Preparing for endurance sports

Fuelling up for endurance

Peta McSharry

- Trained in remedial Sports Massage
- Teach sports massage and sports & cycling first aid
- Am an endurance person
  - Did my first triathlon at 15 and competed in the SA Games at 19
  - Completed several marathons including one ultra (35 miles)
  - Endurance cyclist, last year did 1400km in 15 days
  - Hoping to do 3400km in 21 days this year, also known as the Tour de France
- Treated marathon runners, triathletes and cyclist for past 6 years
  - Some have made it to the race
  - Some have not
- Closet research scientist

Dynamic stretching

- Prepares the whole system to for action
  - Static – muscle fibres
  - Dynamic – muscle, nervous signal, blood flow, joint mobility
- Works best if you already have a dynamic regime
  - Start now if you don't have one
- Fatigue reduces dynamic flexibility
  - May need to use static stretching, e.g. post marathon
- How do you do dynamic stretching
  - Warm up
  - Joint mobilisations
  - Dynamic movements, leg kicks, swinging arms – very simple
  - (Stretching Scientifically, Thomas Kurz)

Nutrition

- I am not a nutritionist
- Information provided is from a selection of literature / research which I have selected for today's talk
- Intended to give you an understanding of how your body uses the fuels available and some basic guidelines
- As our bodies are different no one formula works for all of us
  - It takes trial and error to get it spot on
  - That's why you try things out in training and not on race day

How training improves use of fuel

- Training causes changes in our body
  - Apart from becoming fitter and running/cycling further
  - Increases the rate at which our muscles absorb fuel
  - Increases the rate at which oxygen gets to the muscles
  - Increases the cells in the muscles which convert the fuel to energy to be used by the muscles
  - Increases the utilisation of fat stores as energy

Types of fuels

- Protein
  - Used to build muscle
  - Also used as energy when we run out of other fuels
- Fats
  - Used in endurance races
  - Most efficient energy source
- Carbohydrates
  - Main source
  - Many different types which are useful for athlete

Endurance fuel

- Fat
  - A human has enough fat to run 10 marathons, even the skinny ones
  - Can only be used at lower intensities
  - With training your body uses fat stores more efficiently, but needs carbohydrates to be converted
  - 1g fat = 9kcal
- Carbohydrates
  - Different time to absorb into your body
  - GI index of carbs
    - High GI – fast absorbing
    - Low GI – slow release
  - 1g carb = 4kcal

What's needed for a marathon

- Our daily intake of calories based on an
  - Active 30yr male, 12stone, 5'10"
  - 2,500-2,700 calories
- 4 hours running = 3000-4000 calories
- We store about 800-2000 calories in muscles and liver
- Body can only absorb 60g carbs per hour = 240kcal

What's needed for the Etape

- Cycling uses 21kcal / minute
  - Carbo stores = 90 min @ 26mph
  - Fat stores = 110 hours @ 26mph
- 8 hours cycling = 5,000-6,000 calories
  - Obviously depends on terrain, wind, drafting
- Advantages of cycling – you can carry more food with you
  - Start early with the refuelling

- http://bikecalculator.com/veloMetric.html

Does the maths add up?

- Only enough stored carbs for about an hour or two of racing
- We need to use fats stored in our muscles
  - But without carbs we can't convert fats to fuel
- So we need to keep topping up the carbs while we race
  - Otherwise the red mist descends
  - Performance reduces

GI index of carbs

- Not just a fad diet, useful for athletes
- Low GI
  - Releases slowly
  - Provides energy over longer period of time
  - Does not cause insulin to spike
- High GI
  - Fast release into blood stream
  - Provides short bursts of energy
  - Can cause insulin to spike, body absorbs too much sugar = low blood sugar

Examples of high/low GI

- High GI
  - Glucose
  - Fructose
  - Maltodextrin
  - Raisins
  - Bananas (ripe)
  - Mashed potatoes
  - White bread
- Low GI
  - Muesli
  - Oats
  - Lentils
  - Apples
  - Oranges
  - Sweet potatoes
  - Brown bread
  - Carb + protein
- Many free GI guides you can use

High GI fuels

- Maltodextrin
  - Fast absorbing, and not so sweet
- Glucose
  - Fast absorbing, can be very sweet
- Fructose
  - Slower release
  - Can cause upset stomach/cramps
  - Best taken when mixed with glucose/maltodextrin

When to start topping up

- Depends on the nature of the drink/food
- Body and only absorb 60g carb per hour
  - 240 calories per hour
- Earlier you start drinking, the longer you will save your stores of energy
- As carbs are absorbed slowly
  - Drinking more often, at least every 15 minutes
  - Big gulp is absorbed faster than many little sips

What fuels to use when

- Fuelling is not just about during racing and training
- It is also before and after racing/training too
- As a rule of thumb
  - Low GI carbs 2-3 hours before
  - High GI during
  - Proteins and high GI immediately after - 4:1 carb to protein
    - Protein helps with restocking muscle glycogen and hydration
    - Within 30 minutes of completing of exercise

  - http://www.scientistlive.com/European-Food-Scientist/Opinion/The_carb-protein_drink_advantage/21642/

Pre & rehydration

- As little as 2% loss in body weight due to dehydration can reduce performance by 20% and once carbohydrate is used up performance decreases by 50%
- Vital for maintaining cardiovascular health, body temperature and muscle function
- To check how much water you have lost
  - Weigh yourself pre-exercise and again afterwards
  - A loss of 1KG = loss of 1 litre of fluid
  - If you keep a record of duration, temperature, etc you can work out how much you need in your race

Absorption of water while running

- Understanding how water passes around the body helps with deciding what to drink while racing
- Osmosis determines how fast fluids are absorbed
  - If you drink pure water, your body has to dilute it with salts before it can be absorbed
- So to get water and carbs into your blood and muscles, you need to get the right mix
- Any good sports drink will give you quantities to mix
- Take time to work out your body weight, etc to get the right mix for yourself

Isotonic, hypotonic, hypertonic

- Isotonic
  - Same number of dissolved particles as in the blood plasma
  - Promotes water and carbohydrate absorption
  - Good for racing and replacing water and carbs
- Hypotonic
  - 1-3% carbohydrate
  - Promotes water absorption, but provides less carbohydrates
  - Good for dehydration or training in hot weather
- Hypertonic
  - High in carbohydrate
  - Stomach empties slowly, therefore less fluid replacement
  - Useful as a recovery drink
- Sometimes what you train with can upset you when race, make sure it is isotonic or hypotonic and go for the mildest flavour

How to work out %

- Quantity of powder X amount fluid X 100 = concentration
- Eg
  - 30g powder X 500ml X 100 = 6%
- Isotonic = 6%
- Hypotonic = 1-3%
- Hypertonic = more than 6%
- Electrolytes
  - Contain the elements which create the electric current in your muscles
  - Helps prevent cramps
  - Lost through sweat, so if you sweat a lot, you may need electrolytes

Dehydration

- If you never feel thirsty, it may mean you are always dehydrated – check your fluid intake, especially when racing
- Good hydration starts before your race
- Depending on size, air temperature and humidity
  - Drinking 1-3 litres of fluid a day
  - When you pee it should be straw coloured, not like a pint of bitter
- If you start exercising dehydrated it is difficult to bring your body fluids back into balance
- Once exercise begins, you need to drink every 10-15 minutes

Water intoxication

- When you consume more water than your kidneys can excrete
- Sodium levels in blood drop, changes osmotic pressure
  - Fluids move into cells and cause them to swell
  - Convulsions, or if serious death
- Most likely to happen if
  - Slower runner
  - Takes longer to finish run
  - Have more time to drink excessive water
- Weigh in before and after training so you know how much you should drink, depending on temperature and how long your run for
- Don’t drink plain water, one with electrolytes will have those key salts

Water or sports drink

- Water is fine for low intensity of up to 45 minutes
- Any harder or longer you need a sports drink
- Start drinking as soon as you start your run
- Don’t wait until you get tired or thirsty, or you will already be dehydrated or low on fuel
- Your body won’t be able to absorb carbohydrate fast enough to refuel your body
- No fuel means Fatigue
- Fatigue can result in injuries or not finishing your race

Importance of carbs in racing

- Consuming a carbohydrate energy drink as opposed to flavoured water allows trained athletes to keep going longer than those who drink water
- Tests done with cyclists showed those using a carb drink were able to go an hour longer than those who drank water
  - This was at moderate effort
- This means it took them 33% longer to reach fatigue (Coyle et al 1986)

Next talk – Race prep

- 15 April 2009

- Any feedback from the last talk
- Tapering – how it works
- Preparing for race day
  - Check list for race day
  - Carbo loading
- Any questions leading up to the longest training distances

Questions?

Contact

- Peta McSharry
  07799 037773
- peta@sportsmassagezone.co.uk
- www.sportsmassagezone.co.uk