Nutrition for Strength and Power
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Contents

•Protein, Carbohydrate + fat requirements
•Meeting vitamin and mineral needs
•Competition nutrition
•Fluid needs for training
•Recovery nutrition
•Special considerations
•*Plenty of examples of what to eat*
•*How much do you know v's how much should you know ?*

We are what we eat!

Water
Proteins
Carbohydrates
Fats
Vitamins and Minerals
Nutrition can make the vital difference!

Protein for Strength and Power

1) Do strength athletes have greater protein requirements, yes, why?
- for muscle strength and bulk
- for recovery, repair and adaption
- fuel? NO

2) Greater protein intakes = greater retention of protein, BUT…..
- there is an upper limit
- very high protein intake = fat storage

3) Total Energy Intake is VITAL
- inadequate energy = no muscle growth
- CHO very important for muscle growth

Protein Requirements

1) Consider body size
Protein requirements are 1.4-1.8g/kg/d
Example; 80kg athlete
= 112g –144g day
2) Athletes aims
- bulking up vs. cutting up, does make a difference?

Timing of food/meals to support muscle growth

1) Advantage to consuming CHO and protein pre exercise e.g. (6g Protein/30g CHO) - immediate availability end of exercise.
2) Advantage to consuming protein and CHO immediately post exercise
- accelerated rate of recovery.
- 25-40g protein, 50-100g CHO

3) Advantage to consuming CHO during exercise.
4) Small frequent meals vs few larger mealsAll the above will most likely translate into greater increases in muscle over time.

Matching Protein intakes with other Sports Nutrition Goals

1) Low fat protein choices
2) Inclusion of plant foods
3) A variety of protein foods (vitamins/minerals)
4) Select liquid sources of protein,
- easier to consume,gut comfort
- ideal post exercise (e.g smoothie)
- good snack choice
- easier to meet energy needs

Nutritious Sources of Protein

The following include 25g of protein and a low fat content, <5g.
1) 100g of tuna, 120g plaice/cod
2) 100g of turkey, 100g chicken
3) 3 large egg whites (1 yolk only)
4) 100g lean mince
5) 300g tofu

The following include 50g of CHO and 20g of protein
1) 300ml of skimmed milk smoothie
2) bowl of breakfast cereal with milk
3) 2 pots low fat yoghurt + 25g cashew nuts + fruesli bar
4) 3x slices of wholemeal bread with 2x turkey slices + salad
5) 200g of baked beans on 2x toast (1/2 tin)

Risks with high protein intakes

1) Dehydration, why?
x 5 fold increase in urine
with <u>intakes of 2.0 to 2.5g/kg/bm/d of protein</u>

(80kg athlete = 200g/d)
- minor dehydration effects performance!

2) High saturated fat intakes
3) Increased Calcium losses
4) Excessive intakes, potential for fat storage

So why encourage carbohydrate, (CHO) containing foods over fatty foods?

•Carbohydrate is the preferred fuel source for high intensity exercise
•Carbohydrate stores in the body are quickly depleted and replenished daily
•Nutritious carbohydrate foods provide other nutrients (B vitamins, Mg, Zn, Fe, K)
•Nutritious carbohydrates may assist in weight control
•How much? ~6-8g/kg/bw

QUESTION

You are in a heavy training phase and need extra carbohydrate foods to keep up with the demands of training. Which of the following would be most suitable to increase carbohydrate intake?
A. Have diet drinks at meals and during training
B. Have extra meat at the evening meal
C. Use snacks like a banana/jam sandwich, beans on toast, bowl of porridge, low fat rice pudding
D. Use snacks like mars bars, flapjack and doughnuts

The type of Carbohydrate

Which is the best choice and why?

1) Nutritious vs refined vs high fat

Nutritious	Refined	High-fat
Breakfast cereals	Sugar	Pastries
Pasta	confectionary	Crisps and Chips
Rice	L-fat icecream	Chocolates
Cous-cous	Soft drinks	Cakes
Fruit	Jelly babies	Sweet biscuits
Fruit Juices	Sports drinks	Chocolate coated
Vegetables	Honey	museli & health bars
Low-fat milks	Jams	Full-fat milk
Low-fat yoghurts	Power bars	Ice creams
Oat biscuits	Sorbet	
Breakfast bars	Jaffa cakes	
Frozen yoghurt		

Advantages of CHO during training:

- Maintains blood sugars
- Reduced perception of effort
- Some restoration of muscle glycogen in resting fibres during training
- Reduction in stress hormones released
- Reduced muscle soreness and damage
- If x2 daily training sessions are undertaken enables faster restoration of muscle glycogen

Questions:

As an athlete, what is the ideal mix of foods in your diet?

A No fat, heaps of protein and carbohydrate
B Lots of fat, adequate carbohydrate and protein
C Moderate-low fat, adequate protein, and heaps of carbohydrate
D No fat, adequate protein & heaps of carbohydrate

As an athlete, which of the following would be better sources of fat in your diet?

A Butter, cream, cheese, chocolate, curry
B Cakes, biscuits, chips, lamb/pork chops, ice cream
C Olive oil, low fat marg., light French dressing
D Salmon, muesli (nuts), avocado, Olive oil spray

Sample Daily Meal Plan

Breakfast: Porridge with 400ml of skim milk + 1 banana
1 slices of toast + scrap of margarine & jam
200 ml of orange juice
Snack: Flavoured milk
Lunch: 1 tuna sandwich (salad optional)
1 chicken sandwich
1 piece of fruit
1 pint of water
Snack: Dried fruit/mixed nuts
fruit smoothie
Dinner: lean mince with tomato based sauce
1 cup wholegrain rice
1 - 1 1/2cups of mixed vegetables
1/2 cup of tinned fruit + 1/2 cup of custard
Snack: Fruit smoothie

Summary for Gaining muscle mass

•Appropriate resistance training programme
•Adequate rest and sleep
•Adequate energy intake
- 5 to 9 meals a day
•Adequate carbohydrate and protein intake
•Good genetics

Getting all your vitamins

Vitamin	Food	Content	% RNI
Vitamin B1	Kelloggs Sustain or 1tsp/marmite	1.5mg	150 %
Vitamin B2	1 pint Skim. milk	1 mg	77 %
Vitamin B3	100g rice krispies	15 mg	100 %
Vitamin B6	2 bananas or 1 potato	2 mg	133 %
Folate	1 cup broccoli, spinach	90-200ug	100 %
Vitamin C	1 glass O/J or 1 kiwi fruit	45mg	112 %
Vitamin E	50g start or 2 tomatoes	7-10mg	70-100%
B-carotene	1 sweet potato,1 carrots	2000-4000ug	530-850%

Conclusion: Variety on the diet, eating different foods.

Calcium

Why do I worry?
Research shows some athletes don't have enough Calcium in their diets

Calcium rich foods for the training diet:

Skim milk	200ml	250mg
Salmon (bones)	small tin	335mg
Low fat yoghurt	200g	280mg
Fortified soy milk	200ml	300mg
Spinach	1 cup	72mg
L/fat cottage cheese	1/2cup	80mg
Almonds	50g	125mg
V/fat free fromage frais	100g	80mg

RNI, 1,000mg for men, 800*mg for women

Competition nutrition issues

Aims: DAY OF COMPETITION
•Top up muscle glycogen stores
•Achieve stable blood sugar
•Achieve gut comfort
•Achieve fluid balance
•Continuing to drink in-between heats
•Confidence and not to try anything new on the day!

Pre-event Snack/meal ideas

• **Large meal 4 hours prior or Small meal/snack 2 hours prior**
• **HIGH CARBOHYDRATE, LOW IN FAT AND PROTEIN**

Snacks:
•breakfast cereal/ skim milk/ fresh or canned fruit
•toasted muffins/ crumpets plus jam/ honey
•low fat yogurt and fruit
•rolls or sandwiches with banana
•liquid meal
•Fruesli bars/nutri-grain bar

Meals:
•toast and baked beans/ spaghetti
•sandwiches with meat filling
•Pasta/rice with low fat tomato or meat sauce
•low fat rice pudding with jam
•fruit smoothie
•baked potato with beans

Question:

You are competing at 5p.m and have eaten breakfast at 11a.m. It is now 3p.m - which of the following would be suitable pre-event snack choice?
A. Nothing, I don't normally eat before an event anyway.
B. Bread with marmite and jam and orange juice
C. Chips, grilled steak, eggs and baked beans
D. Mars bar and a can of coca-cola in the changing room
E. Sports/cereal bar with a glass of milk or juice

Recovery Nutrition Issues

Why is nutrition important following training?
- Start refueling
- Anabolic response
- Aid the body in repairing any muscle damage experienced as a result of hard training

Starting the re-fuelling process

What factors dictate the amount of carbohydrate you eat following training?
1) how long and how hard you have trained
2) when your next training session is scheduled
3) availability of next meal

Aim 1 - 1.5g of carbohydrate per kg of your own weight within 2 hours of exercise e.g 70kg athlete = 70-105g of carbohydrate

Factors affecting restoration of muscle fuel stores (glycogen)

Factors enhancing/speeding restoration;
1) Immediate intake of CHO
2) Adequate amount of CHO
- 1-1.5g/kg/bw – immediately post training
- total CHO over 24hrs – 6-8g/kg/bw
- refined CHO's (high GI)

Factors reducing/slowing restoration;
1) Damage to muscle (DOMS/contact injury)
2) Delay in CHO intake
3) Inadequate CHO intake

Suitable choices to provide both protein and carbohydrate

Examples of foods containing 50g of CHO and at least 15g of Protein:

•250-350ml of fruit smoothie/milkshake
•1/2 tin of baked beans with 2 slices of toast
•low fat muesli bar and fruit flavored yogurt
•300ml of low fat milk and 2 bananas
•liquid meal replacements*
•medium bowl of breakfast cereal and milk
•2 muffins and jam
•1 nutri-grain bar and 1/2 pint of milk

Carbohydrate content of certain foods ?

Sources of 50g of carbohydrate
(transportable):

jelly babies	65g
Fruesli bar	2 bars
Banana	2 large
Flavoured low fat milk	1 pint
Fruit Juice	500ml
Sports Drink	500ml
Jaffa cakes	5
Dried Apricots	

Strategies for replacing fluid

1) Water and/or CHO during training
2) CHO conc. 4-8% e.g 40-80g CHO in 1 litre
3) Aim for 80% replacement of fluid lost during training
4) Post-training, drink 150%-200% of fluid lost to re-hydrate completely (continuing losses)
5) Ideally food + fluid after training, faster replacement of lost

Question:

What is the best way to determine whether you are matching your sweat losses during training and throughout the day?

A. Weigh yourself pre and post training
B. Check the colour of your urine
C. Check to see how often you are having a "squirt"
D. All of the above

SPECIAL CONSIDERATIONS

•Antioxidants:
  - Vitamins; A, C, E
  - Minerals; Copper, Zinc, Selenium
•Immunity:
•Alcohol
•Fad diet

Special considerations: Antioxidants (A,C,E and mineral/protein cellular enzymes)

Benefits to athletes
•Reduce DOMS (Delayed Onset of Muscle Soreness)
•Boost immunity
•May aid/accelerate recovery, short and long term

Antioxidants (A,C,E and mineral/protein cellular enzymes) Dietary sources:

•Vegetables e.g sweet potato, broccoli, tomato
•Fruits e.g orange, kiwi, apple, Satsuma
•Soya e.g milk, beans, tofu, yoghurts
•Wholegrain/fortified Cereals e.g sustain, muesli
•Nuts* e.g almonds, brazils, pistachios
•Lean meats and lean fish
•Green tea/tea and garlic
•Supplementation?
– see sports dietitian
- there are risks with high intakes
- when increasing training volume/intensity?

Special considerations: Immunity

•Training places stress on the body
•Competition between muscle/immune system
What to do?
•CHO during exercise
•Increase foods rich in antioxidants
•Select nutrient dense foods
•Consume CHO/protein post exercise
•Eat 3 portions of oily fish week
•Meet energy, CHO and protein requirements
•Modify alcohol intake, get plenty of rest

Alcohol

The down-side to Binge Drinking!

Short-term
- contributes to Dehydration
- delays muscle glycogen restoration
- contributes to soft tissue injury and delays repair
- depresses immune system
- Interferes with good food selection
- slower decision making–

Long-term
- Adds to weight problem by:
- adding calories
- relaxing attitude

Negative aspects of Fad diets

Low carbohydrate diet

- Insufficient carbohydrate
- Insufficient energy
- Metabolic acidosis (loss of glutamine?)
- Bad breath
- Mood changes
- High fat = increased risk of heart disease
- CONCLUSION, DOESN'T WORK