

SPORTS NUTRITION



The good, the “fad” and the ugly-
Preparing your body for Performance

Overview

- Nutrition for athletes
 - hydration
 - nutrition needs
 - pre and post training foods



- Performance supplements- promoting clean sport
- Female Athlete Triad/Relative Energy Deficiency in Sport (RED-S)
- Additional resources

IOC consensus statement on sports nutrition

- The **amount, composition and timing** of food intake can profoundly affect sports performance.
- **Good nutrition** will help athletes train hard, recover quickly and adapt more effectively with less risk of **illness or injury**
- **Good nutritional strategies** need to be adopted before, during and after training to help **maximize** performance



“A great diet cannot make average athletes’ elite, but a poor diet can make an elite athlete average”

Hydration

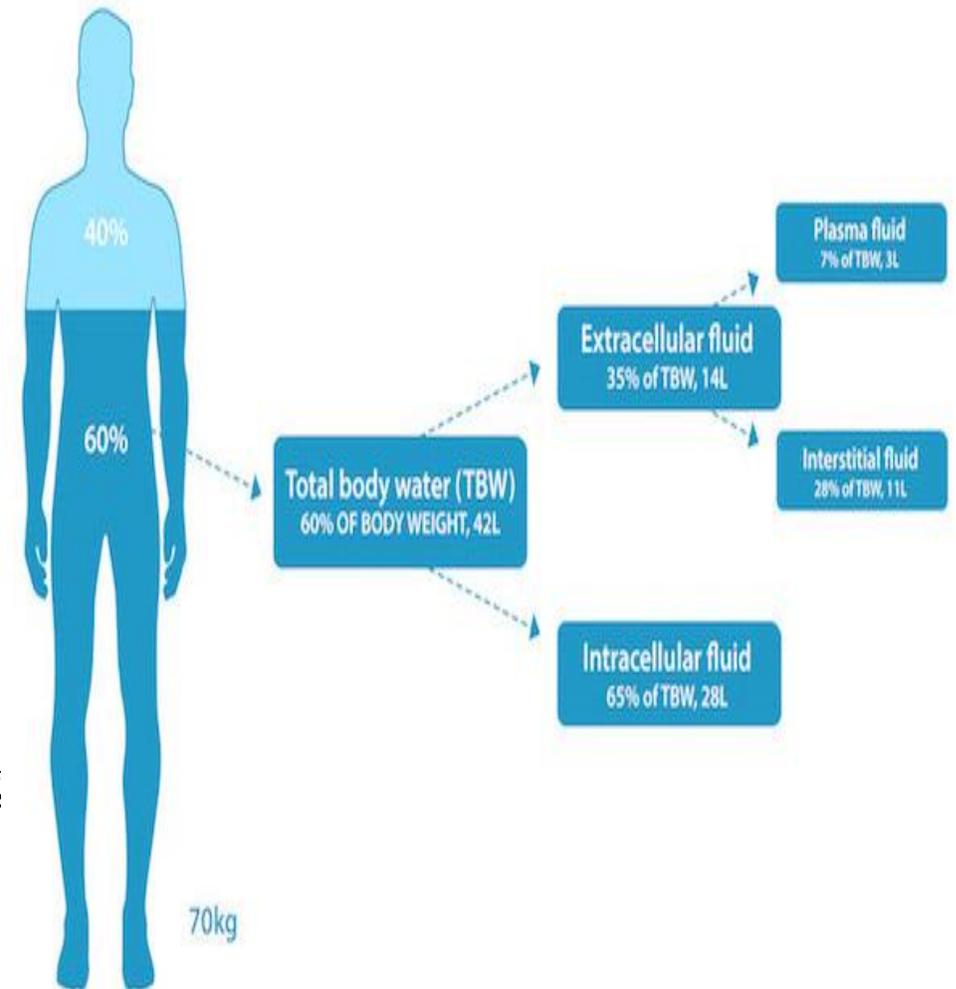
When? How much? How often? And what type?

- Water accounts for approximately 60% of the average person's body weight

Varies with muscle mass, age & hydration status

- Fluid loss of as little as 2% can cause early fatigue, impair performance, increase cardiac stress and increase risk of heat illness.

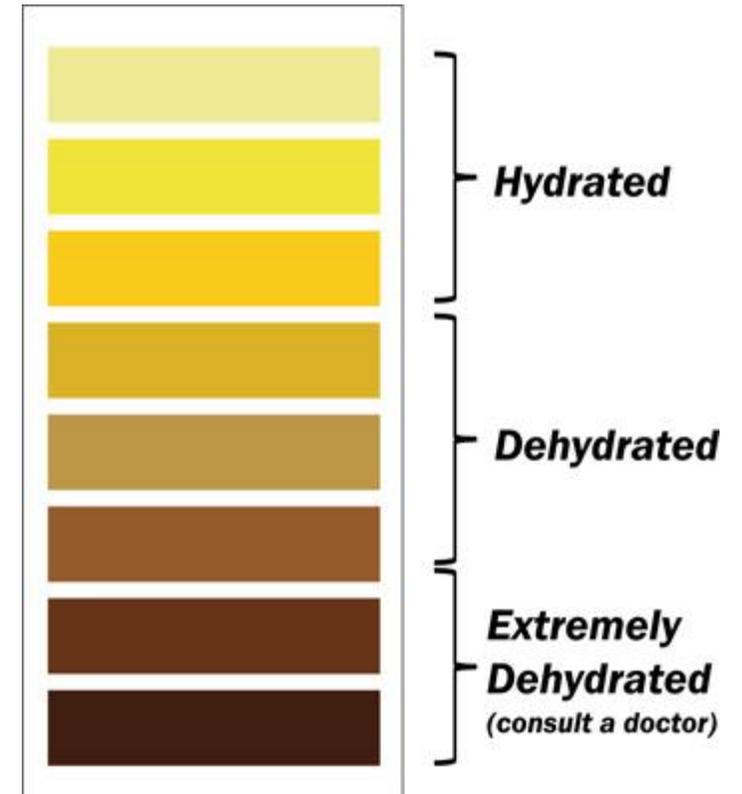
- Proper hydration happens before, during & after training



How to monitor hydration status:

Monitor weight, urine colour and thirst to assess hydration

Weight loss + dark coloured urine + thirst = **dehydration**



Recommended Rate of Hydration

Sedentary people need **2-3 litres/ fluid day**

Sweat rates during exercise are typically **0.5-1.5 litres / hour** but can increase to **3 litres/hour** in trained athletes in hot and humid conditions

1kg weight loss = **1 litre** of sweat loss

Fluid lost is **1.2-1.5 times** the actual fluid lost because of continued sweating and urine production

Hydration Schedule	
2 hours before exercise	500ml
Every 15 minutes during exercise	150-300 ml
After exercise	Every 1 kg weight loss= 1 litre

Specific fluid needs will vary from athlete to athlete depending on **body weight, exercise and environmental conditions**

What type of hydration is best?

For sports/exercise lasting **less** than
60 minutes:

Water is best

** if needed, use a low calorie/ low
electrolyte replacement drink



What type of hydration is best?

For exercise lasting **longer** than 60 minutes or for events in hot/humid conditions:

Isotonic drinks may be beneficial

5-7g Carbohydrate per 100ml

Electrolyte concentration similar to body fluids

source of fluid and fuel

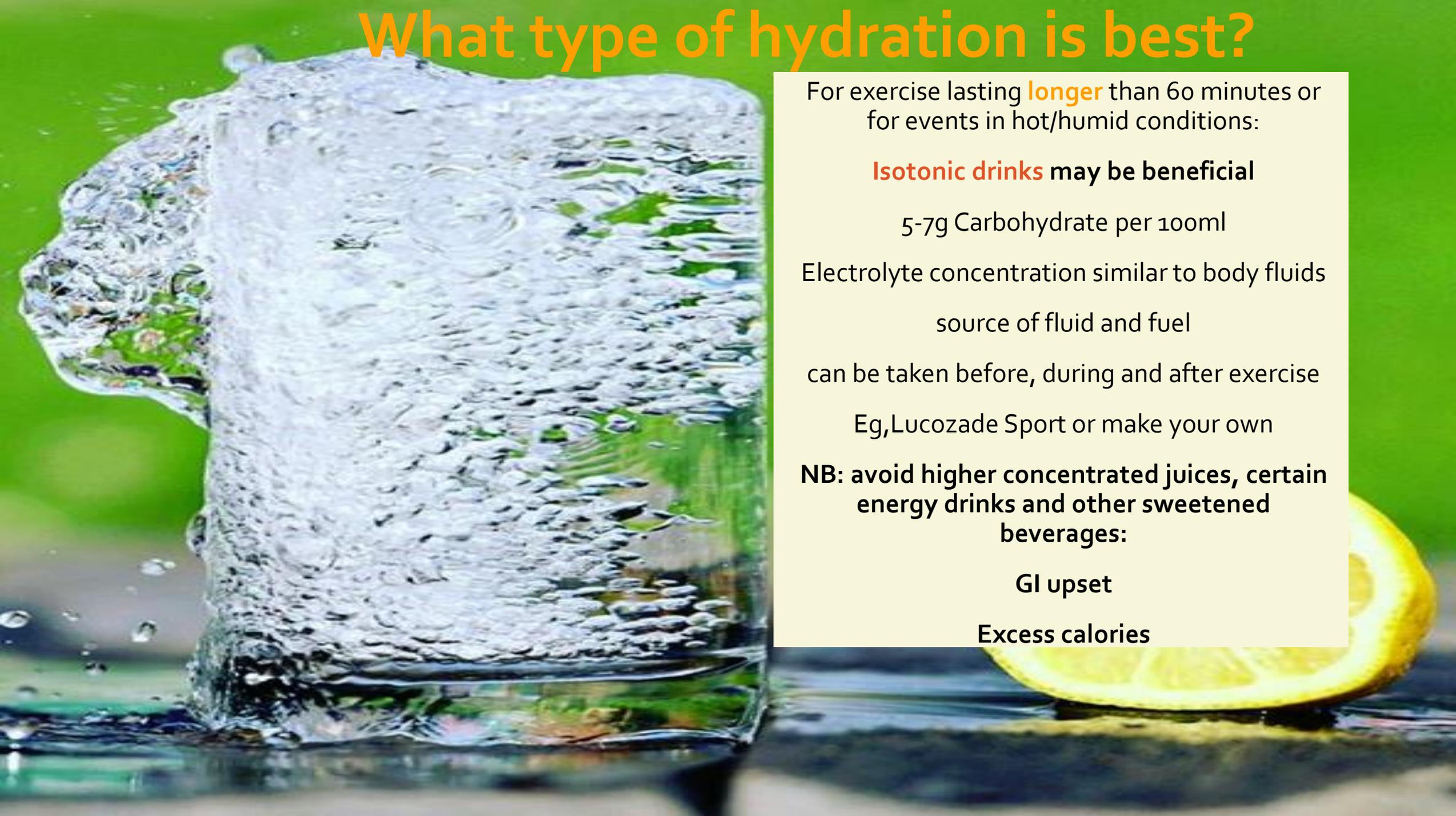
can be taken before, during and after exercise

Eg, Lucozade Sport or make your own

NB: avoid higher concentrated juices, certain energy drinks and other sweetened beverages:

GI upset

Excess calories



How to encourage adequate hydration?

- Keep plenty of water bottles on the field/track/court
 - Remind players to drink water (a few gulps) at half-time/ during training/ while resting
 - Keep water cool, but not ice cold
- Water that is too hot or too cold is typically less palatable & may cause GI upset
- Set the example- drink water



Carbohydrates

Best fuel – provide energy quickly and efficiently for working muscles

Inadequate intake: decreased performance and recovery

Two types

Simple sugars

Glucose – most common form

Fructose – found in fruits and berries

Sucrose/lactose – sources include granulated sugar, milk and milk products

Complex carbohydrates

Starches – from flour, pasta, potatoes

Stored in the body as glycogen*

*Glycogen is stored in the muscles and liver and is depleted after approx. 60 minutes of exercise

*Can train your body to store more glycogen through proper training and carb loading.



Daily carbohydrate needs

Carbohydrates should account for **50-60%** of **total calories**

4 calories per gram of carbohydrate

Moderate duration/low intensity training:

5-7g CHO / kg / day

Moderate to heavy endurance training:

7-12g CHO / kg / day

Extreme exercise training:

10-12+ g CHO / kg / day

Calculating carbohydrate requirements:

Weight (kg) x g CHO/Level of training =
carbohydrate requirement per day

E.g. 70 kg x 10-12 CHO/kg/day = 700-840g



CHO Loading: Total CHO
~805 per day

At least 1 day pre event

Breakfast:

100g porridge, 500ml skimmed milk, 4 tbsp blueberries, 4 heaped tsp honey, 2 slices wholegrain toast, 2tps olive oil spread, 200ml orange juice

CHO g

210



Snack:

2 bananas, 100g berries, 1 energy bar

96

Lunch:

Couscous salad/vegetables/feta, wholegrain roll, 200g watermelon

127



Mid-afternoon:

1 bagel, low fat cream cheese, 120g dried apricots

90

Dinner:

140g grilled chicken, 150g brown rice, 2tbsp sweetcorn, 85g peas

155

Baked apple with honey and raisins

33



Evening snack:

3 shredded wheat, 100ml skimmed milk, 2 oranges

94

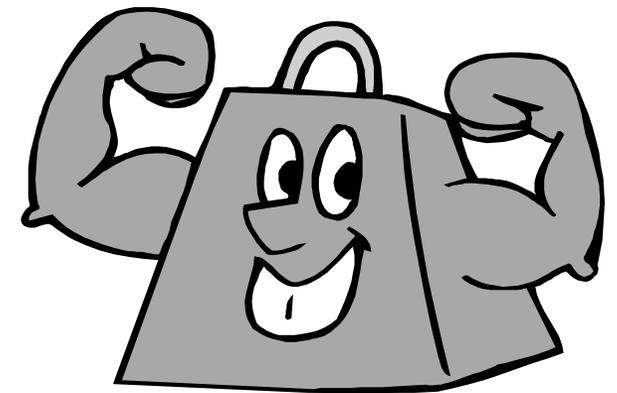


Dietary Protein

- Most athletes eat enough protein in their normal diet to meet the increased needs of training

(Protein should account for 15-20% of total daily calories)

- 4 calories per 1 gram of protein
- Given a sufficient energy intake, lean body mass can be maintained within a wide range of protein intakes
- If increases in muscle mass is the goal a higher protein intake may be beneficial



Protein Requirements & Timing

Average intake of protein in normal diets :

1.2-1.7g protein/kg of body weight

Strength and speed athletes:

1.2-1.7g protein/kg of body weight

Endurance athletes:

1.2-1.4g protein/ kg of body weight

Timing of protein intake may be just as important as total protein intake over the day

Inclusion of *small amounts of food* rich in *protein* at most meals and snacks throughout the day may result in enhanced adaptations

Sources of protein

Protein needs can be met with a balanced diet (20-25g to promote recovery after exercise).

No need for supplements

120g Chicken
= 25 g



600 ml
Milk =
22 g



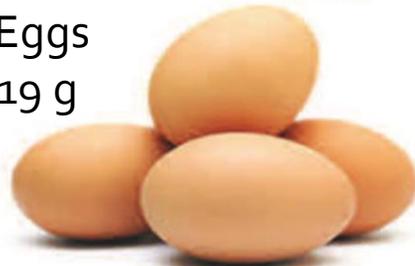
120g Red
Meat = 25 g

1 Salmon Fillet
= 25 g



70g Red. Fat Cheddar = 22g

3 Eggs
= 19 g



120g Lean Mince
= 25 g



200 ml Greek
Yogurt = 20 g

Sources of protein for vegetarians/ vegans

130g nuts =
26 g



350g kidney beans
= 23 g

380g lentils =
18 g



6 cups rice =
26 g

400g Tofu =
48 g



9 slices of bread
= 28 g

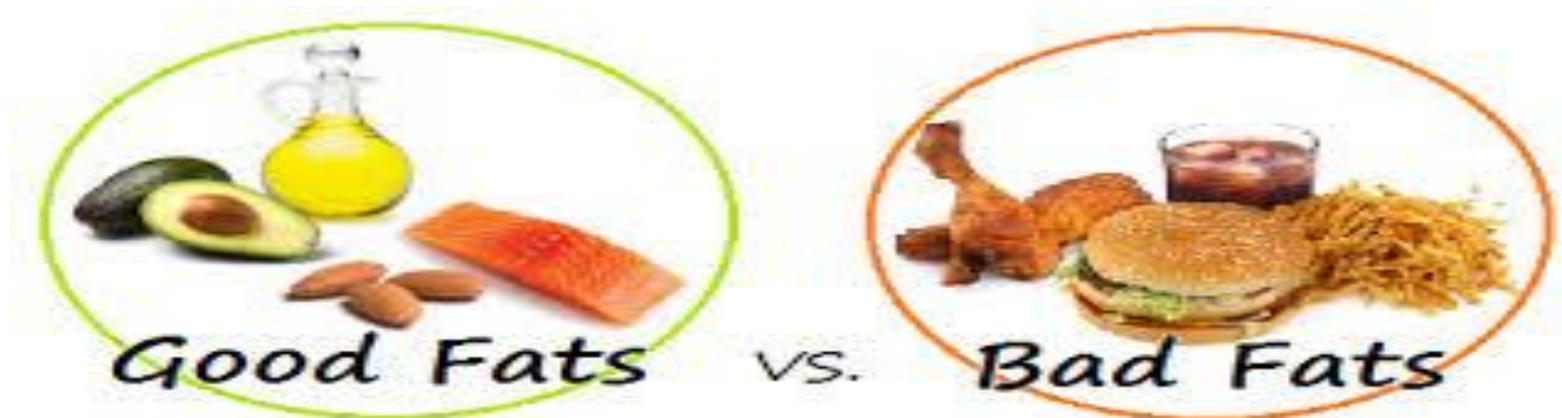
Dietary Fat

Population dietary guidelines that recommend a reduction of total and saturated fat intakes are also appropriate for athletes

(9 calories per 1 gram of fat)

Unlike **glycogen**, there is always sufficient fat as fuel for exercise

Relatively low fat intakes are important, particularly for those involved in endurance training, so that more energy can be derived from **CHO** and **Protein**.



Types and sources of fat:

Healthy fats (unsaturated)

- Nuts & seeds
- Fish
- Oil (vegetable, olive, rapeseed)

Unhealthy fats (saturated)

- Processed meats
- Butter/lard/Coconut oil
- Trans fats e.g. biscuits, cakes, sweets, takeaways



Handy Guide for Portion Size



1 thumb tip = 1 teaspoon of peanut butter, butter, or sugar

1 fist = 1 cup cereal, pasta, vegetables



1 handful = 1 oz. of nuts

1 finger = 1 oz. of cheese



1 palm = 3 oz. of meat, fish, or poultry

PROTEIN: PALM



Protein-dense foods like meat, fish, eggs, dairy, or beans

VEGGIES: FIST



Veggies like broccoli, spinach, salad, carrots, etc.

CARBS: HANDFUL



Carbohydrate-dense foods like grains, starches, or fruits

FAT: THUMB



Fat-dense foods like oils, nut butters, nuts, seeds

Vitamins and Minerals for Sports Performance

Do you need a supplement?

Food first- Balanced diet with adequate calories typically supplies adequate vitamins and minerals

Supplements second



Vitamin B



Vitamin B12



B complex needed for metabolic reactions that produce energy: they **do not** provide energy,

Whole grains, leafy greens, milk

B12 only in animal products

Vitamins and Minerals for Sports Performance

Rich Sources of Vitamin C



Sources of Vitamin A



Vitamin C and E antioxidants

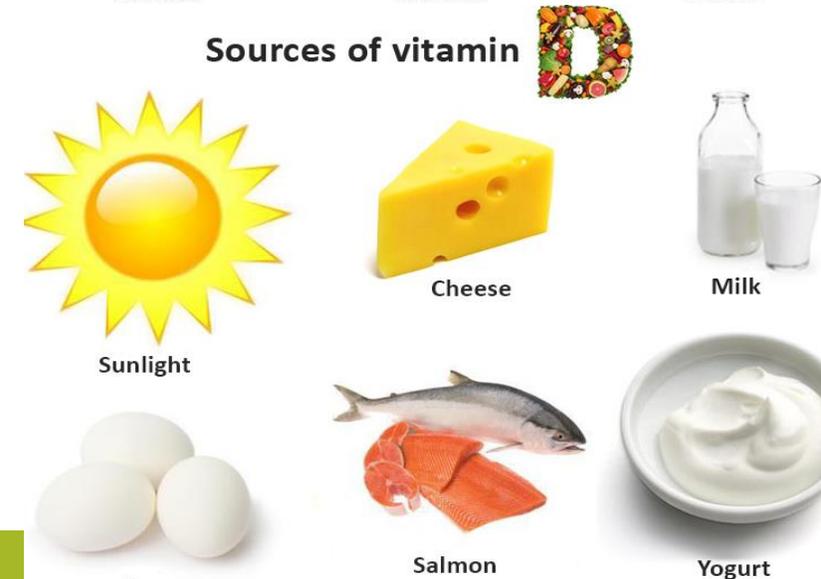
No research showing that supplementation supports increased performance

Adequate fats and fruits and vegetables = Adequate E and C

Sources of Vitamin E



Sources of vitamin D



Vitamin A

Vision, bone & tooth development

Vitamin D

Bone development and strength

Vitamins and Minerals for Sports Performance

Minerals

Calcium: bone strength & muscle contraction

Milk and dairy products, leafy green vegetables, fish with bones

Zinc: protein synthesis

Whole grains, meat and milk.

Iron: oxygen transportation

Seafood, red meat, green leafy vegetables, beans, pulses, dried fruit.

Female athletes are at increased risk of iron deficiency



whole grain flour



wheat germ



sunflower seeds



soybeans



brown rice



spinach



lentils



cheese



shrimp



chicken

Zinc Rich Foods

What should I be eating for my pre-exercise meal?

Everyone is different in what they like to eat (and what sits comfortably in their stomach) before exercise but in general, your pre-exercise meal or snack should be:

Rich in carbohydrate to prime your fuel stores

Low in fibre, especially if you have issues with your gut or feel very nervous

Easy to digest – avoid foods overly **high in fat** as these are slow to digest

Familiar – practice your options in training and don't try anything new on event day!

What should I be eating for my pre-exercise meal?

There is no one “best” pre-exercise meal or snack option!

It will depend on individual goals and requirements but here is a few ideas to get you started:



Small bowl cereal with chopped fruit and yoghurt



Crumpets with jam



Small bowl pasta with tomato based sauce



Toast with eggs and cheese



Blueberry smoothie



Tub of creamed rice with canned fruit

Pre-exercise fuel

- 3-4 hours before
- 200-300 g of carbohydrates (Low glycaemic index type)
- Moderate in protein
- Low in fibre and fat

More example meals:

- Porridge/Weetabix with low fat milk and fruit juice or a piece of fruit
- Pasta, chicken and veg
- Granary/wholegrain bread with baked beans
- Bagel with cream cheese/ pancake with honey and banana
- Basmati rice and chicken
- Fruit salads or a piece of fruit e.g. apple, banana with milk/yoghurt



Pre-exercise fuel

30-60 minutes before exercise

High carbohydrate (high GI food): 50 – 100 grams

Moderate protein

Low fat and fibre

Examples:

Cereal bar, wholemeal bread/pitta and banana

Yogurt and berries/ 2 small oranges

Dried fruit

Wholemeal pitta, low fat cheese stick and small piece of fruit

Isotonic carbohydrate drink

****Be sure to include water with snacks**



Post- exercise glycogen recovery



- Rate of glycogen synthesis is greatest in the first hour after exercise.
- Complete refuelling of glycogen stores may take up to 20 hours post exercise
- Consume 1.2g carbohydrate / kg / hour for first 4 hours
- CHO intake after exhaustive exercise should average 50g / 2 hours

Post game recovery snack:

- small snack of 4:1 ratio (CHO/protein)
- E.g. chocolate milk, Greek yogurt and berries, meat and cheese sandwich



Post-exercise: repair your muscles, refuel your tank and rehydrate

Post game meal: Full meal about 2 hours post-exercise

- Generous amount of carbohydrate
- Moderate protein (**20g** of high quality protein stimulates muscle protein synthesis: aim for this at every meal)
- Moderate fat

Example recovery meal:

Spaghetti Bolognese with added vegetables and fluids

Lasagne, salad and homemade oven chips and fluids

Chicken, potatoes, veggies and fluids

Post-Workout Nutrition

What you eat after a workout is essential to your recovery and achieving your goals.



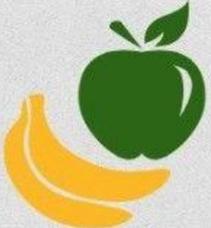
Eat something as soon as your workout ends - you should still be sweating.

Train prepared: pack a snack, pre-make your shake.

What do we need?!



Protein



Carbohydrates



Water

Performance Supplements – Clean Sport

Don't take the risk trying to get a competitive edge that could ruin your athletic career

As an athlete, the responsibility lies with you to know whether a medication you've been taking for years, a new protein powder or any supplement is **safe and suitable to eat**. It doesn't matter whether you compete as an elite or recreational athlete, you alone are ultimately responsible for ensuring that anything you consume is safe and not on the **WADA prohibited substances** list.

"Only 50% of 12 rugby teams questioned had seen informed sport logo and only 67% of those knew what it meant [@close_nutrition #RSMOlympics](#)"

— Hannah Trotman RD

A balanced diet will provide adequate calories and nutrients

Supplements **WILL NOT** make up for the **lack of training, poor nutrition or inadequate rest**



Protein Supplements- Pros and Cons

Convenience- Can help athletes meet their increased protein requirements

Can be a practical way for athletes to meet their increased protein requirements quickly or if some people experience exercise-induced poor appetite after high intensity exercise, protein shakes may be better tolerated than whole food.

Creatine can aid physical performance

EFSA report that there is sufficient evidence which shows that elite-trained athletes consuming 3g of creatine per day may achieve “an increase in physical performance during **short-term, high intensity**, repeated exercise bouts”

Some evidence to support the use of Branched Chain Amino Acids

BCAAs are often found in whey protein supplements, some research indicates that they may improve recovery and exercise performance during intense exercise. However, the overall evidence base is insufficient to prove their effectiveness.

Protein supplements- Pros and Cons

Poor Supporting Evidence

EFSA reports insufficient evidence to support a cause and effect relationship between whey protein supplements, BCAAs or L-Glutamine and: the growth or maintenance of muscle mass, an increase in endurance capacity, skeletal muscle tissue repair, and faster recovery from muscle fatigue

May Not Actually Contain Any Protein!

If the protein supplement hasn't been batch tested it might not really contain ANY protein to begin with! A recent BBC documentary “Pills, Powders and Protein Shakes” found that when they tested a protein supplement advertised with a protein content of 70%; it turned out to have less than 2% protein content....**which is 7 times less than flour!**

Protein supplements- Pros and Cons

May Contain Illegal and Harmful Substances

An investigation by the UK Medicines board found that 84 sports nutrition products on the market contained dangerous ingredients including steroids, stimulants and hormones which can result in: kidney failure, seizures or heart problems.

One specific product “**Celtic Dragon**” was taken off the market after causing two men to be hospitalised with severe jaundice and liver damage.

Side effects of over the counter protein supplements include: dehydration, constipation, increased bowel movements, nausea, cramps, bloating, reduced appetite, fatigue and interaction with medication

Biggest risk = supplements bought online

but even legal sports supplements can be contaminated by illegal substances. You can check whether specific supplements have been registered as batch tested for illegal substances using websites such as

Informed-Sport.com

Protein supplements- Pros and Cons

Not always nutritionally balanced and could lead to unwanted weight gain

As some protein supplements also contain carbohydrate and fat they can have a high calorie content which can lead to weight gain if exercise levels aren't high enough.

Found online: A “muscle gain” product which contained 1260 kcal in one serving is the same as four McDonald’s cheeseburgers!

May Be a Waste of Money

Comparing the cheapest high street protein shakes to a cheap post workout snack (rice cake with banana & peanut butter), the shake would cost roughly 1 euro – 1.20 euro per serving, compared to roughly 20-30 cent for the whole food snack.



VS



Protein supplements- Pros and Cons

Verdict

- Batch tested good quality protein supplements can be useful as an **addition** to a **well-balanced diet** for **high intensity strength athletes aiming to meet their increased protein requirements**; especially if time constraints, cooking facilities or cooking skills are an issue, but it is important to choose a reputable brand.
- However, most people already exceed their protein requirements and will easily meet their increased protein needs using whole foods such as: red meat, poultry, eggs, dairy, beans, tofu and nuts; thus supplements **usually not necessary**
- Overall I consider wholefoods as the better option as the majority of the health claims related to protein supplements aren't warranted and there are many possible associated health risks.

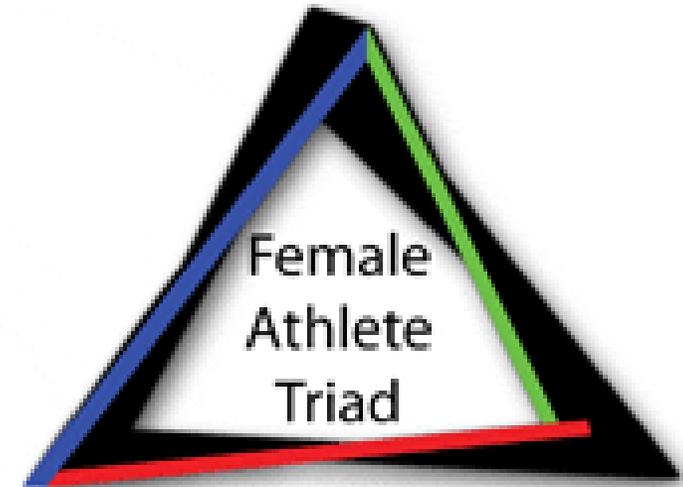
Female Athlete Triad

What is it:

Energy deficiency is an imbalance between the amount of energy consumed and the amount of energy expended during exercise.

The primary cause of the Female Athlete Triad is **energy deficiency**.

Low Energy Availability/Disordered Eating

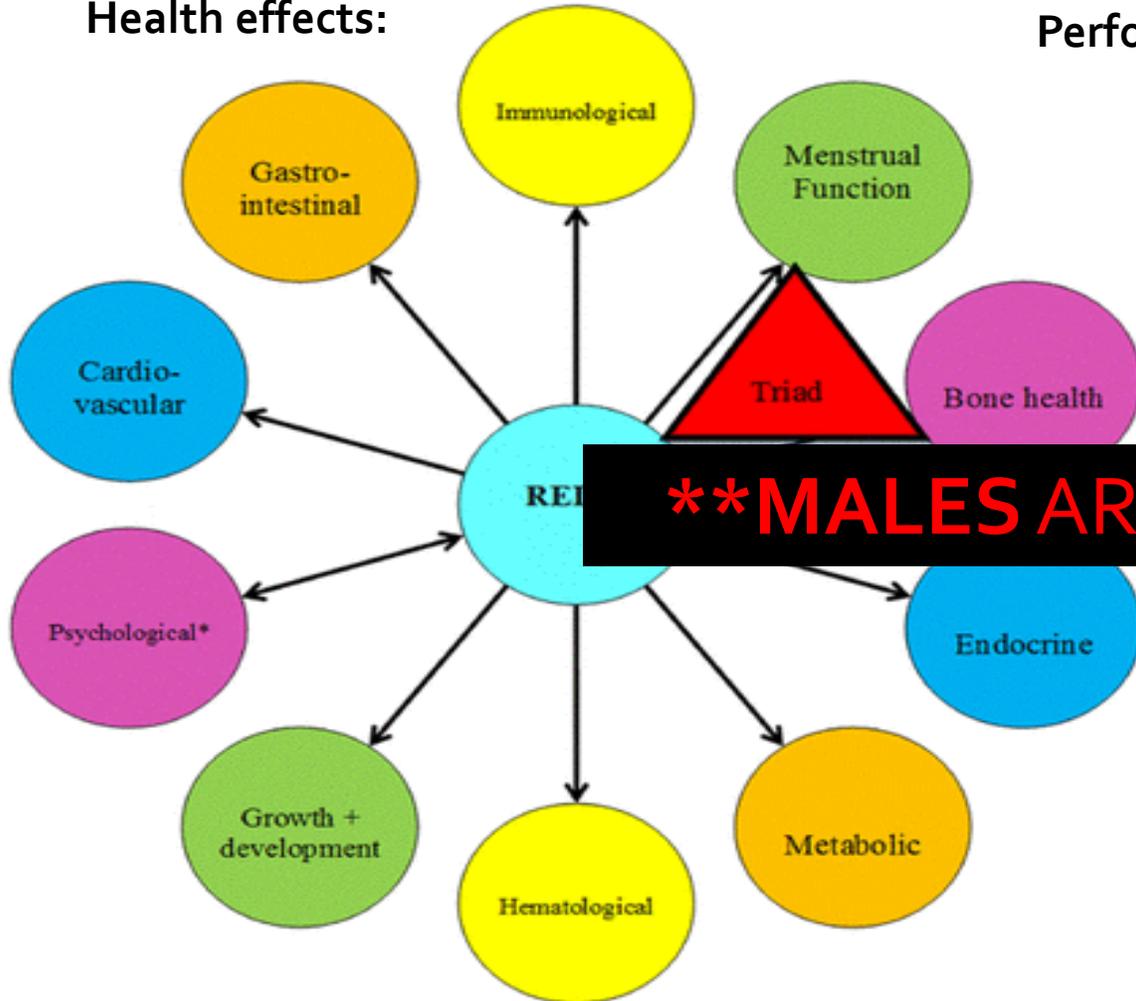


Bone Loss/Osteoporosis

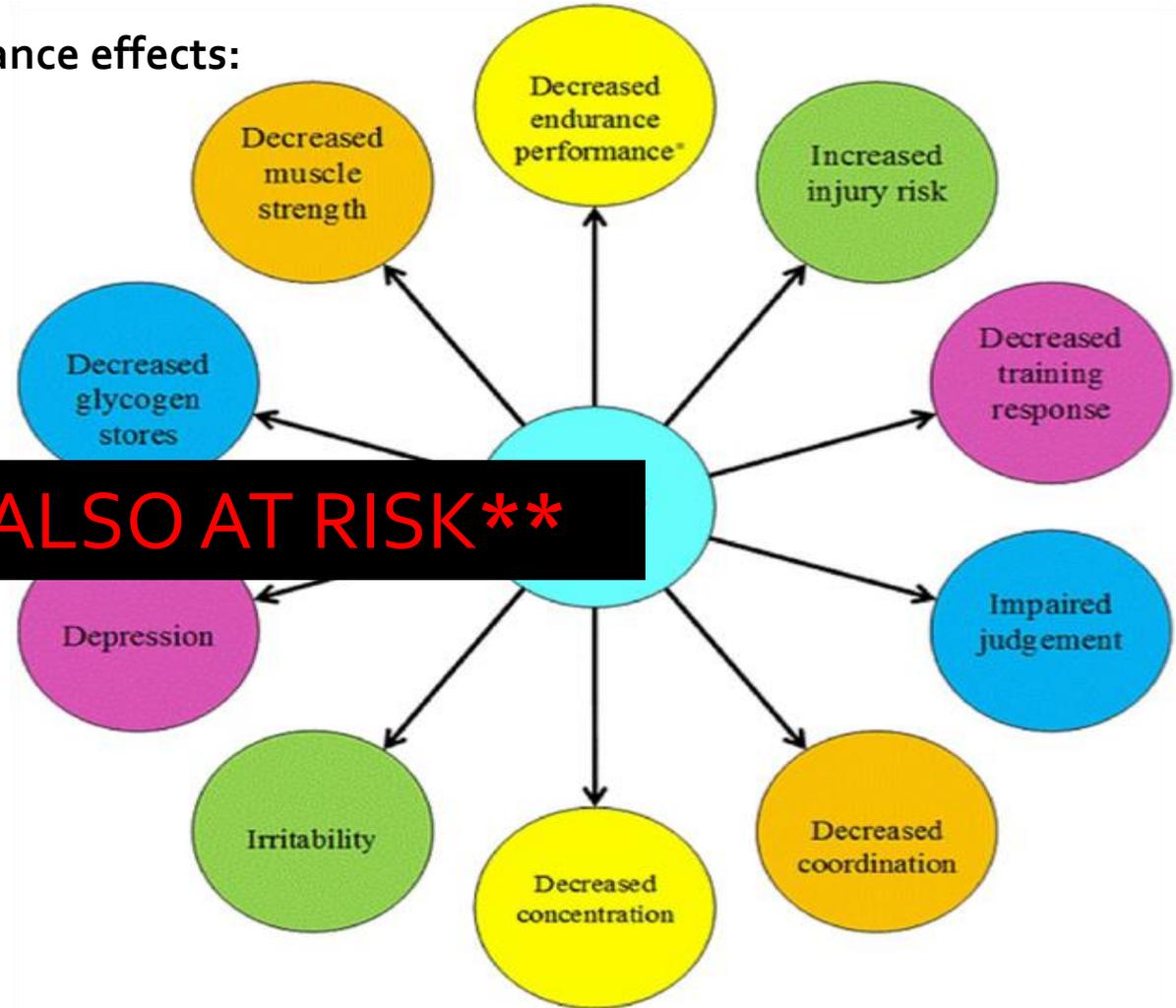
Menstrual Disturbances/Amenorrhea

Relative Energy Deficiency in Sport (RED-S)

Health effects:



Performance effects:



****MALES ARE ALSO AT RISK****

Physiological Consequences Associated with Energy Restriction: What are Athletes Concerned About?

- Performance Issues
 - Fatigue
 - Inability to finish workout
 - Getting “slower” “weaker”
 - Focus and concentration lost

Coaches hear “I need to train more” **not** “I’m under-fuelled”.....

Signs and symptoms

- Irregular or absent menstrual cycles
 - Always feeling tired and fatigued
 - Stress fractures and frequent or recurrent injuries
- Often restricting food intake/dieting
 - Constantly striving to be thin
- Eating less than needed in an effort to improve performance or physical appearance
 - Cold hands and feet



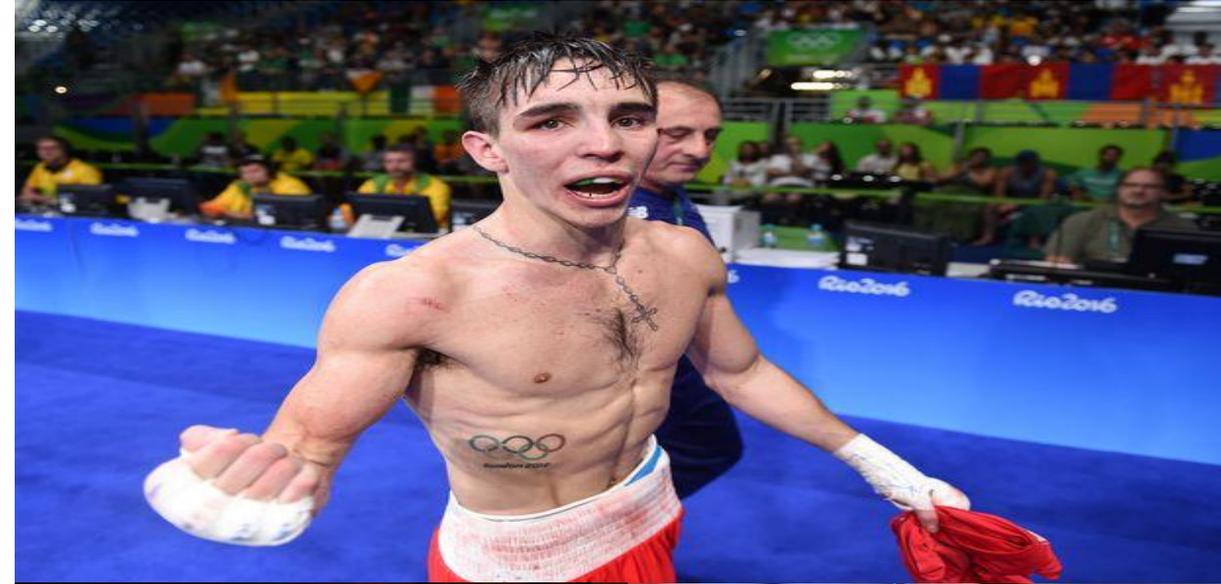
Risk factors

Playing sports that require weight checks

Exercising more than necessary for a sport

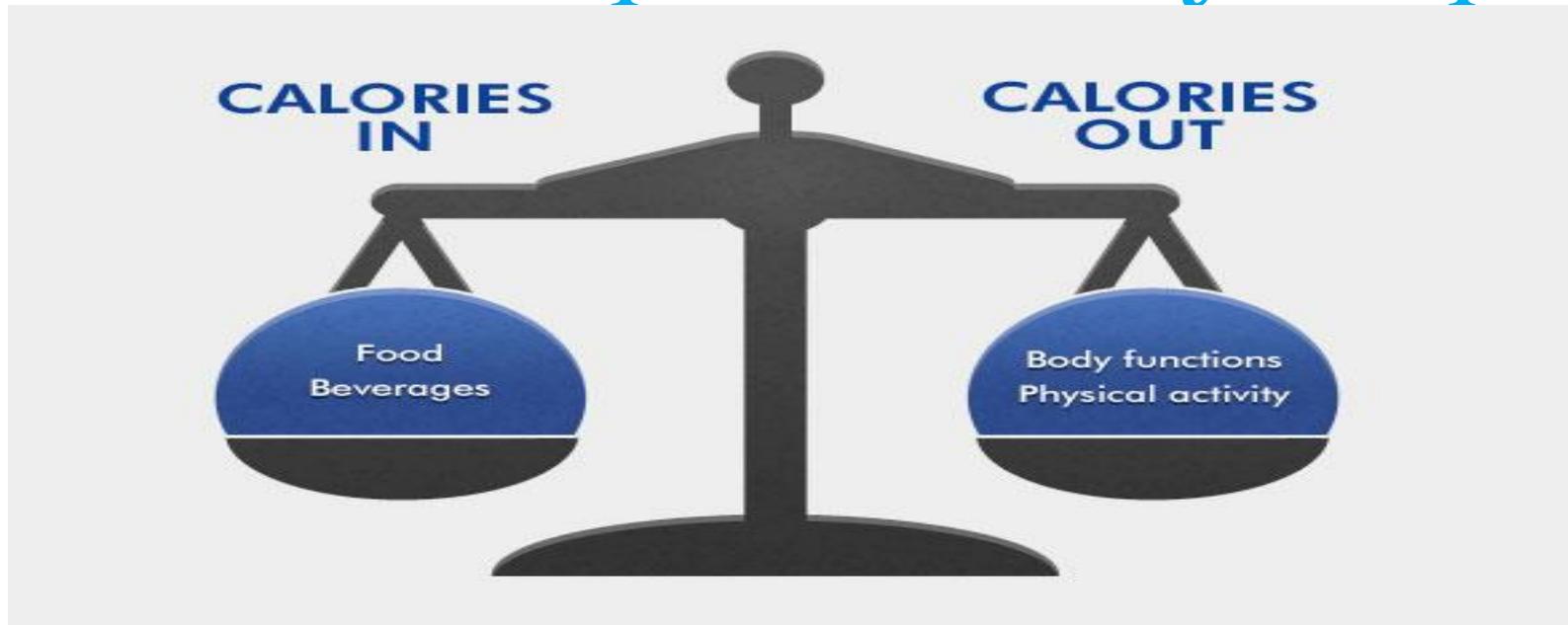
Pressure to “win at all costs”

Irish dancers, marathon runners, gymnasts, swimmers, boxers or any other sport where leanness/ low body weight is emphasised



Key message:

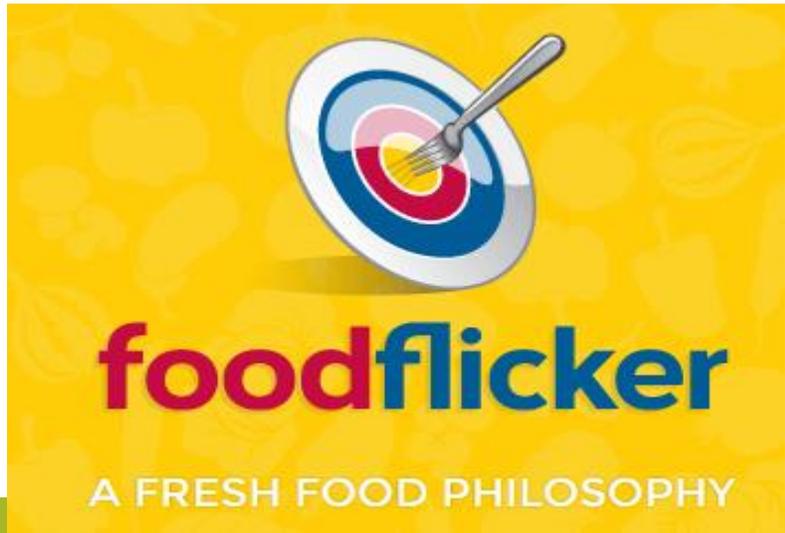
Meeting energy requirements through wholefood sources is essential in order to function and perform at your peak!



Sports nutrition resources for parents, coaches and athletes



THE INTERNATIONAL OLYMPIC COMMITTEE





That's all Folks!

Any Question?

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