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PHYSIOLOGICAL ATTRIBUTES



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Physiological Attributes

Endurance sport



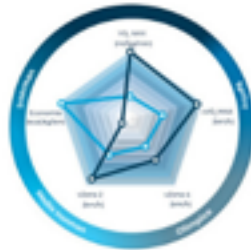
Measuring fitness



Physiological
determinants of
endurance
performance



Physiological
Profiles



Multifactorial
nature of
endurance
training



Physiological characteristics of elite triathletes





VO2max

Maximal oxygen uptake (VO2max) is a measure of the maximum amount of oxygen that an individual can use per unit of time during strenuous physical exertion at sea level (Deuster & Heled, 2008)

Reference	Population	Gender	N	VO ₂ max	Device
Laurenson, Fulcher, & Korkia, 1993	Elite	Female	10	65.6±6.0	Treadmill
Millet & Vleck, 2000	Elite	Female	7	58.0±4.7	
Schabert et al., 2000	Elite	Female	5	63.2±3.6	Treadmill
	Elite	Female	5	61.3±4.6	Cycle-ergometer
Millet & Bentley, 2004	Elite	Female	9	61.0±5.0	Cycle-ergometer
	Elite	Male	9	74.3±4.4	Cycle-ergometer
	Junior	Female	6	60.1±1.8	Cycle-ergometer
	Junior	Male	7	74.7±5.7	Cycle-ergometer
Gianfelici et al., 2012	U23	Male	7	71.4±3.96	Cycle-ergometer
	U23	Male	7	70.3±6.65	Treadmill

VO2max values of national level (elite) triathletes in different categories adapted from Cuba-Dorado's thesis (Cuba-Dorado, 2017)

Physiological Profile - Running

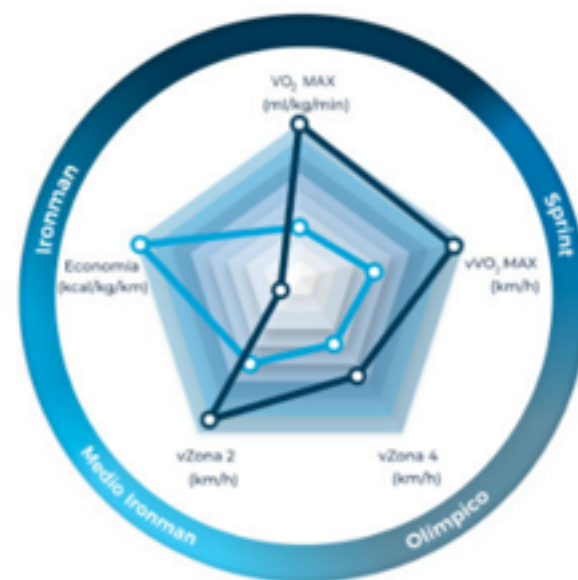
Identifying your athlete's physiological strengths and weaknesses is key.



Physiological profile of running.
(Esteve-Lanao, 2009)

**ALL IN
YOUR MIND**
TRAINING SYSTEM

Variable	Actual	Julio 2018
Economía (kcal/kg/km)	3.9	6.9
Economía (mL/kg/km)	4.5	7.6
VO ₂ pico /max (mL/kg/min)	7.0	4.9
vVO ₂ pico /max (km/h)	6.8	5.1
vZona 4 (km/h)	5.5	4.7
vZona 2 (km/h)	6.6	5.2
Reserva Velocidad Anaeróbica (km/h)	--	--
DMAO (mL/kg)	--	--



Report: Good overall running fitness. Strength: VO2max: Weakness: running economy

Physiological Profile - Running

The following table describes different physiological factors in each column, and for each one lists values that are considered excellent to poor

Category	PERFIL FISIOLÓGICO ATYM	VO ₂ MAX (ml/kg/min)		ECONOMÍA (ml/kg/km)		VO ₂ MAX (km/h)		V _{2do} Umbral (km/h)		V _{1er} Umbral (km/h)		DMQA (ml / kg)	CAPACIDAD ANAEROBICA (cal/kg)	2do Umbral (% VO ₂ max)	ÍNDICE DE RESISTENCIA (nivel mínimo)	RVA
		MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE					
Excellent	10	85	75	160	0.840	24	21.8	21.6	19.6	18.5	16.8	75	390	95	-3	10.0
	9	80	70	171	0.906	22.2	20	20	18	17.1	15.4	70	374	93	-3.5	9.3
Very good	8	75	65	182	0.972	21.8	19	19.6	17.1	16.7	14.5	65	358	90	-4	8.6
	7	70	60	193	1.038	20	17.5	18	15.8	15.2	13.3	60	342	85	-4.5	7.9
Good	6	65	55	204	1.104	19	16.5	17.1	14.9	14.3	12.5	55	326	83	-5	7.2
	5	60	50	215	1.170	17.5	14.8	15.8	13.3	13.1	11.1	50	310	80	-6	6.5
Average	4	55	45	226	1.236	16	13.2	14.4	11.9	11.8	9.8	45	293	78	-7	5.8
	3	50	40	237	1.302	14.6	11.7	13.1	10.6	10.7	8.6	40	276	75	-8	5.1
Low	2	45	35	248	1.368	13.2	10.2	11.9	9.2	9.5	7.4	35	259	70	-9	4.4
	1	40	30	259	1.434	11.7	8.7	10.5	7.8	8.3	6.1	30	242	65	-11	3.7
Very low	0	35	25	270	1.500	10.2	7.1	9.2	6.4	7.1	4.9	25	225	60	-13	3.0

Tabla 2.1.7
Reference scale

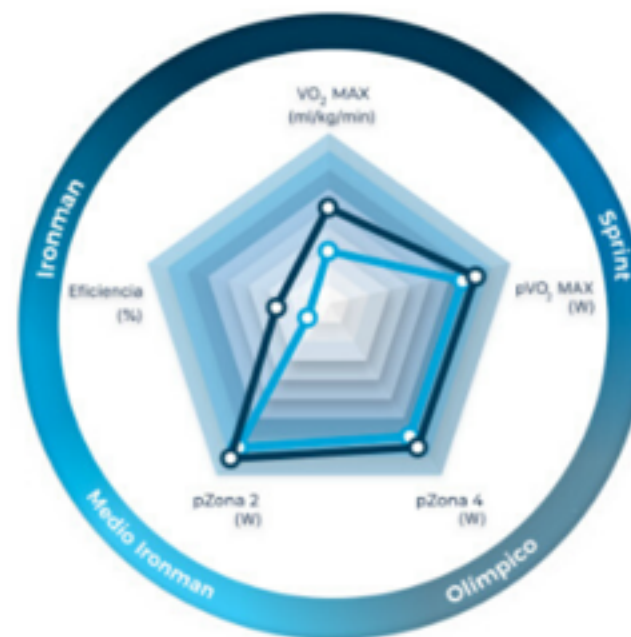
Power Profiling Cycling

Power Profiling is an approach that gives data for your athletes across a range of different durations\intensities, and it helps to build an accurate picture of the athlete.



Physiological profile of cycling

Variable	Actual	Julio 2018
pPico / pVO ₂ MAX (W):	7.7	7.2
VO ₂ Pico / VO ₂ MAX:	6.3	4.7
pUmbral Anaeróbico (W):	7.6	7.1
pUmbral Aeróbico (W):	8.1	7.6
Eficiencia (%):	4.0	2.8
DMAO (ml/kg):	--	--
pRel Potencia Pico (w/kg):	5.9	5.2
pRel Umbral Anaeróbico (w/kg):	5.9	5.0
pRel Umbral Aeróbico (w/kg):	5.7	4.7
Reserva de Potencia Anaeróbica (W):	--	--



Power Profile Cycling

The following table describes different ranges of Watts/kg for different Physiological capacities

Tabla 2.1.9
Reference
scale
Adapted from
Allen &
Coggan 2016

Category	PERFIL POTENCIA AIYM	p5s		p1min		p5min		p60min		Res Pot An
		H	M	H	M	H	M	H	M	
		W/Kg	W/Kg	W/Kg	W/Kg	W/Kg	W/Kg	W/Kg	W/Kg	
Excellent	10	23.22	18.77	11.16	9.02	7.29	6.33	6.13	5.44	20.00
	9	22.14	17.91	10.70	8.66	6.88	5.96	5.78	5.12	18.37
Very good	8	21.05	17.05	10.24	8.29	6.47	5.59	5.42	4.79	16.74
	7	19.69	15.97	9.66	7.84	5.95	5.13	4.98	4.38	15.11
Good	6	18.33	14.89	9.09	7.39	5.43	4.67	4.53	3.95	13.48
	5	16.97	13.82	8.51	6.93	4.90	4.30	4.09	3.55	11.85
Average	4	15.61	12.74	7.94	6.48	4.39	3.74	3.64	3.14	10.22
	3	14.25	11.66	7.36	6.03	3.87	3.28	3.20	2.73	8.59
Low	3	12.89	10.58	6.79	5.57	3.35	2.82	2.75	2.32	6.96
	2	11.53	9.51	6.21	5.12	2.84	2.35	2.31	1.91	5.33
Very low	0	10.17	8.43	5.64	4.67	2.33	1.89	1.86	1.50	3.70

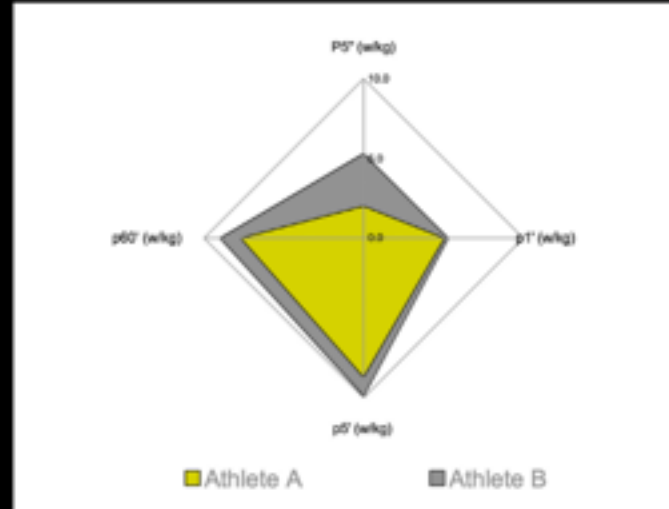
ALL IN
YOUR MIND
TRAINING SYSTEM

Measuring Fitness

The physiological assessment of athletes can be used to identify factors related to performance and to monitor specific adaptation, which provides further evidence for the prescription of training



Practical Coaching Applications





Take Home Message

- The physiological demands of triathlon have been widely researched and the factors underpinning performance are widely known.
- It is a priority for coaches to identify athletes' strengths and weaknesses should be the priority of coaches in order to prescribe the right training and implement the required strategies for helping them become the best they can be.
- Setting a physiological profile will provide coaches with a complete picture of the athlete and give them valuable information for the decision making process



Q & A



UPCOMING WEBINAR

**ATHLETE
DEVELOPMENT
MODEL**

PERSONAL CHARACTERISTICS

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