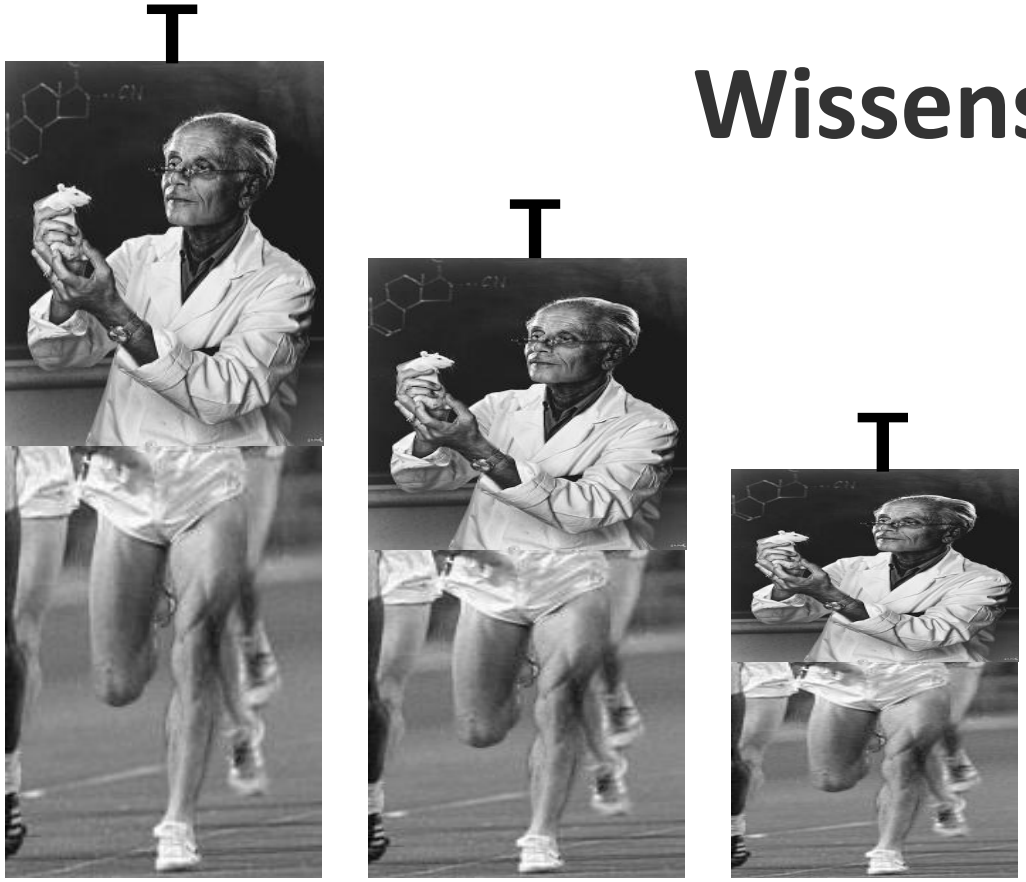


Wissenschaftliches Arbeiten

Trainer A, 26.10.2023

Isidor Fuchser (Präsentationsgrundlage: L. Heyer)


« Be a Good Coach ! »
Science Coach
Art Coach

Programm

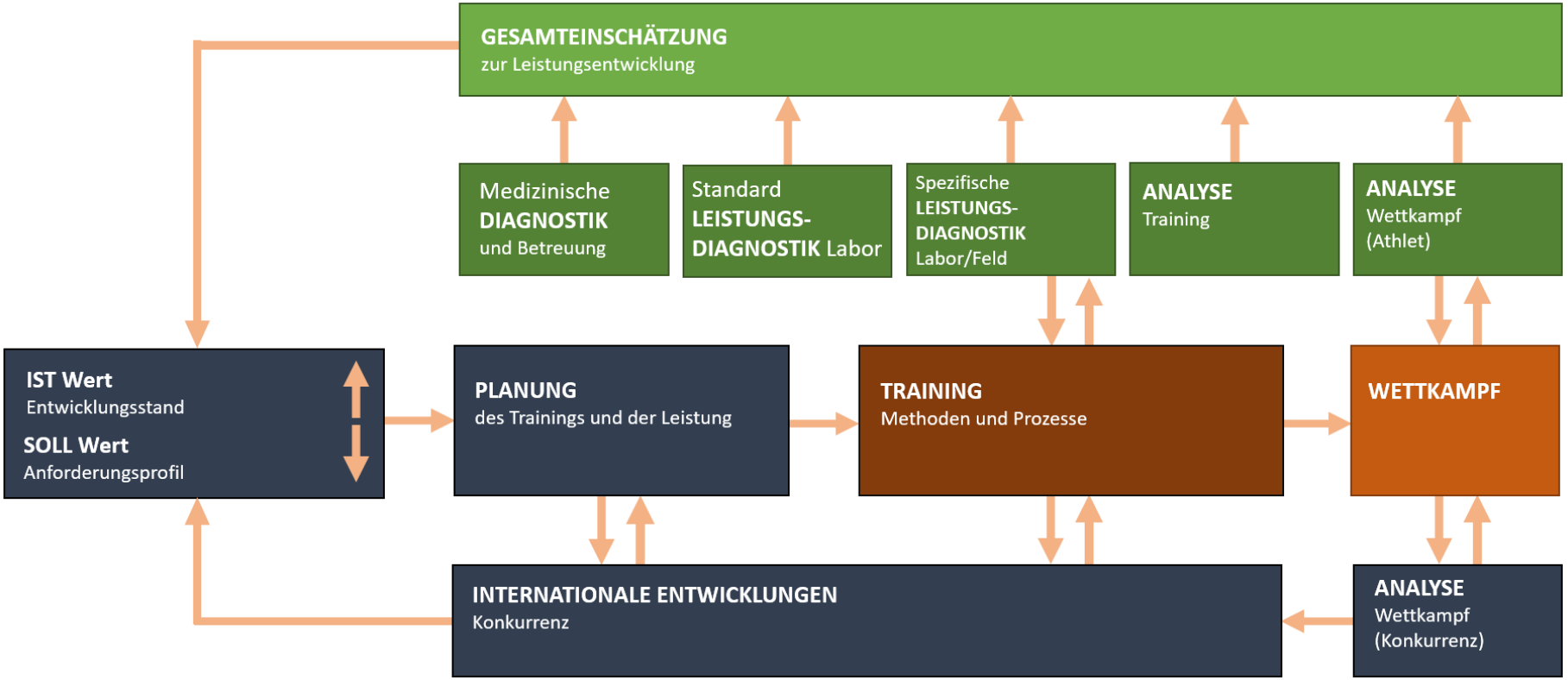
- Weltstandanalyse & Learnings from the bests
- Wissenschaftliche Artikel
- Wichtigste Erkenntnisse wissenschaftlich präsentieren
- Studie «designen»

Auftrag:

- Reflexion (2‘)
- Danach: Diskussion (5‘)

Fragestellungen:
- Wo nutzen wir als Trainer/in die Wissenschaft für unsere Arbeit?
- Welche Quellen kennt/nutzt ihr?

Regelkreis der Trainingssteuerung



Der Regelkreis der Trainingsteuerung (Fuchslocher, Bürgi 2007)

Mobilesport / BASPO

Learn from the bests...

Dreisprung...

https://www.iaaf.org/development/research

Biomechanics Report WC Berlin 2009 Triple Jump

Name / Att.	Jump distance [m]			Stride length [m]					relativ dist. [%]			Horizontal velocity [m/s]					Loss of horizontal velocity [m/s]			Vertical velocity [m/s]			Angle of take-off [°]		
	off.	real	loss	2L	1L	Hop	Step	Jump	Hop	Step	Jump	2L	1L	Hop	Step	Jump	Hop	Step	Jump	Hop	Step	Jump	Hop	Step	Jump
Idowu P. 3rd	17.73	17.92	0.19	2.58	2.49	6.49	5.41	6.02	36	30	34	10.47	10.53	9.72	8.48	7.01	0.81	1.24	1.48	2.45	1.94	2.70	14	13	21
Evora N. 6th	17.55	17.60	0.05	2.68	2.26	6.51	5.41	5.68	37	31	32	10.10	10.13	9.19	8.25	6.50	0.94	0.94	1.76	2.68	1.94	3.14	16	13	26
Copello A. 6th	17.36	17.54	0.18	2.41	2.29	6.01	5.77	5.92	34	33	33	9.99	10.01	9.49	8.27	6.93	0.51	1.22	1.34	2.27	2.21	2.53	13	15	20
Sands L. 5th	17.32	17.34	0.02	2.92	2.30	6.52	5.20	5.62	38	30	32	10.25	10.14	9.53	8.52	7.26	0.61	1.00	1.26	2.48	2.10	2.36	15	14	18
Girat A. 1st	17.26	17.39	0.00	2.49	2.33	6.16	5.41	5.88	35	31	34	9.86	9.88	9.14	8.15	7.06	0.73	0.99	1.09	2.47	2.32	2.45	15	16	19
Li Y.4th	17.23	17.32	0.09	2.30	2.46	6.33	5.24	5.75	37	30	33	9.89	9.99	9.18	8.15	6.94	0.81	1.02	1.22	2.64	2.26	2.57	16	16	20
Spasovkhodskiy I. 2nd	16.91	16.96	0.05	2.55	2.49	6.47	4.80	5.69	38	28	34	10.06	10.09	9.35	8.24	7.11	0.74	1.11	1.13	2.39	1.97	2.67	14	13	21
Gregorio J. 2nd	16.89	17.15	0.26	2.71	2.62	6.33	5.10	5.72	37	30	33	10.42	10.36	9.42	8.28	7.11	0.95	1.14	1.17	2.48	1.75	2.62	15	12	20

Name / Att.	Jump distance [m]			Stride length [m]					relativ dist. [%]			Horizontal velocity [m/s]					Loss of horizontal velocity [m/s]			Vertical velocity [m/s]			Angle of take-off [°]		
	off.	real	loss	2L	1L	Hop	Step	Jump	Hop	Step	Jump	2L	1L	Hop	Step	Jump	Hop	Step	Jump	Hop	Step	Jump	Hop	Step	Jump
Savigne Y. 5th	14.95	15.04	0.09	2.06	2.18	5.50	4.04	5.49	37	27	37	9.32	9.39	8.63	8.22	6.87	0.76	0.41	1.35	2.49	1.24	2.67	16	9	21
Gay M. 4th	14.61	14.78	0.17	2.42	2.15	5.35	4.43	5.00	36	30	34	8.81	8.87	8.12	7.30	6.07	0.75	0.82	1.23	2.34	1.70	2.57	16	13	23
Pyatykh A. 6th	14.53	14.72	0.19	2.30	2.18	5.46	4.31	4.95	37	29	34	8.99	9.01	8.21	7.46	6.32	0.80	0.74	1.14	2.46	1.93	2.48	17	14	21
Topic B. 4th	14.52	14.63	0.11	2.37	2.41	5.30	4.13	5.20	36	28	36	9.08	9.13	8.45	7.80	6.89	0.69	0.65	0.91	2.30	1.72	2.14	15	12	17
Smith.T. 5th	14.48	14.48	0.00	2.42	2.36	5.57	4.38	4.53	38	30	31	9.10	9.10	8.34	7.38	6.00	0.76	0.96	1.38	2.39	1.84	1.78	16	14	17
Lebedeva T. 2nd	14.48	14.57	0.09	2.06	2.09	5.33	4.30	5.00	36	29	34	9.13	9.12	8.59	7.80	6.30	0.53	0.79	1.50	2.24	1.84	2.32	15	13	20
Bujin C. 2nd	14.26	14.37	0.11	2.31	2.20	5.25	4.05	5.11	36	28	35	8.93	8.84	8.00	7.37	6.11	0.83	0.63	1.26	2.49	1.57	2.80	17	12	25
Veldakova D. 1st	14.25	14.26	0.01	2.46	2.21	5.24	3.96	5.06	37	28	35	9.13	9.17	8.48	7.90	6.70	0.68	0.58	1.20	2.24	1.19	2.24	15	9	19

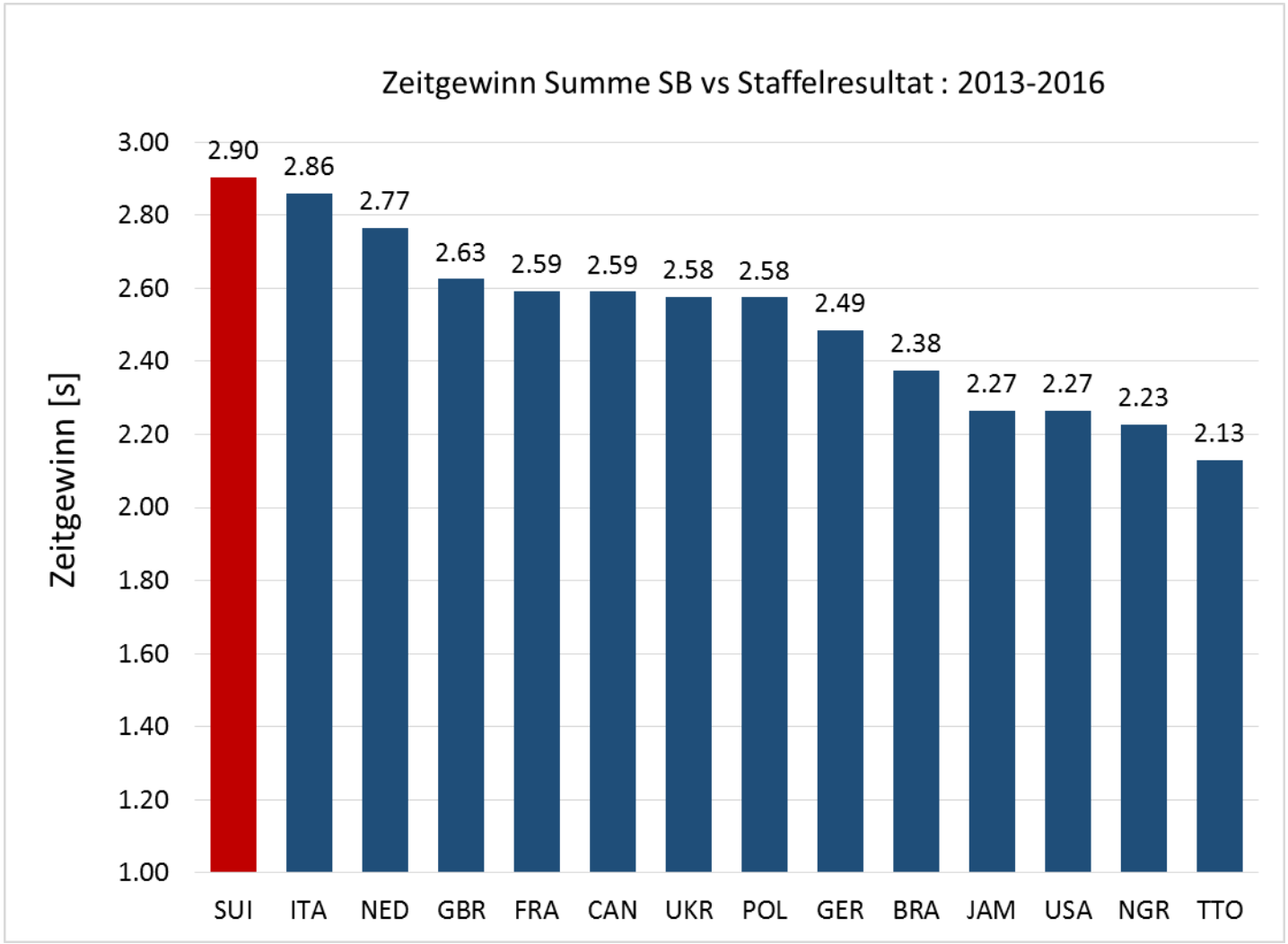
110m/h MAN

THE BIOMECHANICS OF HURDLING: FORCE PLATE ANALYSIS TO ASSESS HURDLING TECHNIQUE
BRIAN McLEAN, Australian Insitute of Sport

Table 1: Biomechanical parameters describing the support phases of take-off and landing in the hurdle clearance (mean ± sd, n = 7; and two subjects, A and B)

		mean ± sd	subject A	subject B
Rhythmic Units				
unit 1	[s]	1.17 ± .04	1.17	1.20
unit 2	[s]	1.14 ± .05	1.11	1.16
unit 3	[s]	1.15 ± .06	1.10	1.17
Take-off				
velocity loss due to braking	[m/s]	-0.60±.09	-0.47	-0.71
velocity increase due topropulsion	[m/s]	0.19 ±.03	0.15	0.21
resultant velocity change	[m/s]	-0.41 ±.07	-.32	-.50
contact time	[s]	0.125 ± .008	.112	.130
braking time	[s]	0.072 ± .005	.065	.078
% braking time		57.8 ± 1.8	58.0	60.0
vertical velocity change	[m/s]	2.32 ± .12	2.31	2.53
peak vertical force	[BW]	5.72 ± .90	4.88	7.0
foot to hurdle distance	[m]	2.44 ± .25	2.36	2.13
center of gravity to foot distance	[m]	0.33 ± .04	.311	.320
Flight time	[s]	.389 ± .020	.393	.396
Landing				
velocity loss due to braking	[m/s]	-0.08 ± .05	0.0	-.09
velocity increase due to propulsion	[m/s]	0.31 ± .05	0.32	0.35
resultant velocity change	[m/s]	0.23 ± .06	.32	.26
contact time	[s]	0.092 ± .011	.076	.094
braking time	[s]	0.018 ±.008	.007	.018
% braking time		18.9 ± 6.3	9.2	19.1
vertical velocity change	[m/s]	0.97 ± .32	1.15	1.10
peak vertical force	[BW]	3.68 ± .48	4.21	3.82
foot to hurdle distance	[m]	1.26 ± .15	1.23	1.39
center of gravity to foot distance	m]	-0.01 ± .04	0.0	0.0
Total velocity change over hurdle	[m/s]	-0.18 ± .09	0.0	-.24

Staffel


Zeitgewinn Summe SB vs Staffelresultat : 2013-2016
Zeitgewinn [s]
3.00
2.80
2.60
2.40
2.20
2.00
1.80
1.60
1.40
1.20
1.00
2.90
2.86
2.77
2.63
2.59
2.59
2.58
2.58
2.49
2.38
2.27
2.27
2.23
2.13
SUI
ITA
NED
GBR
FRA
CAN
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POL
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BRA
JAM
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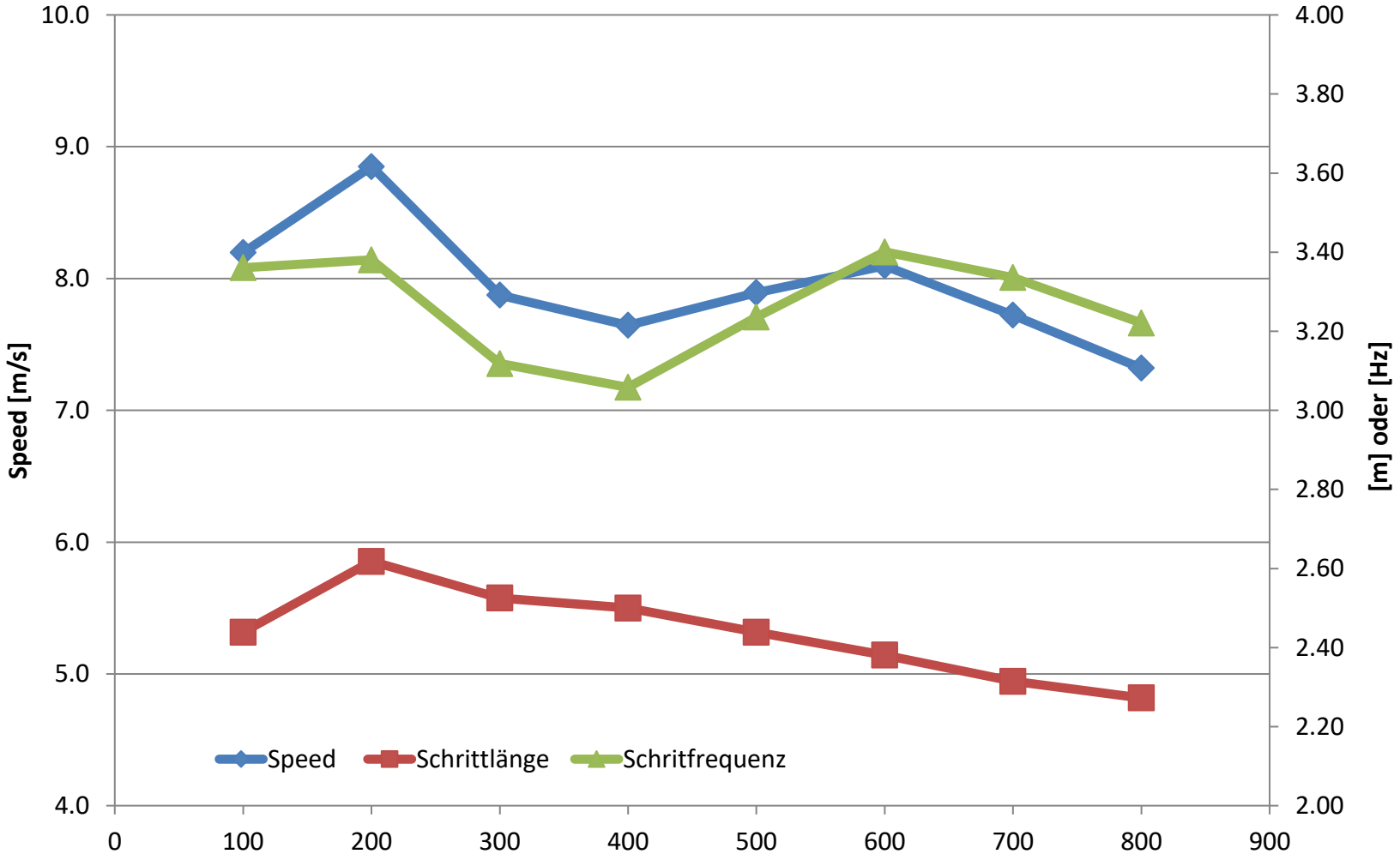
NGR
TTO

Learn from the bests...

800m World Record

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

World Record 800m - 1'40.91



Leistungsdiagnostik

Clinique romande de réadaptation suvacare

OPTOJUMP next

ANALYSE DE COMPETITION

swiss athletics

GGB Meeting - Magglingen - 05.02.2011

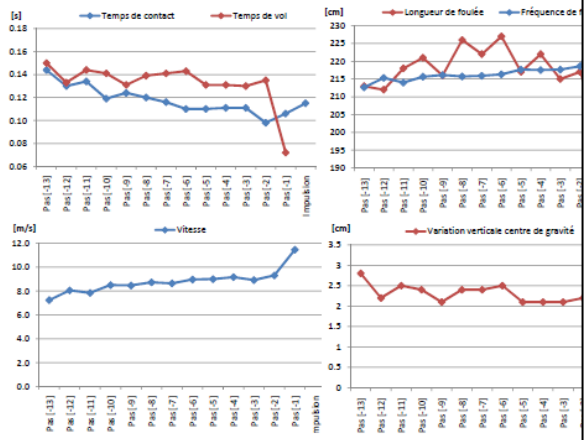
Longjump - WOMEN

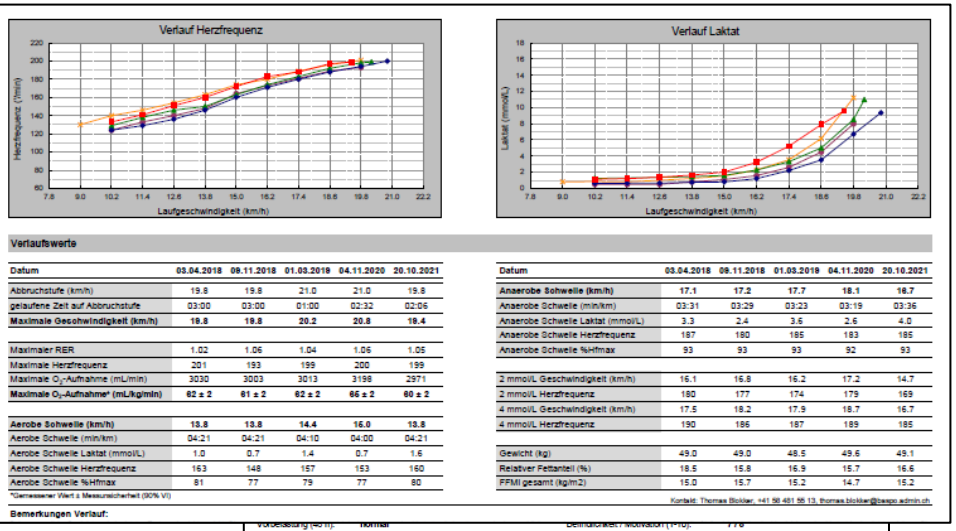
Irene Pusterla — **Saut 3**

Résultat : 6.57

		Temps cellules	11m - 6m	6m - 1m
		Temps [s]	0.523	0.570
Distance à la planche :	cm	Vitesse [m/s]	9.56	8.77
Distance réelle :	m			

	Pied	Temps de contact [s]	Temps de vol [s]	Longueur de foulée [cm]	Fréquence de foulée [foulées/s]	Vitesse [m/s]	Variation verticale centre de gravité [cm]
Impulsion	G	0.115					
Pas [-1]	D	0.106	0.072	204	5.62	11.5	
Pas [-2]	G	0.098	0.135	217	4.29	9.3	
Pas [-3]	D	0.111	0.130	215	4.15	8.9	
Pas [-4]	G	0.111	0.131	222	4.13	9.2	
Pas [-5]	D	0.110	0.131	217	4.15	9.0	
Pas [-6]	G	0.110	0.143	227	3.95	9.0	
Pas [-7]	D	0.116	0.141	222	3.89	8.6	
Pas [-8]	G	0.120	0.139	226	3.86	8.7	
Pas [-9]	D	0.124	0.131	216	3.92	8.5	
Pas [-10]	G	0.119	0.141	221	3.85	8.5	
Pas [-11]	D	0.134	0.144	218	3.60	7.8	
Pas [-12]	G	0.130	0.133	212	3.80	8.1	
Pas [-13]	D	0.144	0.150	213	3.40	7.2	
Pas [-14]	G						
Pas [-15]							
Pas [-16]							
Pas [-17]							





Verlaufswerte

Datum	03.04.2018	09.11.2018	01.03.2019	04.11.2020	20.10.2021
Abbruchstufe (km/h)	19.8	19.8	21.0	21.0	19.8
gelaufene Zeit auf Abbruchstufe	03:00	03:00	01:00	02:32	02:06
Maximale Geschwindigkeit (km/h)	**19.8**	**19.8**	**20.2**	**20.8**	**18.4**
Maximaler RER	1.02	1.06	1.04	1.06	1.05
Maximale Herzfrequenz	201	193	199	200	199
Maximale O_2-Aufnahme (mL/min)	3030	3003	3013	3198	2971
Maximale O_2-Aufnahme* (mL/kg/min)	**62 ± 2**	**61 ± 2**	**62 ± 2**	**66 ± 2**	**60 ± 2**
Aerobe Schwelle (km/h)	**13.8**	**13.8**	**14.4**	**16.0**	**13.8**
Aerobe Schwelle (min/km)	04:21	04:21	04:10	04:00	04:21
Aerobe Schwelle Laktat (mmol/L)	1.0	0.7	1.4	0.7	1.6
Aerobe Schwelle Herzfrequenz	163	148	157	153	160
Aerobe Schwelle %Hfmax	81	77	79	77	80

*Gemessener Wert ± Messunsicherheit (90% VI)

Bemerkungen Verlauf:

Datum	03.04.2018	09.11.2018	01.03.2019	04.11.2020	20.10.2021
Anaerobe Schwelle (km/h)	**17.1**	**17.2**	**17.7**	**18.1**	**16.7**
Anaerobe Schwelle (min/km)	03:31	03:29	03:23	03:19	03:36
Anaerobe Schwelle Laktat (mmol/L)	3.3	2.4	3.6	2.6	4.0
Anaerobe Schwelle Herzfrequenz	187	180	185	183	185
Anaerobe Schwelle %Hfmax	93	93	93	92	93
2 mmol/L Geschwindigkeit (km/h)	16.1	16.8	16.2	17.2	14.7
2 mmol/L Herzfrequenz	180	177	174	179	169
4 mmol/L Geschwindigkeit (km/h)	17.5	18.2	17.9	18.7	16.7
4 mmol/L Herzfrequenz	190	186	187	189	185
Gewicht (kg)	49.0	49.0	48.5	49.6	49.1
Relativer Fettanteil (%)	18.5	15.8	16.9	15.7	16.6
FFMI gesamt (kg/m2)	15.0	15.7	15.2	14.7	15.2

Kontakt: Thomas Blokker, +41 58 481 55 13, thomas.blokker@baspo.admin.ch

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Bundesamt für Sport BASPO

swiss olympic

Einzelsprung — beidbeinig elasto-/statodynamisch

Büchel Selina

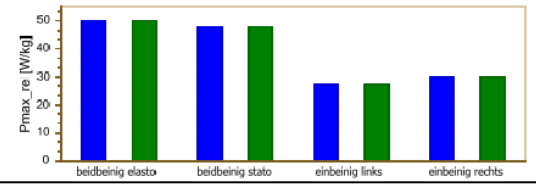
Geb. Datum: | Testdatum: 01.05.2014 15:59 | Testvoraussetz
Grösse: | Referenztest:
Gewicht: 59 kg
Dom. Seite: | Gruppe: NM-Kader f Leichtathletik Mittelstrecke
Bemerkung: | n: 1

Resultate

Mittelwerte		Maximalleistung durch KG Pmax_rel[W/kg] Person	Referenz	Gruppe	Sprunghöhe s_max[cm] Person	Referenz	Gruppe
beidbeinig	elastodynamisch	50,0		50,0	34,0		34,0
beidbeinig	statodynamisch	48,0		48,0	33,5		33,5
Differenz[%]	elasto-/statodyn.	4,3		4,3	1,6		1,6
einbeinig	rechts	29,8		29,8	19,7		19,7
einbeinig	links	27,3		27,3	17,9		17,9
Seitendifferenz[%]		8,4		8,4	9,3		9,3

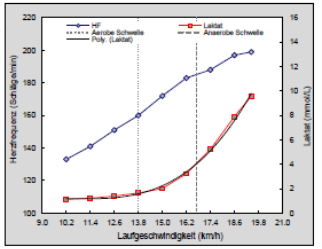
Bilaterales Defizit		Effect of Prestretch	
-12,2	-12,2	1,6	1,6

Maximalleistung



Rohdaten

Stufe	v (km/h)	min/km (min:s)	Laktat (mmol/L)	HF (1/min)	Borg
1	10.2	05:53	1.1	133	8
2	11.4	05:16	1.2	141	9
3	12.6	04:46	1.4	151	10
4	13.8	04:21	1.6	160	12
5	15.0	04:00	2.0	172	13
6	16.2	03:42	3.2	183	15
7	17.4	03:27	5.2	188	17
8	18.6	03:14	7.9	197	19
9	19.4	03:05	9.6	199	20
10					
11					
12					
13					
14					
Max	19.4	03:05	9.8	199	20
	Zeit in Abbruchstufe (min:s):		2:06		



Testergebnisse Stufentest Lauf und DEXA

Schwellen (mod. Dmax)	v (km/h)	min/km (min:s)	%v_{max} (%)	HF (1/min)	%HF_{max} (%)	Laktat (mmol/L)	Kader Damen Elite Mittelwert	Pers. Vergleich
Aerobe Schwelle	13.8	04:21	71	160	80	1.6	12.7 km/h	+8.5 %
Anaerobe Schwelle	16.7	03:36	86	185	93	4.0	16.1 km/h	+3.8 %
Max. Geschwindigkeit (v_{max}):			19.4	km/h	03:05	min/km	18.7 km/h	+4 %
Max. Sauerstoffaufnahme (VO2max):			60.0	mL/min/kg	2971	mL/min	56.9 mL/min/kg	+5.4 %
Körperzusammensetzung (DEXA):			Relativer Fettanteil		16.6	%	17.1 %	
			FFMI gesamt		15.2	kg/m²	15.9 kg/m²	

swiss athletics

Leistungssport

DEUTSCHER OLYMPISCHER SPORTBUND

DAS MAGAZIN | ABONNEMENT | AKTUELLE AUSGABE | JAHRESÜBERSICHT | HINWEISE FÜR AUTOREN

Blick über den Zaun

Leistungssport bietet Trainern, die über die Grenzen ihrer Sportart hinausblicken, praxisbezogene Informationen über neue Erkenntnisse der Sportwissenschaft und übertragbare Untersuchungsergebnisse aus anderen Sportdisziplinen. Besonderer Wert wird dabei auf die Verwertbarkeit der Beiträge für die Praxis gelegt. In der Rubrik „Trainerforum" erhalten Praktiker die Möglichkeit, über ihre Erfahrungen, Trainingsplanung und -durchführung zu berichten. Unter dem Stichwort „Im Brennpunkt" werden aktuelle Themen aufgegriffen, die in Fachkreisen kontrovers diskutiert werden. Unsere Zielgruppe besteht aus:

- Trainern aller Sportarten, die sich auch für sportartübergreifende, praxisrelevante Themen interessieren,
- Sportlehrern,
- Sportwissenschaftlern aller Disziplinen
- und Sportstudenten.

Warum Leistungssport lesen?

"Mit dem Transfer trainingswissenschaftlicher Erkenntnisse in die Praxis tragen wir zur Qualifizierung aller am Leistungssport Interessierten bei."

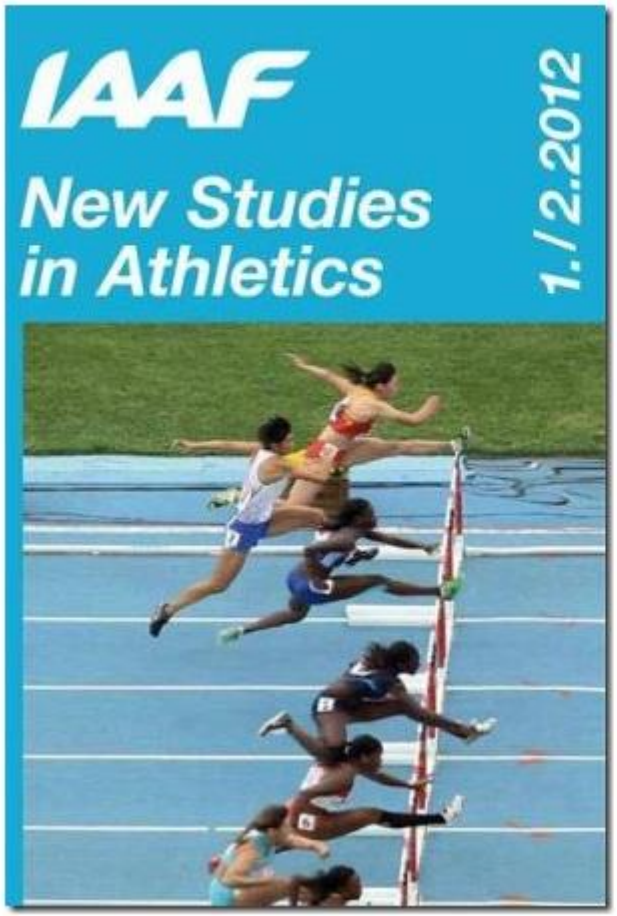
Heiner Brand
(ehe. Vorsitzender des Beirats der Trainerinnen und Trainer des DSB/Bereich Leistungssport und Trainer der deutschen Handball-Männernationalmannschaft)

Leistungssport Archiv
PDF-Artikel von 1971 - 2011

http://leistungssport.net/

swiss athletics

IAAF New Studies in Athletics



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http://www.iaaf.org/development/new-studies-in-athletics

www.iat-leipzig.de

Aktuelles Projekt Wurf/Stoß (Laufzeit: 2013-2017)

> Analyse und Beeinflussung der Beschleunigung der Wurfgeräte unter besonderer Berücksichtigung des Spannungsaufbaus (Projektleitung: PD Dr. Frank Lehmann)

Aktuelles Projekt Stabhochsprung (Laufzeit: 2013-2017)

> Untersuchungen zum Zusammenhang von Leistungsvoraussetzungen und Anlaufgeschwindigkeiten im Stabhochsprung (Projektleitung: Dr. Bettina Perlt)

Kooperationspartner

Deutscher Leichtathletik-Verband

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1. Lower Body Determinants of Running Economy in Male and Female Distance Runners.
Barnes KR, McGuigan MR, Kilding AE.
J **Strength** Cond Res. 2013 Oct 11. [Epub ahead of print]
PMID: 24126900 [PubMed - as supplied by publisher]
Related citations

2. Genomic haplotype within the Peroxisome Proliferator-Activated Receptor Delta (PPARD) gene is associated with elite athletic status.
Maciejewska-Karlowska A, Hanson ED, Sawczuk M, Cieszczyk P, Eynon N.
Scand J Med Sci Sports. 2013 Oct 14. doi: 10.1111/sms.12126. [Epub ahead of print]
PMID: 24118591 [PubMed - as supplied by publisher]
Related citations

3. A review of the management of patellofemoral pain syndrome.
Rixe JA, Glick JE, Brady J, Olympia RP.
Phys Sportsmed. 2013 Sep;41(3):19-28. doi: 10.3810/psm.2013.09.2023.
PMID: 24113699 [PubMed - in process]
Related citations

4. A Systematic Review of Dietary Protein During Caloric Restriction in **Resistance** Trained Lean **Athletes**: A Case for Higher Intakes.
Helms ER, Zinn C, Rowlands DS, Brown SR.
Int J Sport Nutr Exerc Metab. 2013 Oct 2. [Epub ahead of print]
PMID: 24092765 [PubMed - as supplied by publisher]
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J **Strength** Cond Res. 2013 Oct 1. [Epub ahead of print]

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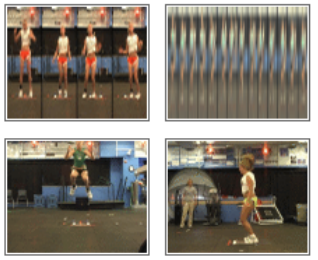

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Aktuelles

Forschungsbasis für den Leistungssport erweitert
14.10.2013

Wettkampfresultate

Apeldoorn NED
Radsport
18.10.2013-20.10.2013

Wroclaw POL
Gewichtheben
16.10.2013-23.10.2013

Almaty KAZ
Boxen
11.10.2013-27.10.2013

weitere Resultate →

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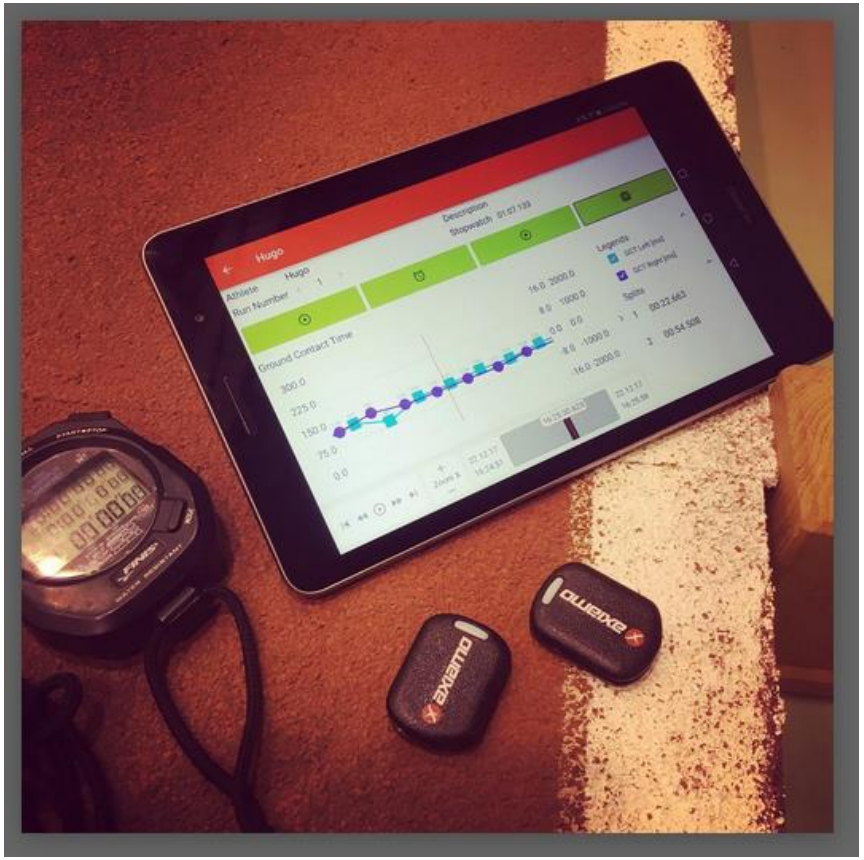
Hugo
Athlete Hugo
Run Number 1
Description
Stopwatch 01:07.139
Legends
Ground Contact Time
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225.0
150.0
75.0
0.0
Splits
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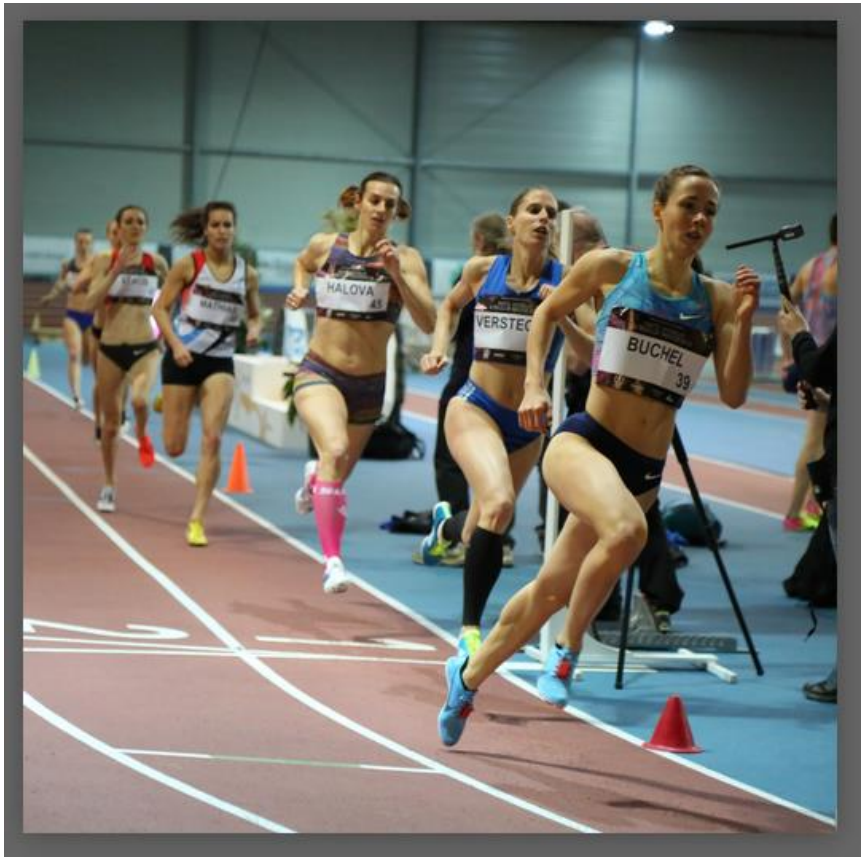
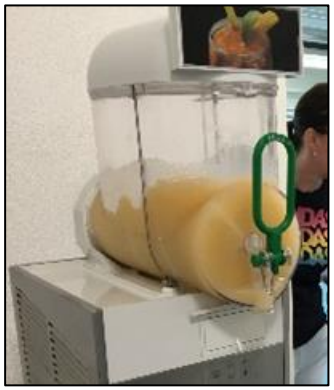
2 00:54.508
axiamo


HALOVA
BUCHEL
39


Beat the Heat

Projekt Beat the Heat



Effects of concurrent endurance and strength training on running economy and $\dot{V}O_2$ kinetics

GREGOIRE P. MILLET, BERNARD JAOUEN, FABIO BORRANI, and ROBIN CANDAU

UPRES-EA 2991, Sport, Performance, Santé; Faculté des Sciences du Sport, Montpellier, FRANCE; and CREPS de Montpellier, Montpellier, FRANCE

Abstract

- Zusammenfassung
- Gleiche Struktur wie den ganzen Artikel
- Schnell Methode und Konklusion lesen…

ABSTRACT

MILLET, G. P., B. JAOUEN, F. BORRANI, and R. CANDAU. Effects of concurrent endurance and strength training on running economy and $\dot{V}O_2$ kinetics. *Med. Sci. Sports Exerc.*, Vol. 34, No. 8, pp. 1351–1359, 2002. **Purpose:** It has been suggested that endurance training influences the running economy (CR) and the oxygen uptake ($\dot{V}O_2$) kinetics in heavy exercise by accelerating the primary phase and attenuating the $\dot{V}O_2$ slow component. However, the effects of heavy weight training (HWT) in combination with endurance training remain unclear. The purpose of this study was to examine the influence of a concurrent HWT+endurance training on CR and the $\dot{V}O_2$ kinetics in endurance athletes. **Methods:** Fifteen triathletes were assigned to endurance+strength (ES) or endurance-only (E) training for 14 wk. The training program was similar, except ES performed two HWT sessions a week. Before and after the training period, the subjects performed 1) an incremental field running test for determination of $\dot{V}O_{2max}$ and the velocity associated ($V_{\dot{V}O2max}$), the second ventilatory threshold (VT_2); 2) a 3000-m run at constant velocity, calculated to require 25% of the difference between $\dot{V}O_{2max}$ and VT_2, to determine CR and the characteristics of the $\dot{V}O_2$ kinetics; 3) maximal hopping tests to determine maximal mechanical power and lower-limb stiffness; 4) maximal concentric lower-limb strength measurements. **Results:** After the training period, maximal strength were increased ($P < 0.01$) in ES but remained unchanged in E. Hopping power decreased in E ($P < 0.05$). After training, economy ($P < 0.05$) and hopping power ($P < 0.001$) were greater in ES than in E. $\dot{V}O_{2max}$, leg hopping stiffness and the $\dot{V}O_2$ kinetics were not significantly affected by training either in ES or E. **Conclusion:** Additional HWT led to improved maximal strength and running economy with no significant effects on the $\dot{V}O_2$ kinetics pattern in heavy exercise. **Key Words:** ENERGY COST, MAXIMAL OXYGEN CONSUMPTION, OXYGEN UPTAKE SLOW COMPONENT, HOPPING POWER

Methode

- Probanden (Geschlecht, Alter, Niveau, Anzahl (« n »), etc…)
- Was für einen (Leistungs)Test
- Wie wurde trainiert (falls intervetionstudie)
- Wann und wie wurde getestet (labor vs field, etc…)
- Kompatibilität mit der Realität
- Was wurde wie gerechnet/ausgewertet

TABLE 1. Main characteristics of the endurance strength (ES) and endurance-only (E) triathletes.

				Training Characteristics					
	Age (yr)	Height (cm)	Weight (kg)	Total Training (yr)	Swimming ($km \cdot wk^{-1}$)	Cycling ($km \cdot wk^{-1}$)	Running ($km \cdot wk^{-1}$)	Stretching ($h \cdot wk^{-1}$)	Amount ($h \cdot wk^{-1}$)
ES ($N = 7$)	24.3 ± 5.2	175.4 ± 9.1	67.4 ± 8.8	7.0 ± 2.6	18.3 ± 5.0	221 ± 49	48 ± 7	1.6 ± 0.5	20.5 ± 3.8
E ($N = 8$)	21.4 ± 2.1	175.4 ± 5.4	65.0 ± 7.4	6.6 ± 1.7	19.8 ± 4.0	210 ± 50	44 ± 5	1.6 ± 0.5	20.3 ± 3.0

Weight, pretraining weight.

Resultate

- Mittelwert ± Standardabweichung
- Statistik : Signifikant vs nicht signifikant
- Grafiken: Skalen, absolut vs relativ

- Korrelationen :
  - $R^2 < 0.5$ = poor
  - $R^2 > 0.75$ = very good

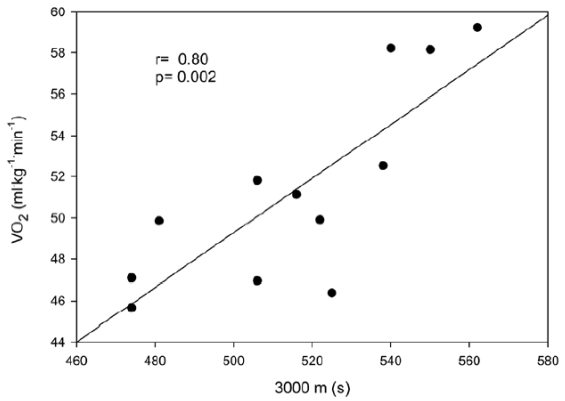


Figure 2 — Relationship between personal-best time in 3000-m run and oxygen consumption (VO_2) during stage 3 (241.2 m·min^{-1}) of treadmill test.

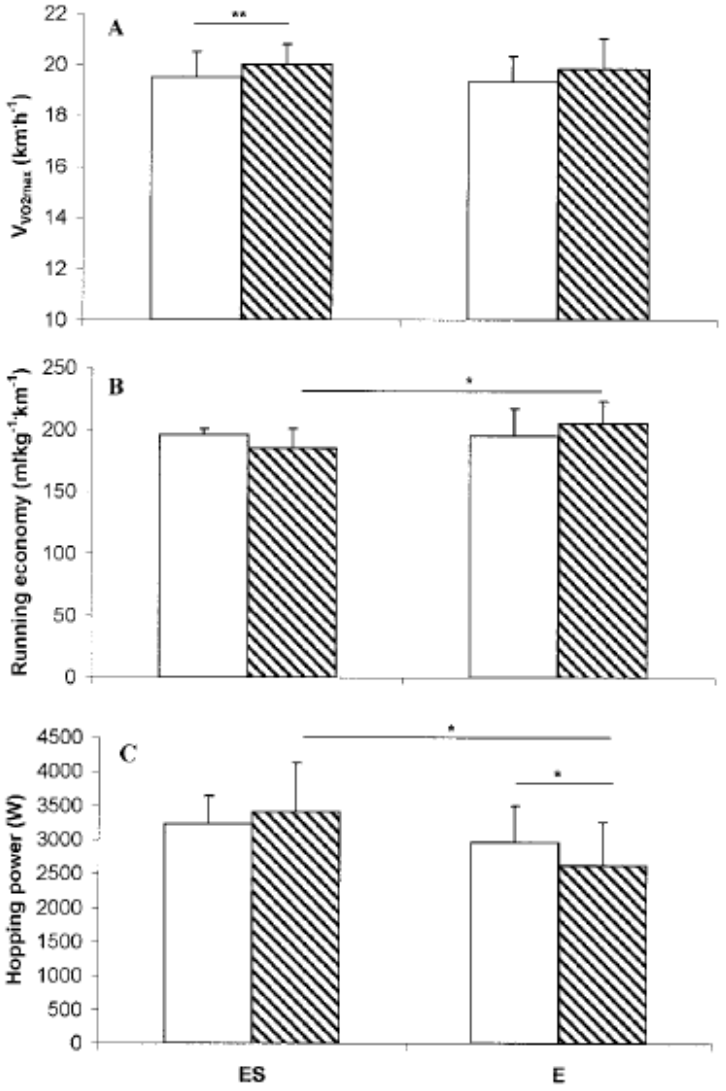


FIGURE 2—Change in (A) the velocity associated with $\dot{V}O_{2max}$ ($V_{\dot{V}O2max}$, km·h^{-1}); (B) the running economy (mL·kg^{-1}·km^{-1}); and (C) the maximal hopping power (W), between pre- (*white bar*) and post-training (*black bar*) in the endurance-strength (ES; $N = 7$) and endurance-only (E; $N = 8$) groups. *$P < 0.05$, **$P < 0.01$.

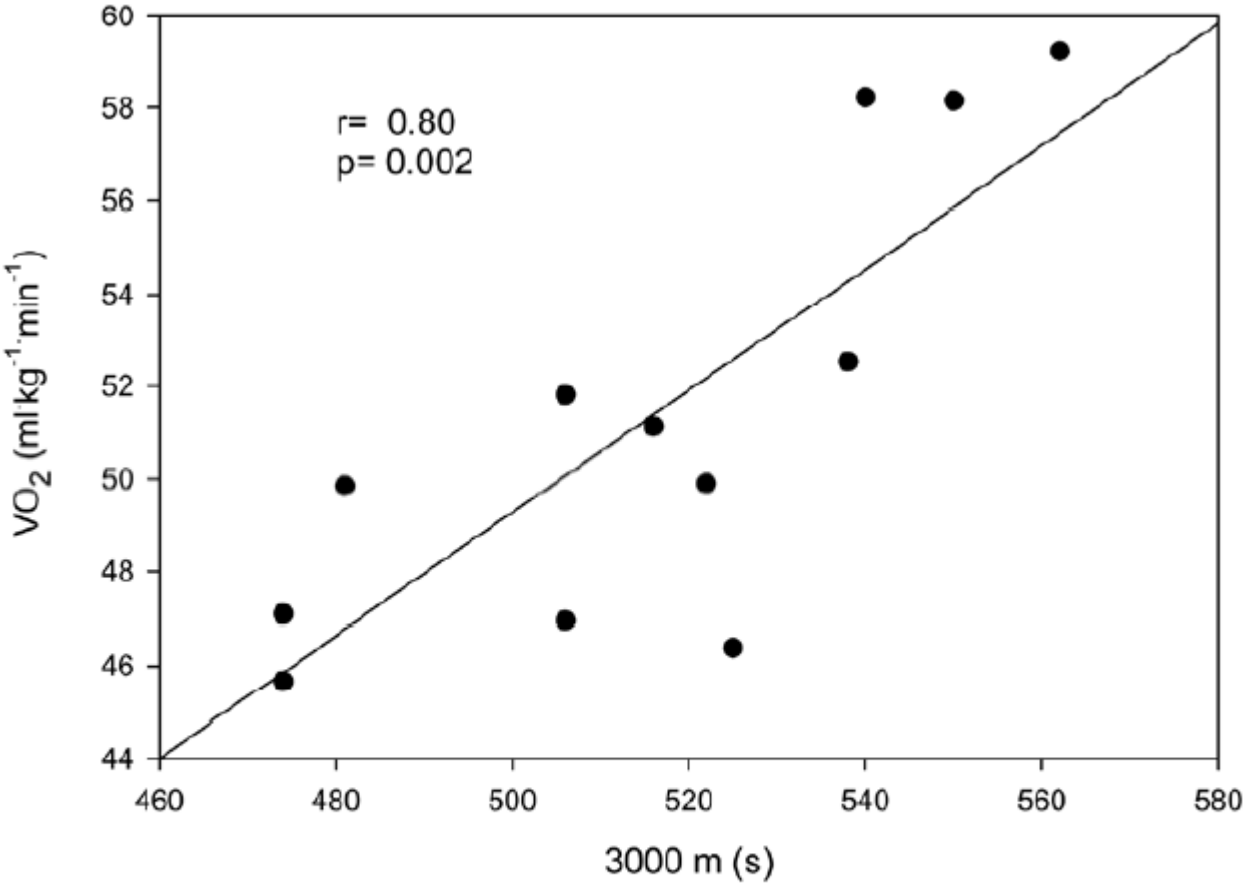


Figure 2 — Relationship between personal-best time in 3000-m run and oxygen consumption (VO_2) during stage 3 (241.2 m·min^{-1}) of treadmill test.

		Olympic Games (London 2012, Beijing 2008)				World Championships (Moscow 2013, Daegu 2011)				European Championships (Helsinki 2012, Barcelona 2010)				U20 World Championships (Barcelona 2012)				Total (ohne U20WM)			
			Leistungsein busse	new SB ?			Leistungsein busse	new SB ?			Leistungsein busse	new SB ?			Leistungsein busse	new SB ?			Leistungsein busse	new SB ?	
Event	Sex	n	(%)	YES	NO	n	(%)	YES	NO	n	(%)	YES	NO	n	(%)	YES	NO	n	(%)	YES	NO
100m	m	76	-0.7	28.9	71.1	85	-1.9	10.6	89.4	50	-1.1	20.0	80.0	53	-1.8	17.0	83.0	211	-1.3	19.4	80.6
	w	76	-0.8	28.9	71.1	69	-1.2	11.6	88.4	50	-0.9	32.0	68.0	37	-1.6	13.5	86.5	195	-1.0	23.6	76.4
200m	m	72	-0.7	30.6	69.4	89	-1.6	19.1	80.9	52	-1.1	13.5	86.5	53	-1.0	20.8	79.2	213	-1.2	21.6	78.4
	w	70	-0.8	35.7	64.3	73	-1.1	21.9	78.1	46	-0.6	30.4	69.4	44	-1.2	29.5	70.5	189	-0.9	29.1	70.9
400m	m	84	-0.8	36.9	63.1	51	-0.7	31.4	68.6	49	-0.3	34.7	65.3	54	-1.0	22.2	77.8	184	-0.6	34.8	65.2
	w	76	-1.2	22.4	77.6	60	-1.1	30.0	70.0	40	-0.9	25.0	75.0	33	0.0	60.6	39.4	176	-1.1	25.6	74.4
800m	m	83	-1.4	14.5	85.5	69	-1.5	11.6	88.4	58	-2.1	5.2	94.8	52	-1.6	17.3	82.7	210	-1.6	11.0	89.0
	w	57	-0.8	36.8	63.2	56	-1.0	32.1	67.9	33	-1.1	27.3	72.7	40	-1.5	30.0	70.0	146	-0.9	32.9	67.2
1500m	m	67	-2.1	9.0	91.0	58	-2.4	1.7	98.3	48	-2.7	0.0	100.0	34	-2.0	8.8	91.2	173	-2.4	4.1	95.9
	w																			14.2	85.8
5000m	m																			3.2	96.8
	w																			27.5	72.5
10000m	m																			13.7	86.3
	w																			33.3	66.7
110m hurdles / 100m hurdles	m																			29.2	70.8
	w																			26.7	73.3
400m hurdles	m																			33.5	66.5
	w																			34.0	66.0
3000m Steeplechase	m																			19.5	80.5
	w																			32.6	67.4
Long Jump	m	59	-5.2	0.0	100.0	50	-4.2	6.0	94.0	40	-1.8	32.5	67.5	24	-2.8	16.7	83.3	149	-4.0	10.7	89.3
	w	51	-4.4	11.8	88.2	56	-5.0	7.1	92.9	42	-3.4	21.4	78.6	30	-2.8	20.0	80.0	149	-4.3	12.7	87.3
High Jump	m	57	-2.9	7.0	93.0	60	-2.1	18.3	81.7	41	-2.8	7.3	92.7	28	-2.5	10.7	89.3	158	-2.6	11.4	88.6
	w	57	-2.3	24.6	75.4	52	-2.1	25.0	75.0	41	-1.6	36.6	63.4	27	-2.8	7.4	92.6	150	-2.0	28.0	72.0
Pole Vault	m	54	-2.8	11.1	88.9	58	-2.8	19.0	81.0	39	-1.9	33.3	66.7	28	-1.4	25.0	75.0	151	-2.6	19.9	80.1
	w	65	-4.0	15.4	84.6	47	-2.1	23.4	76.6	41	-2.8	22.0	78.0	25	-2.8	20.0	80.0	153	-3.1	19.6	80.4
Triple Jump	m	57	-2.4	12.3	87.7	41	-1.9	17.1	82.9	38	-1.3	36.8	63.2	27	-2.4	25.9	74.1	136	-1.9	20.6	79.4
	w	56	-2.8	14.3	85.7	52	-2.9	11.5	88.5	41	-1.4	31.7	68.3	24	-2.0	20.8	79.2	149	-2.4	18.1	81.9
Shot Put	m	68	-4.0	11.8	88.2	51	-4.3	7.8	92.2	33	-3.1	9.1	90.9	34	-2.6	23.5	76.5	152	-3.9	9.9	90.1
	w	58	-3.7	24.1	75.9	51	-3.2	15.7	84.3	36	-3.0	8.3	91.7	19	-3.1	15.8	84.2	145	-3.4	17.2	82.8
Javelin Throw	m	73	-5.9	9.6	90.4	63	-5.5	7.9	92.1	42	-5.8	9.5	90.5	44	-6.4	13.6	86.4	178	-5.7	9.0	91.0
	w	78	-5.2	11.5	88.5	52	-3.1	21.2	78.8	36	-6.6	5.6	94.4	33	-5.1	21.2	78.8	166	-4.8	13.3	86.7
Discus Throw	m	73	-5.9	2.7	97.3	58	-5.7	1.7	98.3	54	-5.5	5.6	94.4	25	-4.3	16.0	84.0	185	-5.7	3.2	96.8
	w	70	-4.8	10.0	90.0	46	-4.9	8.7	91.3	41	-5.7	4.9	95.1	34	-7.5	8.8	91.2	157	-5.1	8.3	91.7
Hammer Throw	m	62	-5.0	8.1	91.9	57	-4.1	12.3	87.7	47	-4.6	8.5	91.5	44	-4.9	20.5	79.5	166	-4.6	9.7	90.3
	w	78	-5.2	7.7	92.3	51	-3.8	21.6	78.4	38	-5.5	5.3	94.7	30	-3.5	26.7	73.3	167	-4.8	11.4	88.6
Decathlon/ Heptathlon	m	43	-1.5	25.6	74.4	37	-0.7	37.8	62.2	29	-0.8	41.4	58.6	13	1.5	84.6	15.4	109	-1.0	33.9	66.1
	w	55	-0.8	38.2	61.8	49	-1.2	26.5	73.5	24	0.6	54.2	45.8	22	0.0	40.9	59.1	128	-0.7	36.7	63.3
Total	**m**	**1234**	**-2.6**	**17.5**	**82.5**	**1094**	**-2.6**	**13.8**	**86.2**	**847**	**-2.2**	**19.0**	**81.0**	**690**	**-2.3**	**20.3**	**79.7**	**3175**	**-2.5**	**16.6**	**83.4**
	w	**1220**	**-2.4**	**24.4**	**75.6**	**1014**	**-2.2**	**19.8**	**80.2**	**734**	**-2.0**	**25.5**	**74.5**	**564**	**-2.2**	**28.2**	**71.8**	**2968**	**-2.2**	**23.1**	**76.9**

Vergleich Meldeleistung vs Leistung am Grossanlass

TN Barcelona 2010 : schon dabei als Nachwuchs ?

- U18 WM
- U20 EM

- U23 EM
- U20 EM

- Limite EM U20 als U20 aber nicht dabei

MEN
86%

WOMEN
88%

SUI-Delegation (Stadion Leichtathletik) an der EM 2014 ?

25/29 = 86%

Auftrag:

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