



**50 años**  
FEDERACIÓN DE  
**TRIATLÓN**  
COMUNITAT VALENCIANA

**ALL  
IN YOUR  
MIND**  
TRAINING  
SYSTEM

10 de Diciembre 2020

**Jornadas Técnicas**  
**Federación Valenciana de Triatlón**

# **Distribución de la Intensidad**

Jonathan Esteve Lanao

## **CONTENIDOS**

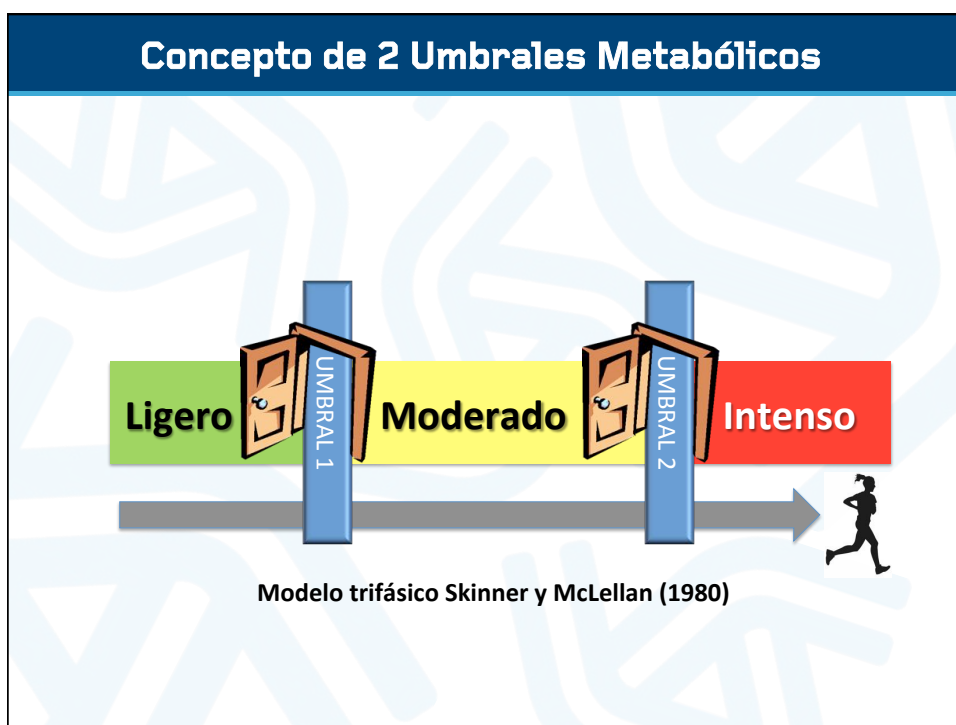
- **Concepto de Distribución de la Intensidad**
- **Posicionamiento General**
- **Situaciones a considerar**
- **Sugerencias por pruebas y nivel**
- **Herramienta para calcularla**

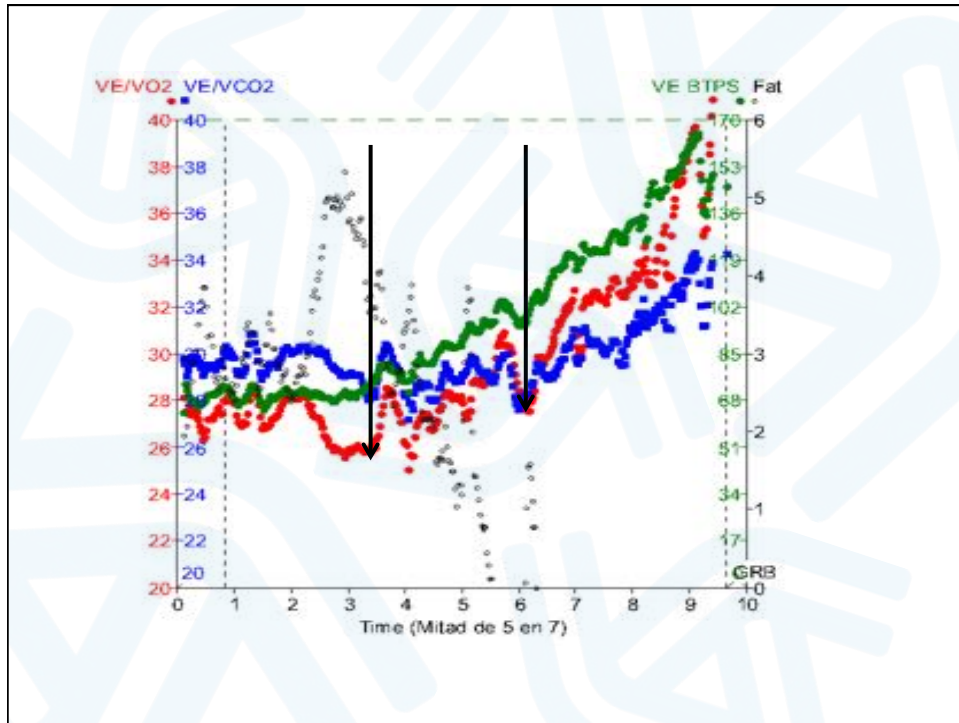
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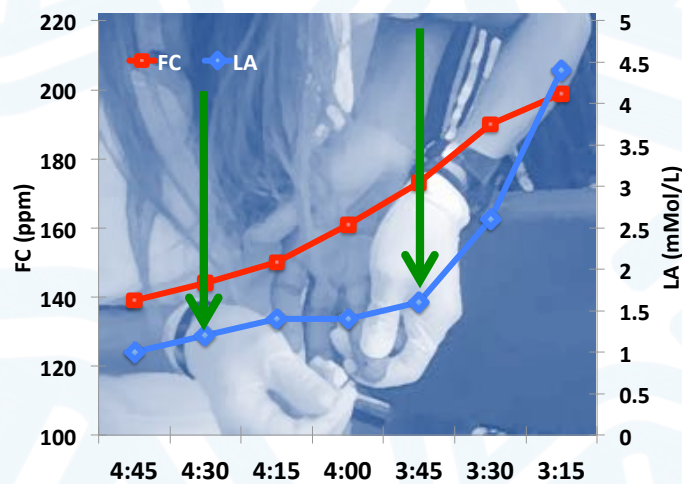


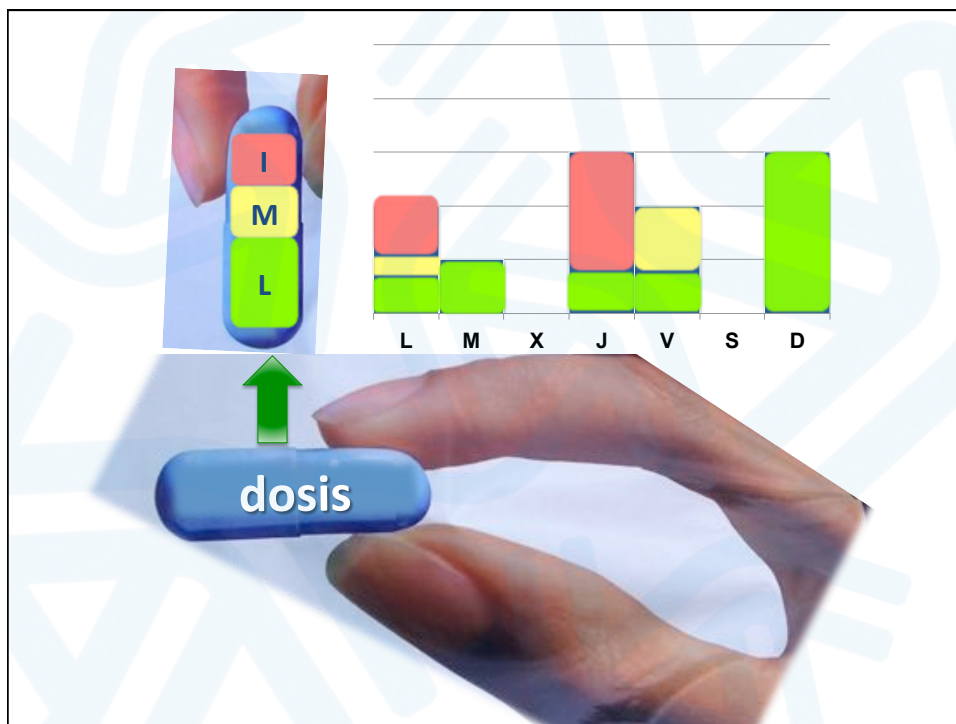
# 1. Concepto General





**Se puede identificar los umbrales con tests de lactato (y relacionar variables)**

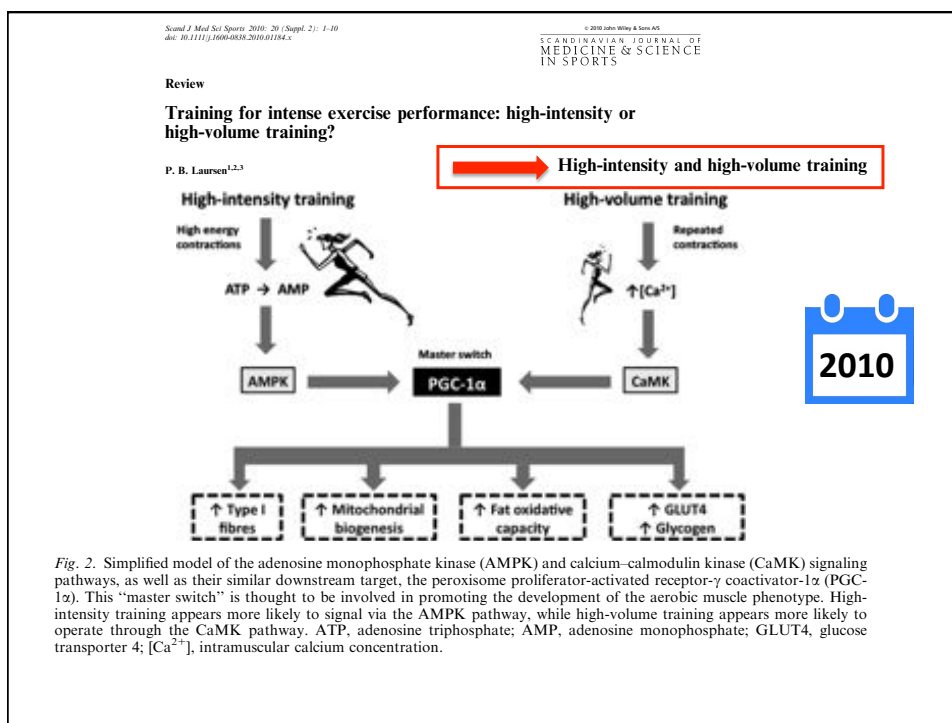
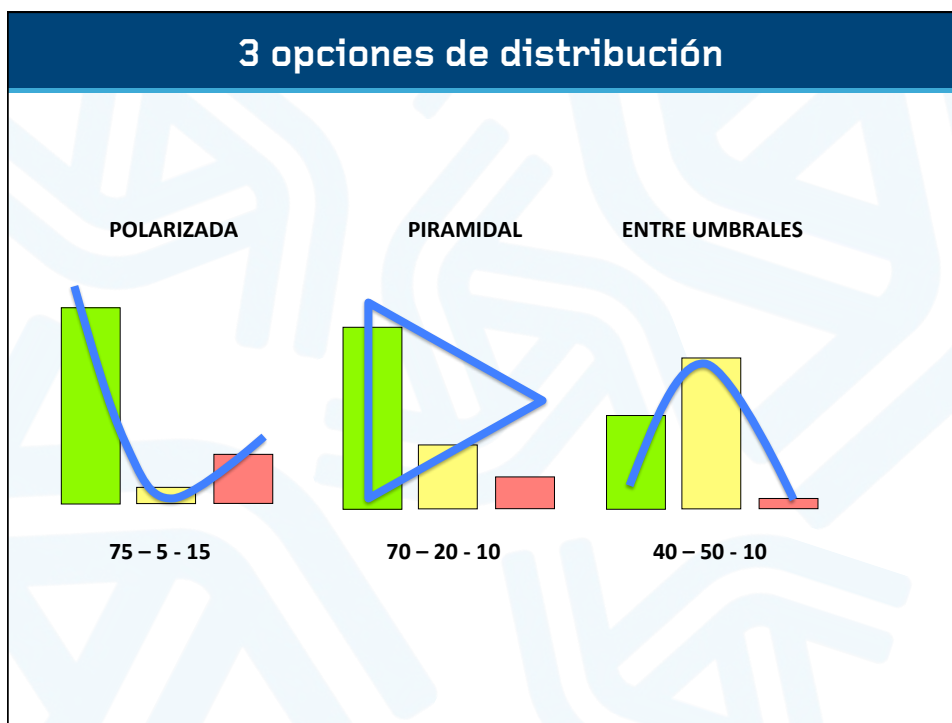




**Distribución de la Intensidad**

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# 2. Posicionamiento General



## How Do Endurance Runners Actually Train? Relationship with Competition Performance

JONATHAN ESTEVE-LANA<sup>1</sup>, ALEJANDRO F. SAN JUAN<sup>1</sup>, CONRAD P. EARNEST<sup>2</sup>, CARL FOSTER<sup>3</sup>, and ALEJANDRO LUCIA<sup>1</sup>

<sup>1</sup>Exercise Physiology Laboratory, European University of Madrid, SPAIN; <sup>2</sup>Cooper Institute Center for Human Performance and Nutrition Research, Dallas, TX; and <sup>3</sup>University of Wisconsin-La Crosse, La Crosse, WI

**Volumen en Zona 1 única variable que discrimina el rendimiento, aunque las competiciones son cerca de VO<sub>2</sub> max**



**“Haz todo el entrenamiento Intenso posible, y todo el entrenamiento Suave que puedas que no te canse para las sesiones fuertes”**

## Autonomic Recovery after Exercise in Trained Athletes: Intensity and Duration Effects

STEPHEN SEILER<sup>1,2</sup>, OLAV HAUGEN<sup>1</sup>, and ERIN KUFFEL<sup>1</sup>

<sup>1</sup>Faculty of Health and Sport, Agder University College, Kristiansand, NORWAY; and <sup>2</sup>Sorlandet Regional Hospital, Kristiansand, NORWAY

**La Potencia de la respuesta genética a una señal de ‘Volumen x Intensidad’ cambia rápidamente**

**Se observan rápidamente efectos ‘techo’ con el ejercicio intenso**

**Una mayor frecuencia de ejercicio a baja intensidad podría amplificar la expresión total de la señal de expresión genética**



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Latest issue

Perspectives / Training

This issue

Intervals, Thresholds, and Long Slow Distance: the Role of Intensity and Duration in Endurance Training

Stephen Seiler<sup>1</sup> and Espen Tønnessen<sup>2</sup>

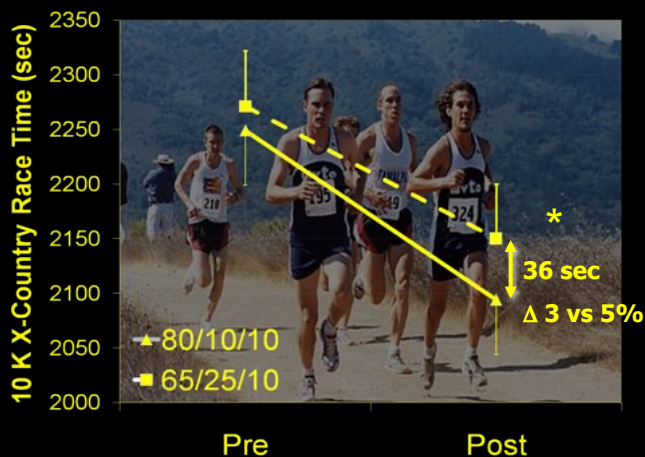
Sports Science 13, 32-53, 2009 (sportsci.org/2009/ss.htm)

**Possible Negative Effect of Moderate Training:****No produce una capacidad oxidativa superior en el músculo****Reclutamiento y Fatiga prematura de fibras rápidas****Efecto Agudo: Recuperación Más Lenta Sistema Nervioso Autónomo (SNA)****Efecto Crónico: regulación a la baja SNA**

2009

**'No-Training Zone'**Journal of Strength and Conditioning Research, 2007, 21(3), 943-949  
© 2007 National Strength & Conditioning Association**IMPACT OF TRAINING INTENSITY DISTRIBUTION ON PERFORMANCE IN ENDURANCE ATHLETES**JONATHAN ESTEVE-LANA<sup>1</sup>, CARL FOSTER<sup>2</sup>, STEPHEN SEILER<sup>3</sup> AND ALEJANDRO LUCIA<sup>1</sup><sup>1</sup>Exercise Physiology Laboratory, European University of Madrid, Madrid, Spain; <sup>2</sup>Department of Exercise and Sport Science, University of Wisconsin-La Crosse, La Crosse, Wisconsin 54601; <sup>3</sup>Faculty of Health and Sport, Agder University College, Kristiansand, Norway.

2007



International Journal of Sports Physiology and Performance, 2014, 9, 265-272  
<http://dx.doi.org/10.1123/IJSP.2012-0350>  
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INTERNATIONAL JOURNAL OF  
**SPORTS PHYSIOLOGY  
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[www.IJSP-Journal.com](http://www.IJSP-Journal.com)  
 ORIGINAL INVESTIGATION

## Does Polarized Training Improve Performance in Recreational Runners?

Iker Muñoz, Stephen Seiler, Javier Bautista, Javier España, Eneko Larumbe, and Jonathan Esteve-Lanao

2014



International Journal of Sports Physiology and Performance, 2014, 9, 332-339  
<http://dx.doi.org/10.1123/IJSP.2012-0352>  
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INTERNATIONAL JOURNAL OF  
**SPORTS PHYSIOLOGY  
 AND PERFORMANCE**  
[www.IJSP-Journal.com](http://www.IJSP-Journal.com)  
 ORIGINAL INVESTIGATION

## Training-Intensity Distribution During an Ironman Season: Relationship With Competition Performance

Iker Muñoz, Roberto Cejuela, Stephen Seiler, Eneko Larumbe, and Jonathan Esteve-Lanao

Variable	Sport		
	Swim	Bike	Run
Total training time	-.303	-.898**	-.459
Training time in zone 1	-.346	-.949**	-.916**
Training time in zone 2	.042	.455	.461
Training time in zone 3	.400	.354	.199
% training time in zone 1	-.237	-.896**	-.844**
% training time in zone 2	.289	.896**	.848**
% training time in zone 3	-.326	.728*	.207
Total training TRIMPs	-.247	-.592	.065
Load in zone 1 TRIMPs	-.400	-.942**	-.918**
Load in zone 2 TRIMPs	.019	.454	.471
Load in zone 3 TRIMPs	-.400	.333	.205

\* $P < .05$ . \*\* $P < .01$ .

Abbreviations: TRIMP, training impulse

2014



Jonathan Esteve-Lanao<sup>1</sup>, Diego Moreno-Pérez<sup>1,2</sup>, Claudia A. Cardona<sup>1,3</sup>, Eneko Larumbe-Zabala<sup>4</sup>, Iker Muñoz<sup>5</sup>, Sergio Sellés<sup>6</sup> and Roberto Cejuela<sup>1,4\*</sup>

	IM	42k
<b>TOTAL</b>		
Total training time (h)	-0.59 (0.021)	-0.80 (<0.001)
Total training load (ECCs)	-0.04 (0.894)	-0.73 (0.002)
<b>ZONE &lt;AeT</b>		
Training time in zone <AeT	-0.74 (0.002)	-0.82 (<0.001)
% of Time in zone <AeT	-0.70 (0.004)	-0.10 (0.723)
% of Load in zone <AeT	-0.60 (0.019)	0.37 (0.175)
<b>ZONE BAeT-AnT</b>		
Training Time in zone BAeT-AnT	0.47 (0.015)	0.11 (0.703)
% of Time in zone BAeT-AnT	0.71 (0.003)	0.66 (0.008)
% of Load in zone BAeT-AnT	0.54 (0.038)	0.79 (<0.001)
<b>ZONE &gt;AnT</b>		
Training time in zone >AnT	0.30 (0.223)	-0.77 (0.001)
% of Time in zone >AnT	0.44 (0.098)	-0.74 (0.002)
% of Load in zone >AnT	0.30 (0.234)	-0.81 (<0.001)

2017

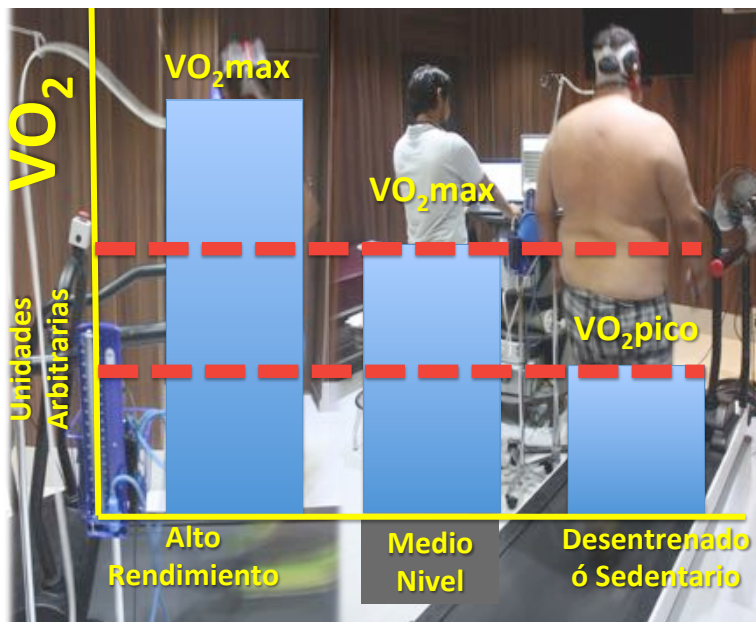
## Distribución de la Intensidad



# 3. Consideraciones en la práctica



## Por qué funciona entrenar mucho tiempo suave en entrenados



## Cuidado con los estudios que no tienen un contexto práctico

Six weeks of a polarized training-intensity distribution leads to greater physiological and performance adaptations than a threshold model in trained cyclists.  
 J Appl Physiol. 2013 May 15;114(10):1490.



**Polarized model 80%, 0%, and 20%**

**'Threshold' model 57%, 43%, and 0%**

## Lo primero es evaluar bien las Zonas

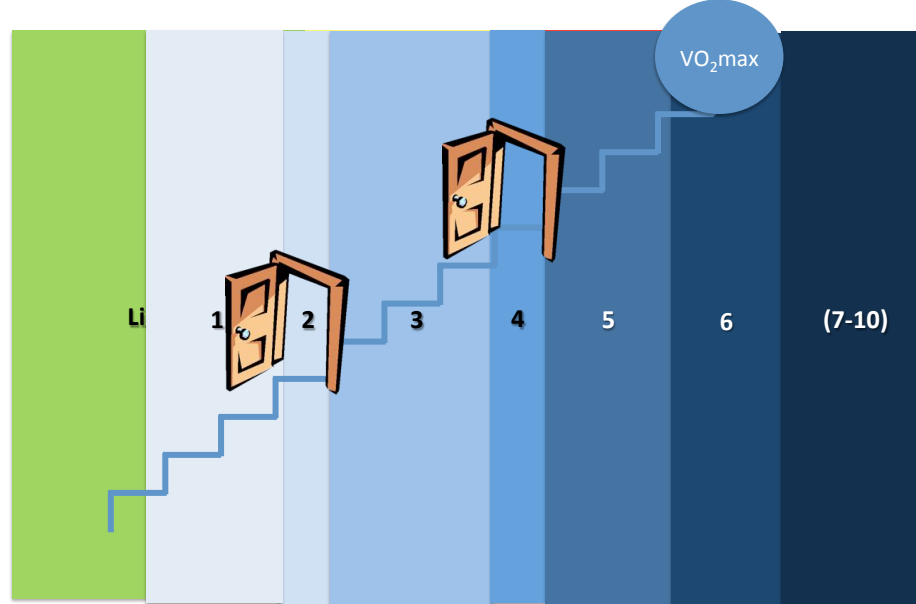
Si no evaluamos las zonas de manera específica, quién sabe qué distribución estamos llevando a cabo



## Si podemos medir, para qué vamos a estimar



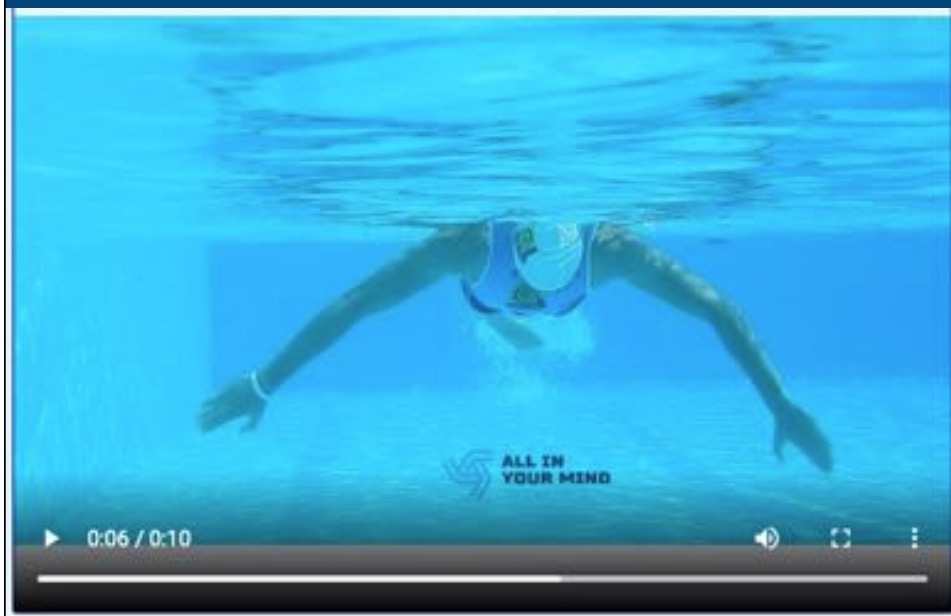
## Fases Metabólicas vs Zonas



## Definir criterios de cuantificación de la sesión



### Definir criterios de cuantificación de la sesión



### Definir criterios de cuantificación de la sesión





### Maneras de Acumular Más Intensidad

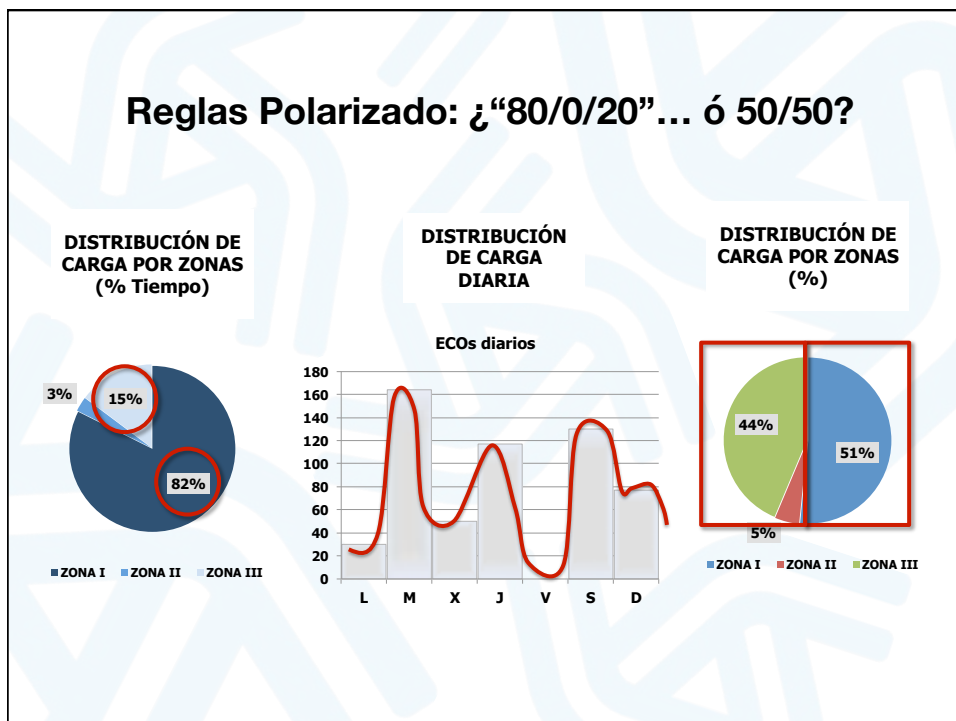
SEMANA TIPO NO-COMPETICIÓN INVIERNO
CC Ext + Multisaltos hor. + CC Int + Técnica + Rit Esp 8 x 1000
CC ext + Fuerza smax pot res + Multis. Hor. + IT ext.l. 15 x 600
CC ext + CC Ritmos alternativos 4 x (1000-3000)
CC ext + Fuerza smax pot res + Multis. Hor. + IT ext.m. 20 x 300
CC ext + Multis. Hor. + CC Int + Técnica + Rit Res. 2x(1500-1000-800)
CC ext + Cuestas medias 12 x 500
CC ext
SEMANA TIPO COMPETICIÓN INVIERNO
CC ext + Fartlek + Multisaltos horizontales
CC ext + Fuerza Resistencia + Rit Comp 2x(400-1000-400-1000-400)
CC ext + Estim. Max. + Cuestas cortas + IT Int.Corto 5 x 3 x 200
CC ext + Fuerza Res. + Multisaltos hor + Rit Res 2 x (2000-1500)
CC ext + cuestas cortas + IT ext largo 3 x 5 x 600
CC ext + Cuestas medias 10 x 300 + CC int
DESCANSO
SEMANA TIPO NO-COMPETICIÓN VERANO
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CC ext + Fuerza smax pot res + Multis. Horiz + IT ext L 2x6x600
CC ext + Técnica + Rit Res. 2 x 3 x 2000
CC ext + Fuerza smax pot res + Mult.Horiz + IT ext m 15 x 300
CC ext + Fartlek + técnica + CC Int.
CC ext + Cuestas largas 8 x 800
DESCANSO
SEMANA TIPO COMPETICIÓN VERANO
CC ext + técnica + Rit Res. 2 x (2000-1600-1200-800)
CC ext + Fuerza Resist + Multis. Horiz + IT int corto 2 x 15 x 200
CC ext + Rit Comp 2 x (400-1000-1000-1000-1000-400)
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CC ext + Pot ana. Alac + IT ext med 2 x 10 x 400
CC ext + veloc 4 x 150 + CC int
DESCANSO



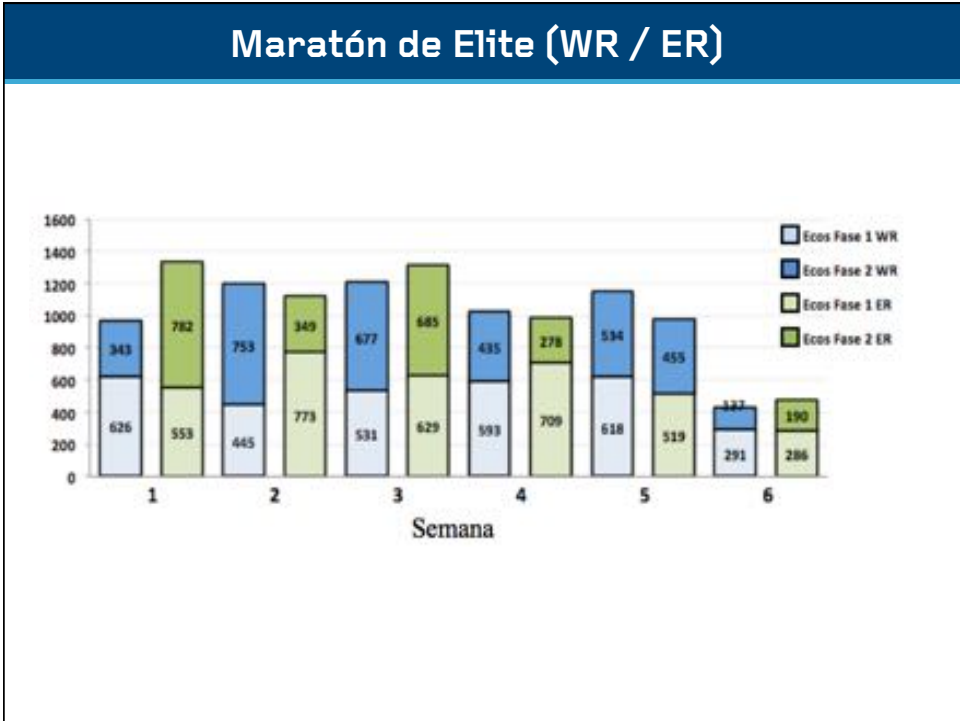
### ¿La Fuerza Cuenta?

General
Semanal

Fase	%Tiempo	%Carga	%Carga	<div style="font-size: 2em; font-weight: bold;">30.7</div> <div>Horas</div>	<div style="font-size: 1.5em; font-weight: bold;">Kms</div>	<div style="font-size: 1.5em; font-weight: bold;">ECoS</div>			
I	73	48	47					37	880
II	19	26	25					440	733
III	8	26	28					114	662
						83			







### Triatlón de Elite (Dist. Olímpica)

CARGA (ECDs)			VOLUMEN (Horas/kms)		
Triatleta	A	B	Triatleta	A	B
Carga 47 semanas	53523	40558	Horas 47 semanas	792	675
%F1	45	50	%F1	117	88
%F2	19	6	%F2	4	3
%F3	36	44	%F3	9	9
Promedio semanal	1135	1033	Promedio Horas/Semana	17	14
Pico Semanal	2108	1888	Pico Horas/Semana	26	25
Natación (%)	52	31	Natación Media kms (pico)	25	24
Ciclismo (%)	31	38	Ciclismo Media kms (pico)	304	281
Carrera (%)	37	39	Carrera Media kms (pico)	72	75

## ¿Polarizar vs la intensidad de competición?

Published online 2015 September 23.

Research Article

### Specific Intensity for Peaking: Is Race Pace the Best Option?

Iker Munoz<sup>1</sup>; Stephen Seiler<sup>2</sup>; Alberto Alcocer<sup>3</sup>; Natasha Carr<sup>4</sup>; Jonathan Esteve-Lanao<sup>1</sup>

<sup>1</sup>Department of Motricity and Sport Training Fundamentals European University of Madrid, Madrid, Spain

<sup>2</sup>Faculty of Health and Sport Sciences, University of Agder, Kristiansand, Norway

<sup>3</sup>Cardiometabolic Unity, Faculty of Medicine, Autonomous University of Yucatan, Merida, Mexico

<sup>4</sup>School of Nutrition and Health Promotion, Arizona State University, Tempe, USA

\*Corresponding author: Iker Munoz, European University of Madrid, Spain. Tel: +34-9120115500, E-mail: iker.munoz.perez@gmail.com



## ¿Cuánto por debajo del primer umbral "sirve"?


**Laursen, Rhodes:**

**"Ultra Umbral de Resistencia" (sub umbral aeróbico)**


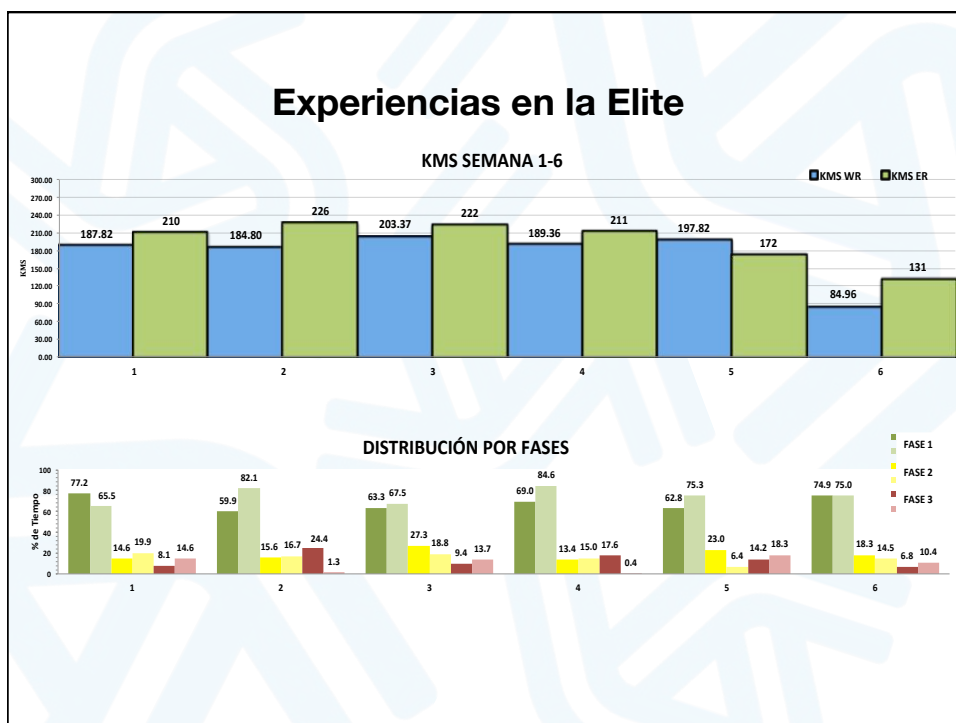
*Thus, an optimum ultraendurance intensity that may be relative to the AT intensity is needed to establish ultraendurance intensity guidelines. This optimal UET intensity could be referred to as the ultraendurance threshold.*

Laursen PB, Rhodes EC. Factors affecting performance in an ultraendurance triathlon. Sports Med. 2001;31(3):195-209. Review.

## Distribución de la Intensidad



# 4. Sugerencias por prueba y nivel

## Experiencias en la Elite

Review

### The training of international level distance runners

Leif Inge Tjelta

#### Abstract

A limited number of studies have examined the distribution of training at different intensities during longer training periods among elite runners. Runners who want to reach international level in distance running should run  $\geq 110$  km/week at the age of 18–19 years. For senior runners, it appears that training volumes around 150–200 km/week are appropriate for 5000 and 10,000 m runners and 120–160 km/week for 1500 m runners. It also appears to be beneficial to

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DOI: 10.1177/174954115624813  
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- Diferentes aproximaciones en la Elite compensando HVLI - LVHI
- Optimización Individual

## Experiencias en la Elite

### The Effect of Periodisation and Training Intensity Distribution on Middle- and Long-Distance Running Performance: A Systematic Review

Mark Kenneally<sup>1</sup>, Arturo Casado<sup>2</sup>, Jordan Santos-Concejero<sup>1</sup>

<sup>1</sup>Department of Physical Education and Sport, University of the Basque Country UPV/EHU (SPAIN)

<sup>2</sup>Faculty of Health Sciences, Isabel I University (SPAIN)

- PIR y POL más efectivo que THR, pero depende de la distancia de preparación

### Podríamos aventurarnos a decir que...

- **Muy Bajo nivel no logran acumular suficiente en fase 1, por tanto "entre umbrales"**
- **Los que "quieran" o "puedan", ir pasando a Piramidal (mucha más fase 1 y más fase 3)**
- **Alto Nivel y Elite en Corta Distancia SIN DUDA Polarizado (y vigilar 50/50 de carga)**
- **Larga Distancia Piramidal, con algunos momentos polarizado y solo en muy bajo nivel o momentos iniciales "entre umbrales"**

Distribución  
de la Intensidad



## 5. Plataforma All In Your Mind

