

Supplementation

- supplementation
 - vitamins/minerals
 - protein
 - caffeine
 - creatine products
- critically analyse the evidence for and against supplementation for improved performance

Supplementation

Some athletes supplement their diets to improve performance at training and in competition...

Caffeine



Creatine



Vitamins & Minerals

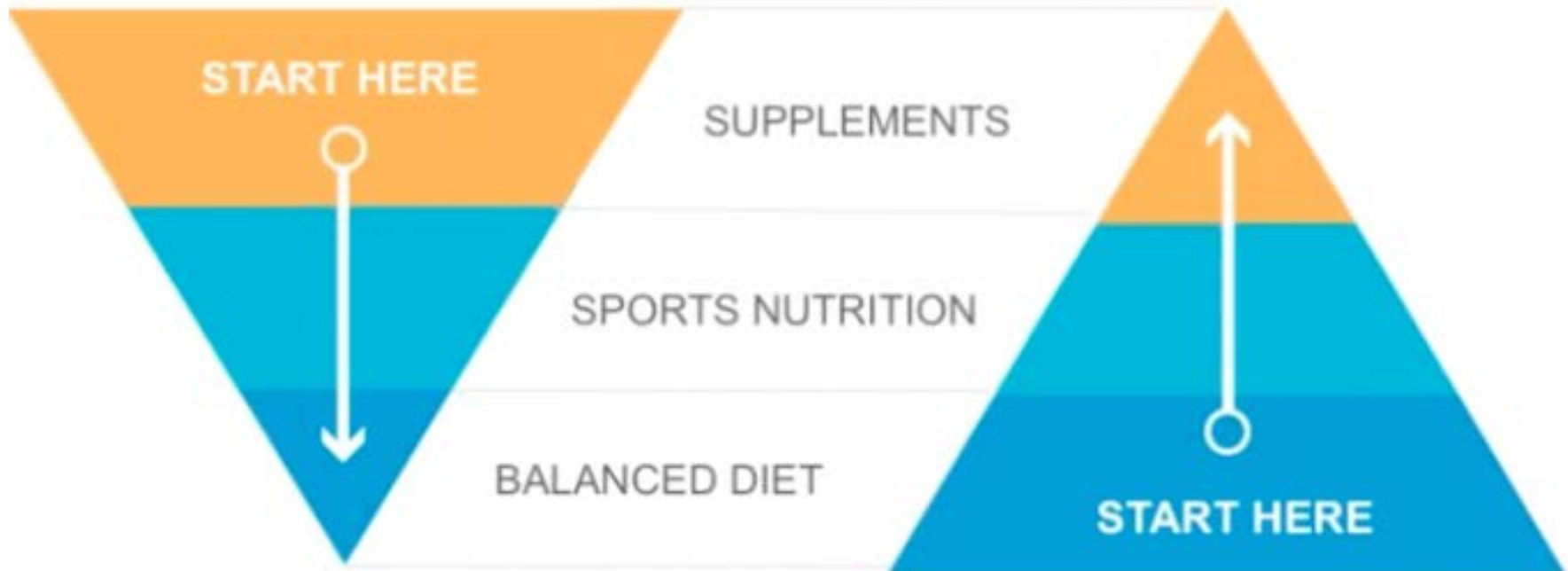


Protein



Sports Nutrition Pyramid

The sports nutrition pyramid of many athletes (and supplement companies)



Evidence-based approach by sports dietitians and other experts

Vitamins/Minerals

- Vitamins (micronutrients) should be all adequately met through a variety of fresh and nutritious foods. Eg vitamin B and vitamin C
- Vitamins do not provide energy as such but function as catalysts that help the body use energy nutrients. They help assist such functions as energy release and tissue building.
- Minerals are essential micronutrients eg Iron relates to oxygen carrying capacity and important for endurance athletes and calcium is needed for strong, dense bones.

Vitamins & Minerals

Vitamins and minerals are compounds necessary for the healthy functioning of our bodies.



Vitamins & Minerals

Advantages

A healthy diet will provide sufficient vitamins and minerals to the body, making supplements not necessary... for most people.

Disadvantages

Health risks for consuming excessive fat soluble vitamins (A, D, E, K).

Excessive water-soluble vitamins (B, C) are excreted in the urine.

Protein

- Protein is important for all athletes, as it is needed for muscle repair.
- Different sports lead to more muscle fatigue and damage.
- Strength training requires the most (1.8–2.2 grams per kilogram body weight).
- Endurance training requires a moderate amount (1.2–1.4 grams per kilogram body weight).
- It should only be supplemented if the athlete is unable to get enough protein by eating whole foods such as dairy, eggs, nuts and meat.

Protein

What is it?

It's a nutrient that has important structural and functional roles.



Structural proteins build connective tissue, cell membranes & muscle cells.

Proteins are made up of various sequences of amino acids. Some amino acids are used as a minor fuel source during exercise.

Protein

Are there advantages to protein supplementation?

Some athletes who are vegetarian, vegan or do not eat enough dairy may be protein deficient if nutrition is not adequately planned. Protein supplements may help achieve the recommended intake.



Protein

The advantages of protein supplementation?

By consuming protein immediately after exercise it enhances muscle uptake and retention of amino acids, and promotes a more positive protein balance. This heightened state of protein metabolism seems to last for up to 24 hours.



Protein

Arguments AGAINT protein supplementation?



Athletes have higher protein needs than the general population, however most easily reach their RDI targets with a well-balanced diet & nutritional plan.

High protein intakes may increase fluid requirements.

High protein foods may displace other important nutrients such as (eg. carbohydrate & fat) which are required for energy.

Protein

Are there side-effects?

Yes, which can have a negative affect on performance.

These include:

- o Muscle cramps
- o Tightness in muscles and muscle tears
- o Nausea and upset stomach
- o Diarrhoea
- o Dehydration



Caffeine

- Caffeine may be used in two ways:
- To act as a mild stimulant to the CNS (central nervous system) for high intensity sports. It can increase alertness and arousal and decrease feelings of fatigue.
- It may also be used by endurance athletes, as caffeine mobilises some fat to be used as an energy source by muscle cells.

Caffeine

Caffeine is a naturally occurring stimulant.

It influences the central nervous system, resulting in reduced perception of effort (exercise "feels" easier) and/or reduced perception of fatigue.



Caffeine



Research to date suggests that a wide range of athletes **MAY** benefit from caffeine including:

- * Team or intermittent sports
- * Endurance sports
- * High intensity, short duration sports

Creatine products

- High-intensity, power and anaerobic-based training can derive benefits if they utilise the ATP/PC system in training and competition, as the creatine can assist with resynthesis of creatine phosphate. For sports involving heavy resistance training and maximal power output (weightlifting, sprinting), supplementation has been shown to lead to improved performance.

Creatine

What is it?



... it is a naturally occurring compound synthesised from amino acids by the kidneys and liver

SNAPSHOT

Creatine loading

Creatine is a rapidly available, energy-producing substance used by the body during high intensity activity. It is used to bind phosphate to form creatine phosphate, which is essential to regenerate ADP to ATP and provide energy for muscular contraction. As creatine is a natural substance and found in meat and fish, it is classified as a food supplement, not a pharmaceutical. As such, it has gained vogue among athletes keen to improve performances in strength, power and sprint events. It is a legal food supplement and was first used in the 1992 Olympics.

Most studies have found creatine to be effective in boosting performance when taken in conjunction

with high carbohydrate diets. Creatine supplementation of 20 grams per day over five to seven days each week has been reported to improve sprint performances from one to five per cent and up to 15 per cent on repeated sprint type activities. Other studies report no performance-enhancing effect.

Most research on creatine is inconclusive, particularly where supplementation continues over a period of time. It appears to contribute to weight increases, elevated heart rate and dehydration, which causes cramping in hot, humid conditions. It has also been reported to contribute to stress fractures attributable to escalation in the strength of muscular contractions.

Creatine

Do athletes need it?



It's specific to certain athletes in certain situations, eg. improving performance in initial bout of a high-intensity sprint

Creatine

Other benefits?

It improves the recovery between repeated bouts of high-intensity exercise. Enhanced muscle creatine levels increase the rate of resynthesis of PC during the rest periods between sprints, so the muscle has greater stores for the next bout. This is most important when the recovery period is brief, from 30 seconds to less than 3 minutes.



Supplementation for and against

- Supplements are generally only advised if there is a deficiency in the diet.
- Where possible, whole, fresh foods have more useable nutrients than artificially produced foods (a variety of nutritious fresh foods will ensure the majority of RDIs are easily met).
- Some athletes may have a medical reason to supplement (such as a female with anaemia needing iron).
- Certain training programs demand higher RDIs than normal, and therefore supplementation may be the only way to ensure these unique RDIs are met.
- Athletes should be very careful, as some products contain banned performance-enhancing products.
- A nutritionist or doctor should advice on all supplementation.

Does this guy use supplements?

- <https://www.youtube.com/watch?v=2h0i1ZEOeyc&list=PLesvgngPCeVN4n1o7gTNF67Ckr49LS0lG&index=3>



- Using your Outcomes text p222-226 summarise the case for/against supplementation
- HSC Hub also does a good analysis!
- Also read: <https://www.pdhpe.net/supplementation-and-performance/>

	The case FOR supplementation	The case AGAINST supplementation
Vitamins/Minerals		
Protein		
Caffeine		
Creatine Products		

Chelsea Football Club Nutrition

- <https://www.youtube.com/watch?v=6EggN3szhYM&list=PLesvqngPCeVN4n1o7gTNF67Ckr49LS0IG&index=1> (9 mins)