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The Parent's thoughts

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Proper body nutrition and hydration is a vital matter to all of us. A tennis player, like any other sports person, requires more sources of energy for the intensity of training and actual play. It's worth to be knowledgeable about the principles for creating a diet that can stimulate your body and help increase its capacities for physical activity as well as recovery.

Diet

Each body has distinctive characteristics and so each diet is different, also in cultural terms. Learning about yourself, your body, and metabolism pays off during a sports career and afterwards, and the habits you work out make you enjoy a longer, healthier life.

Because of its significance, diet, as well as more widely understood physical culture, ought to become a mandatory subject in the education of young people.

1. Let's think about energy first.

Einstein did not have to observe the Universe to notice the relationship between mass and energy. In our dietary context this mass is the amount of consumed meals turned into energy, built new cells, or used for cell recovery.

To maintain our life functions, we need energy to sustain the so-called resting metabolism abbreviated as RMR (Resting Metabolic Rate). Energy needs of a young man can be calculated with the following formula: $RMR = \text{body weight} \times 17.5 + 651$. So for a young athlete weighing 50 kg the calculation would be $50 \times 17.5 + 651 = 1526$ kcal. Now you also have to add the number of calories used for everyday activity and sport.

Physical activity may come in different forms and it obviously may translate to very individual calorific needs, but it can be generalized that:

- a walk is 80 kcal/km,
- a relaxing, breaststroke swim is 18 kcal/min,
- a medium-intensive tennis training session is 400 kcal/h, etc.

It is good to identify the number of calories your body burns during average activities by taking into account your age and weight. You can do it e.g. by devices such as Polar, which in connection with special applications such as MyFitnessPal provides you with such data. A professional tennis player should spend 4 to 6 hours daily at the court, the gym, and fitness room. During this time s/he will burn additional 2000 kcal or even more. If it is a young body, still developing, then besides calories it essentially needs the right proportions of products conducive to cell formation. Therefore, a young sports person aged 15 and weighing 50 kg should get 3000-3500 kcal during average daily food intake. It is quite difficult to arrive at these values with large amounts of physical exercise and the need to eat quite a lot of vegetables as they supply less calories.

2. Calories are provided with food products with the following energy-source nutrients:

- carbohydrates – 4 kcal/g
- proteins – 4 kcal/g
- alcohol – 7 kcal/g
- fats – 9 kcal/g

In order not to overload the head with information, it is enough only to be aware what these nutrients are responsible for:

- Carbohydrates – they provide energy of which a quarter is stored in the liver for maintaining life function and three fourths in muscles; part of glucose that is formed during digestion is present in the blood flow and in the brain.
- Proteins – their main function is to act as a building material for cells.
- Alcohol – it is first to be burnt by the body, so it hampers the burning of glucose from blood and, consequentially, increases fat storage; blood glucose level should remain stable; changing glucose levels are undesirable and a sudden, big increase may make the pancreas change the insulin it produces into fat.

- Fat – it is energy storage mostly for carbohydrates (glucose) that have not been burnt.

3. The next issues it is good to be aware of are the **proportions of individual nutrients**, the times of day they need to be consumed, and a few simple rules based on understanding of your body needs.

- 60% - every meal should provide that much carbohydrates = $3000 \text{ kcal} \times 60\% : 4 \text{ kcal/g} = 450$ grams per day – this is the energy for regular daily use, its excess will turn to fat and its shortage may lead to protein consumption and worse recovery, even muscular dystrophy.
- 15-30% of food is fat = $3000 \text{ kcal} \times 25\% : 9 \text{ kcal/g} = 83$ grams per day – they are the biggest source of calories and enable absorption of some vitamins, so they are quite vital, and saying colloquially that someone has “zero fat” is incorrect and inadvisable.
- 12-15% protein = $3000 \text{ kcal} \times 15\% : 4 \text{ kcal/g} = 113$ grams per day – for building and rebuilding cells, protein excess is not

dangerous and it will be digested just as carbohydrates.

The calorific values of products and the percentage of nutrients per gram are today displayed on every product label. Nutritional information is easily accessible on the internet, e.g. 3 scrambled eggs with bacon is approx. 400 kcal and they contain:

- 4 grams of carbs $\times 4 \text{ kcal} = 16 \text{ kcal}$
- 32 grams of fat $\times 9 \text{ kcal} = 288 \text{ kcal}$
- 24 grams of protein $\times 4 \text{ kcal} = 96 \text{ kcal}$

A little effort or a visit to a dietician and you may easily establish a healthy diet adequate to your needs. Initially some math is necessary, but in no time it will be clear how much, how often, and what to eat.

4. Food is not only energy but loads of other nutrients, as well, necessary for the body to function properly. What to eat and how to choose products, which besides calories need to also provide vitamins, microelements, fibre and more?

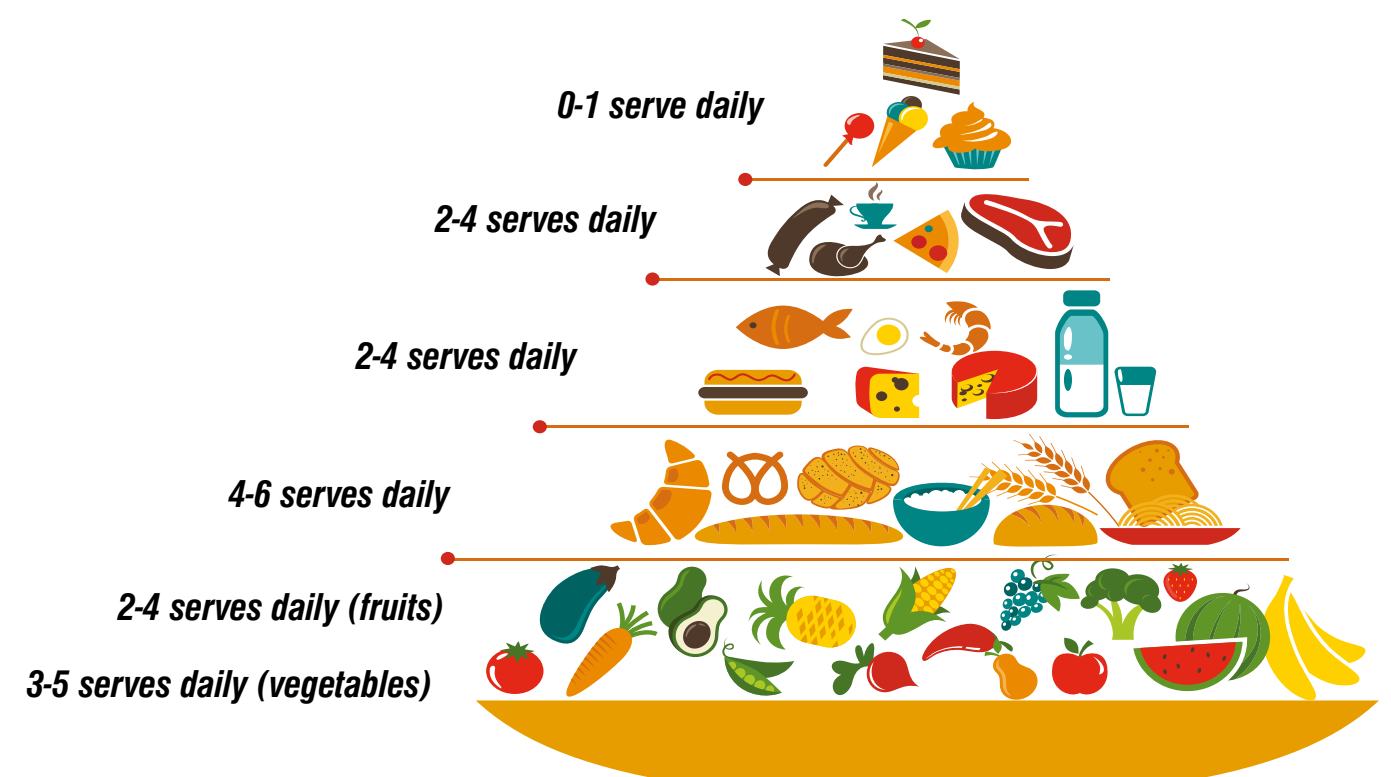
Experts have composed a food pyramid which helps to choose basic food elements. The idea behind it is diversity of grocery products:

- In the bottom of the pyramid are products which you must consume the most vegetables and fruits.

- The next level of the pyramid is foods rich in carbs.
- Above it, slightly less consumption of calcium and protein.
- Next, healthy fats, e.g. found in fish.
- The top of the pyramid are products less advised like cakes, sweets, chocolate, etc.

5. How to eat? There are many theories that attempt to answer the question depending on the aim you want to reach. Again, it is best to adapt it to one's needs and habits or to carefully modify them. It is worth remembering a few basic rules:

- right after wake-up it is good to have some water; it's zero calories, it hydrates the body and removes toxins;
- attempts not to eat breakfast to allow faster fat burning may actually end up (due to no available carbs) in burning protein necessary for cell recovery
- Ideally, breakfast should consist in more carbohydrates with low IG (glycaemic index), e.g. rye bread or muesli cereal; the reason for this is that we have to supply the body with fuel for the coming training session, because the larger part should already be “loaded”



in the muscles; it is good to eat 2 hours before training, because after digestion glucose can reach the blood flow and next muscles; ***the whole process of filling up the body with carbohydrates, which are later transformed into glucose and glycogen, takes up around 20 hours***, so it is a whole-day process.

- Faster carbohydrates doses with high IG means that glucose enters the blood faster, and it is advisable to provide these during and right after physical activity, e.g. a ripe banana,
- Meals with higher IG are not recommended during later parts of the day and evening, because they cause large glucose fluctuations in the bloodstream, which should be avoided.
- A dinner should contain all nutrients, i.e. carbohydrates, proteins as well as fats, preferably the healthy ones.
- Generally the most unhealthy fats are those have solid forms such as butter, margarine, lard, etc.
- The healthiest fats are those supplied with oily fish such as salmon, nuts or grapefruit.
- Sometime after dinner comes another, evening training and hydration.
- Afterwards, it's good to have a snack rich in carbs and proteins; carbohydrates replenish their the daily amount and restore them in the liver and muscles, and protein to help with the recovery of damaged cells; ***a protein-carb mix is the most desirable type of meal after an intensive training session.***
- Energetic snacks will help with intense workout strain mainly by sending out information to the nervous system telling it not to slow down the metabolism in a reaction to depleting energy storage; ***the minimal time for glucose to reach the bloodstream is 30 minutes.***
- do not eat products that contain sugar, this includes having fructose (fruit) before sleep, because they raise the level of glucose for the night.

6. Hydration. Body hydration is indispensable before, during and after training.

- In hot weather water loss may reach the level of 1 litre per hour. This requires having even more liquids.

Recovery of a body exposed to a lot of physical stress should be just as important for a sports person as intensive training

- Sweating is a reaction to producing large amounts of heat by the body. Energy from metabolism is utilized by the body only in roughly in 20% while the rest of it is turned into thermal energy.
- When it's hot outside, it is better to drink only water and when it is cold isotonic drinks with e.g. honey fructose help to provide carbs.

- Regular, plain water is best for hydration; drinks should generally be hypotonic drinks (8%) or isotonic (5-8%), i.e. water and sugar solutions with the right, higher or lower concentration levels.
- An example of a good isotonic drink is fruit juice with water (in 50:50 proportion) and with a pinch of salt; adding some salt to drinks helps to maintain thirst;
- Body fluids are mostly electrolytes; water alone dilutes sodium levels in blood too much and reduces thirst even when body hydration is still insufficient.
- The level of body hydration is easy to recognize by observing the colour of urine; darker colours signal poor hydration, brighter ones mean good hydration.

7. Supplementation. The amounts of calories and nutrients required by a professional athlete shows clearly that he or she would have to be a glutton to meet these levels. A young, growing body with additionally increased needs for building material is not able to cope. Furthermore, intensive

training often stops reduces appetite. At this point, supplementation may seem as almost a necessity. It is an individual and controversial matter.

I am not in favour of supplementation.

- There is too little complementary research on its effects.
- It is legal but unlike strictly medical products, dietary supplements are not subject to control regimes.
- Taking the risks connected with supplements intake is an athlete's responsibility.
- There is no guarantee they are free from prohibited substances.

Differing opinions on supplementation is another discouraging factor:

- providing proteins may lead to their excess and it is not really sure whether this may put strain on the liver and kidneys.
- Calories supplied in excess in the forms of energy bars or sports cocktails may increase blood glucose level and strain the pancreas, which produces insulin; a possible insulin deficiency with glucose not changed into fat is very dangerous for

cells, especially for some organs such as eyes.

The aim is to maintain a stable glucose level in blood and to regularly provide considerable doses of proteins of around 1.8-2.0 grams per 1 kg of body weight and possibly more with more intensive exercise.

I believe it is safer to supply these nutrients often and in small amounts and think about which products are easier to consume and absorb, e.g.:

- Banana-orange based cocktails,
- Dried dates with high IG index,
- Nuts and dried fruit – a handful at a time,
- A wheat bread roll with cottage cheese and jam,
- Isotonic and energy drinks, e.g. water with honey and lemon or fruit juices.

Building a habit of eating often and healthy should be more than enough. It is better to ensure proper oxygenation, large amounts of blood haemoglobin responsible for transporting oxygen to cells, and hydration in order to take load off the heart, because mere consumption with no proper metabolism won't help or it will bring as many positives as negatives.

8. One Polish saying goes: ***"Eat breakfast alone, dinner with a friend, and give your supper to your enemy"***

It is interpreted the following way: you should eat a lot in the morning to replenish energy for the whole day and in the evening reduce consumption, because if you provide energy while activity is low, it will be stored in body fat.

But there can be another, complementary interpretation.

Your body cells continuously get damaged, die out, regenerate, and form.

So do our organs including those responsible for metabolism like the liver, pancreas or kidneys.

Just like the heart, these organs sometimes need to slow down and rest, and instead of working all night at full bore, they should rather regenerate.

9. Proper energy management is one of the essentials of modern professional sport. This is why Novak Djokovic has passionately written a book titled "Serve to Win".

Highly recommended, it says nothing about serving :). It is entirely devoted to diet and in his

case it is gluten-free. The knowledge and experience he offers in the book may greatly help those with poor gluten tolerance.

This does not concern us.

10. Of course food is not only energy and building material, there are also ***ingredients which regulate bodily processes***, hormone balance, etc. It is worthwhile to know some of the beneficial effects of various products:

- Vitamin C in dosage of above 1000 mg restores an athlete's immune system weakened after an intensive workout.
- Manuka honey further supports the immune system.
- Grapes improve removal of lactic acid.
- Dried plums eaten after dinner improve peristalsis of the intestines.
- Iron present in e.g. spinach or red meat increases the number of red blood cells and blood transport.
- A tomato has strong antioxidant properties which eliminate carcinogenic free radicals.
- With headaches, it's good to dilute blood by drinking a lot of water and support the process with taking a hot shower; this is particularly advisable in the case of migraine.

Many more examples of advantageous food products could be listed. How they impact our bodies is a very individual matter.

One of my friends, a Hindu man, asked me one day if I had thanked my feet the day before for taking me where I wanted all day. I chuckled, but after more thought it dawned on me that there was a certain truth embedded in the question.

Mindfully observe yourself, your feet, and every other part of your body and care about your organs.

They are always with you and they send out a lot of signals.

The ability to observe yourself may well pay off in the context nutrition.

As usual, my aim is not to describe all processes and analyse them scientifically, but it's rather to point to the nature and complexity of the issue, yet another vital problem in the training of a professional sports person.

