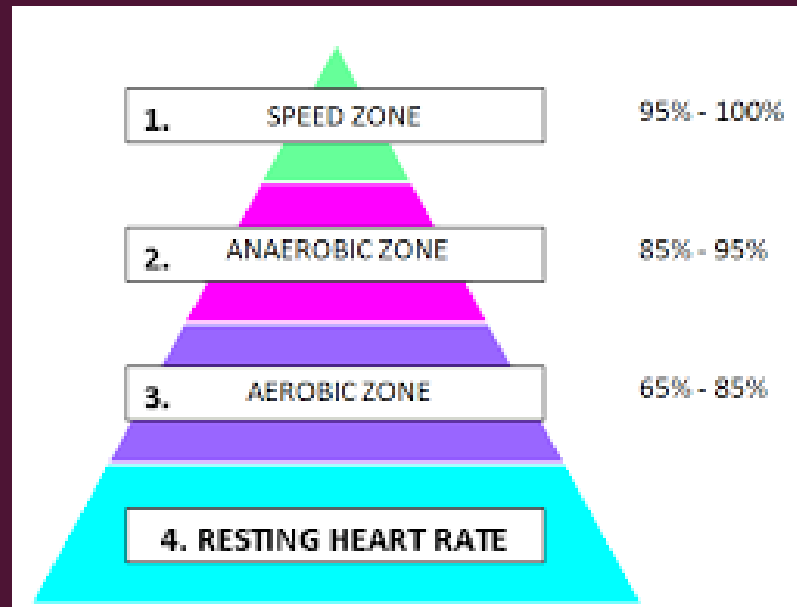
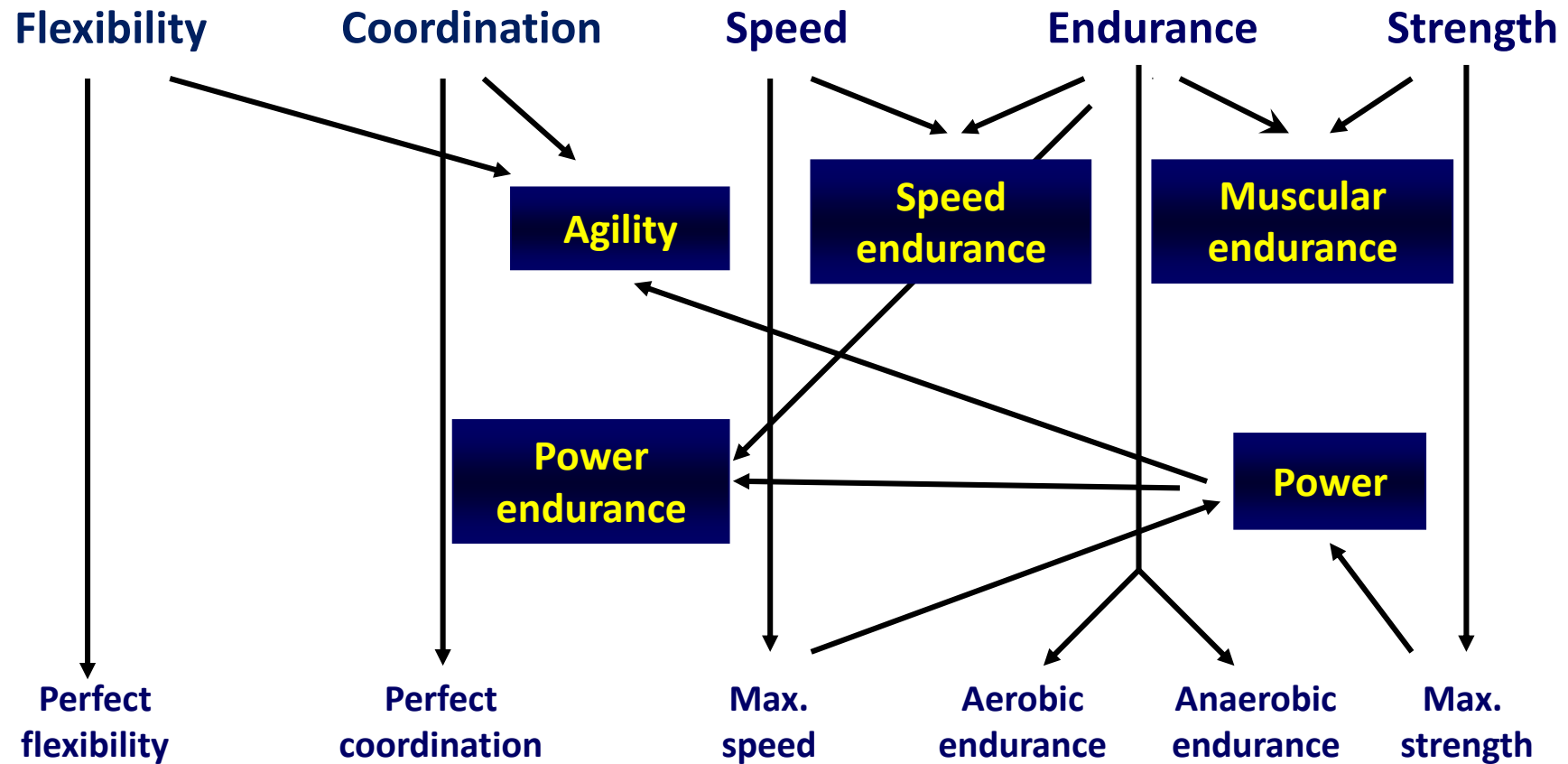


TRAINING ZONES

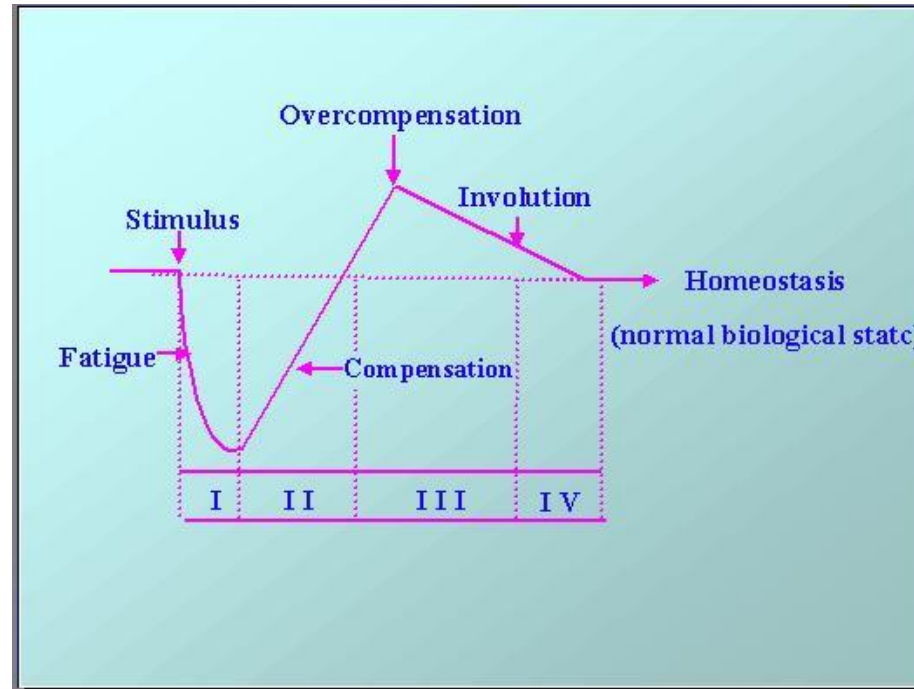
HAMID RAJABI
KHARAZMI UNIVERSITY



Bio-motor abilities



خستگی=کاهش عملکرد=سازگاری



	High Volume	Low Volume
High Intensity	Not sustainable. Will lead to injury.	Strength, stamina, power, speed training
Low Intensity	Endurance Training, flexibility or mobility work	Practice: Balance, accuracy, coordination, agility

اندازه خستگی

FATIGUE SCALE

Select the number that best describes how you feel today.



NO
FATIGUE

0



MILD
FATIGUE

1 2 3



MODERATE
FATIGUE

4 5 6



EXTREME
FATIGUE

7 8 9



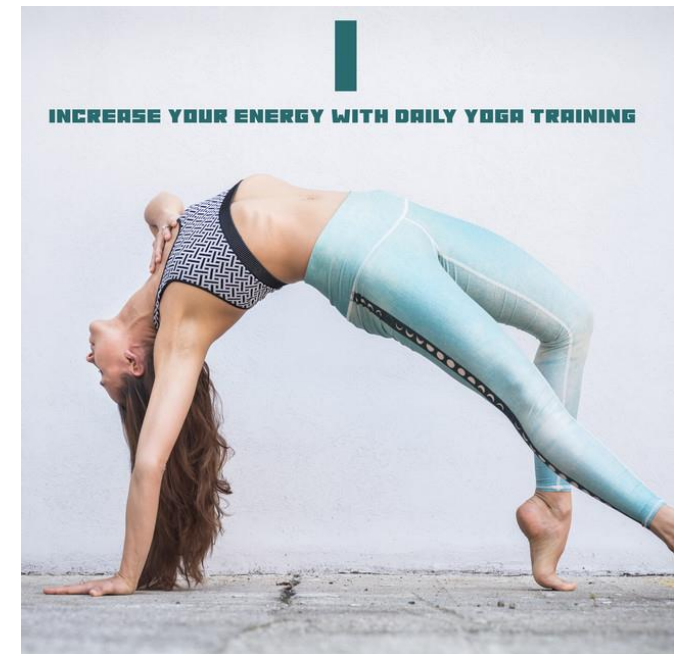
THE WORST
FATIGUE

10

Flexibility training zones

Flexibility Training: Intensity

- ✓ To allow for a training effect, perceived exertion is prescribed somewhere between “moderate” and “very hard”
- ✓ Note:
 - ❖ Dynamic stretches *do not* allow for ‘moderate’ to ‘very hard’ intensities
 - ❖ Static stretches allow for ‘moderate’ to ‘very hard’ intensities
 - ❖ PNF stretches allow for ‘hard’ to ‘very hard’ intensities



استقامت ویژه بازی و مسابقه

GAME OR COMPETITION SPECIFIC ENDURANCE



Tabata Workout

four different tabata that will leave you dripping in sweat

pb.fingers.com

ONE

20 sec. burpees

10 sec. rest

20 sec. jumping jacks

10 sec. rest

4x

THREE

20 sec. mountain climbers

10 sec. rest

20 sec. high knees

10 sec. rest

4x

TWO

20 sec. squat jumps

10 sec. rest

20 sec. skaters

10 sec. rest

4x

FOUR

20 sec. kettlebell swings

10 sec. rest

20 sec. jump rope

10 sec. rest

4x

10 minute fat burning

TABATA WORKOUT

TABATA 1 2 rounds

jumping jacks - 20 secs

rest 10 secs

butt kicks - 20 secs

rest 10 secs

squats - 20 secs

rest 10 secs

mountain climbers - 20 secs

rest 10 secs

rest 1 minute

TABATA 2 4 rounds

burpees

rest 10 secs

squat jumps

rest 10 secs

HIITWEEKLY

Total Body TABATA WORKOUT

Complete each exercise for 20 secs, rest 10 secs

Perform each tabata set 4 times

Rest 1 minute between sets

SET 1

Dumbbell Push Press

Mountain Climbers

SET 2

Dumbbell Cleans

Squats

SET 3

Dumbbell Reverse Lunges

Standing Overhead Tricep Extension

SET 4

Kettlebell Swings

Dumbbell Curl to Arnold Press

SET 5

Goblet Squats

Stability Ball Leg Curls

*Workout time estimated 25 minutes

*Select a weight that is challenging, but not too heavy

You should be able to complete the movements quickly, but safely

Fit *mitten*
KITCHEN

SQUAT JUMPS 20 Seconds

REST 10 Seconds

PUSH-UPS 20 Seconds

REST 10 Seconds

BURPEES 20 Seconds

REST 10 Seconds

SIT-UPS 20 Seconds

REST 10 Seconds

SQUAT JUMPS 20 Seconds

REST 10 Seconds

PUSH-UPS 20 Seconds

REST 10 Seconds

BURPEES 20 Seconds

REST 10 Seconds

TABATA 1 Repeat 4x



TABATA 2 Repeat 4x







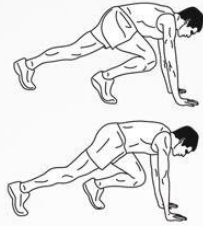
Cardio & Core

DAREBEE WORKOUT @ darebee.com

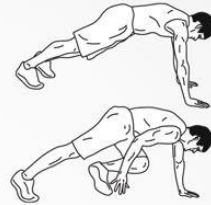
LEVEL I 3 sets LEVEL II 5 sets LEVEL III 7 sets REST up to 2 minutes



60 high knees



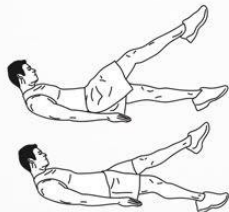
10 climbers



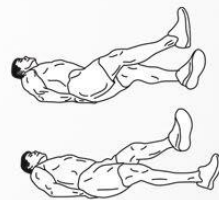
10 climber taps



60 high knees



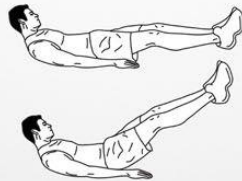
10 flutter kicks



10 scissors



60 high knees



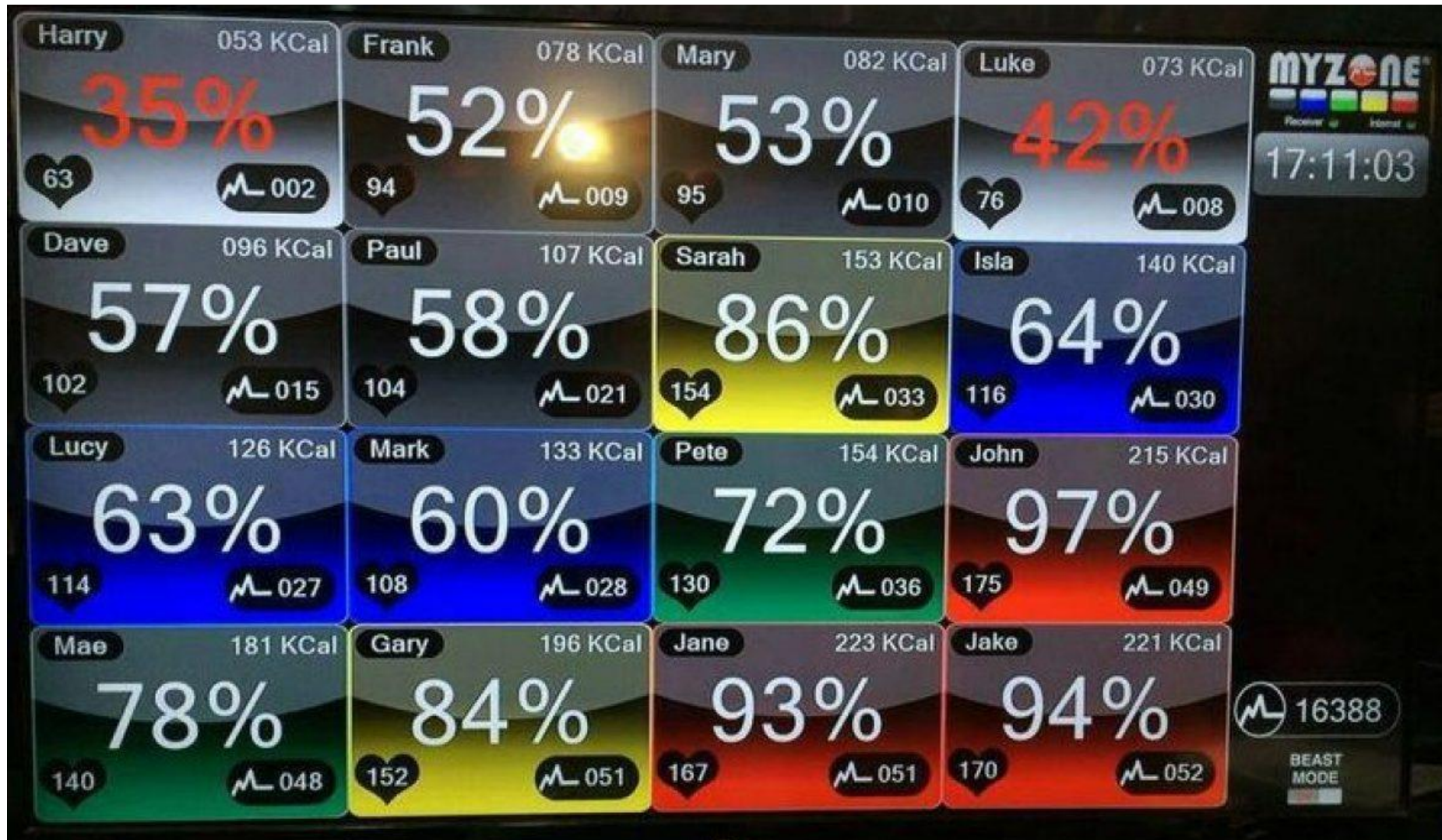
10 leg raises



10 raised leg circles



TRAINING ZONES



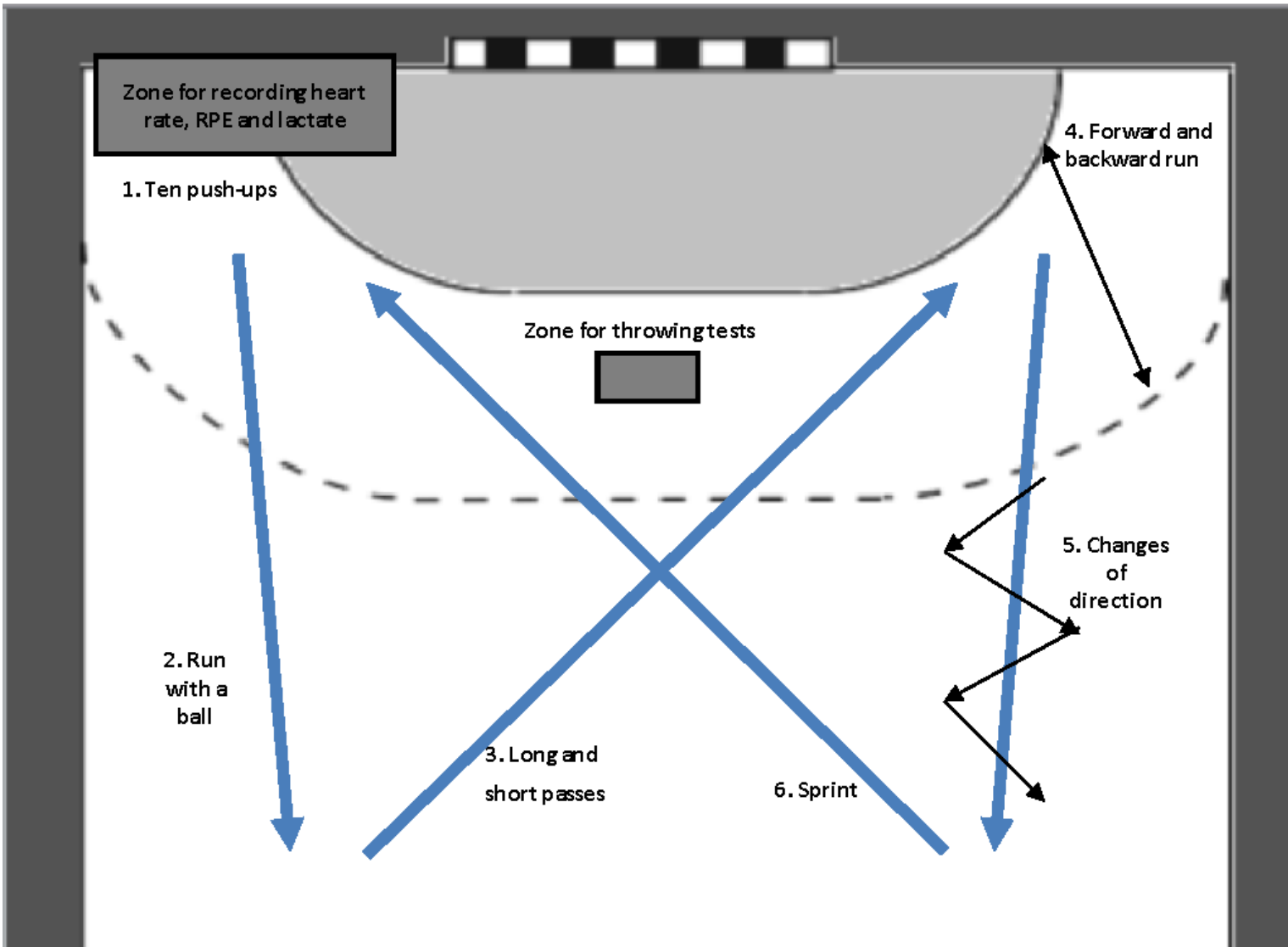


Figure 2

Diagram of the team handball circuit, data recording areas and the area for the throwing



10 push-ups with palms open and separated to elbow width, a 12 m run while dribbling a ball, a 15 m run with long and short passes to a teammate who remained standing, defensive 6 m runs with forward and backward movements of 2 m; a 6 m run with four changes of direction touching training cones and a diagonal 15 m sprint.

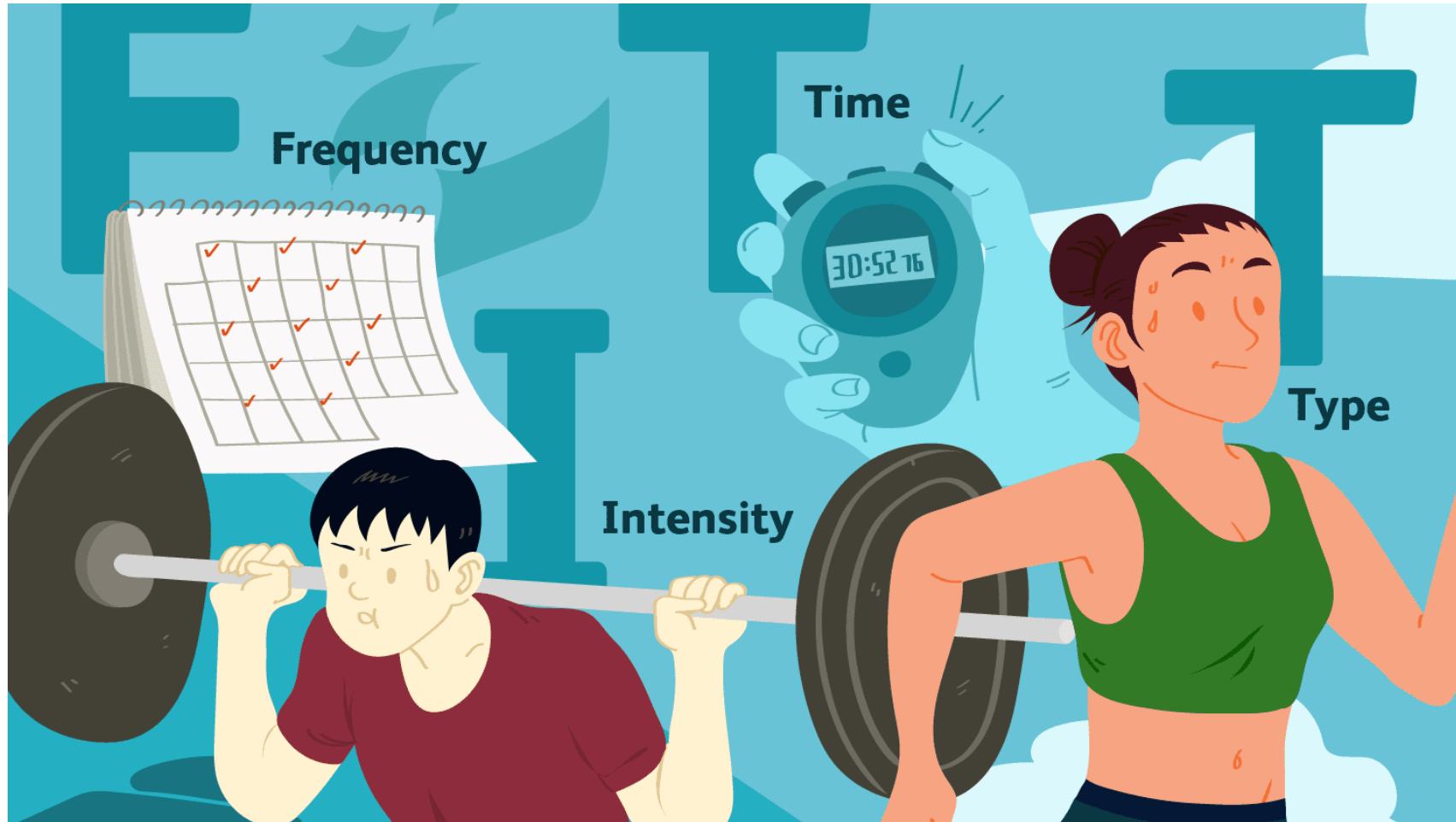
تعویق خستگی ذهنی = استقامت مغزی تمرین استقامتی باز



Integrated Aerobic Training



FITT Principle



F.I.T.T.	CARDIOVASCULAR ENDURANCE	FLEXIBILITY	MUSCULAR ENDURANCE	MUSCULAR STRENGTH
F FREQUENCY	4-5 days per week	Should be a part of every warm-up and cool down, but at least 3 days per week	3 – 4 times per week Vary the muscle groups used	3 times per week
I INTENSITY	Add more intensity as student becomes more fit	Static stretches held for 15 to 30 seconds	15 or more reps/ 1-3 sets Less than 60% of predicted maximum rep	8 reps/1-3 sets
T TYPE OF ACTIVITY	Running, cycling, swimming, biking, skipping rope, soccer or basketball, skating – uses large muscles	Controlled stretches (usually part of yoga, dance, gymnastics, pilates, martial arts)	Medicine balls, Resistance bands, Free weights, Sprinting, Sit ups, Planks, Push ups	Medicine balls, Resistance bands, Free weights at a level where you can do 8 reps but it is difficult
T TIME	At least 30 minutes of continuous exercise	About 10 minutes	About 30 minutes	About 15 minutes

1. Warm-up light cardio (5-10min)

dynamic stretching (~10min)

sport specific

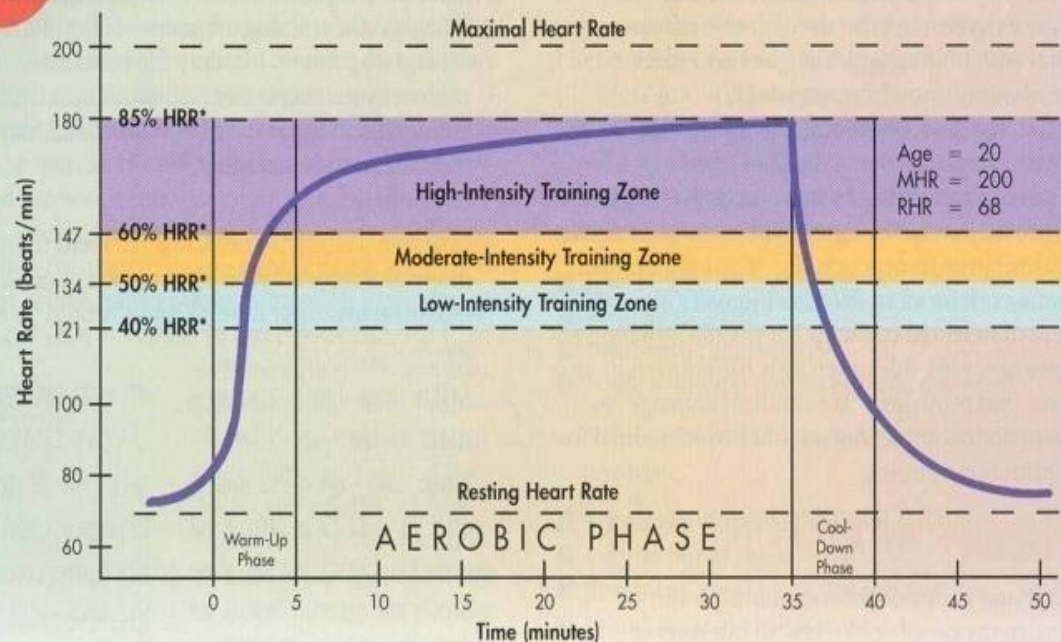
2. Training (FITT principle)

<u>Types</u>	<u>Factors Involved</u>	<u>Monitoring</u>
Endurance	progressive overload	HR training zone
Interval	specificity	Karvonen HR
Circuit	reversibility/detraining	Borg Scale
Resistance	recovery	
Flexibility	adaptation	
	variety	
	periodization	

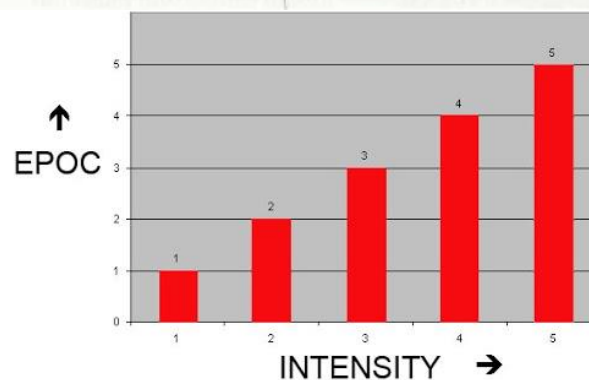
3. Cool Down

Figure 7.1

Recommended cardiorespiratory or aerobic training pattern.



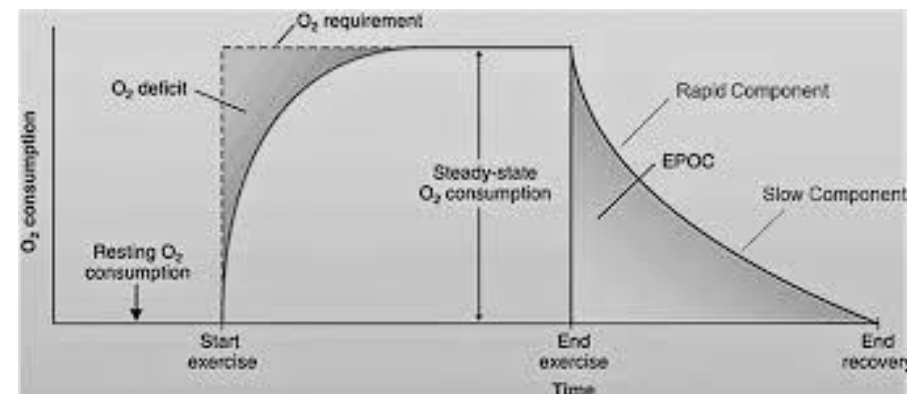
*HRR = Heart rate reserve



Fuel Utilization During Exercise

- Carbohydrates and Fats (very little Protein)

	R	% Fat	% Carbs
Resting	0.70	99	1
	0.75	83	17
Low Intensity	0.80	67	33
	0.85	50	50
High Intensity	0.90	33	67
	0.95	17	83
Max. Intensity	1.00	1	99



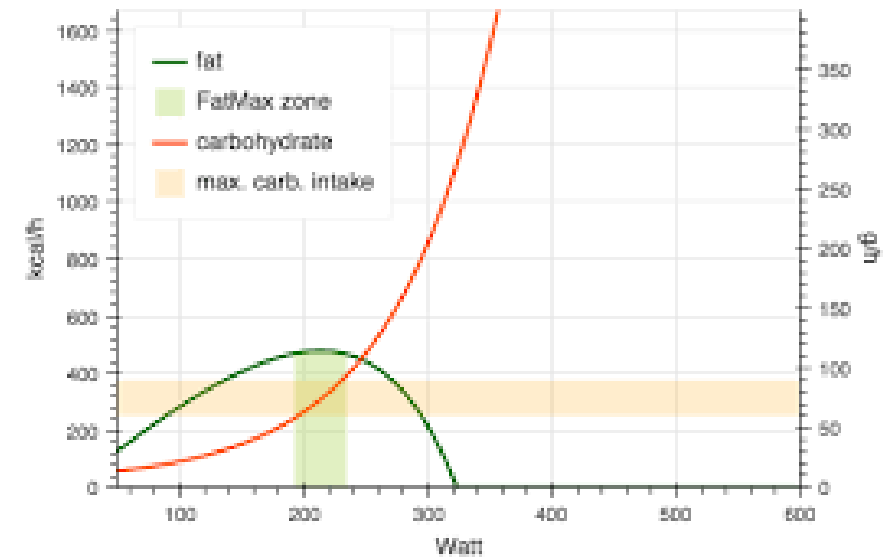
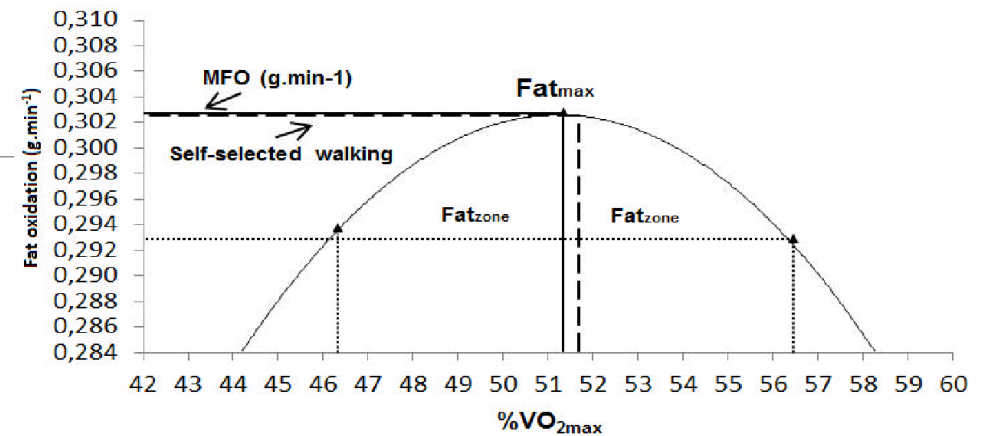
Fat max zone

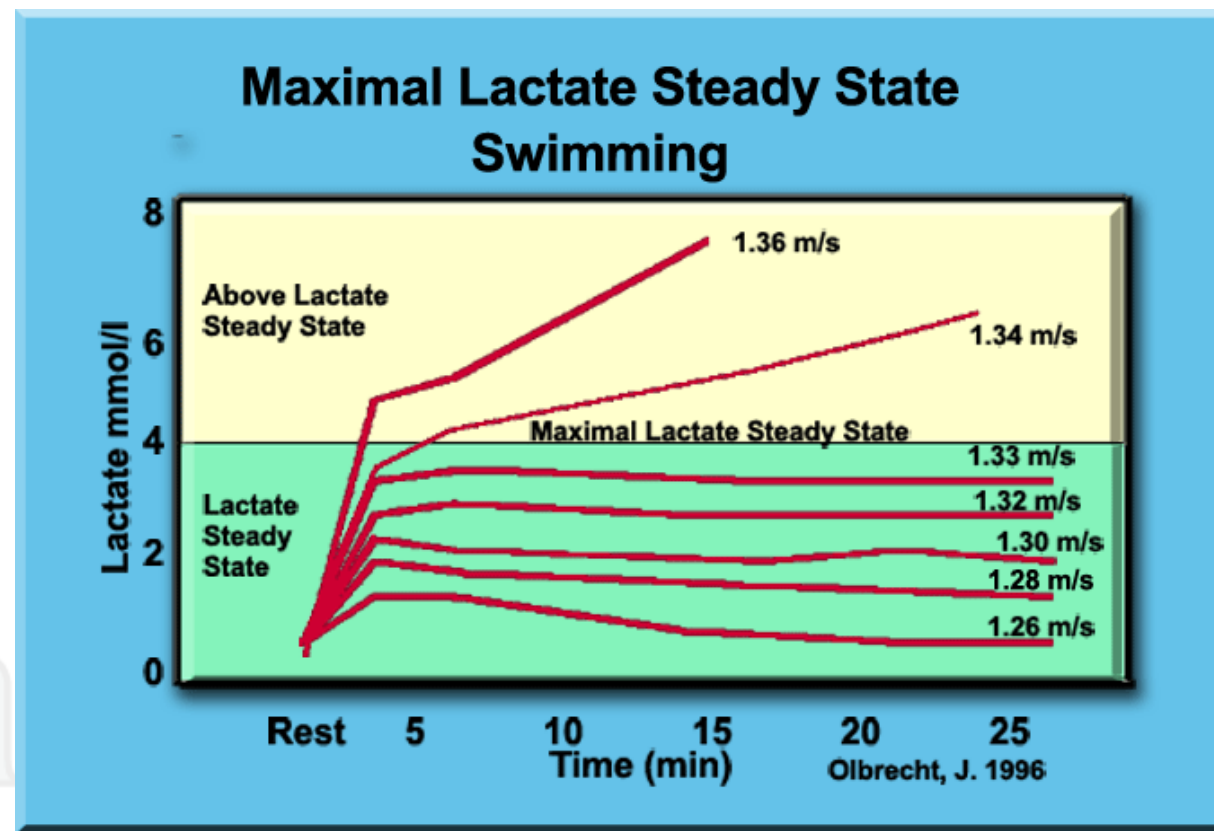
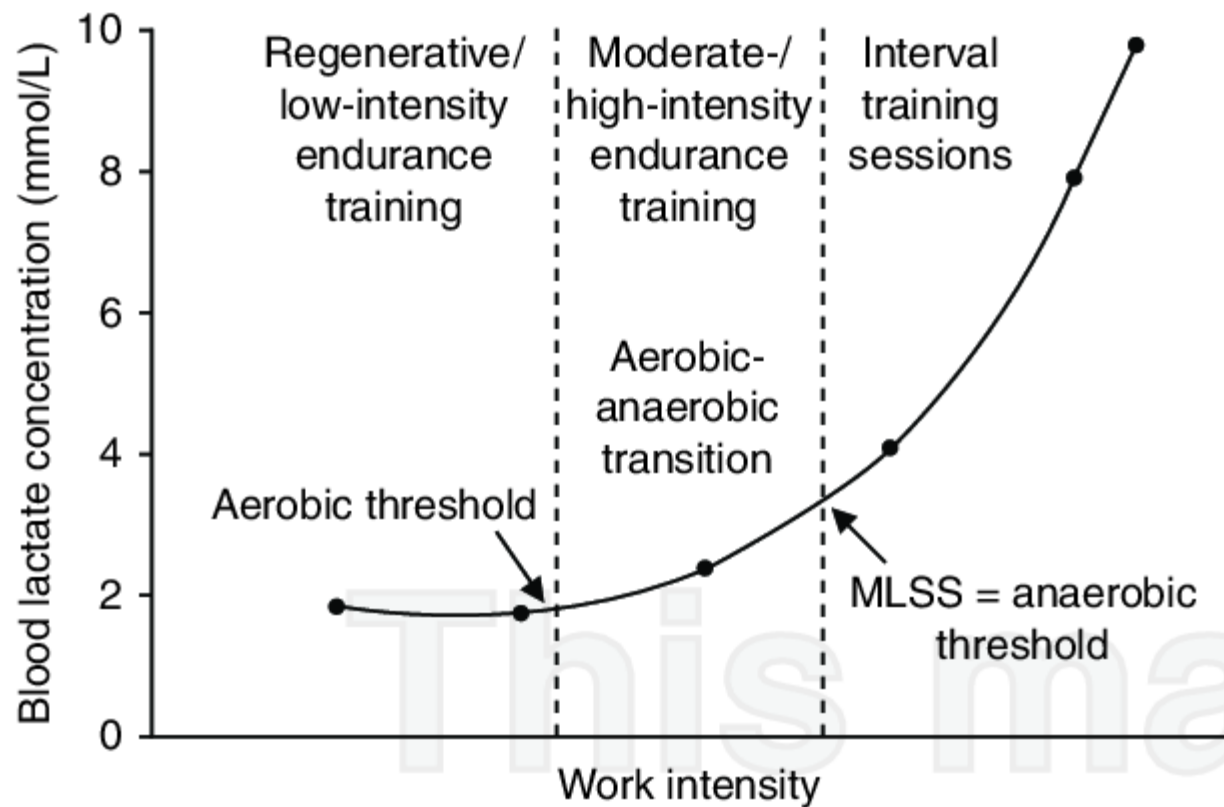
Find your FatMax Zone!

Fat burning is highly individual.

INSCYD

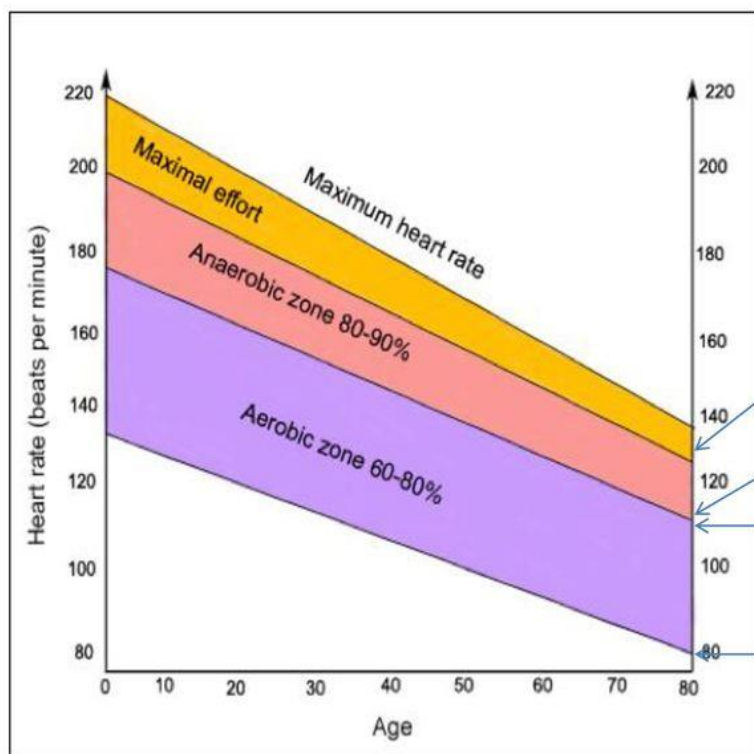
Fat burning is different in each athlete and changes with training.
It is impossible to give a general advice on the FatMax zone.
Find yours - with INSCYD!





Training Zones

Threshold means boundary

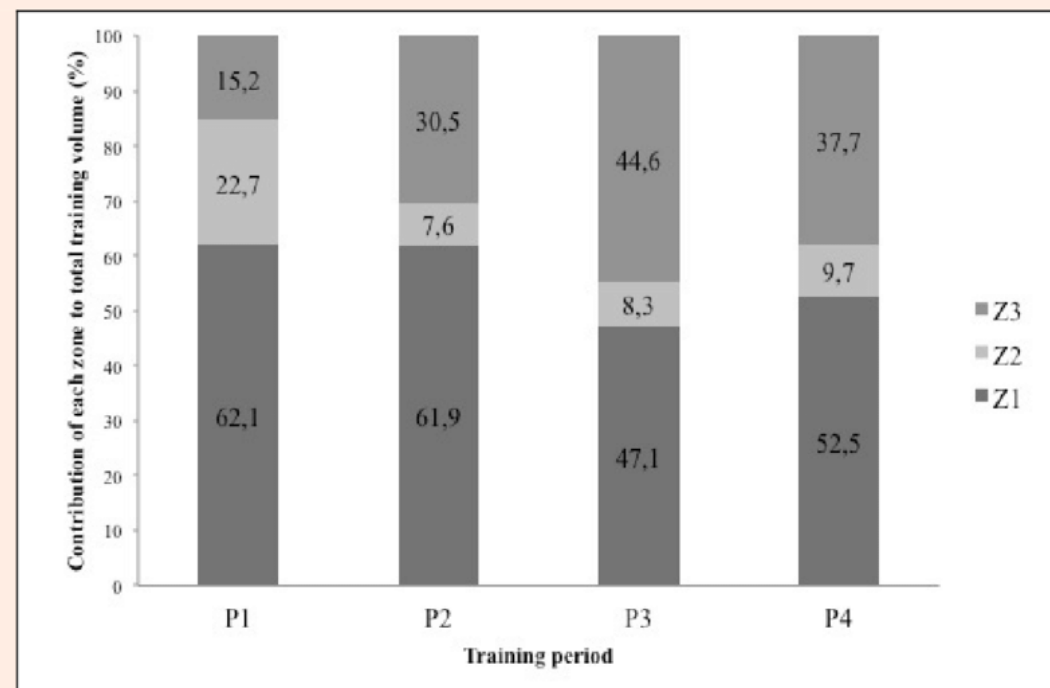
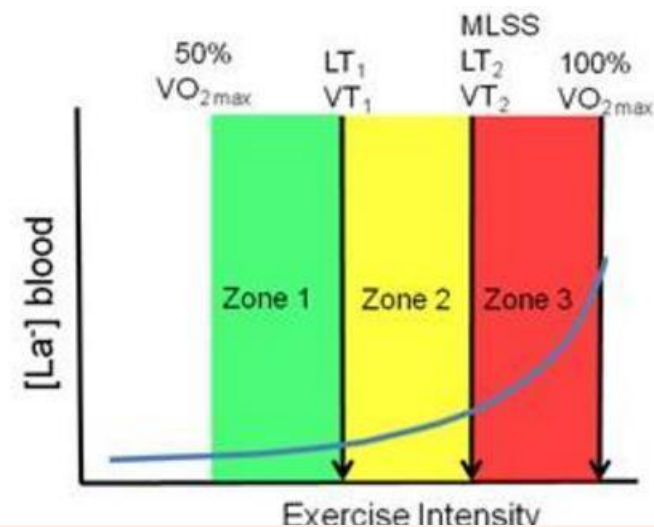


Upper anaerobic threshold

Lower anaerobic threshold

Upper aerobic threshold

Lower aerobic threshold



RATING OF PERCEIVED EXERTION (RPE)

Borg's Scale	(Gunner borg 1982):	Modified Borg Scale:
6-		0- at rest
7- very, very light		1- very easy
8-		2- somewhat easy
9- very light		3- moderate
10-		4- somewhat hard
11- fairly light		5- hard
12-		6-
13- somewhat hard		7- very hard
14-		8-
15- hard		9-
16-		10- very, very hard
17- very hard		
18-		
19- very, very hard		
20-		



Cardiovascular Training Phases

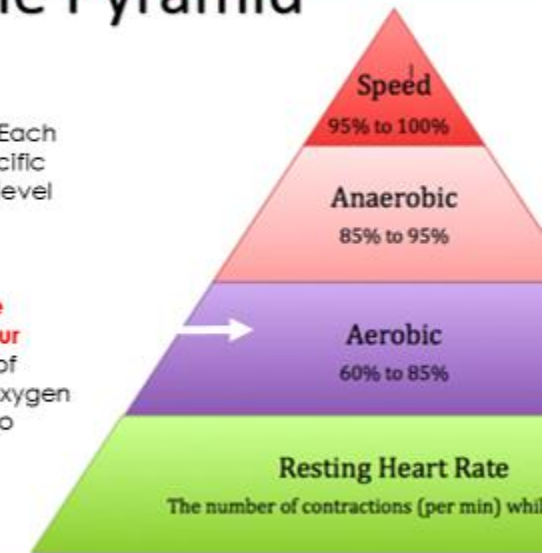
- Phase I Aerobic-Base training (zone 1) 20-30 MIN with comfortable
- Phase II Aerobic-efficiency training (zone 1- 2) for one year
- Phase III Anaerobic endurance (zone 2)
- Phase IV Anaerobic power (zone 3)

- Zone (1) moderate to hard = scale **3-4** (RPE).
- Zone (2) hard = scale **5-6** (RPE).
- Zone (3) very hard = scale **7-10** (RPE).

Training Zone Pyramid

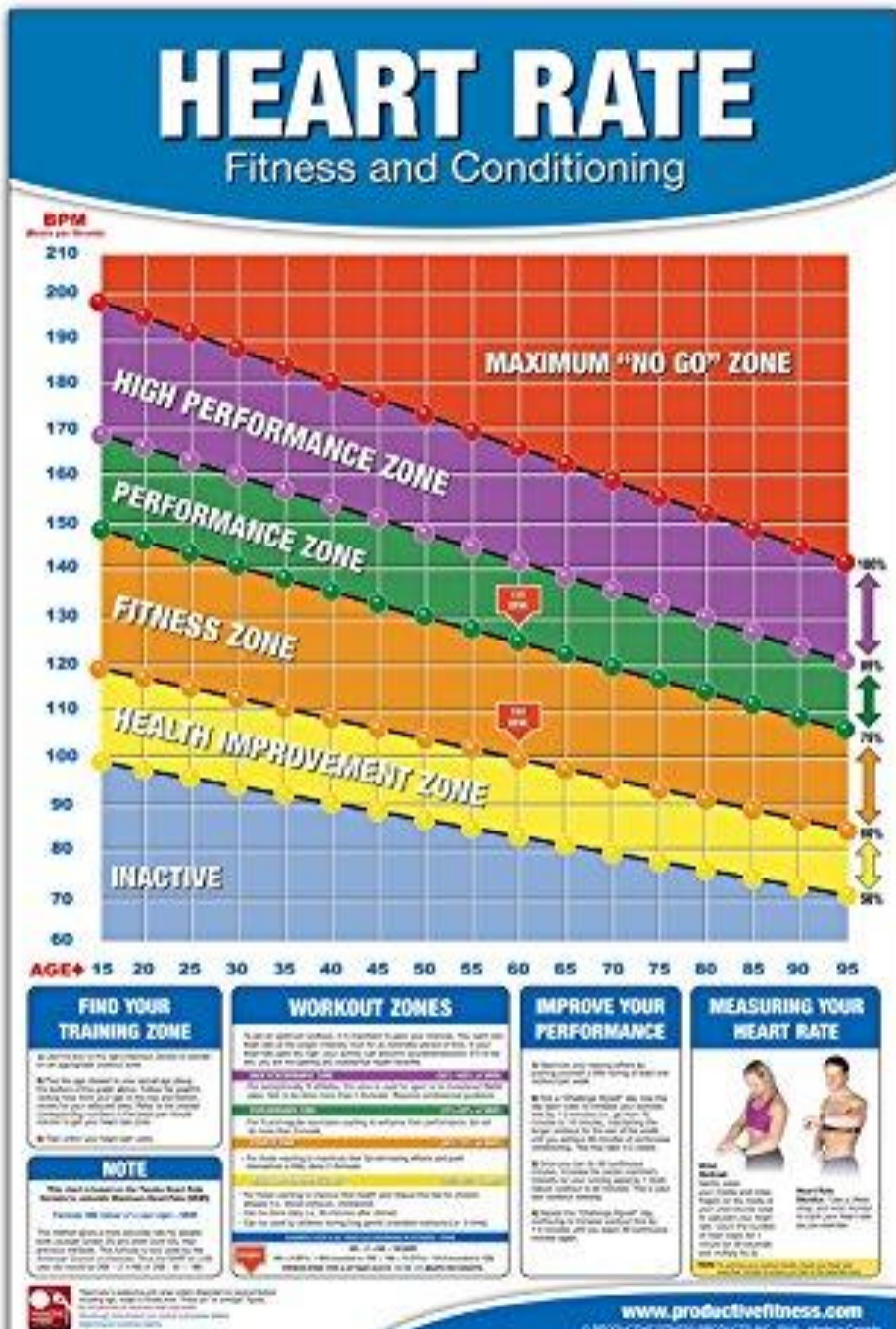
This is the training zone pyramid. Each types of training will fit into a specific **training zone** depending on the level of **intensity** you are training at.

If you train at a **steady-moderate intensity** you will be training in **your Aerobic Training Zone** (60%-85% of your MHR). In the aerobic zone oxygen is readily available for the body to



Training zone and substrate

Training Zone	Energy Substrate Mainly Used	Type of Fiber
Zone 1	Fat	Type I
Zone 2	Fat-Carbohydrates	Type I
Zone 3	Fat-Carbohydrates	Type I-IIa
Zone 4	Carbohydrates	Type IIa
Zone 5	Carbohydrates	Type IIa-b
Zone 6	Carbohydrates-ATP-PC	Type IIb



TRAINING ZONE



Target Zone	% Training Intensity	Duration	Physiological Benefit
5. Maximum	90-100%	10s- 3min	>Tones the neuromuscular system >Increases sprinting speed
4. Hard	80-90%	2 - 25min	>Increases anaerobic/lactate tolerance >Improves high speed endurance
3. Moderate	70-80%	10 - 40min	>Enhances aerobic power >Improves blood circulation
2. Light	60-70%	20 - 80min	>Increases aerobic endurance & fat metabolism >Strengthens body to tolerate higher intensities
1. Very Light	50-60%	20 - 40min	>Helps speed up recovery after heavy exercise

Training zone and adaptation



HEART RATE TRAINING ZONES

ZONE 5 - HR_{max} 90-100%
Maximum Performance Capacity

ZONE 4 - HR_{max} 80-90%
Anaerobic Endurance

ZONE 3 - HR_{max} 70-80%
Aerobic Endurance

ZONE 2- HR_{max} 60-70%
Aerobic Development

ZONE 1 - HR_{max} 50-60%
Warm-Up and Recovery

jillconyers.com

Time for some good old fashion math's. Calculate the aerobic and anaerobic training zones for a 16 year old.

HRmax equation = ? **220 - age**

16 year old HRmax = ? **220 - 16 = 204 Beat Per Minute**

60% HRmax = ? **122 Beat Per Minute**

80% HRmax = ? **163 Beat Per Minute**

100% HRmax = ? **204 Beat Per Minute**

Aerobic training zone = **122 - 163 Beat Per Minute**

Anaerobic training zone = **163 - 204 Beat Per Minute**

Coggan Classic Power Training Levels

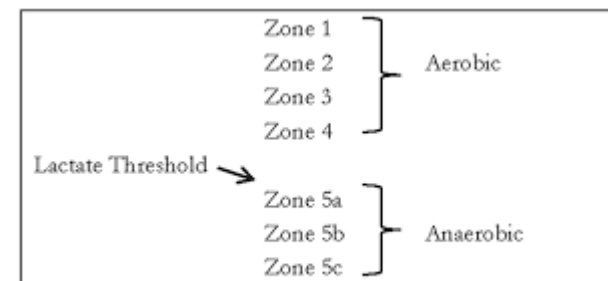


Figure 3-1. Training zones

Level	Name/purpose	% of threshold power	% of threshold HR	RPE	Time
1	Active recovery	≤55%	≤68%	<2	1.5hours
2	Endurance	56-75%	69-83%	2-3	2.5 hours to 14 days
3	Tempo	76-90%	84-94%	3-4	30min to 8 hours
4	Lactate threshold	91-105%	95-105%	4-5	10 - 60 min.
5	VO ₂ max	106-120%	>106%	6-7	3 - 8 min.
6	Anaerobic capacity	121-150%	N/a	>7	30 sec. - 2 min.
7	Neuromuscular power	N/a	N/a	(maximal)	5 - 15 sec.

Aerobic and anaerobic zones

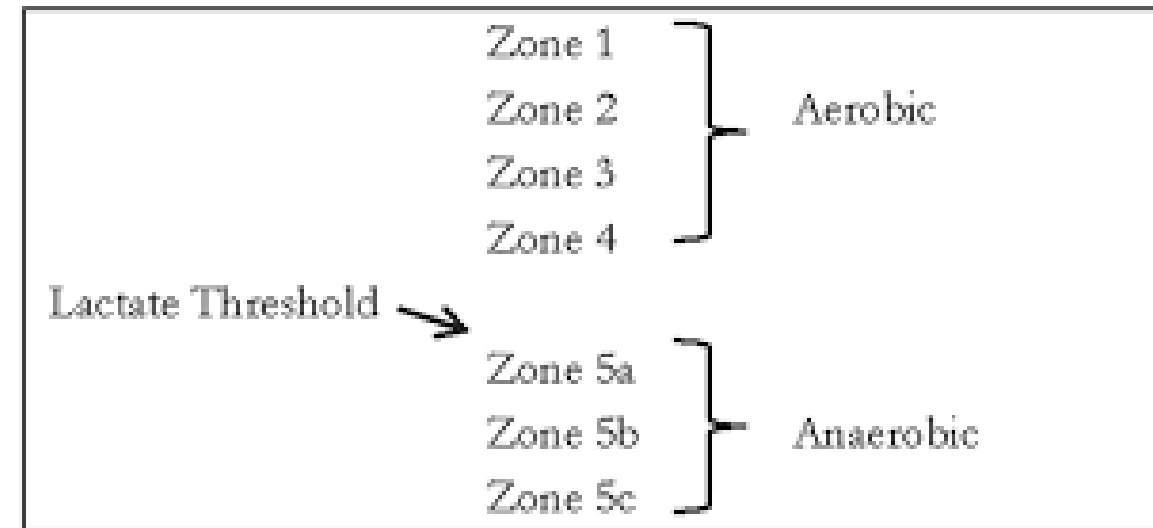


Figure 3-1. Training zones

Zone	Name	% FTP Power	% Threshold HR	% Max HR
One	Active recovery	<55%	<68 [^]	50-60%
Two	Endurance	55-75%	68-83%	60-70%
Three	Tempo	76-90%	84-94%	70-80%
Four	Threshold	91-105%	95-105%	80-90%
Five	VO2	106-120%	>106%	90-100%
Six	Anaerobic	121-150%	n/a	n/a
Seven	Neuromuscular power	>150%	n/a	n/a

RPE Chart

Rate of Perceived Exertion

Training Zone

% MHR



10

Max Effort Activity

Feels almost impossible to keep going.
Completely out of breathe, unable to talk.

Zone 6

Neuromuscular / Power

94-100%

9

Very Hard Activity

Very difficult to maintain exercise intensity.
Can barely breath and speak a single word.

Zone 5

VO2max / Speed

89-94%

7-8

Vigorous Activity

On the verge of becoming uncomfortable.
Short of breath, can speak a sentence.

Zone 4

Anaerobic / Threshold

82-89%

4-6

Moderate Activity

Feels like you can exercise for hours.
Breathing heavily, can hold short conversation.

Zone 3

Stamina / Tempo

75-82%

2-3

Light Activity

Feels like you can maintain for hours.
Easy to breathe and carry a conversation.

Zone 2

Endurance / Aerobic

65-75%

1

Very Light Activity

Anything other than sleeping,
watching TV, riding in a car, etc.

Zone 1

Recovery / Basic Endurance

60-65%

Rowing Heart Rate distribution-37 weeks World Class Junior Rowers (n=36)

Intensity Category	Heart rate [b·min ⁻¹]	Blood lactate [mM·L ⁻¹]	% of Time [min]
Compensation	< 140	< 2	8 (6)
Extensive endurance	140-160	< 2	87 (6)
Intensive endurance	156-168	2-4	2 (1)
Highly intensive endurance	> 180	4-8	1 (0.4)
Race-specific velocity-endur.	Max (0.5-2 min)	4-10	2 (0.6)

Gullich A, Seiler S, & Eriich E. Training Methods and Intensity Distribution of Young World Class Rowers. *Int. J. Sports Physiology and Performance*. 2003, 4(4):448-458.

HEART RATE TRAINING ZONES				IGC performance training
Zone	Name	% Max HR	% Lactate Threshold	
1	Active Recovery	50-60%	<70%	
2	Base Endurance	60-70%	70-85%	
3	Tempo	70-80%	85-95%	
4	Threshold (Aerobic + Anaerobic)	80-90%	95-105%	
5	Anaerobic	90-100%	>105%	

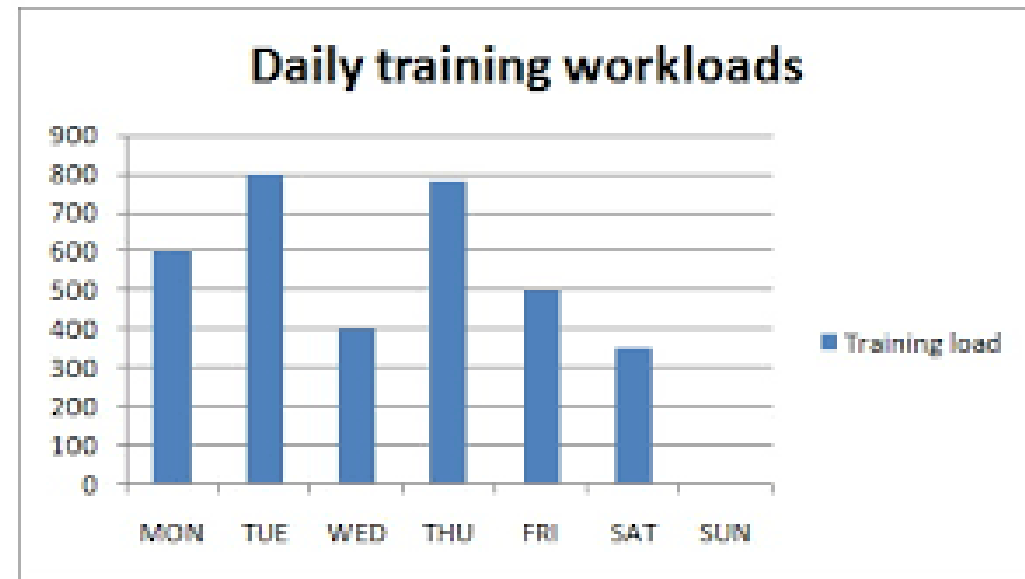
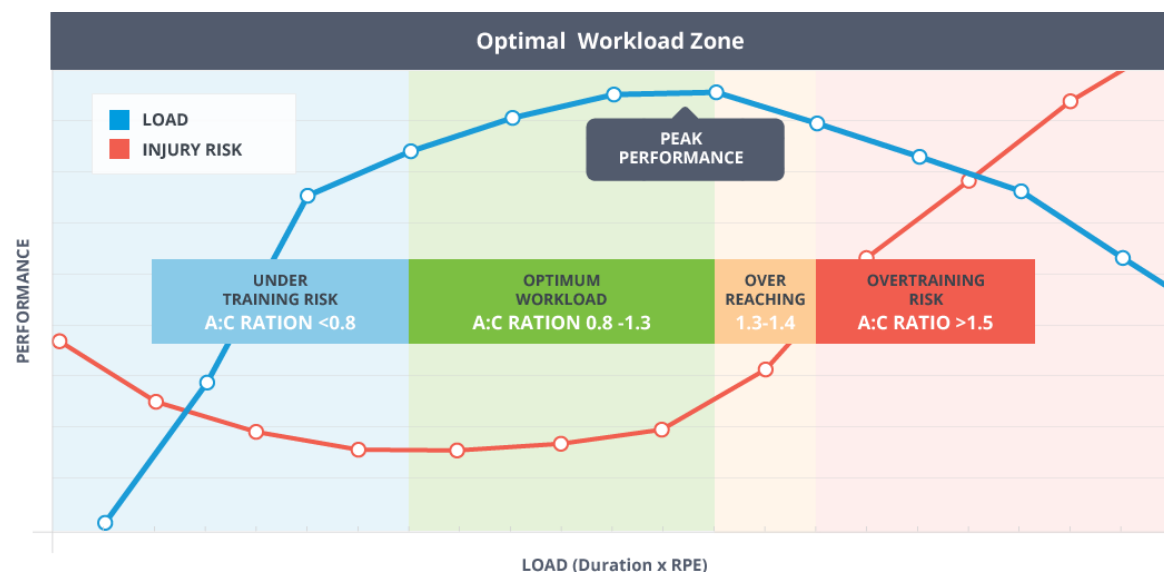


Table 2
Example of calculating internal training load with session-RPE

Internal TL = session-RPE × duration (minutes)

If an athlete indicated that an exercise bout lasting 60 minutes was hard (RPE = 5) the internal TL for that session could be determined using the following calculation

Internal TL = 5 × 60 = 300 AU

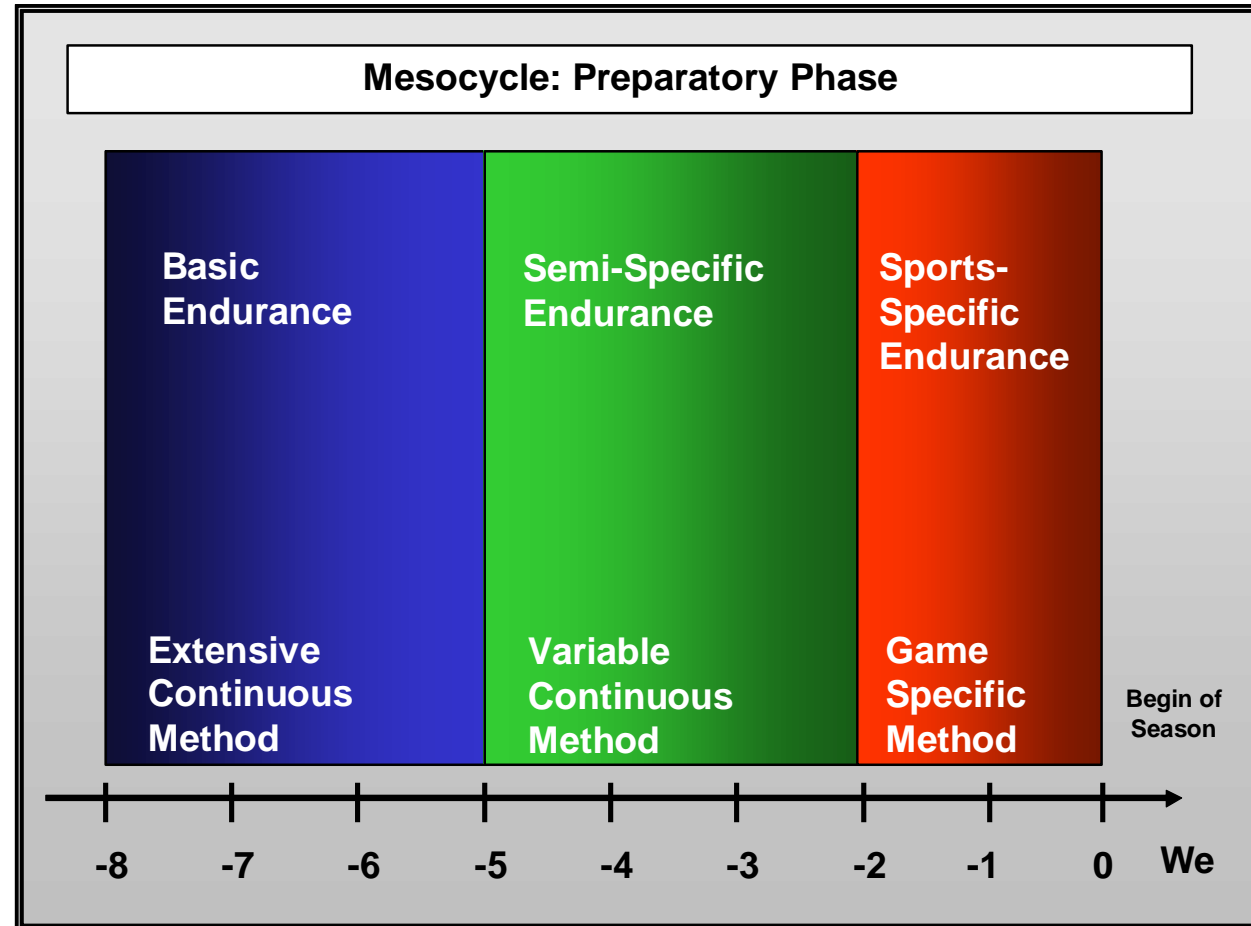
AU = arbitrary units; RPE = rate of perceived exertion; TL = training loads.



Energy Zones

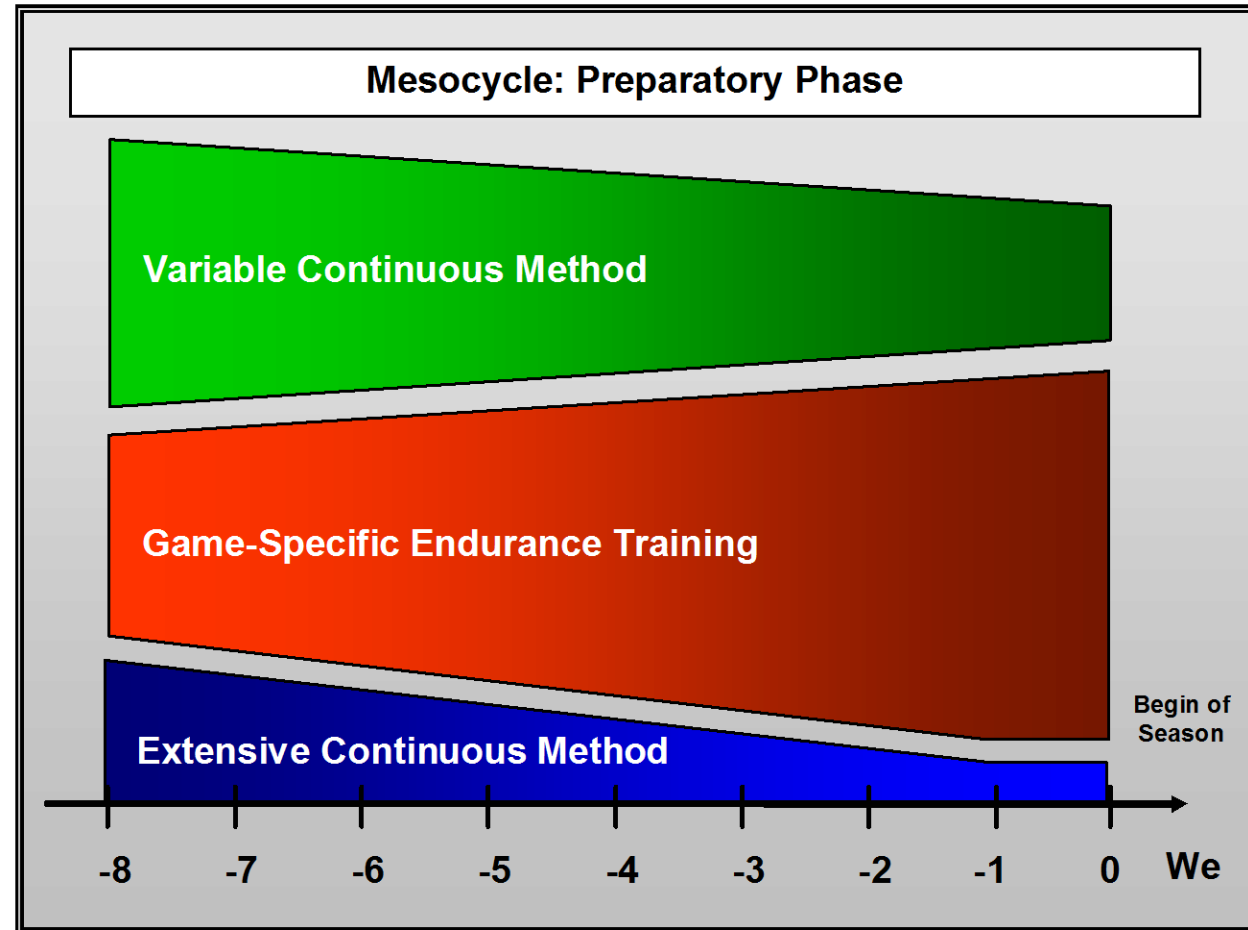
- US coaches are using from five to seven energy zones (categories):
 - REC – recovery, color – white
 - EN1 – aerobic swim, color – pink
 - EN2 – threshold swim, color – red
 - EN3 – VO2 max, color – blue
 - SP1 – lactate tolerance, color – purple
 - SP2 – lactate peak, color – green
 - SP3 – alactate speed/power, color – gold

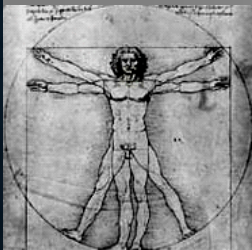
Different Types of Mesocycles for Training Endurance in Game Sports





Different Types of Mesocycles for Training Endurance in Game Sports





Characteristics of Different raining Methods and their Use in Periodisation

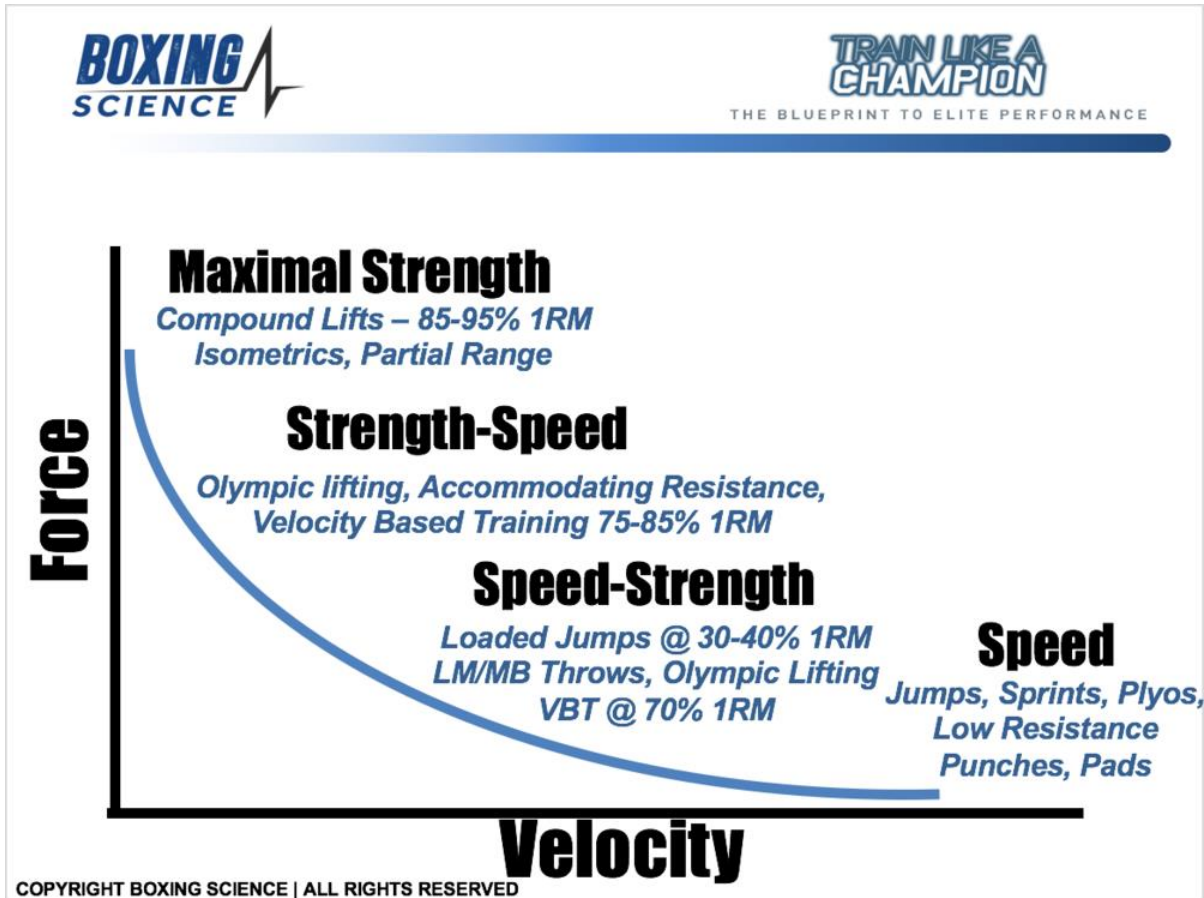
RECOM- Training	BE 1 - Training	BE 2 - Training	CSE – Training
GOAL	GOAL	GOAL	GOAL
Support recovery; Increasing the ability to mobilise adaptation reserves for high intensive training at a later time	Stabilising the higher level of BE; Increasing the aerobic performance	Increasing the BE performance; Enhancing the aerobic /anaerobic performance	Developing the competition specific endurance; Lactate tolerance
METHOD	METHOD	METHOD	METHOD
Continuous Method	Continuous M.; Changeable Continuous M. (Fartlek)	Extensive Interval Method; Changeable Continuous M.	Intensive Interval Method; Competition M.; Repetition M.
INTENSITY	INTENSITY	INTENSITY	INTENSITY
Very low HR: 60 - 70% Lactate: < 2mmol/l	Low to medium HR: 70 - 80% Lactate:<2,5mmol/l	Middle to high HR: 80- 90% Lactate: 3-6mmol/l	High to maximal HR: > 90% Lactate: >6 mmol/l
DURATION	DURATION	DURATION	DURATION
< 45 min.	> 45 min.	20 – 120 min.	10 – 45 min.

Training zone in strength workout

RESISTANCE TRAINING PYRAMID



Training zone in strength workout



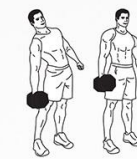
SUPER STRENGTH

DAREBEE WORKOUT © darebee.com

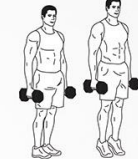
20 seconds rest between sets | no rest between exercises



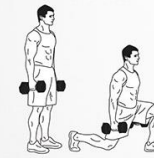
10 goblet squats
x 3 sets



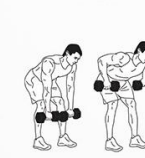
10 side bends
x 3 sets



10 calf raises
x 3 sets



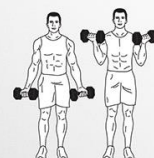
10 forward lunges
x 3 sets



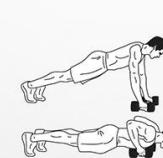
10 bent over rows
x 3 sets



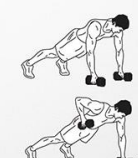
10 deadlifts
x 3 sets



10 bicep curls
x 3 sets



10 push-ups
x 3 sets



10 renegade rows
x 3 sets

	Strength	Power
Zone 1:<50%	General muscle and technical	General neural and technical (<25% 1RM)
Zone 2:50–75%	Hypertrophy training	Ballistic speed training (25–37.5 % 1RM)
Zone 3:75–90%	Basic strength training	Basic power training (37.5–45 % 1RM)
Zone 4:90–100%	Maximal strength training	Maximal power training (45–55 % 1RM)

Strength training zones

SUBSECTION	ABSOLUTE SPEED		SPEED STRENGTH		MAX POWER ≈60%	STRENGTH SPEED		ABSOLUTE STRENGTH	
Intensity	20-40%		40-50%	50-60%		60-70%	70-80%	80-90%	90-100%
Resistance	Very Low	Low	Moderate	Moderate		High	Very High		
Velocity	Very High	High	Moderate	Moderate		Low	Very Low		
Optimal Training Zones	Speed		Power via Velocity	Power via Force		Strength			

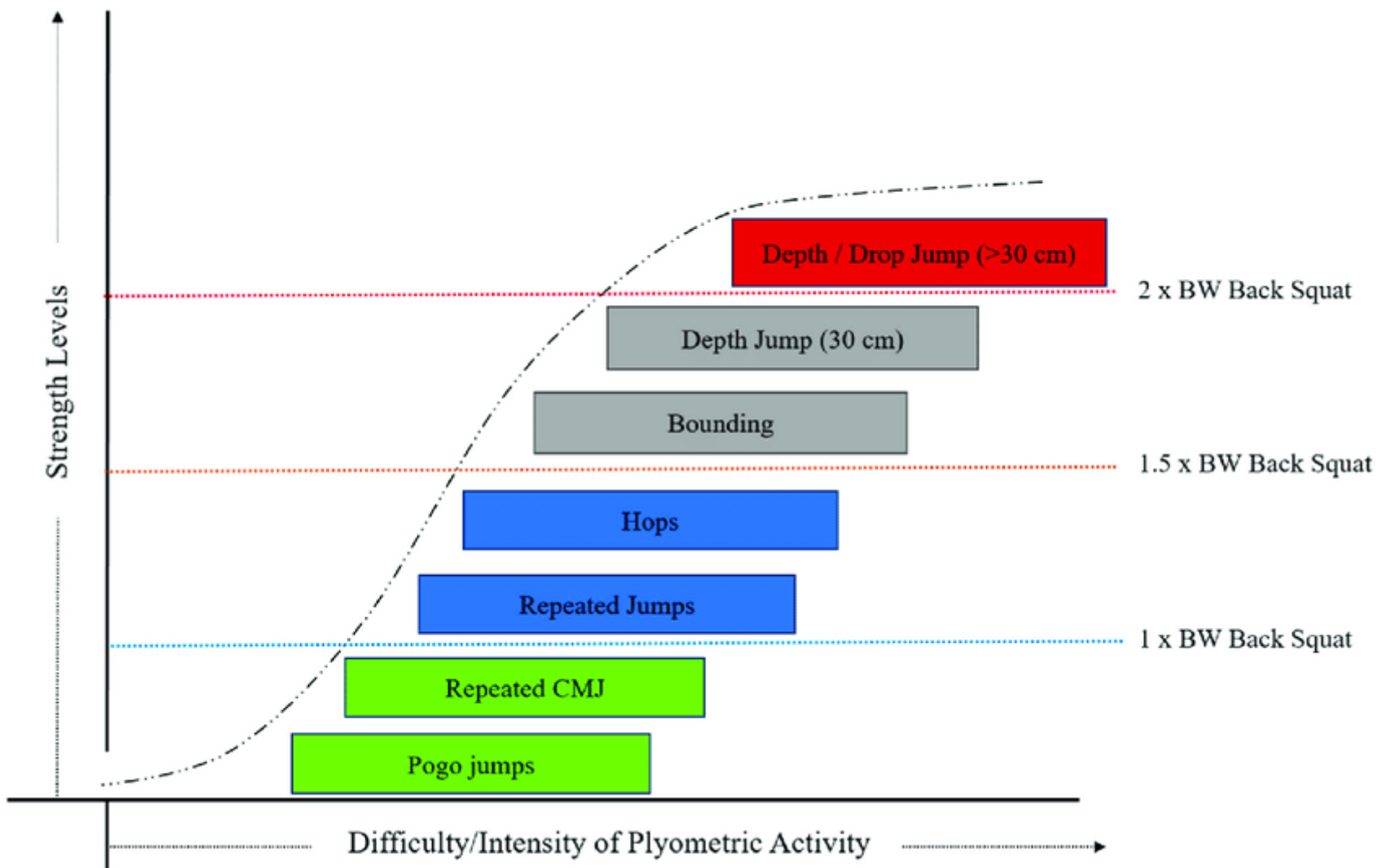
Figure 1: PERCENTAGES FOR INTENSITY OF TRAINING ON OLYMPIC LIFTS

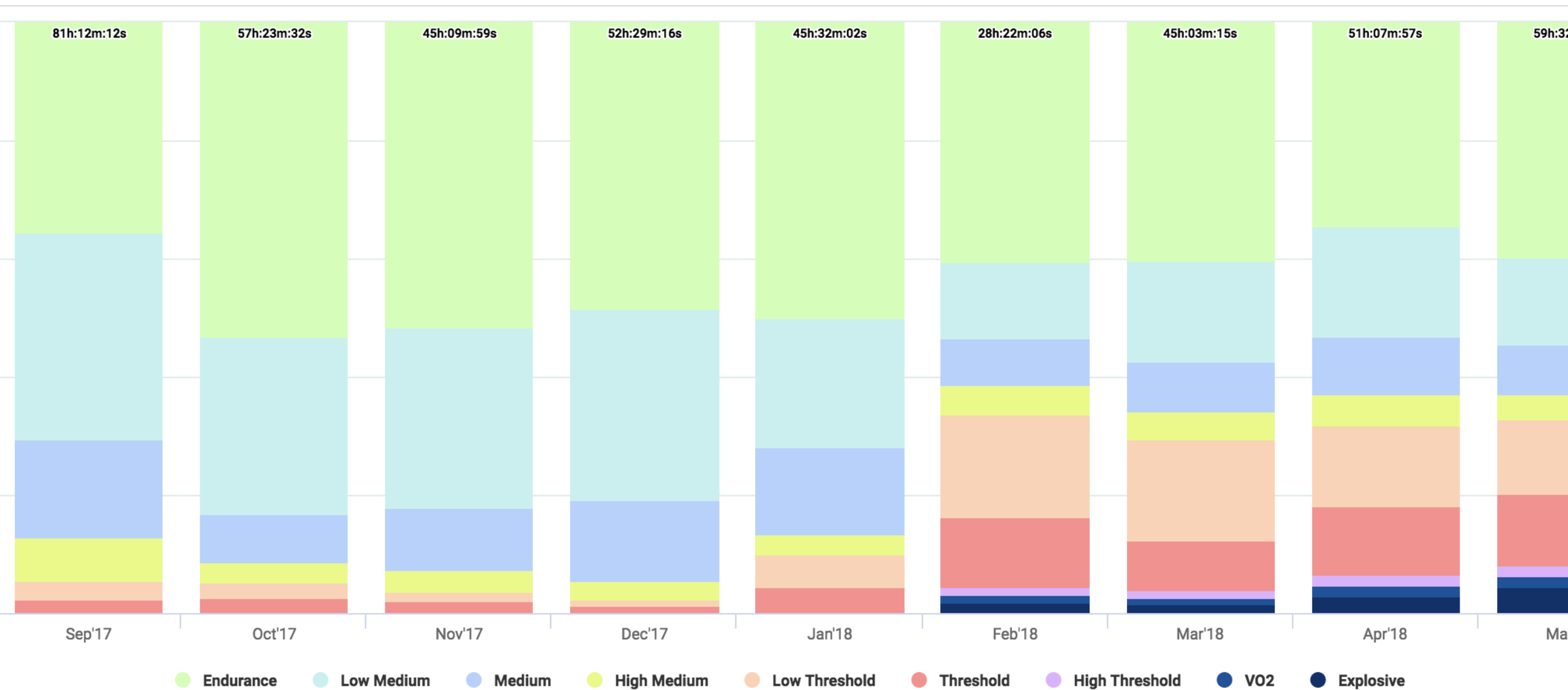
93% and over	Very Heavy	Single attempts achievable only when the athlete is in very good form
88%-92%	Heavy	Can manage only a single mostly but very rarely a double can be achieved
82%-87%	Medium Heavy	Mostly doubles but very rarely a triple
73%-81%	Medium	Usually intensity range for achieving 3's some 5's during preparatory period
65%-72%	Light	3's when working on speed and technique, 5's when working on fitness
Below 65%	Very Light	This intensity range used mostly for rehabillitation and recovery

Leo Isaac, TRAININGWEIGHTLIFTING.COM, 2017



TRAIT	PERCENTAGE OF RM	VELOCITY ZONE
Starting Strength	15%-40%	> 1.3 m/s
Speed - Strength	40%-60%	1 - 1.3 m/s
Strength - Speed	40%-60%	0.75 - 1 m/s
Accelerative Strength	60%-80%	0.5 - .75 m/s
Absolute Strength	80%+	< 0.5 m/s







باتشکر از توجه
شما