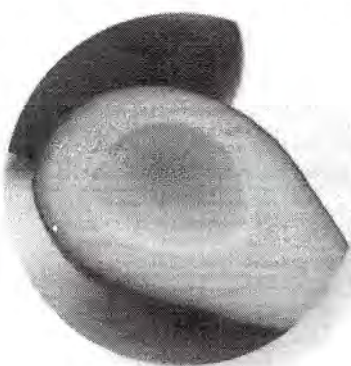


NUTRITION FOR THE SERIOUS YOUNG ATHLETE – THE PRACTICAL APPROACH



by Jane Griffin BSc RD RNutr

Children and adolescents have dietary requirements that are different from adults and those involved in sport at a competitive level are set apart even from other youngsters when considering the practical aspects of their diet. Underlying principles of the diet remain the same but lifestyle and the demands of training together with the requirements of the sport itself will necessitate some dietary modifications. A variety of different methods of collecting dietary data can be used to evaluate existing diets and eating patterns. Similarly the way that practical, workable advice can be given based on the data collected will vary depending on a number of factors including frequency of contact time, how much contact time is face-to-face and particular living situations such as living at home, boarding school, attending local college or away at university. Lifestyle issues can also hinder the development of the right diet, particularly if time management skills are poorly developed. However young athletes may encounter problems which they have no control over, such as inappropriate school meals, excessive travel time to training sessions straight after school and financial constraints on the amount that can be spent on extra food.

ENERGY REQUIREMENTS

Childhood and adolescence are times of rapid growth and development with parallel increases in nutritional requirements. Because of the demands of growth, children require a higher energy intake than adults at comparable weights. Absolute energy needs for growth are higher during adolescence than in childhood years (see Box 1).

Added to the estimate average requirements (EAR) for energy will be the extra energy cost of exercise in serious young athletes. A simple method of calculating total daily energy requirements is based on the Physical Activity Level (PAL) (1) where an assumption of the energy demands at school/college and during the rest of the day is made and using the basal metabolic rate (BMR) estimated average energy requirements can be calculated. A higher PAL value indicates a higher physical activity level (see Boxes 2 and 3).

Poor energy intakes that do not match

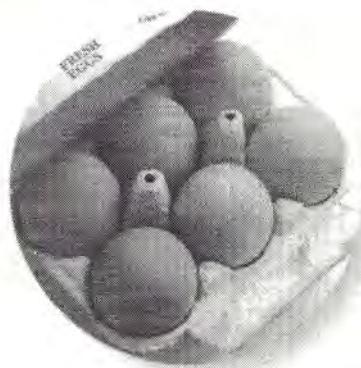
requirements over a significant period of time can result in growth retardation, delayed puberty, poor bone health and increased incidence of injuries – and of course poor performance in training and competition or matches.

ADEQUATE FUEL

Carbohydrate and fat are both used as fuel sources but during prolonged exercise there is a preference for fat metabolism in children and a shift towards a preference for carbohydrate in adolescents. To sustain training over a number of months, children still depend on adequate carbohydrate stores to be present. There is certainly no evidence that fat intake should be more than 30% of total energy intake in children or adolescents. All serious young athletes need to be encouraged to refuel with suitable carbohydrate rich foods and fluids after all training sessions and competitions or matches. Poor eating habits such as regularly missing breakfast, frequent, inappropriate snacking (as opposed to refuelling) and

BOX 1: ESTIMATED AVERAGE REQUIREMENTS (EARS) FOR ENERGY (KCAL/D) (1)

Age in years	males	females
7-10	1970	1740
11-14	2220	1845
15-18	2755	2110
19-50	2550	1940



high intakes of fast or take-away foods are all indicators that fuel intakes may not be ideal in quality or quantity.

PROTEIN REQUIREMENTS

Children and adolescents have slightly higher protein requirements than sedentary adults. As the protein requirements of adult athletes are higher than those of sedentary adults, it is possible that those of young athletes might also be higher than their less active peers. Protein intakes have to meet the requirements of growth, development and the needs of the sport. However there are no published studies of young athletes' protein requirements and specific recommendations cannot be made. Muscle growth comes from consuming a diet containing sufficient energy, protein and other essential nutrients, a well-planned training programme and sufficient rest and recovery time. It also comes from physical maturity, the stage of development when hormones are released in sufficient amounts to stimulate muscle growth. It can generally be assumed that if energy requirements are being met and the diet contains a reasonable selection of foods including good sources of protein, the intake of protein will be sufficient to meet demands.

FLUID REPLACEMENT

Serious young athletes are high risk candidates for dehydration. This is because they are not as efficient at thermoregulation and are more susceptible to heat stress than adults. Children are especially at risk as they are poor at coping with extremes of environmental temperature, sweat less, get hotter during exercise, have a lower heart output and a greater surface area for their weight. Certain conditions can make things worse

eg. protective clothing required in some sports can reduce the ability to cool down. Young swimmers, because they are already wet, often do not realise how much fluid they are losing through sweating, compared to say a tennis or netball player. The temperature and humidity of many swimming pools does not help the situation.

Coaches, teachers and parents can be a great help by checking to make sure all young athletes have their own drinks

bottle (containing an appropriate fluid) before the start of all training sessions and competitions. Children do not instinctively or voluntarily replace fluid losses during exercise and yet they are at greater risk of dehydration than adults. Coaches and parents should remind children to drink frequently - ideally to a schedule of every 15 to 20 minutes, perhaps more frequently in warm/hot weather. Children should be allowed to drink until they feel their thirst has been quenched and then encouraged to drink

BOX 2: ESTIMATED AVERAGE REQUIREMENT ACCORDING TO BODY WEIGHT AND PHYSICAL ACTIVITY LEVEL (KCAL/D) FOR FEMALES AGED 10-18 YEARS(1)

Bodyweight (kg)	BMR (kcal)	PAL=1.6	PAL=1.8	PAL=2.0
30	1095	1752	1971	2190
35	1162	1859	2092	2324
40	1229	1966	2212	2458
45	1295	2072	2331	2590
50	1362	2179	2452	2724
55	1429	2286	2572	2858
60	1496	2394	2693	2992

BOX 3: ESTIMATED AVERAGE REQUIREMENT ACCORDING TO BODY WEIGHT AND PHYSICAL ACTIVITY LEVEL (KCAL/D) FOR MALES AGED 10-18 YEARS (1)

Bodyweight (kg)	BMR (kcal)	PAL=1.6	PAL=1.8	PAL=2.0
30	1188	1901	2138	2376
35	1276	2042	2297	2552
40	1365	2184	2457	2730
45	1453	2325	2615	2906
50	1542	2467	2776	3084
55	1630	2608	2934	3260
60	1718	2749	3092	3436
65	1807	2891	3253	3614

some more. This is because their thirst mechanism is poorly developed. Young athletes who are particularly irritable at the end of a training session should have their fluid intake monitored to assess how much they fluid they do generally drink. Fluids intakes can be improved by flavouring the drink and by adding sodium chloride and carbohydrate in the amounts that are typically found in sports drinks.

WORKING WITH SERIOUS YOUNG ATHLETES

Different methods of collecting dietary information can be used depending on the time available and the frequency that the athletes are seen. Two different approaches are described here.

Rugby Football League

An annual national training camp is held in October for under 14, under 15 and under 16 rugby league players (the best in the country in their respective age groups). Prior to the camp each player is sent a general questionnaire, a 7-day food diary and a supplement questionnaire which are then assessed prior to the camp. The dietary questionnaire highlights problems or potential problems such as do they always eat when hungry or do they put off eating if they are busy. Players who are struggling to gain weight invariably fall into the latter group. From the supplement questionnaire it is possible to check what, if anything, they are using (hopefully nothing), who recommended they use the product and why they are using it. The food diary can provide a lot of information if it has been kept well i.e. if it looks as if everything has been recorded over the week. Evidence of dried food and spills on the diary is actually an encouraging sign! From the diary it should be possible to assess what has been eaten and drunk on a daily basis:-

- Number of meals and snacks or refuellers
- Number of portions of fruit and vegetables
- Number of portions of dairy foods
- Number of portions of meat, chicken, fish, eggs
- Number of portions of pasta, bread, cereals
- Number of portions of iron-rich foods
- Amount of water, squash, cola and

Home-made sports drink 1

- 500ml unsweetened fruit juice (e.g. orange, pineapple or grapefruit)
 - 500ml water
 - 1 large pinch of salt (1.0-1.5g or 1/5 teaspoon)
- Dissolve the salt in a little warmed of the water which has been warmed.
- Add the fruit juice and remaining water (not warmed).
- Mix together, cover and keep chilled in the fridge.

Home-made sports drink 2

- 200 ml squash (any flavour but not low sugar or no added sugar varieties)
 - Make up to 1 litre with water
 - 1 large pinch of salt (1.0-1.5g or 1/5 teaspoon)
- Dissolve the salt in a little warm water.
- Add the squash and than make up to 1 litre with cool water.
- Mix together, cover and keep chilled in the fridge.

other soft drinks

- Amount of sports and energy drinks
- Hours of sleep and rest

The major areas that usually need to be addressed include frequency of putting off eating, lack of consistency across the

week, variation in eating pattern and food types between weekdays and weekends and variable intakes of dairy foods, fruit and vegetables. The vast majority of players do now seem to eat plenty of carbohydrate-rich foods and enough protein-rich foods. However refuelling after training is not always ideal nor is fluid intake in terms of both what is drunk and the amount. Surprisingly, but reassuringly, supplement usage is not an issue. Most players get plenty of sleep but little rest time is recorded. The information is used in two ways at the camp. A presentation of the diary findings is given to all the parents when they drop their sons off at the start of the camp. This covers the main findings and key changes that need to be made. At the camp each player gets a chart showing the number of meals and portions etc they had each day together with a report highlighting good points and then bad points and practical ways they can improve things. Time is at a premium at the camp and it is not possible to see every player individually there are 40 in each age group. However when the diaries are assessed each player is put into a green, amber or red group. Those in the 'red' group are seen individually during the camp, 'amber' players

with similar problem areas are seen in small groups and 'green' players are not seen at all unless they request it. This system seems to work well given the numbers and the minimal individual contact time that is possible. Each age group also gets two educational sessions at the camp as well as a practical session on fluids.

England Rugby Academy at a Premiership Club

The England Rugby Academy structure operates at three levels. Level 1 is a National Academy for a select group of up to 60 players mainly in age groups U19-U24. However for the majority of time they are based at their Premiership clubs. Level 2 includes the network of regional academies each of which serves a discreet geographical area of the country and supports the development of up to 300 young athletes in age groups U16-U21. Level 3 is concerned with establishing a comprehensive programme of talent search and player development. The author works on a one-day a week basis with level 1 and 2 players based full-time at one Premiership club. This involves both educational and practical sessions. It is the aim that each player should be able to put into practice the theory they have learnt in the educational part of the programme. Practical sessions take place in supermarkets and in the players' kitchens (the majority live in Academy

houses owned/rented by the club). Some work can be done at the club such as a brainstorming sessions on how many different meals they can think up using lean mince or chicken breasts. At the end of the programme players should be able to:

- Plan and shop for a week on their budget to meet their nutritional requirements and their personal preferences (ie. enjoy what they are eating)
- Prepare all the meals so they satisfy their nutritional requirements, taking into account cooking methods as well as the foods/ingredients used in the meals
- Demonstrate safety and hygiene in the kitchen, particularly how different types of food should be stored in cupboards, fridge and freezer
- Identify inappropriate ingredients in a recipe and make suitable substitutes
- Identify basic foods which should be stored in the kitchen so that appropriate meals can always be prepared.
- Identify basic cooking equipment which should be in the kitchen and how to use it safely.

Individual monitoring

At the beginning of pre-season training each academy player is seen individually for a consultation using a nutritional assessment form designed by the author for use with this particular group. It includes the following sections:

- General information (name, date of birth, position etc)
- Medical information (problems, medication, susceptible to colds etc)
- Anthropometric information, including any personal goals (gain muscle, lose body fat etc)
- Lifestyle information (living situation, cooking skills, alcohol intake, sleep pattern)
- Dietary information
- Food likes, dislikes and any foods which they avoid (and why)
- Eating patterns
- Any history of diet-related problems (eg. allergies)
- Typical food intake on training days and rest days and timing in relation to training
- Typical food intake on the day before, day of and day after matches and timing in relation to the match
- Fluid information (what and approximate amount)
- Fluids at home

- Fluids during training
- Fluids around matches
- Typical sweat losses in training and matches
- Peeing habits (frequency, volume and colour)
- Problem areas (eg. fatigue, cramp heavy legs, stiff joints)
- How they rate their diet
- Any specific questions on diet and nutrition generally and relating to sporting performance.

Food diaries

Food diaries can be very useful tools, particularly for monitoring changes and for educational purposes. Diaries only give an indication of the type of foods and fluids consumed and when they are consumed (particularly in relation to training and matches). Any analysis of the data by computer programme must not be considered as an accurate assessment of nutritional intake. There are too many inaccuracies and assumptions. However, it can be a worthwhile exercise to keep a qualitative rather than a quantitative diary (for 3, 5 or 7 days) to gain insight into what and when players eat and drink on training days, rest days and on pre-match and match days. An initial diary, followed by diaries kept at appropriate times once the educational and practical programmes are underway, gives an insight into the changes that are being implemented as a result of the learning processes. Feedback to players on a one to one basis must be carried out as soon as possible after the diary has been kept. This includes talking through the written report and its recommendations and ensuring the player understands what changes need to be made and why they must be implemented. The player must be comfortable with the suggestions and know how he will follow them.

CONCLUSION

Serious young athletes need sound, practical advice if they are to follow the type of diet that will support their training and competition programme while ensuring that they grow and develop healthily into serious adult athletes. Ideally this advice should be backed up by educational sessions so that the young athlete understands why their diet will be different from their less sporty friends. Advice should be provided in a practical and workable form taking into account their individual living situation, their growth and development as well as the nutritional requirements of their sport. Different approaches will be needed in different situations. This article describes two such approaches.

THE AUTHOR

Jane Griffin qualified from London University with a degree in Nutrition and a Postgraduate Diploma in Dietetics and is an Accredited Sports Dietitian. She is currently the Sports Dietitian to London Irish RFC (having previously worked with NEC Harlequins for three seasons) and at the Rugby Football League. She is also the sports dietitian to London Irish, London Wasps and NEC Harlequins England Rugby Academies. She has written extensively for a wide range of sports magazines and her first book Food for Sport ('Eat Well, Perform Better') was published by The Crowood Press in September 2001. Her second book 'Nutrition for Marathon Running' was published in August 2005 and she is currently writing her third book 'Food for Rugby'.

References

1. Department of Health (DH). Dietary Reference Values for Food Energy and Nutrients for the United Kingdom. Report of the Panel on Dietary Reference Values of the Committee on Medical Aspects of Food Policy. Report on Public Health and Social Subjects 41. London: HMSO, 1991

