

Sports Nutrition and The Female Runner

For
The Serpentine Running Club
By
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INTRODUCTION

- Karen Campbell:
- Registered Sports Nutritional Therapist
- Specialist area - endurance sports
- Private Practice
- 17 time European marathon runner
- Ultra Runner
- Nutrition for Mental Health
- Clinic Tutor - ION



Group Introduction

Aims of the Presentation

To provide information on nutrition for female runners, specifically:

- CHO in training
- Importance of Hydration
- Iron Status
- FAT/RED-S



Why is Nutrition in Sport Important?

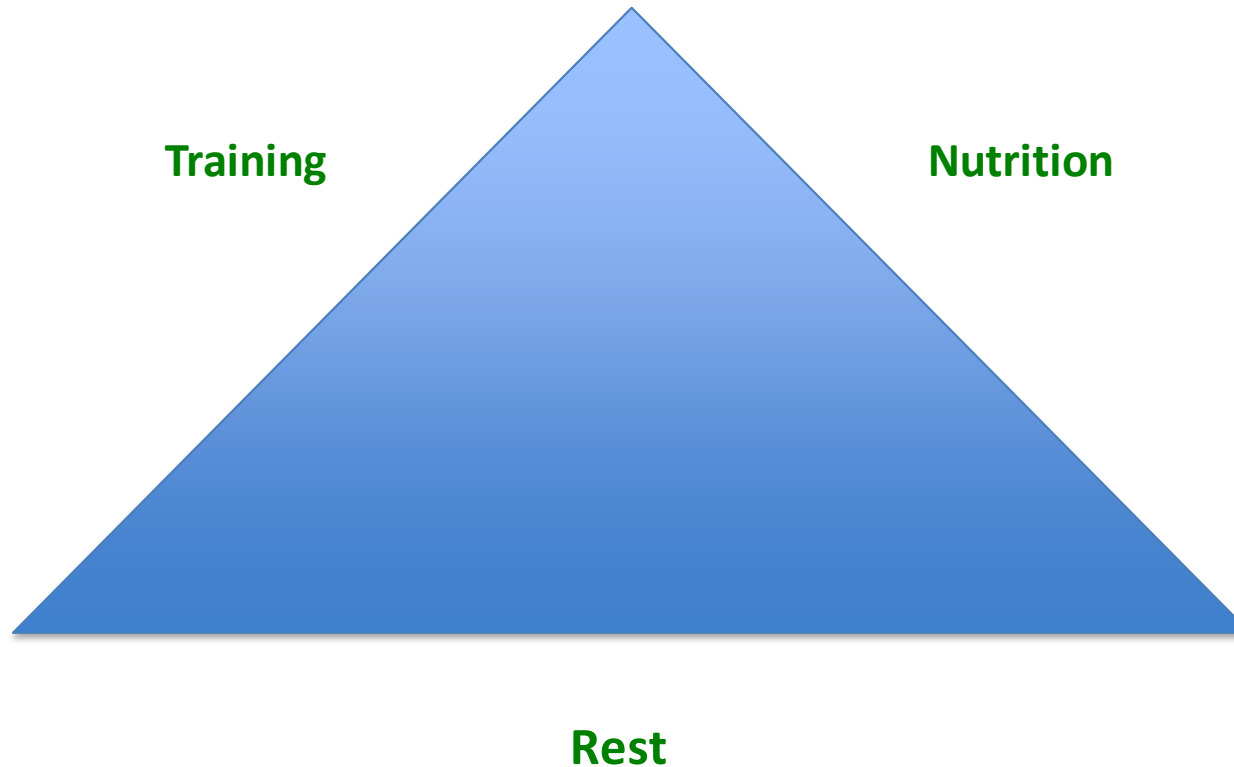


ANSWER

- General good health
- Injury prevention
- Recovery
- Immune support
- Longevity of sporting “career”
- Training adaptation
- Sports Performance



PERFORMANCE TRIANGLE



Minimise fatigue:Maximise Performance

Nutrition in Sport

“When everything else is equal, nutrition can make the difference between winning and losing”

KE Black (researcher of sport and nutrition)

Carbohydrates



Carbohydrates

Population	Estimate of carbohydrate requirements (g/kg/d)
Low training volume, skill based sports, or for athletes looking to lose weight	3-5
Moderate exercise programmes (e.g. <1hr per day)	5-7
Endurance athletes (e.g. > 1-3hrs per day)	7-10
Extreme exercise programme (e.g. >4-5hrs per day)	10-12



Key Points

Primary energy source

glucose:fructose 2:1 ratio during exercise

Storage in the body as glycogen is limited

Combine complex carbohydrates with protein at meal times

Body may utilise up to 90g per hour during exercise

Helps blunt stress response

Carbohydrates

Carbohydrates:

- Most researched
- Digested and absorbed quickly
- Provides more energy per unit of time than fats
- Generally linked to endurance/high intensity sports eg. Distance running/cycling
- Converted to glucose for fuel
- Stored in liver/muscle as glycogen
- Brain uses ONLY glucose as fuel



CHO

Carbohydrate:

- Pre exercise
- During exercise
- Post exercise



May help prevent overtraining;

Drop in performance, altered mood, sleep disturbance

CHO

WHAT?

Slow Release CHO:

wholegrains/vegetables/legumes

Quick Release CHO: fruit flapjacks, rice cakes, commercial bars, CHO gels, bananas

Glucose: honey, fruit/dried fruit

Fructose: bananas, mango, pineapple, dried fruit

Protein/CHO combination: scrambled egg on toast.

Smoked salmon on wholegrain bagel, mackerel with brown rice, porridge with mixed nut topping

Food/Meal Ideas For (Pre, During, Post) Long Training Runs and Marathon Event

PRE-EXERCISE	DURING EXERCISE	POST-EXERCISE
<p>2-4h carbohydrate and protein</p> <ul style="list-style-type: none"> · Porridge with mixed seeds and berries · Salmon on 2 x slices wholemeal toast with cream cheese, tomatoes and mushrooms · Wholemeal muffin with nut butter and banana · Rice pudding with stewed apple and raisin and walnuts, plus a yogurt. <p>30 mins – 1hr</p> <ul style="list-style-type: none"> · vegetable juice eg. Spinach, avocado, kale, apple, chia seeds. · Banana · Bar eg. Mule bars, Nom <p>Hydration - 2hrs:</p> <ul style="list-style-type: none"> · Approx 400ml <p><small>Rodriguez NR et al (2009) , Nutrition and Athletic Performance Practical Sports Nutrition. Louise Burke 2007 The Complete Guide to Sports Nutrition, Anita Bean (2013)</small></p>	<p>Per Hour</p> <ul style="list-style-type: none"> · Dried fruit eg. dates, raisins · 1 x sports bar/gel containing quick release carbohydrate only eg. Honey Stinger, Gu · Banana · Large white bread roll with honey/jam <p>Hydration Drink to thirst.</p> <p>NB. Remember importance of trialing foods, snacks, drinks during training.</p>	<p>Within 20-30 minutes</p> <ul style="list-style-type: none"> · Dried fruit eg. dates, raisins · Fresh fruit eg. banana, apple, pear · Large bread roll with honey/jam · 1 x sports bar/gel containing quick release carbohydrate only eg. Honey Stinger, Gu <p>30 mins – 2hrs (Carbohydrate:protein – 4:1 ratio)</p> <ul style="list-style-type: none"> · Chocolate milkshake or fruit smoothie made with yogurt · Muesli with milk (or yogurt) · Wholemeal bread sandwich with cheese or chicken plus 1 x piece fruit plus · Large baked potato with cottage cheese · 2 x slices wholemeal toast with 250g baked beans · NOTE: continue with this protocol every 2hrs until 6hrs post-exercise then resume regular eating pattern. This would only be necessary for training in excess of 3hrs. Below this time, have one of the above snacks approx. 1hr following training then another 2hrs later. Resume normal eating afterwards. <p>Hydration: Salty snacks to encourage thirst response</p>

Hydration



Why is Hydration important for a runner?



Answer

- Performance limiting factor in exercise >90 minutes
- Ensure adequate hydration pre-exercise
- Drink to thirst
- Ensure body becomes no more than 2% dehydrated
- Increase intake in heat
- Electrolyte drinks during prolonged exercise and under hot conditions
- Listen to your body – assess individual needs rather than ‘one size fits all’
- Ensure reasonable access to fluids during training
- Overhydration can cause gastric upset
- Salty snacks following exercise



Mental Performance

- Mild dehydration (~2%) shown to impair cognition
 - Concentration
 - Short-term memory
 - Perceptual discrimination
 - Arithmetic ability
 - Psychomotor skills



Lieberman, H. R. (2007). Hydration and cognition: a critical review and recommendations for future research. *J Am Coll Nutr*, 26(5 Suppl), 555S-561S.

Effect on Physiological Parameters:

- Reduction in blood volume
- Decreased skin blood flow
- Decreased sweat rate
- Decreased heat dissipation
- Increased core temperature
- Increased rate of muscle glycogen use



ACSM Position Stand



“Because there is considerable variability in sweating rates and sweat electrolyte content between individuals, customized fluid replacement programs are recommended”.

Sawka, M. N., Burke, L. M., Eichner, E. R., Maughan, R. J., Montain, S. J., & Stachenfeld, N. S. (2007). American College of Sports Medicine position stand. Exercise and fluid replacement. *Med Sci Sports Exerc*, 39(2), 377-390.

HYDRATION



Am I Hydrated? Urine Color Chart

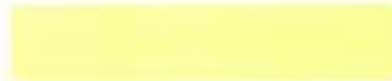
1



2



3



4



5



6



7



8



This urine color chart is a simple tool your can use to assess if you are drinking enough fluids throughout day to stay hydrated.

If your urine matches the colors numbered **1, 2, or 3** you are **hydrated**.

If your urine matches the colors numbered **4 through 8** you are **dehydrated** and need to drink for more fluid.

Be Aware! If you are taking single vitamin supplements or a multivitamin supplement, some of the vitamins in the supplements can change the color of your urine for a few hours, making it bright yellow or discolored.

If you are taking a vitamin supplement, you may need to check your hydration status using another tool like Handout #15: Hydration Check: Body Weight Log.

Name	Date	A	B	C	D	E	F	G	H
		Body weight		DBW (A-B)	Drink volume	Urine volume*	Sweat loss C+D-E	Exercise time	Sweat rate
		Before exercise	After exercise						
Mackinzie	9/15	61.7 kg	60.3 kg	1400 g	420 mL	90 mL	1730 mL	90 min	19.2 mL·min ⁻¹
								1.5 h	1153 mL·h ⁻¹

*Weight of urine should be subtracted if urine was excreted prior to postexercise body weight
 DBW, difference in body weight
 Sweat loss = total fluid loss during exercise
 Sweat rate = fluid loss per unit time

Sweat rate		Fluid intake		Rehydration intervals
mL·h ⁻¹	lb·h ⁻¹	mL	oz	min
500	1.1	125	4	15
750	1.7	190	6.5	15
1000	2.2	250	8.5	15
1500	3.3	250	8.5	10
2000	4.4	330	11	10
2500	5.5	415	14	10
3000	6.6	500	17	10

Sweat loss example

Two hour training session:

- Pre-training weight = 70Kg
- Post training weight = 68.8kg
- Fluid consumed during training = 750ml
- Total sweat lost = $70 - 68.8 + 0.75 = \mathbf{1.95L}$
- Sweat loss rate = $1.95 / 2 = \mathbf{0.975L/hr}$
- Dehydration at end of session = $68.8 / 70 \times 100 = \mathbf{98.3\% \text{ hydrated or } 1.7\% \text{ dehydrated (OK)}}$

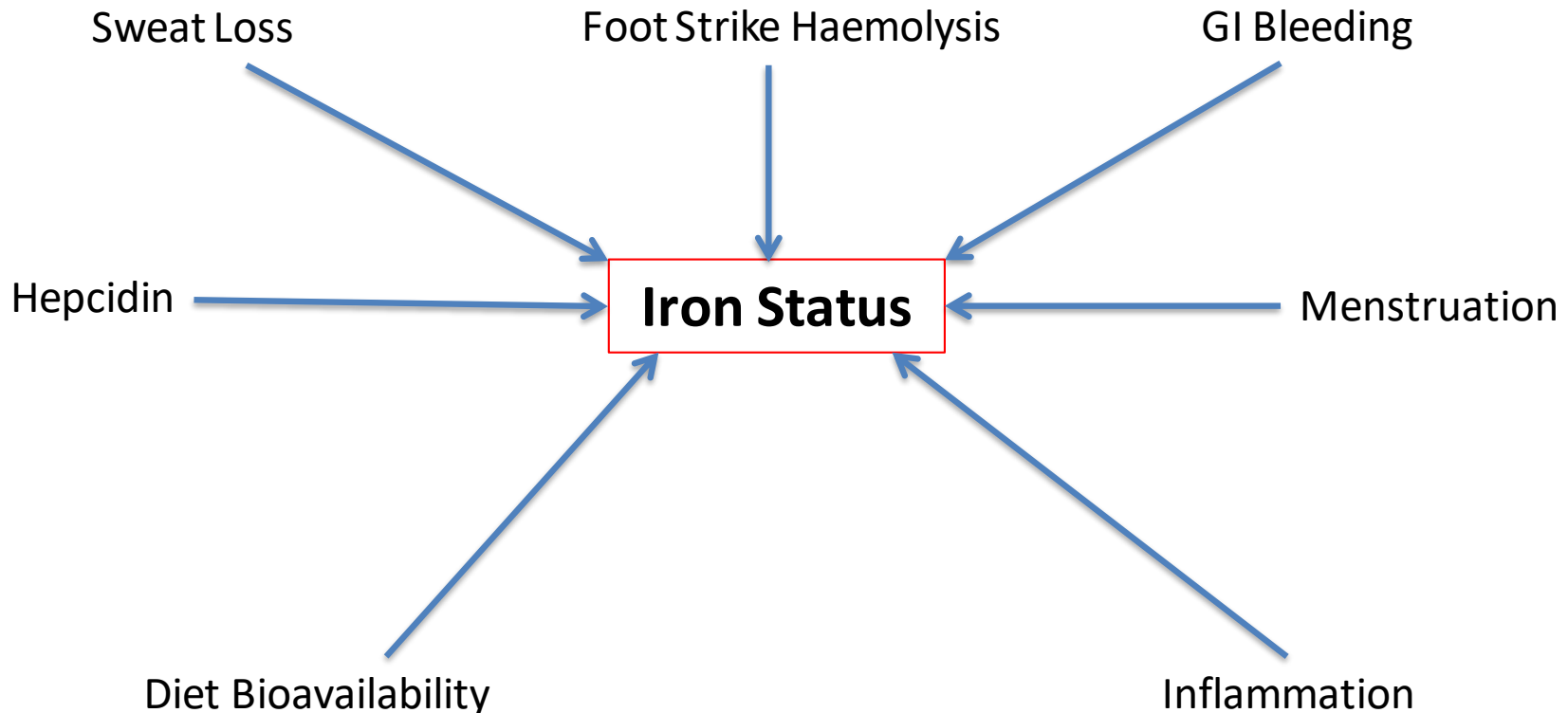
Iron Status and the Female Runner



What are Some of the Risk Factors for Iron Insufficiency/Deficiency?



Risk Factors for Iron Insufficiency/Deficiency



Individuals at Increased Risk of Iron deficiency

- Adolescents
- Female
- Distance runners
- Vegetarians
- Pescatarians (or those eating very little red meat)
- Male runners – although less prevalent than in female runners due to lower requirements and an increased capacity to store iron.



Signs and Symptoms

- Lethargy/tiredness/fatigue
- Reduced resistance to infection
- Headaches/light headedness
- Pale skin of inner mouth/nails Pale on inner lining of eyes
- Rapid heartbeat/ low blood pressure
- Thin, brittle, pale, spoon shaped nails
- Sore, smooth, red tongue
- Shortness of breath during exercise
- Decreased appetite
- Brittle hair
- Reduced cognition and mood
- Disturbed sleep
- Restless leg syndrome (RLS)
- Tender/sore muscles
- Hormone dysfunction eg. Thyroid, sex hormones
- Impaired sports performance



Types Of Iron



Iron Absorption Enhancers



Iron Absorption Inhibitors

Inhibitors	Principle Food Sources	Traditional Processing Methods Used To Reduce Effects
Phytic Acid	Pulses, unrefined grains, nuts/seeds, legumes (beans and pulses), soybean and products	Fermentation, soaking (minimum 12hrs), sprouting, germination, milling, leavening (of bread)
Calcium (inhibits haem and non-haem iron)	Milk, yogurt, Cheese	Avoidance when eating iron rich foods
Polyphenols (Flavonoids/tannins)	Tea, coffee, herbal teas, cocoa, red wine	Avoidance when eating iron rich foods.

Hints and Tips on How to Enhance Iron Absorption From Food

Eat lean red meat 3-4 times weekly

Add meat to dishes containing legumes, nuts and seeds, and grains

Vegetarians - add vitamin C rich vegetables to dishes containing legumes, nuts/seeds, grains eg. red chilli peppers, sweet peppers, kale, parsley, broccoli, Brussels sprouts

Consume foods fortified with iron eg. fruit juices, cereals, plant milks eg. rice, oat, almond milks

Avoid drinking tea/coffee/red wine when consuming a meal

Have yogurt as a snack between meals

Hints and Tips on How to Enhance Iron Absorption From Food

Soak nuts and seeds before adding to recipes

Eat sourdough bread (leavened bread)

Eat rye bread

Add vitamin C rich fruits to breakfast muesli eg. strawberries, papaya, mango, melon, raspberries

Drink freshly squeezed orange juice once a day with a meal

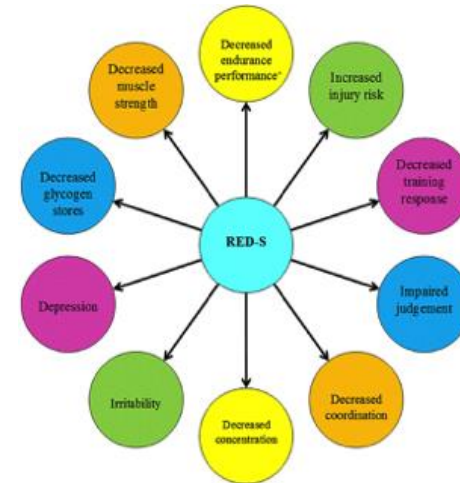
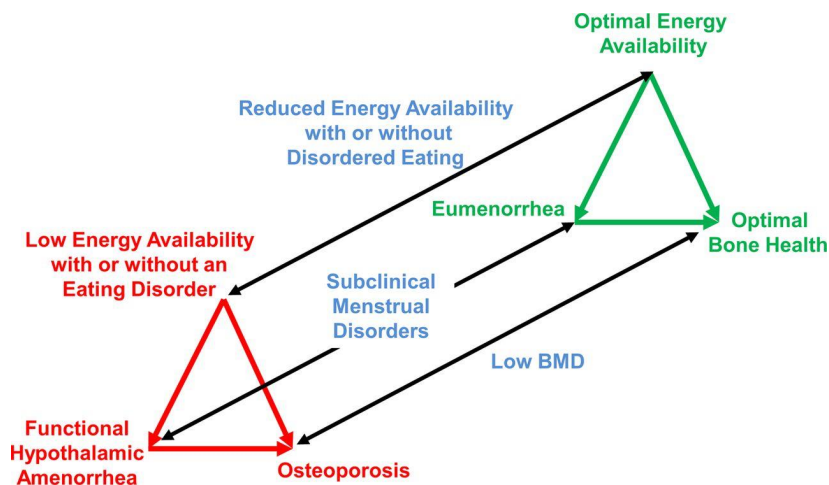
Use lemon juice and/or apple cider vinegar in salad dressings when eating alongside dishes containing legumes, nuts/seeds, grains

Soak legumes, grains, nuts and seeds for at least 12 hours before cooking – discard soaking water

FAT/RED-S

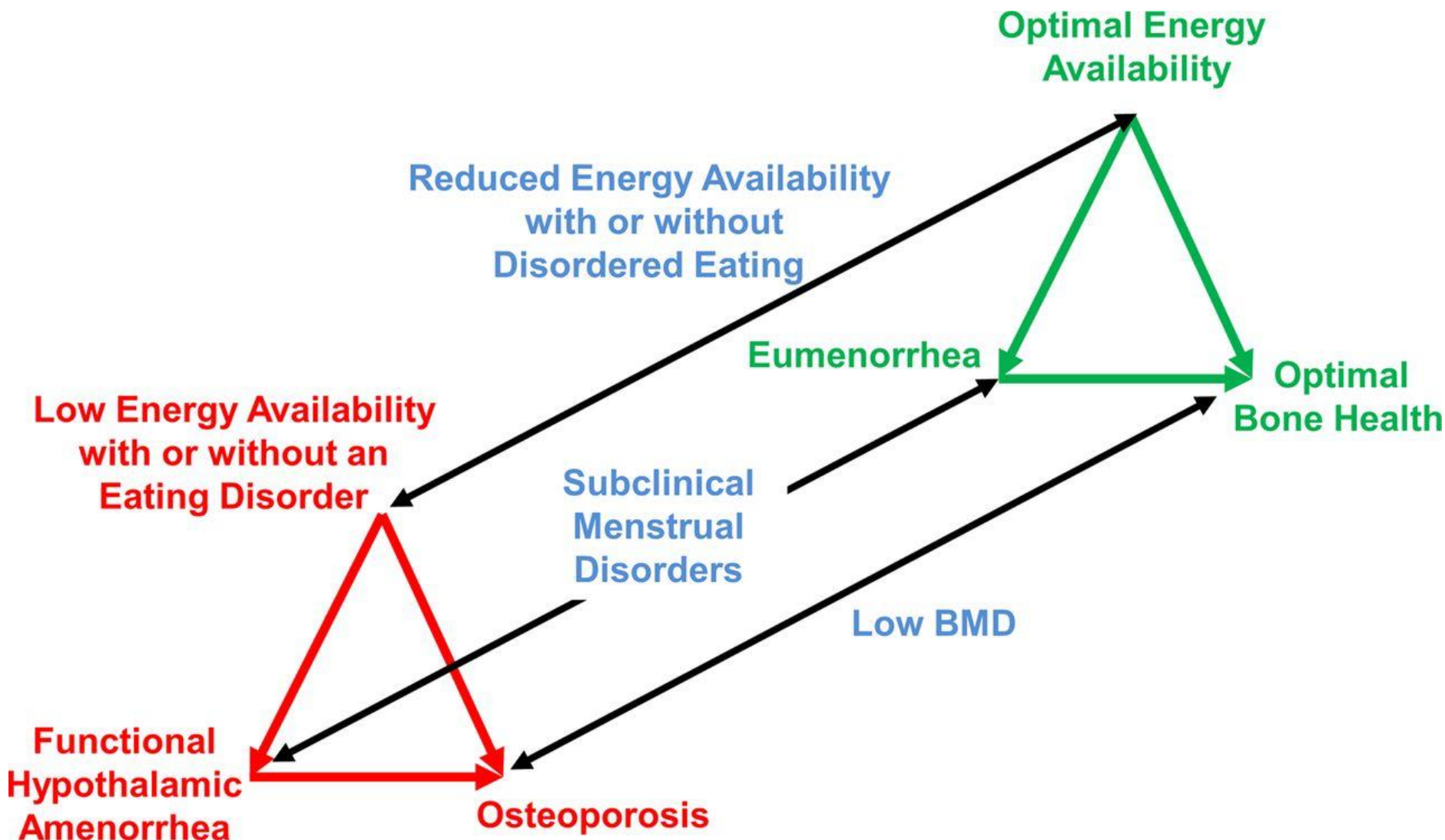


What are Female Athlete Triad and Relative Energy Deficiency Syndrome?

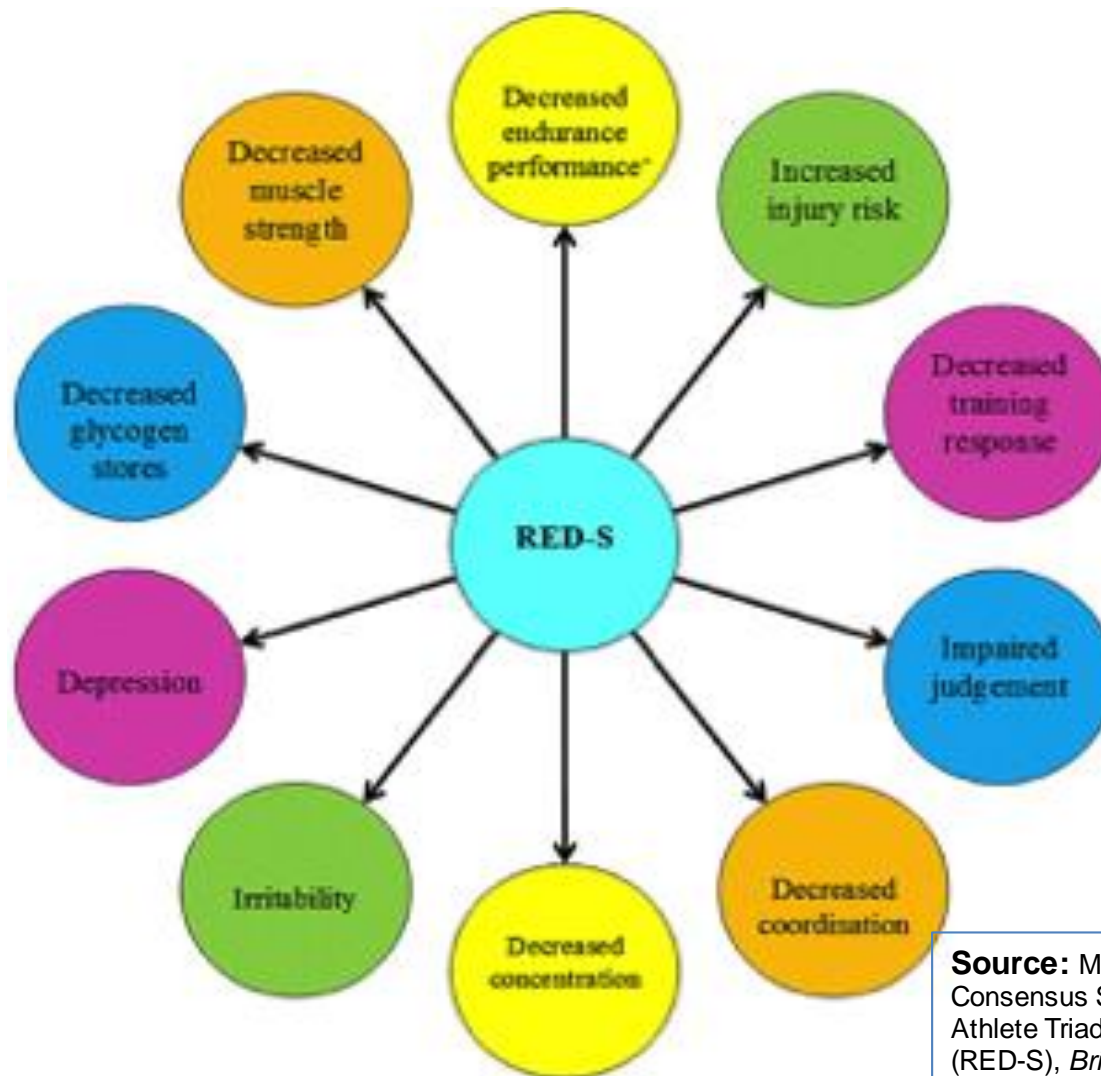




Female Athlete Triad/RED-S



Female Athlete Triad/RED-S



Source: Mountjoy M, et al (2014), The IOC Consensus Statement: Beyond the Female Athlete Triad-Relative Energy Deficiency in Sport (RED-S), *British Journal of Sports medicine*, **48**: 491-497.

Women v Men



Tips on RED-S Prevention





TAKE HOME MESSAGE

- Nutrition is only a part of the performance triangle
- An everyday nutrient dense diet is important
- A “one size fits all” nutrition programme is inappropriate for athletes
- A personalised plan for athlete macronutrient and hydration requirements is important
- Long training runs and racing event require additional nutrient considerations
- Planning is key to ensuring nutritional needs are met.

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The End

- **Thank you for listening**
- **Any Questions?**

