PART 1. THE TRAINING DIET

INTRODUCTION
Performance in rowing, including rowing in the lightweight category, tends to favour those athletes with long levers and a large muscle bulk. Many successful lightweight rowers are naturally above the weight classification, and as a result may employ weight cycling strategies to enable them to compete.

The aim of any rower trying to achieve lightweight status should be to evolve a gradual weight loss strategy over a prolonged period of time in order to achieve an optimal body composition at the target weight. Such a strategy would therefore minimise the need to engage in performance-limiting and potentially dangerous rapid weight loss methods.

Unless the nutritional requirements of lightweight rowers are met through careful planning and organisation, several nutritional and nutrition-related problems can arise e.g. unexplained underperformance (under recovery) syndrome, obsession with weight, pre-occupation with food, chaotic or disordered eating patterns, stress fractures and (recurrent) upper respiratory tract infections. Although not unique to lightweight rowers, these problems may be more apparent or acute in nature due to the requirement of strict weight management.

The TRAINING DIET guide can be split into 4 main sections:
Section 1. ASSESSMENT
Section 2. PLANNING
Section 3. MONITORING
Section 4. SPECIAL CONSIDERATIONS

Section 1. ASSESSMENT
What is my likely racing weight?
The FISA rules (as of January 2005) for lightweights are:

<table>
<thead>
<tr>
<th></th>
<th>LWT men</th>
<th>LWT women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crew average</td>
<td>70.0kg</td>
<td>57.0kg</td>
</tr>
<tr>
<td>Max. Individual weight</td>
<td>72.5kg</td>
<td>59.0kg</td>
</tr>
</tbody>
</table>

What is my ‘living weight’ when not training?
As a guide, your weight in the off-season or when not training should be as follows:

**LWT women:** ideal 60-63kg  
**LWT men:** ideal 74-76kg

NB. Based on a natural ‘living’ weight, any rower who needs to lose 6kg or more in 6 months or less to achieve a final race weight should be referred for individual advice. This level of weight loss is significant as this represents a loss of bodyweight, which carries a risk of malnutrition.

What is my training weight?
Most rowers breaking into the squad already have rates of energy expenditure. Stepping up to the volume and intensity of squad training, may only result in a small **weight** loss. Indeed, no weight change or even weight gain may be seen that represents a gain in lean muscle tissue. It is important that your natural training weight is:

**LWT women:** 57.5-61kg

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LWT men: 71-73.5kg

Alternatively, you may be set an individual target weight and so it is advisable that you stay within 1kg, of this weight (men) and 1.5kg (women). This may be expressed as a % e.g. to stay within 2-4% of your target race weight. Obviously for crew boats, your weight may be influenced by others.

e.g. target weight of 70kg + 1.5kg = 71.5kg from March onwards
    target weight of 57kg + 1.5kg = 58.5kg from March onwards

What is my body composition?
It is important not only to know your bodyweight, but also to know how much of this is fat and how much is fat-free mass i.e. muscle. This information can then be used to identify a target weight. The overall aim is to achieve a target race weight with maximum loss of fat and minimal loss of muscle in order to retain power and endurance.

Body composition is usually assessed by a trained person using metal skinfold callipers over 4-7 sites in the body. Whilst a %bodyfat is important to predict minimal weight, the total sum of skinfolds, in millimetres, is often seen as the easiest and most convenient way to monitor fat gained or lost.

Who is going to measure by body composition?
Whoever is going to measure your body composition needs to be trained in taking skinfold measurements using callipers. Any further measurements taken through the season should be done by the same person to avoid confusion.

How frequently should this be done?
To avoid confusion, skinfold measurements should be taken no more than once every 6 weeks. The sum of skinfolds rather than the % should be reported. In reality, routine measuring of skinfolds in lightweight rowers becomes increasingly difficult as body fat decreases – the likelihood of error increases and confusion can result. A better scenario may be to include pre/off-season, mid-season and pre-racing skinfold measurements.

How to estimate safe amounts and rate of weight loss using % of bodyfat
Experts generally agree that male athletes should not attempt to go below 5-7% body fat and females should not drop below 14%. There may however be individual variation to these figures.

<table>
<thead>
<tr>
<th></th>
<th>Male, 15% fat, 76kg</th>
<th>Female, 23% fat, 65kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimal weight</td>
<td>76 x 0.15 = 11.4kg fat mass 64.6/0.93 = 69kg minimal wt (7% bodyfat)</td>
<td>65 x 0.23 = 15.0kg fat mass 50.0/0.86 = 58.1kg minimal wt (14% bodyfat)</td>
</tr>
<tr>
<td>Amount of weight to lose</td>
<td>7kg (approx. 15lb)</td>
<td>6.9kg (approx. 15lb)</td>
</tr>
<tr>
<td>Duration to achieve minimal weight</td>
<td>7-12 weeks @ rate of 0.5-1.0kg a week</td>
<td>7-12 weeks @ rate of 0.5-1.0kg a week</td>
</tr>
</tbody>
</table>
These 2 rowers therefore have minimal weights of 69kg and 58kg at 7% and 14% body fat respectively. These could be used as target weights, but it should be remembered that optimum weight for performance may occur at a higher % of bodyfat.

These 2 rowers need to plan a small, but significant, reduction in calorie intake (see basic nutrition below) over 7-12 weeks in order to achieve these weights.

What are my daily energy (calorie) requirements at my current weight?
Calculating energy requirements is best done by a qualified sports dietician. However, based on previous dietary records of elite lightweights training 2-3 times a day (inclusive of 2 outings), the following can be used as a guide to estimate energy requirements to maintain bodyweight:

Weight in kilos x 40-55kcal per day  
E.g. a male rower who weighs 74kg will require between 3000-4000kcal a day (average 3500kcal daily) to maintain his weight at 74kg.  
A female rower who weighs 60kg will require between 2400-3300kcal a day (average 3000kcal daily) to maintain her weight at 60kg.

What are my daily energy (calorie) requirements to lose weight?
In order to lose weight at a rate of 0.5-1.0kg a week you need to create an energy deficit of 500kcal a day.  
E.g. a rower weighing 74kg needing 3500kcal a day to maintain weight should reduce his intake to 3000kcal a day in the first instance to lose weight.

Weight should continue to be lost until a new equilibrium is found – sometimes called ‘getting stuck’. When it is certain that no further weight loss can be achieved at a 500kcal daily deficit, the calories will need to be reduced by a further 200-500kcal a day. It is therefore important not to create too big an energy deficit at the outset.

Reality Check! It is not true that a greater energy deficit will result in faster loss of body fat. Cutting down too severely on calories will however result in a more rapid loss of muscle rather than fat.

What is the lowest calorie intake I can achieve safely?
The lowest for a female athlete is 1500kcal a day.  
The lowest for a male athlete is 2000kcal a day.

These levels of intakes should only be used for a short period of time and when training has been tapered. These levels should never be used during winter training.
Section 2. PLANNING
BASIC NUTRITION

Having a good understanding of the basics of nutrition can help improve control over your diet and improve your confidence with planning your strategy.

Carbohydrate (CHO)
CHO intake needs to be kept high relative to your bodyweight and training programme i.e. ideally between 6-8g CHO per kg bodyweight per day when losing weight.
CHO is an essential nutrient for fuelling the muscle, brain, liver and immune system
CHO spares protein from being used as a fuel during exercise
It is difficult to convert CHO from food into stored body fat as the body likes to use it as a fuel
Each meal and snack should provide good amounts of CHO
1g of CHO provides 4kcal

Reality Check!
When choosing snacks, you can also look at the ratio of fat to carbohydrate. A good ratio is at least 1:5 or more
e.g. for every 1g of fat there is at least 5g of carbohydrate.

There are a number of sources of carbohydrates, some which provide additional nutrients other than just carbohydrate energy.

Table to show different food sources of carbohydrate

<table>
<thead>
<tr>
<th>CHO + other nutrients</th>
<th>CHO + few nutrients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wholemeal bread and rolls</td>
<td>White bread and rolls</td>
</tr>
<tr>
<td>Brown and wholegrain rice</td>
<td>White rice</td>
</tr>
<tr>
<td>Breakfast cereal</td>
<td></td>
</tr>
<tr>
<td>Brown pasta</td>
<td>White pasta</td>
</tr>
<tr>
<td>Potatoes</td>
<td></td>
</tr>
<tr>
<td>Lentils, beans</td>
<td></td>
</tr>
<tr>
<td>Root vegetables e.g. carrots</td>
<td></td>
</tr>
<tr>
<td>Fruit and fruit juice</td>
<td></td>
</tr>
<tr>
<td>Yoghurt</td>
<td></td>
</tr>
<tr>
<td>Milkshakes</td>
<td></td>
</tr>
<tr>
<td>Breakfast bars</td>
<td></td>
</tr>
</tbody>
</table>

Fat
Fat intake needs to be kept low – around 20% of your energy needs. However, your diet should not be fat free as you have a requirement for health and performance of essential fatty acids and fat-soluble vitamins.

Unsaturated fats found within the muscle are used for energy along with CHO during most training.
sessions for rowing.
It is very easy to over-consume high fat foods, and therefore over-consume calories
It is easy for the body to convert fat from food into stored body fat
1g of fat provides 9kcal

Reading and understanding food labels is an important way of managing your diet.
As a rule of thumb:
- when looking at whole meals or main dishes look at the fat content for the whole meal or serving (your serving). This includes bottled or canned sauces used over pasta, vegetables, meat etc e.g Ragu-type
- when looking at snacks, look at the fat content per 100g

How much is a lot of fat and how much a little fat?
As a general guide:

3g or less of fat is a little
4-10g of fat is low-moderate
11-19g of fat is moderate-high amount
20g or more of fat is a lot

Good sources of essential fats include oily fish such as salmon (fresh or tinned), mackerel and fresh tuna as well as nuts and seeds. Small amounts of olive, rape and sunflower oils will also provide essential fats. At least one portion of oily fish is suggested each week or regular consumption of small amounts of those foods providing essential fats is advised.

Protein
Protein intake should be appropriate relative to your bodyweight and training programme i.e. ideally between 1-2g protein per kg bodyweight per day when losing weight.
Including good amounts of protein in your diet may help control appetite and provide a sense of ‘fullness’
A diet too high in protein will compete for CHO requirements (and vice versa)
Very high protein intakes can elevate blood ammonia levels and put additional stress on the liver and kidneys
Sudden switches of very high to very low intakes of protein is not advisable
Protein-rich foods provide excellent sources of many other nutrients such as B Vitamins, Iron and Zinc
1g protein provides 4kcal

Alcohol
Alcohol has to be metabolically handled by the liver and will compete with the process of recovery after exercise. Alcohol should be kept to a minimum when trying to lose weight.
Binge drinking is worse than ‘little and often’
Alcohol will suppress the body’s ability to ‘burn fat’ – it encourages fat storage
Alcohol can have diuretic (dehydrating effect) when above 5% strength and when drunk to excess
1g alcohol provides 7kcal
PUTTING IT TOGETHER – A BASIC STRUCTURE

1. Estimate your daily calorie requirements for your current weight
2. Deduct 500kcal a day from this figure
3. Work out your carbohydrate requirements. This ideally should be between 6-8g CHO per kg bodyweight when losing weight (or at least 65% of your total energy requirements). Less than 5g CHO per kg of your bodyweight without dietetic supervision is not advisable.

Suggested calorie Intake, relative to approximate CHO requirement

<table>
<thead>
<tr>
<th>CHO for meals</th>
<th>CHO for snacks</th>
<th>CHO for sports drinks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1500kcal</td>
<td>245g</td>
<td>35g 500ml Lucozade Sport</td>
</tr>
<tr>
<td>2000kcal</td>
<td>325g</td>
<td>35g 500ml Lucozade Sport</td>
</tr>
<tr>
<td>2300kcal</td>
<td>375g</td>
<td>35g 500ml Lucozade Sport</td>
</tr>
<tr>
<td>2500kcal</td>
<td>405g</td>
<td>50g 750ml Lucozade Sport</td>
</tr>
<tr>
<td>2700kcal</td>
<td>440g</td>
<td>70g 1 litre Lucozade Sport</td>
</tr>
<tr>
<td>3000kcal</td>
<td>490g</td>
<td>70g 1 litre Lucozade Sport</td>
</tr>
</tbody>
</table>

4. Split the grams of CHO over 6 meals, snacks and sports/hydration drink
   Suggest approx. 60% of CHO over 3 meals
   Suggest approx. 25-30% of CHO over 3 snacks or smaller meals
   Suggest approx. 10-15% of CHO as sports/hydration drink i.e. minimum 30g and a maximum of 100g a day of CHO (out of 245g and 490g respectively)

EXAMPLE STRUCTURE OF CHO for 2000kcal and 325g CHO per day

**Breakfast** – small meal/snack
25g CHO

**Sports drink** – main training session of day
30-35g CHO

**Recovery breakfast** – main meal
75g CHO

**Snack**
25g CHO

**Lunch** – main meal
75g CHO

**Mid-afternoon** snack
20g CHO

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1 Lucozade Sport is British International Rowing's sponsor. Calculations shown here are for the Isotonic variety providing approximately 6g CHO per 100ml
Evening meal – main meal
75g CHO

5. Decide which meals are going to be providing most of the carbohydrate e.g. breakfast after early morning outing, lunch and evening meal; and which are smaller meals or snacks e.g. breakfast and late morning and mid-afternoon snacks?

6. Decide main sources of carbohydrate and main meals and work out portion sizes to match your needs – refer to snack ready reckoner

7. Decide main sources of carbohydrate-containing snacks, making sure that they are mostly nutritious carbohydrates – refer to handout on snack types

8. Make sure that each main meal has a source of protein e.g. meat, fish, poultry, eggs, cheese, milk or yoghurt, beans or nuts

9. Make sure that the fat content of your plan is low, but not fat free. Use olive oil, rapeseed and sunflower oils and spreads sparingly.

10. Make sure that each main meal includes plenty of vegetables, salad and/or fruit

11. Write down your meal plan, including portion sizes

12. Using food tables e.g. found in most good bookshops or via recognised websites check that the overall calories are correct for slow weight loss

13. Monitor using a food and weight diary

Section 3. MONITORING
Monitoring your weight
☑ You need access to an accurate pair of scales.
☑ Weigh yourself once a week when aiming to lose bodyfat
☑ Record this weight on a piece of graph paper to visually demonstrate your pattern of weight loss
☑ Avoid daily weighing when trying to lose fat as you will be weighing muscle glycogen and water gains and losses plus the ‘physical’ weight of food eaten.
☑ Weighing more frequently than weekly can be suggested when looking at your personal weight fluctuations e.g. to know how much weight (water) you lose after an overnight sleep and fast. Frequent weight recording should be done as ‘research’ and used for reflection and planning purposes, particularly when close to your target race weight. This information should build confidence and not be destructive.

Monitoring your rate of weight loss
Rapid weight loss of more than 1kg a week will not be fat – it will be water, glycogen and muscle.

Bodyweight will fluctuate daily, even hourly – but these rapid changes are due to changes in hydration, weight of food eaten and loss of muscle and liver glycogen. Stored carbohydrate, as glycogen can weigh 350-600g, of which approx. 100g is found in the liver
1 lb loss of fat represents a 3,500kcal deficit
Bodyfat is lost at a maximum rate of 1-2lb or 0.5-1.0kg per week or 1-2% of bodyweight
To lose 2lb or 1kg a week, a deficit of 500kcal a day needs to be created i.e. 3,500kcal
Weight is not lost in a uniform manner e.g. some weeks 0.5kg is lost, on others 1.0kg.

A large amount of the weight lost in the first week on popular ‘low carbohydrate’ diets is due to the loss of stored glycogen and water. For every gram of glycogen stored, 3-4g of water have to be stored with it. 1.5-3kg of glycogen and water could be lost on such fad diets. The problem is that
these are 2 nutrients vital for training, recovery and performance.
Reality check!
If you suddenly gain a 0.5kg overnight without any obvious reason – this can not possibly be fat! For this weight gain to be fat, you would have needed to consume an extra 3,500kcal on top of your normal food intake. This sudden gain is likely to be water and/or glycogen.

Monitoring your food & drink intake
Monitoring improves confidence that target will be achieved

A record of what you are doing, alongside a record of your weight is vital. This should include the time of the meal or snack, the amount of food and drink consumed, a record of the training undertaken and a daily measure of ‘how you feel in training’ e.g. 😊😊😊😊 and your weekly weight. By doing this you can establish your individual weight loss pattern relative to your food and drink intake. If the rate of weight loss is undesirable then you can look back on your records and identify ways of eating less or eating more to speed up or slow down weight loss respectively. The more accurate you are with monitoring, the easier it becomes to repeat good practice and the easier it becomes to identify why things may not be working. If the plan is not working you can then discuss this with a sports dietician with greater ease.

<table>
<thead>
<tr>
<th>Time</th>
<th>Food &amp; Drink Eaten, including amounts</th>
<th>Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.30a m</td>
<td>50g Corn Flakes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>200ml Semi-skim milk</td>
<td></td>
</tr>
<tr>
<td></td>
<td>250ml Orange Juice</td>
<td></td>
</tr>
<tr>
<td>8.30a m</td>
<td>1000ml 1/2 strength Lucozade Sport</td>
<td>UTI 90mins</td>
</tr>
</tbody>
</table>

How did I feel/train today? 😊😊😊😊
Weight this week? 73.6kg

Monitoring your mood relative to your food & drink
What you eat and drink, how much you consume and the timing of food and drink will have an effect on your mood. If you feel that your plan is being hampered by inappropriate eating or drinking due to your moods, keeping a food and mood diary can help you/ a sports dietician identify the solution. If you consistently find that you are eating inappropriate foods, inappropriate amounts or at inappropriate/unplanned times, consult a sports dietician – refer also to Food and Mood handout

Monitoring your ability to manage your appetite
Controlling your appetite is the key to success in weight management. It is less about willpower and over-coming sensations of hunger, but more about planning the right types of meals and snacks around training and competition. By allowing a sufficient time-scale in which to lose weight, by not creating a too bigger calorie deficit and by following the suggested basic structure appetite management will be easier. Keeping a food (and mood) diary again will help identify difficult times of the day of specific situations.
Section 4. SPECIAL CONSIDERATIONS
Maintaining Hydration

Dehydration can adversely affect performance and health

Weight fluctuations seen in a day are not due to fat loss! These changes are due to your state of hydration e.g. if you drink 1litre of water and then weigh yourself you will be 1kg heavier! Likewise if you finish a training session 1kg lighter (approx 2 lbs) – this will be due mostly to fluid loss. Remember 0.5kg (1lb) lost is equivalent to a 3,500kcal deficit. It is impossible to create such a large deficit in a single training session!

Unless fluid losses are replaced during exercise, you will become dehydrated. Dehydration impairs performance by causing the following:

- exercise feels harder than usual and you will fatigue earlier
- reduced mental function
- reduced skill level
- stomach upset (and inability to tolerate the correct fluids)
- impaired carbohydrate metabolism – you use it less efficiently and resynthesis of carbohydrate stores is adversely affected
- impaired protein metabolism – you will breakdown muscle and use protein as a fuel

All levels of dehydration – even as small as a 2% loss of bodyweight, impair capacity for exercise and the magnitude increases as the degree of dehydration increases.

In order to minimise dehydration, you need to drink enough during exercise to match your sweat losses. Sweat loss can be determined by weighing yourself before and after exercise. Each kilogram of weight loss indicates 1litre of fluid loss. Adding the amount of fluid consumed during the exercise session, gives total fluid loss for the session. For example, if you finish a training session or race 1kg lighter and you have consumed 1litre of fluid during the session, total sweat loss equals 2litres. Once you know your average sweat loss, a plan can be prepared to enable you to match sweat losses in subsequent exercise sessions.

To get the body back into fluid balance after training, you need to consume a volume of fluid in excess of your sweat losses along with the replacement of electrolytes, in particular, sodium. You therefore need to consume 150% of your sweat losses.

Refer to “Estimating Sweat Losses" handout

Use of sports drinks

Sports drinks are an essential part of any rower’s performance programme. Knowing what, when and how much to drink is essential.

Sports drinks e.g. Lucozade Sport Isotonic, Powerade and SiS Go are specially formulated carbohydrate-electrolyte drinks, which are designed to improve sporting performance. They deliver carbohydrate to working muscles, and promote better fluid absorption. As it is well known that the two main factors limiting prolonged exercise are depletion of the body’s carbohydrate energy stores and dehydration, the correct sports drink can help maximise training and performance.

A carbohydrate-electrolyte drink to provide energy and fluids should have the following qualities:

- a palatable flavour to encourage greater fluid intake
• contain around 6% carbohydrate (6g CHO per 100ml) i.e. 30g carbohydrate per 500ml
• contain sodium (salt) to encourage continued drinking, to stimulate glucose absorption in the gut and to replace sweat losses
• be non-carbonated

If fluid requirements are high, due to high sweat losses, a 1/2 strength sports drink plus additional salt could be used instead. This will then provide 30g CHO per 1000ml.

Plain water is not the ideal post-exercise rehydration beverage when quick and full restoration of fluid balance is necessary and where all intake is in a fluid form. Plain water encourages you to urinate rather than retain fluid and so you will not remain in positive fluid balance for long! The addition of sodium (salt) in the sports drinks not only encourages retention, but the salt encourages more to be drunk. Water could be consumed post exercise if solid food is also consumed at the same time. The electrolytes in solid food probable help with the retention of fluid.

Some benefits of a sports drink to a lightweight rower:

✔ When sipped during training, it will provide a source of carbohydrate to for your muscles and so spares precious muscle glycogen
✔ If 500ml-1000ml of a ‘typical’ isotonic sports is consumed during prolonged training (≥ 90 minutes), to provide 30-60g CHO per hour, your immune system may be less suppressed. This may result in fewer coughs, colds and chest infections.
✔ It will help maintain saliva flow rate and hence help maintain salivary IgA secretion rate (a protein with anti-microbial properties). This too may help your immune system.

A sports drink will provide calories in the form of carbohydrate. This needs to be factored into your eating plan. It is highly likely that 500-1000ml of sports drink – either full strength or half strength (with added salt) will need to be included.

1g CHO provides 4kcal
30g CHO in a 500ml bottle of full strength sports drink will provide 120kcal

Refer to “Know Your Drink” or “Sports Drinks Compared”?

Eating & drinking to recover

A dietary plan needs to include a strategy for optimal recovery in order to maximise the training effects of the session and to get the most out of a subsequent training session.

Eating and drinking for recovery is to begin the process of:

✔ Re-fuelling liver and muscle glycogen stores
✔ Rehydration
✔ Helping the immune system
✔ Repairing muscle

It is unlikely that a ‘main’ meal is to be eaten within 15-20minutes of finishing exercise and so a snack should be eaten to optimise recovery. A snack should be high in carbohydrate but also include a small, but significant amount of protein to help aspects of recovery. This snack should provide at least 0.5-1.0grams of carbohydrate per kg bodyweight plus a total of 6-15g protein and should fit into your overall dietary plan.

For example, a rower weighing 70kg should include a snack providing:
35-70g carbohydrate plus 6-15g protein
Example snacks that can be included in recovery plan:

<table>
<thead>
<tr>
<th>Low fat food or drink</th>
<th>Portion</th>
<th>Carbohydrate per portion (grams)</th>
<th>Protein per portion (grams)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lucozade Sport or similar</td>
<td>500ml</td>
<td>33</td>
<td>0</td>
</tr>
<tr>
<td>Jordan’s Frusli bar or similar</td>
<td>33g bar</td>
<td>25</td>
<td>2</td>
</tr>
<tr>
<td>Glass skimmed milk</td>
<td>1/2pint</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Ham sandwich</td>
<td>1</td>
<td>30</td>
<td>12</td>
</tr>
<tr>
<td>Longlife milkshake</td>
<td>250ml</td>
<td>30</td>
<td>9</td>
</tr>
<tr>
<td>Banana</td>
<td>1 med</td>
<td>30</td>
<td>1.5</td>
</tr>
<tr>
<td>Mullerlight Yoghurt or similar</td>
<td>1</td>
<td>20</td>
<td>9</td>
</tr>
<tr>
<td>Jelly babies</td>
<td>60g pack</td>
<td>50</td>
<td>2.5</td>
</tr>
<tr>
<td>NutriGrain bar</td>
<td>1</td>
<td>25</td>
<td>1.5</td>
</tr>
<tr>
<td>Weetabix or similar</td>
<td>2</td>
<td>25</td>
<td>4.5</td>
</tr>
<tr>
<td>Maltloaf</td>
<td>2 slices</td>
<td>40</td>
<td>4</td>
</tr>
</tbody>
</table>

A low fat milkshake with a banana would provide an excellent start to the recovery process as it would provide carbohydrate, protein and essential vitamins and minerals.

The Role Of Animal Products: Meat, Poultry & Fish

Based on health or performance factors, animal products should not be excluded by lightweight rowers.

It is my professional opinion that there are no nutritional or health advantages for a rower, particularly if training or competing abroad, to follow a vegetarian diet. In fact there are a number of reasons why a vegetarian diet may put you at a disadvantage. In addition to eggs, nuts and beans, most vegetarian rowers regularly include fish and perhaps chicken i.e. they become demi-vegetarians. Meat, including red meat, should not be excluded from the diet for fear of it being too high in fat. Whilst some meat cuts and meat products are high in fat e.g. sausages many cuts of meat are not and can be less than 5g of fat per 100g.

Reality Check! 10 Nutritional benefits of animal products:

1. Animal products (fish, poultry and meat) are a source of haem iron – which means the iron absorbed effectively by your gut. Whilst plant foods such as beans and green vegetables may contain good amounts of iron, the absorption is less effective
2. Red meats such as liver, beef and lamb are the best sources of iron
3. Adding small amounts of animal products to plant sources of iron will encourage better absorption of iron e.g. stir fry broccoli with beef and cashew nuts
4. Animal products are sources of zinc, again in a form absorbed effectively
5. Meat is a natural source of creatine - an immediate and short-lived source of phosphate to regenerate ATP. The creatine-phosphate system is the most important fuel source for sprints or bouts of high-intensity exercise lasting up to 10 seconds.
6. Meat is a natural source of carnitine – an amino acid that transports fatty acids into muscle cells for use as energy fuel
7. Meat is a natural source of CLA - a slightly altered form of the essential fatty acid linoleic acid and research is underway looking at its involvement in reducing body fat
8. Red meat is rich in mitochondria and a natural source of lipoic acid – an antioxidant
9. Protein-rich foods have a high satiety value (they make you feel ‘satisfied’ after a meal) – lean meat, fish and poultry can help create this feeling and may help prevent unplanned snacking or ‘picking’

10. Diets containing at least 3 portions of milk and dairy products a day may improve weight loss (fat loss). A portion of milk is equal to 1/3pint or 150g pot yoghurt

The Female Athlete
The female athlete has special health concerns that require particular attention.

There is good evidence that in order to protect reproductive and skeletal health, a weight loss programme should avoid energy availability that falls below 30kcal per kg fat free mass (FFM) per day. This picture may be made worse by an inadequate intake of calcium and other nutrients for bone health. Whilst much of the attention is towards the bone health of women, malnutrition with respect to energy requirements of male rowers may also adversely affect skeletal health.

e.g. a 60kg female with 20% bodyfat, training 2.5 hours a day

FFM = 48kg
Dietary energy intake (estimated from tables etc) “a” = 2300kcal a day
Energy used in exercise “b” = 1000kcal
Energy Availability = a – b = 1300kcal
1300 \( \div \) 48kg = 27kcal per kg FFM

Regular menstruation will result in an increased need for iron in the female athlete – perhaps double or even treble the amount compared with a non-exercising female.

Suggestions:
☑ Seek medical help from a sports doctor or sports dietician if your periods stop for 3 months or more
☑ If you are pre-occupied with your weight or bodyfatness seek an assessment by an accredited sports dietician
☑ If you are in a cycle of ‘binge-guilt-starve-binge’, seek the help of an accredited sports dietician or psychologist

Feeling out of control with food does not mean that you have or will develop an eating disorder. These feelings are fairly common in many athletes and is often the result of poor meal and snack planning, extreme hunger and a competitive nature. These feelings can affect male and female athletes.

Whilst true iron-deficiency anaemia is rare in elite athletes, a poor iron store, as reflected in a low ferritin level (below 30μg/l) is common in female athletes. Having a very low iron store will make you feel generally fatigued, you may catch frequent infections and fail to recover in between training sessions.

Suggestions:
☑ Have routine monitoring of your iron stores (serum ferritin) and blood haemoglobin e.g. 2-4 times a year
☑ If you need an iron supplement, ask your doctor or dietician to suggest an alternative to ferrous sulphate, as this can cause constipation
☑ Enjoy iron-rich foods such as meat, especially lean red meat such as beef, lamb, venison, and oily fish such as salmon, fresh tuna or mackerel 3-5 times a week
Beans, nuts, eggs and green vegetables are a good source of iron – be sure to include these every day, particularly if vegetarian.

Drink a glass of orange juice with a meal rather than tea or coffee, which may interfere with iron absorption from plant foods.

Eat a bowl of iron-fortified breakfast cereal and milk a day – perhaps as a snack?

**Sources of dietary iron – see also role of meat, poultry and fish**
- Red meat e.g. minced beef, lamb, liver, liver paté
- Other meat, poultry and fish e.g. pork, ham; chicken, turkey (dark meat of poultry is higher than white meat); oily fish such as tuna, salmon and mackerel (white fish such as cod, plaice and haddock are lower in iron)
- Eggs
- Wholegrain breakfast cereals e.g. muesli, Shredded Wheat, Weetabix
- Breakfast cereal fortified with iron e.g. Cornflakes, Cheerios
- Nuts, seeds
- Beans and lentils
- Dried fruit
- Dark green vegetables
- Curry powder, molasses and dark chocolate, cocoa

**Vitamin and/or Mineral Supplementation**

A multivitamin and mineral supplement may be used as an insurance policy. Any supplement taken is the responsibility of the individual rower.

As energy intake (calories) decreases, the intake of essential vitamin and minerals will also decrease, and yet your requirement for these nutrients will stay the same. This does not mean that you suddenly become deficient, as your usual diet should be providing more than 100% of your vitamins and minerals, but what it does mean is that your diet needs to remain balanced, planned and particularly well-organised when losing weight. Routine supplementation is therefore not required. However, due to a reduction in energy intake during weight loss, some athletes choose to take a 1-a-day multi-vitamin and multi-mineral supplement as an ‘insurance policy’. To date, “Forceval” is the only brand that is available on prescription and directly from a pharmacist (you need to ask). Its product license number adds greater confidence to its safety and efficacy. Another brand is by ActivePlus called “City Sport” (www.activeplus.co.uk), which will be coded with a batch number to indicate that it has been screened by an IOC accredited laboratory to be free of contaminants.

Supplementation is likely to be needed if energy intake falls below 1500kcal a day, whereby it becomes very difficult to meet requirements. Individual consultation with a qualified sports dietician or nutritionist is advised as no multi-preparation will provide 100% of daily requirements for all nutrients.

Supplements that contain mega-doses of vitamins or minerals or contain herbal ingredients are not advised. If in any doubt, speak to a qualified sports dietician or nutritionist.
EXAMPLE MEAL PLANS

*Putting it all together can be a challenge at first, and often requires some input by a sports dietician. But with organisation and flexibility, a meal plan to lose or manage your weight becomes a habit, which if practised, becomes permanent. Refer to example meal plans*
PART 2. Critical Race-Weight Management – approaching your race weight

INTRODUCTION
Few lightweights sit naturally and comfortably at their race weight and even if they do, they may still need to lose a small amount of weight, perhaps up to 2kg in a crew boat, in order for the whole boat to meet racing weight criteria. The challenge for the lightweight athlete is to adopt a weight making strategy, which allows for the optimisation of the trained muscle mass available to deliver a performance, whilst avoiding the potential for performance or health impairment resulting from the strategies themselves.

Whilst it is logical that if a rower is carrying ‘excess’ fat on their body that this can be lost through a sensible, gradual strategy, there often comes a point at which further fat can not be lost without detriment to health or performance and indeed losing muscle, and therefore power, becomes a real risk.

When maximum fat loss has been achieved, the following remain to be manipulated through the weigh-in process, to ensure that the athlete has an optimal active muscle mass in competition:

- Contents of the gastrointestinal system (bowel evacuation)
- Physical weight of food consumed leading up to weigh-in (a kilo of lettuce weighs the same as a kilo of chocolate…)
- Fluids and hydration status
- Weight of muscle (and liver) glycogen and associated water that is stored with the glycogen

Each of the above can be manipulated to a greater or lesser degree to the advantage of the individual rower. For some rowers, it may simply be a case of a reduction in food volume (food weight) and mild dehydration during an early morning paddle; for others a more precise approach may be needed. With careful planning, self-monitoring and practising in less important races, lightweight rowers can develop a critical race-weight management strategy.

Whilst it is possible to adopt a critical race-weight management strategy, it may not be the best psychological tactic 12-48hours from a race. Changes in diet can invoke mood changes, which if managed appropriately by all involved is fine, but rowers and coaches need to be aware of this.

GUT (COLON) EMPTYING STRATEGY
Your gastrointestinal system is broadly made up of the small bowel, where most of the digestion and absorption of food occurs, and the large bowel (the colon) where products escaping digestion le.g. undigested starch, some proteins and fibre, ferment with colonic bacteria and water either to be reabsorbed by the bowel or to form faeces, which are then eliminated from the body.

Commonly asked questions:
How often should your bowels empty?
This will vary from individual to individual and what may be normal for one person may be abnormal for another. Most rowers will empty their bowels at least once a day e.g. first thing in the morning, after a hot drink, when the bowel reflex is strongest.

How quickly does my gut work? (The” Sweetcorn Test”)
You can approximate your gut transit by eating some sweetcorn kernels and timing how long it takes for their appearance in the faeces. Sweetcorn kernels escape digestion and will often appear ‘whole’ in faeces. Gut transit time is individual and can vary depending on your physiology, your emotional state as well as dietary habits. Exercise itself can influence gut transit, and some exercises may have a greater influence that others. Running for example is known to have a particular effect on the gut, so much so that some runners have to stop mid training to go to the toilet.

**How can I maintain regular bowel function during training?**

a) **Avoid dehydration**
One of the functions of the colon is to regulate the movement of water into and out of itself. Too much fluid entry into the colon and a looser stool; too little fluid and a hard, difficult to pass stool will result. Following a high fibre diet to help regulate your bowels will not work, and may even have the opposite effect, if insufficient fluid is consumed.

b) **Include probiotic functional foods**
Probiotic functional foods include live yoghurt and live milk cultures e.g. Actimel, Yakult, Muller Vitality. Taken regularly on a daily basis, they help promote the growth of ‘helpful’ bacteria, which will add bulk to stools and may help prevent some gut infections and generally help the immune system.

c) **Include a hot drink at breakfast**
The reflex to go to the toilet is strongest in the morning after breakfast, particularly when a hot drink is consumed. Getting into a routine can help regulate bowel function.

d) **Include fibre**
There are different types of fibre – the fibre found in porridge oats for example may have different effect on the bowel than the type of fibre found in wheat bran e.g. All-Bran, branflakes etc. What is important is that during training you include a variety of fibres e.g. from fruit, vegetables, nuts, seeds (e.g. pumpkin, sesame), beans, pulses (e.g. lentils), wholewheat breakfast cereal, wholemeal bread, brown rice. If taken regularly, linseed grain, available in larger supermarkets and healthfood shops will encourage regular bowel action and has the added advantage of being an excellent source of omega-3 fatty acids.

**Is there anything I can do to speed things up?**
Nerves and nervous excitement can trigger the desire to go to the toilet. Some foods and drinks, particularly fruit, are natural laxatives in that they may draw water, by osmosis, into the colon. Typical foods and drinks include liquorice, prunes, prune juice, figs and fig extract, concentrated fruit juice e.g. apple juice, dried fruit such as apricots, raisins. A cup of strong coffee can also stimulate the bowel into action. This may be due to the effects of caffeine or the osmotic effects of the coffee itself. Caffeine can have a stimulatory affect on the bowel, although it may also have affects on your central nervous system. Whilst caffeine is no longer on the list of banned substances in competition, it is known to affect performance and so a planned approach would be needed. A source of guaranteed caffeine that has been produced under GMP and tested by an accredited laboratory for banned substances can be found at [www.activeplus.co.uk](http://www.activeplus.co.uk)²

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² Active Plus is a small range of supplements that have been produced under Good Manufacturing Practice (GMP) and undergone batch testing at an accredited laboratory. Certificates of batch purity are available to the consumer to view online. The decision to take of supplements is the responsibility of the individual rower.
All herbal or ‘natural’ remedies claiming to speed up gut transit should be avoided due to the unregulated nature of their manufacturing and their potential to contain banned substances.

*How can I manage my ‘colon weight’ leading up to weigh-in?*
A reduction in fibre intake and possibly food volume, can have two main effects. The first is that the contents of the bowel will weigh less – a good thing in the short-term when making critical race weight; but the bowels will open less often. This second response is absolutely normal, as the colon has less ‘material’ to work on. It is likely to be difficult for a rower to distinguish whether they can not go to the toilet due to a reduction in bowel contents and not being able to go to the toilet due to constipation. The following points may therefore help:

- Maintain a hydration status sufficient to allow bowel action
- Reduce your intake of high fibre foods a few days prior to weigh-in (use the Sweetcorn Test to approximate your gut transit time and help in planning)
- Plan in liquid, low fibre meal replacement drinks to provide replacement food carbohydrate and protein e.g. SlimFast, Complan, Build-Up, Boots’ equivalent, SiS Re-Go, Lucozade Sport ‘Recover’ (similar to, but not strictly a meal replacement as low in vitamins and minerals). These ‘foods’ will weigh 40-100g per dry serve plus 250-500ml of liquid (milk or water). Whilst some of these drinks will contain some fibre, it will be less than in a normal diet. Counting calories is of lesser importance 48hours before or during racing, rather the actual weight of the food and its content with respect to carbohydrate becomes vital to manage (remember a gram of carbohydrate stored as glycogen will store 3-4 grams of water with it).
- Plan in low fibre ‘light’ high carbohydrate foods e.g. Rice Krispies or Cornflakes with milk, white bread/toast with jam/honey/yeast extract, pretzels, chocolate, yoghurt, sorbet, fruit juice, soup with added glucose polymer (to increase carbohydrate content)
- Include foods and drinks in your plan that you have shown to help keep your bowels active due to their water-pulling or osmotic effects e.g. fruit juice, prunes, coffee

Whilst a successful gut emptying strategy can be achieved for the first day of competition, experienced rowers and coaches have found that bowel movements may be slowed or stalled for up to 24-48hours afterwards. The reasons for this are not clear but could involve functional gut issues such as a lack of bulk in the colon or be due to altered nerve stimulation to the gut.
An example low fibre ‘liquid’ meal plan (precise amounts will vary depending on individual)

<table>
<thead>
<tr>
<th>Food or drink</th>
<th>CHO</th>
<th>Protein</th>
<th>Total weight</th>
<th>Fluid weight</th>
<th>Solid weight</th>
<th>Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakfast</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slim Fast, 250ml milk + 2 scoops powder</td>
<td>35</td>
<td>13</td>
<td>285</td>
<td>228</td>
<td>57</td>
<td>212</td>
</tr>
<tr>
<td>250ml fruit juice e.g. prune, apple</td>
<td>36</td>
<td>1.3</td>
<td>250</td>
<td>200</td>
<td>50</td>
<td>143</td>
</tr>
<tr>
<td>Hot drink e.g. black coffee (5g CHO per rounded teaspoon sugar)</td>
<td></td>
<td></td>
<td>250</td>
<td>250</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snack</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lucozade Sport Recover</td>
<td>55</td>
<td>18</td>
<td>575</td>
<td>500</td>
<td>75</td>
<td>291</td>
</tr>
<tr>
<td>Lunch or Evening Meal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slim Fast, 250ml or</td>
<td>35</td>
<td>13</td>
<td>285</td>
<td>228</td>
<td>57</td>
<td>212</td>
</tr>
<tr>
<td>Soup e.g. tomato (adding CHO polymer will increase CHOs)</td>
<td>15</td>
<td>2</td>
<td>250</td>
<td>210</td>
<td>40</td>
<td>130</td>
</tr>
<tr>
<td>Chocolate e.g. standard 65g Mars or carbohydrate bar</td>
<td>43</td>
<td>3.5</td>
<td>65</td>
<td>5</td>
<td>60</td>
<td>287</td>
</tr>
<tr>
<td>Snack</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lucozade Sport Recover</td>
<td>55</td>
<td>18</td>
<td>575</td>
<td>500</td>
<td>75</td>
<td>291</td>
</tr>
<tr>
<td>Evening Meal or Lunch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>150g cooked rice, potatoes, pasta</td>
<td>46</td>
<td>3.9</td>
<td>150</td>
<td>102</td>
<td>48</td>
<td>207</td>
</tr>
<tr>
<td>125g fish, meat, chicken</td>
<td>0</td>
<td>38</td>
<td>125</td>
<td>82</td>
<td>43</td>
<td>190</td>
</tr>
<tr>
<td>Or</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>150g yoghurt or 2 scoops icecream</td>
<td>27</td>
<td>6</td>
<td>150</td>
<td>117</td>
<td>33</td>
<td>135</td>
</tr>
<tr>
<td>Or</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SlimFast</td>
<td>35</td>
<td>13</td>
<td>250</td>
<td>228</td>
<td>57</td>
<td>21</td>
</tr>
<tr>
<td>Chocolate or carbohydrate bar</td>
<td>43</td>
<td>3.5</td>
<td>65</td>
<td>4.5</td>
<td>60.5</td>
<td>287</td>
</tr>
<tr>
<td>Drinks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000ml Lucozade Sport in training and sipped during day</td>
<td>64</td>
<td>0</td>
<td>1080</td>
<td>1000</td>
<td>80</td>
<td>280</td>
</tr>
<tr>
<td>Water – to requirements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>396g CHO</td>
<td>115</td>
<td>Protein</td>
<td>3790g</td>
<td>3212g</td>
<td>578g</td>
<td>2248kcal</td>
</tr>
</tbody>
</table>

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FLUID BALANCE STRATEGY
The most common strategy used by lightweight athletes to manipulate body weight in the final period leading up to weigh-in is controlled dehydration. By restricting fluid intake and engaging in practices designed to promote water loss (sweat baths, sweat runs, etc…) it is possible for an athlete to significantly reduce their body weight prior to weigh-in. Essentially this allows a larger, and potentially more powerful muscle mass to be carried into the boat for racing. However, the extent, timescale and nature of this water loss must be well controlled and well rehearsed to avoid the potential for a negative performance outcome resulting from excessive dehydration.

What is a safe amount of water loss?
The question of how much water can be lost must be framed around the amount of fluid likely to be recovered in the period after weigh-in and before performance. Any athlete could potentially achieve a water deficit of several kilograms prior to weigh-in, but this would only be partially recoverable before racing, and may be compounded day by day in a regatta situation. Since it is known that performance decrement can result from a water loss of only 2% of body weight, it would be prudent to stay well within this target when planning a weigh-in strategy.
The rehearsal of a fluid balance strategy for weigh-in should therefore focus as much on the process of rehydration post weigh-in as on the period of dehydration beforehand. When engaging in controlled water loss, particular care should be taken to consider the following factors:

- Considerable variation exists in individual sweating rates. You should know your own sweat rate to ensure that a sensible amount of fluid loss is achievable without excessive effort as this might detract from the performance process (i.e. long periods in a humid bath; extended night time or early morning running). Recording dry, nude weight pre and post activity and offsetting against fluid intake can provide a reliable estimate of sweat rate.
- Fluid requirement and sweat rate will vary with climate. To ensure optimal preparation you should be aware of how your sweat rate changes with different environmental conditions (i.e. cold British winter; hot dry air, hot humid air, sunshine or cloud) and plan accordingly.
- Other stresses such as travel or major competition have the potential to alter the body’s water balance and response to the outside environment. Careful planning and good record keeping will ensure that the diligent athlete is well prepared for such eventualities.

How long should it take to ‘sweat down’?
An acute loss of a moderate amount of water can be tolerated fairly well if it is recovered in the short term. If the water deficit is not recovered there will be a gradual shift in the internal environment, resulting in fluid moving out of the cells to balance with the fluid lost from the extracellular space. This shift in fluid balance takes longer to redress than acute extracellular fluid loss. Prolonged dehydration over a period of days is therefore likely to result in, amongst other things, a loss of training quality and an inability to optimally maintain concentration. It is therefore desirable that a fluid balance strategy be contained within the period after the final training session (the day before) and up to the weigh-in.

What should I do after weigh-in?
The process of rehydration should begin immediately after weigh in is achieved. Ideally this will involve a sports drink with a moderate amount of carbohydrate (3-7%) to enhance fluid uptake and optimise carbohydrate stores, and a small amount of salt to replenish sweat losses. However, the determining factor in the foods and/or fluids consumed after weigh-in will be the ability of the gut to tolerate and ingest available foodstuffs. This will be highly individual and should be planned into your strategy:

- Since the best estimate of gut transit is around 1L of fluid per hour, we can likely expect something less than this to be achievable after weigh-in where fluid uptake has been impaired by dehydration.
and restricted food intake. In a two hour window prior to performance it is therefore likely that 1-2L of fluid will be recoverable, although this will be as variable as sweat rate and should be determined on an individual basis. Your individual **rehydration rate** should therefore set a limit on the amount of fluid lost prior to weigh-in, to ensure optimal fluid status for performance.

- Whilst full strength sports drinks (~7% CHO) are tolerable for some, experimentation may be required to find your optimal drink mix to promote rehydration during this period.
- The timing of cessation of fluid intake prior to competition will also require some planning to ensure that performance isn’t impaired by excess fluid in the gut. This will set a limit on the total fluid recoverable in the timescale after weigh-in.
- Individual rehydration rates are likely to be affected by the same issues as sweat rate, such as environmental conditions and other stresses. It is essential therefore that variation in rehydration rates resulting from these are recorded and built into the planning process.

A fluid balance strategy can significantly alter body weight prior to weigh-in to ensure optimal race weight for the lightweight athlete. With careful planning and rehearsal this can be integrated into the performance process to ensure that athletes approach competition in a robust state for optimal performance.