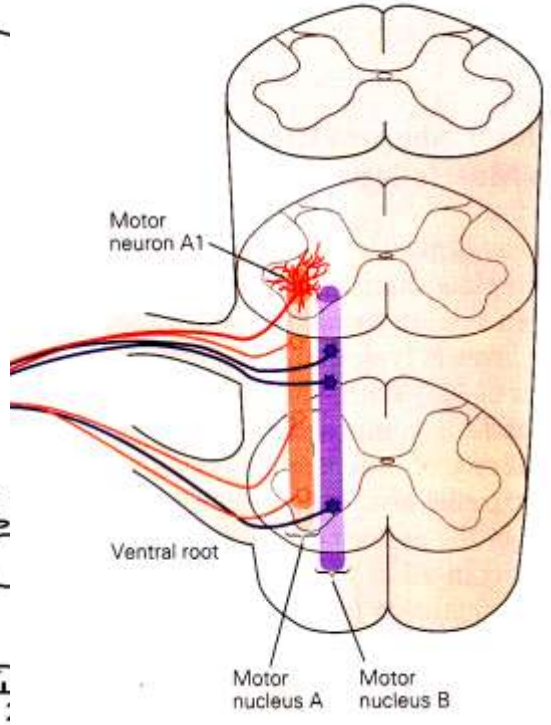

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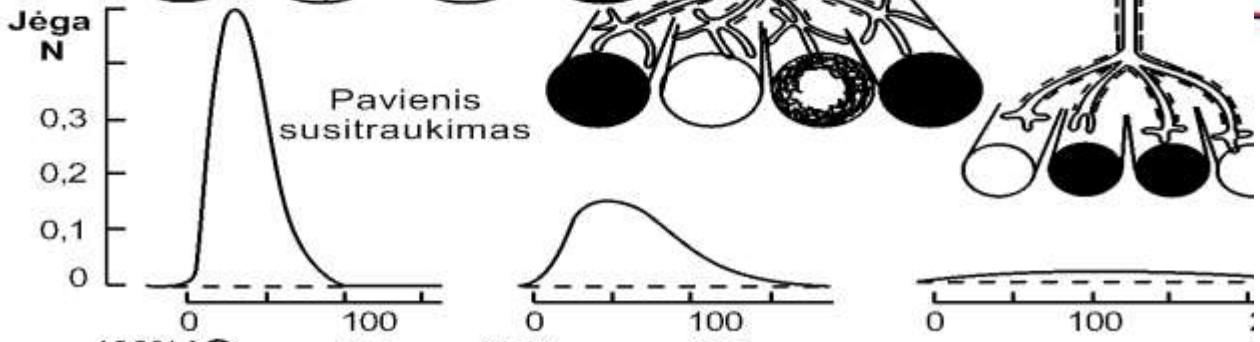

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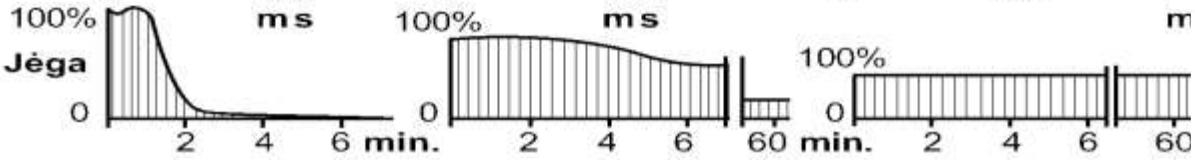

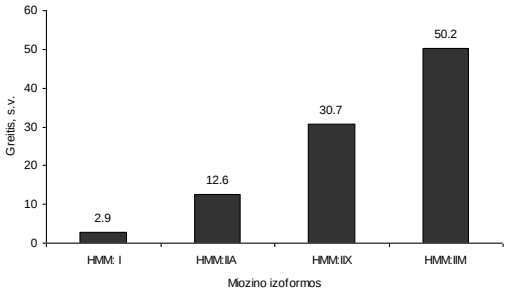

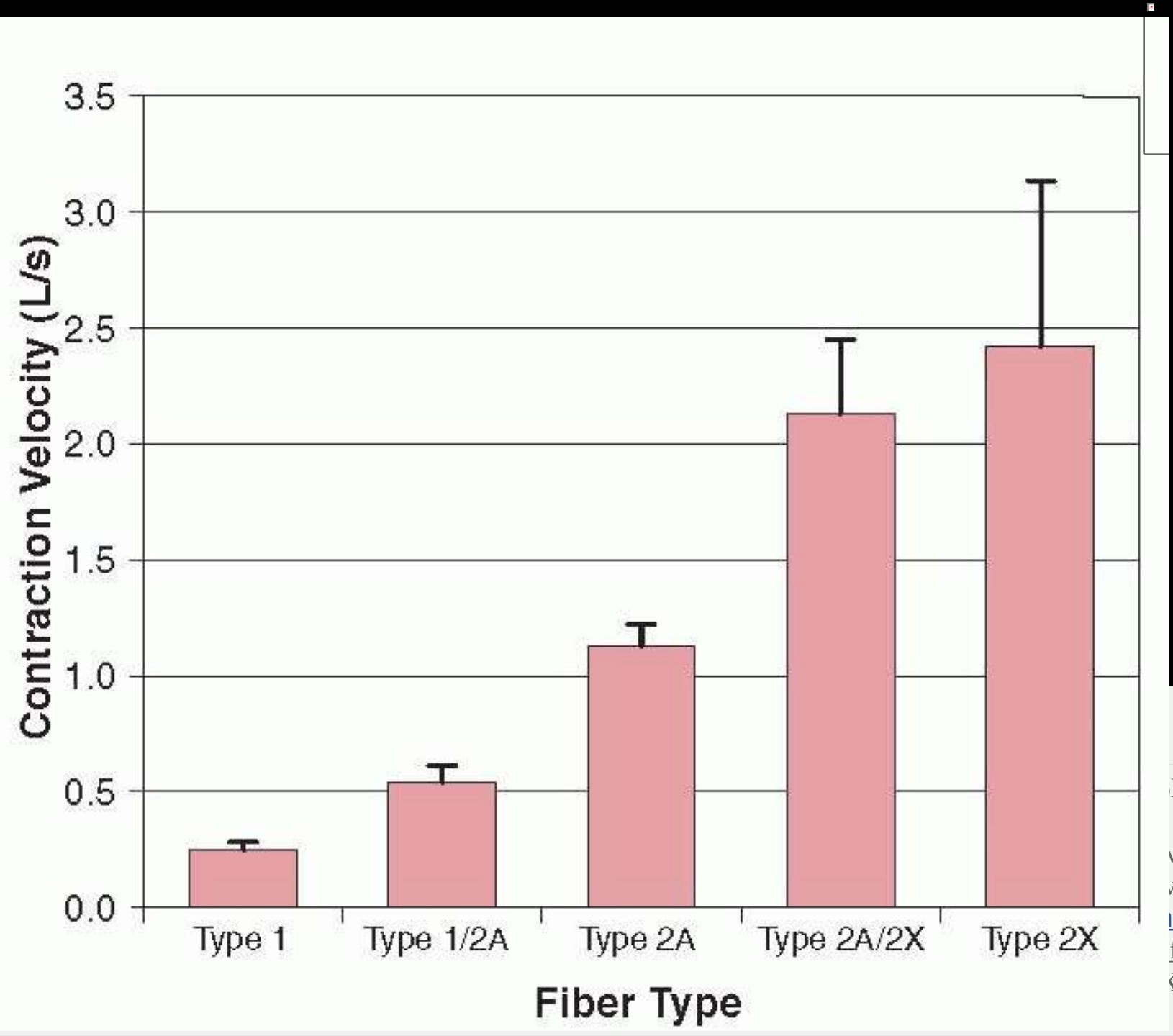

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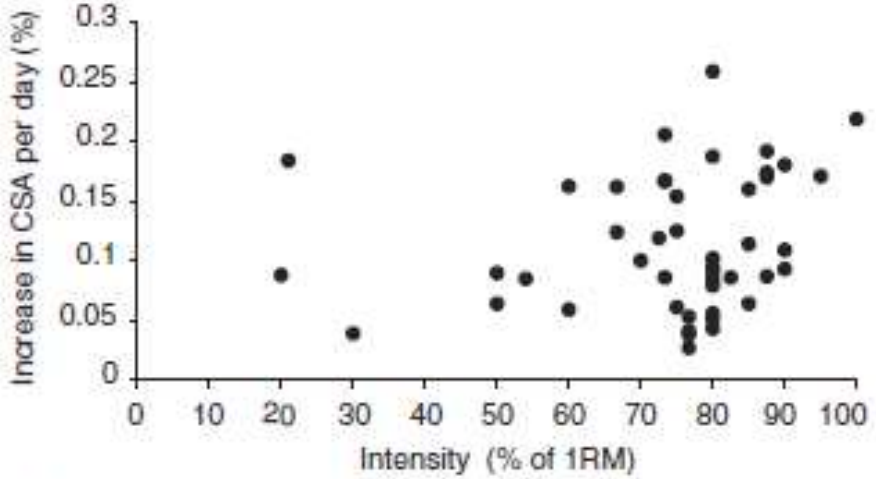


Fig. 2. Peak intensity of training vs percentage increase in cross-sectional area (CSA) per day of the quadriceps during dynamic external resistance training (number of study groups = 46). **RM** = repetition maximum.

REVIEW ARTICLE

The Influence of Frequency, Intensity, Volume and Mode of Strength Training on Whole Muscle Cross-Sectional Area in Humans

Mathias Wernbom,[1] *Jesper Augustsson*[1,2] and *Roland Thomee*[1,2]

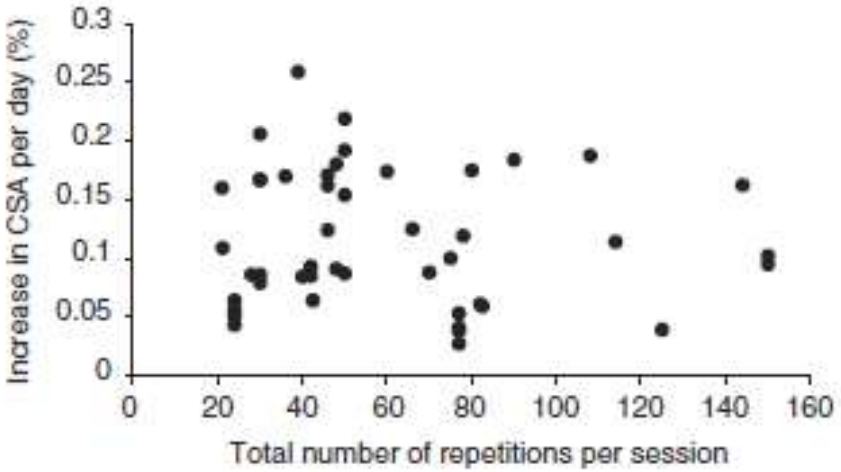


Fig. 3. Total number of repetitions vs percentage increase in cross-sectional area (CSA) per day of the quadriceps during dynamic external resistance training (number of study groups = 45).

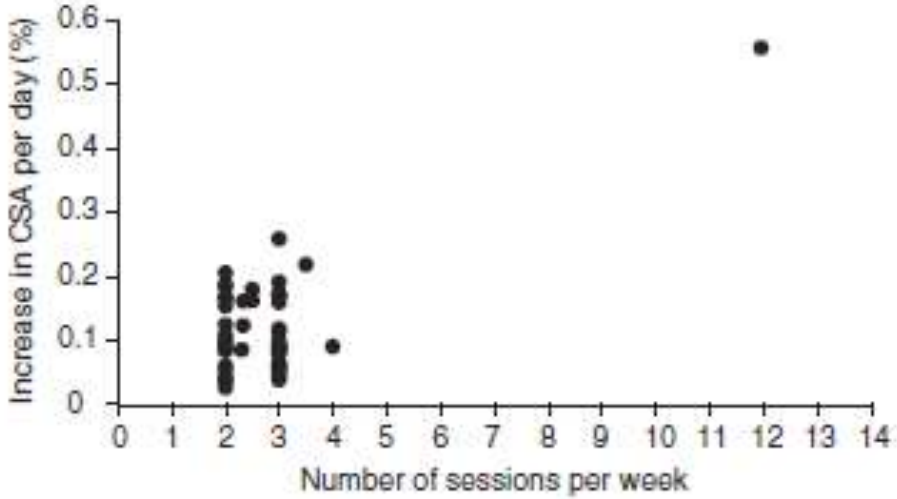


Fig. 1. Frequency of training vs percentage increase in cross-sectional area (CSA) per day of the quadriceps during dynamic external resistance training (number of study groups = 47).

Jėgos
treniravimas

Sports Med
https://doi.org/10.1007/s40279-018-0862-z

REVIEW ARTICLE

The Importance of Muscular Strength: Training Considerations

Timothy J. Suchomel[1] · Sophia Nimphius[2] · Christopher R. Bellon[3] · Michael H. Stone[4]

Table 2 The theoretical potential of resistance training methods to benefit hypertrophy, strength, and power

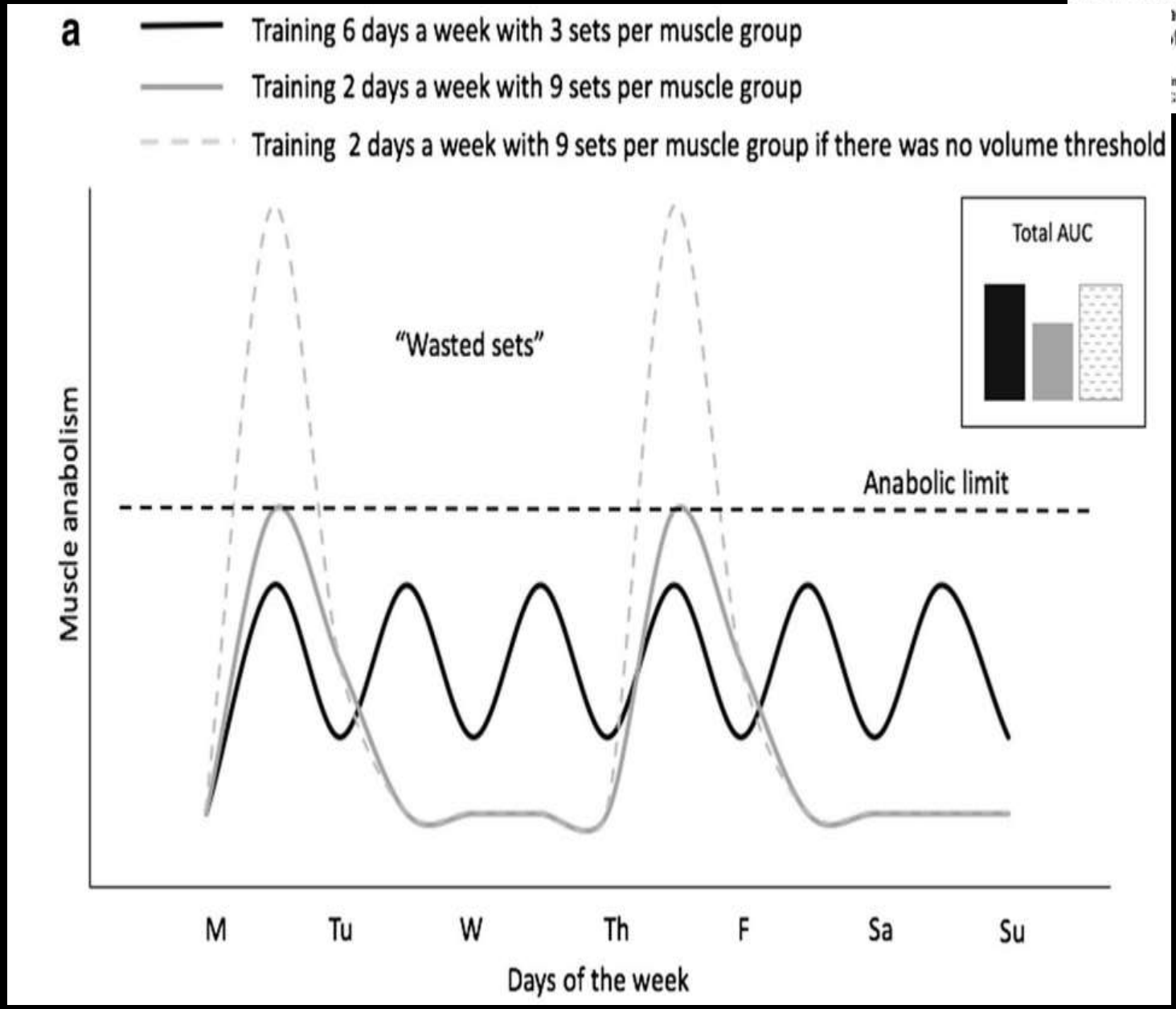
Resistance training method	Hypertrophy	Strength	Power
Bodyweight exercise	+	+	++
Machine-based exercise	++	++	++
Weightlifting derivatives	+++	+++	+++++
Plyometrics	+	++	++++
Eccentric training	+++++	+++++	++++
Potentiation complexes	[a]	+++	+++++
Unilateral exercise	+++	++	+++
Bilateral exercise	++++	++++	+++
Variable resistance	+++++	++++	++++
Kettlebell training	++	++	+++
Ballistic training	++	+++	+++++

Sports Med
DOI 10.1007/s40279-016-0640-8

CURRENT OPINION

...e Overlooked Resistance Training Variable ...Muscle Hypertrophy?

...n T. Mattocks[1] · Matthew B. Jessee[1] · Samuel L. Buckner[1] · J. Grant Mouser[1] · ...Gilberto C. Laurentino[1] · Jeremy P. Loenneke[1]



Elito sprinto pasaulyje rengimo sistema: „reikia tiek, kiek reikia“

5x30 m

Haugen et al. Sports Medicine - Open (2019) 5:44
https://doi.org/10.1186/s40798-019-0221-0

Sports Medicine - Open

REVIEW ARTICLE Open Access

The Training and Development of Elite Sprint Performance: an Integration of Scientific and Best Practice Literature

Thomas Haugen[1*], Stephen Seiler[2], Øyvind Sandbakk[3] and Espen Tønnessen[1]

Table 2 Summary of best practice sprint training recommendations

Training method	Distance (m)	Intensity (%)	Recoveries (min)	Total session volume (m)	Initiation	Time to next HIS (hours)	Footwear and surface
Acceleration	10–50	> 98	2–7	100–300	Block/3-point/crouched	48	Spikes on track
Maximal velocity	10–30[a]	> 98	4–15	50–150[a]	20–40-m flying start	48–72	Spikes on track
Sprint-specific endurance	80–150	> 95	8–30	300–900	Standing start	48–72	Spikes on track
Speed endurance	60–80	90–95	2–4 (8–15)	600–2000	Standing start	48–72	Spikes on track
Resisted sprints	10–30	80–95[b]	3–6	50–200	3-point/crouched	48	Optional
Assisted sprints	10–30[a]	≤ 105	5–15	≤ 100[a]	20–40-m flying start	48	Spikes on track
Tempo	100–300	60–70	1–3	1000–2000	Standing start	24	Trainers on grass

Intensity is expressed in percent of maximal velocity. Recovery = time between repetitions (sets). *HIS* = high-intensive session
[a]Flying start distance excluded
[b]The perceived effort is maximal, so the velocity decline is caused by resistance loading

Haugen *et al. Sports Medicine - Open* (2019) 5:44
https://doi.org/10.1186/s40798-019-0221-0

Sports Medicine - Open

REVIEW ARTICLE Open Access

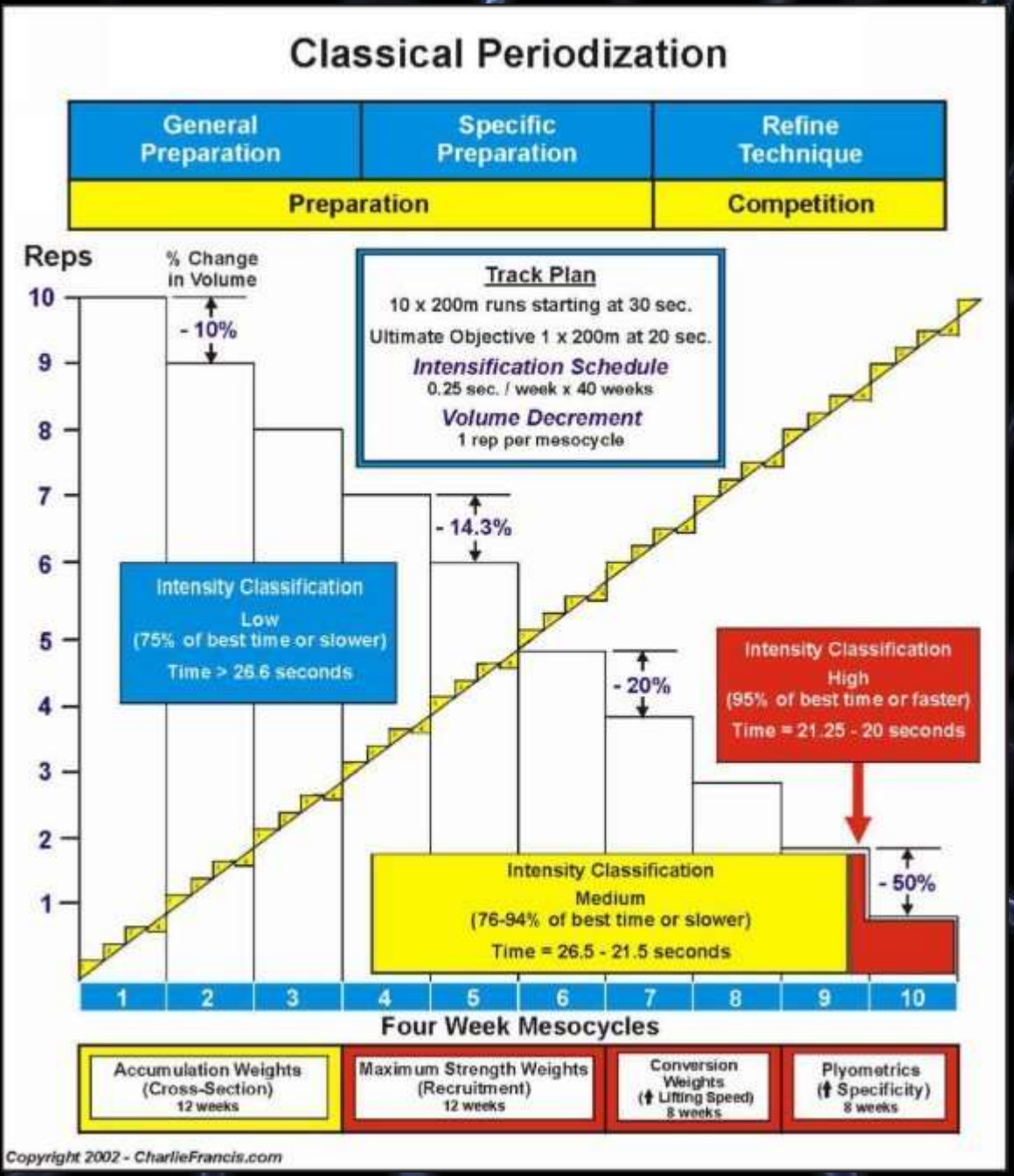
The Training and Development of Elite Sprint Performance: an Integration of

Table 3 Training week examples across varying meso-cycles

Day	Early preparation period	Mid-preparation period	Late preparation period	Mid-season
Mon	Hill sprints	Resisted sprints	Acceleration	Acceleration and maximal velocity
Tue	Hypertrophy strength	Maximal strength	Explosive strength + plyometrics	Plyometrics
Wed	Tempo	Tempo	Tempo	Tempo
Thu	Speed endurance	Speed endurance	Maximal velocity	Sprint-specific endurance
Fri	Hypertrophy strength	Maximal strength	Explosive strength + plyometrics	Plyometrics
Sat	Tempo	Tempo	Tempo	Tempo
Sun	Off	Off	Off	Off

See Table 2 for the session-specific training content

Ne daug , kaip dvi vienodos treniruotės per mikrociklą!



Haugen et al. Sports Medicine - Open (2019) 5:44
https://doi.org/10.1186/s40798-019-0221-0

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The Training and Development of Elite Sprint Performance: an Integration of Scientific and Best Practice Literature

Thomas Haugen[1*], Stephen Seiler[2], Øyvind Sandbakk[3] and Espen Tønnessen[1]

Ar galima „perkaitinti variklius“?

2013 American Physiological

Mechanisms Modulating Skeletal Muscle Phenotype

Bert Blaauw,[1,2] Stefano Schiaffino,[2,3] and Carlo Reggiani*[1,3]

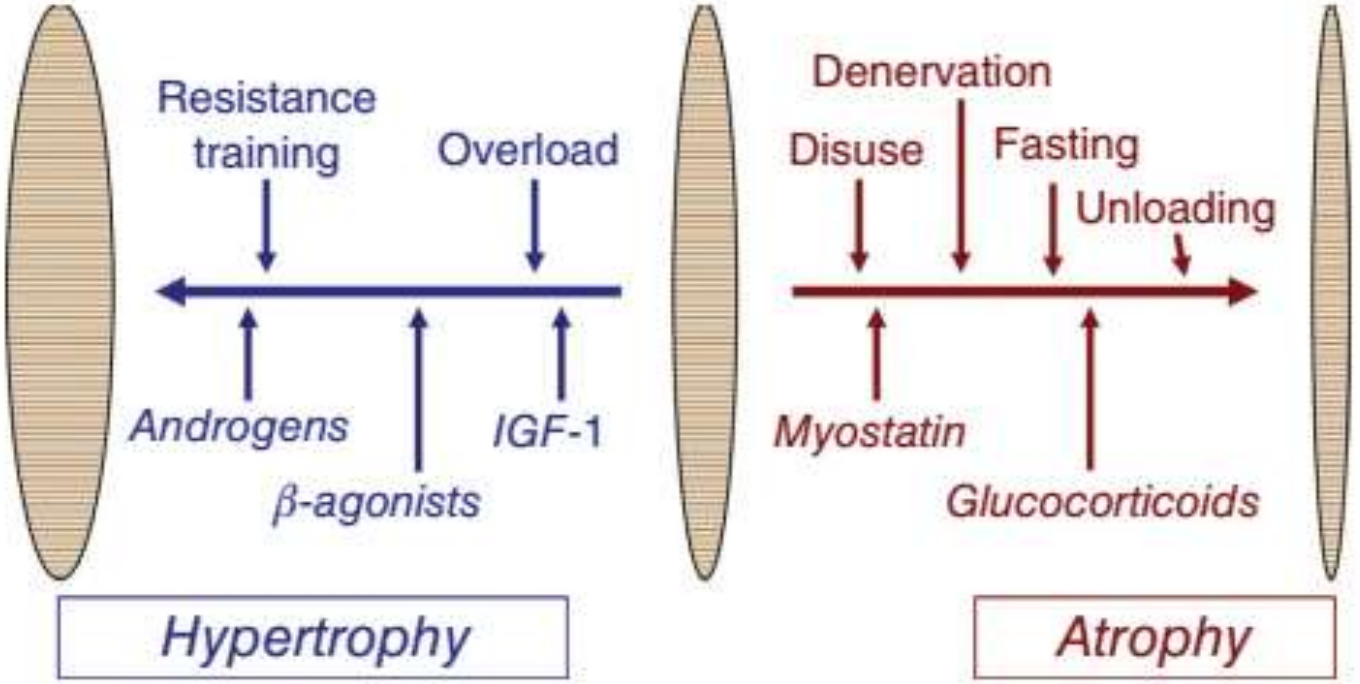
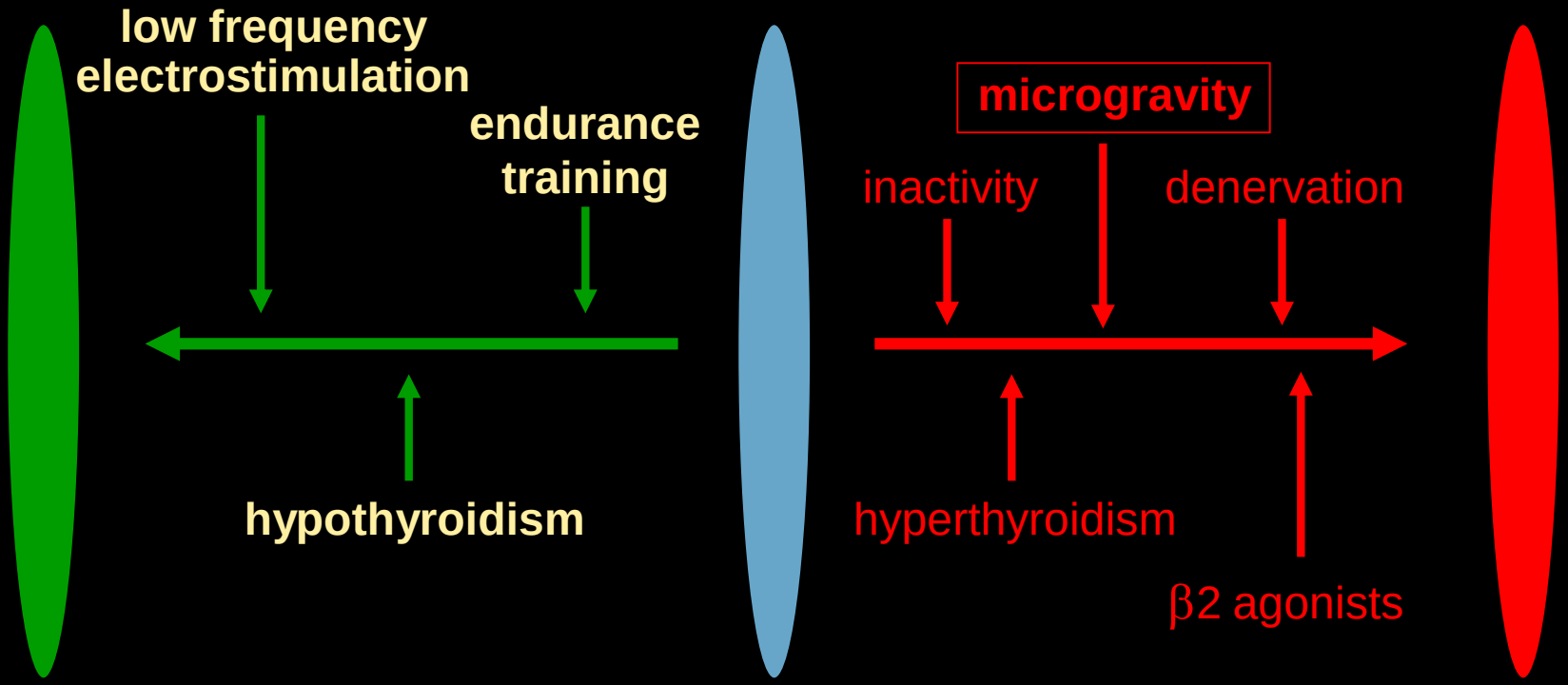


Figure 5 Summary of some conditions and factors able to induce skeletal muscle hypertrophy and atrophy. Overload: functional overload imposed by elimination of synergistic muscles; unload: muscle unloading induced by hindlimb suspension or in conditions of microgravity.

Factors controlling the fast/slow muscle phenotype



Slow-oxidative phenotype

Fast-glycolytic phenotype

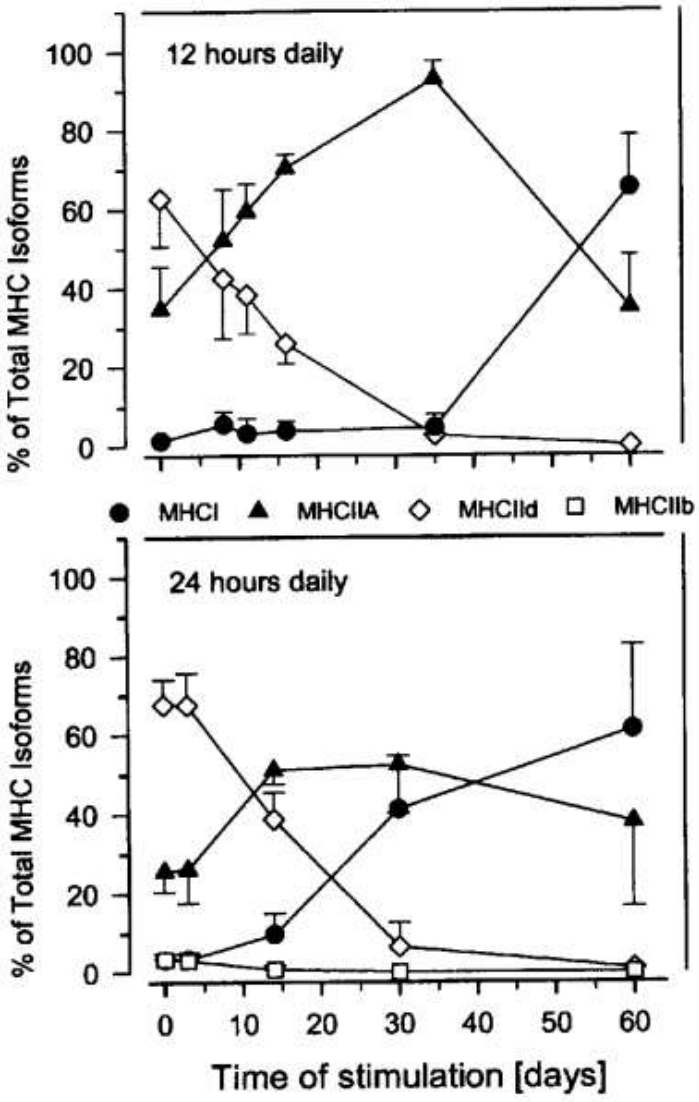
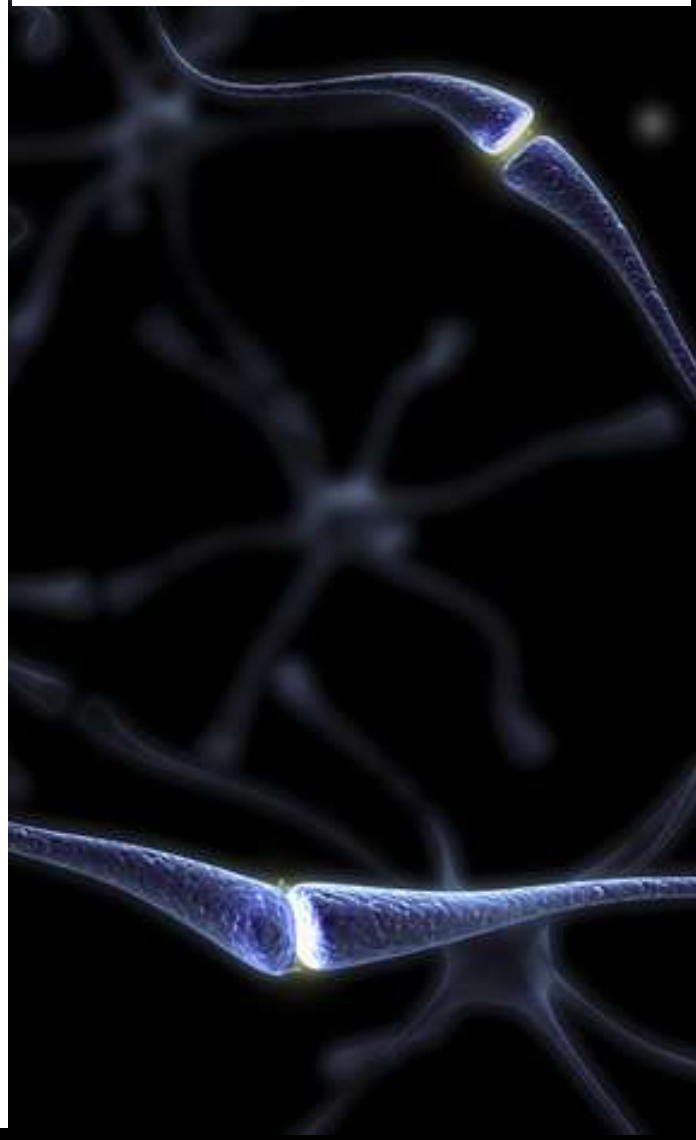
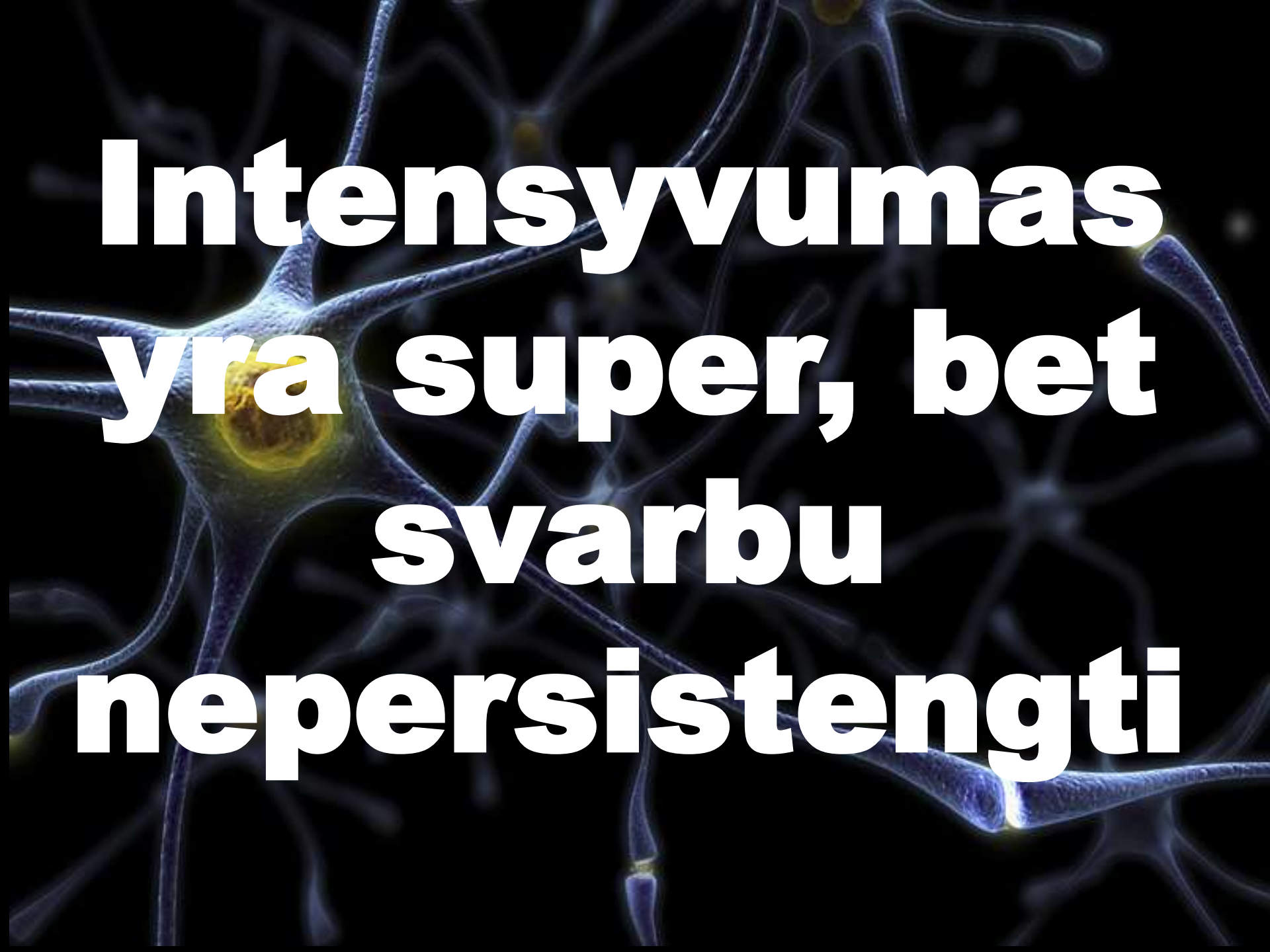


Figure 4. Time-dependent changes in relative concentrations of MHC isoforms in rabbit tibialis anterior muscle exposed to intermittent (12 hours per day) or continuous (24 hours per day) low-frequency (10 Hz) stimulation. Values are means ± SD. Modified from Peuker et al., 1999.

The Adaptive Potential of Skeletal Muscle Fibers

Dirk Pette




Intensyvumas
yra super, bet
svarbu
nepersistengti

Review

The training process: Planning for strength–power training in track and field. Part 1: Theoretical aspects

Brad H. DeWeese [a], Guy Hornsby [b], Meg Stone [a], Michael H. Stone [b,*]

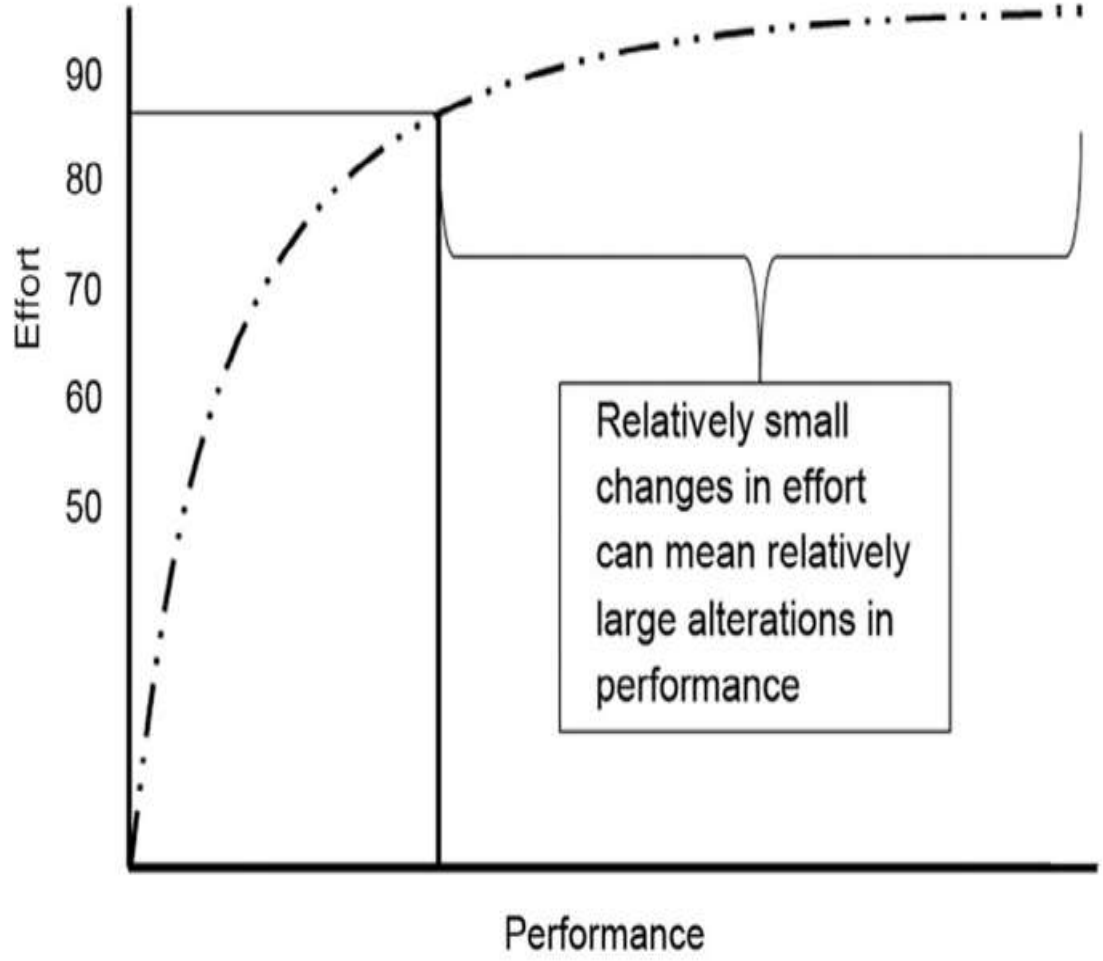


Fig. 2. Relationship between effort and performance. Based on Bannister.[69,70]

Training process

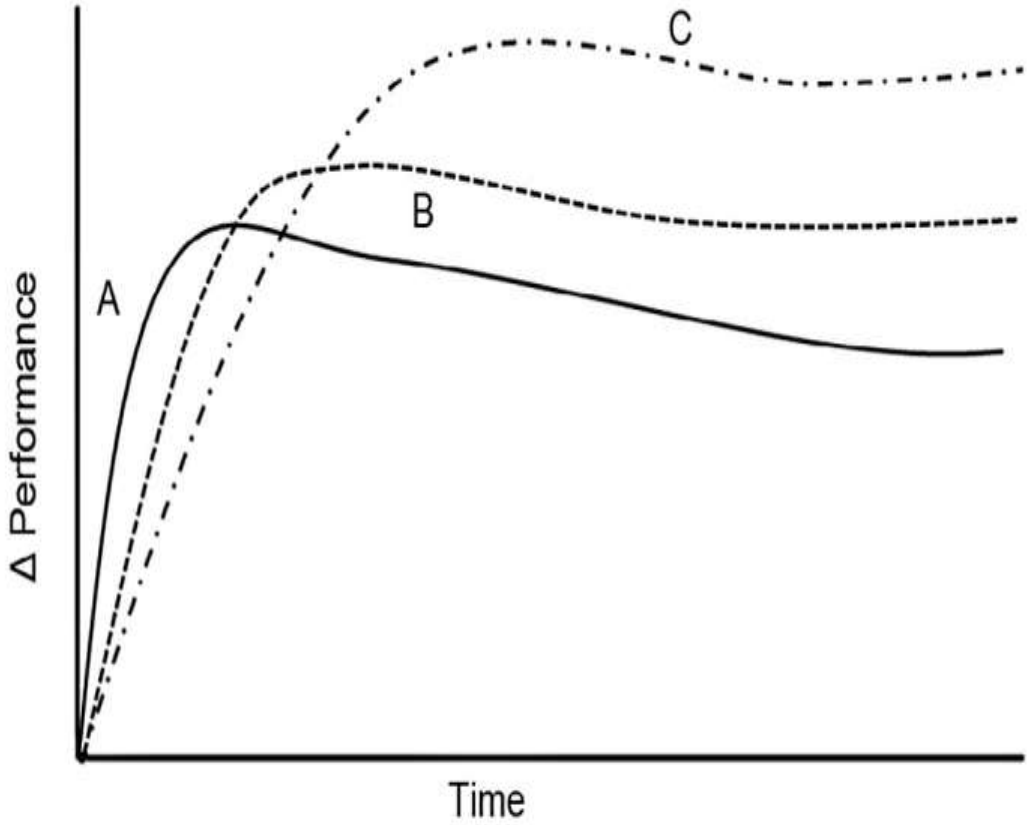


Fig. 1. Characteristics of different prolonged average intensities. A: Rate of gain is directly related to average intensity of training; B: final level of performance is inversely related to the average rate of gain; C: rate of gain is inversely related to the length of time (time period) that peak performance can be sustained. Thus for: 1. initial rate of gain A > B > C; 2. final level of performance C > B > A; 3. time period of maximum performance C > B > A.

Review

The training process: Planning for strength–power training in track and field. Part 1: Theoretical aspects

Brad H. DeWeese [a], Guy Hornsby [b], Meg Stone [a], Michael H. Stone [b,*]

Optimalaus poilsio pagrindinė taisyklė – skandinavų paradigma

Imuninės sistemos treniravimas- atletų sekmės garantas

Review

The compelling link between physical activity and the body's defense system

David C. Nieman [a,*], Laurel M. Wentz [b]

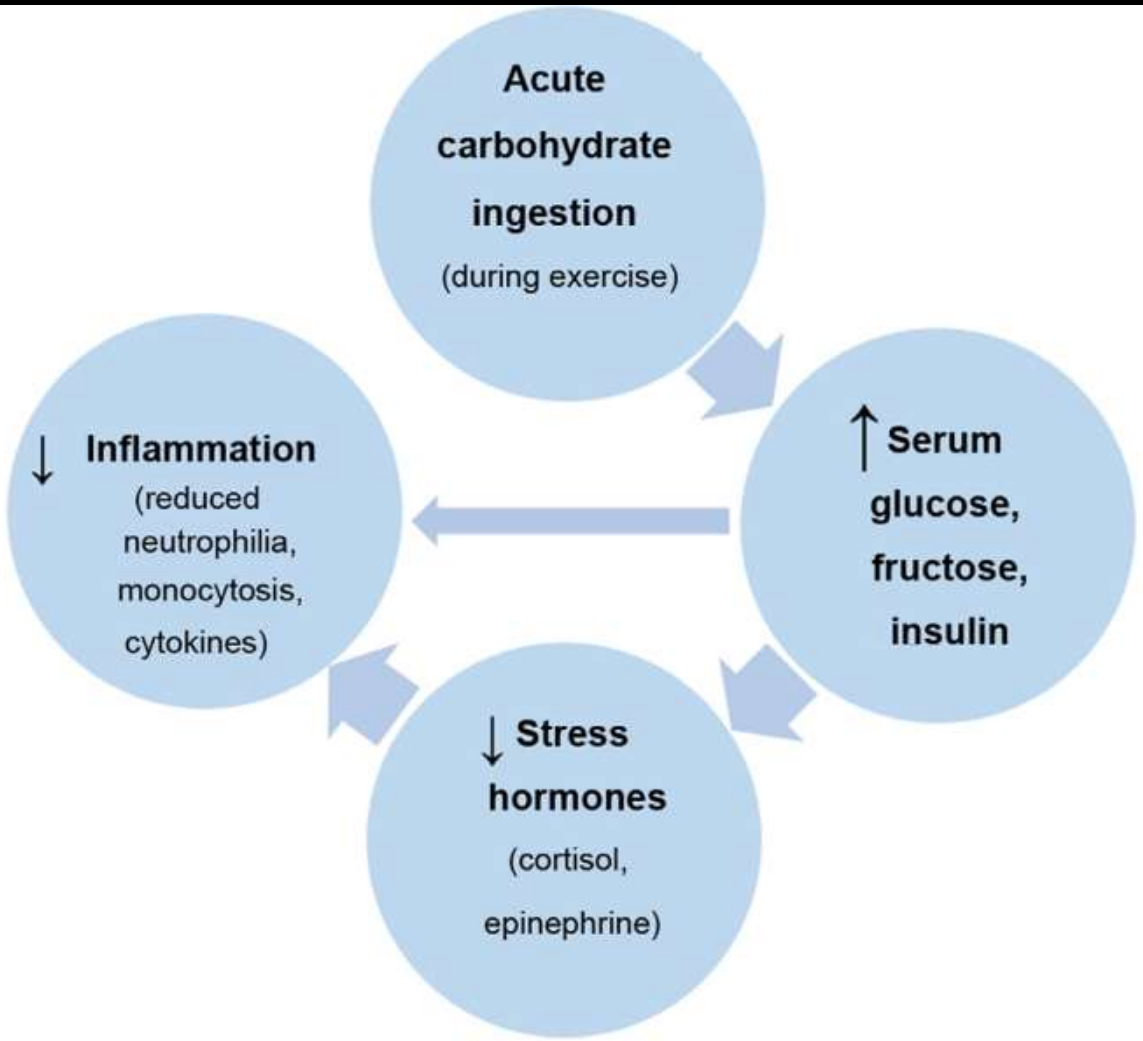


Fig. 8. Carbohydrate ingestion before and during exercise attenuates postexercise inflammation.

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]

Table 1. Summary of immunonutrition supplements, underlying rationale, and recommendations *.

Immunonutrition Supplement	Underlying Rationale	Recommendation Based on Current Evidence
Carbohydrate	Maintains blood glucose during exercise, lowers release of stress hormones; partially counters post-exercise inflammation and related immune changes.	Recommended: 30–70 g per hour of heavy exertion depending on exercise intensity and duration.
High fruit and vegetable intake, with extracts rich in polyphenols	Augment oxidative capacity, anti-viral defenses; gut-derived phenolics aid inherent defenses against long-term inflammation and oxidative stress, improve vascular health, and decrease risk of chronic disease.	Recommended, but the focus should be on long term benefits; extracts reserved for periods of heavy training and competition.
Bovine colostrums	Mix of immune, growth, and hormonal factors in fluid produced by the mammary glands for 24–72 h following calving improves immune function and lower illness risk.	Results are mixed; more data from well-designed studies needed.
Probiotics, prebiotics	Non-pathogenic bacteria in probiotics colonize the gut, improve intestinal microbial flora, and thereby enhance gut and systemic immune function, with a reduction in infection rates; prebiotics provide non-digestible food ingredients that promote the growth of beneficial microorganisms.	Results are mixed; more data from well-designed studies needed.
β-glucan	Receptors on intestinal wall immune cells interact with β-glucan improving innate immunity.	Results are mixed; more data needed comparing different sources.

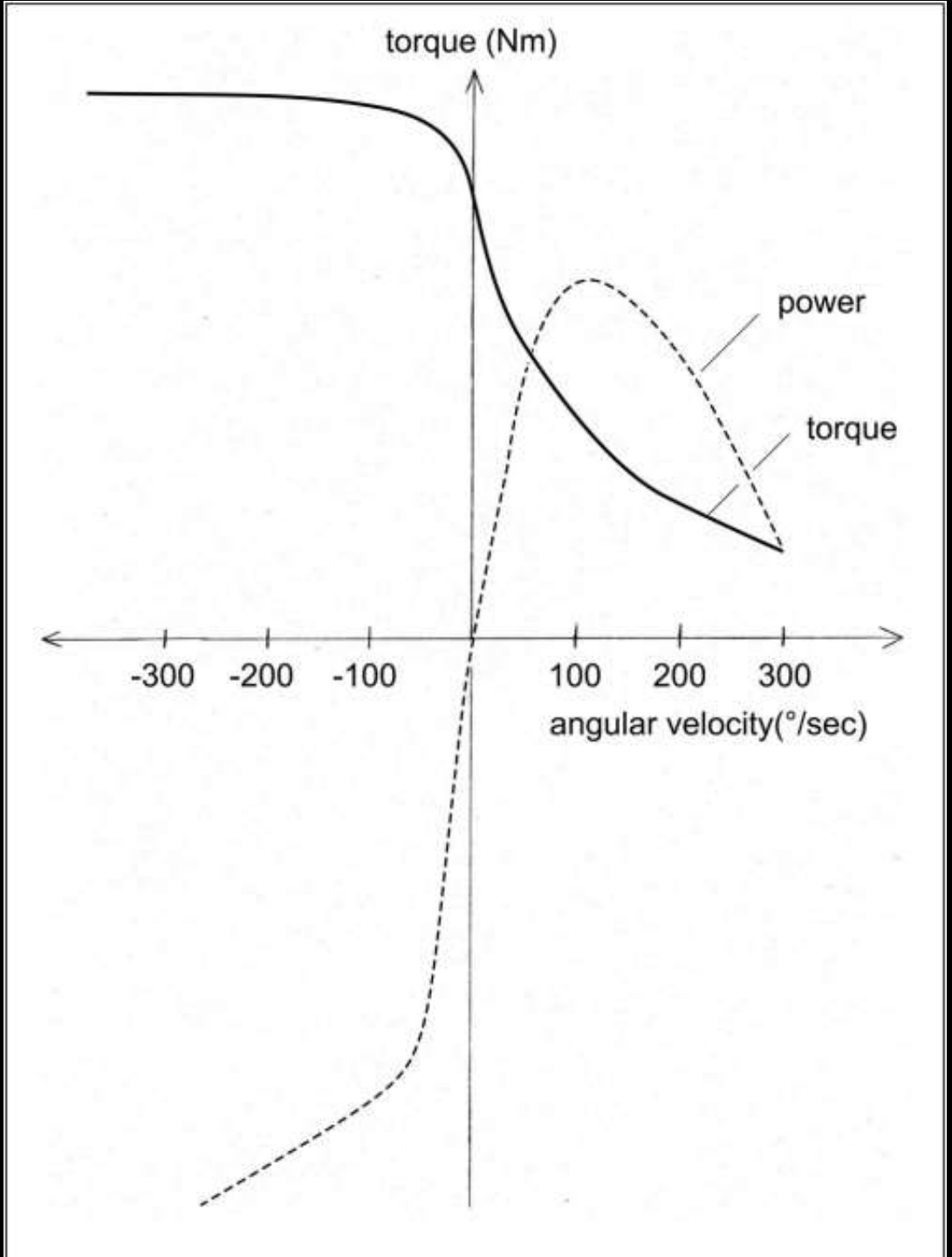
Potential Impact of Nutrition on Immune System Recovery from Heavy Exertion: A Metabolomics Perspective

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

Immunonutrition Supplement	Underlying Rationale	Recommendation Based on Current Evidence
n-3-PUFAs (fish oil) rich in EPA 20:5n3 and DHA 22:6n3	Exert anti-inflammatory and immune-regulatory effects post-exercise; incorporated into cell membranes, partly replacing arachidonic acid and decreasing omega-6-derived mediators.	Results are mixed; data needed with longer duration and improved selection of outcome biomarkers.
Vitamin D	Plays a key role in both innate and acquired immunity through gene expression modulation; athletes may have low vitamin D levels, especially during the winter months.	Results are mixed; data needed on what actually constitutes a deficiency and benefits for correcting low levels.
Glutamine	Important immune cell substrate that may be lowered with prolonged exercise.	Results are mixed; more data from well-designed studies needed.
Vitamin E	Quenches exercise-induced reactive oxygen species (ROS) and augments immunity.	Not recommended; may be pro-oxidative and pro-inflammatory at high doses.
Vitamin C	Quenches ROS and augments immunity.	Not recommended; not consistently different from placebo.
Multiple vitamins and minerals (zinc, magnesium, iron, selenium, manganese)	Work together to quench ROS and reduce inflammation; co-factors for immune responses.	Not recommended; not different from placebo; balanced diet typically sufficient, but may be beneficial if the diet is insufficient. Concerns over blocking ROS signaling for training adaptations.
Amino acids (especially leucine, isoleucine, valine)	Metabolism provides nitrogen for glutamine synthesis.	Not recommended; lack of quality data from controlled studies to recommend amino acid supplementation with exercise.
Herbal supplements (e.g., ginseng, Echinacea)	Contain bioactive molecules that augment immunity and counter infection.	Not recommended; humans studies do not show consistent support within an athletic context.

* Based on References [2,13,31–40]. "Results are mixed" indicates that results from available studies (in regards to the underlying rationale) are both supportive and non-supportive.

Greitis, jėga, režimas. Svarbiausiai SSC!



frontiers in Physiology

REVIEW

Moderate Load Eccentric Exercise; A Distinct Novel Training Modality

Hans Hoppeler*

Energetikos specifika

SCANDINAVIAN JOURNAL OF MEDICINE & SCIENCE IN SPORTS

Review

Training for intense exercise performance: high-intensity or high-volume training?

P. B. Laursen[1,2,3]

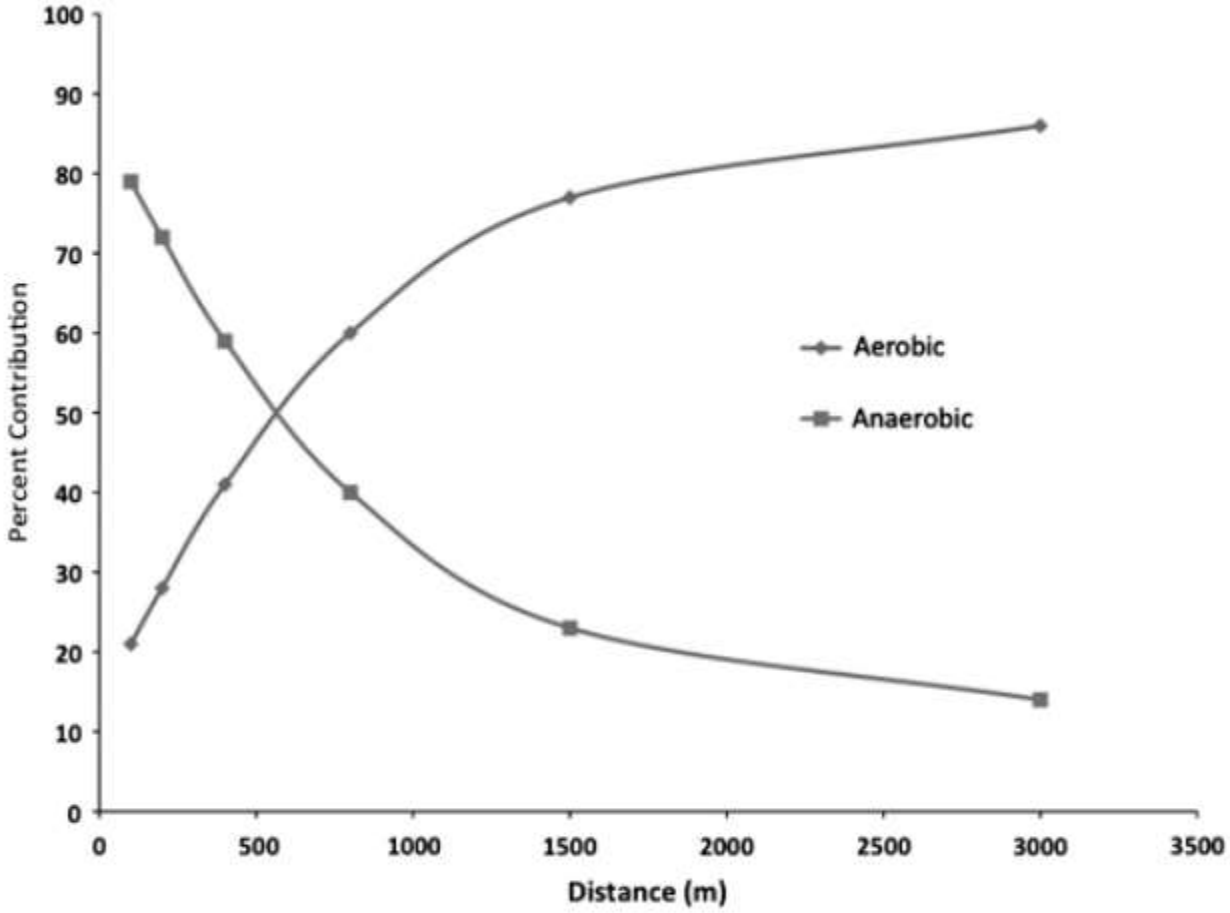


Fig. 1. Percent aerobic and anaerobic energy system contributions to near maximal running over distances ranging from 100 to 3000 m. Figure derived based on the male data obtained from the studies of Duffield et al. (2004, 2005a, b).

J Muscle Res Cell Motil (2017) 38:143–155
DOI 10.1007/s10974-017-9467-7

REVIEWS

Energy demand and supply in human skeletal muscle

C. J. Barclay[1]

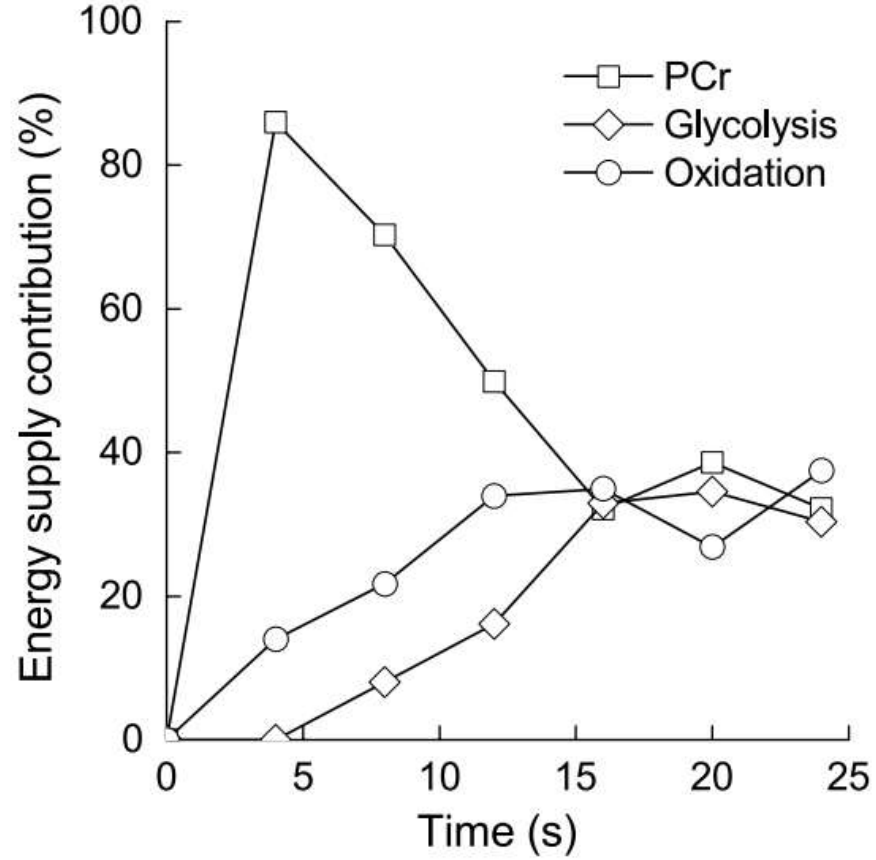


Fig. 5 Contributions to energy supply during 24 s maximal voluntary contraction of vastus lateralis muscle. Relative contributions of PCr, oxidative ATP supply and glycolytic ATP supply determined from magnetic resonance spectroscopy. Contributions are quantified

2013 National Strength and Conditioning Association

Analysis of Sprinting Activities of Professional Soccer Players

Marcin Andrzejewski,[1,2] Jan Chmura,[3] Beata Pluta,[1] Ryszard Strzelczyk,[4] and

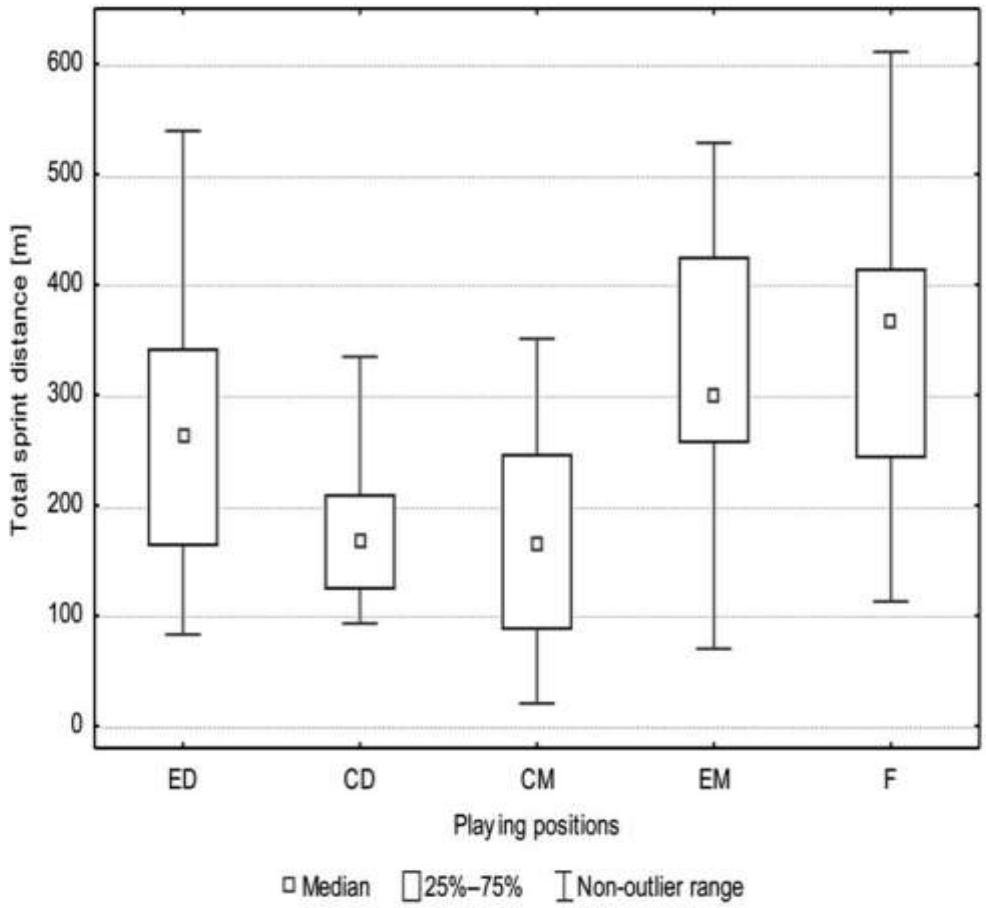


Figure 1. Total sprinting distance covered (in meters) by examined players ($n = 147$) in 5 positional groups: central defenders (CD, $n = 39$), external defenders (ED, $n = 35$), central midfield players (CM, $n = 35$), external midfield players (EM, $n = 20$), and forwards (F, $n = 18$). Differences between all positions: F = EM = ED > CD = CM ($p < 0.05$).

ewski,[1,2] Jan Chmura,[3] Beata Pluta,[1] Ryszard Strzelczyk,[4] and ak[2]

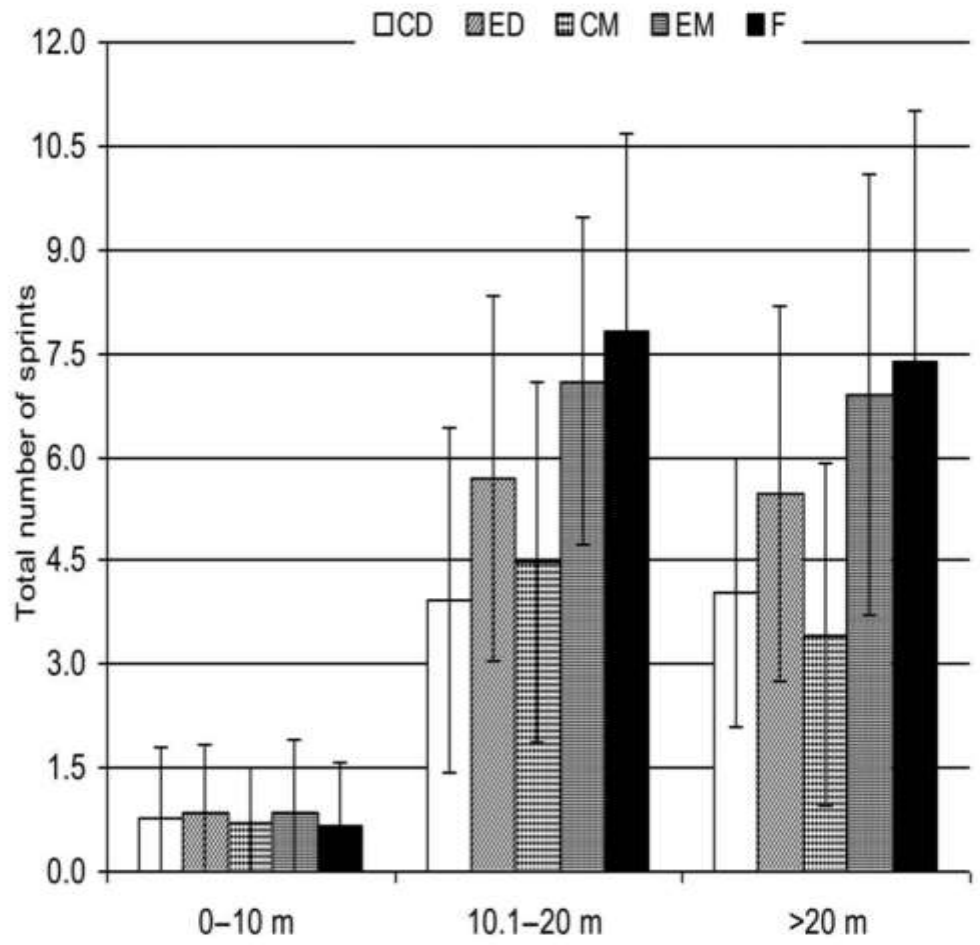


Figure 2. Total number of sprints in 3 sprint distance categories performed by examined players ($n = 147$) in their respective positions of play: central defenders (D, $n = 39$), external defenders (ED, $n = 35$), central midfield players (CM, $n = 35$), external midfield players (EM, $n = 20$), and forwards (F, $n = 18$). Differences between all positions in 3 distance categories: 0–10 m: ns ($p \geq 0.05$), 10.1–20.0 m: F = EM > CM = CD ($p < 0.05$), and >20 m: F = EM > CD = CM < ED ($p < 0.05$).

To cite this article: Filipe Manuel Clemente, Hugo Sarmento, Alireza Rabbani, Cornelis M. I. (Niels) Van Der Linden, Mehdi Kargarfard & Israel Teoldo Costa (2019) Variations of external load variables between medium- and large-sided soccer games in professional players, Research in Sports Medicine, 27:1, 50-59, DOI: 10.1080/15438627.2018.1511560

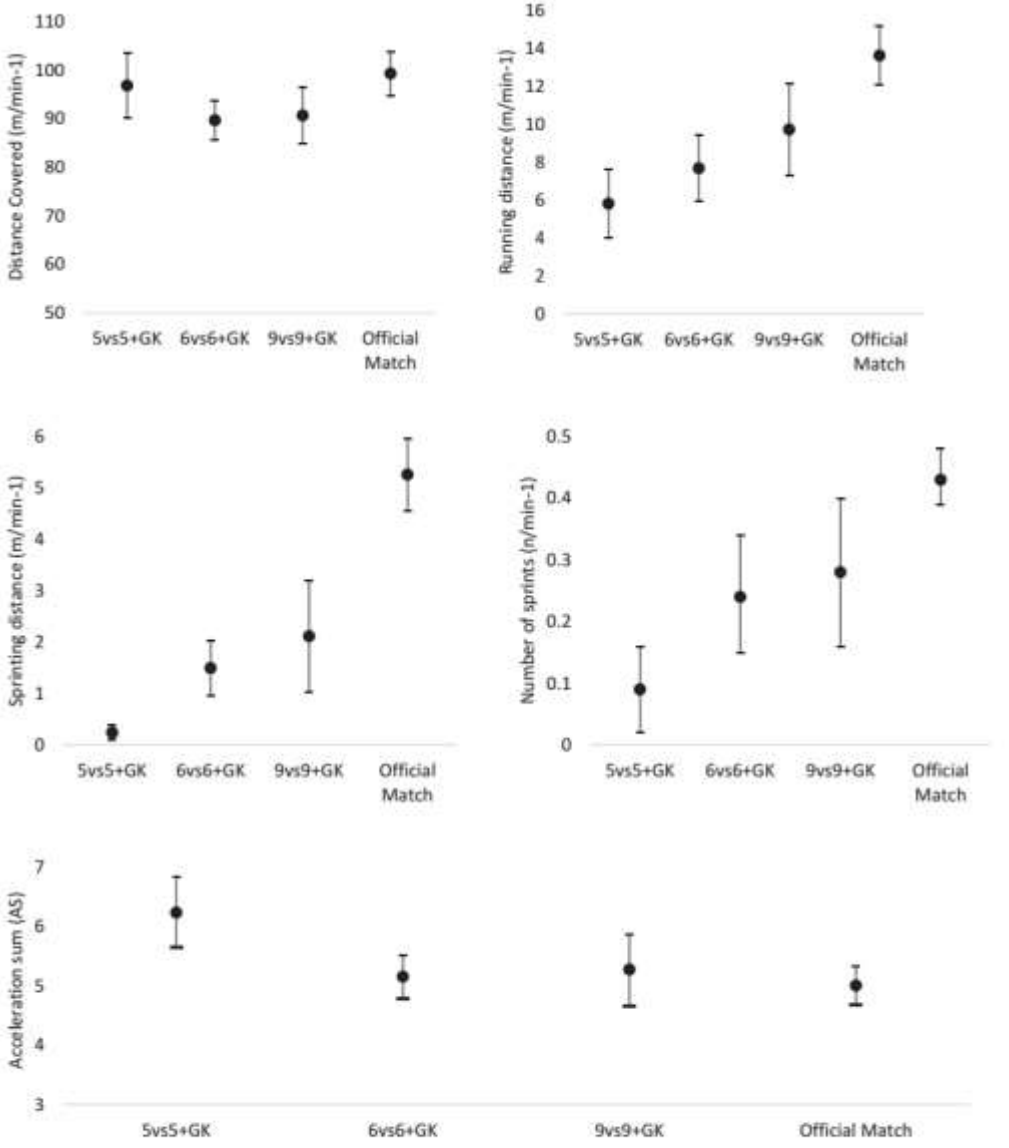
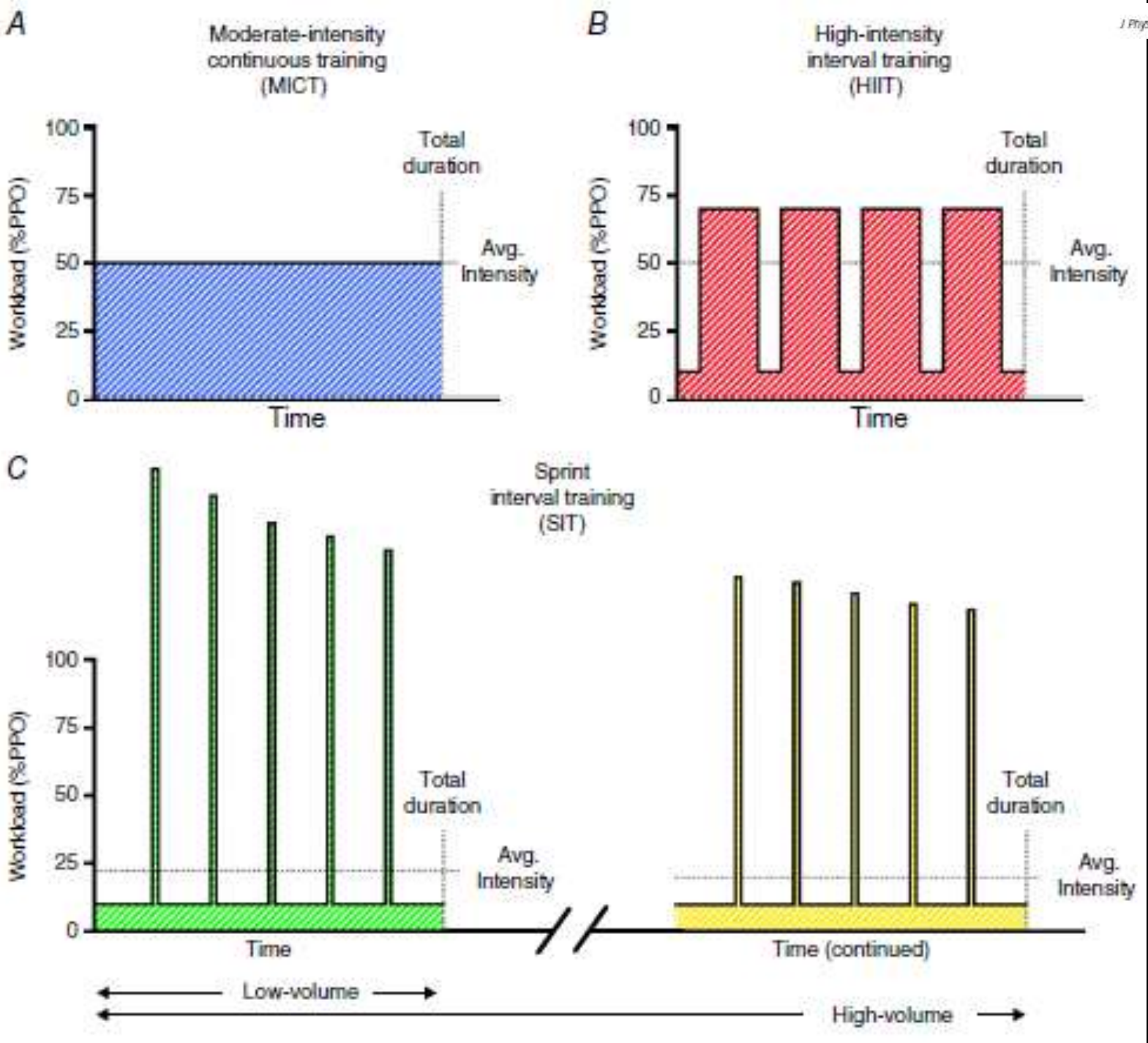


Figure 1. Mean ± 90% confidence intervals of distance covered, running distance, sprinting distance, number of sprints and acceleration sum intensity in the sided games and official matches.

Per varžybas po 5 m sprinto per 1 min. Per rungtynes po 45 sprintus. Treniruotėse to trūksta.

MDS treniravimo neišnaudotas rezervas:

IIX RS mitochondrijų treniravimas!


A
Moderate-intensity continuous training (MICT)
Workload (%PPO)
100
75
50
25
0
Total duration
Avg. Intensity
Time
B
High-intensity interval training (HIIT)
Workload (%PPO)
100
75
50
25
0
Total duration
Avg. Intensity
Time
C
Sprint interval training (SIT)
Workload (%PPO)
100
75
50
25
0
Total duration
Avg. Intensity
Time
Total duration
Avg. Intensity
Time (continued)
Low-volume
High-volume

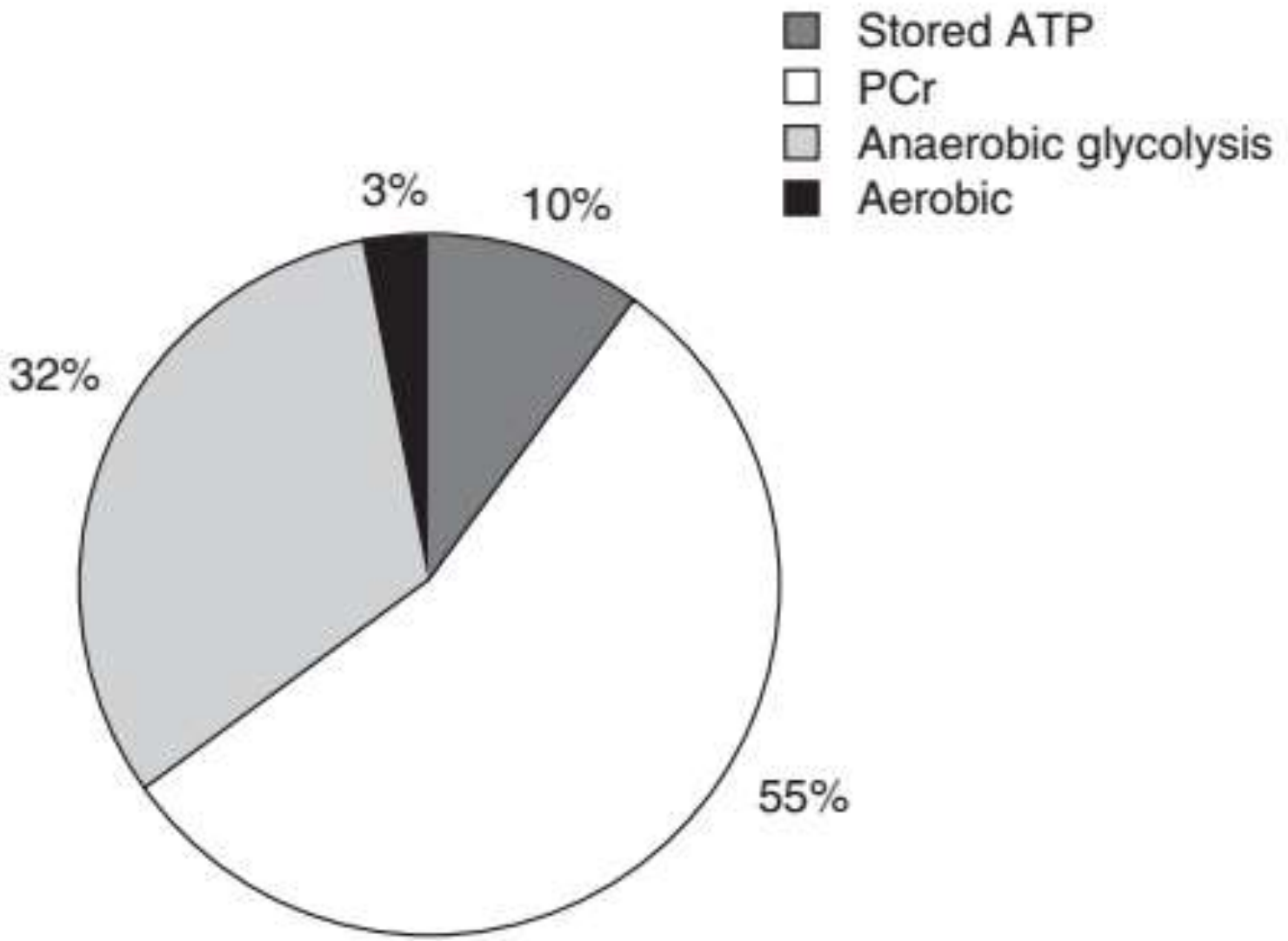
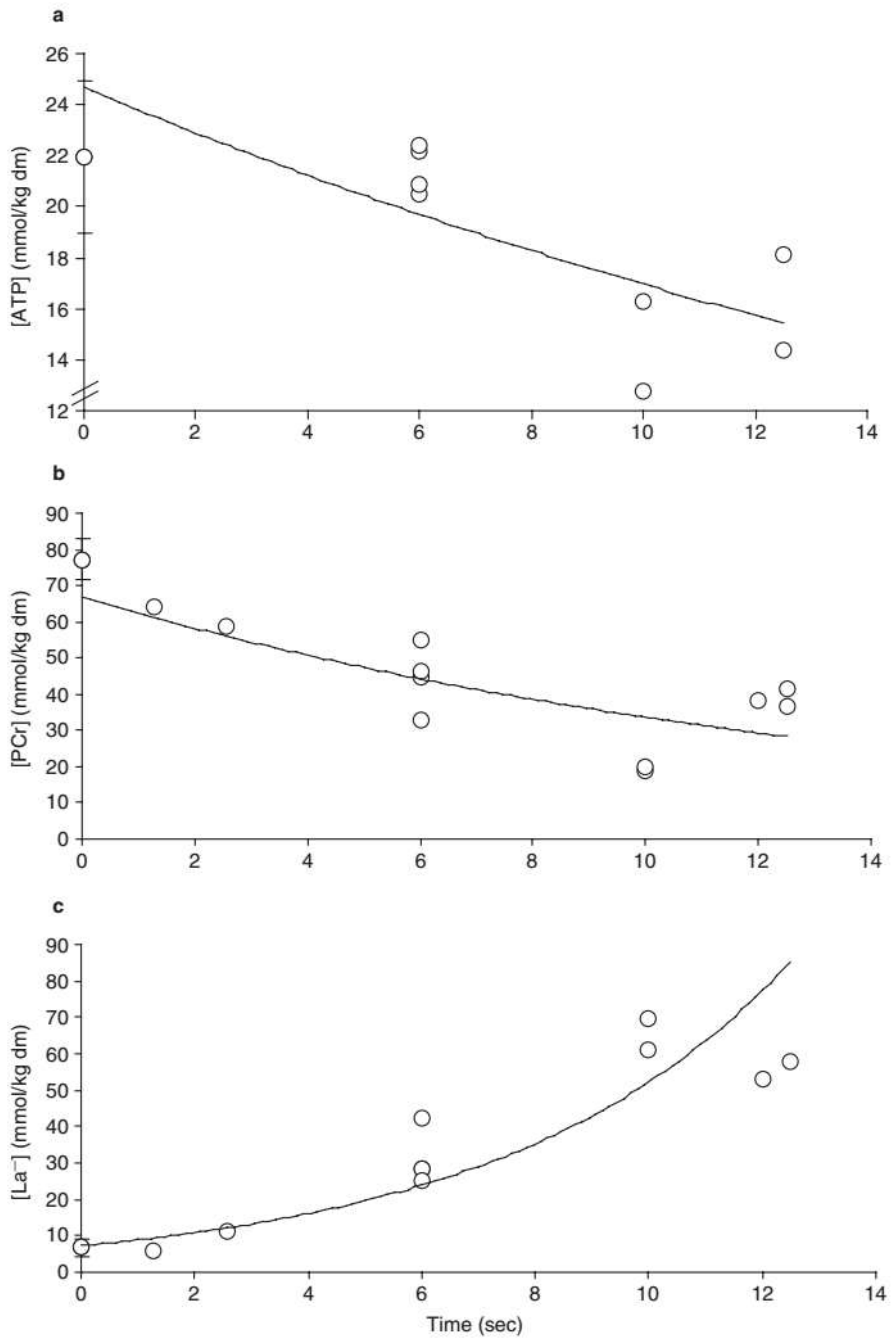


Fig. 2. Estimated energy system contribution of a 3-second sprint.[24,29,30,33,34] **ATP** = adenosine triphosphate; **PCr** = phosphocreatine.



g. 3. Relative (**a**) adenosine triphosphate (ATP); (**b**) phosphocreatine (PCr); and (**c**) muscle lactate (La^-) concentrations during maximal int exercise.[24,29-33,35,38,39] Resting values have been averaged (±SD) from the aforementioned references. **dm** = dry muscle.

REVIEW ARTICLE

Physiological and Metabolic Responses of Repeated-Sprint Activities

Specific to Field-Based Team Sports

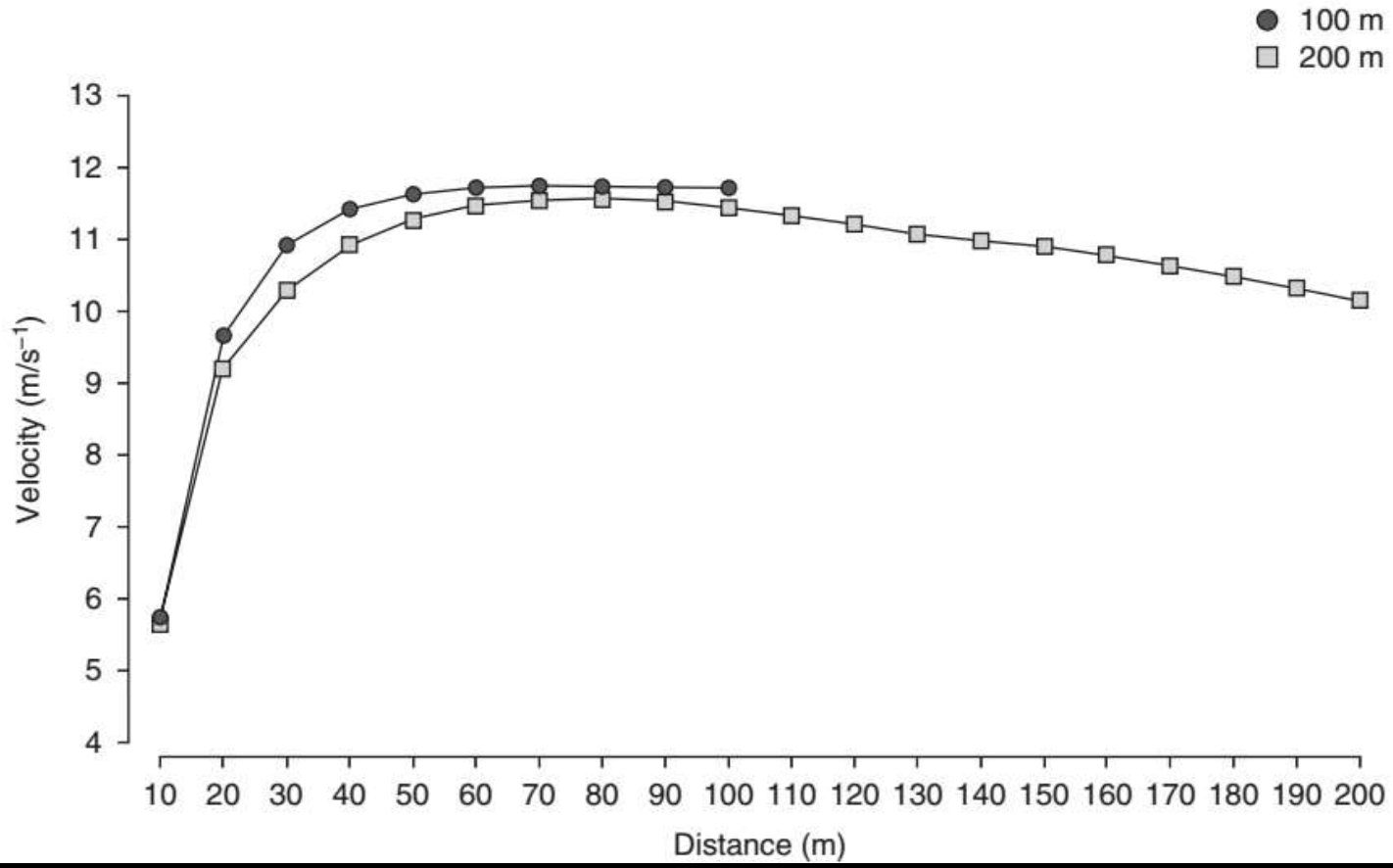
Matt Spencer,[1,2] David Bishop,[1] Brian Dawson[1] and Carmel Goodman[1]

REVIEW ARTICLE

Repeated-Sprint Ability – Part I

Factors Contributing to Fatigue

Olivier Girard,[1] Alberto Mendez-Villanueva[2] and David Bishop[3]



Repeated-Sprint Ability – Part I

Factors Contributing to Fatigue

Olivier Girard,[1] Alberto Mendez-Villanueva[2] and David Bishop[3]

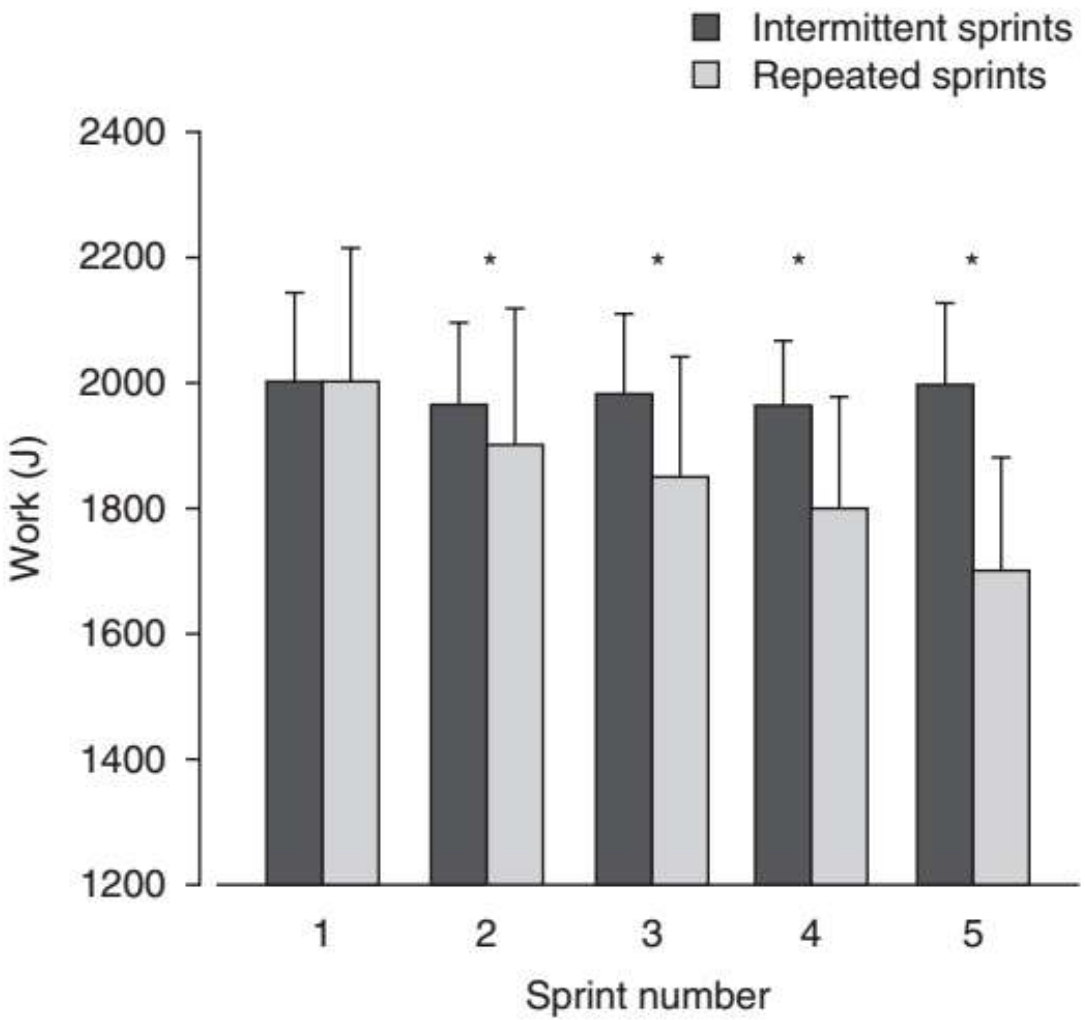


Fig. 2. Graph showing the effects of rest duration on maximal 4 sec, cycle sprint performance. Intermittent sprints were performed every 2 min,[19] whereas repeated sprints were executed every 30 sec.[20]
* Significantly different from sprint 1 in the repeated-sprint condition.

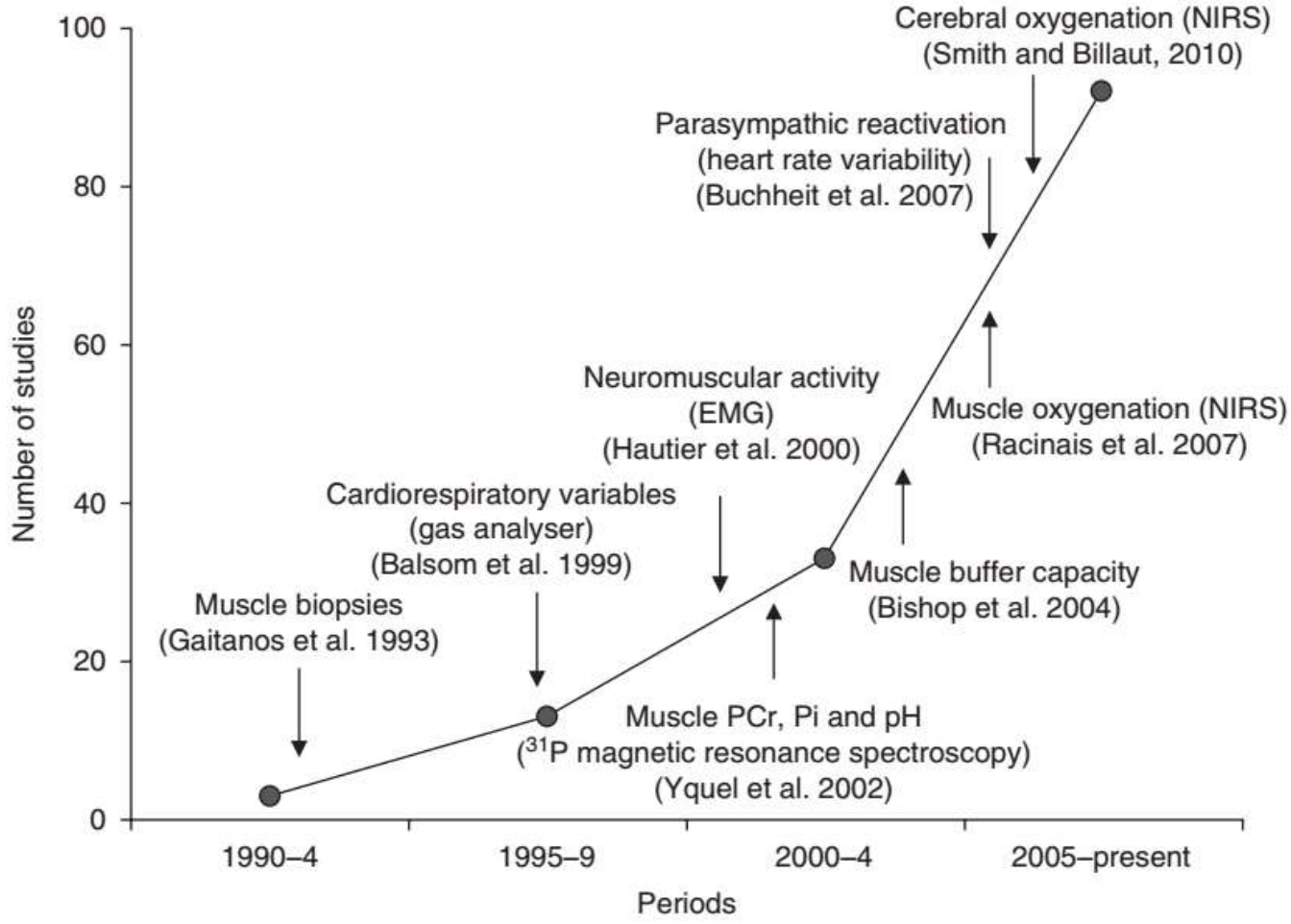


Fig. 3. Published research on the possible physiological mechanisms responsible for fatigue during repeated-sprint exercise (Gaitanos et al.,[22] Balsom et al.,[23] Hautier et al.,[24] Yquel et al.,[25] Bishop et al.,[26] Racinais et al.,[27] Buchheit et al.[28] and Smith and Billaut[29]). Time-points when new analysis methods were introduced into the investigation of repeated-sprint ability are also shown. **EMG** = electromyogram; **NIRS** = near-infrared spectroscopy; **PCr** = phosphocreatine; **Pi** = inorganic phosphate.

Repeated-Sprint Ability – Part I
Factors Contributing to Fatigue

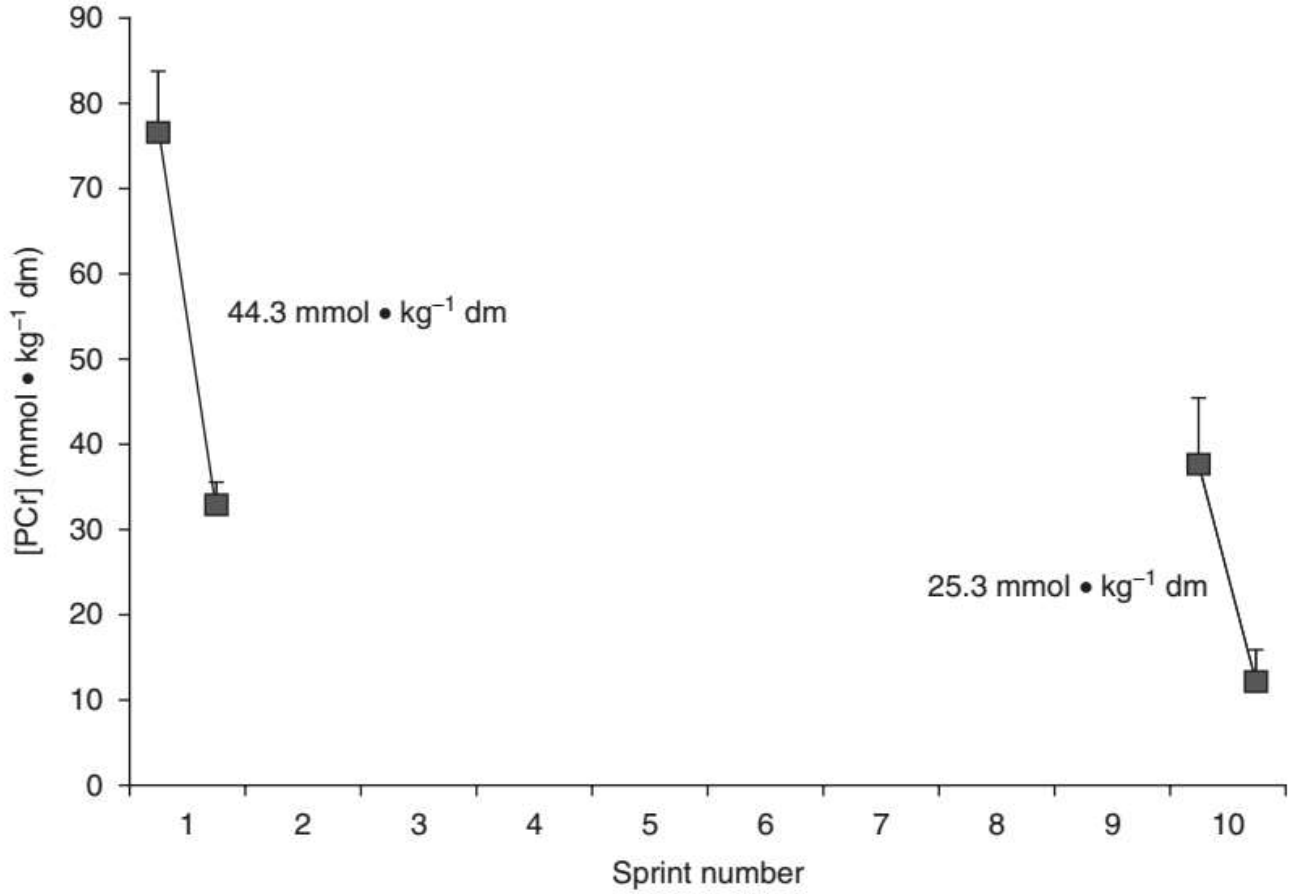
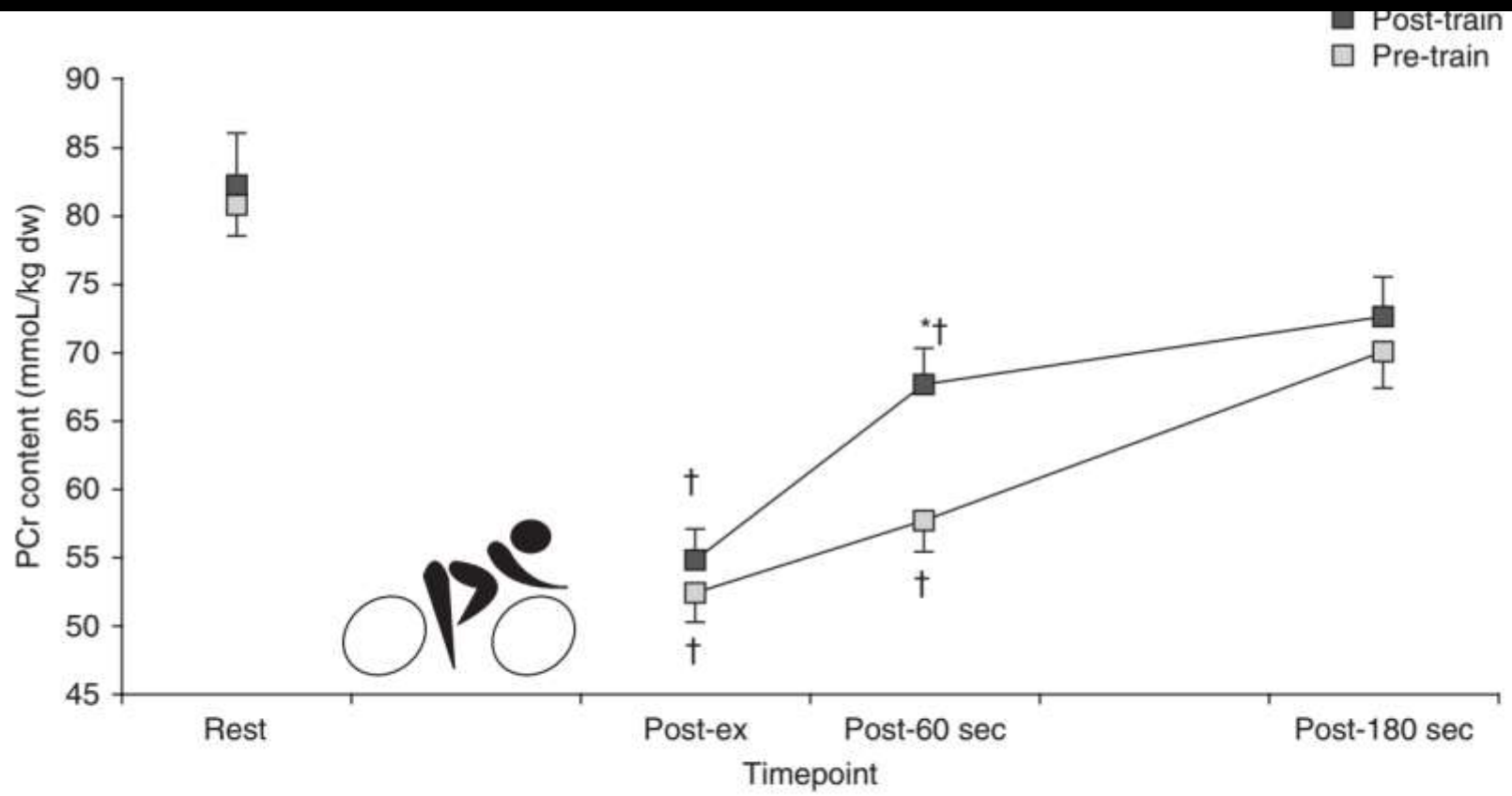


Fig. 6. Changes in phosphocreatine concentration ([PCr]) utilization before and after the first and last sprint of a 10 × 6 sec repeated-sprint test (with 30 sec of recovery between sprints) on a cycle ergometer (modified from Gaitanos et al.[22]). **dm** = dry muscle.



. Changes in resting and post-exercise phosphocreatine (PCr) content following high-intensity interval training ([25] and Bishop D. et al. lished research). **dw** = dry weight; * indicates significantly different from pre train; † indicates significantly different from rest.

Table II. A summary of the characteristics and results of training studies that have investigated changes in cycle repeated-sprint ability (RSA) following different types of training performed on a cycle ergometer

Study (y)	Subjects		Training programme	Adaptations			
	type	$\dot{V}O_{2max}$ (mL/kg/min)[a]		sprint 1 (%) [W]	total work (%) [kJ]	DS (%)	$\dot{V}O_{2max}$ (%)
Edge et al.[10] (2005)	10, MA, F	42.4 ± 6.3	6–10 × (2 min at 120–140% LT: 1 min rest); 3 d/wk, 5 wk	↑ 6.2*	↑ 13.0*,†	↑ 10 NS	↑ 13.2*
				↑ 6.9*	↑ 8.5*	↓ 16 NS	↑ 10.4*
	10, MA, F	41.3 ± 7.3	20–30 min at 80–95% LT; 3 d/wk, 5 wk				
Bishop and Edge[104] (2005)	11, MA, F	39.0 ± 6.4	3–12 × (2 min at 130–180% LT: 1 min rest); 3 d/wk + RSA test (5 × 6 sec sprint every 30 sec); 1 d/wk, 8 wk	↑ 21.2*	↑ 28.3*	↓ 14 NS	↑ 14.6*
Glaister et al.[11] (2007)	12, MA, M, TS	46.6 ± 4.2	20 min at 70% $\dot{V}O_{2max}$; 3 d/wk, 6 wk	↑ 4.0*	↑ 9.4*	↑ 46*	↑ 9.9*
	9, MA, M, TS	52.1 ± 3.6	Control (normal recreational activities)	–	↑ 1.4 NS	↑ 10 NS	–
Ortenblad et al.[105] (2000)	9, MA, M	61.3 ± 1.7	20 × (10 sec sprint: 50 sec rest); 3 d/wk, 5 wk	↑ 6.6*	↑ 12*	↑ 27*	–
				–	↑ 1.0 NS	–	–
	6, MA, M	64.0 ± 0.5	Control (normal recreational activities)				

a Data presented as mean ± SD.

DS = decrement score (or fatigue index); **F** = females; **LT** = lactate threshold (as determined using the modified Dmax method[106]); **M** = males; **MA** = moderate aerobic fitness; **NR** = not reported; **NS** = not significant; **TS** = team-sport athletes; **$\dot{V}O_{2max}$** = maximal oxygen consumption; * indicates significant difference between pre and post ($p < 0.05$); † indicates significantly greater improvement than the alternate training group; ↑ indicates improved; ↓ indicates worsened; – indicates no change.

Review Article

Repeated-Sprint Ability – Part II

Recommendations for Training

David Bishop[1] Olivier Girard[2] and Alberto Mendez-Villanueva[3]

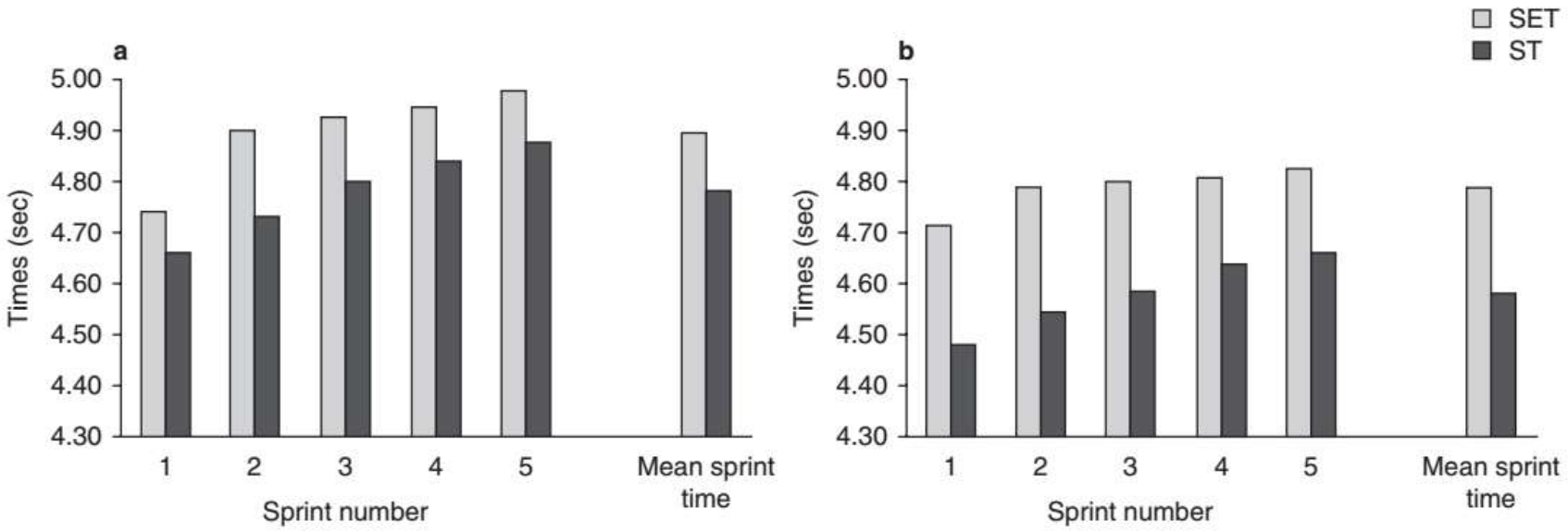


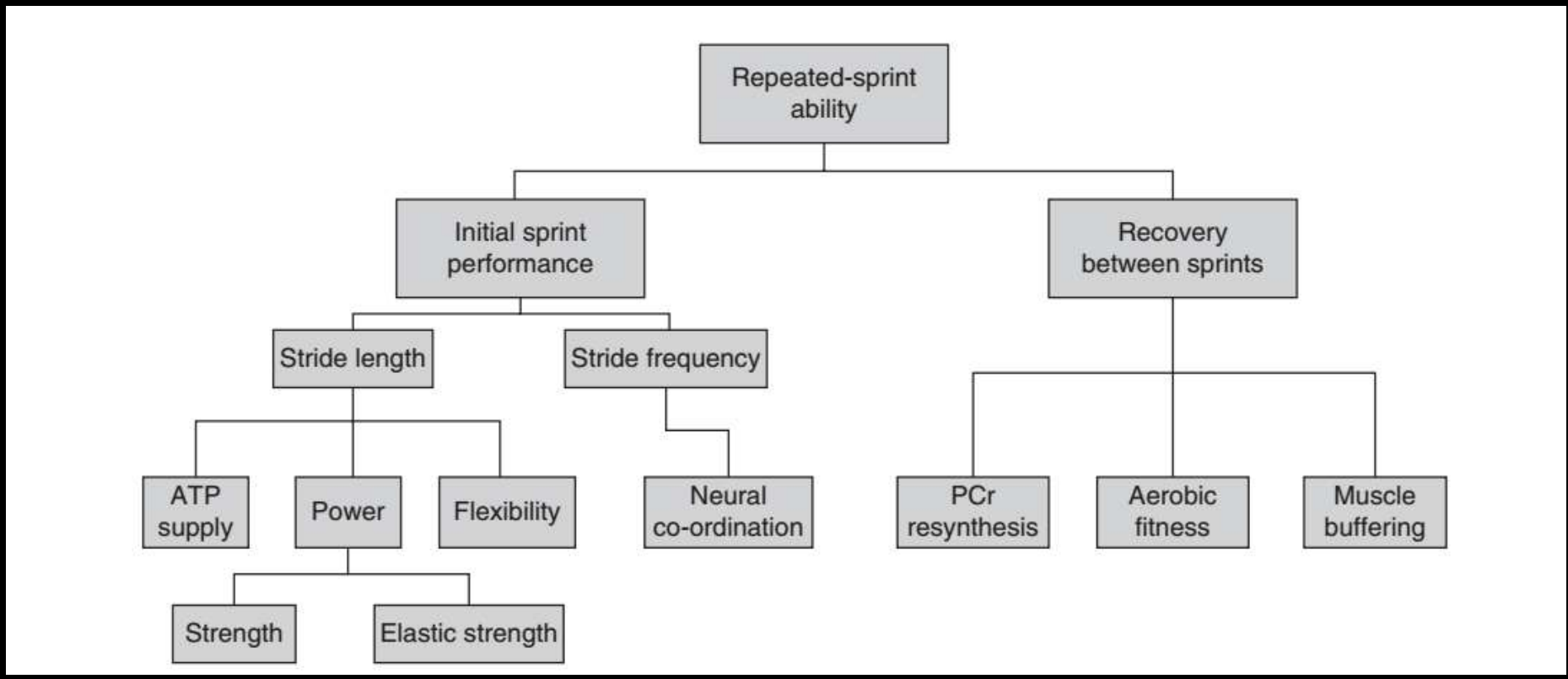
Fig. 3. (**a**) Pre-training and (**b**) post-training individual and mean sprint times derived from a repeated-sprint test consisting of five 30 m sprints, separated by 25 sec periods of active recovery during which the subjects jogged back to the starting line. ST performed intermittent-sprint training, while SET performed 'speed-endurance' training (a type of interval training). [See table II for more details of the training performed]. Post-training there was a significant decrease in initial sprint time for ST only, but a significant decrease in mean sprint time for both groups.[12]

Review Article

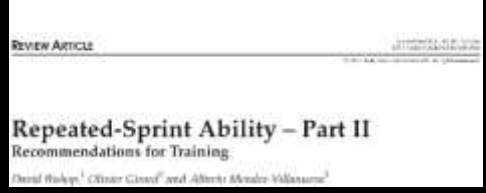
Repeated-Sprint Ability – Part II

Recommendations for Training

David Bishop,[1] Olivier Girard[2] and Alberto Mendez-Villanueva[3]



1. It is important to include some training to improve single-sprint performance. This should include (i) specific sprint training; (ii) strength/power training; and (iii) occasional high-intensity (>$\dot{V}O_{2max}$) training (e.g. repeated, 30-second, all-out efforts separated by ~10 minutes of recovery) to increase the anaerobic capacity.


REVIEW ARTICLE

Repeated-Sprint Ability – Part II
Recommendations for Training

David Bishop[1] Olivier Girard[2] and Alberto Mendez-Villanueva[3]

2. It is also important to include some interval training to best improve the ability to recover between sprints (if the goal is to improve fatigue resistance). High-intensity (80–90% $\dot{V}O_{2max}$) interval training, interspersed with rest periods (e.g. 1 minute) that are shorter than the work periods (e.g. 2 minutes) is efficient at improving the ability to recover between sprints by increasing aerobic fitness ($\dot{V}O_{2max}$ and the lactate threshold), the rate of phosphocreatine resynthesis and $\beta m_{in\ vitro}$.

Aukštikalnės
labai daug
prideda, jei tik
žinai kaip!

Sports Medicine
https://doi.org/10.1007/s40279-019-01165-y

REVIEW ARTICLE

Contemporary Periodization of Altitude Training for Elite Endurance Athletes: A Narrative Review

Iñigo Mujika[1,2] · Avish P. Sharma[3,4] · Trent Stellingwerff[5,6]

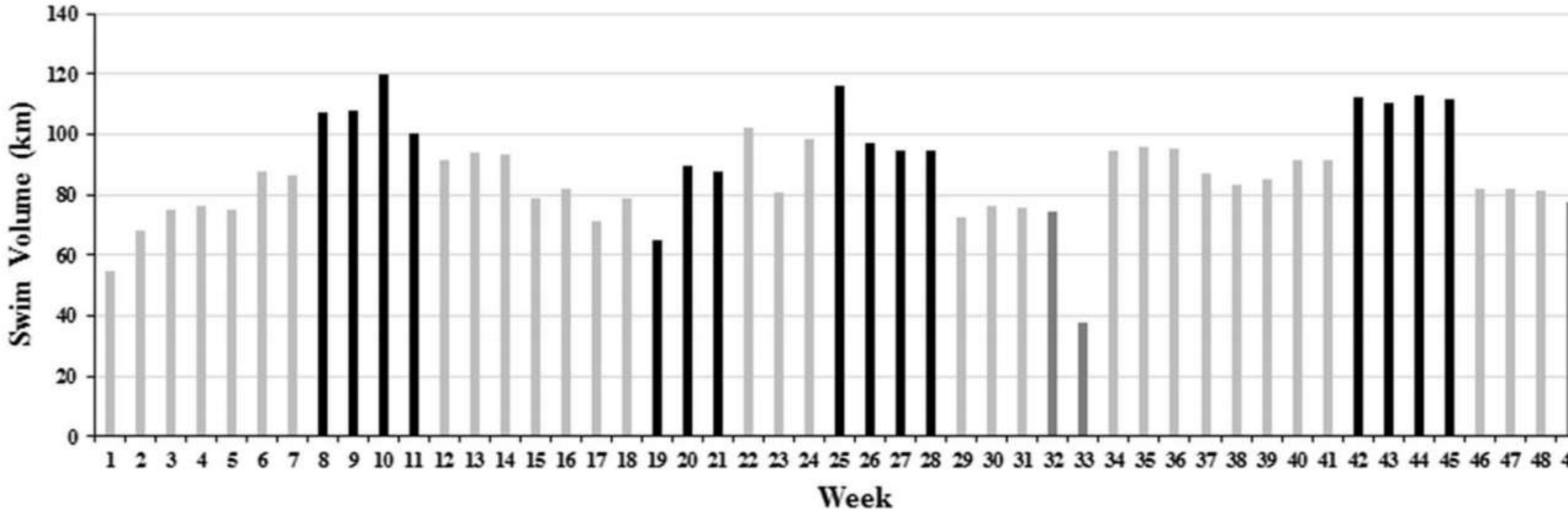


Fig. 1 Swim training volume of an Olympic and World Champion female swimmer during an entire season leading to the London 2012 Olympic Games. Light-grey bars are training weeks at sea level; black bars are training weeks at altitude (2320 m, except for weeks 19–21 at 1360 m); dark-grey bars correspond to the most important competitions of the season (Olympic qualification champion weeks 32–33; Olympic Games, weeks 49–50). Most weeks spe altitude were characterized by very high swimming volumes 9 weeks exceeding 100 km/week), and the highest weekly volum the season were repeatedly performed at an altitude of 2320 m

Maratoninkai:
krūvių ir
mitybos
planavimas

INTERNATIONAL JOURNAL OF SPORT NUTRITION AND EXERCISE METABOLISM

Case Study: Nutrition and Training Periodization in Three Elite Marathon Runners

Trent Stellingwerff

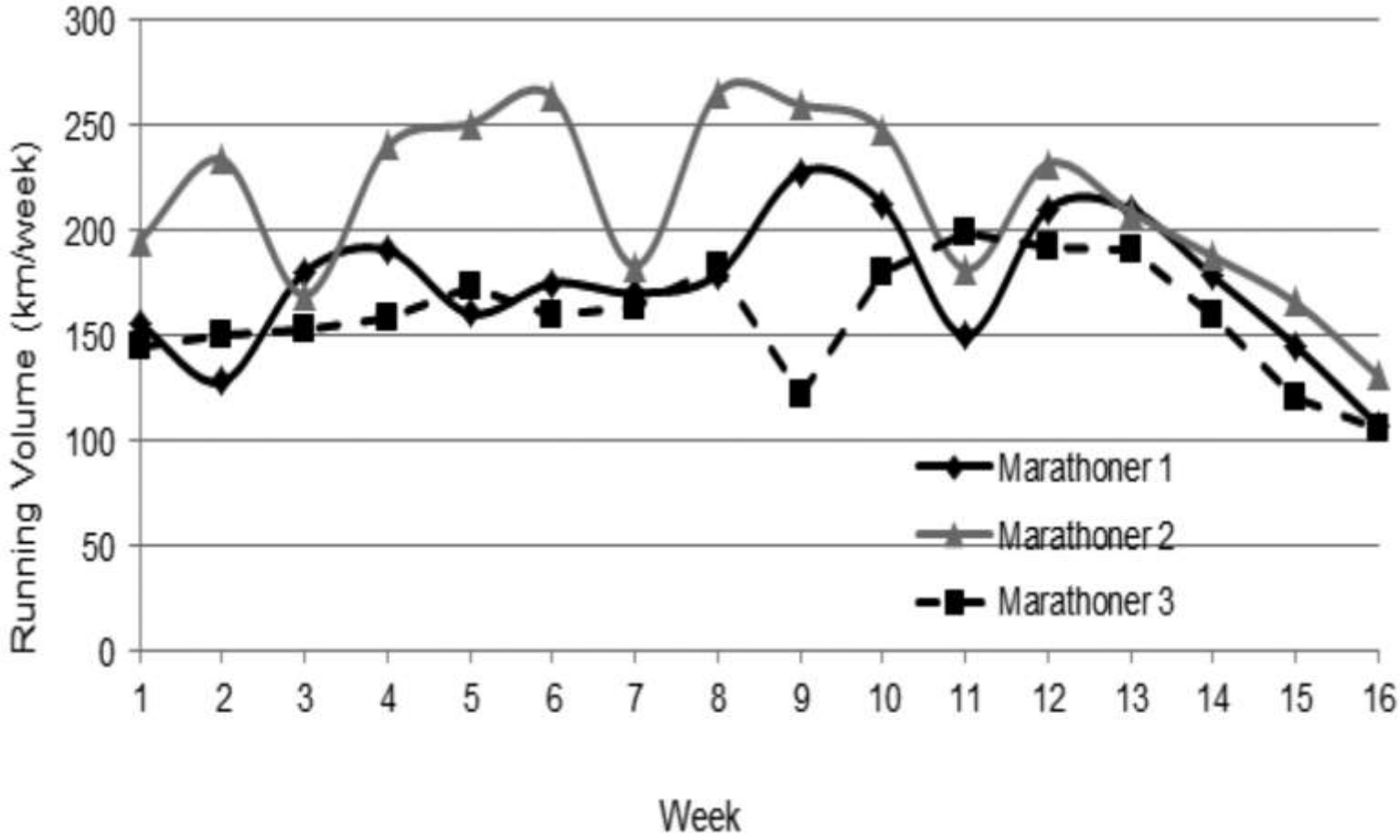


Figure 1 — Comparison of weekly training volume over 16 weeks until the target marathon (race included).

SPORT NUTRITION and EXERCISE METABOLISM

Case Study: Nutrition and Training Periodization in Three Elite Marathon Runners

Trent Stellingwerff

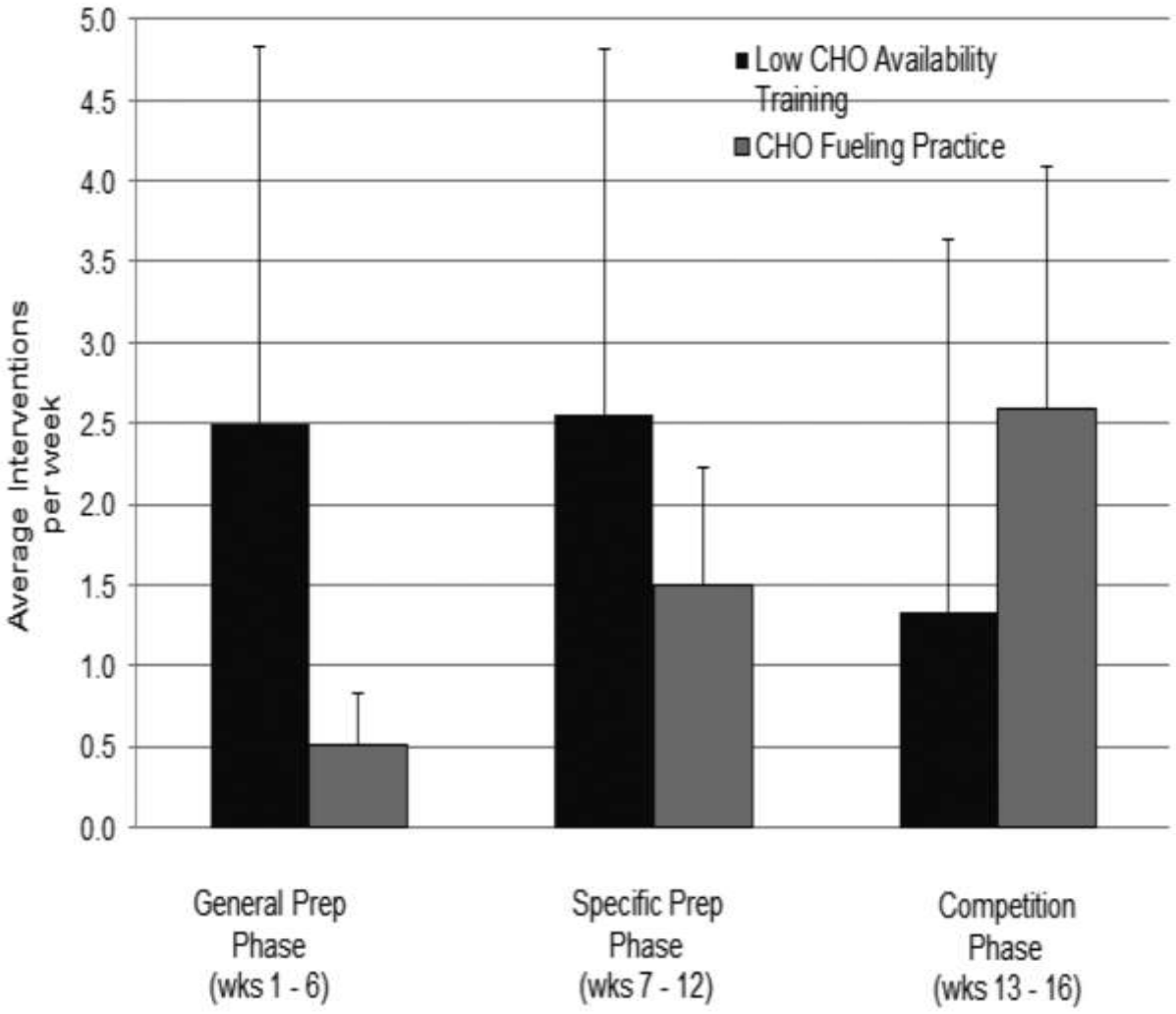


Figure 4 — Frequency of nutrition approaches throughout the 16-week marathon preparation. CHO = carbohydrate.

Čempionų smegenys

Kas labiau „perdega”?

Open Access Review

BMJ Open Sport & Exercise Medicine

The anticipatory stress response to sport competition; a systematic review with meta-analysis of cortisol reactivity

Kjell N van Paridon,[1] Matthew A Timmis,[1] Charlotte M Nevison,[2] Matt Bristow[3]

BMJ Open Sport Exerc Med 2017

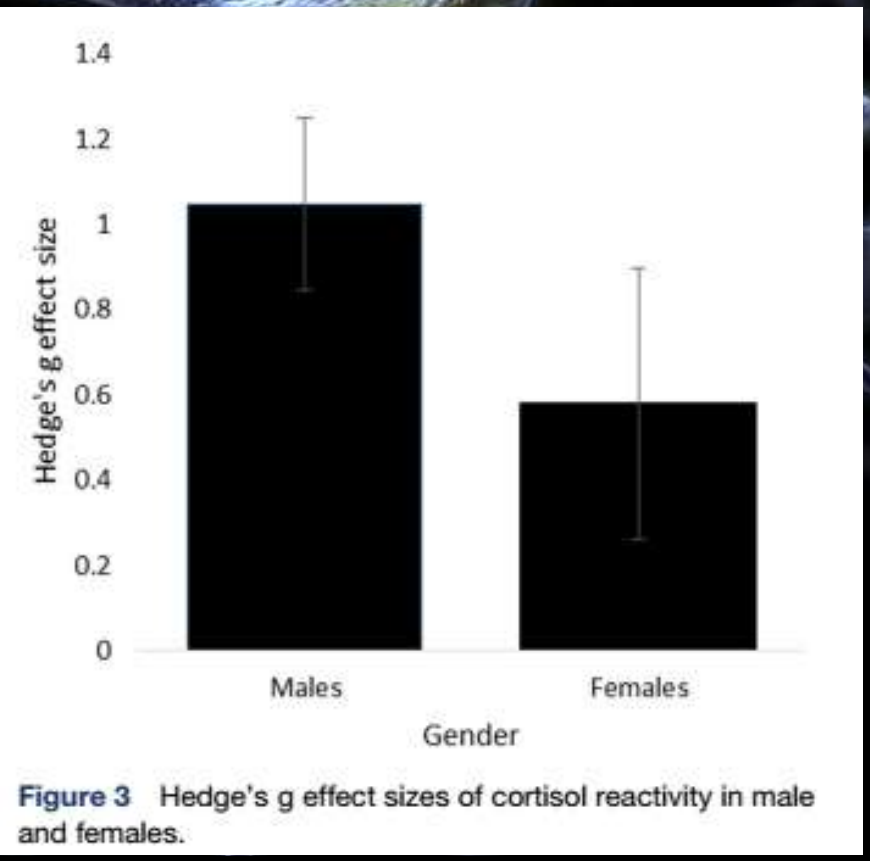


Figure 3 Hedge's g effect sizes of cortisol reactivity in male and females.

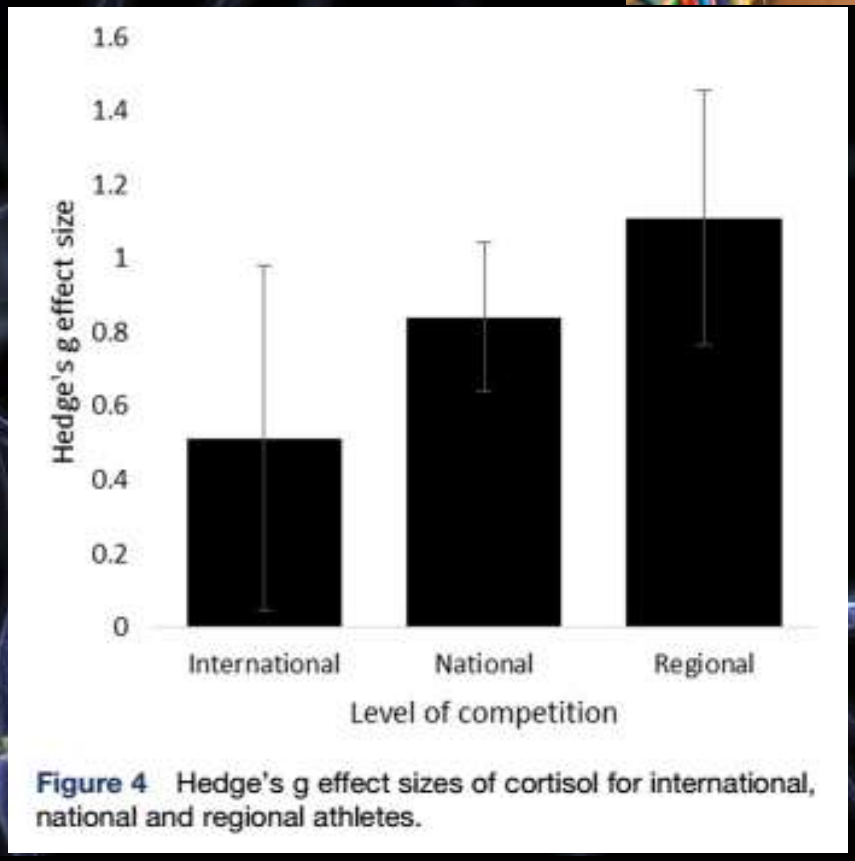


Figure 4 Hedge's g effect sizes of cortisol for international, national and regional athletes.

The hidden dimensions of the competition effect: Basal cortisol and basal testosterone jointly predict changes in salivary testosterone after social victory in men

Samuele Zilioli, Neil V. Watson*

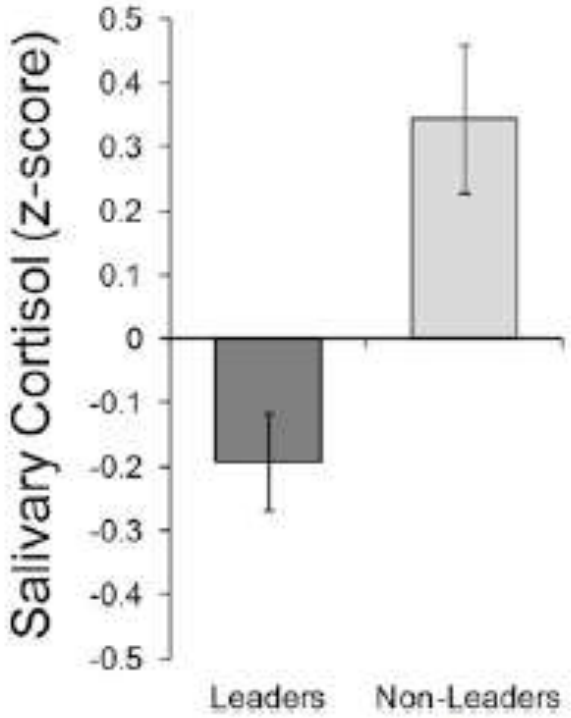
Table 1 Descriptive statistics for raw hormone measure.

	Winners and losers (*n* T = 59; *n* C = 58)		Winners (*n* T = 30; *n* C = 30)		Losers (*n* T = 29; *n* C = 28)	
	M (SEM)	SD	*M* (SEM)	SD	*M* (SEM)	SD
Pre-competition testosterone (pg/mL)	113.2 (5.9)	45.3	113.4 (8.4)	46.2	113 (8.4)	45.2
Post-competition testosterone (pg/mL)	107.7 (5.2)	40.1	112.8 (7.3)	40.1	102.5 (7.4)	40
Changes in testosterone (pg/mL)[a]	−5.4 (2.3)	18	−.6 (3.3)	18	−10.5 (3.1)	16.8
Pre-competition cortisol (μg/dL)[b]	.18 (.03)	.21	.16 (.02)	.11	.2 (.05)	.28
Post-competition cortisol (μg/dL)[c]	.12 (.01)	.1	.12 (.01)	.07	.13 (.02)	.13
Changes in cortisol (μg/dL)[d]	−.06 (−.02)	.1	−.04 (.01)	.08	−.08 (.03)	.17

Leadership is associated with lower levels of stress

Gary D. Sherman[a], Jooa J. Lee[a], Amy J. C. Cuddy[b], Jonathan Renshon[c], Christopher Oveis[d], James J. Gross[e], and Jennifer S. Lerner[a,1]

PNAS | October 30, 2012 | vol. 109 |



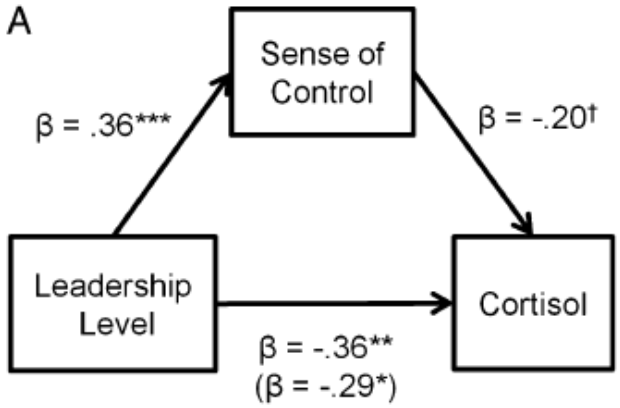


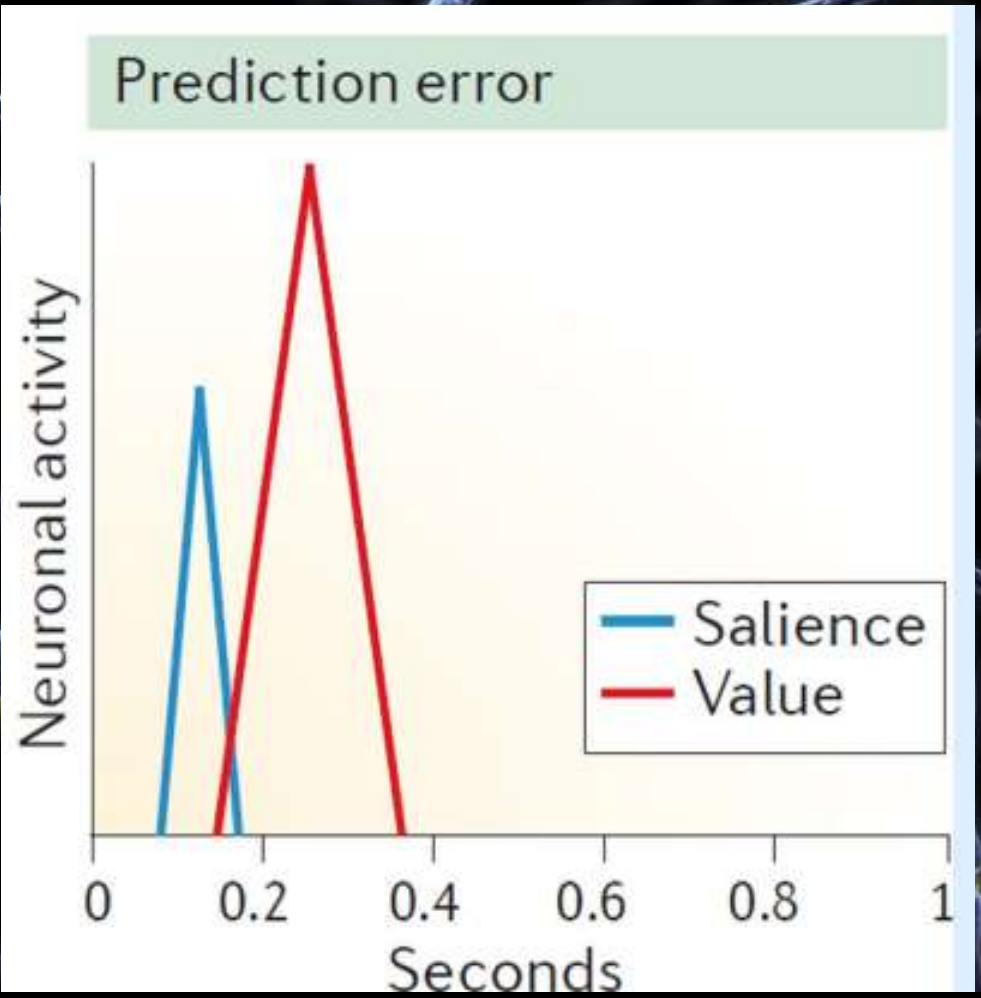
Fig. 1. Cortisol as a function of leadership (study 1). Error bars represent ±1 SEM.

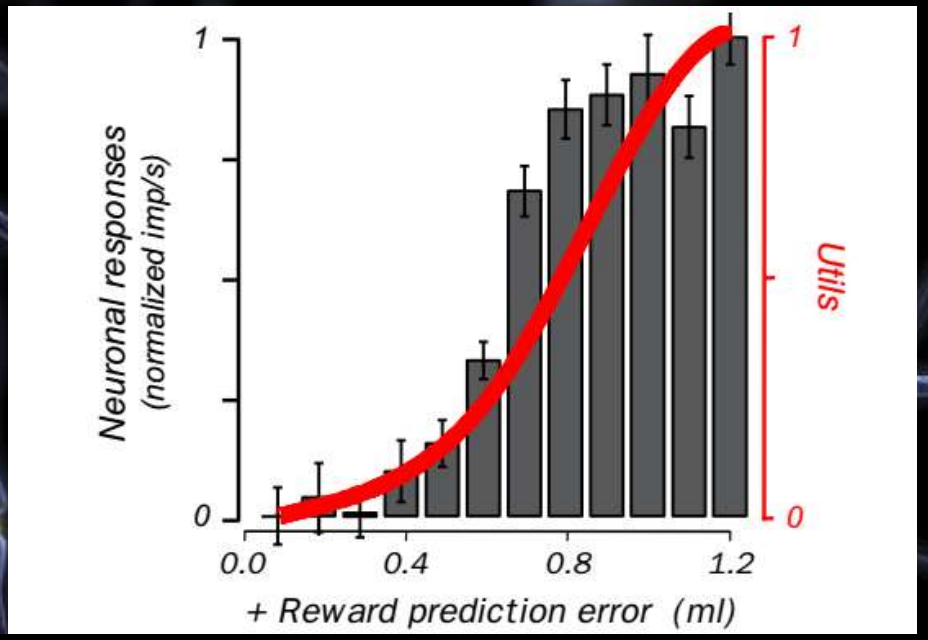
Smegenų nuovargis staigiai išnyksta, kai tik padidėja „atpildas“

Nat Rev Neurosci. 2016 March ; 17(3): 183–195. doi:10.1038/nrn.2015.26.

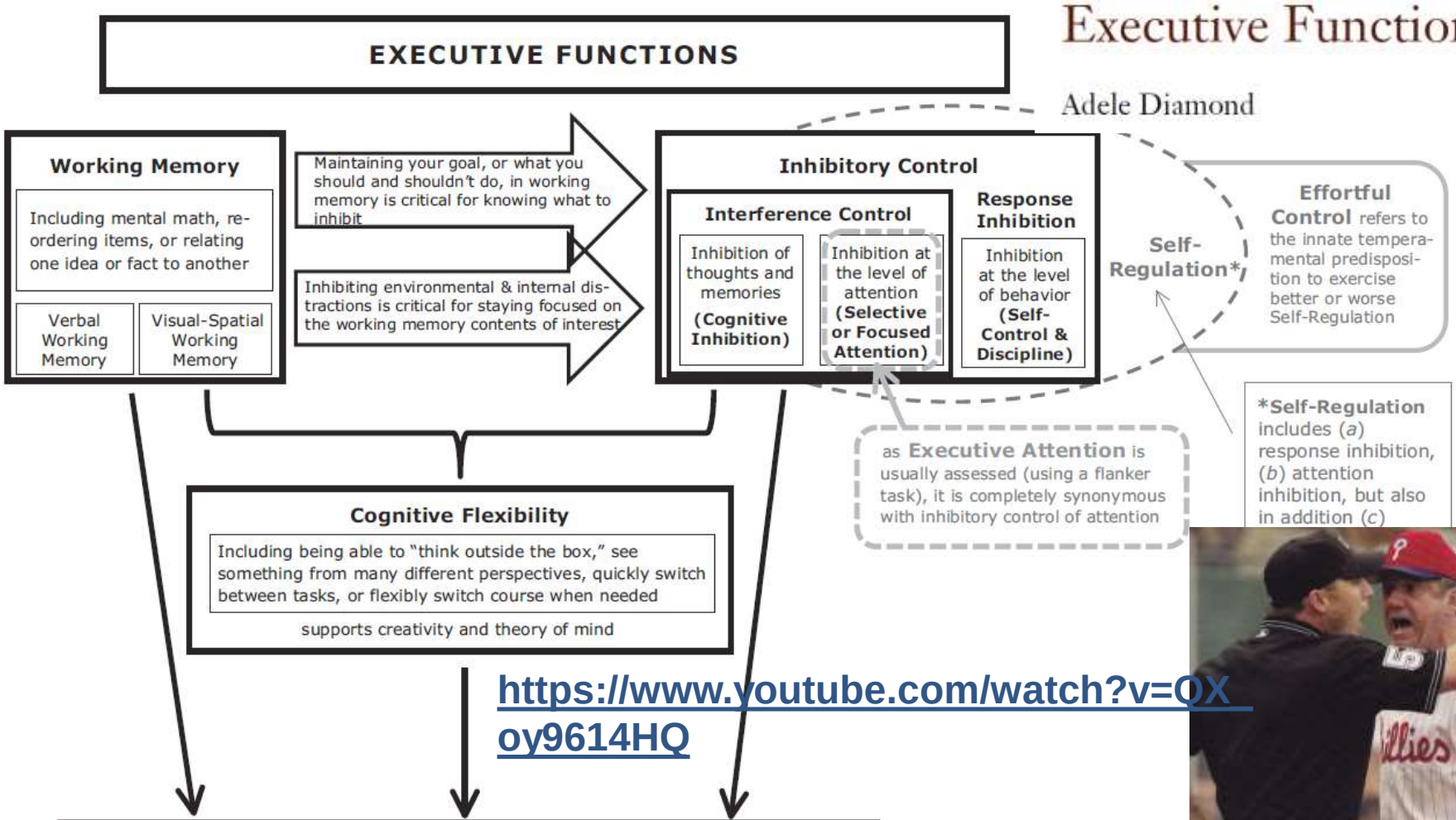
Dopamine reward prediction-error signalling: a two-component response

Wolfram Schultz

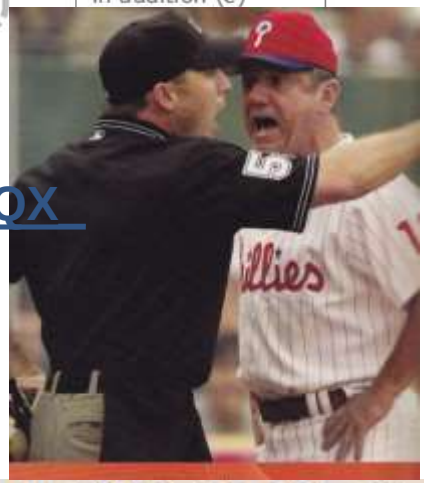




Kognityvinės funkcijos pratimai



https://www.youtube.com/watch?v=QXoy9614HQ



Psichologinių pastangų mažinimo taisyklės svarba ištvermės atletams

LIETUVOS SPORTO UNIVERSITETAS

Psichologinis krūvis!

Padidėjęs psichologinis krūvio jausmas reikšmingai sumažina atletų ištvermės rezultatą. Norint, kad ištvermės sporto šakų atletų rezultatas būtų geresnis, būtina, kad kuo mažesnį krūvį jaustų jų galvos smegenys

(Pageaux and Lepers, 2016).

LIETUVOS SPORTO UNIVERSITETAS

Vykdomosios funkcijos 8 komponetai

1) Emocijų valdymas

„Valdyk savo arklius“
„Nepyk į kritiką“

LIETUVOS SPORTO UNIVERSITETAS

2) Impulsų valdymas

„Mąstyk prieš darant“

„Laikyk liežuvį už dantų“

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3) Lankstus mąstymas

„Nepasimesk, kai staigiai pasikeis kalbos tema ar tonas“

4) Aktyvuok darbinę atmintį

„Laikyk atmintyje 3-7 svarbiausius faktus“

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5) Visose situacijose adekvačiai vertink save

„Būk savimi, o stenkis įtikti“

6) Planuok prioritetus

„Išrink visados 1-3 svarbiausius dalykus“

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7) Inicijuok darbus

„Kai nuspręsi, nedelsk pradėti“

LIETUVOS SPORTO UNIVERSITETAS

8) Stebėk, sek ir prižiūrėk savo veiksmus

„Darbai savaime nepasidirba – reikia juos nuolat patepti“

$MT = a + b[\log_2(2D/W)]$

Kas sulėtina sprendimo priėmimus?

Kas lėtina sprendimus?

1) Motyvacijos stoka
2) Nuovargis
3) Prieš tai buvęs klaidingas sprendimas
4) Adrenalino stoka
5) Išmokto bejėgiškumo fenomenas
6) Netikėtas dėmesio pertraukimas

Tikslo išlaikymo strese treniravimas

Fixing Our Focus: Training Attention to Regulate Emotion

Heather A. Wadlinger and Derek M. Isaacowitz

Pers Soc Psychol Rev 2011 15: 75 originally published online 30 April 2010

Table 2. A Model of Attention Training Methods: Integrating Emotion Regulation Strategies and Attentional Networks

	Attentional training methodologies[a]	Emotion regulation strategies		
Higher	Concentration meditation[b] (C)	Sustained attention on object	Selective attention to object	Disengage distracters; reengage object
	Insight meditation[c] (C)	Sustained awareness without focus	—	Disengage distracters; nonreactive labeling of distracters
Moderate	Loving-kindness meditation[d] (R/C)	Sustained attention to positive emotion	Selective attention to positive emotion	Disengage distracters; reengage object
	ATT[e] (D/C)	Vigilance for neutral sound	Selective attention to neutral sound	Alternate attention between sounds; attend to multiple sounds
Lower	Dot-probe training (D)	Vigilance for positive information	Selective visual attention to positive information	Disengage negative and neutral information
	Visual search training (D)	Vigilance for positive information	Selective visual attention to positive information	Avoidance of negative information
Effort (to execute)	**Attentional network[f]** *Similar constructs[g]*	**Alerting** *Awareness, alertness, vigilance, sustained attention*	**Orienting** *Scanning, selective attention*	**Executive** *Selective, focused, alternating, and divided attention*
Cognitive effort (to acquire)[h]		Lower	Moderate	Higher

Galingumas ir ištvermė

Performance velocity

100 m ← – – – – – – – – – – – – – – – 800 m ⟷ 1,500 m ⟷ 5,000 m – → Marathon

NM and mechanical determinants ⟷ Physiological determinants

⟷ Anaerobic speed reserve ⟷

NM/mechanical performance

Anaerobic power / capacity performance

Aerobic power / capacity performance

RFD / power / strength

Total buffering capacity / La tolerance

Caffeine suppl.

Endurance running economy

Structural factors: muscle-tendon unit stiffness, Type II fiber hypertrophy, total muscle mass, high-energy phosphate content (ATP / PCr), flexibility & anthropometrics

Anaerobic enzyme develop.

Sodium bicarbonate suppl. ?

Type II fiber hypertrophy

β-alanine suppl.

VO_{2max}

Cardiac output (SV × HR)

Hemoglobin

Lactate threshold (LT2 to LT1)

Nitrate (beetroot) suppl. ?

Aerobic enzyme develop.

Distribution of power / energy

Collagen precursors (e.g. gelatin) suppl?

Creatine suppl.

Optimized dietary & suppl. PRO

Optimal hydration

Iron suppl. (if anemic)

Periodically training on low CHO availability ?

L-carnitine suppl. ?

← Event optimized physique (high power to weight ratio; ideal FFM) via appropriate long - term strategic manipulation of EA →

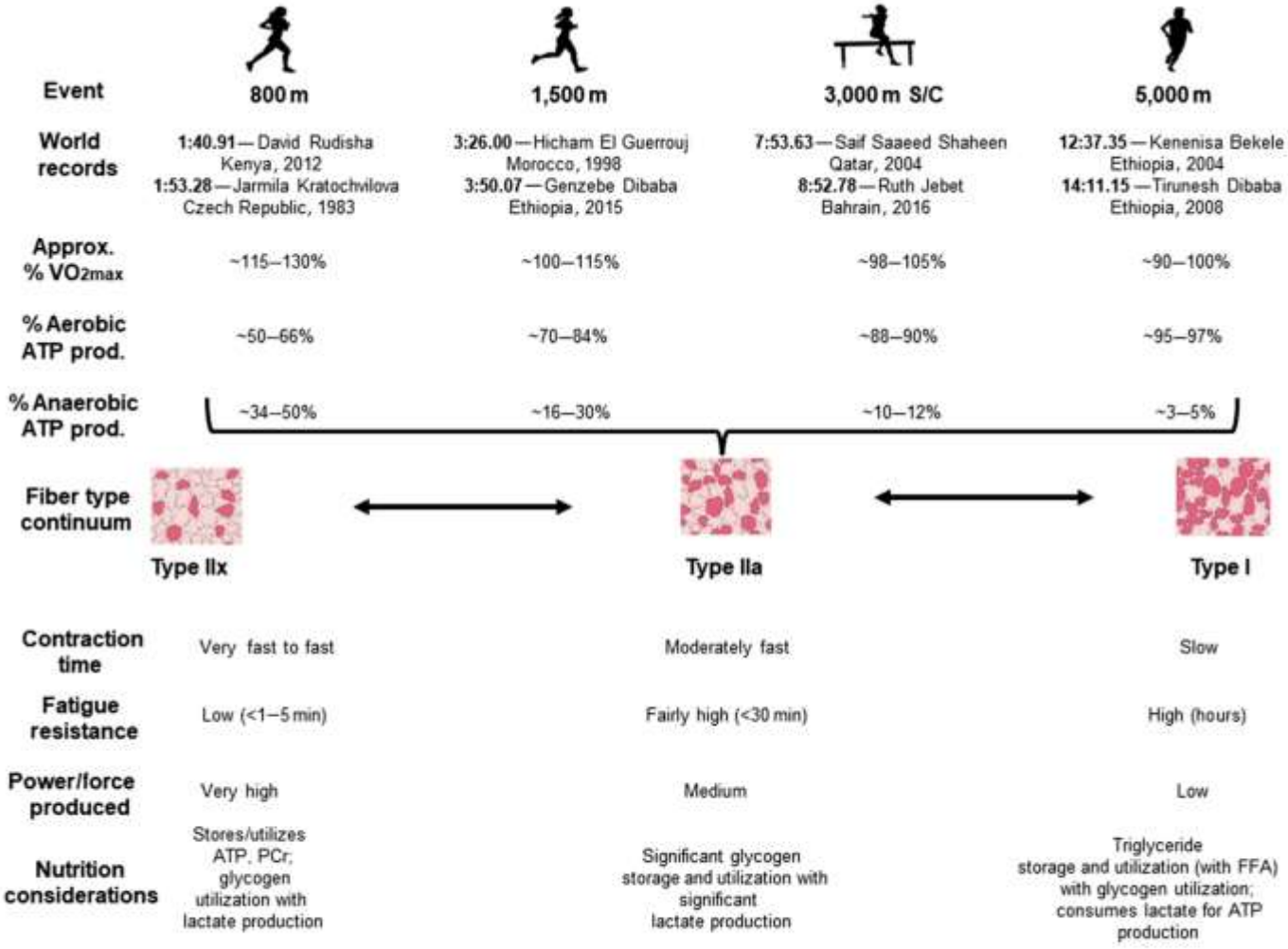


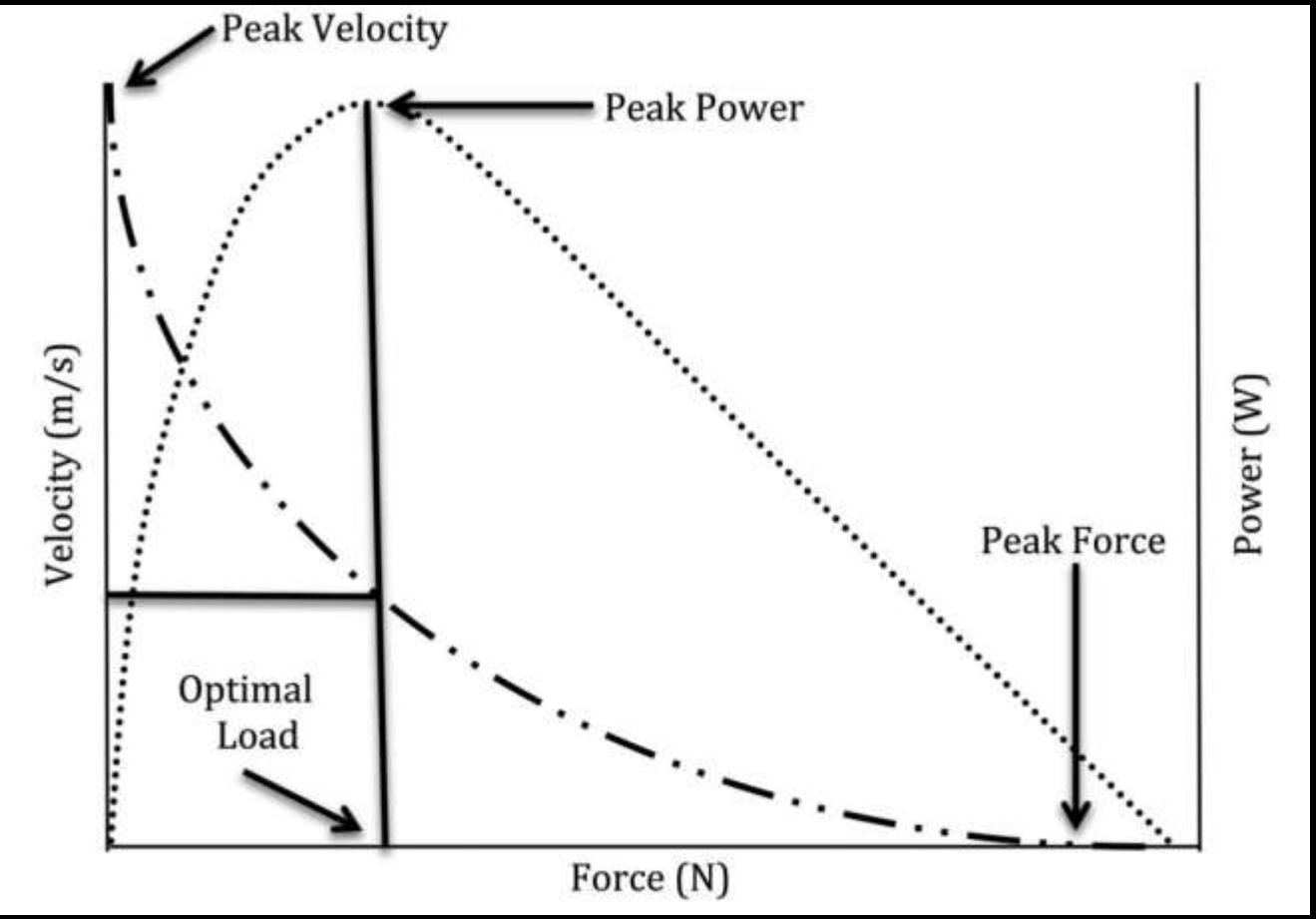
Figure 1 — Differences in ATP energy source provision in middle-distance events within the context of fiber types and endogenous nutrition considerations. It should be noted that fiber typing is a continuum, and only 100- to 400-m athletes have >60% Type IIx fiber types, while most middle-distance athletes 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).

VOLUME 34 | NUMBER 6 | DECEMBER 2012

Training Principles for Power

G. Gregory Haff, PhD, CSCS*D, FNSCA, ASCC and Sophia Nimphius, PhD, CSCS*D

Strength and Conditioning Journal



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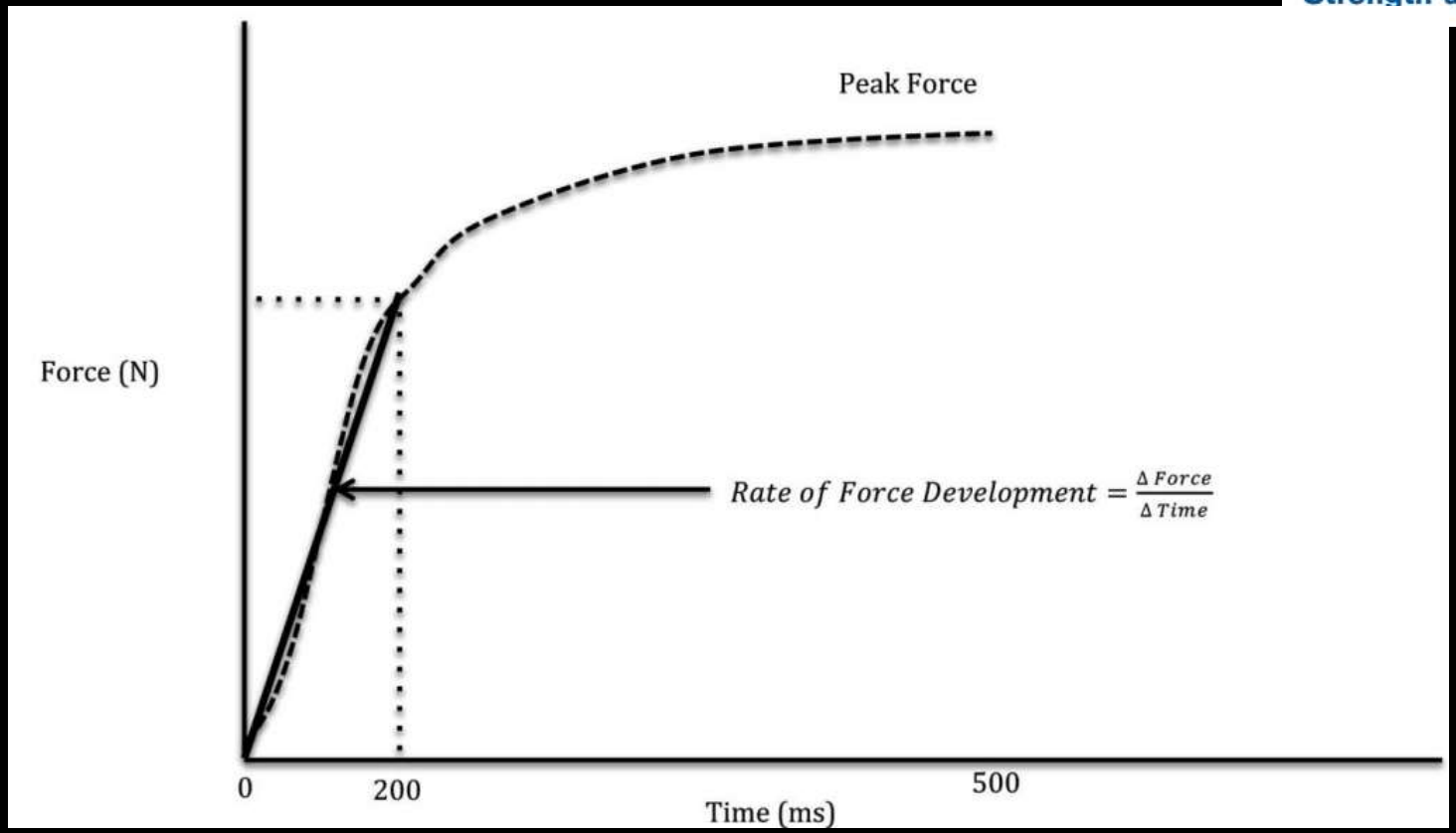

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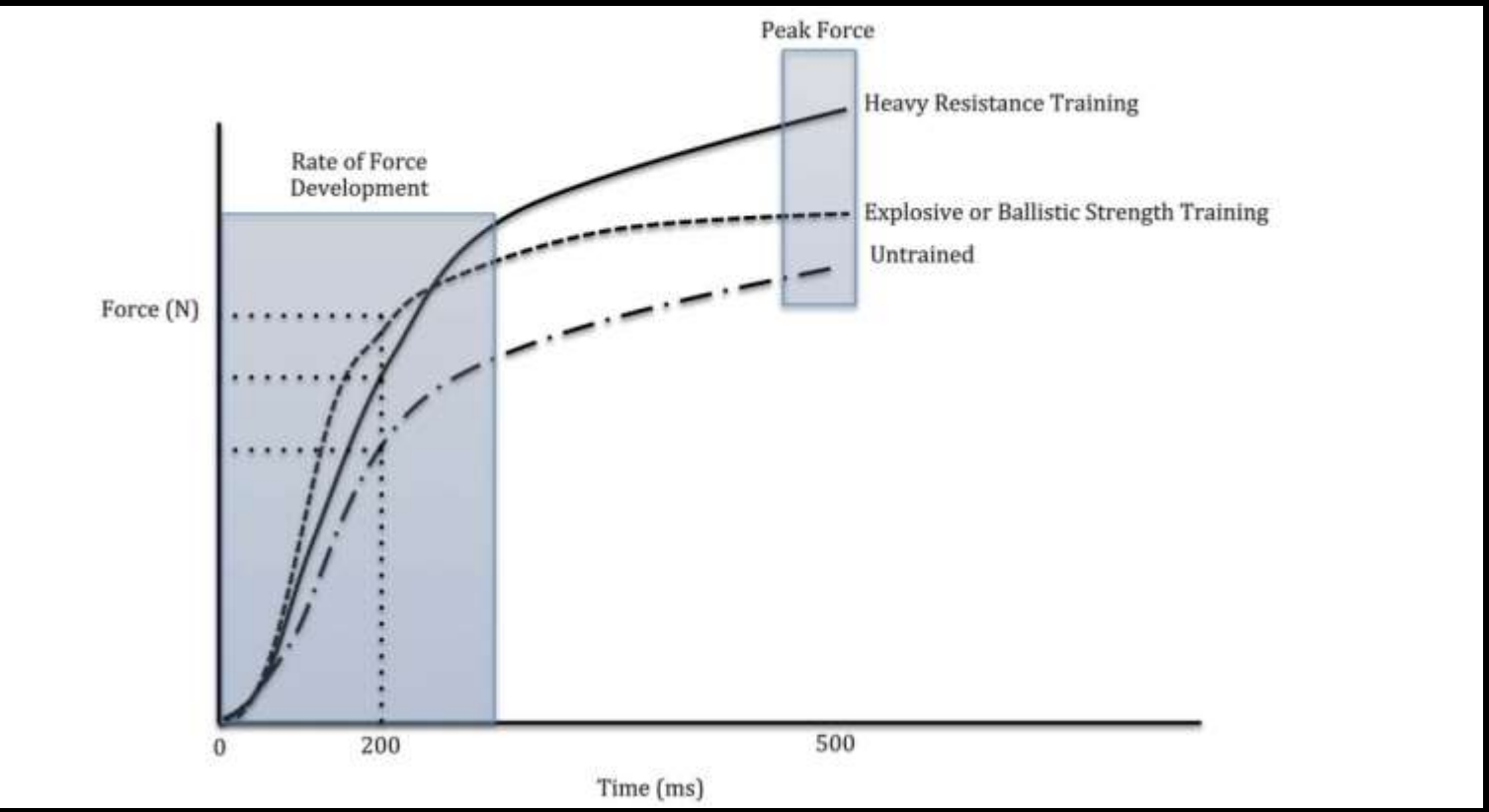

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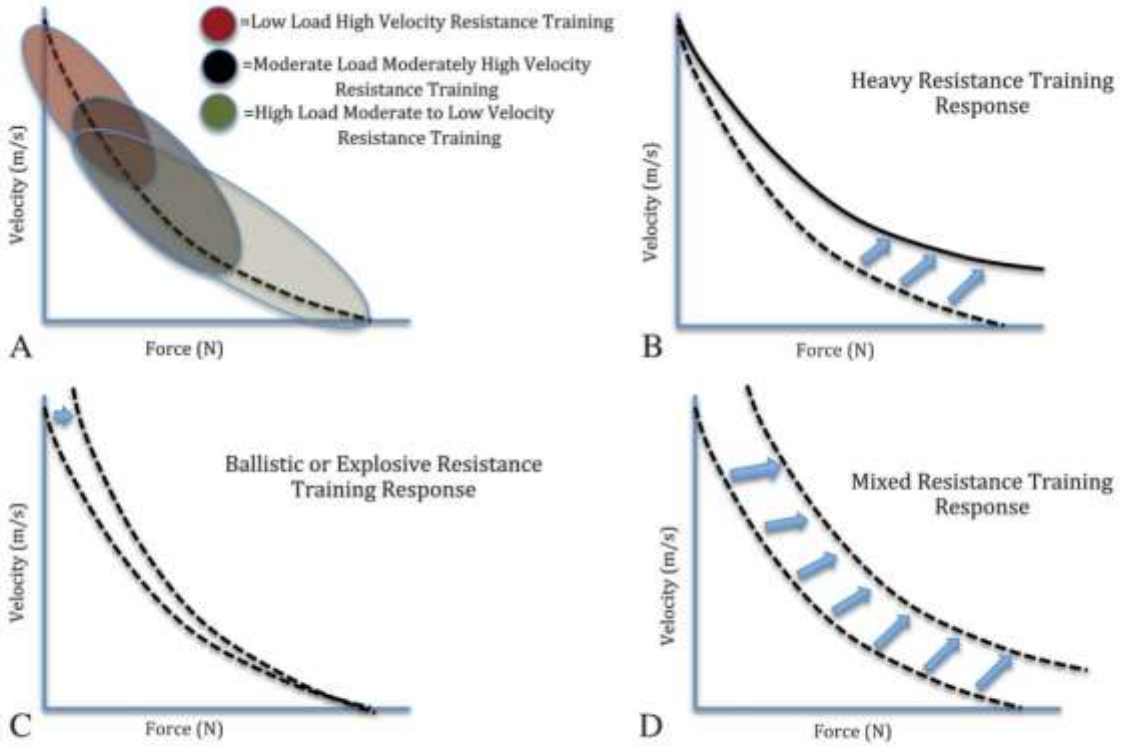
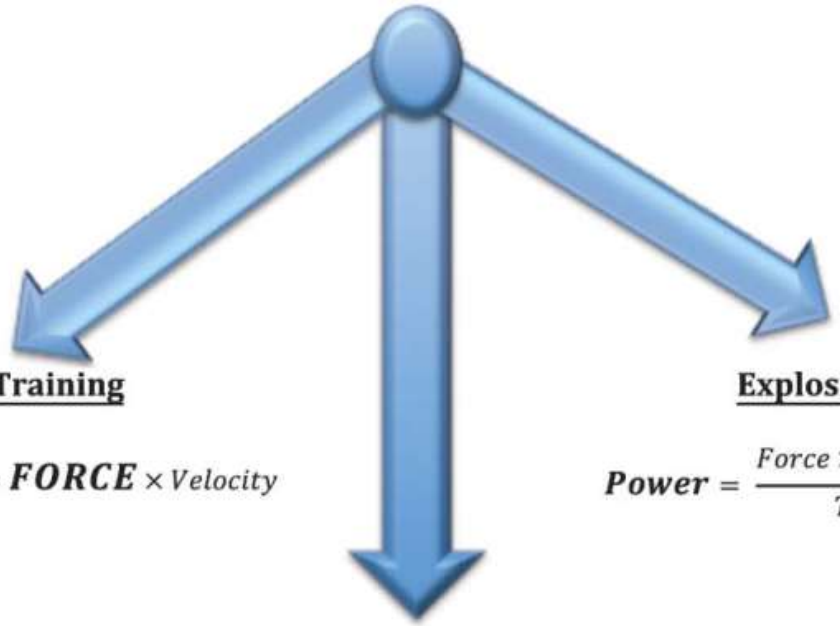


Figure 6. Potential training interventions which impact the force-velocity curve.

Training Principles for Power

G. Gregory Haff, PhD, CSCS*D, FNSCA, ASCC and Sophia Nimphius, PhD, CSCS*D

$$Power = \frac{Force \times Distance}{Time} = Force \times Velocity$$



Heavy Resistance Training

$$\boldsymbol{Power} = \frac{\boldsymbol{FORCE} \times Distance}{Time} = \boldsymbol{FORCE} \times Velocity$$

Explosive Power Training

$$\boldsymbol{Power} = \frac{Force \times Distance}{Time} = Force \times \boldsymbol{VELOCITY}$$

Mixed Methods Training

$$\boldsymbol{POWER} = \frac{\boldsymbol{FORCE} \times Distance}{Time} = \boldsymbol{FORCE} \times \boldsymbol{VELOCITY}$$

Training Principles for Power

G. Gregory Haff, PhD, CSCS*D, FNSCA, ASCC and Sophia Nimphius, PhD, CSCS*D

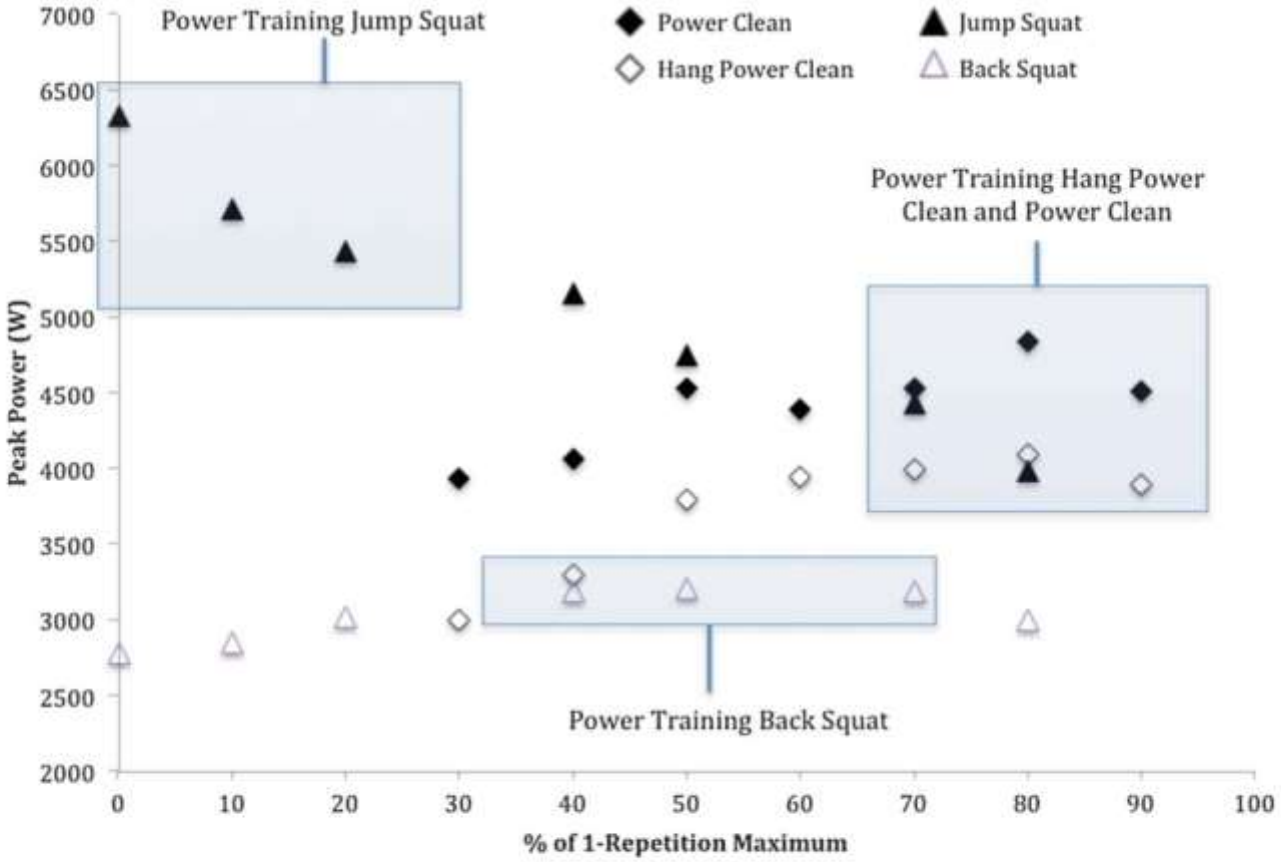


Figure 8. Relationship of power zones and various exercises. Data obtained from Kawamori et al. (41), Kirby et al. (44), and Cormie et al. (13).

Training Principles for Power

G. Gregory Haff, PhD, CSCS*D, FNSCA, ASCC and Sophia Nimphius, PhD, CSCS*D

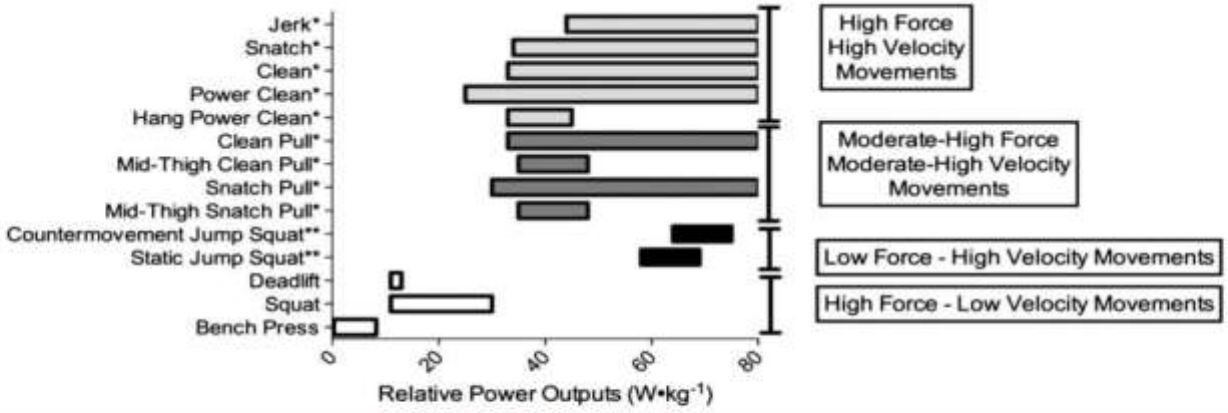


Figure 9. Relative power outputs for various exercises. The relative power outputs noted will vary depending upon the load lifted, the level of athletes, athletes level of strength, and the technique used in the lift. *Loads of between 75 and 85% of 1repetition maximum produce the highest power outputs; **loads of 0–30% produce the highest power outputs.

Training Principles for Power

G. Gregory Haff, PhD, CSCS*D, FNSCA, ASCC and Sophia Nimphius, PhD, CSCS*D

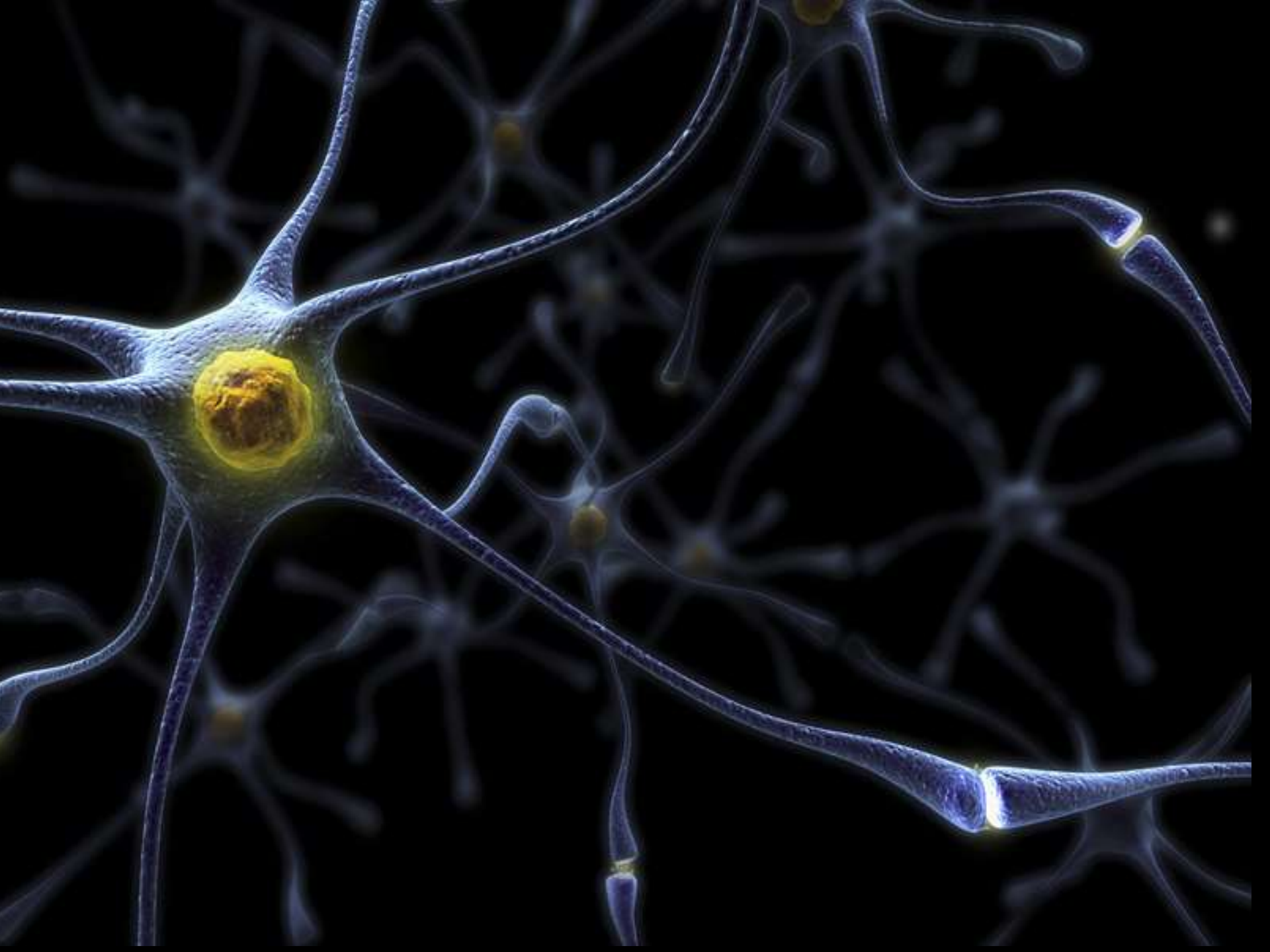
Table 1
Example mixed methods approach for developing power

Exercise	Sets × reps	Load (%, 1RM)	Type of exercise
Power clean	3 × 5	75–85	High force, high velocity
Back squat	3 × 5	80–85	High force, low velocity
Jump squat	3 × 5	0–30	Low force, high velocity
Depth jump	3 × 5	0	High force, high velocity

G. Gregory Haff, PhD, CSCS*D, FNSCA, ASCC and Sophia Nimphius, PhD, CSCS*D

Table 2
Strength training example of a mixed methods approach for developing power

Exercise	Sets × reps	Load (%, 1RM)	Type of exercise
Snatch	3 × 5	75–85	High force, high velocity
Snatch pull*	3 × 5	90–95	High force, moderate velocity
Snatch pull from blocks*	3 × 5	100–110	High force, moderate velocity
Romanian deadlift	3 × 5	70–75	Moderate force, low velocity

*Training load is a percentage off of the maximum snatch.

Ačiū!