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@madigan_sharon

Unwrapping the power of food : Keep It Simple (KISS)

SHARON MADIGAN RD. PhD

Sports Dietitian

Nutrition and hydration:
Part of your performance puzzle?

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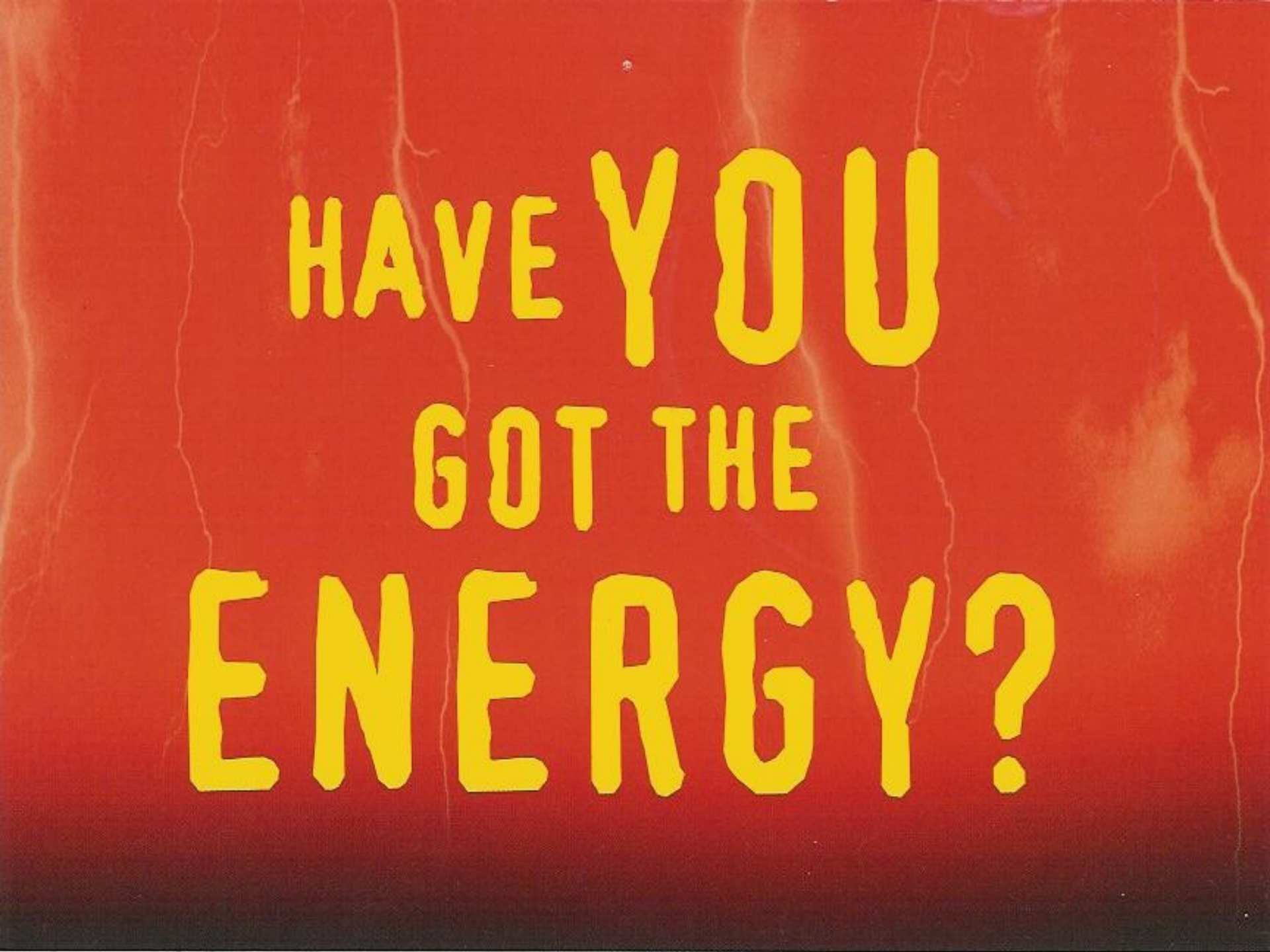
HAVE YOU
GOT THE
ENERGY?

Sports Nutrition???

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- The main aim is to allow athletes to train and compete as well as possible while providing enough nutrients for daily life.
- It can mean different things to different people depending on requirements, training status, underlying medical issues.

Impact of Nutrition

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Focus

- **Athlete wellness** – strong immunity, reduced risk of injury and fatigue
- **Athlete performance** – fuel to train and perform, delay fatigue, enhance recovery
- **Athlete rehabilitation** – optimal healing and recovery from injury

Performance Impact

- Less training and competitive time lost to illness
- Supports optimal physical adaptations from training programmes
- Accelerated return to training

Different things different athletes

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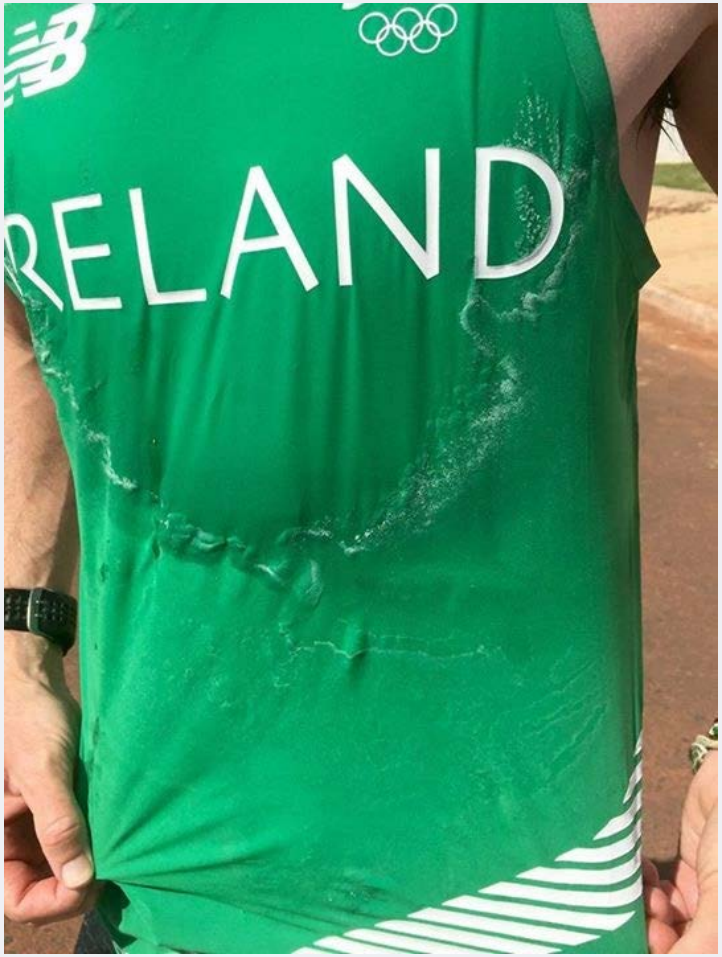

Eating and drinking: what should you do?

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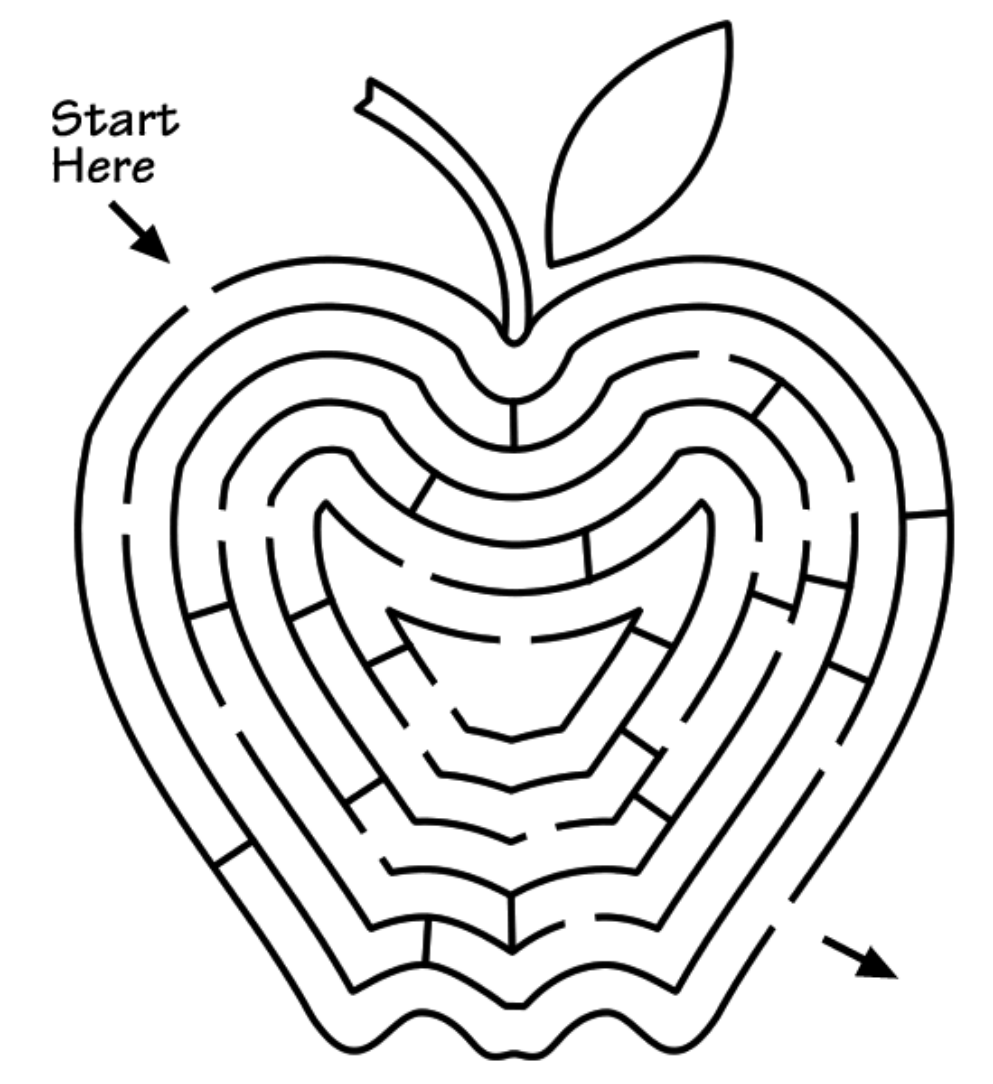

Lots of buzz areas out there

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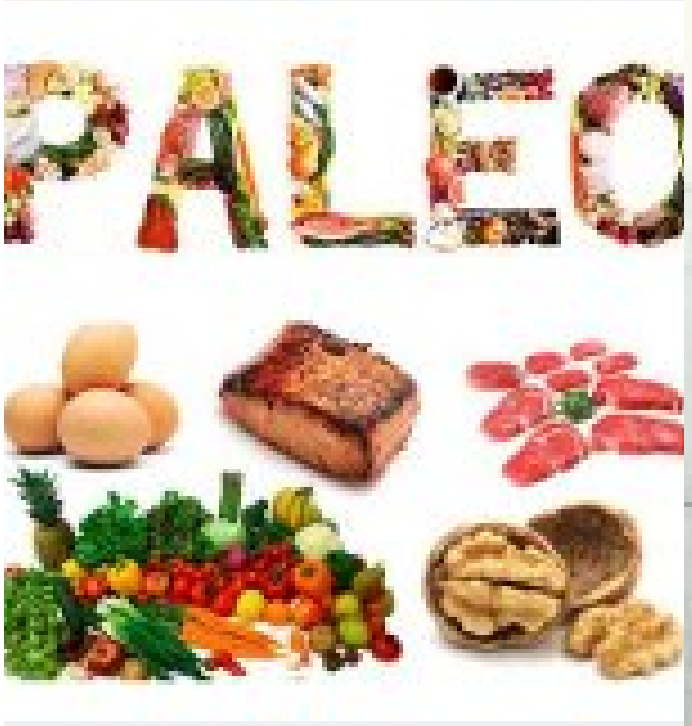
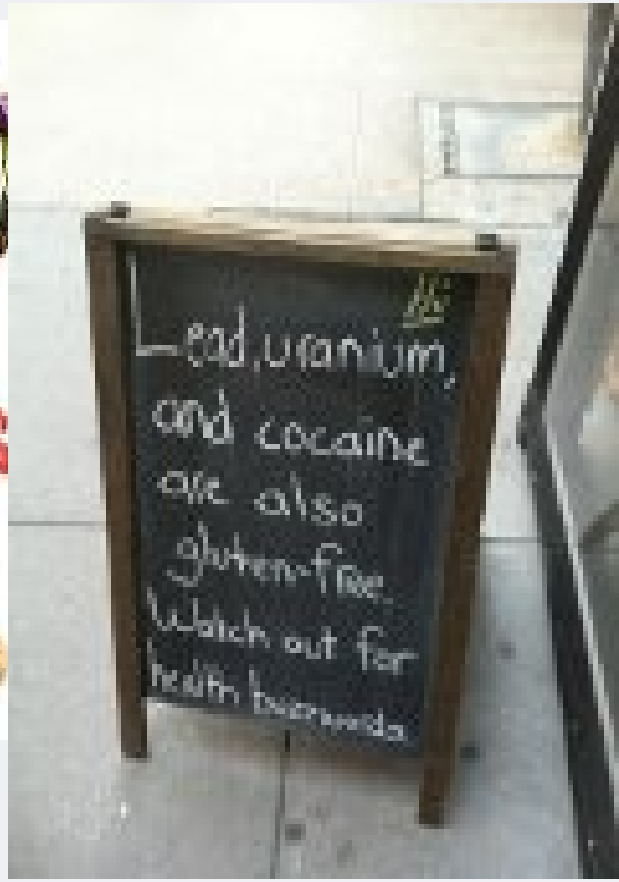
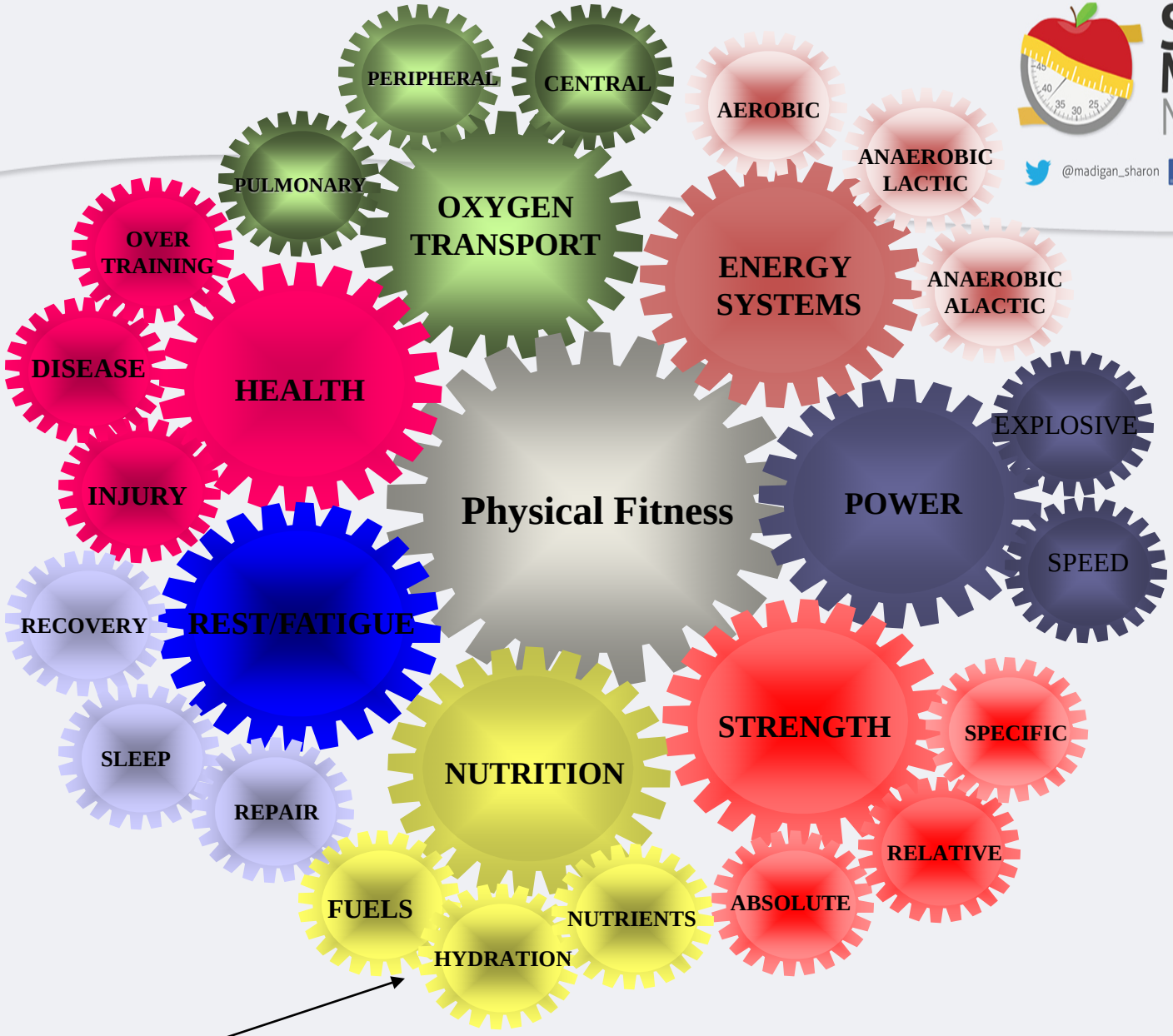
Vs







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Critical to health, growth and athletic Performance!

What are the problem areas?

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- Not enough calories for the training load
- Too many calories: the scales are not balanced?
- Too much fat and sugar.
  - Types of fat.
- Too much salt.
- Alcohol?
- Weekends
- Eating out
- Drinks

Quantity of food needs to reflect how much you are doing

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Different requirements

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The energy equation

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- "Energy balance" is the relationship between "energy in" (food calories taken into the body through food and drink) and "energy out" (calories being used in the body for our daily energy requirements).
- We often find it difficult to balance this!

Energy restriction and athletes

- Weight loss (fat) in the main can occur if done well.
- Often high training loads and energy restriction result in no changes in weight and there can be losses in muscle mass.
- Have seen significant increases in calorie and energy intakes resulting in weight loss:
  - Consistent and increased intensity in training
  - Less days lost to sickness which allows better training.

Negative health effects of long term energy imbalance

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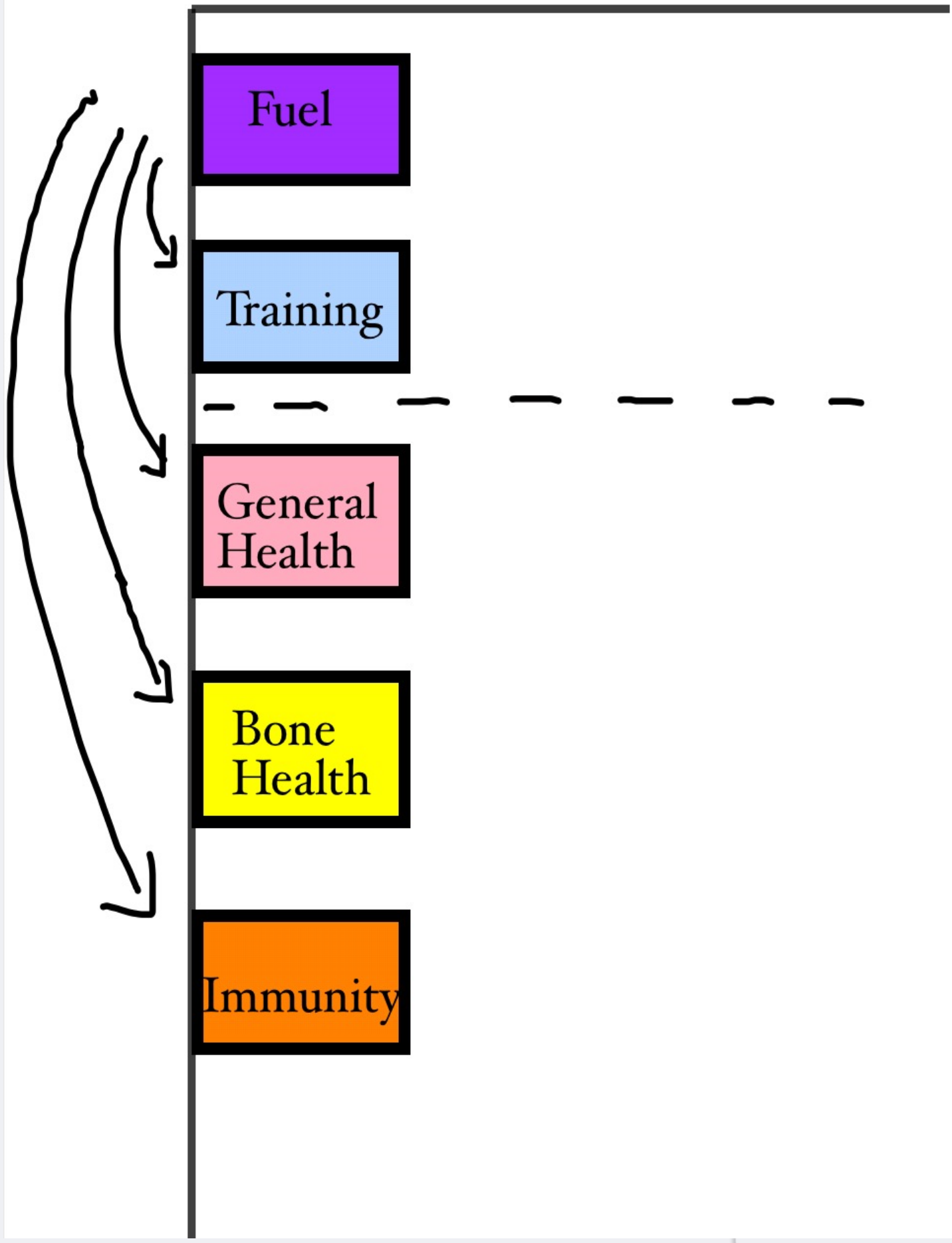
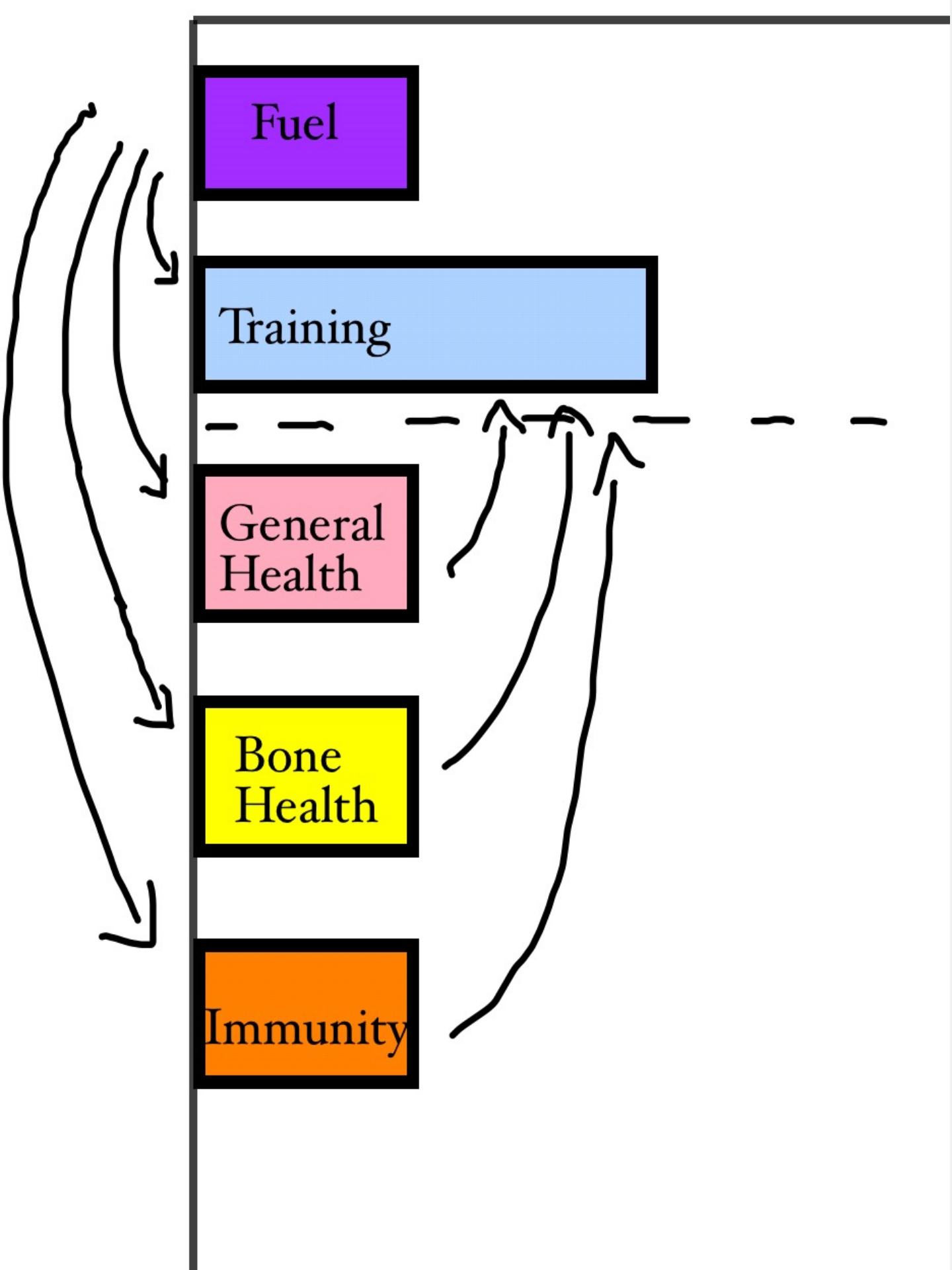
- Low available energy and osteopenia, amenorrhea (female athlete triad)
- Drop in metabolic rate, reduced T3
- Risk of injury
- Abnormal bloods and increase in days sick (uRTI, anaemia)
- Cardiovascular changes : low blood pressure, low pulse, hypoglycemia
- Gastrointestinal symptoms
- Elevation in cholesterol
- Impaired sleep, fatigue, depression


Fuel
Training
General Health
Bone Health
Immunity

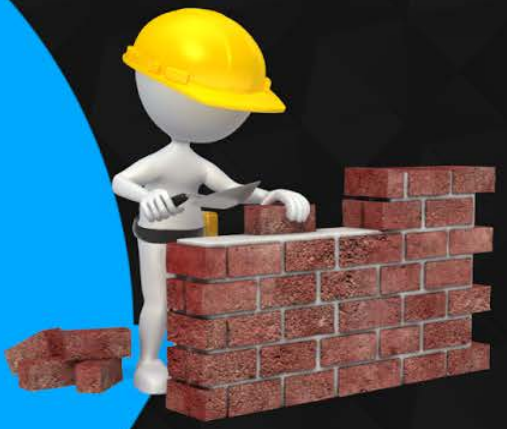

Fuel
Training
General Health
Bone Health
Immunity

THE 4 R'S OF RECOVERY

Designed by @YLMSportScience

Refuel

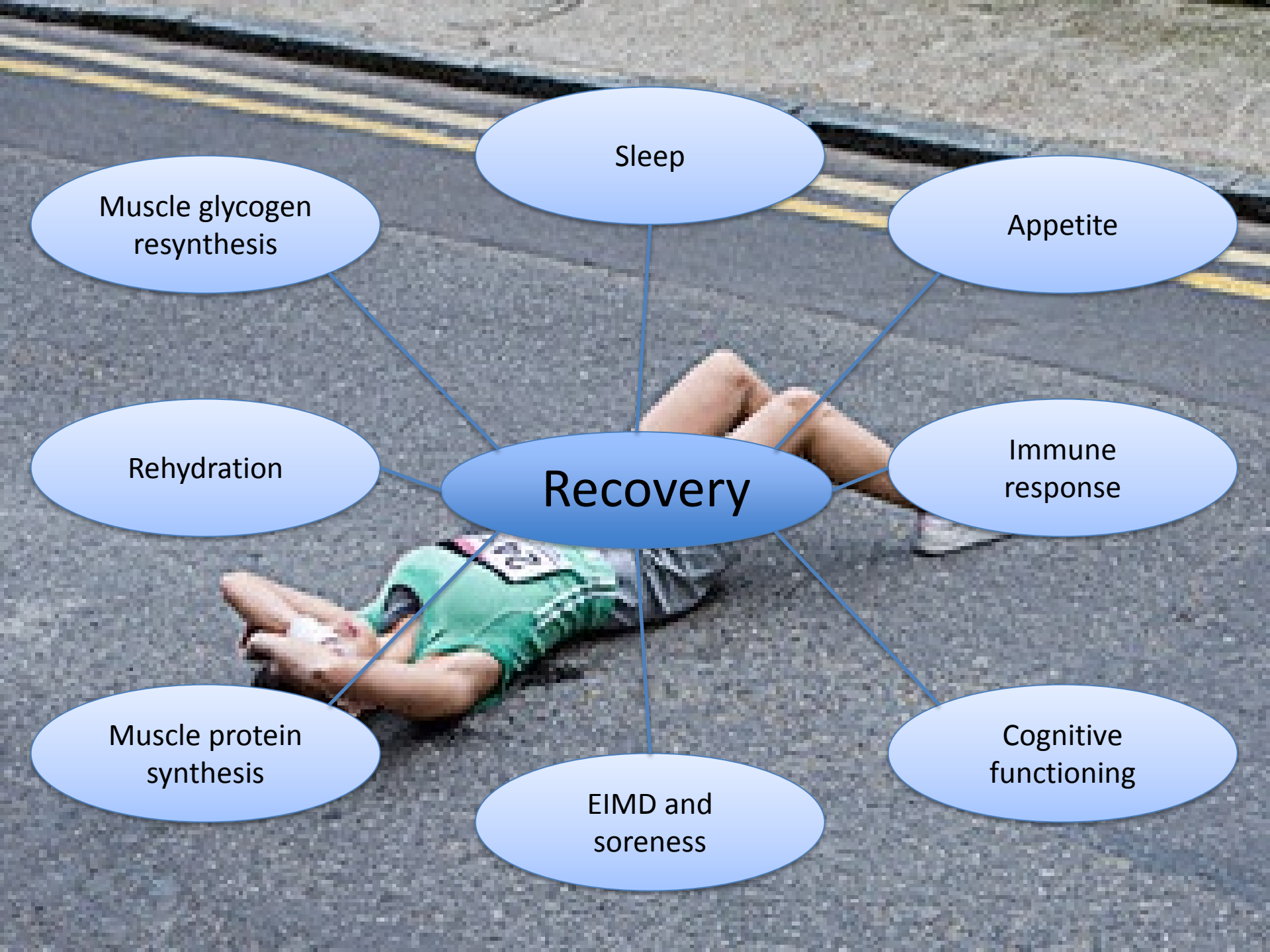
Repair



THE 4R's

Rehydrate

Relax


Sleep
Muscle glycogen resynthesis
Appetite
Rehydration
Recovery
Immune response
Muscle protein synthesis
EIMD and soreness
Cognitive functioning

The post-exercise meal

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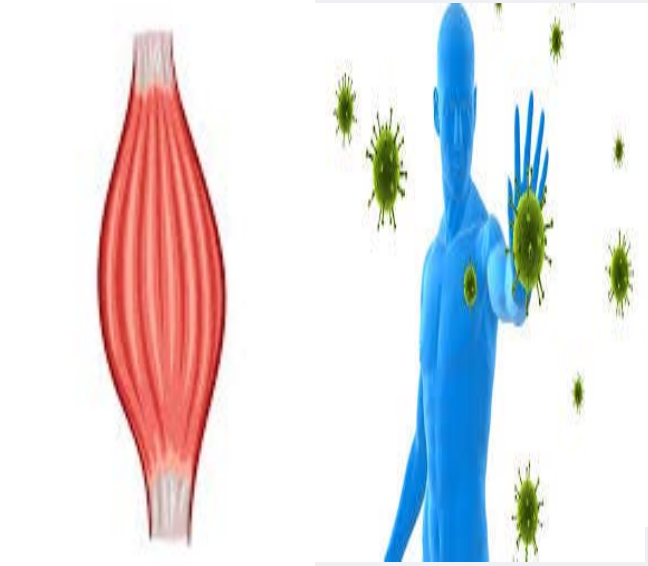

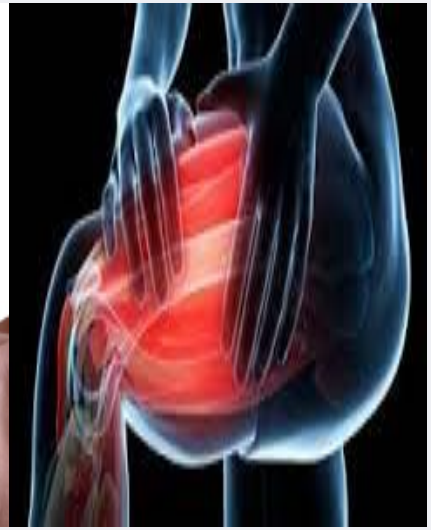

Dairy and exercise recovery

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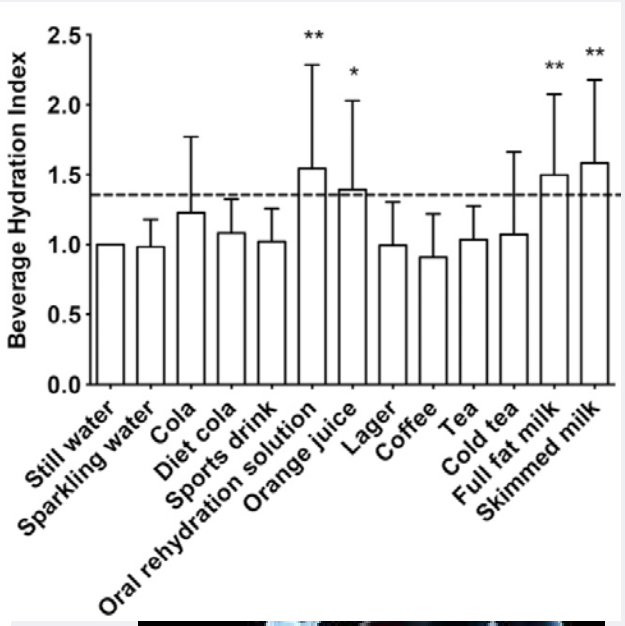

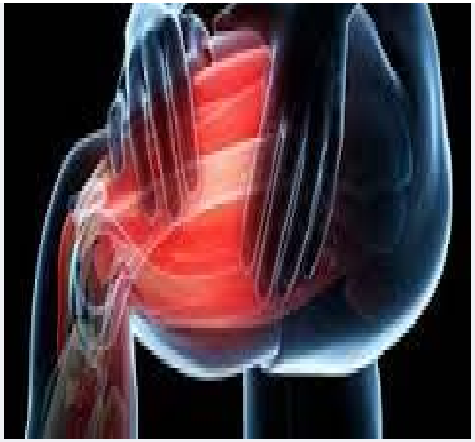

Recovery from endurance exercise

- Studies have reported improved endurance capacity following milk-based products consumed during a short term recovery period (Thomas et al. 2009, Ferguson-Stegall et al. 2011)

European Journal of Clinical Nutrition
https://doi.org/10.1038/s41430-018-0187-x

REVIEW ARTICLE

Chocolate milk for recovery from exercise: a systematic review and meta-analysis of controlled clinical trials

Mojgan Amiri[1,2] · Reza Ghiasvand[3,4] · Mojtaba Kaviani[5] · Scott C. Forbes[6] · Amin Salehi-Abargouei[1,2]

Received: 12 September 2017 / Revised: 28 March 2018 / Accepted: 18 April 2018

Pre-sleep protein and recovery

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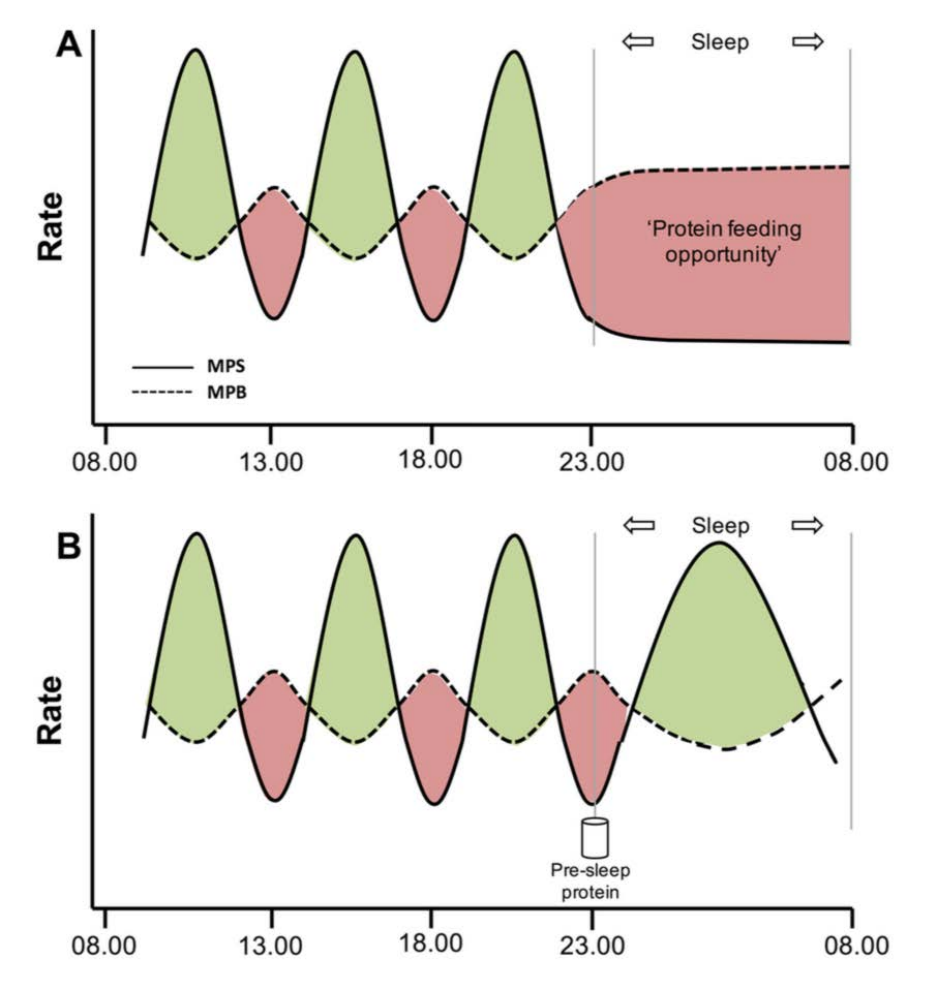
Protein ingested prior to sleep is effectively digested and absorbed and thereby stimulates muscle protein synthesis rates during overnight recovery.



Trommelen & van Loon (2016)

What is Energy Availability?

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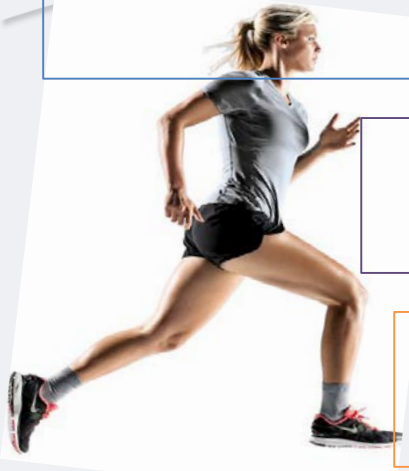
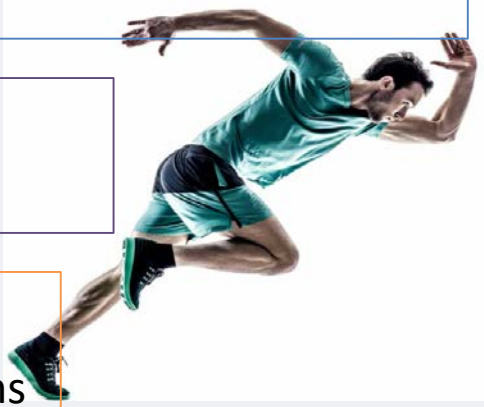
Energy Availability (EA)

The amount of energy needed to optimally fuel your bodily functions **after** you subtract out the calories (energy) used during exercise



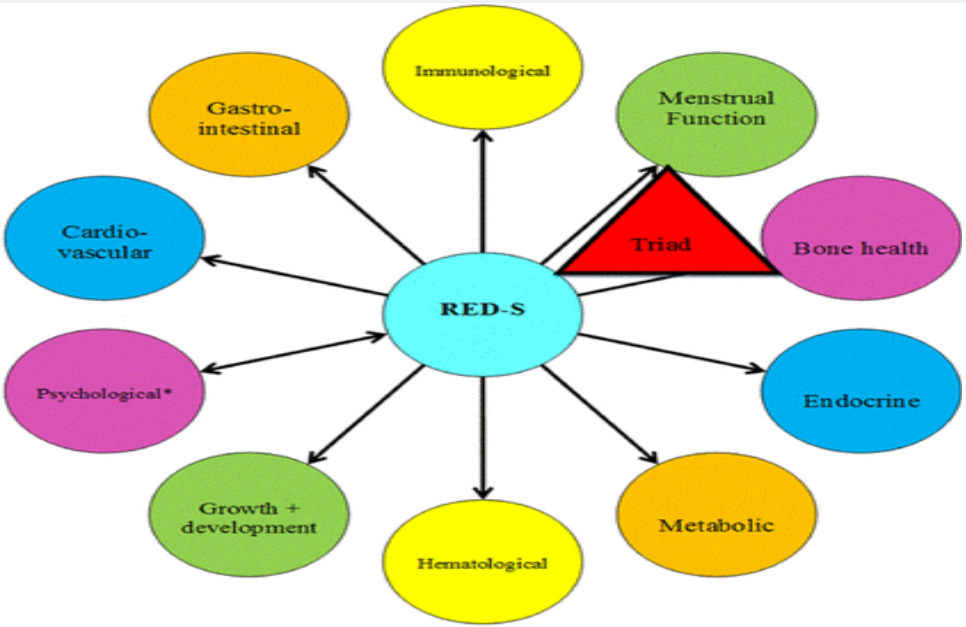
Low Energy Availability (LEA)

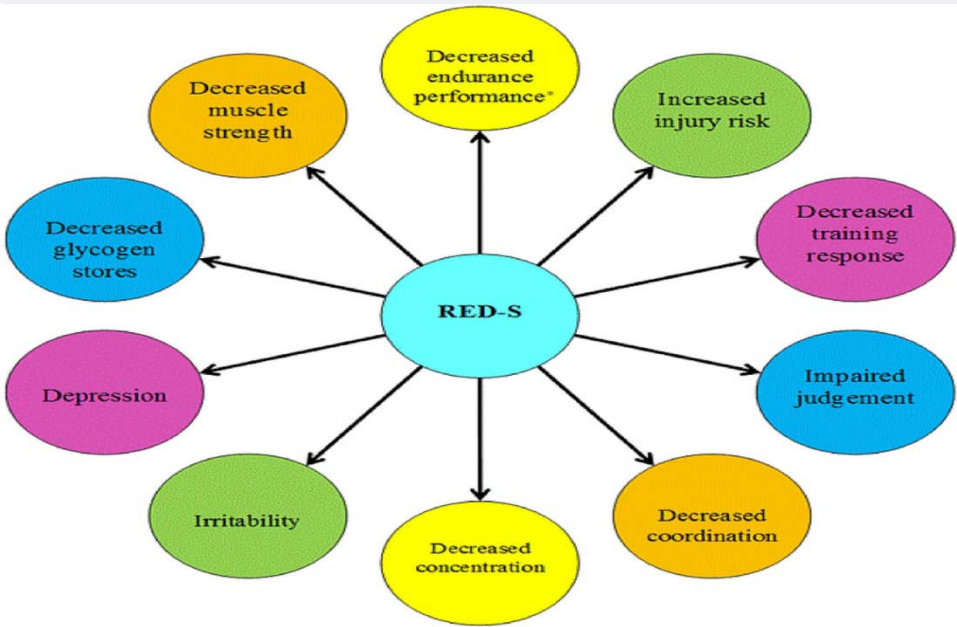
Insufficient energy for normal body functioning



LEA/RED-S Impact

Athletes present with **different** signs and symptoms





> Calculating energy availability

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(EI- EEE) / kg FFM

EI = Dietary intake

EEE= Exercise Energy Expenditure

FFM= Fat Free Mass (body composition assessment needed)

2000 kcal/day

800 kcal/day "x2 intensive training sessions"

FFM (60 kg with body fat @ 20% = 60 (BW) -12 (FM)= 48 kg (FFM))

(2000 – 800/ 48 kg FFM)

25 kcal/kg energy availability

Loucks AB, Kiens B, Wright HH et al. (2011) *J Sports Sci.* **29**, 7-15.

Aim: to determine risk of LEA in active females in Ireland

- Insert details.

- Method:

- Online questionnaire

Results:

International

162

Provincial/County

155

Competitive in Sport

281

Recreational

235

Low energy availability risk in Ireland

What's the risk?

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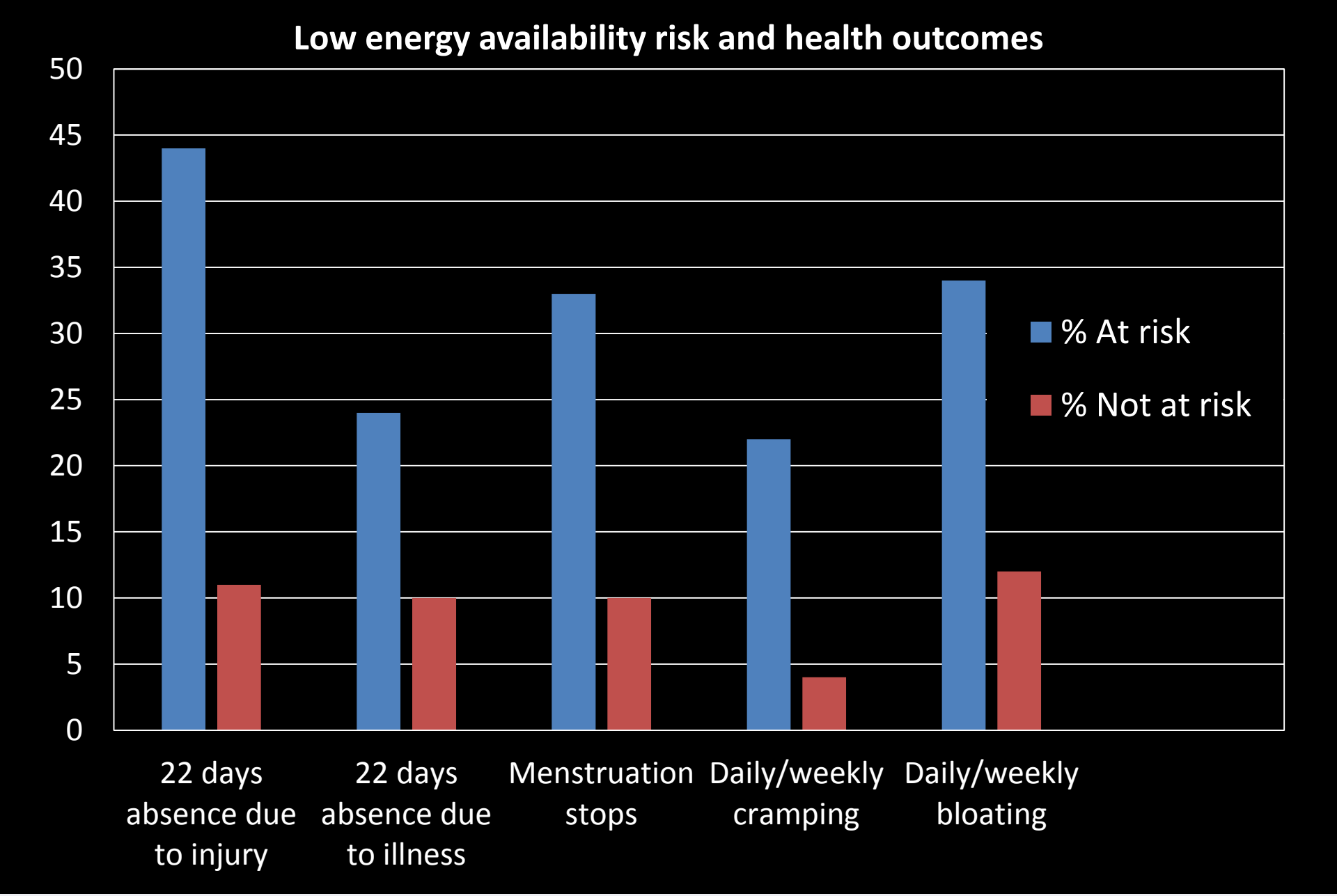
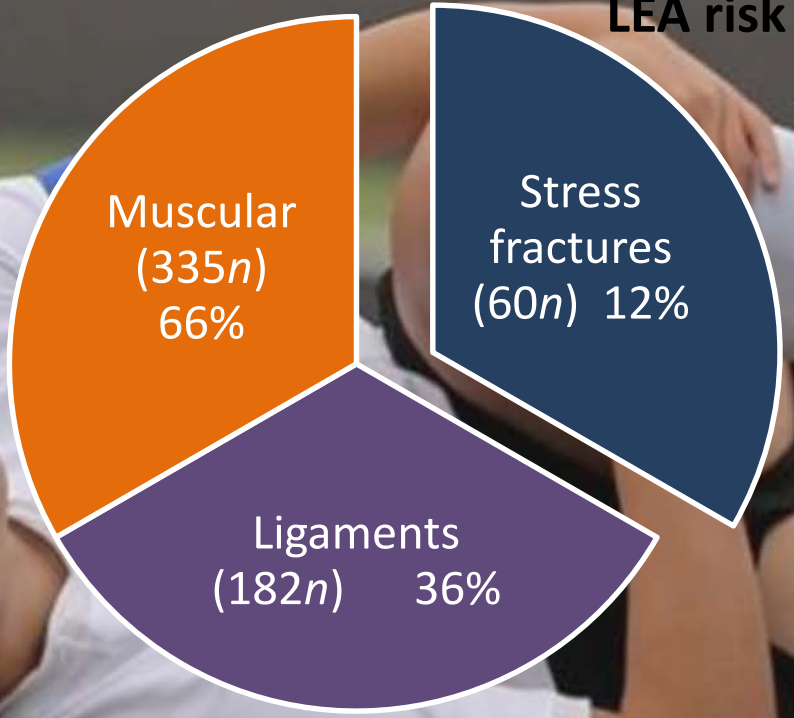

Low energy availability risk and health outcomes
50
45
40
35
30
25
20
15
10
5
0
% At risk
% Not at risk
22 days absence due to injury
22 days absence due to illness
Menstruation stops
Daily/weekly cramping
Daily/weekly bloating

Types of Injuries reported:

LEA risk (46*n*) *vs* not at risk (14*n*)



Risk of LEA in active Irish Females

Article Title:	Screening for risk of low energy availability in athletic and recreationally active females in Ireland
Manuscript DOI:	10.1080/17461391.2018.1526973
Journal (Published):	European Journal of Sport Science (October 2018)

Case History

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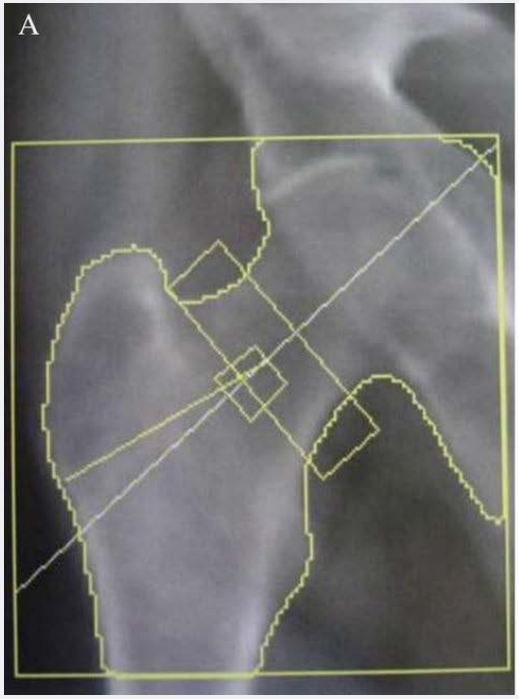
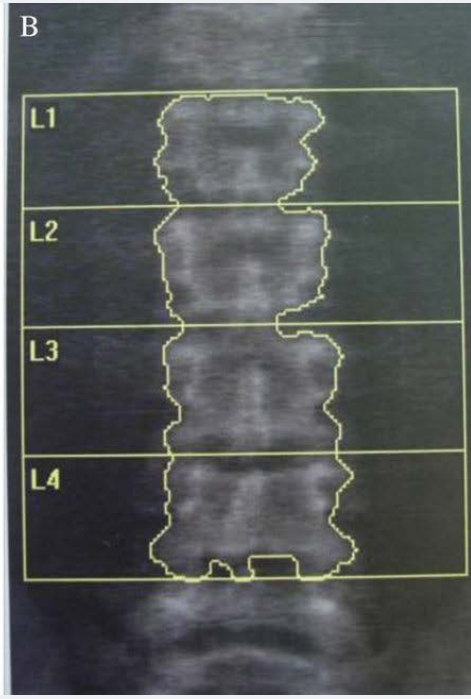
- Elite endurance athlete
- Presented at 32years.
- Stress fracture of one foot previous season and then presents with new issue on other foot.

Investigations -

- Blood tests
- Medical screen
- Physio screen and rehab
- DEXA
- Nutritional assessment
- Team and athlete interaction / discussion





Case History

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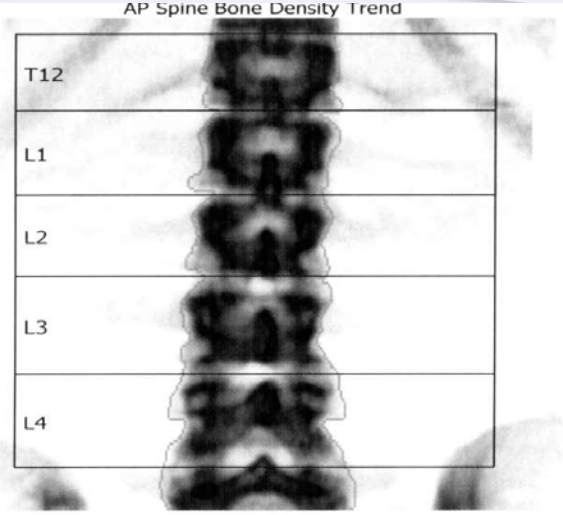

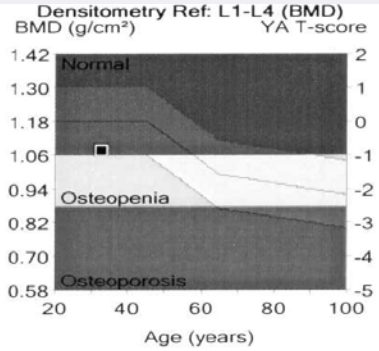

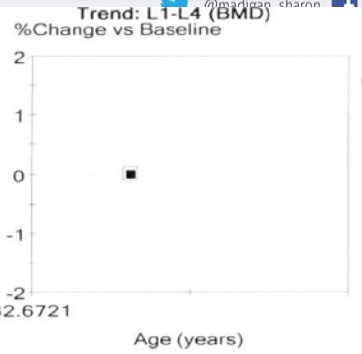

Region	BMD [1] (g/cm²)	Young-Adult [2] T-score	Age-Matched [3] Z-score
L1	1.092	-0.3	-0.3
L2	1.153	-0.4	-0.4
L3	1.061	-1.2	-1.2
L4	1.021	-1.5	-1.5
L1-L4	1.075	-0.9	-0.9

DEXA 2011 NORMAL AND 2013 OSTEOPENIA IDENTIFIED

Trend: L1-L4				
Measured Date	Age (years)	BMD [1] (g/cm²)	Change vs Previous (g/cm²)	Change vs Previous (%)
18/02/2013	32.6	1.075	-	-

Body Fat % = 10.2%

COMMENTS:

Image not for diagnosis

Printed: 18/02/2013 09:27:24 (14.00)76:3.00:50.00:12.0 0.00:7.74 0.60x1.05
18.9:%Fat=10.2%
0.00:0.00 0.00:0.00
Filename: c3seimw81.dfx
Scan Mode: Standard 37.0 µGy

1 - Statistically 68% of repeat scans fall within 1SD (± 0.010 g/cm² for AP Spine L1-L4)
2 - UK (ages 20-40) AP Spine Reference Population (v112)
3 - Matched for Age, Ethnic
11 - World Health Organization - Definition of Osteoporosis and Osteopenia for Caucasian Women: Normal = T-score at or above -1.0 SD; Osteopenia = T-score between -1.0 and -2.5 SD; Osteoporosis = T-score at or below -2.5 SD; (WHO definitions only apply when a young healthy Caucasian Women reference database is used to determine T-scores.)

Nutrition Assessment

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- Athlete was eating well below her requirements, particularly as she is engaging in 60-120minutes of moderate intensity exercise everyday – erg, Xtrainer, cycle commute.
- Her energy intake is 52% of requirement and while her protein intake is within recommendations, her carbohydrate intake is only 205g and her fat intake was very low at 39g. This would explain the macronutrient deficits highlights in her abnormal biochemistry results and low body fat on DEXA. She is also at significant risk of menstrual irregularity though denied this initially.
- Both Calcium and Vit D were also lower that recommended and this again would link to the recent occurrence of osteopenia.
- This restrictive dietary intake is for the purpose of intentional weight loss. Her weight has reduced from 62kg to 60.9kg since DEXA in previous month.
- The athlete is concerned a prolonged period of reduced running will cause weight gain hampering a return to competition. However she does not use any objective means of weight monitoring such as a scales and so could not give any accurate history of reported weight fluctuations since becoming injured. Her goal weight is <57kg though her body fat was 10.2% at last DEXA.

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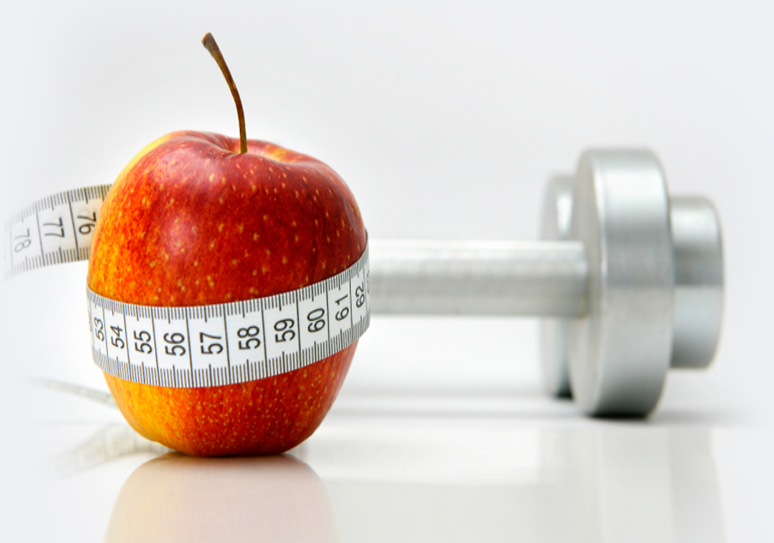
WHY SIMPLE WORKS?



Athlete case study

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- Frequently sick
- Unable to sustain intensity in training for lengthy periods of time
- History of Injury

DAY 2			
7.40 AM	GET UP		
8.00 AM	Water	250ml	
	USN Whey Protein	1 Scoop	
	Poliquin Complete Multi 2.0	2 Caps	
	Nordic Naturals Pro Omega D	2 Caps	
	Kiki Antioxidant Extreme	1 Cap	
	Muesli	1 Very small bowl	
	Milk	Enough for cereal	
	Orange Juice +	1 Small Glass	
	Jarrow Formulas Super Green Foods Green Defence Powder	1 Scoop/serve	
	Boiled Egg	1	
	Brown Wholegrain Roll	1 Small	
			9.00 AM Aerobic Loops
	Water sipped through session	400ml	80 mins inc warm up
10.30 AM	Water	250 ml	
	USN Whey Protein	1 Scoop	
	Lactobin N Colostrum	10g	
	White bread roll	1 small	
	Banana	1 small	
	Dried berries	small handful	
11.10 AM	Chocolate sweets - Kinder choc balls	4	
12.10 PM	Water	300ml	
	Brazil Nuts	5 or 6.	
12.45 PM	NAP for 50 mins.		
13.50 PM	Brown Wholegrain Seeded Roll	1	
	Boiled Egg	1	
	Sausage Pate	very small	
	Muller milk Cocunut Milk Drink	400 ml	
2.40 PM	Caffeine Gum	1 Piece	
	Water	200 ml	
			2.50 PM Technique Training
			100mins inc warm up
4.40 PM	Water	250 ml	
	USN Whey Protein	1 scoop	
	Banana	1	
	Dried berries	handful	
6.30 PM	Salted wholegrain Pretzel st (snacking for 1 hour)	90 grams	
			7.20 PM Physio Exercises
			40 mins
	Shower - Armband off.		
8.30 PM	Vietnamese Curry with Vegtables + Beef	normal dinner size	
	Boiled Rice	Cupful	
	Apfelschorle -(55% Apple Juice 45 % mineral water)	400 ml	
10.45 PM	Poliquin Uber Lysine	2 Caps	
11.00 PM	IN BED		

What changes were made?

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- Timing of food intake
- Not eating enough for training

Example:

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- Average 3 training sessions in a 15hr period.
- Could do 5 in a 30hr period.
- Habitual low ferritin (storage form of Iron)
- Lots of colds and flu
- Then started to pick up lots of Injurys!

- Sample of pre intakes and post food intakes

Breakfast	Calories	Carbs	Fat	Protein	Sodium	Sugar
Flahavan's Irish - Porridge Oats 30 g, 60 g	232	0	0	0	0	0
Bee Products Active - *Manuka Honey, 1 tbsp=30 g	102	25	0	0	5	25
Raspberries - Raw, 1 cup	64	15	1	1	1	5
Quick Tools	398	40	1	1	6	30
Lunch						
Homemade - Chicken Curry With White Rice, 1 plate	577	69	13	36	44	14
Bread - Spelt Bread, 2 slice	106	18	3	3	183	1
Quick Tools	683	87	16	39	227	15
Dinner						
Chicken - Breast, meat and skin, cooked, roasted, 1 cup, chopped or diced	276	0	11	42	99	0
Potatos - Roast -, 1 cup	189	25	9	3	128	1
Homemade - Roasted Winter Vegtables - Squash, Parsnip, Turnip, Carrots, Sweet Potatoe, Olive Oil and Parsley, 1 cup	189	30	7	3	490	0
Quick Tools	654	55	27	48	717	1
Snacks						
Lidl Fin Carre - Whole Nut and Fruit Chocolate, 25 g	142	12	9	2	30	11
Wholebake - 9 Bar Pumpkin (40g Bar), 40 g	204	11	14	9	0	9
Fruit - Banana, 126 g	110	30	0	1	1	19
Quick Tools	456	53	23	12	31	39
Totals	**2,191**	**235**	**67**	**100**	**981**	**85**
bingobingo80 Daily Goal	**3,795**	**521**	**126**	**142**	**2,500**	**77**

Breakfast

	Calories	Carbs	Fat	Protein	Sodium	Sugar
Kinetica - Oat Gain (Correct Info), 160 G	620	78	14	47	0	6
Flahavan's Irish - Porridge Oats 30 g, 60 g	232	0	0	0	0	0
Linwoods - Flaxseed, Milled, Cocoa & Berries, 100 g	455	4	39	22	30	4
Raspberries - Raw, 1 cup	64	15	1	1	1	5
Bee Products Active - *Manuka Honey, 1 tbsp=30 g	102	25	0	0	5	25
Tesco - Ground Cinnamon, 1 tsp	6	0	0	0	0	0
Cereal - Granola, 1/2 cup	280	36	14	6	0	12
Vitasoy - Rice Milk, 250 ml	125	24	3	1	162	15
Quick Tools	1,884	182	71	77	198	67

Lunch

Quick Tools

Dinner

Generic - Parmesan Chicken Filet, 1 Filet	270	8	13	31	340	0
Fresh Garlic - Garlic Clove, 2 Medium Clove (4g)	8	2	0	0	0	0
Maille - Whole Grain Mustard, 1 tsp, 5mL	10	0	0	0	100	0
Cream - Half and half, 100 g	130	4	12	3	41	0
Quick Tools	418	14	25	34	481	0

Snacks

Marks & Spencer - Mango Madness, 280 g	170	38	1	2	0	37
Nature Valley - Sweet and Nutty Peanut, 1 Bar (30g)	148	15	8	4	100	9
Belvita Breakfast - Wholegrain Breakfast Biscuit - Milk & Cereals, 4 biscuits	224	34	8	4	76	8
Oc - Rice Cakes, 2 Cake	60	13	0	1	66	0
M&S - Sour Cream & Black Pepper Wholegrain Snacks, 1 bag	290	34	15	5	0	4
New York Bakery Co - Wholemeal Bagel, 100 g	248	41	3	12	400	5
Sabroso - Serrano Ham Slices, 300 g	615	0	27	93	3,000	0
Generic - Rocket Salad, 100 g	25	4	1	3	27	0
Store Bought - Advocado, 150 g	240	13	22	3	11	1
Hummus - Home prepared, 200 g	354	40	17	10	484	1
Dubliner - Irish Cheese Slices, 40 g	158	0	12	10	320	0
Tropicana.1 - Smooth Orange Juice - Pulp Free 250ml, 250 ml	120	25	0	2	0	25
Quick Tools	2,652	257	114	149	4,484	90

Totals	4,954	453	210	260	5,163	157
bingobingo80 Daily Goal	2,430	334	81	91	2,500	49
Remaining	-2,524	-119	-129	-169	-2,663	-108

What happens?

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- Have seen food diaries where training for individuals with frequent training sessions over a short period of time.

- Have seen calorie intakes of 1200-1500 in a period from 1pm to 10am next day when 2 sessions have been done.
  - Especially GAA!
- People wonder why they are fatigued?
- Look at your training week: Plan it out

Your energy needs are high

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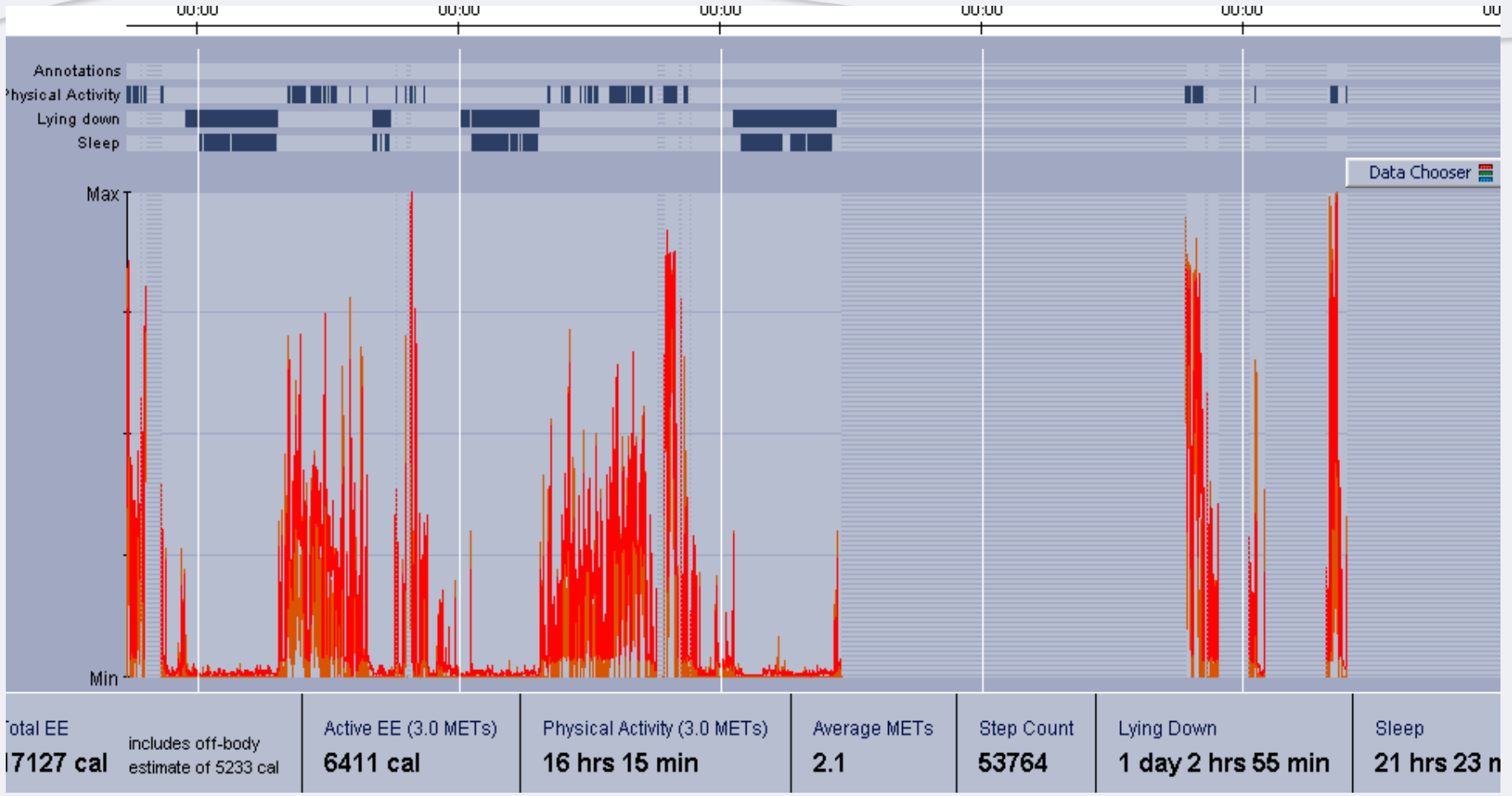

Energy requirements

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Total Energy Expenditure	Average METs	Sedentary (up to 3.0 METs)
21018 calories (includes off-body estimate of 8788 cal)	2.0	55 hrs 35 min
Number of Steps	**Active Energy Expenditure (3.0 METs)***	**Moderate (3.0 - 6.0 METs)**
54682 steps	6484 calories	12 hrs 58 min
Lying Down	**Physical Activity Duration (3.0 METs)***	**Vigorous (6.0 - 9.0 METs)**
1 day 2 hrs 55 min	16 hrs 30 min	3 hrs 6 min
Sleep	*Active Energy Expenditure and Physical Activity Duration require at least two consecutive minutes at 3.0 METs or higher.	**Very Vigorous (9.0 METs and higher)**
21 hrs 23 min		26 min

Calorie Requirement average over 3 days = averaged 3800 calories
Intake =Approx 2400 calories.

Common mistakes

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- Large gaps between eating and drinking, especially on training and comp days.
- Too many processed carbohydrates and fats.
- Not understanding that you need to play for **“YOUR”** requirements.
- Not understanding what “supplement” means
- LOW fat or Carb diets at the wrong time.
  - Player on low carb diet cramping:
- Over focus on some nutrients at the expense of others.
- Not enough sleep

So how can you put simple strategies into practice?

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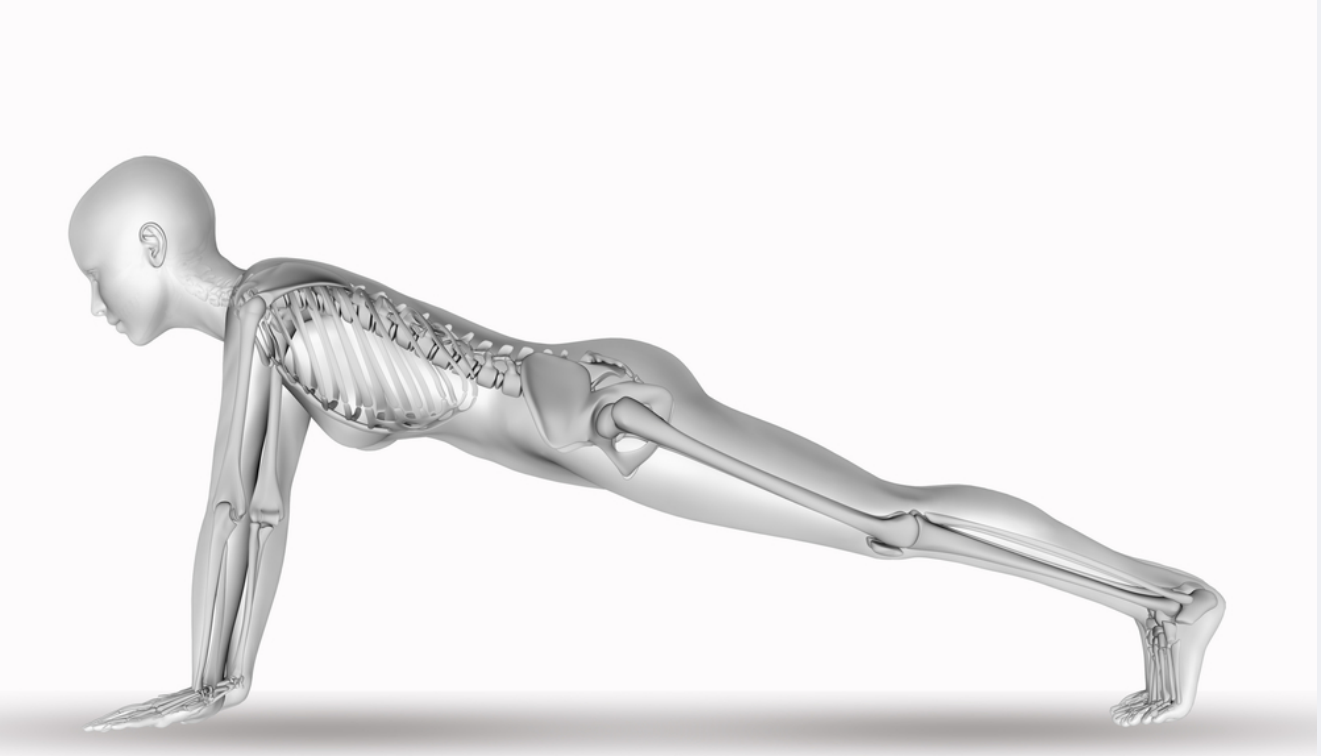

Example: Protein supplements

- Whey protein is a very popular strategy with athletes and players across many sports.
- It is also a popular strategy with the public
- Evidence linking recovery with adequate protein intakes but aim will be to split intakes into 20-25g (0.4g / kg) approx. 4 times per day.
- Amino acids involved in muscle protein synthesis.
- Evidence to suggest that as we get older it may help preserve muscle.

Can everyday foods do a similar job?

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- Can it help with recovery?
- Could there be other benefits?
- Could there be a cost benefit?
- Safety?

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REHYDRATE

Fluid & Electrolytes *(e.g. potassium)*

REFUEL

Carbohydrate
(lactose)

3 R's of Post-Exercise Recovery

REPAIR

Protein
(whey and casein)

Natural source of vitamins and minerals

- Calcium
- Phosphorus
- Potassium
- Vitamin B12
- Vitamin B2
- Iodine

- Convenient
- Affordable
- Versatile
- Accessible

Food focus: why is it useful?

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- Build from the base and then additions can be made as required.
- This cuts out the risk of sticky plaster approach.
- Over focus on certain nutrients usually leaves weakness in other places:
  - A focus on whey protein where an athlete just takes **whey** then rules out the opportunity to get calcium from a food.

Food alternatives

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- A number of strained yoghurts have significantly higher protein profile.

Yoghurts

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Per 100g	Liberte	Chobani	Danio	Total 0%
Kcals	81	92	80	57
Protein	7.8g	7.3g	8.1g	10.3g
CHO	11.1g	11.8g	11.5g	4g
Fat	0.1g	1.6g	0.1g	0

Comparisons

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per 100mls	Semi-Skimmed Milk	Choco milk	Enriched milk*	Kinetica Recovery	Kinetica Prorelease	Maxi Muscle Progain	Maxi Muscle Cyclone
Kcals	50	85	84	98	64	81	62
CHO	4.8	12.4	10.1	8.7	0.95	12.2	5.6
Protein	3.6	4.3	7.2	5.2	11.25	5.7	7.3
Non-cariogenic	✔	✘	✔	✘	✔	✘	✘
Calcium	124	130	252	✘	✘	✘	120
£	6p	10p	10p	50p	50p	64p	69p

Hydration: is it important?

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Hydration

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- Focus
- Fatigue
- Practice now
- What do you drink?

Salty sweat

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Immunity

- While moderate training appears to boost the immune system, the functioning of the immune system is affected by strenuous exercise.
- Several other behavioural and lifestyle factors can influence immune function including;
  - Nutrition
  - Extreme environmental conditions
  - Rest and Recovery
  - Sleep
  - Psychological issues

Immunity

- Carbohydrates and fluids are important in prevention of infection especially URTI.
- However increased intakes of CHO at the expense of protein is also an issue.
- No long gaps between eating and drinking while hard training.
- Bringing down your weight while training hard requires care and don’t expect big losses

Strategies to counter illness

- Avoid getting a dry mouth both during training and at rest.
- Never share drinks bottles.
- Avoid rapid weight loss as this has been associated with adverse immune changes.
- Good sleep, 7hrs min.

Planning: food and fluids

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- What is your training day or match day plan?
- How does your training plan mirror your match / comp day?
- What difficulties arise when away from home?
  - Work, matches, training?
- Do you ever get nervous playing and your guts are not good or you feel sick and can't eat?
- What are you doing if you are doing manual work?

What are the key points

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- What is the magic bullet?
- Are the basics correct?
- Are you focusing on the right areas?
- A one size fits all approach does not work.
- Watch marketing : if something is being sold then be mindful of this.
- If it sounds too good to be true……
- Watch social media as a source of information

Be careful of sources of information

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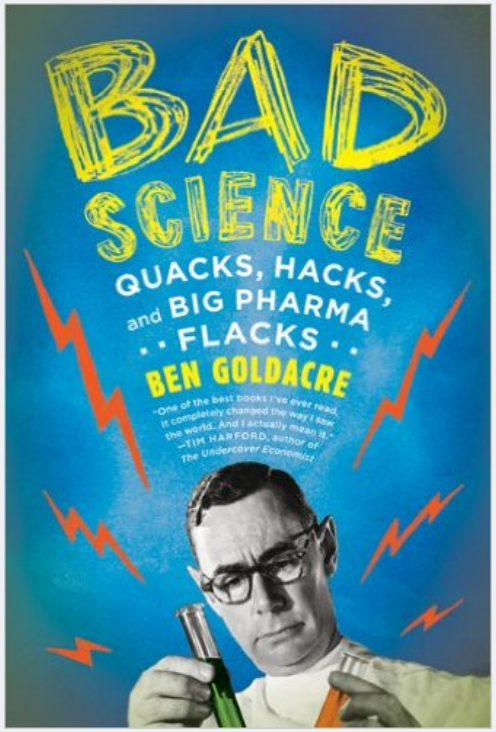
- Anyone can call themselves a “nutritionist”



Thank you and questions

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