Basic Sports Nutrition

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Basic nutrition concepts

- Healthy, balanced diet
- Seven essential nutrients
- Five food groups
- Hydration
- Nutrition for weight management
- Nutrition for performance
- Supplementation

Healthy, balanced diet

- Athletes fail to get the full benefit from training and other interventions if their diet is unhealthy and/or lacks balance
- Before considering sports specific interventions, athletes must first understand basic nutrition concepts and how to make suitable food choices to ensure a healthy balanced diet

Seven essential nutrients

- There are seven nutrients required in varying proportions BUT all are essential for good health
- Most foods contain more than one nutrient
- Some foods have hidden ingredients… eat real food (unprocessed) to aid appropriate food choices
  - Carbohydrate – macronutrient
  - Protein – macronutrient
  - Fat – macronutrient
  - Vitamins – micronutrient
  - Minerals – micronutrient
  - Water
  - Fibre

Carbohydrate

- Stored as glycogen in the liver and muscles
- Converted to blood glucose before being used to create energy through the synthesis of ATP
- Primarily used for energy production and is the preferred source of energy for all muscular work… more importantly, athletic activities!
- Also required for the digestion of other nutrients



Carbohydrate requirements

- Yields 4 kcals of energy per gram
- Complex carbohydrates… slower release
- Simple sugars… quicker release

- Sedentary: 4 – 5g per kg/BW
- Moderately active: 6 – 7g per kg/BW
- Severe exerciser: 8 – 10g per kg/BW
  - May be even higher depending on the regime

Protein

- Used for tissue synthesis and repair
- A key nutrient for growth & development… and for recovery from injury
- Can be used for energy if carbohydrate intake is inadequate (a very undesirable situation for competitive athletes)
- Yields 4 kcal per gram
- Complete/incomplete proteins…

Protein requirements

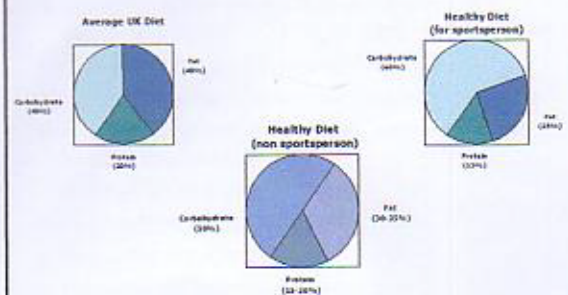
- Normal : ~ 1.0g per 1 kg of BW
- Endurance : 1.2 – 1.4g per 1 kg of BW
- Strength : 1.2 – 1.7g per 1 kg of BW
- Maximum : ~ 2.0g per 1 kg of BW
- Reference Nutrient Intake (RNI)… *may be quite inadequate for the competitive athlete*
  - Women : 45g per day
  - Men : 55.5g per day

Fat

- Essential for a range of bodily functions
  - Insulation
  - Protection of internal organs
  - Normal hormone production and function
  - Energy
- Fat type impacts on health

- Yields 9 kcal per gram
- Generates ATP at a much slower rate than carbohydrate but lasts considerably longer…
- A good supplementary fuel for endurance activities BUT does not liberate energy quick enough to be a good fuel for high intensity or multiple sprint sports; i.e., football!

Macronutrient proportions



Reducing dietary fat intake

- Do not use processed foods and pre-prepared meals (microwavable and oven-ready dinners)
- Avoid adding fat in cooking
- Consider low-fat cooking methods
- Avoid fried foods
- Use lean meat, chicken, turkey and fish
- Choose low-fat dairy foods
- Check food labels
- Choose carefully for meals out and takeaways… or better still, cook real food and do not add unnecessary fats (oil to pasta, mayonnaise to sandwiches, butter to vegetables or rice etc.)

Vitamins

- Micronutrient… required in very small quantities but essential to a healthy diet
- Water soluble – B, C *(fruit, vegetables, wholegrains, meat)*
- Fat soluble – A, D, E, K *(dairy, fish, eggs, nuts, vegetables)*
- Involved in a number of cellular and regulatory processes within the body… for example; blood clotting, maintaining healthy skin, hair and nails, liberating energy from macronutrients, enhancing immune function, aiding a positive mood state


- The main focus should be a healthy balanced diet, comprised of foods from all food groups (discussed later)
- Particular attention should be given to antioxidant vitamins (A,C,E) found in brightly coloured and leafy fruits and vegetables. These combat the effects of free-radicals
- Free-radicals are damaging to health and can be elevated in response to severe exercise


Minerals

- Micronutrient… required in very small quantities but essential to a healthy diet
- Involved in a range of bodily functions including *(but not limited to)*: the formation of healthy bones, teeth and nails; aids oxygen transport; involved in muscle contractions, helps maintain healthy skin and hair
- Like vitamins, they have no calorific value

- The main focus should be a healthy balanced diet, comprised of foods from all five food groups (discussed later)
- Different minerals are found in good supply in a wide range of foods… cereals, meat, dairy produce and vegetables. If athletes follow the principles for achieving a balanced diet, they will not be deficient.

Water

- Often not acknowledged as a nutrient but is essential to good health and sports performance
- Aids digestion and normal bowel function
- Hydrates the body and maintains blood volume
- Aids the transport of nutrients, waste products, bodily secretions and the distribution of electrolytes
- Aids muscle contractions
- Promotes mental alertness
- Essential for thermoregulation

Fibre

- Non-starch polysaccharides
- Promotes good digestion & normal bowel function
- Can have a protective effect on health
- Non-soluble fibre
  - Found in whole-wheat breads, rice and pasta; wholegrain cereals, fruit and vegetables
  - Helps prevent bowel disorders and diseases
- Soluble fibre
  - Helps control cholesterol and blood glucose
  - Found in oats, rye, barley, peas, lentils, fruit and vegetables

Five food groups

- A healthy diet derives food from all five food groups
- Many nutrients can be found in more than one food group
- When athletes need more calories, the plate size increases but the balance remains relatively unaltered

Five food groups

The daily diet should derive foods from the five food groups in approximately the following proportions:-

- 33 - 34% Complex carbohydrates/starchy foods: cereals, rice, pasta, bread, potato, polenta, yam
- 33 - 34% Fruit and vegetables – especially dark green, leafy and red vegetables
- 15% Dairy: milk, cheese, yoghurt, cream, butter
- 12% Meat, fish, eggs, peas, beans, lentils, nuts
- 5 - 6% Sugary and fatty foods (cakes, chocolate, sweets, biscuits, fried and processed foods… most high street take-outs)

Hydration in sport and exercise

- Dehydration can occur rapidly during exercise
- The risk of dehydration increases with hot weather, high humidity (even in the cold), clothes that do not permit sweat to evaporate, heavy protective equipment, padded and/or non-breathable headgear
- Athletes suffer a decline in performance due to dehydration long before they feel thirsty
- Dehydration can lead to heat cramps, heat illness, heat stroke and ultimately death
- The effects of dehydration cannot be avoided retrospectively – you can't play 'catch-up'

Helpful tips

- Ensure good pre-exercise hydration
- Begin fluid replacement within 15 minutes of starting to exercise
- Aim to drink at least ~4oz every 10-15 minutes
- Wear clothes that do not cause sweat to drip onto the ground but allow cooling by evaporation
- Remove headgear when possible
- Use isotonic drinks (discussed later)
- Use external methods of cooling (such as ice towels) in hot weather

Nutrition for weight management

- Energy Balance
  Energy In = Energy Out
  food eaten *metabolism plus exercise*
- Negative Energy Balance
  Energy In < Energy Out - *results in weight loss*
- Positive Energy Balance
  Energy In > Energy Out - *results in weight gain*

Helpful tips

- When aiming to gain or loose weight, great care should be taken to maintain a healthy, balanced diet… however, the total quantity will need to be adjusted
- Aim for a maximum weight loss or gain of approximately 2lbs per week
- Avoid 'diets'… instead, pay attention to total intake versus energy expenditure

Nutrition for performance

- Athletes with a high calorie demand may need to eat four or five meals per day
- The timing of meals is important for performance
- Too much fatty food lowers energy levels
- Athletes may need to slightly modify nutrient proportions during certain phases of their annual training cycle; e.g.
  - Slightly lower fat consumption and increase protein intake during hypertrophy resistance training
  - Increase carbohydrate consumption during two-a-days, training camps or leading up to a game

Helpful tips

- Ensure adequate carbohydrate in the diet
  - Maintains energy levels
  - Prevents under-training due to early fatigue
  - Spares protein
  - Prevents central fatigue… poor concentration, impaired coordination due to hypoglycaemia
- Eat a proper meal ~2 hours before exercise
- Carbohydrate snacks such as cereal bars and bananas, and hypertonic drinks (> 8% carbohydrate/sugars) can be taken up to 30 minutes before exercise
- Ensure complex carbohydrates feature in all main meals
- Replace carbohydrate during exercise

Helpful tips

- Isotonic drinks (4 – 8% carbohydrate/sugars) are beneficial during exercise by:
  - Promoting the absorption of water from the stomach while exercising
  - Helping to maintain levels of circulating blood glucose
  - Reducing the chance of muscle cramps, muscle fatigue, poor synergy between reciprocal muscle groups and central fatigue
  - They are technically a carbohydrate supplement
- Ideally, replace carbohydrate within 30 – 60 minutes of exercise (when glycogen synthesis is greatly enhanced), some foods with a higher glycaemic index could be eaten at this point along with complex carbohydrates
- Post-exercise is also a good time to have supplementary protein… or better still, a proper meal, with real food!

Supplementation

- Supplements are not promoted or endorsed!
- Two broad categories
  - Food supplements
  - Ergogenic aids
- Food supplements… supplement nutrients and nothing else
  - They can supplement dietary deficiencies when absolutely essential
  - Should be viewed as food supplements and not as food substitutes

Supplementation

- Ergogenic aids… substances that have performance enhancing properties
  - Many are banned substances
  - Many have very serious side effects, having a negative impact on long-term health and emotional well-being
- Many apparently innocent food supplements also contain ergogenic aids
- Some ergogenic aids have additional work enhancers included that may not be obvious on the label… it is often the extra work that leads to the advertised benefit from the product